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pruned. Apple, pear, plum, and cherry trees from 1 to 10 years of age will produce more fruit if given no pruning. Peach trees need pruning more than other fruit trees. Heading back is necessary to prevent tall, leggy growth and to maintain a large bearing area.

Q. Is spraying necessary?
A. Spray 3 or 4 times each season to protect the tree and fruit from the damage of insects and diseases. For spray information, see your county agent.

Q. What spray equipment is needed?
A. A barrel spray pump or a bucket pump.

Q. What is the best time to plant fruit trees?
A. In the early spring or late fall.

Q. What varieties? How many trees?
A. *Apples,* 5 to 8 trees, Transparent, Wealthy, Yellow Delicious, Grimes, Rome, or Stayman variety, all resistant to apple scab. *Peaches,* 3 to 6 trees, Carman, Belle of Georgia, Hale Haven, or July Heath variety. *Pears,* 2 Kieffer trees. *Cherries,* 2 Montmorency trees. An orchard too large is frequently neglected.

Q. Is it desirable to cultivate and intercrop young fruit trees?
A. They do better if cultivated. Tobacco or vegetables are satisfactory intercrops. Broadcast manure around the trees each year.

Q. Where should trees be obtained?
A. From any established nursery. Varieties sold by tree peddlers too often are not well chosen.

Q. Should a temporary tenant plant a fruit garden?
A. Most land owners want the tenant to make farm improvements and probably will buy plants and trees for him if requested to do so. The tenant that "raises" a good living moves less frequently and is usually a better citizen.



THIS FOLDER is given to you by _____ who has voluntarily agreed to bring this and other important war information to families in your neighborhood.

200M—1-43

Grow Fruits and Berries for Home Use

By W. W. Magill

THOUGH you may have the money to buy fresh and canned fruits and berries this year, you may be unable to get them. Shipments abroad to meet requirements of the war program limit the supply and sometimes use it up entirely. Your family may lack these necessary health foods unless you grow them in your own fruit garden.

The questions and answers in this leaflet give some essentials for growing fruit and berries for home use.

Strawberries

Q. Why plant strawberries?
A. They are generally liked; are easy to grow; require little space in the garden; ripen earlier than any other similar crop; and seldom fail to bear.

Q. How many plants are needed?
A. Two hundred plants should produce next year 25 gallons, enough berries for the average family.

Q. What is the best variety?
A. Blakemore.

Q. Are everbearing varieties successful in Kentucky?
A. No.

Q. Where should strawberries be planted?
A. In the garden or on any fertile land used last year to produce a cultivated crop.

Q. When should plants be set?
A. Late March or early April.

Leaflet 1

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*
Lexington, Kentucky January, 1943

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Q. How should plants be set?
A. Place them 2 feet apart in rows 4 feet apart. Set the base of the crown just level with the surface of the soil.

Q. Will it pay to use fertilizer?
A. Use 25 pounds of superphosphate for 200 plants.

Q. What culture is needed?
A. Frequent shallow cultivation from May to August and sufficient hoeing to remove weeds. Keep blossoms picked during the first spring so runners will form early.

Q. Where should plants be obtained?
A. From a nursery or from a neighbor. Bought in small quantities, one cent per plant is a fair price.

Q. What growth will appear the first summer?
A. On each plant 20 to 30 runners during June and July. They will bear fruit the following spring.

Q. Should plants be mulched during winter?
A. Apply in December a 2-inch mulch of strawy material.

Q. May plants be dug from a bed one year old?
A. Yes. Enlarge your bed with them.

Grapes

Q. What is the best general purpose variety?
A. Concord.

Q. How should grapes be planted?
A. Plant them in early spring, 10 feet apart in rows 8 feet apart.

Q. What is the best way to train the vines?
A. Use a two-wire trellis with the first wire 3 feet above the ground and the second, 2 feet above the first. Old, tangled vines rarely can be trained in this way. Keep them as they are until new vines begin to bear grapes.

Q. Is pruning necessary?
A. Cut new growth on tangled vines back to 2 buds; trained vines to 6 buds. Prune in February.

Q. Should grapes be cultivated?
A. Cultivate young vines until they begin to bear, then, if desired, seed to a cover crop of lespedeza.

Q. Do grape vines need feeding?
A. Use a liberal annual application of manure.

Q. What makes grapes rot?
A. A disease known as Black Rot. Control by spraying at 2-week intervals with bordeaux mixture, beginning when first leaves expand, and continuing until 3 sprays have been applied.

Q. What is a good yield of grapes?
A. A vine should produce a peck; 8 to 10 should supply the family.

Q. How long will grapes continue to bear?
A. If properly pruned and fertilized they will bear for a generation.

Bramble Fruits

Q. What fruits are in this group?
A. Raspberries, blackberries, dewberries, and Boysenberries.

Q. How many plants are needed for home use?
A. Usually 50 plants of each kind are sufficient. Families that prefer only one or two kinds of bramble fruit need more plants of each kind.

Q. What varieties succeed best?
A. Latham red raspberry, Cumberland black raspberry, Eldorado blackberry, and Lucretia dewberry.

Q. Is pruning necessary?
A. When young shoots of black raspberry and blackberry are 18 to 24 inches tall, pinch out their tops. In February or early March, cut side branches of red and black raspberries and blackberries back to about 10 inches and head top to about 4 feet; lift vines of dewberries and Boysenberries from the ground, twist the vines of each variety together and tie them to a stake or wire trellis. After harvest, cut off near the ground old fruiting canes of all brambles and burn them. This stimulates the growth of the new canes and also helps to control diseases.

Q. Do brambles need winter protection?
A. Protect dewberry and Boysenberry canes from severe winter weather by covering them with a straw mulch while they lie on the ground.

Fruit Trees

Q. Why do old trees fail to bear?
A. The chief cause is nitrogen starvation. Liberal use of manure, especially poultry manure, increases the yield of fruit.

Q. Is pruning necessary?
A. Many home orchards have been greatly over-

RECORD

Name _____

Address _____

County_____ Age___ Years in Club work___

Leader _____

Date chicks were started _____

Number chicks started_____

Number chicks raised to market age _____

Number of pullets for winter layers _____

Fill in items below as of October 1.

Costs		Receipts	
Chicks	$_____	Sales of meat ...	$_____
Fuel	_____	Chickens on hand	_____
Starting mash ...	_____	Chickens eaten ..	_____
Grain	_____	Chickens canned.	_____
Total	_____	Total	_____

Gain or loss .....

After your record is finished, turn it in to your leader or County Agent.

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

100M—1-43

Poultry Brooding

★ ★ for 4-H Clubs ★ ★

Kentucky Agricultural Library

FOOD is no less a weapon than tanks, guns, and planes. As the power of our enemies decreases, the importance of the food resources of the United Nations increases. With this thought in mind, we must further mobilize our resources for the production of food.

—President Roosevelt

Leaflet 2

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky January, 1943

Poultry Brooding for 4-H Clubs

Chickens raised this year by 4-H Club members in their brooding project will be an important help in producing the food needed by our country. More eggs, more poultry meat, more pullets to add to the laying flocks are needed now than at any other time in our history. This is one important way that 4-H boys and girls are helping in the war effort.

Requirements

1. Fifty or more chicks make a standard project. However, if brooder house and equipment is suitable for a larger flock, plan to raise the larger number. The full use of all equipment is important this year when our country needs more food.
2. Keep a record of this project. Turn it in to your leader early in October. Use the record on page 4 of this leaflet.

Equipment

1. Use present buildings or those made from materials on hand on the farm.
2. Provide ample equipment. For 50 to 75 chicks you will need: 2 1-quart jars with "star tops" for milk and water, and 2 feeders, each 2 feet long, 2 inches deep and 6 inches wide.
3. Clean and disinfect thoroughly both house and equipment and check lighting and ventilation arrangement.
4. If no equipment is on hand make a lantern brooder from material to be found around the farm. For plans see Ext. Cir. 358.
5. Operate the brooder a day or so before chicks arrive, to be sure it is serviceable and will provide proper heat.

Chicks

1. Obtain chicks from a reliable hatchery.
2. Choose chicks of a general purpose breed, such as Rocks, Rhode Island Reds, and New Hampshires.
3. Start chicks early. From March 1 to April 15 is the best starting time.

4. Have water, feed, litter, and heat ready for chicks when they arrive. Dry sand only is used for litter in lantern brooders.
5. Do not overheat chicks or allow them to become chilled.
6. Do not crowd too many chicks into small brooder space.
7. If possible keep chicks off the ground. Provide wire runs or sun porches with wire bottoms for them.
8. As soon as the chicks will use the sun porch, place feed and water in it rather than in the brooder house. Hang old feed sacks on the windward side of sun porch to make it more comfortable.
9. Use movable range shelters to keep growing pullets on clean ground and away from the laying flock.

Buying and Marketing

1. Hatcheries, farm bureaus and organizations interested in 4-H Club work will assist you in starting poultry brooding projects this year. See your county agent or leader about this help.
2. If chicks are furnished, find out when you can get them, and on what terms. If later you are to pay for them, as well as their feed, with poultry meat, find out how much is required. Get all the details.
3. If you buy chicks, get them early for best results. Although you must give early chicks careful attention you can make larger profits on them and produce pullets in time for winter layers.
4. Buy chicks rather than hatch them with hens.
5. Feed broilers abundantly. Sell them when they weigh about 3 pounds.

Feed

1. Use commercial starting mash. Follow feeding directions given by the manufacturer.
2. When the chicks are 4 to 5 weeks old begin self-feeding a 32-percent commercial supplement and grain in separate hoppers. Or self-feed yellow corn, soybean oil meal with two pounds of salt added to each 100 pounds, and bone meal. Feed each in separate hopper.
3. Provide ample green pasture at all times.

How to Keep the Bugs From Ruining Your Garden

For insects that eat the leaves or other parts of the plant put poison where they feed. The best poison is rotenone dust or spray. Another is a dust made by mixing 1 part calcium arsenate, or arsenate of lead, or magnesium arsenate, with 6 parts lime. Or, a wet spray may be used, 2 rounded tablespoons of any of the arsenates dissolved in 1 gallon of water. Because of danger of poisoning people, don't use the arsenates on greens, cauliflower, cabbage in head, or beans in pod. Rotenone, however, is safe on these. Except for bean beetle and cucumber beetle, begin dusting or spraying at the first sign of damage.

For sap-sucking insects (plant lice, "squash bug" and the like) use "contact poisons" that actually hit their bodies. There are two such "contact poisons"—tobacco "tea" and rotenone dust or spray. If the insects are not dead in 30 minutes after such treatment they should be dusted or sprayed again.

For the Mexican bean beetle don't wait until there are holes in the leaves, but begin dusting or spraying when the first egg-clusters are seen on the underside of the leaves, and then dust or spray again in 10 days, and perhaps in 10 days again. Dusters or sprayers with up-turned nozzles must be used, to put the material where the beetle always feeds, the undersides of the leaves, and covering should be complete.

The striped cucumber beetle, sometimes called the "melon bug," is the cause for the early death of cucumbers, melons, and squash. Dead plants have their side-roots eaten away, by worms that hatched from the beetle's eggs laid in the first soil cracks the seedlings made as they came up. Start poisoning, therefore, when the soil over the hills begins to "hump." Use rotenone, or this dust:

Calcium arsenate, 1 part by weight
Gypsum or "fiber plaster," 15 parts

Sift the dust from a loosely woven sack over the middle of the hill. Repeat the dusting every 3 days, for at least 15 times.

Protect Your Garden From Diseases

Vegetable diseases are of three kinds — "wilt," "blight," and a "general" kind that causes the crops to do poorly The last is usually a sign that rotation

has not been practiced. No vegetable should be planted where it grew last year; there should be a gap of at least one year.

Wilt dries up cabbage, tomatoes, and watermelons, and is caused by germs that live in the soil. The only way to combat it is to use resistant varieties, as *Wisconsin All Seasons* cabbage (or others the seedsmen list as "resistant"), *Break O'Day, Marglobe,* or *Rutgers* tomatoes, and *Kleckley No. 4* (or others) watermelons.

Blight may be caused by several germs, but the result is the same: the spotting and final killing of the leaves. As the germs are carried by the wind, the control is to "copper coat" the leaves, by spraying with bordeaux mixture. Start when the spotting first is seen (on the lower leaves) and repeat in 2 weeks. *Complete covering* is necessary, with a good sprayer; "splashing on" will not do.

This is an easy way to make bordeaux mixture in a garden-size amount:

1. In a stone crock, dissolve 1 lb. of bluestone in 5 quarts of water, the bluestone hung in a cloth sack so that its tip is just in the water. This is "bluestone stock."

2. In the tank (preferably brass) of a sprayer, put 9 quarts of water, 1 quart of "bluestone stock" and ¼ pound of screened lime, and if insects are present, the proper amount of any of the arsenates named under "Insect Control."

3. Close the sprayer, and shake it end-wise, 10 to 15 times. The result is 2½ gallons of 4-4-50 bordeaux.

Winter Storage

Harvest and store vegetables in late September or early October. Look well to the condition of the vegetables and to storage arrangements. Underripe vegetables will wilt, no matter how good the storage conditions. Choose mature vegetables, free from disease infection, bruises, cuts, and other wounds. Successful storage also requires proper temperature, humidity, and ventilation. Squashes, cushaws, and sweetpotatoes require a temperature of 50°; controlled ventilation ("sweating" may cause them to rot); and dry storage place. Turnips, beets, carrots, cabbage, and potatoes require a temperature between 34° and 38°, and a moist storage place.

For further information about storage see Kentucky Extension Circular 266, "Home Storage Structures and Equipment."

VICTORY GARDEN RECORD

1. Kind of garden (check below)
   Home Victory Garden ( )
   Individual Victory Garden ( )
   Special Crop Victory Garden: potatoes ( ) tomatoes ( ). If some other crop write name _____.
2. Size of garden: _____ feet long _____ feet wide.
3. How many kinds of vegetables? _____
4. Estimate total hours worked _____
5. Number of days vegetables used fresh from garden _____.
6. Bushels of Irish potatoes, cabbage, etc. stored for the winter _____.
7. Total quarts of all vegetables canned from the garden _____.
8. Amount sold from garden $_____.
9. Size of fall garden _____. Names of vegetables in it _____

Name of member _____

Town _____

County_____ Neighborhood_____

Age_____ Years in club work_____

Name of Leader_____

This leaflet was prepared by
JOHN S. GARDNER, Field Agent in Horticulture, and
E. E. FISH, Field Agent in 4-H Club Work

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director.* Issued in furtherance of the Acts of May 8 and June 30, 1914.

100M—1-43

VICTORY GARDENS

★ ★ for 4-H CLUBS ★ ★

MANY MEN in our fighting forces and in factories making war supplies formerly worked on farms and cultivated gardens. Somebody must take their place. Food is now shipped to our soldiers overseas and to our allies. To meet this need more gardens are necessary. Somebody must plan and tend them. Who will produce the food so essential now to the life of our nation?

Agricultural leaders believe that 4-H Club members will produce part of it in Victory Gardens and have prepared this leaflet to help them. When a 4-H Club member has a victory garden he supplies the family with vegetables for the table and for canning and storing, and sells those not needed for home use.

Leaflet 3

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky January, 1943

Decide Which Garden You Will Grow

For a victory garden you may have either a home garden, an individual garden, or a special-crop garden.

Home garden

Older 4-H members take complete charge of the home garden. They plan it; prepare the seed bed; plant, cultivate, spray, and harvest the vegetables for daily use, canning, storage, and sale.

Plant just enough vegetables to satisfy the family appetite: beans, peas, tomatoes, corn, cabbage, onions, beets, potatoes, greens, carrots. For fall planting add to this list: turnips, spinach, seven top, kale, mustard, and chinese cabbage.

For a family of five a home victory garden should be from ¼ to ½ acre. A plot 100 feet by 100 feet is about ¼ acre. But the way a garden is managed is more important than its size. A small garden well fertilized, properly cultivated, and full of growing crops will produce more than a much larger garden poorly planned and operated.

Individual garden

This garden may be either a plot by itself or a definite part of the family garden. In either case all the work should be done by the 4-H member. Parents or older members may help with the hard jobs such as plowing. Plant at least four of the following vegetables: beans, tomatoes, potatoes, onions, carrots, greens, cabbage. It is better to plant larger amounts of four or five commonly used vegetables than just a little of many kinds.

The size of this garden will depend on the strength and age of the club member, space available for separate garden, and use to be made of the vegetables produced (used at home or sold for market). A small garden may be 20 feet by 40 feet but a large garden one acre or more.

Special-crop garden

In this garden, 1/10 acre or more, plant either tomatoes or Irish or sweetpotatoes. Other crops such as sweet corn, beans, or root crops may prove desirable if a market for them is near by. The crop may be used at home or sold.

Plan Your Garden Early

To save time and worry later on, and to be sure of getting the things planted that you really want, make a detailed plan of your garden before the planting season comes around. Make a plan like the one shown here, on a cardboard big enough to be read easily, and tack it up where it is handy to see. Measure your garden so you will know exactly how much room you have.

The sample garden shown on this sheet should supply five persons 21 servings a week of fresh vegetables in season, and 12 servings of canned or stored vegetables, besides potatoes, each week during the rest of the year. This garden has variety, and makes double use of ground for the fall garden.

If your garden is small, make full use of it by planting late crops in rows of early crops taken out, or between the rows of crops that will be out of the way when the later crops come on. Some of the rows could be crowded a little closer than shown in the sample plan, but it doesn't pay to crowd very much.

Keep the Garden Soil Rich

Plow under stable manure, if you can get it, at the rate of 10 tons an acre. Plow about 10 inches deep. As manure by itself may cause the vegetables to "grow to top," it should be balanced by broadcasting 20-percent superphosphate, 400 pounds per acre, after breaking, working it in as the seedbed is being finished. When enough manure cannot be got, use a complete fertilizer (4-8-6 or 5-10-5) at a rate of 400 to 1,000 pounds per acre, in the same manner as just described for superphosphate.

Make a Fine, Deep Seedbed

In a good seedbed the top 3 to 6 inches of soil is as fine as the smallest seed to be sown. The right depth to sow seed is 8 times the least thickness

of the seed. There is more likelihood of planting too deep than too shallow.

Use Fresh Seed of a Good Variety

Don't risk the disappointments that come from planting poor seed; unless you know it is good, don't plant it. The variety should be suited to Kentucky's climate, and the seed should be fresh, to insure a good stand. In Kentucky seed sold in lots of 1 pound or more must bear official state tags stating the true varietal name, the percent of germination, and the year in which the seed was grown.

Keep the Weeds Out

The reason for cultivating a garden is to stop the weeds, not merely to loosen the soil. In fact, deep working and chopping with a hoe, even in the middles of the rows, can do serious damage to the roots.

Weeds can be stopped easiest when they are small, before they rob the vegetables of plant food and moisture. They can be *scraped off* with a sharp hoe or with the scuffle-hoe attachment of a garden plow, without digging deep into the soil. If a horse cultivator is used, the 16-tooth cultivator is best.

Keep the surface of the garden smooth at all times; don't make hills and ridges. It takes extra work to make them, and in scraping soil away from the middles of the rows to make the ridges you rob the vegetables of valuable moisture and sometimes ruin part of the roots.

White Potatoes

This garden plan takes for granted that 1,500 to 2,000 feet of row of potatoes will be grown in a separate patch, outside the garden. But if the potatoes must be grown in the vegetable garden, one way to have them and still not have to do without the other vegetables, is to plant them early (before April 10) in rows 3 feet apart, and then between June 15 and July 15, to plant late tomatoes, late sweet corn, late beans, late cabbage, between the potato rows.

SAMPLE GARDEN PLAN for a FAMILY OF FIVE

(Recommended varieties, when to plant, and planting distances; the heavy border represents the boundary of the 100 ft. x 100 ft. garden)

WHEN to plant	Feet between rows	WHAT and HOW MUCH to plant (rows 100 ft. long)
(Perennial)	2	ASPARAGUS *(Martha Washington)*, 2 ft. apart in the row
	4	ASPARAGUS *(Martha Washington)*, 60 ft. —— RHUBARB *(Victoria)*, 40 ft., 3 ft. apart
March 15 to April 1	3	PARSNIPS *(Guernsey)*, 75 ft., thinned to 2" in row —— SWISS CHARD *(Lucullus)*, 25 ft.
	2½	PEAS *(Alaska)*, 1½ lb. seed sown 1 to 2 inches apart
	2½	PEAS *(Telephone)*
	2	LETTUCE *(Wonderful, Grand Rapids)*, 30 ft. —— RADISHES *(White Tip Scarlet)*, 70 ft. 2 plantings
	2	MUSTARD *(Southern Curled)*, 50 ft. —— SPINACH *(Bloomsdale)*, 50 ft.
	2½	CABBAGE *(Golden Acre)*, 100 plants
	2½	CABBAGE *(Succession, Copenhagen,* or *Wisconsin All Seasons)*, 100 plants
April 1 to April 15	2	ONIONS *(Yellow sets)*, 1 gallon of sets planted 2 to 3 inches apart
	2	BEETS *(Crosby's Egyptian)*, 2 oz. seed; thin to 3 inches
	2	CARROTS *(Chantenay)*, 1 oz. seed; thin to 2 inches
	2½	BEANS *(Valentine)*, 50 feet, 1 lb. seed; *Henderson Bush* lima, 50 ft., 1 lb. seed
April 15 to May 1	3	SWEET CORN *(Adams)*, 1 oz. seed; in hills 2-3 ft. apart, or drilled ½ ft. apart
	3	SWEET CORN *(Adams)*
May	3	SWEET CORN *(Golden Cross Bantam)*, with 20 hills of CUSHAWS *(Green-Striped)*
	3	SWEET CORN *(Golden Cross Bantam)*
	3	TOMATOES *(Earliana, Break O'Day)*, 35 plants, staked
	3	PEPPERS *(Ruby King)*, 50 ft., 25 plants —— EGGPLANT *(New York)*, 50 ft., 20 plants
	3	SQUASHES *(Summer Straightneck)*, 30 hills
	3	SQUASHES *(Table Queen)*, 20 hills
	3	OKRA *(White Velvet)*, 50 ft., 1 oz. seed; thin to 18 in. —— BEANS *(Stringless Greenpod)*, 50 ft.
	3½	SWEETPOTATOES *(Porto Rico)*, 75 slips set 15 inches apart
	4	SWEETPOTATOES *(Porto Rico)*
June 1 to June 15	4	TOMATOES *(Marglobe, Greater Baltimore)*, 25 plants, mulched
	4	TOMATOES *(Marglobe, Greater Baltimore)*, 25 plants, mulched
	4	TOMATOES *(Marglobe, Greater Baltimore)*, 25 plants, mulched
	3½	BEANS *(Stringless Greenpod, Kentucky Wonder)*
	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
June 15 to July 1	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
	3	BEETS *(Detroit Dark Red)*, 2 oz. seed; thin to 3 inches
Late crops following early crops		LATE CABBAGE, in *Alaska* pea row
		BEANS *(Stringless Greenpod)*, in mustard-and-spinach row
July 1 to 15		BEANS *(Stringless Greenpod)*, in half of *Telephone* pea row
July 15 to August 1		BEANS *(Stringless Greenpod)*, 50 ft. in rest of *Telephone* pea row
August		KALE *(Siberian)*, 100 ft. in lettuce row, or TURNIPS *(Purple Top Globe)*, 100 ft., 1 oz. seed
		SPINACH *(King of Denmark* or *Norfolk)*, in *Golden Acre* cabbage row
September		KALE *(Scotch)*, 50 ft.; and CHINESE CABBAGE, 50 ft., in one of *Adams* corn rows
		GREENS or TURNIPS in other *Adams* corn row and in early beet row
		Remove harvested crops and sow rye or barley for winter cover crop. Continue this through October, using *Balbo* or *Rosen* rye.

TO TAKE ADVANTAGE of the HIGHEST PRICES farmers must have their lambs ready for market at the right time. Information on production of sheep and lambs can be had from the following Kentucky Extension circulars:

Breeding Season for the Farm Flock of Sheep—Circ. 301

Lambing Time—Circ. 346

FOR INFORMATION on current factors affecting lamb prices see your county agricultural agent, or write to the College of Agriculture and Home Economics, Lexington.

Lexington, Kentucky January, 1943

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. THOMAS P. COOPER, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

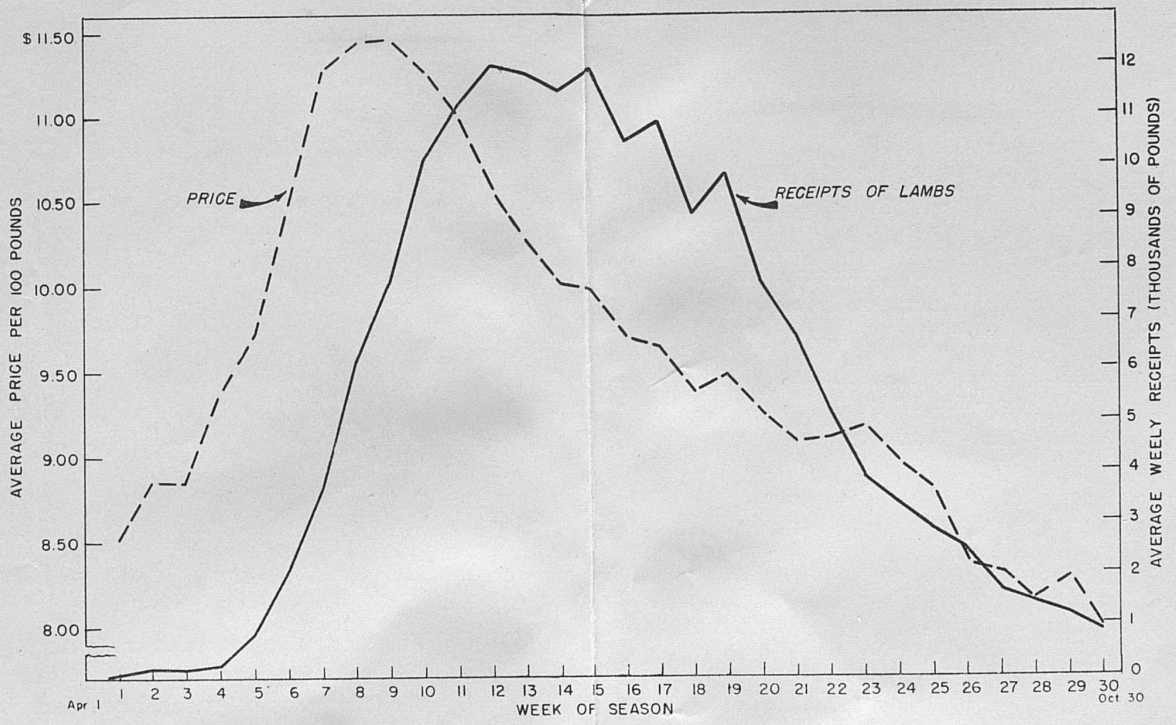
25M—1-43

When to Sell SPRING LAMBS

Farmers who have their spring lambs ready for market *early* get the best prices, year after year!

Leaflet 4

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*



When is the best time to sell lambs, is a question often asked by Kentucky farmers. The answer is found in the above chart showing average marketings and prices of lambs at four principal auction markets in central Kentucky from 1927 to 1939.

The broken line in the chart represents the average prices at which lambs sold on these markets during the 13 years. Weeks of the season are shown along the base line, April 1 to October 30 representing the lamb marketing season. From this chart it is evident that the prices are highest from the 7th to the 9th weeks of the season (usually from the middle of May to the tenth of June). The solid line represents the receipts of lambs expressed in pounds. More lambs are sold in June and July when prices are steadily going down than in May when prices are highest; and after May, in general, the later the sale the lower the price.

One reason why the average price of lambs goes down after mid-June is the fact that receipts later in the season contain a larger proportion of lower-quality lambs. The average price declines more rapidly than the price of better quality lambs.

In some seasons, of course, lamb prices through the season follow a somewhat different course, and the peak fails to come at the time shown here. Those years are the exception, however, not the rule. Those farmers who have their lambs ready for market in late May or early June year after year hit the market right more often than they miss.

Lambs weighing between 76 and 84 pounds bring higher prices than lambs of other weights regardless of time of sale. Eighty-pound lambs sold in late May bring the highest price. Average weight of lambs declines, as a rule, as the season progresses. For lambs of any given average weight, the value per head declines from month to month throughout the season, following closely the decline in price per pound.

(This leaflet is based on a detailed study of lamb prices, in Kentucky Agricultural Experiment Station Bulletin 427.)

This leaflet is prepared by C. D. Phillips and R. W. Rudd of
the Kentucky Agricultural Experiment Station

When to Sell CHICKENS

Carefully planned production and marketing offer the greatest opportunity for profit in chickens. It is well to know when to sell to hit the season of highest prices. It is equally important to know whether the high seasonal prices are offset by higher production costs. This leaflet is to help the producer himself determine these facts.

Leaflet 5

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky January, 1943

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

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OFFICIAL BUSINESS

UP-TO-DATE INFORMATION on the marketing of poultry, prepared each month, can be had from Department of Markets and Rural Finance, College of Agriculture and Home Economics, Lexington. The charts given here show trends usually associated with seasonal increases or decreases in supply. Individual poultrymen need to recognize any new development which affects their current operations.

For:

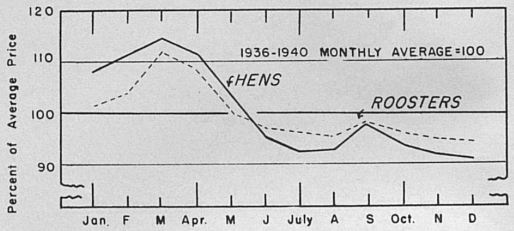
25M—1-43

When To Sell Chickens

By John B. Roberts

Hens and Roosters

The season of advancing prices for hens and roosters is from December to March. February, March, and April are usually the months of highest prices. Most of the seasonal decline in the price of mature chickens occurs between April and July and after July the price usually remains low.



Highest prices in February, March and April

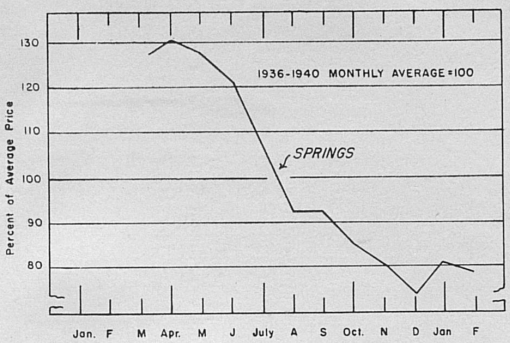
Cull and sell hens.— Hens not to be kept over into the fall should be sold in the spring, as soon as they become unprofitable as layers. If chickens are kept primarily for egg production, follow culling practices recommended by the Kentucky Experiment Station and Extension Service (see Extension Circular 330). Take out all undersized, crow-headed pullets and overfat hens whenever they are found. They can be sold or eaten.

Sell roosters.— If income from eggs rather than from meat is the primary consideration, sell roosters because fertile eggs spoil more easily than infertile eggs. Sell all roosters unless eggs are produced for hatching. Prices are highest in early spring.

Spring Chickens

Kentucky prices of new-crop young chickens (1¾ to 2½ pounds each) are highest from March to June. Not enough of these are sold by Kentucky producers to establish farm prices before March. Prices of "run of the farm" spring chickens usually decline continuously from June to December, remaining low in many years as late as January and February, pending the disposal of coarse, thin, and low quality chickens.

It is usually a good policy to sell surplus young chickens as soon as they reach market weights of 2 to 3½ pounds. If sold later than July, low fall prices will largely offset gains in weight.

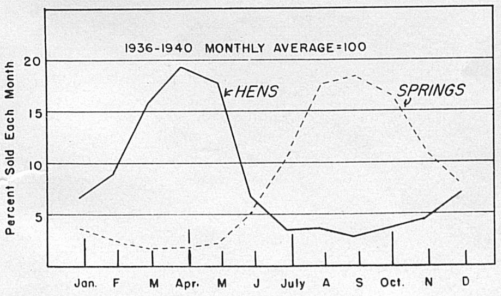


Highest prices in March, April and May

Timing the Sale

In past years 75 percent of hens were sold the first six months of the year. The advantage of selling at this time is the relatively higher price per pound and per head. The disadvantage is the loss of income from the sale of eggs.

Over 80 percent of young chickens were marketed during the last six months of the year. Prices at this season are low because of the large supplies sold from the competing mid-west and corn-belt states. Many Kentucky spring chickens sold after September sell at discounted prices because they are coarse, thin, and generally of low quality. They are not the quality most demanded by buyers for dressed markets and storage pack.



Percent Kentucky chickens marketed each month

If income provided by the sale of meat rather than eggs is the most important consideration, sell older chickens in February, March, and April. At this season average weights per head are greatest and prices are highest, so that chickens sold in these months frequently bring 40 percent more per head than those sold during the fall.

HOW TO ORDER PARTS

Order replacements for worn parts as well as broken parts that cannot be repaired.

Furnish your dealer with the following information:

1. Kind of machine, name of manufacturer, model or year purchased.
2. Number of the part needed. (The number is usually stamped on steel parts or cast into castings.)
3. In case of doubt, take the broken or worn parts to your dealer.

KEEP MACHINES IN GOOD REPAIR

Farmers cannot hope to meet their 1943 goals for greater production of crops and livestock unless they get the fullest possible use of the farm machines they now have. *Only one-fifth as much farm machinery will be manufactured this year as in 1940.* New farm machinery is rationed and cannot be bought to replace machines that could be repaired. Only by taking the best care of the machines they now have, and getting the most efficient use of them, can farmers stretch the machinery supply enough to do the job needing to be done.

ORDER REPAIRS EARLY

It is extremely important to order repair parts early. Farmers must cooperate with dealers to obtain repair parts for farm machinery. Before the war, repair parts were available at any time. In 1943, they will be manufactured in quarterly periods.

Manufacturers and dealers will be guided by your orders in making and stocking repair parts and in asking for increases in materials for parts.

All repair parts required for a machine should be on hand before reconditioning is started.

This leaflet was prepared by
The Agricultural Engineering Section,
College of Agriculture and Home Economics

CHECK YOUR REPAIR PARTS NOW.
TAKE THIS LIST TO YOUR DEALER
WHEN YOU ORDER PARTS.

County Agent

100M—1-43

For:

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

U. S. Department of Agriculture
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WASHINGTON, D. C.

OFFICIAL BUSINESS

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CHECK LIST
for
Farm Machinery Repairs

Use this list in examining your machinery and ordering repairs through your dealer

Leaflet 6

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky January, 1943

CHECK LIST

Use this check list as a guide to a systematic examination of your machines. Mark in the space at the right the repairs needed.

Tractors

Check here

1. Wheels ..... ____
2. Wheel bearings ..... ____
3. Steering assembly ..... ____
4. Power take-off ..... ____
5. Hitch ..... ____
6. Rubber tires and valves ..... ____
7. Pistons ..... ____
8. Rings ..... ____
9. Connecting rods ..... ____
10. Sleeves or cylinder walls ..... ____
11. Wrist pins ..... ____
12. Motor bearings ..... ____
13. Valves and springs ..... ____
14. Oiling system parts ..... ____
15. Carburetor ..... ____
16. Governor ..... ____
17. Clutch parts ..... ____
18. Gaskets ..... ____
19. Spark plugs ..... ____
20. Magneto parts ..... ____
21. Wiring ..... ____
22. Transmission ..... ____
23. Lubrication system ..... ____
24. Cooling system ..... ____
25. Air cleaners ..... ____

Tractor plows

1. Shares (Points) ..... ____
2. Moldboard ..... ____
3. Coulter parts ..... ____
4. Jointer parts ..... ____
5. Hitch connections ..... ____
6. Wheel parts ..... ____
7. Lifting clutch ..... ____
8. Lifting springs ..... ____
9. Levers ..... ____
10. All bolts ..... ____

Disk harrow

1. Disks ..... ____
2. Disk bearing ..... ____
3. Lever ..... ____
4. Scraper ..... ____
5. Hitch parts ..... ____
6. Lubrication devices ..... ____

Feed grinders

1. Bearings ..... ____
2. Worn burrs ..... ____
3. Feed adjustments ..... ____
4. Elevator parts ..... ____

Walking plows

Check here

1. Share (Point) ..... ____
2. Moldboard ..... ____
3. Hitch castings ..... ____
4. Handles ..... ____
5. Bolts ..... ____
6. Braces ..... ____

Corn planter, 1-row

1. Hopper ..... ____
2. Seed plates ..... ____
3. Bearings ..... ____
4. Valves ..... ____
5. Drive mechanism ..... ____
6. Hitch parts ..... ____
7. All bolts ..... ____

Corn planter, 2-row

1. Hoppers ..... ____
2. Seed plates ..... ____
3. Bearings ..... ____
4. Clutch parts ..... ____
5. Valves ..... ____
6. Checking forks ..... ____
7. Drive chains ..... ____
8. Check wire ..... ____
9. Variable drop mechanism ..... ____

Cultivators

1. Shovels ..... ____
2. Gangs ..... ____
3. Lifting springs and lever ..... ____
4. Wheels ..... ____
5. Handles ..... ____
6. Fenders ..... ____
7. Hitch parts ..... ____
8. Tongue ..... ____

Grain drill

1. Hopper repairs ..... ____
2. Feed cups ..... ____
3. Grain spout parts ..... ____
4. Gears ..... ____
5. Chains ..... ____
6. Wheel pawls ..... ____
7. Pawl springs ..... ____
8. Furrow openers ..... ____

Riding plows

Check here

1. Share (Point) ..... ____
2. Moldboard ..... ____
3. Coulter ..... ____
4. Jointer ..... ____
5. Hitch castings ..... ____
6. Wheel parts ..... ____

Tooth harrow (spring or spike)

1. Teeth ..... ____
2. Tooth clamps ..... ____
3. Tooth bars ..... ____
4. Hitch parts ..... ____
5. Levers ..... ____
6. Quadrants ..... ____

Binders

1. ALL bearings ..... ____
2. ALL rollers ..... ____
3. Canvases ..... ____
4. Sprocket wheel and chains ..... ____
5. Binder attachment ..... ____
   a. Knotter ..... ____
   b. Twine knife ..... ____
   c. Twine disc ..... ____
   d. Twine tension ..... ____
   e. Discharge arm ..... ____
   f. Trip arm and spring ..... ____
6. Reel slats ..... ____
7. Pitman ..... ____
8. Bundle carrier ..... ____
9. Tongue truck parts ..... ____
10. Oiling devices ..... ____
11. Cutter bar ..... ____
    a. Section ..... ____
    b. Guards ..... ____
    c. Clips ..... ____
    d. Ledger plates ..... ____

Hay rake, dump type

1. Wheels ..... ____
2. Wheel pawls ..... ____
3. Pawl springs ..... ____
4. Levers ..... ____
5. Teeth ..... ____
6. Tongue ..... ____

Side delivery hay rake

Check here

1. Wheels ..... ____
2. Wheel pawls and springs ..... ____
3. Drive gears and clutch ..... ____
4. Rake bars ..... ____
5. Rake teeth ..... ____
6. Braces and frame casting ..... ____
7. Stripper bands ..... ____

Mowers

1. Counter shaft ..... ____
2. Counter shaft bearings ..... ____
3. Crank shaft ..... ____
4. Crank shaft bearings ..... ____
5. Crank pin ..... ____
6. Transmission parts ..... ____
7. Axle bearings ..... ____
8. Wheel bearings ..... ____
9. Pawls and springs ..... ____
10. Pawl springs ..... ____
11. Pitman ..... ____
12. Pitman box ..... ____
13. Sickle head ..... ____
14. Sickle head strap ..... ____
15. Knife sections ..... ____
16. Knife holder or clips ..... ____
17. Wearing plates ..... ____
18. Ledger plates ..... ____
19. Guards ..... ____
20. Knife head guide ..... ____
21. Inner shoe ..... ____
22. Outer shoe ..... ____
23. Hinge pins ..... ____
24. Swath boards ..... ____
25. Bolts, springs and levers ..... ____

Manure spreaders

1. Wheel bearings ..... ____
2. Drive pawls and springs ..... ____
3. Apron and apron drive ..... ____
4. Apron shaft and bearings ..... ____
5. Beater shaft and bearings ..... ____
6. Drive chain ..... ____
7. Beater chain ..... ____
8. Feed pawls ..... ____
9. Feed ratchet ..... ____
10. All bolts ..... ____

Tobacco setters

1. Wheels ..... ____
2. Water barrel ..... ____
3. Water valve mechanism ..... ____
4. Furrow openers ..... ____
5. Seats ..... ____
6. Covering devices ..... ____

PLANTING SUGGESTIONS

Plant only certified seed.— Double-cross seed of hybrid corn, the kind planted on the farm, is produced by making definite crosses of selected inbred lines. To be assured of properly produced seed of hybrid corn, accurately graded and of high germination, buy only seed certified by an official agency. The grain grown from this double-cross seed is not "hybrid seed" and when used as seed corn will result in greatly reduced yields.

Use proper planter plates.— The grades of seed of hybrid corn offered for sale in Kentucky are based on the size and shape of the kernel. Seed may be flat or round; large, medium, or small. Neither the yield nor the quality of corn is affected by size or shape of kernel planted; in fact, some farmers prefer the smaller kernels because they go farther in planting. Planter plates suitable for accurate planting of any properly graded seed may be obtained for all makes of planters. Get the same size of seed each year so that the same planter plates may be used year after year.

Plant seed closer together.— Because hybrid corn uses plant food and soil moisture to better advantage than open-pollinated varieties, plant it 20 to 30 percent closer than common varieties.

Give soil proper treatment.— Though hybrid corn yields several bushels per acre more than open-pollinated corn on the same soil, it cannot produce high yields on soil low in fertility. In tests over a long period at the Experiment Station, the use of limestone and phosphate in addition to manure increased the yield of corn about 60 percent. In general, the greatest profits from hybrid corn and other crops as well, are made on land capable of highest production.

PLANT HYBRID CORN THIS YEAR

100M—1-43

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

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OFFICIAL BUSINESS

For:

Penalty for Private Use to Avoid Payment of Postage, $300

Kentucky Agricultural Experiment Station

PLANT *Hybrid Corn This Year!*

- Save labor
- Increase yield
- Lower cost

Leaflet 7

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*
Lexington, Kentucky

023391

January, 1943

Plant Hybrid Corn This Year

By Wm. C. Johnstone

By producing more corn per acre and at the same time using less labor per acre of corn, Kentucky farmers can help relieve the farm labor problem while increasing grain supplies. This may seem to be a contradiction, but it can be done by growing more hybrid corn.

ADVANTAGES OF HYBRID CORN

Saves labor.— Hybrid corn saves labor because (1) it is not generally necessary to thin or to replant the crop, (2) the stalks of most hybrids stand up, even against heavy winds, and the corn is therefore easily handled, and (3) the hybrid corn husks easier than open-pollinated kinds. Certified seed of hybrid corn is accurately graded and at least 90 percent of it germinates with strong sprouts. It is therefore safe to plant it at the desired thickness so that the crop will not need to be thinned.

Increases yield.— In many tests throughout the state in 1942, Kentucky hybrids produced more corn than local varieties. In one test, at the Western Kentucky Substation, the Kentucky hybrids averaged 17 to 22 bushels more per acre that the local variety and 2 to 7 bushels more than the Northern closed-pedigree hybrid. The average yields were:

Kentucky white hybrids	73.2 bu.
Kentucky yellow hybrids	68.2 bu.
Northern closed-pedigree hybrid	65.9 bu.
Pride of Saline (local variety)	51.3 bu.

Hybrids are more dependable than open-pollinated varieties, especially in hot, dry seasons and when there are heavy winds.

Lowers production cost.— It costs less than one dollar per acre to plant a Kentucky hybrid, only slightly more than the cost of planting ordinary corn. Higher yield with less labor cost means lower production cost per acre, and hence greater profit. Many Kentucky farmers have found that a bushel of seed of adapted hybrid corn will produce from 50 to 100 bushels more corn than a bushel of seed of a local variety.

Promotes better farming.— Since the amount of corn needed on a given farm can be produced on fewer acres with adapted hybrids than with common kinds of corn, fewer acres have to be plowed, and less-productive land can therefore be left in sod. As hybrid corn matures earlier than open-pollinated varieties, cover crops can be seeded earlier after the hybrids.

KINDS OF HYBRID CORN

Kentucky farmers may select from several adapted hybrids the ones best suited to their needs or desires. There are white hybrids and yellow hybrids; early hybrids and late hybrids; tall hybrids and low hybrids. The white and yellow hybrids each have their advantages. White corn brings more for milling than yellow corn. The white hybrids yield more per acre, especially in favorable seasons, and are damaged less by earworms and birds, than most yellow hybrids. On the other hand, yellow corn is better feed for livestock than white, especially where green feed is lacking; and for early seeding of cover crops some of the yellow hybrids have an advantage over most whites because they are somewhat earlier.

In the following descriptions the number of days to maturity in each instance is based on average conditions, under which Boone County White would require about 142 days to reach maturity. Besides those described here, certain other hybrids, both yellow and white, are grown for seed on small acreages in Kentucky and may be expected to give satisfactory results.

White Hybrids

Ky. 69 (27 x 30A) x (39 x 21).— One of the oldest white hybrids; still quite popular. Medium-sized ear; especially adapted to soils of medium fertility. 128 days to maturity.

Ky. 72 (27 x 58) x (39 x 30A).— Very similar to Ky. 69; somewhat more stocky and leafy. 128 days to maturity.

Ky. 72B (27 x 58) x (39 x 21).— One of the newer hybrids; very dependable; suitable for wide range of conditions. Grain softer than Ky. 69 or Ky. 72. 128 days to maturity.

Ky. 201 (13 x 56) x (122 x 58).— Rank-growing, late, large-eared, soft-grain hybrid. 140 days to maturity. Plant early on more fertile soil where moisture conditions are favorable.

Ky. 203 (27 x 122) x (33-16 x 49).— New white hybrid; moderately early; good-sized ears; grain not too hard. Seems very dependable over wide area. 128 days to maturity.

Yellow Hybrids

U. S. 13 (WF9 x 38-11) x (HY x L317).— Earliest hybrid recommended for Kentucky; probably too early for highest yields in southern half of state. Low, strong stalk; excellent root; poor tip covering. 125 days to maturity.

Ky. 102 (Kys x 38-11) x (K4 x L317).— About 10 days later than U. S. 13. Strong, tall stalk; leafy; useful for silage as well as for grain. 135 days to maturity.

Ky. 103 (WF9 x 38-11) x (K4 x L317).— Somewhat later and taller than U. S. 13; not as late nor as tall as Ky. 102. Very dependable under all conditions; rapidly becoming one of the most popular hybrids in the state. 128 days to maturity.

Depreciation	$ 83.33
Interest	31.50
Housing	4.00
Annual fixed cost	$118.83
Daily fixed cost (70 days' use)	1.70

If the tractor were used only 30 days during the year, the daily fixed cost would be $3.96.

Operating costs.— The amount of fuel used by a tractor varies according to its state of repair, kind of work it is doing, and the way it is handled. The summary below gives the average daily (10-hour day) fuel consumption for different kinds of work, found by the Kentucky Agricultural Experiment Station:

	Gallons of kerosene or distillate per 10-hr day
Plowing	20
Disking	20
Cultipacking	12
Cultivating	15
Mowing	15
Binding	15
Combining	14
Pick-up baling	10
Grain drilling	15

With this wide variation in daily fuel consumption it is necessary to figure fuel costs for each kind of work to be done.

Oil and grease consumption and repair charges, in addition to fuel, make up the operating costs. Oil consumption depends chiefly on the condition of the tractor, and may range from 1 to 6 quarts a day. Grease is a very minor cost, usually 50 cents to a dollar a year, roughly a cent a day. Repairs depend on what care is taken of the tractor, on its age, and the general working conditions. Rocky, hilly land, or tight clay soil, is harder on a tractor than loamy soil and level land. On an average, repairs run about $25 a year, or about 50 cents per day of use.

For example, the daily (10-hr. day) tractor operating costs for plowing can be estimated as follows:

Fuel (20 gallons at 10 cents)	$2.00
Oil and grease, for tractor in average repair	.41
Repairs	.50
	$2.91

Adding the daily fixed cost ($1.70 for the tractor in this example, used 70 days a year) the total daily tractor cost for plowing thus is $4.61. If the tractor is used only 30 days a year, the total daily cost ($2.91 plus $3.96) is $6.87. In increasing the use to this

extent, the farmer reduces the cost by $2.26 a day. This cost does not include cost of labor for operator or daily cost charged to the tractor-plow.

Costs for other farm machines can be figured in the same way as tractor costs. For many of the other machines the daily cost would be almost entirely fixed cost.

By increasing the annual use of farm machines through exchange or custom work, and thereby reducing the daily cost of using the machines, all parties benefit. The farmer owning the machine does his own work for less, by such cooperation. And at the same time the neighbors who use his machines get their work done for less, provided that "fair and equitable rates" are rightly established.

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For:

Cooperate with Neighbors for MORE USE of FARM MACHINERY

By George B. Byers

POWER MACHINERY does the work of many farm hands. One man with tractor machinery, for example, can take care of as large an acreage of corn as 4 or 5 men with horse-drawn tools. But now that very little new machinery is being made, the saving of labor on a large scale by use of machinery must come about by more use of the machines already on the farm.

In general, Kentucky farmers have not made full use of their machinery, and most of them will therefore be in position to help out in this program for more use of the machines we now have.

Ways to Get Most Use From Machines

Do custom work.— Owner of machinery does his own work and also that of his neighbors, charging them a prearranged rate per acre or per hour.

Exchange machines.— A farmer owning a small tractor or cultivator, for example, plows corn in exchange with another farmer who has a large tractor and a combine for harvesting small grain.

Have joint ownership.— Two or more farmers jointly own one or more machines. Because of the difficulty of dividing the expenses of repairs and upkeep and the time of using the machinery, this method is not used as much as the other two mentioned.

Leaflet 8

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky 50M—1-43

Swap labor for machine work.— One farmer exchanges labor, or labor and horse work, with the owner of a machine in return for use of the machine and its operator, if it is a power machine. In breaking ground, preparing a seedbed, and cultivating crops the machine can be operated in two 10-hour shifts per day. Use of machinery is thereby greatly increased.

Make Pre-Season Agreements

Before the work season, make the necessary agreements with other farmers for cooperative use of machinery. Matters that should be agreed on are—

Method of cooperation.— Find which one of the above-mentioned four ways to get more use from machines, or a combination of these ways, best fits the farming to be done. Keep in mind the great need for increased farm production this year.

Who is to operate the machine.— More complex machines such as tractors, combines, and balers should be operated by the owner or an operator hired by him.

Work schedule.— Make a schedule for the exchange of work in order to provide for as full use of the machine as possible, and to avoid conflicting requests for it.

Rates of pay.— Decide on rates of pay and terms of exchange. In custom work, give attention to the time required for overseeing the work, and make allowances for the time and expense involved in moving from one job to another.

Time of settlement.— Make frequent settlements according to the rates agreed on so that misunderstanding will not develop.

How to Determine Rates of Pay for Custom or Exchange Work

One of the chief problems in working out plans for cooperative use of farm machines is to determine rates of pay for different machines and different farm operations. Though this is a problem each group must work out for itself, certain average costs, as found by the Kentucky Agricultural Experiment Station, may be helpful as general guides. These averages are given in Table 1. Except for the pick-up baler and the grain drill, the rate given for each machine in Table 1 is the average for 12 to 72 machines.

TABLE 1.—AVERAGE DAILY COST FOR EACH OF 12 FARM MACHINES AND THE COST PER ACRE OF WORK DONE BY EACH MACHINE

Machine	Average purchase price	Average life, years	Annual cost: Percent of purchase price	Annual cost: Total[1]		Use per year, days		Cost per day[1]	Acres covered: Per year	Acres covered: Per day	Cost per acre[1]
Tractor (2-plow)	$1050	12	24.0	$252	÷	50	=	$5.05	.....	.....	.....
Tractor plow (2—12-inch)	122	16	14.0	17	÷	13	=	1.31	91.4	7.0	$ .19
Tractor plow (2—14-inch)	124	15	13.8	17	÷	11	=	1.55	78.4	7.1	.22
Disk harrow (6-foot)	114	15	11.5	13	÷	12	=	1.08	266.0	22.0	.05
Disk harrow (7-foot)	131	14	11.7	15	÷	14	=	1.06	344.1	23.8	.04
Cultipacker (8-foot)	73	22	8.9	6	÷	2	=	3.00	50.4	25.4	.13
Tractor cultivator (2-row)	139	14	10.9	15	÷	6	=	2.50	143.4	22.5	.11
Tractor mower (7-foot)	134	13	14.4	19	÷	4	=	4.75	91.4	23.0	.21
Tractor binder (8-foot)	244	12	13.7	33	÷	4	=	8.25	74.5	17.5	.45
Combine[2] (5-foot)	707	8	18.5	131	÷	16	=	8.19	166.4	10.6	.79
Combine[2] (6-foot)	759	8	17.8	135	÷	17	=	7.94	190.3	11.1	.71
Grain drill (6-foot)	167	24	8.0	13	÷	8	=	1.62	98.0	11.8	.14
									Tons		Per Ton
Pick-up baler[3]	859	14	16.4	142	÷	37	=	3.84	1000 T	27 T	.14

[1] No charge included for the time of the operator. [2] Power take off. [3] Cost of baling wire not included.

Suppose you wish to estimate the rate for plowing a field with a 2-bottom 12-inch tractor plow from the averages in Table 1. The cost of the tractor is $5.05 per day; the cost of the plow $1.31 per day. To this must be added the wages for the operator—if $2.50 per day may be taken as the average for this kind of work, the total cost of tractor, plow, and operator would be $8.86 a day. As the average number of acres plowed by 2-bottom tractor plows with 12-inch bottoms is 7 acres a day, also from Table 1, the cost per acre would be $1.27.

Rates for harrowing and other kinds of farm work can be estimated in the same way. In arriving at exchange and custom rates, give careful consideration to the kind of crop, the size of the field, general working conditions, and whether the machines are in good repair, for all these directly affect the operating costs.

EXAMPLE: How to Figure Cost of Tractor Operation

Machinery costs are "fixed costs" and "operating costs." Annual fixed costs, such as depreciation, interest, and housing remain about the same regardless of the number of days the machine is used during the year. Daily fixed costs, on the other hand, become less as the machine is used more. Operating costs (cost of fuel, oil, grease, and repairs) occur only when the machine is in use, and vary somewhat with different farming operations. Total daily costs (fixed cost plus operating cost) can therefore be reduced

chiefly by increasing the use of the machine, because this reduces the daily fixed cost. That is why it is especially profitable for machinery owners who heretofore have not made full use of their machinery to exchange machine work or do custom work, provided the rates are fair and equitable.

Fixed costs.— *Depreciation* is a charge based on the life, first cost, and salvage-value of the machine. For example, a tractor costing $1050, lasting 12 years, with a "junk" value of $50, has an annual depreciation of $83.33; that is, 1/12 of $1000.

Interest is a charge for the use of the money invested in the machine. It is calculated at a given rate on the average annual value of the machine during its lifetime. For example, the tractor costing $1050 when new represents an average annual investment of $525. The annual interest charge for this tractor at 6 percent is $31.50; that is, 6 percent of $525.

Housing is a charge for sheltering the tractor. Figuring the cost of a shed 15 feet by 30 feet (tractor using one-fifth of the space) at $200, and estimating the annual charge for depreciation, repairs, interest, taxes, and insurance at 10 percent of the original cost, the housing charge is $4 per year.

Depreciation, interest, and housing charges are about the same for the year regardless of the number of days the machine is used. If the tractor will be used about 70 days during the year, the fixed cost per day of use will be about $1.70:

Since calcium caseinate may not be obtainable, it is suggested, where power outfits are used, that the bordeaux mixture be used as the emulsifier. Amounts of material to use for 200 gallons of spray are bluestone (copper sulfate), 8 pounds, hydrated lime, 8 pounds, and oil, 6 gallons.

Preparation.— Start agitator with 20 gallons of water in 200-gallon tank. Add 6 pounds of powdered bluestone and 6 pounds of hydrated lime. Start pump and allow discharge from spray rod to flow back into tank under full pressure. Pour in slowly 6 gallons of spray oil, continuing agitation, and pump until thoroughly mixed. Next add 2 more pounds of bluestone, 2 pounds of hydrated lime, and water to make 200 gallons of 4-4-100 bordeaux plus 3 percent oil. Apply the spray immediately.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating

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5M—1-43

PEACH and PLUM SPRAY PROGRAM

FOR EFFECTIVE CONTROL of curculio, sprays should be supplemented by jarring the adult curculio from the trees, both as a means of control and as an indication of when and where to spray. Dropped fruit should be picked up and destroyed.

Jarring for Curculio

Jarring should be done several times each week during the month following petal fall. Spread a large bed sheet or canvas under a peach tree and strike the trunk or limbs above the sheet or canvas two or three sharp blows with a padded mallet. Record for each tree the number of curculios that fall on the sheet, and then destroy them. They are small, grayish-black snout beetles about ¼ inch long with rough humps and with gray spots on their wings.

Jarring is most effective between daylight and 8 a.m., while it is still cold and the curculios are numb. Start on plum trees, because the curculios appear on these earlier in the season than on peach trees. In jarring peach trees, start with those on the edge of the orchard nearest the places where curculios hibernate—especially woods or plum thickets. If jarring shows curculios present on the outside rows, continue jarring at intervals throughout the orchard. In this way the movement of the curculios in from winter quarters can be followed.

By jarring, each grower can keep informed as to when and where his orchard needs spraying. Sprays can therefore be omitted or delayed when curculios are not present in sufficient numbers to warrant spraying—though it should be remembered that plums rarely escape injury. Growers who do not make a practice of jarring should follow the fixed spray schedule.

Leaflet 9

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky January, 1943

Destroy Dropped Fruits

Fruits that drop because of curculio injury should be picked up twice a week and destroyed. Curculios cause drops during two periods. The first drop results from punctures made by overwintered beetles. The stung fruits usually grow to ½ inch or more in diameter, and have a bead of gum over the injury. Most of them fall soon after the "June drop." The second drop is caused by second-generation curculio worms which cause the fruit to ripen prematurely and fall just before harvest. Stung peaches that do not drop should be picked off while thinning. The curculio grub may be killed by submerging the drops in water for several days. Picking up and destroying the first drops is important, and if thoroughly done assures nearly a worm-free crop. As brown rot follows curculio stings, the control of curculio is an important means of controlling that disease. Destruction of wormy fruit just before and during harvest reduces the number of beetles that hibernate. Their destruction is important in protecting the crop of the following year.

Notes on Mixing the Spray

Use pure "chemical" hydrated lime. Zinc sulfate should be included when lead arsenate is used. Run a few gallons of water into the tank, add the zinc sulfate and continue filling the tank while adding the lime, previously made into a paste, through the strainer. Add the wettable sulfur, if required, and when the tank is nearly full, add the lead arsenate. Wettable sulfur is sold in Kentucky under various trade names.

Caution.— Neither lime sulfur nor bordeaux mixture should be used as a summer spray for peaches. Apply lead arsenate only when the trees and foliage are dry and do not apply sprays when the temperature is above 90° F. Otherwise, there is danger of burning.

Dormant Sprays

Lime sulfur is both a scalecide and a fungicide. It is the simplest dormant spray and it usually is effective if thoroughly applied. The liquid form is preferred. Dilute each gallon with 8 gallons of water. Dry lime sulfur should be used as recommended by manufacturers.

The cheapest combined fungicide and insecticide spray is bordeaux mixture added to the tank-mixed oil emulsion or oil-bordeaux in which concentrated bordeaux is used as an emulsifier. Oil emulsions have given better control of San Jose scale than lime sulfur. In orchards where scale is moderate to heavy, the formula for bordeaux-oil spray should be modified by using 3 gallons of mineral oil in each 100 gallons, thus making a 3-percent rather than a 2-percent oil emulsion.

Apply oil sprays in the spring, when the temperature is above 45° F., and before growth has started.

Tank-Mixed Oil-Bordeaux

Use lubricating oil sold by petroleum companies at their bulk stations under such names as "agricultural spray oil," "orchard spray oil," or "scale oil." Use oils with the following specifications:

Viscosity at 100° F.....125 to 200 seconds Saybolt
Volatility at 105° C.....not above 2 percent

PEACH SPRAY SCHEDULE

Spray	Time	Spray Mixture		For
*1. Dormant	Before buds swell	Tank-mixed oil-bordeaux or Liquid lime sulfur 1 to 8 or Dry lime sulfur 30 lb. to 100 gal.		Scale and leaf curl.
2. Shuck fall	When 75% shucks off—2-3 weeks after bloom	Lead arsenate Hydrated lime Zinc sulfate Water	2½ lb. 2½ lb. 2 lb. 100 gal.	Curculio. Omit if no curculio present, or spray in spots for scattered infestations.
*3. Ten-day	Month after petal fall or 10 days after shuck fall. This spray should not be postponed	Lead arsenate Hydrated lime Zinc sulfate Wettable sulfur Water	2½ lb. 2½ lb. 2 lb. 6 lb. 100 gal.	Scab, curculio. If jarring shows no curculio, omit arsenate, lime and zinc
4. Twenty-four-day	Two weeks later if jarring indicates the need	Lead arsenate Hydrated lime Zinc sulfate Water	2½ lb. 2½ lb. 2 lb. 100 gal.	Curculio. Use as jarring results indicate
*5. First preharvest	Three weeks before harvest	Wettable sulfur Water	6 lb. 100 gal.	Brown rot
*6. Second preharvest	Just before harvest	Wettable sulfur Water	6 lb. 100 gal.	Brown rot

*Growers who do not practice jarring should use the starred sprays as a fixed schedule.

June. In the vicinity of Henderson and Bowling Green, the first summer spray should be applied during the three or four days after July 4. These dates are good only for average years. Chemically treated bands, put on in early June, are a valuable aid in codling-moth control.

Dormant Sprays

To control scale insects on dormant trees use a spray such as tank-mixed oil emulsion, commercial oil emulsion or miscible oil, or lime sulfur. Liquid lime sulfur is preferable to the dry form. Growers who want protection against rosy aphis damage should use one of the commercial aphis oils.

Tank-mixed emulsions.— Use lubricating oil. Petroleum companies sell these oils at their bulk stations under such names as "agricultural spray oil," "orchard spray oil," or "scale oil."[1]

Emulsion with calcium caseinate.— For mixing 200 gallons of spray: Make a paste of 1 pound of calcium caseinate in a bucket with 2 quarts of water. Fill bucket gradually while stirring. Pour mixture into spray tank with enough warm water to operate pump. Start pump and allow discharge from open spray rod to flow back into tank under full pressure. Add slowly 6 gallons of spray oil, continuing agitation, and pump for a few minutes. Fill tank with water and apply immediately.

Other emulsifiers.— If calcium caseinate is unobtainable, soybean flour, bentonite clay, lignin pitch, concentrated bordeaux mixture, or one of the commercial emulsifiers may be substituted. Commercial materials should be used according to the manufacturer's directions. Growers with a few trees or little experience with tank-mix emulsions may find it preferable to use the commercial oil emulsions or miscible oils.

[1] Use oil with the following specifications:
Viscosity at 100° F.....125 to 200 seconds Saybolt
Volatility at 105° C.....not above 2 percent

Growers interested in sprays which leave nonpoisonous residues should write the College of Agriculture for nicotine spray schedules.

10M—1-43

APPLE SPRAY PROGRAM

For:

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

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APPLE SPRAY PROGRAM

The main factors in successful spraying are *correct timing, thorough application,* and use of *proper material.* Success cannot be expected if any one of these three is neglected.

Leaflet 10

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky January, 1943

Apple Spray Program

The entire schedule as printed in this folder is needed in orchards where infestation with codling moth is very bad. The average commercial orchard may need only the sprays marked * and **; the home orchard should have at least the latter.

Apple Scab

Losses from apple scab each year are probably greater than from any other disease or from any insect affecting apples. In a rainy spring, the apple crop in unsprayed orchards sometimes fails to set and the reason given is too much rain or too cold weather, whereas apple scab is the actual cause. In 1933 and 1935, unsprayed orchards in Kentucky lost their entire crop from apple scab. The scab attacked the leaves, also, to the extent that many trees were defoliated in early May. Many of our standard Kentucky varieties such as Winesap, Stayman, Black Twig, Red Delicious, Golden Delicious, and King David are very susceptible to scab.

Bitter Rot

To keep bitter rot in check, a bordeaux spray should be applied in all orchards each year, about the first of July (Spray 13). Growers who had loss from bitter rot last year should apply a 4-6-100 bordeaux spray about the middle of June (See "Remarks" to Spray 12), and at two-week intervals thereafter, until four sprays have been applied. The grower should be alert to observe the first appearance of the disease. Hand-pick and destroy all bitter-rot-spotted fruits and search for overwintering places, such as old fruit stems, mummied fruits, cankers and dead wood. The source will usually be found directly above the first rotted fruits and should be removed. With the first appearance of bitter rot, remove spotted fruit and spray affected trees and neighboring trees immediately. For codling moth control add lead arsenate alone to the bordeaux. When the complete schedule is followed, the frequent use of weak bordeaux should control bitter rot.

Codling Moth

In the Paducah district, the first second-brood spray (No. 13) should be applied during the last week in

APPLE SPRAY SCHEDULE

Spray	Time	Material in 100 gal.	For—	Remarks
*1. Dormant	Before growth begins in spring	Oil 3 gal. (as tank-mixed emulsion or equivalent of commercial oil emulsion), or liquid lime sulfur 11 gal, or dry lime sulfur 30 lb	Scale	Spray only when temperature is above 45°. See page 4 for preparation of tank-mixed emulsions.
2. Green tip	When green tips of leaves are exposed	Liquid lime sulfur 2½ gal	Scab	This spray is especially desirable on Red Delicious.
*3. Pre-pink	Before cluster buds separate	Liquid lime sulfur 2 gal	Scab	If wet weather prevailed during green-tip stage, do not omit this spray.
**4. Pink	Fruit buds pink, clusters separated	Liquid lime sulfur 2 gal	Scab	This is usually the most important spray for scab and should never be omitted.
5. Full bloom	⅛ of blossoms open	Bordeaux made of Copper sulfate 2 lb Hydrated lime 4 lb	Blossom blight	Especially desirable on Transparent, Polly Eades, Jonathan, Wealthy, Hagloe, King David, Grimes. Do not use lead arsenate.
**6. Calyx or petal fall	When ¾ of petals are off	Lead arsenate 3 lb Wettable sulfur 6 lb Hydrated lime 3 lb	Codling moth Scab	A very important spray for codling moth. Add 2 quarts liquid lime sulfur if weather is favorable for scab development.
*7. Calyx top-off	Immediately after Spray No. 6	Lead arsenate 3 lb Wettable sulfur 6 lb Hydrated lime 3 lb	Codling moth Scab	Apply to upper third of tree only.
8. First cover	7 days after calyx spray	Lead arsenate 4 lb Wettable sulfur 6 lb Hydrated lime 4 lb	Codling moth Scab	Recommended in orchards where codling moth is important.
**9. Second cover	2 weeks after calyx spray	Lead arsenate 4 lb Hydrated lime 4 lb Soybean flour ¼ lb	Codling moth	For blotch, sooty blotch and King David spot use 4-6-100 bordeaux and 4 lb. of lead arsenate. A very important spray for codling moth.
10. Third cover	3 weeks after calyx spray	Lead arsenate 4 lb Copper sulfate ¾ lb Hydrated lime 1½ lb Summer oil ½ gal	Codling moth	The summer oil is added to kill codling moth eggs.
*11. Fourth cover	4 weeks after calyx spray	Lead arsenate 3 lb Copper sulfate ¾ lb Hydrated lime 1½ lb Summer oil ½ gal	Codling moth	If blotch, sooty blotch and King David spot are expected, use 4-6-100 bordeaux and 3 lb. of lead arsenate
12. Fifth cover	10 days after fourth cover	Lead arsenate 3 lb Copper sulfate ¾ lb Hydrated lime 1½ lb Summer oil ½ gal	Codling moth	If bitter rot has been a factor, see page 2 and use 4-6-100 bordeaux with or without lead arsenate.
**13. First summer	See note for timing, Page 2	Lead arsenate 3 lb Copper sulfate 4 lb Hydrated lime 6 lb	Second brood codling moth, Bitter rot.	Omit lead arsenate if codling moth is not a factor. If the complete schedule of codling moth sprays has been used, reduce the copper sulfate to ¾ lb. and the lime to 1½ lb.
14. Second summer	10 days—2 weeks after No. 13	Lead arsenate 3 lb Copper sulfate ¾ lb Hydrated lime 1½ lb	Second brood codling moth, Bitter rot	If bitter rot has been a factor see note, Page 2.
15. Third summer	10 days—2 weeks after No. 14	Lead arsenate 3 lb Copper sulfate ¾ lb Hydrated lime 1½ lb	Second brood codling moth, Bitter rot	If bitter rot has been a factor see note, Page 2.

* ** Commercial orchards may need only these sprays.
** Home orchards should have at least these sprays. See Ky. Ext. Cir. 353, "Sprays for the Home Fruit Garden."
See Ky. Agr. Exp. Sta. Bul. 393, "Fruit Pests and Their Control," for a more complete discussion of insects and diseases.

healthy plants should not be touched until the hands have been washed with soap and water. If mosaic plants are encountered in burley fields at topping time, they may be left untouched until cutting time, or topping may be delayed until most of the plants are in bloom, when all may be topped together without injury to the crop. Mosaic causes more injury to dark tobacco when spread at topping time than to burley because dark tobacco is topped earlier than burley. Consequently, efforts should be made to have the field free from mosaic at topping time. If mosaic plants are found they should be passed without touching and topped last.

Horn-worms should be controlled by dusting rather than by hand worming. Handling the plants may spread mosaic, especially when the plants are wet.

A concentrated solution of trisodium phosphate destroys mosaic on the hands immediately. It may be used to free the hands from virus very effectively when working in the bed or field.

Curing

To produce well-cured leaf and to prevent houseburn in burley tobacco keep the relative humidity between 65 and 70 percent. Relative humidity above 85 percent is almost sure to darken tobacco and reduce its value, while long exposure to such high humidity may cause houseburn.

Ask your county agent for Kentucky Extension Leaflet "Tobacco Varieties That Have Proved Their Worth"

50M—2-43

HOW TO CONTROL TOBACCO DISEASES

Cooperative Extension Work in Agriculture and Home Economics, University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating

For:

U. S. Department of Agriculture
EXTENSION SERVICE
WASHINGTON, D. C.

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HOW to Control TOBACCO DISEASES

Kentucky Agricultural Experiment Station

• • • Practical steps from selecting seed to curing the crop



Tobacco resistant to root-rot and protected from other diseases produces, on fertile soil, a high yield of excellent quality leaf

Leaflet 11

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky February, 1943

How to Control Tobacco Diseases

By W. D. Valleau[1]

Every tobacco grower should try to reduce the chances of crop failure as much as possible. There are many diseases of tobacco, some of which can be prevented completely by right management of the crop. It is not always easy, of course, for a grower to become familiar with the details of each of the many diseases that attack tobacco and with the methods of prevention recommended for each. By closely following the recommendations given here, however, a grower should be able to protect his crop against all diseases for which control methods are known, without requiring a detailed knowledge of any one of them.

Plant Root-Rot Resistant Seed

Plant seed of a satisfactory variety resistant to black root-rot, if possible, and plant no other kind until a better variety has been found and has definitely proved itself to be better. Don't save seed from plants affected with ring spot. Chemical treatment of seed probably is helpful, but is not recommended for any specific purpose.

Plant Beds

For the plant bed, select a site each year where tobacco has not been grown previously. A bed used year after year becomes infested with the black-root-rot fungus unless burned or steamed thoroughly or a highly resistant strain of tobacco has been grown. There is danger of the blue-mold fungus being carried over in an old bed and of the disease developing about 2 weeks earlier than it otherwise would. Beds should be located away from tobacco barns or other sources of tobacco trash and, if possible,

[1] Plant Pathologist, Kentucky Agricultural Experiment Station.

where there are few narrow-leaf or broad-leaf plantains, horsenettles (bullnettle) or ground-cherries affected with mosaic. Burn or steam the bed very thoroughly so that little weeding will be necessary. If horsenettles or ground-cherries are found in the bed it is best not to handle them at all, either while weeding or pulling, because they sometimes carry mosaic. Removing them while weeding or pulling has sometimes resulted in heavy field infection. Never use ground tobacco stalks or other tobacco material, unless sterilized, on the bed as a fertilizer, because it is nearly certain to introduce mosaic. Commercial fertilizers are safe and are as effective as tobacco materials.

Serious injury occurs in dry seasons from the use of too much fertilizer on the bed. Consequently, about 30 pounds of 6-8-6 or comparable fertilizer should be used on a steamed bed 12 feet wide by 100 feet long, or about the same amount of 6-8-0 or comparable fertilizer on a burned bed, because the wood ashes furnish enough potash.

To produce stalky plants sow a level teaspoon of seed on 35 to 45 feet of bed 12 feet wide. Sufficient bed space should be provided so that beds need not be pulled over more than twice. Repeated pulling spreads mosaic. When the plants are established in the bed; that is, when the first leaves are just developing, and again 10 days later,[1] sprinkle the bed with 3-4-50 bordeaux mixture (bluestone-lime) at the rate of 1 quart per square yard or 50 gallons to a bed 12 feet wide by 150 feet long or 9 feet wide by 200 feet long. This prevents the bacterial diseases, angular leaf-spot and wildfire from developing in the bed.

[1] For the duration of the war copper compounds will be difficult to obtain. It is therefore recommended that only one application be made because experience has shown that it will result in satisfactory plants, although some leafspot infection may develop in the bed.

Don't Chew or Smoke While Handling Plants

It has been clearly demonstrated in Kentucky that cured tobacco is the source of most of the mosaic infection of tobacco plants before and during transplanting. Therefore do not use natural leaf tobacco for either chewing or smoking and do not carry it or otherwise handle it while working around the plant bed. If natural leaf tobacco has been handled recently, scrub the hands thoroughly with soap and water before handling plants in the bed. If natural leaf tobacco has been carried in the pockets, brush them out, after which plug or twist tobacco may be substituted. Commercial plug, twist, and scrap chewing tobacco usually are free from mosaic and are much safer to use while working with plants than natural leaf tobacco. Pipe smokers who work with tobacco plants should use a brand of canned smoking tobacco rather than the natural leaf. Manufactured cigarettes probably are safe to use while working with the plants. It is preferable, however, to use no tobacco whatever when working in the plant bed.

Field Practices

Do not set plants from a bed known to be affected with black root-rot unless the field soil is known to be distinctly acid. Do not set plants from a neighbor's bed unless it is known positively that no barn-cured tobacco has been used by workmen while weeding or pulling plants. Soil high in organic matter, liberal applications of high-grade fertilizer, and liberal applications of manure all tend to reduce blackfire. They will also reduce firing and increase yield and quality, especially in dry seasons.

The few mosaic plants found at first cultivation or at any time when the plants are small should be removed from the field, preferably ahead of cultivation. If this is done by hand,

for, and the broccoli or cauliflower would return conservatively 10 times the cost of the pound of rotenone or pyrethrum dust.

Now, if the duster had an upturned nozzle, making it possible to apply the insecticide on the leaves' undersides where the Mexican beetle feeds, the garden could be widened to 9 feet 6 inches, to accommodate a 50-ft. row of Stringless Greenpod beans. This row would provide about 15 5-person servings, spread over about 3 weeks. If the first planting were made April 15, another of the same variety could replace it about July 15, to make beans in late September or in October, when beans are often at a premium. After the beans are harvested, sow rye for winter cover, to be spaded under the next spring.

The first dusting for Mexican bean beetle is made when the first eggs come, a second, in 10 days and, if needed, a third, in 10 days again. The eggs are bright yellow, on the under sides of the leaves. Only rotenone or pyrethrum are safe to use after the beans are in pod. Edible soybeans may be planted instead of the Greenpods, as the bean beetles are less likely to bother the soybeans.

The foregoing garden is by no means a "complete garden," but the vegetables produced in it will be worthwhile. Obviously, it may be added to finally, to take the whole back lawn, but only after having thought the matter through.

For information on a complete garden "for a family of five" write for Leaflet "Your Vegetable Garden in 1943," College of Agriculture and Home Economics, Lexington.

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Kentucky Agricultural Library Collection

Victory Gardens for City People

By JOHN S. GARDNER

MANY CITY DWELLERS who have a little good ground and some spare time will grow some of their own vegetables this year. In this way they will assure their families of certain foods they might not otherwise be able to get, and at the same time they will help toward our total production of food for war.

Though it is important to produce as much food as possible, it would be wrong for gardens to be planted on soil where they would not grow, or to be put out by persons who would neglect them and let them go to weeds. It is usually not a good idea to dig up the front lawn for vegetables, for often the lawn has only an inch or two of good soil, the rest having been graded in from the excavation of the basement. Such soil will not produce a good garden.

But if there is a backyard where the soil is good and tree roots and shade do not interfere, vegetables will thrive. The garden may have to be small, but this is met by using only a small number of vegetables, so that what is produced is a real contribution to the food supply. As no two garden sites are the same, what follows must be general, but it may be helpful, nevertheless.

Leaflet 12

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Service

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky February, 1943

A PLANTING PLAN

At one edge of the lot, if soil is good and trees or shrubbery (as a hedge) not too close, the garden may be started. The amount of space that can be used for the garden will determine how much of this garden plan should be used.

If the edge of the lot is, say, 50 feet long, spade a strip 4 feet wide. If you can get it, spade under 5 bushels of stable manure. After spading, broadcast evenly 5 lb of superphosphate or any of the mixed fertilizers recommended for gardens, and work it into the soil with a hoe or a rake. Make the seed bed so that the soil particles are as fine as the smallest seed to be sown, for a depth of at least 2 inches below the seed.

About April 1, lay off, lengthwise, 3 furrows, 12 inches apart and ½-inch deep, and divide the garden into 4 equal parts. In one part set 1 pint of yellow onion sets; in the other 3 parts sow 1 packet each of White-tipped Turnip radishes, Southern Curled mustard, and Grand Rapids lettuce, and cover by light raking.

May 1 to 15, set (among the growing crops) evenly, down the middle of the garden, 15 Break O'Day or Marglobe tomato plants, and drive a 4-foot stake beside each. As the tomato plants grow, they should be "suckered," by removing the clusters of leaves that arise in the crotch at each main leaf, which would later become branches. The plant, now one-stemmed, should be tied to the stake, under every other flower cluster, as these appear, by a loop of soft twine or a strip of cloth, passing the tying material twice about the stake to keep it from slipping, and leaving the loop about the plant LOOSE.

As the radishes and the other crops are removed, cultivate the garden to keep weeds out. Scraping with a hoe, by holding the blade flat with the soil surface, is the best way to cultivate.

About August 1 (the spring crops between the tomatoes having been harvested long ago) the surface should be scratched fine, but not deeper than 2 inches, as the tomato roots lie shallow.

Then, a mixture of Seven Top greens, radishes, Purple Top Globe turnips and Siberian kale, 1 pkt. each, should be sown broadcast, raking the seed in lightly.

The vegetables so far named are usually bothered very little by insects, saving the trouble and expense of spraying, but the tomato plants could be kept green and thrifty, increasing their yield, by spraying with bordeaux mixture when they first straighten up (after setting) and again in 2 weeks and in 2 weeks again. For these three sprayings you would need 1 pound of prepared bordeaux (from drugstore or seed house) and an inexpensive "flit" sprayer.

From this 4′ x 50′ garden would come produce in really usable amounts. There would be 15 to 20 5-person servings of early greens, 50 to 100 pounds of tomatoes between July 1 and frost, and late greens until killing frost, with the possibility of early spring greens the year after.

Instead of the late greens, barley or rye could be sown broadcast (½ lb. of seed), a cover crop, to spade under next spring in lieu of stable manure, as soil "conditioner."

FOR A SLIGHTLY LARGER GARDEN

The garden may be made larger by spading another foot, sowing a 50-ft. row of Chantenay carrots, ½ oz. of seed. Or the row may be half carrots (¼ oz.) and half Crosby Egyptian beets (½ oz.); or, Swiss Chard (1 pkt.) half the row, and beets or carrots. These three add no serious insect-control problems, and all are "vitamin" foods.

If 2 feet more could be spared, making the garden 7 feet by 50 feet, 2 dozen "frostproof" Copenhagen cabbage plants could be set, or 1 dozen cabbage and 1 dozen Calabrian broccoli or Snowball or Long Island cauliflower. With these would come the green worm, to be controlled with rotenone or pyrethrum dust, the only insecticides to use on vegetables whose plant parts are used for food. A half row of cabbage would more than pay for the needed duster, usable over several seasons if well cared

7. Entrance or membership fees, or in lieu of fees, the capitalization of the association, the amount of common and preferred stock, its par value, maximum dividend rates, and stock requirements for membership
8. Method of making amendments to the bylaws

Step V: Marketing Agreement

An association may operate successfully either with or without a marketing agreement or as the agreement is sometimes called, a membership contract. Such a contract is, however, a very valuable device for determining the approximate volume of business to be expected. If such an agreement is used care should be taken to set forth carefully the privileges and obligations of both the association and the members. Cooperatives other than marketing associations use membership contracts instead of marketing agreements or contracts. Suggested forms for marketing agreements, articles of incorporation, bylaws, and organization agreements may be had on request from the College of Agriculture and Home Economics, University of Kentucky.

First Official Meeting

When the articles have been filed and the charter received from the Secretary of State, the bylaws must be adopted by a majority vote of the members. The members at this first official meeting of the new corporation comprise the incorporators only, and they have the power to approve the bylaws. The other business to be done at this meeting is to elect the permanent directors and officers.

The board of directors when elected then have the immediate duty of adopting marketing agreements, setting up permanent working committees, hiring adequate management, securing a business location, and providing building, equipment, machinery, and suitable financial structure for the organization.

Care in setting up the new organization to assure sound structure is but the first step toward successful cooperative effort. Continued success in the business will depend upon well-informed participation by the members; active, honest, and intelligent administration by the directors; and energy and capability of management.

10M—2-43

HOW TO START A MARKETING COOPERATIVE

For:

Cooperative Extension Work in Agriculture and Home Economics, University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating

U. S. Department of Agriculture
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OFFICIAL BUSINESS

Penalty for Private Use to Avoid Payment of Postage, $300

HOW to Start a Marketing Cooperative

Describes the various steps and duties in organizing, from forming the first committees to holding the first official meeting

Leaflet 13

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky February, 1943

How to Start a Marketing Cooperative

By L. A. Vennes

Cooperatives do not "just grow." Instead, they are the result of concerted, well-planned action by persons who see the need for cooperative business and choose a time to do something about it. These persons set up committees to prepare the way for the cooperative. Their duties fall into a series of definite steps:

First, to formulate the broad, general plans of the cooperative

Second, to draw up an organization agreement and secure definite commitments from prospective members

Third, to draw up articles of incorporation and attend to the incorporating of the association

Fourth, to draw up tentative bylaws to be adopted by the association after incorporation

Fifth, to draw up a marketing agreement form, if such is to be used by the association

Organization agreements, articles of incorporation, bylaws, and marketing and membership agreements are legal documents that chart the future course of the cooperative. They must all be in keeping with Kentucky law. Though there are two state acts under which marketing and buying cooperatives may be incorporated, most Kentucky cooperatives have found it to their advantage to incorporate under the Bingham Cooperative Marketing Act. Its requirements are general enough to enable most farmer cooperatives to qualify under it. Kentucky also provides for the formation of credit unions; mutual insurance; sheep protective, rural electric, and burial associations. Steps in their formation depend on the act under which they are incorporated but the general procedure follows the suggestions in this paper.

Step I: General Plans

The committee that formulates the general plans for the cooperative must consider and decide:

1. What services the cooperative will perform
2. How much capital will be needed
3. How the capital will be raised
4. Whether the cooperative will be a stock or a nonstock organization

Step II: Organization Agreement

After the general scope and nature of the cooperative has been decided, the next step is to draw up an "organization agreement" and get commitments from prospective members on the volume of business they will furnish the proposed cooperative and the amount of capital they will contribute to get it started. The extent to which the farmers are willing to pledge business and capital to the new venture finally determines whether the cooperative should be started, and if so, the form its organization should take.

The organization agreement therefore should show:

1. Services the proposed organization will perform
2. Names and addresses of the organization committee
3. Important provisions to be included in the bylaws
4. A statement of the minimum number of members and minimum volume of business or of capital required for organization of the cooperative, and statement that failure to reach these minimum goals by a given date voids all agreements
5. A pledge that the organization committee will keep accurate and complete records of all expenses and that in event of failure to complete the organization all unexpended funds will be returned to the contributors
6. A form to show the volume of business and amount of capital the prospective member pledges to the cooperative, and a place for his signature under this pledge
7. A pledge of the member to sign a membership or marketing agreement with the proposed cooperative when formed

Step III: Articles of Incorporation

Rules for drawing up articles of incorporation are very fully stated under the Bingham Act, but certain changes may be made to adapt them to the needs of the association being incorporated.

The articles of incorporation should include:

1. The purposes for which the corporation is formed and its powers. Include under "purpose" any activity into which the corporation proposes to enter now or might enter later.
2. Membership requirements.
3. Whether it is a stock or nonstock corporation. If a stock corporation it must show the number of shares of stock and its par value, and if there is preferred stock the extent of its preference.
4. The life of the corporation, which may not exceed 50 years.
5. Names of the directors. The Bingham act requires a minimum of five.

6. Principal place of business. Some business but not all must be done at this place.
7. Date of the first annual meeting.

Rules for the conduct of the business need not appear in the articles of incorporation but they should be included in the bylaws.

After the articles of incorporation have been prepared and approved by the organization committee the following steps should be taken:

1. Get the signatures of twenty farmers on each of 3 copies of the articles of incorporation.
2. Secure the acknowledgement of the articles by one of the incorporators, before an official authorized by law to take and certify acknowledgements of deeds and conveyances.
3. File the articles in the office of the Secretary of State.
4. Record the articles in the county clerk's office of the county in which the principal place of business is located.
5. File a certified copy of the articles with the dean of the College of Agriculture, University of Kentucky.
6. Accompany the copy of articles sent to the Secretary of State with a check of $10.00 to cover filing charges, and a second check in the amount of 25 cents per hundred words to cover recording charges.

Step IV: Bylaws

An organization forming under the Bingham Cooperative Marketing Act must adopt bylaws within 30 days after its incorporation. While the bylaws of the corporation must be adopted *after* incorporation, farmers' associations frequently prepare and tentatively adopt bylaws before incorporating, as a convenient method of deciding upon many of the details of organization. When this is done, they can be formally adopted as the bylaws of the association after incorporation has been effected.

Bylaws set forth rules to govern the business of the association. They should always be formulated to meet the local situation but the following points should in general be covered:

1. Requirements for membership
2. Location of the principal office
3. Time, place, and manner of calling and conducting meetings
4. Number of stockholders or members constituting a quorum
5. Number of directors of the association and method of electing them
6. Qualifications, compensation, duties, and terms of office of officers and directors

HOW TO IMPROVE OLD PASTURES

1. Topdress old rundown pastures with a mixture of 2 parts of fine-ground limestone and 1 part 20-percent superphosphate at the rate of 1,000 pounds per acre.
2. Reseed thin pastures in early spring with lespedeza and ryegrass.
3. Topdress thin spots with light applications of manure or tobacco stalks to increase pasture growth.
4. Spread the manure dropped on pasture by livestock with a harrow or light form of drag.
5. Roll pastures in early spring.
6. Drill small grain in old pastures in early fall to provide additional winter and early spring pastures.

HOW TO MAKE GOOD-QUALITY HAY

Good quality legume hay is grown on a fertile soil and cured to retain its leaves and green color. Try to make green leafy hay. Alfalfa, red clover, and lespedeza are among the best legume hays for cattle and sheep.

1. If soil needs lime and phosphate, spread 2 tons of lime and 300 pounds of phosphate per acre.
2. Cut the crop in the early bloom stage.
3. Rake into small windrows as soon as wilted.
4. Store under shed as soon as sufficiently cured.

PROVIDE WINTER PASTURE

Winter pasture lowers feed cost and helps to keep animals healthy.

1. Sow ryegrass or small grain, especially Balbo rye, barley, or oats, as soon as possible after tobacco, soybeans, and corn are harvested.
2. To increase the value of the winter pasture, sow crimson clover or vetch with the Balbo rye, barley, or oats.
3. Use liberal rates of seeding: 2 bushels of rye or barley, 3 bushels of oats, or 30 pounds of ryegrass.
4. If soil is acid or deficient in phosphate, apply 2 tons of limestone and 300 pounds of superphosphate, or 1,000 pounds of a mixture of 2 parts fine-ground limestone to 1 part superphosphate.

PRODUCE-MORE-BEEF RECORD

(If several calves have been fed, give figures for the whole lot.)

	Bushels	*Value*
Corn fed	_____	$_____
Oats fed	_____	$_____
Barley fed	_____	$_____
Other feeds		$_____
		$_____
		$_____
Total feed		$_____

Total days pasture_____; kind_____; $_____

Total roughage fed_____; kind_____; $_____

Cost of grain, pasture, and hay $_____

Weight of calf or calves at start _____; at end _____; gain _____

Value of calf or calves at start $_____; sale value $_____

Net income: $_____

Date project started _____; date closed _____; Plan No. _____

Name _____

Age _____ County _____

Address _____

Club year 194_____

Years in club work _____; years in this project _____

Signed _____
Club Leader

_____
County Agent

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How 4-H Clubs Can Produce MORE BEEF

THE OBJECT of the beef project in 1943 is to produce, at the least cost, on every Kentucky farm, as much meat as possible for our homes, our armed forces, and our allies. The need for food is urgent and almost unlimited. Boys and girls who help produce it will have a part in keeping our citizens fit to do their work in a period of war.

SIZE OF PROJECT

Feed and finish 1 to 10 calves to a weight of 700 pounds or over. From the 4 plans given in this leaflet use one or more of them.

SELECTION OF A CALF

Select a calf weighing 300 to 500 pounds. Choose a purebred calf or a good grade calf of any breed of beef cattle. Pick one that has a wide, deep, blocky form; short, straight legs; straight top line; short, broad head, with a broad muzzle; well developed for its age but not necessarily in high condition.

PLAN NO. 1

This plan is for a spring or summer calf, 3 to 6 months old, weaned, and to be sold in the fall of the following year. As soon as the calf is selected start feeding as follows:

1. Begin with ¼ pound of corn and ¼ pound protein supplement. Increase these gradually

Leaflet 14

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

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for 15 days. Then feed daily 5 pounds of corn and ½ pound protein supplement. For protein supplement, use either soybean oilmeal, linseed meal, or cottonseed meal.

2. Feed 6 to 8 pounds of hay daily.

3. If corn silage is substituted for hay, feed 3 pounds of it for every pound of hay replaced. A calf will eat 10 pounds of silage and 3 to 5 pounds of hay daily. If corn silage is fed, increase protein supplement gradually to 1 pound per day, in 15 days.

4. Use permanent pasture or small-grain pasture in fall and winter. If a cover-crop pasture is used during winter, accustom the calf to it gradually, grazing in afternoon only. Frozen cover crops may cause digestive disturbances.

5. In early spring, graze cover-crop pasture rather than the young permanent pasture.

6. Start calf on summer pasture in May, and gradually reduce the grain feeding until at the end of 15 days no grain is fed.

7. Start feeding grain again on August 1st, or sooner if grass fails. Begin feeding corn-and-cob meal, shelled corn, or a mixture of cracked corn and crushed barley at the rate of 1 pound daily. Gradually increase to a full feed in 3 weeks. A full feed of grain on pasture is about 1½ pounds of feed for each 100 pounds of calf. Feed calf once a day. Feed protein supplement beginning with ¼ pound daily. Gradually increase for 15 days until you feed 1 pound daily. Continue until the calf is sold.

8. Provide fresh water, and in separate containers, salt and ground limestone.

PLAN NO. 2

This plan is for a spring calf from a good milking cow; the calf to be sold in late fall or early winter.

1. Breed cow in early summer in order to have the calf early the following spring. Calf should be sired by a good purebred beef bull.

2. Run calf with cow on grass.

3. Castrate bull calf when 60 to 90 days old.

4. On September 1 start feeding ¼ pound of grain daily. Increase grain gradually until about 1½ pounds is being fed.

5. Wean in October.

6. After weaning, bring gradually to full feed of grain in 15 days. A full feed is 1½ pounds of grain for each 100 pounds weight of calf. Feed 8 parts of grain to 1 part of protein supplement. The grain should be corn-and-cob meal, shelled corn, or a mixture of cracked corn and crushed barley. For protein supplement use cottonseed meal, soybean oilmeal, or linseed meal. Continue full feeding until calf is sold.

7. The calf should be on pasture most of the time from the day it is born until it is sold.

8. If the calf's dam is part dairy breeding and continues to produce a good flow of milk through late summer and fall, and if an abundance of palatable, nutritious pasture forage is available, the calf may be sold off the teat without having received grain. A calf handled in this manner should be marketed the same day it is taken off its dam.

9. Provide fresh water; have available in separate containers, salt and ground limestone.

PLAN NO. 3

This plan is for a spring calf, with high grade beef cow, to be sold during the summer or fall of the following year.

1. Breed cow in early summer in order to have calf early the following spring. Calf should be sired by a good purebred beef bull.

2. Run calf with cow on grass.

3. Castrate bull calf when 60 to 90 days old.

4. On September 1 start feeding ¼ pound of grain daily. Gradually increase to the limit of the calf's appetite.

5. Wean in October or November.

6. After weaning, increase grain to 7 pounds. This amount can be fed until about May 1st, when calf is turned out on permanent pasture. Gradually increase grain to full feed in one month. Continue full feed until the calf is sold.

7. Feed all the good roughage the calf will eat, throughout the winter.

8. Use fall and winter permanent pasture or small grain pasture. A full feed is about 1½ pounds of grain for each 100 pounds weight of

the calf. Feed 8 parts of grain to 1 part of protein supplement. The grain may be corn-and-cob meal, shelled corn, or a mixture of cracked corn and crushed barley; and the protein supplement may be cottonseed meal, soybean oilmeal, or linseed meal. Continue full feeding until spring.

9. Reduce roughage and protein supplement when spring pasture becomes available.

10. Begin feeding ¼ pound protein supplement again by July 1st. Gradually increase to 1 pound in 15 days. Continue this amount until calf is sold.

11. Provide fresh water, and have available in separate containers, salt and ground limestone.

PLAN NO. 4

If extra quality baby beeves are to be developed for the Fat Stock Show in Louisville they should be fed and handled as recommended in Circular No. 374.

SOME PRACTICAL CONSIDERATIONS FOR ALL PLANS

1. Good pasture forage is high in protein, vitamins, minerals, and carbohydrates; and Kentucky can produce an abundance of such pasture forage as economically as any other section of the United States. Such forage by itself will produce gains on thin steers at about 1/3 the cost of hay and grain fed in drylot.

2. Feeder steers grazing on the best pasture by itself will gain about ¾ as fast as on a full feed in drylot.

3. Grazing poor, rundown pasture is never profitable since the forage is so scant and low in quality that steers gain only 1/3 as fast at 3 times the cost per pound as steers grazing on fertile, well-managed pasture.

4. Wartime ceiling prices and meat rationing will probably result in less difference in price between steers finished with a long feed in drylot and steers grown out mainly on grass and home-grown roughage and then finished with grain on pasture; there may be no difference in price.

cases on slatted platforms so that air can circulate underneath.

5. **Avoid rough handling of eggs** and all unnecessary jarring of them. Aside from danger of breakage, such jarring breaks down the egg whites and makes the air cell move out of place. Eggs so treated deteriorate rapidly.

6. **Market eggs as frequently as possible.** Keep them moving to the larger market centers or cold-storage plants.

7. **Don't store eggs near kerosene, nor in the same room with raw furs, onions, cabbage, potatoes.** Even through the wooden cases, eggs rapidly absorb the odors of such products and are made unfit for table use.

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For:

Fresh, Clean EGGS for Market

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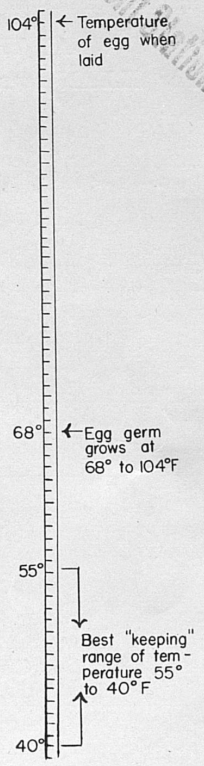
BY KEEPING EGGS CLEAN AND FRESH, Kentucky farmers and dealers would gain at least a million dollars annually. That is the amount now lost from spoiled eggs and price deductions for inferior quality. Better management by farmers and better handling methods by truckers and dealers would prevent much of this loss. Dirty eggs spoil quicker than clean ones, and are less attractive to buyers; and spoiled eggs can neither be eaten nor hatched. Keep them clean, and keep them cool!



Leaflet 15

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky 15M—2-43

Fresh, Clean Eggs for Market

By C. E. Harris

Getting eggs to the consumers fresh and clean is a job that must have the cooperation of all who handle eggs. To improve the general quality of eggs in a broad market area, so that buyers for consumer markets will pay a premium price for eggs from that area, requires the most widespread adoption of good methods of handling eggs.

WHAT THE FARMERS CAN DO

For CLEAN eggs —

1. **Provide at least 1 nest for each 4 hens.** Unless enough nests are provided, hens are likely to crowd one another when laying. Crowding breaks eggs; broken eggs soil nests; soiled nests smear clean eggs.

2. **Face nests so that the hens will enter on side next to the wall.** Leave a passageway between wall and nests large enough for the hens to get in, and place a drop door on the side of the nests away from the wall, for gathering eggs. In the dark nests provided by this arrangement there will be less fighting and crowding than in lighter nests, and fewer broken and dirty eggs.

3. **Keep plenty of hay, straw, or shavings in nests** to prevent breaking of eggs and to absorb moisture from droppings and broken eggs.

4. **Keep a deep litter on the floor.** Mud or manure, clinging to the feet of hens, will lodge in the litter instead of in the nests to soil the eggs.

5. **Keep hens away from droppings** by using dropping pits or dropping boards. How to equip a poultry house with these devices is explained in Kentucky Extension Circular 351.

6. **House hens until noon on rainy days.** Hens with muddy feet soil nests and eggs.

7. **Use a cloth or egg-cleaning brush** dampened with a mixture of vinegar and water to remove dirt spots. Do not wash dirty eggs; washed eggs deteriorate more readily than unwashed eggs.

For FRESH eggs —

1. **Produce infertile eggs;** sell or confine all roosters. A high percentage of fertile eggs are thrown away in hot weather as rots; and the rest may not

reach consumers in good condition in summer. At temperatures above 68° F. incubation takes place. Blood rings, the result of beginning incubation, occur only in fertile eggs.

2. **Sell broody hens.** By sitting on nests they keep eggs laid by other hens warm, and if the eggs are fertile may start incubation.

3. **Gather eggs in wire baskets at least twice a day.** Eggs, when laid, register 104° F. Unless gathered frequently they will be kept too warm by hens using the nests. Warm eggs deteriorate badly even though they are infertile.

4. **Put the eggs at once in a cool place,** such as a cellar or basement, and leave them in the wire baskets over night to cool. These baskets allow air to circulate around the eggs so that all are cooled.

5. **Case the eggs small end down** to keep the yolk well centered and to prevent breaking the air-cell membrane usually found at the large end of the egg. Eggs spoil when this membrane is broken.

6. **Keep the cased eggs in a cool, moderately humid place until marketed.** Such a temporary storage room prevents evaporation of water from the egg white and enlargement of the air cell. A large air cell means a low-quality egg. When eggs are stored in a basement, keep the baskets or cases off the floor by placing them on wooden strips.

7. **Keep eggs away from onions, cabbage, potatoes, and kerosene.** Eggs absorb such odors.

8. **Market eggs 2 or 3 times a week, if practical.**

9. **Sell to dealers properly equipped to handle eggs.** By so doing, you will help build up the reputation of your market area for good-quality eggs, and therefore strengthen the local price of eggs.

WHAT TRUCKERS AND DEALERS CAN DO

1. **Protect eggs from sun.** Truckers who pick up eggs at the farms should make provision for shading the cases, to prevent their being unduly heated by the sun. Covered trucks are best; a tarpaulin or similar covering over the cases is next best.

2. **After candling the eggs, case them small end down,** to keep the yolk well centered and prevent breaking the air-cell membrane.

3. **While holding the cased eggs for shipment, store them in a cool, moderately humid place.** A temperature between 40° and 55° F. is best.

4. **In stacking the cases of eggs for storage, leave space between the cases** for air to circulate around them and cool them more readily. Stack the

parts of large ones can be easily fenced off. Where hogs range over too large areas, considerable corn may be wasted.

Leaving a few shucks on the ear does not impair feeding value, but permits the corn to be gathered more quickly. Large wagon beds for hauling corn to crib reduces the number of trips required. The use of "bang boards," and "scoop boards" on the wagon bed saves both corn and labor.

Grow All the Corn You Can This Year — It Is Badly Needed

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For:

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Grow More Corn with Less Labor

By E. J. NESIUS and W. C. JOHNSTONE

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CORN is a vital war crop. It is one of the best of all grains for feeding meat animals; and it will produce more feed per acre in Kentucky than any other crop on the same land, with the possible exception of alfalfa. Unless more bushels of corn and other grains are produced this year farmers will find it almost impossible to feed out their greatly expanded numbers of livestock. Both acreage and yield must be maintained, and if possible increased. But it takes labor to produce corn, and farm labor, too, is short. The only way out is to grow "*more* corn with *less* labor." This leaflet gives some suggestions on how to get the job done.

Use Machinery to Full Capacity

Many farmers still use labor-consuming practices, and the general opinion is that corn takes lots of labor. By changing to labor-saving practices and by full neighborhood cooperation in use of machinery on hand, the labor needs per acre of corn can be reduced in many cases as much as half. Farmers using power machinery have a great advantage over those using horse-drawn machinery, as shown by these figures on hours needed to produce an acre of corn:

Leaflet 16

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
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Corn grown with tractor plow, disk, and cultivator and—	*Hours*
Harvested with mechanical picker	10 to 15
Harvested from standing stalks by hand	15 to 20
Harvested from the shock	25 to 30
Corn grown with the usual horse-drawn equipment and—	
Harvested from standing stalks by hand	25 to 30
Harvested from the shocks	35 to 40

These figures do not include the production of corn in the hilly and mountainous regions of Kentucky where the use of small implements and hand work increases the labor required.

Produce High Yields Per Acre

High yields lower the amount of labor needed per bushel. To plow the ground, prepare the seedbed, plant the corn, and cultivate a crop yielding 20 bushels an acre takes about the same labor as for a crop of 40 bushels an acre. Even though somewhat more labor is needed to harvest the higher yield, the total labor needed per bushel of corn grown is almost cut in half by doubling the yield.

The way to get high yield is to plant certified hybrid seed corn on productive soil. Plant your corn on good land, and use good soil-management practices. See Leaflet 18, "Soil-Improving Materials . . . Get the Most Out of Them."

Plant Tested Seed

Seed corn tested for germination and graded for uniform size of kernel, when properly planted, requires neither thinning nor replanting. Certified hybrid seed corn saves labor not only because of good germination but because the stalk will withstand wind and disease, making it easier to cultivate and harvest. Plant it about 25 percent thicker than open-pollinated varieties, on fertile soil, and at about the usual rate on soils low in fertility. Closer planting gives higher yields; and earlier shading of the ground reduces weed growth. For more information on hybrid corn, see Leaflet 7, "Plant Hybrid Corn This Year!"

Plow in Winter

Unless erosion is a problem, break land during the winter to relieve the rush period in April. Winter

cover crops may be turned under later, after they have furnished additional pasture, or made more growth for green manure.

Make Good Seedbed and Cultivate Only to Control Weeds

Thoroughly disk, drag, and harrow the field before planting, to reduce the number of cultivations needed later. Cultivate only when needed to control weeds. Two or three cultivations are enough when the field is thoroughly prepared. Use a spiked-tooth harrow for the first one.

Plant for Early Harvest

Plant at least part of the corn to mature early so that labor for cutting, or harvesting from the standing stalk, can be spread over a longer period with less rush on fall work. Corn planted the last week of April or the first week of May usually matures early enough for this purpose and besides produces high yields. Early harvesting also permits a longer use of land for winter pasture.

Method of Harvest Greatly Affects Labor Needs

Hours of labor required for harvesting corn by different methods is shown in the following tabulation:

	Hours per acre
Hogging down	1.0
Mechanical picker	3.0
Snapping from standing stalk	6.7
Husking from standing stalk	8.0
Cutting and snapping corn from the shock	16.7
Shredding	22.0
Cutting and shucking corn clean from the shock	23.0
Ensiling	25.0

Harvesting corn from the standing stalk requires 10 hours less labor per acre than cutting, shocking, and husking. Cutting and shocking saves more of the stover for feed and permits earlier seeding of cover crops. However, early hybrids mature 15 to 20 days earlier than the open-pollinated varieties adapted to Kentucky and may be harvested from the stalk early enough to sow wheat, rye, or oats. Stalks well disked down give added protection to these small grains, or to grass and legumes.

Harvesting corn by hogging down takes the least labor and is practical where fields are small or small

Bill of Materials for Sun Porch

4 pcs. 1″ x 4″ x 6′-0″ sides
4 pcs. 1″ x 4″ x 5′-0″ for 2 ends
3 pcs. 1″ x 4″ x 4′-8″, floor braces
4 pcs. 1″ x 4″ x 2′-0″, posts or legs
2 pcs. ½″ hardware cloth 30″ wide, 6′-2″ long (bottom)
1 pc. 1″ chicken wire 15″ wide and 20′-0″ long for end and two sides
3 pcs. 1″ x 4″ x 5′-0″ for ends and center of cover
2 pcs. 1″ x 4″ x 6′-0″ for sides of cover
2 pcs. 1″ chicken wire 30″ wide and 6′-0″ long to cover top

How to Operate the Brooder

The lamps should be placed in the bottom section of the brooder two days before the chicks are put in. This will give time to learn the amount of heat needed and to regulate the flame to keep the brooder warm. The sand used as litter in the removable tray will also become warm and dry. Be sure to allow at least 1 inch of space between the top of the lamp chimney and the floor of the brooder.

If the weather is extremely cold, the brooder may be placed in a building with the front of the brooder facing a window for light, but in ordinary weather it should be outside on the south side of a building. If the brooder is inside a building, less heat and less kerosene will be required. In this case the floor around the brooder must be kept free from straw or other trash to avoid fire hazards.

Clean the brooder at least once the first week and twice a week thereafter. Never use straw for litter in this type of brooder, since it burns easily, does not hold the heat as well as sand, and is more difficult to clean out.

As soon as the chicks will use the sun porch, feed and water should be placed there rather than in the brooder. Feed sacks extending from the top of the sun porch to the ground on the three exposed sides will serve as a wind breaker and encourage the chicks to use the sun porch at an early age.

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How to Make a LANTERN BROODER (with Sun Porch)

By Stanley Caton and Jesse B. Brooks

Kentucky Agricultural Experiment Station

CHICK BROODERS made on the plan described in this leaflet have been found satisfactory for brooding 50 to 60 chicks at a time. In general, when raising a small number of chicks, it is better to use a lantern brooder than to depend on hens to brood them.

Directions for Building

(See the drawings on page 3)

Section 1 (Bottom section)

Sides and ends of bottom section made of 1″ x 12″ boards. Before nailing together, cut out and hinge the 8″ x 10″ door as shown in one of the sides. Nail a 1″ x 2″ x 2′ strip above the door on the inside to strengthen the weakened side. Cut the boards to correct lengths, allowing for thickness of boards, so that the section will be exactly the dimensions shown. Make three ½″ openings on two sides of this section for ventilation.

Section 2 (Removable tray)

Made of 1″ x 4″ boards fastened together with ½″ corrugated wood fasteners driven at an angle to the grain in the boards. A tin bottom is nailed with small shingle nails to the bottom of the tray so that the lamp flame will not come in contact with wood. After building Section 3, nail 1″ x 1″ x 4″ blocks on the top and bottom sides of Section 2 to keep it from slipping.

Section 3 (Section over tray)

Sides made of 1″ x 12″ boards trimmed to the dimensions shown to provide slope for the roof. At the front is a 1″ x 6″ board under which a drop curtain of burlap is tacked. The rear board is 1″ x 8″. Put a window in each side of this section to furnish light in the brooder, and a door for closing the window opening and keeping the brooder warm at night and during cold weather.

Leaflet 17

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
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Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky February, 1943

(Note) A 1″ x 1″ nailing strip can be put in Section 3 to hold in place an artificial glass or transparent cover. On warm, bright days, the top can be raised or laid back to provide more light in the brooder.

Section 4 (Top)

Use flooring or matched boards, and brace with 2 or 3 1″ x 4″ pieces. The bracing should fit just inside Section 3, to prevent air coming in. Cover with good roofing material.

Bill of Materials for Brooder

Section 1 (Bottom Section)

2 pcs. 1″ x 12″ x 4′-0″ for sides
2 pcs. 1″ x 12″ x 2′-8″ for ends
2 small hinges or leather straps for hanging 8″ x 10″ door
1 pc. 1″ x 2″ x 2′-0″ to strengthen weakened section over door

Section 2 (Removable tray)

2 pcs. 1″ x 4″ x 4′-0″ for sides
4 pcs. 1″ x 4″ x 2′-2″ for ends and braces
8 pcs. 1″ x 1″ x 4″ for blocks to prevent sliding of tray
1 pc. of tin 2′-10″ x 4′-0″

Section 3 (Section over tray)

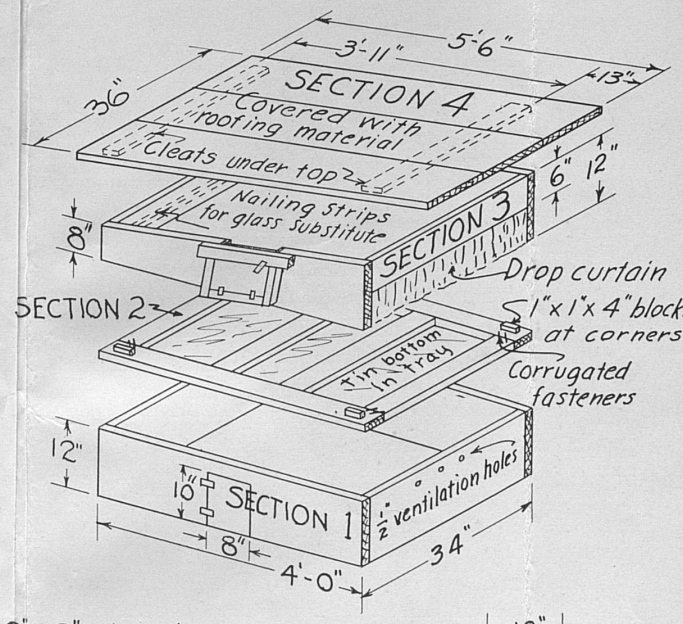
2 pcs. 1″ x 12″ x 4′-0″ trimmed for sides (Save parts cut out for making doors)
1 pc. 1″ x 8″ x 2′-8″ for back
1 pc. 1″ x 6″ x 2′-8″ for front
1 pc. of burlap to cover front
2 pcs. 1″ x 1″ x 4′-0″
2 pcs. 1″ x 1″ x 2′-8″ } nailing strips for artificial glass
2 pcs. 1″ x 2″ x 4′-0″ for windows
6 pcs. 1″ x 1″ x 12″ strips to hold 8″ x 10″ glass
2 — 8″ x 10″ window panes
4 small hinges or leather straps

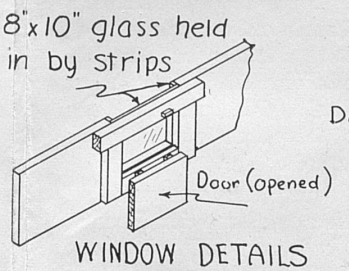
Section 4 (Top)

3 pcs. 1″ x 12″ x 5′-6″ flooring or matched boards for top
3 pcs. 1″ x 4″ x 2′-7″, cleats for bracing top
1 pc. roofing 3′-0″ wide and 5′-8″ long
1 pr. of 4″ strap hinges for hinging top

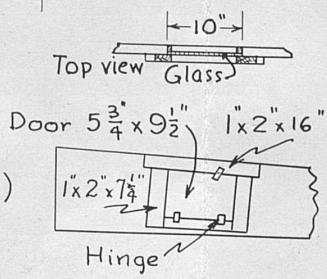
Making the Sun Porch

A sun porch attached to the front of the brooder lets the chicks get out in the sunlight but keeps them off the ground, where they might pick up poultry parasites. It is simple to make, consisting of a screened-in platform with a wire bottom. If hardware cloth or poultry netting cannot be bought, use wooden slats.



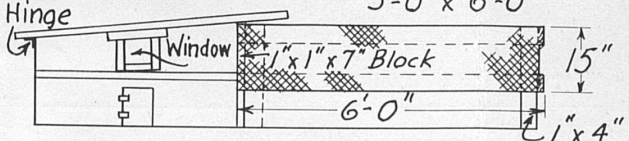


WINDOW DETAILS



Top & sides of sun porch covered with 1" mesh poultry netting. ½" hardware cloth bottom

Top of sun porch on separate frame & removable, 5'-0" x 6'-0"



Side view of Brooder

Sun porch

food as a ton of average farm manure. When the stalks are exposed to rain, these valuable plant nutrients are soon lost through leaching. For this reason store tobacco stalks under shelter until spring, then spread them on pasture, meadow, or small grain.

Complete Fertilizers

Use high-analysis fertilizers.— High-analysis fertilizers, less bulky per pound of plant-food content, reduce the cost of sacks, storage, transportation and handling. Therefore their cost per pound of plant food is less.

Use them on the most valuable crops.— As the supply of complete fertilizers is limited, the most effective use of them is on such crops as tobacco, hemp, and vegetables.

Apply fertilizer at the row.— A small amount of fertilizer is more effective when used in the row than when broadcast.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

U. S. Department of Agriculture
EXTENSION SERVICE
WASHINGTON, D. C.
OFFICIAL BUSINESS

For:

Penalty for Private Use to Avoid Payment of Postage, $300

SOIL-IMPROVING MATERIALS ★ ★ ★

Get more from them!

By S. C. Jones

AGRICULTURAL EXTENSION LIBRARY

To get the best use of farm manure, crop residues, limestone, phosphate and other fertilizers requires good soil management. Nutrients are lost by erosion and leaching unless land is well farmed. Good soil management includes growing grasses and clovers in mixtures for meadow and pasture, contour tillage on sloping and hill land, growing winter cover crops on all land where row crops or other summer annuals have been grown, using diversion ditches and terraces where needed, draining wet land, growing row crops as much as possible on more level land, and keeping hill land in pasture and meadow crops as much as possible.

In this leaflet ways and means of getting the most from soil-improving materials is pointed out.

Limestone and Phosphate

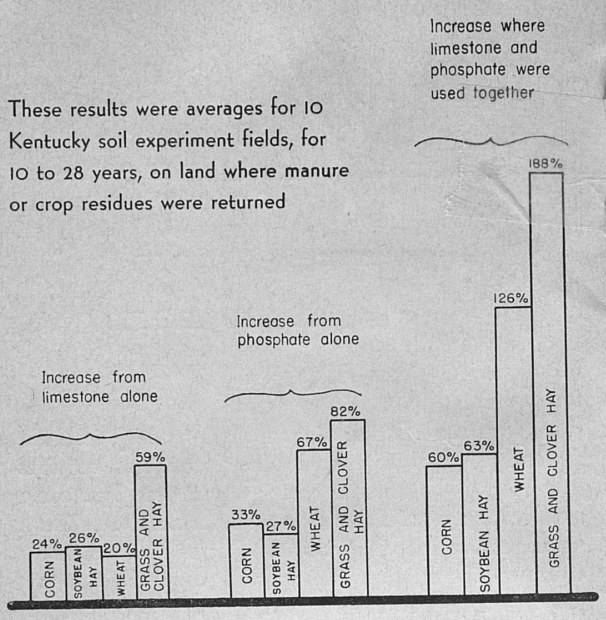
Make limestone go as far as possible.— Two tons of ground limestone per acre usually is best if labor and material permit. However, if only limited acreage can be limed at this rate, it is better to make a lighter application on larger acreage. One-third ton per acre each round of the rotation, gives excellent results.

Use limestone with phosphate.— On land needing both limestone and phosphate, the two used together are much more effective than either used alone.

Leaflet 18

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky 100M—3-43



A mixture of 2 parts limestone and 1 part superphosphate drilled 1,000 pounds per acre has given excellent results.

Apply limestone on land not recently limed.— When land has been limed at 2 tons or more per acre little is gained by reliming within 10 years or perhaps even longer, if other good soil-management practices have been followed. It pays better to put it on land not previously limed. Pasture on unlimed land is improved by top-dressing with limestone. As little as 500 pounds per acre as a top-dressing generally gives a profitable increase of forage.

Thoroughly mix limestone with the soil.— To mix the limestone thoroughly with the soil, apply it when preparing a seedbed or cultivating a crop.

Use marl or burned lime.— If you cannot get ground limestone, use high-testing marl if you have a marl bed and can get at it easily. In communities where both wood and limestone occur, and ground limestone cannot be had, burned lime may be the best source of lime.

Farm Manure

Save manure without loss.— Farm manure is 75 to 80 percent water, and the liquid excrement contains much of the nitrogen and potassium. To save

these valuable nutrients, use plenty of bedding of straw, stalks, weeds, leaves, or chaff, to soak up the liquid.

Losses in plant food occur in storing, handling, and spreading manure, unless proper care is used. When liquid, solid and bedding are stored together, pack tightly. Allow manure to contain all the water it will hold without any leaking away. If stacked in the open, make piles compact, with straight sides, and flat tops; keep clear of barn eaves.

Apply manure properly.— Spread manure evenly if the soil is uniform. Four to 8 tons per acre, spread evenly, give effective results. When land is not uniform in fertility spread the manure more heavily over the poor parts.

When manure is hauled to the field, spread it immediately. If spread on meadow, pasture, or small grain, the growing crop reduces the loss of soluble nutrients. If spread on bare land, plow or disk it into the soil at once to avoid loss by leaching during heavy rains, and by evaporation during warm, windy weather.

Put manure on the most valuable crops.— Since enough manure to cover all fields is not usually produced on a farm, use it on the best-paying crops. Give the garden, because it should be the most productive land on the farm, all it needs. Apply it to tobacco because it increases yield and improves the quality of this crop.

Use phosphate with manure.— Although high in nitrogen and potassium, manure is low in phosphorus. On soil low in phosphorus, the use of phosphate fertilizers with manure greatly increases its value.

Spread manure dropped on pasture.— Scatter by harrowing or dragging the dung hills dropped on pastures. This distributes their benefit as a plant food over a large area, giving increased pasturage.

Crop Residues

Corn stover and straw.— The most effective use of these crop residues is for feed or bedding, returning the manure to the land. When not possible to use them as bedding, disk them into the soil or scatter them over the land. They help control erosion, conserve moisture, and supply plant food and organic matter to the soil. Never burn them.

Keep tobacco stalks under shelter.— A ton of tobacco stalks contains about 60 pounds each of nitrogen and potassium, or about 6 times as much plant

CORN PROJECT RECORD—194___

Rich, medium, or poor land _____ Acres _____

Kind _____ Date planted _____

Yield per acre _____

Expenses

Cost of seed .....$_____

How much manure _____ Value $_____

How much superphosphate _____ Cost $_____

How much mixed fertilizer _____ Cost $_____

Work done by yourself and help:

Date	*Kind of work*	*Number of hours*
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total	_____

Value of work at 20c per hour .....$_____

Total of all expenses .....$_____

Receipts

Total bushels of corn produced.....

Value of corn produced.....$_____

Value of fodder produced.....$_____

Total value .....$_____

Total value less total expenses..$_____

Name of member _____ Age _____

Address _____ County _____

Years in club work _____

Name of club leader _____

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50M—3-43

CORN PROJECT

★ ★ for 4-H Clubs ★ ★

FOOD is no less a weapon than tanks, guns, and planes. As the power of our enemies decreases, the importance of the food resources of the United Nations increases. With this thought in mind, we must further mobilize our resources for the production of food.

—President Roosevelt

Leaflet 19

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics

Agricultural Extension Service

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky

March, 1943

Corn Project for 4-H Clubs

This leaflet tells how 4-H club members can grow corn. The project is planned to help farm boys produce enough corn for the home livestock and at the same time become acquainted with farming methods and varieties of corn which give a high yield on the acreage planted.

Requirements of the Project

1. Grow one or more acres of corn, depending on the number of livestock. Select good corn land and high quality seed. Use good fertilization and tillage methods.

2. Keep record of costs and yield, using the outline at the end of this leaflet.

Preparation for Planting

1. Select land from which you can expect a good yield.

2. Turn under clover, alfalfa or other legume sod if possible.

3. Apply 6 to 8 loads of barnyard manure per acre. Plow under coarse manure. Well rotted manure gives good results if applied after breaking.

4. Plow in early spring to a depth of 6 to 7 inches. Fall plowing has some advantages in killing harmful insects.

5. Work sod ground with a disk harrow after breaking. Other types of harrows will do the work, but they take more time.

6. As needed, until planting time, use a spike-tooth harrow to keep down weeds.

7. If manure has been applied use also 300 pounds superphosphate per acre on the plowed land before preparing the seedbed. When no manure is used, the fertilizer should be 300 pounds of superphosphate per acre or 250 pounds of mixed fertilizer, such as 0-14-7 analysis. Under present government regulations no mixed fertilizers containing nitrogen can be used for corn. The mixed fertilizer should be applied in narrow bands on both sides of the

seed and about 2 inches away. Cover the mixed fertilizer the same depth as the seed.

Plant Adapted Hybrid Seed

Adapted hybrid corn yields more than open-pollinated corn. Yellow corn is more valuable for feeding; white corn often yields more than yellow. If yellow corn is wanted, use Kentucky 102 on very productive soil and U. S. 13 or Kentucky 103 on soils not so strong. The white hybrids most favored are Kentucky 69 and 72 B for upland and Kentucky 201 or 203 for bottomland.

Seed of the last two hybrids is limited for 1943. Get certified seed from growers or dealers.

How to Plant Corn

1. Regulate the corn planter to drop the right number of grains each time and to space them properly.

2. Drill corn on hillsides with the rows following the contour. On level land checking is better if the ground is weedy. From the same number of plants the yield per acre of drilled corn is about the same as that of checked corn.

3. In rich ground drop 3 grains in hills 3½ feet apart or 1 grain every 14 inches if drilled.

4. On less fertile land, drop 2 seeds per hill or 1 every 21 inches apart where corn is drilled.

5. Plant between April 25 and May 15.

Cultivation

1. Use a light spike-tooth harrow soon after planting.

2. Cultivate only as necessary to kill weeds, and as soon as possible after a rain.

3. Cultivate corn three times and, if necessary to keep down weeds, as many as five times.

4. Cultivate shallow and, if possible, with a cultivator that has many teeth or shovels. Deep plowing may injure the crop by cutting off the roots and may waste moisture. However, it will not damage corn to cultivate deep for first cultivation.

5. Cut the corn so a cover crop may be sown as early as possible.

REQUIREMENTS OF THE PROJECT

1. The club member must be enrolled with the County or Home Demonstration Agent in the Labor Service Project.

2. The club member must work at least 150 hours on the production or conservation of food, feed, or fiber, or on other work which will help directly in winning the war. This does not include work in industry. It must be in connection with agriculture and home economics. Time spent in collecting scrap or in the sale of war stamps and bonds, and any other activity connected with the war and recommended by the Agricultural Extension Service, can be credited on this project.

3. The club member must keep a record of the hours worked, and must have employer certify to the record.

4. The club member must turn in to the County Extension Agent a report on or before November 1st showing the amount and kind of work done. Use the form in this leaflet for the report.

5. Time spent on other projects in which the club member is enrolled cannot be credited on this Labor Service project.

6. Club members living on farms will not be given credit on this project for work done on their home farms or in their own homes. Such club members may receive credit on this project for work done on other farms or in other homes.

RATE OF PAY

Each club member, his parents, and the employing farmer will decide on the rate of pay. The difference in the size and ability of club members and the many kinds of work to be done make it impossible to set up a definite standard rate of pay.

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25M—3-43

Labor-Service Project

for 4-H Club Members

Kentucky Agricultural Experiment Station Library

MANY BOYS AND GIRLS who live in towns and cities or in nonfarm areas can help a great deal in relieving the farm-labor shortage. Unless everyone does his full share, the shortage of farm labor will seriously handicap our production of food, feed, and fiber needed to win the war.

It is just as helpful to the war effort and just as patriotic to produce food for our men in the armed forces as it is to make guns and tanks for them. Each family that produces its own food is making available additional food for our army and our allies.

The purpose of this project is to give boys and girls who do not have the space or equipment for a food or fiber production project an opportunity to take part in the war effort by helping others to produce and conserve food. Some club members will carry both a production project and a Labor Service project.

Learn as well as earn.— Nonfarm club members who take part in this project will have a new way of life opened to them and they will learn new skills in farm and home work which may be helpful to them later on.

Leaflet 20

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1943

RECORD OF WORK ON LABOR-SERVICE PROJECT

Month	Kind of work	Hours worked today or this week	Name of employer	Payment received	Signature of employer
				$	

Guide Posts Along the Canning Road

1. Check jar supply early; buy needed jars, tops, rubbers.
2. Follow the specific canning directions for each product as given in Ky. Ext. canning circular. Every farm family has or can have a copy of this by asking the County Home Demonstration Agent or County Farm Agent.
3. Select products at the right stage for canning.
4. Can products as soon as picked.
5. Wash and sterilize all jars and tops.
6. Keep yourself, your equipment and all food spotlessly clean.
7. Process food the time required.
8. Seal jars according to manufacturers' instructions.
9. Store canned foods where it is cool in summer and where they will not freeze in winter.
10. Labeling is desirable.

VICTORY CANNING RECORD

Name_____ Age___

Address_____

1. Have you canned before? _____
2. How many qts canned fruits and vegetables has your family stored for winter? _____

Girls, 8-10 years. Describe your help in the family canning _____

_____

Total number hours you have worked _____

Girls, 11-13 years. Answer one or both of the following:

Total number of quarts of fruits and tomatoes you have canned _____

Total number hours you have worked _____

Girls, 14-16 years. Total number of quarts of fruits and vegetables you have canned _____

Total number of hours you have assisted with canning fruits and vegetables _____

Girls, 16 or over. Total number of quarts of food you have canned _____

Vegetables _____ Fruits _____ Meat _____

Total pounds of foods dried Fruits _____

Vegetables _____

100M—3-43

4-H GIRLS



Can "Victory" Foods!

Leaflet 21

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1943

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

Can Your Quota of "Food for Victory"

Enlist now in a 4-H canning project. Select what you can do. Do all you can. Choose your work according to your age and experience.

Girls, 8-10 years

Help with canning of fruits and vegetables for at least 25 hours. Your work may be:

Gathering foods	Keeping fire going
Washing jars	Preparing, peeling, shelling
Labeling jars	Helping store canned foods

Keep a record of working hours.

Girls, 11-13 years

Choose either of the following projects that suits your age:

1. Can 30 quarts of fruits or tomatoes or both.
2. Assist with canning all fruits and tomatoes for the family. At least 50 hours.

Keep a record of your work.

Girls, 14-16 years

Choose either of the following projects according to your age and experience:

1. Can 50-100 quarts of fruits and vegetables.
2. Assist with canning the entire fruit and vegetable budget for the family. At least 100 hours.

Keep a record of your work.

Girls, 16 years and older

Choose one of the following:

1. Can 100 quarts or more of fruits and vegetables.
2. Can 100 quarts or more of food and dry 10 or more pounds of fruits and vegetables.
3. Can and store the entire food supply for your family according to "Food Canning & Storage Budget."

Keep your work record here. Record the products canned, or hours of work or both

Date	Products you canned	Number of quarts

Date	Assistance in Canning (Nature of work)	Number of hours

6. Drill small grain in old pasture in early fall for additional winter and early spring forage.

MAKE GOOD HAY

Best legume hay is grown on fertile soil and cured to retain its leaves and green color. Alfalfa, red clover, and lespedeza are among the best legume hays for dairy cattle. Here are suggestions for improving hay quality:

1. If the soil needs lime and phosphate, spread 2 tons of limestone and 300 pounds of phosphate per acre.
2. Cut the crop in the early bloom stage.
3. Rake into small windrows as soon as wilted.
4. Store under shed as soon as sufficiently cured.
5. Try to make green leafy hay.

MILK RECORD

Weigh or measure the milk one day every month and multiply the production for this day by the number of days the cows were milked that month. This will be a fairly accurate record of monthly production. Weigh or measure on or about the same date every month.

Date	*Morning milking*	*Evening milking*	*Total for day*	*Days in month*	*Total value*

Total milk for year (pounds or gallons) _____

Value ..... $_____

BUSINESS RECORD

Month	*Value, feed bought*	*Value, feed raised*	*Number of cows in milk*	*Number of cows dry*
	$	$		
	$	$		
	$	$		
	$	$		
	$	$		
	$	$		
	$	$		
	$	$		
	$	$		
	$	$		
	$	$		
	$	$		

Pounds, milk or cream	*Price, milk or cream*	*Cash received*	*Total value, feed or pasture*	*Mixture fed*
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	
	$	$	$	

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25M—3-43

Kentucky Agricultural Experiment Station

DAIRY PROJECTS

for 4-H Clubs

Dairy Project of

Name ..... Age .....

County ..... Date .....

Post Office ..... R. F. D.....

Years in club work ..... Years in this project .....

Approved .....
County Agent

Date .....

Leaflet 22

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1943

KENTUCKY BOYS AND GIRLS can help greatly in our "food for war" program for more milk and dairy products. A large part of the milk produced in Kentucky comes from farms where only 2 to 4 cows are milked. Club members can greatly increase the production of these cows by feeding them and caring for them according to the recommendations in this leaflet.

MILK PRODUCTION PROJECT

The milk production project can be carried with either grade or purebred cows. 4-H club members will receive full recognition in this project by taking responsibility for feeding and milking the cow or cows now on the farm. It is not necessary for the club member to own the cows.

If cows are kept primarily for milk for family use, some of them should be bred to freshen in the fall and some in the spring, so as to have milk the year round.

Feeding

Fall and winter.— Provide 1½ to 2 tons of good legume hay per cow, and use fall and winter pasture (either permanent pasture or small grain). Legume hay and silage during winter is a satisfactory substitute for pasture.

1. Feed grain twice daily using one of the following mixtures or a similar mixture:

Feed Mixture 1	Feed Mixture 3
400 pounds crushed corn	400 pounds crushed corn
200 pounds bran	100 pounds soybean oilmeal
100 pounds soybean oilmeal	
Feed Mixture 2	**Feed Mixture 4**
300 pounds crushed corn	200 pounds crushed corn
200 pounds bran	200 pounds crushed barley
100 pounds soybean oilmeal	200 pounds bran
	100 pounds soybean oilmeal

Linseed oilmeal or cottonseed meal can be used in place of soybean oilmeal. Protein feeds are not needed by a dry cow, or during the month after freshening.

2. Feed each cow 3 quarts of the grain mixture for each gallon of milk she gives.

3. Feed all the legume hay the cow will clean up at each feeding.

4. Have salt and clean water available at all times.

5. For winter pasture, sow ryegrass or small grain (especially Balbo rye, barley, or oats) as soon as possible after tobacco, soybeans, or corn is harvested. Seed 2 bushels of rye or barley, or 3 bushels of winter oats, per acre. Winter pasture lowers feed cost and helps keep animals healthy.

Spring and summer.— Make full use of new grass; little or no hay need be fed. Feed each cow 2 or 3 quarts of one of these mixtures for each gallon of milk she gives.

Feed Mixture 1	Feed Mixture 2
400 pounds crushed corn	200 pounds crushed corn
200 pounds bran	200 pounds crushed barley
100 pounds soybean oilmeal	200 pounds bran
	100 pounds soybean oilmeal

General Recommendations

1. Keep the stalls clean and use plenty of fresh bedding.

2. Feed enough grain after the cow is dry to keep her thrifty and in good flesh.

3. Test cows for Bang's disease and tuberculosis.

4. Weigh or measure the milk one day each month.

HEIFER-CALF PROJECT

Too many good dairy heifers that should be raised for milk cows are sold as veal calves. Keep your own heifer calves, or buy some and grow them out. Either keep them for use at home or sell them to others as milking heifers or cows when your project closes. Use one or more heifer calves.

Feeding

1. Let the calf nurse the cow 3 or 4 days after it is born.

2. Then teach the calf to drink from a clean bucket. Use about ½ gallon of milk at each feeding the first week. Feed whole milk the first month; then gradually change to skimmilk.

3. When the calf is 3 weeks old, give her a little good mixed hay in a rack, never on the ground.

4. Feed some grain until the calf is 10 months old, even if she is on good pasture.

5. For calves past 6 months, use permanent pasture or small grain. Give those under 6 months a place to exercise in the sun.

6. During the fall and winter, feed the bred heifer about 2 quarts of grain twice daily, and all the legume hay she will clean up.

7. Reduce the heifers grain feed about half several days before calving, but give her all the hay she will eat and all the clean water she wants.

8. Three or 4 days after calving, gradually increase the grain feed to 3 quarts for each gallon of milk. Use a grain mixture recommended for milk cows, not that for the growing heifer.

9. Provide salt and water for the heifer at all times.

Other Suggestions

1. Teach the calf to lead with halter when one month old and keep her "halter-broke," gentle, and easy to handle.

2. Keep the calf clean. Use a brush.

3. Provide a warm, dry place during bad weather.

4. Have the heifer tested for Bang's disease and tuberculosis before breeding.

5. Breed the heifer when 15 to 20 months old, depending on size. Where possible use only a good registered bull from a high-producing herd.

6. Wash udder and hands before milking and use clean utensils.

7. Cool the milk as soon after milking as possible.

8. Weigh or measure milk one day each month.

9. Turn the heifer dry 6 to 8 weeks before freshening again.

HOW TO IMPROVE OLD PASTURES

1. Topdress rundown pasture with a mixture of 2 parts fine-ground limestone and 1 part 20-percent superphosphate, spread at the rate of 1,000 pounds per acre.

2. On thin pasture, reseed in early spring with lespedeza and ryegrass.

3. Topdress thin spots with light applications of manure or tobacco stalks.

4. Spread manure dropped on pasture by livestock with a harrow or light drag.

5. Roll pasture in early spring.

RECORD

Which project? _____

Date project started _____ Date Closed _____

	Amount of feed	*Cost or value of feed*
Corn	_____	$_____
Small grains	_____	_____
	_____	_____
	_____	_____
Protein supplement	_____	_____
Milk	_____	_____

Total cost of feed.....$_____

Number of pigs_____ Original cost $_____

Other expenses $_____

Total expense $_____

Sale receipts or value of all pigs in project..$_____

Profit or loss $_____

Name of member_____

County_____ Years in club work____

Age in 1944_____ Address_____

Project leader _____

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20M—1-44

PORK PROJECTS for 4-H Clubs

FAT-PIG PROJECT

Chief attention in the fat-pig project this year should be given to better feeding and management practices instead of stressing so much the number and market weight of the pigs raised.

Choose Thrifty Pigs

Thrifty weanling pigs of good quality and type are the best choice. Feed at least 3 pigs if you can. Some members raise only one pig; some raise several litters.

Provide Good Shelter

Good shelters save feed and cut down losses from exposure to heat or cold. If present buildings will not do, use material at hand to build a new one. Use poles, boards, or wire, with straw or cornstalks for cheapest shelter.

Use Good Pastures, Summer and Winter

One acre of good legume pasture takes the place of about 1,000 pounds grain and 500 pounds of protein supplement. Some protein supplement is needed with pasture, however, for full-fed pigs will not eat enough forage to balance their ration no matter how palatable it is.

Temporary Spring and Summer Pasture

1. Dwarf Essex Rape is superior for hogs. Seed 8 to 10 pounds per acre on well-prepared fertile soil from March 15 to April 15. Graze it heavily but not below 5 leaves to the stalk.

Leaflet 23

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UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
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Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky January, 1944

2. Sudan grass is good. It thrives during hot weather. Seed it about the 10th of May at the rate of 20 to 25 pounds per acre.

Temporary pastures provide better sanitary conditions, and therefore healthier pigs.

Do a Good Job of Feeding

1. Feed regularly, using home-grown feeds as much as possible.

2. Balanced feeding is most profitable, even when supplements are scarce and high in price. Hogs fed corn alone in drylot need about 12 bushels of corn to make 100 pounds of gain, while 45 pounds of soybean oilmeal and about 7 bushels of corn produce an equal gain in one-third less time.

Skimmilk is an excellent source of protein. Daily allowances of ½ gallon per pig on pasture, or 1 gallon per pig in drylot, will furnish enough protein to balance farm grains. Whey may be fed instead of skimmilk, but it takes twice as much whey as skimmilk to balance the ration.

3. You will need at least 15 bushels of corn, good pasture, and if skimmilk is not available, 50 pounds of protein supplement such as soybean meal, for each pig to be fed to 250 pounds weight.

4. Feed pigs all they will eat all the time.

Salt and Ground Limestone

All the minerals needed are supplied by keeping salt and ground limestone in a dry place where the pigs can get them at any time. Use a box, salt in one end, and ground limestone in the other, with a partition in the middle. Or mix the minerals together, 4 parts ground limestone and 1 part salt.

Fresh Water and Shade

Water is the cheapest raw material in pork production. A pig needs 1 to 2 gallons every day. Unless there is fresh water in the pasture or lot, use an automatic waterer. A good home-made waterer can be made from a metal barrel, a piece of tin, and some rough lumber. See your county agent for plans. Dirty ponds are often the cause of disease and parasite troubles. Keep water and feed close together and if possible under the same shade.

Give Pigs a Chance to be Healthy

1. Pigs raised the "healthy" way average at least two more pigs marketed per litter, use 20 percent less feed, and go to market 8 weeks younger, weighing about 20 pounds more per pig than pigs raised the "wormy" way.

2. Clean quarters pay big dividends. Before pigs are farrowed, first clean the house or shelter thoroughly by brushing and scraping all dirt and litter from the floor and walls. Then wash the house with boiling water and lye

(a 13-ounce can of lye to 20 or 30 gallons of water). Keep clean bedding in the house, as needed.

3. Keep the pigs on fields and lots where there have been no hogs for 2 or more years. Cultivate fields and lots that have been used by hogs.

4. If pigs have not been vaccinated against hog cholera, vaccinate them 10 to 15 days after weaning.

5. Keep pigs free from lice, for lousy pigs are unprofitable. Lice can be controlled easily by sprinkling the pigs thoroughly with crude oil or old motor oil. Protect the pigs from direct sun for 12 hours after oiling, and repeat the treatment in 2 weeks.

GILT PROJECT

If the club member wishes to venture into a larger project than just feeding out some pigs, raising a gilt as a start toward a small herd is worth while.

Choose from a Good Herd

Select a purebred gilt from a herd which shows a marked uniformity of type. The breed chosen should be acceptable to the member and popular in the community.

Choose a Pig of Medium Type

Don't choose a gilt that is short and chunky, of the type known as "Cob Rollers." Though pigs from such gilts are usually fat, the packer buyers pay less per pound for them during normal times, because they have too much fat in proportion to lean, and their loins and sides of bacon lack length to class as top commercial cuts.

On the other hand, don't choose a long, shallow, narrow-bodied, long-legged pig. Hogs of this "big type" are discriminated against by packers because they do not get fat enough at the most desirable market weights of 175 to 225 pounds, and many of them lack in ham development. Such gilts may farrow large litters, but when full grown sows, weighing 600 to 700 pounds, they are likely to overlay many of the pigs.

The "medium type"—longer than the chunky type and not as long as the big type—has become the packers' and large breeders' favorite. It has the good qualities of the other two types and without so many of their faults. The sows farrow and raise more pigs per litter. The pigs reach market size in six months or less if properly fed. The wholesale cuts of meat come more nearly meeting the packers' ideal. Club members who select gilts of the medium type will in the long run get a greater return for the investment.

SOW-AND-LITTER PROJECT

Members with the sow-and-litter project should ask their County Agent for Extension Circular 368.

the top leaves do not develop fully and are small and short. Such leaves are usually placed in a grade known as *tips*. All damaged leaves are kept separate from the sound leaves, and perhaps two or more grades of damaged may be made. Finally, many growers make two or more divisions of all the natural grades, the separations being based chiefly upon the length of leaf. The trash and lug grades usually bring the highest prices. Flyings come next, bringing as a rule about 80 per cent as much as lugs. Bright leaf usually sells for about 70 percent of the lug price and red leaf 25 to 30 percent.

Tie the hands of tobacco neatly, because this adds to the appearance of the leaf on the sales floor. Usually about 20 leaves are put into each hand of burley. Bulk tobacco as fast as it is sorted to prevent drying out and to retain its finish. Quality will improve in the bulk in many cases.

Marketing

District 4-H club tobacco shows and sales have been established at many of the leading market centers. Where Club members have access to these shows and sales they should make their plans to participate. Prizes are offered for the best-handled crops and best-kept records. None but 4-H club crops are sold during the sale. These shows are held in December and January, and keeping this in mind while housing will make it practicable to strip and sort the club member's crop in time for the show and sale.

RECORD

Variety of Burley Tobacco grown _____

Acres_____ How much manure was applied_____

Amount of Commercial Fertilizer_____ Cost_____

Use of land at $10.00 per acre _____

No. hours spent by Club member on project_____

Club member's time at $ .15 per hour _____

Help's time at $ .25 per hour _____

Other items of expense _____

Pounds of tobacco produced _____

Amount received for the crop _____

Net Income _____

Timely Reminders

Though these suggestions are arranged by months, the weather must govern the activities.

January: Plan the year's program. Meet with the leader. Study project literature. Get a good variety of tobacco seed.

February: Select site for plant bed (fence row or woods). Prepare plant bed—burn or steam—seed the bed—box and cover with tobacco cotton. Allow 9 x 12 feet of bed for ¼ acre.

March: Complete work of February. Plow sodland. If land is in small grain plow when 6-8 inches high. Measure your land. See that records are complete to date.

April: Learn how to make a hygrometer; also method of firing. Apply stable manure broadcast. Drag or roll ground. Weed plant bed; water if necessary. Watch bed for insects. If plants make slow growth use fertilizer.

May: Cut and drag ground. Set as early as plants are ready. Set plants 16-20 inches in rows 3 feet 6 inches apart.

June: Finish setting by June 20. Cultivate as soon as plants are set. Keep accurate record of time. Reset missing hills. Keep down worms.

July: Cultivate to keep down weeds. Watch for bud worms. Top early plants high (16-24 leaves) and leave 2 top suckers to grow. Begin to prime lower leaves.

August: Complete topping. Control worms. Prepare barn for crop. Continue priming. Let tobacco ripen as long as it is not wasting at the ground. Cut the plants and place on sticks. House when wilted. Visit other members.

September: Attend to curing. Use hygrometer. Fire if necessary. Seed the tobacco plot to a cover crop.

October: Strip when the thoroughly cured tobacco comes in case. Bulk the tobacco on sticks when stripped.

November: Write a story of your project in the record book. Complete stripping. Keep the tobacco in bulk until marketed.

December: Sell the tobacco through your district 4-H tobacco show. Arrange with other members for hauling to market. Your completed record book is required at the show, and also to close this project.

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12M—3-43

Burley Tobacco Project

for 4-H Clubs

By E. J. KINNEY

Kentucky Agricultural Experiment Station Library

Selecting and Preparing the Land

Choose fertile, well-drained soil; sodland is best. Break the land as early as possible, especially if in sod. Fall plowing is particularly desirable for heavy grass sods. Disk at intervals to keep down weeds and put the land in good condition for transplanting.

Fertilizers

Fertilizer seldom fails to give an increase in yield of tobacco and often improves the quality of the leaf. Use a fertilizer containing 4 to 5 percent of nitrogen, 8 to 12 percent of phosphoric acid, and 6 to 8 percent of potash. Use 100 to 125 pounds of such fertilizer for ¼ acre. When it is impossible to get a fertilizer with as high percentage of nitrogen as recommended, use 100 pounds of the best fertilizer obtainable.

In applying the fertilizer, mark out the land in rows 3½ feet apart. For ¼ acre, it is most convenient to drill the fertilizer in the rows by hand. To apply 125 pounds per quarter acre, drill 4 pounds in each 100 feet of row. After drilling the fertilizer, run along the edge of the furrows with a hand garden plow or a single-shovel one-horse plow, so as to cover the fertilizer and make a new mark. Set the tobacco in the new mark. This puts the roots of the plants close to the fertilizer but not in contact with it.

Setting the Plants

In most instances plants may be obtained from the farm bed. Machine setting is preferable but it is

Leaflet 24

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1943

often more convenient for club members to set by hand. Space the plants 16 inches apart on very productive soil, and 18 to 20 inches on soil of medium productivity and on hill land. The rows should be 42 inches apart. The secret of getting a good stand is to press the earth firmly around the plants when setting. Early transplanting, from May 10 to June 1, usually gives the best quality of tobacco.

Cultivation

As soon as the plants start to grow, or before if rain crusts the ground, give the tobacco a shallow cultivation. It is desirable to loosen the soil around the plants with a hoe, but care should be taken not to loosen the plants. Further hoeing is unnecessary except to destroy weeds. Cultivate after heavy rain and whenever necessary to keep down weeds. Shallow cultivation is best. Discontinue cultivation when the passage of the cultivator between the rows begins to break and bruise the leaves.

Combating Worms

One should be constantly on the watch for tobacco worms. At the first appearance, dust the plants with lead arsenate. This poison is much safer than paris green, as the latter, unless applied very carefully, may burn the plants.

Topping and Suckering

Allow burley tobacco to bloom out fully before topping. Sixteen to twenty-four leaves should be left, depending upon the vigor of the plant. The aim is to keep as many leaves as will mature perfectly and grow to a good size. After topping, pull the suckers when they reach a length of three or four inches.

Harvesting

Cut burley when the middle leaves show a distinct yellow tinge. In very dry weather it may be necessary to cut before the crop is mature, to prevent loss of the lower leaves (see "priming"). Put the tobacco directly on the sticks as fast as cut, 5 or 6 plants on each stick, with the butts toward the sun. Haul the tobacco to the barn as soon as it is wilted, and hang the sticks about 8 to 9 inches apart. Shake out the tobacco well before hanging, so the leaves will not stick together. This is very important. In very hot, dry weather, cut the tobacco in the late afternoon and haul it to the barn the next forenoon. Splitting the stalk is preferable to spearing.

Priming

In dry periods and in periods of very wet weather, the lower leaves on nearly mature burley usually become more or less damaged and frequently drop off before the crop is mature enough to harvest. It usually pays well to prime burley tobacco under such conditions—that is, to pick off the leaves that have yellowed, string them on sticks, and cure. By doing this, not only can the lower leaves be saved in good condition, but the plant can be allowed to stand until the other leaves are ripe.

Curing Burley Tobacco

It is urged that the club member go to the barn each day during the curing period and note the changes in the leaf that take place from day to day. It is suggested that a hygrometer be used and daily records kept of the temperature and humidity while the tobacco is curing.

All ventilators should be kept wide open for several days after housing tobacco to permit the escape of the tremendous amount of water given off by the plants; but if nights are cool, especially cool and windy, it is best to close the side ventilators then. If weather is decidedly cold and windy when tobacco is housed, it is best to shut all side ventilators and heat the barn moderately with coke stoves. After the leaf begins to yellow, close some of the side ventilators during the day if the weather is very hot and dry. If hot and damp, however, keep all open.

When weather is such that, in spite of perfect ventilation, the leaf stays in high order for 36 hours, especially if the temperature is high, houseburn is likely to develop. Under these conditions the only remedy is to dry out the leaf by the use of heat. When firing tobacco, shut all side ventilators tight and keep the ridge ventilators wide open. Continue firing until cured parts of leaves rattle. Usually, raising the temperature 10° above the outside temperature is enough. A hygrometer is very useful in determining when conditions favor houseburn. As long as average relative humidity does not exceed 75 percent, there is little danger of houseburn. If it exceeds 80 percent, however, and remains at this point over 36 hours, and the temperature is 70° or over it is advisable to start fires. Detailed directions for firing with coke stoves will be furnished by the Kentucky Experiment Station on request.

After yellowing is completed, all ventilators may be kept open in fair weather until the leaf is completely dry. On windy days and in rainy weather they should be closed. When curing is finished, all ventilators should be kept closed. Tobacco keeps its finish better when bulked than when left hanging up; hence as soon as safe it is advisable to bulk down the entire crop. Care must be taken to see that it is not in such high order, when bulked, that there is danger of damage in the bulk.

Stripping and Sorting

The leaves on a stalk of cured tobacco differ greatly in size, soundness, texture, body (thickness), and color; hence they can be separated into several classes based on these differences. This is known as sorting. Sorting is necessary for two reasons. The various classes of leaf are used for different purposes in the manufacture of tobacco products. If sorting were not done on the farm, it would have to be done by the manufacturer. Because of a smaller supply or greater demand, some grades command higher prices than others. If tobacco were sold unsorted, it would be difficult to determine a price fair to both the manufacturer and the grower.

The more leaves allowed to mature on a tobacco plant, the greater the variation in leaf characteristics and the larger the number of grades that must be made. Burley often is topped at 20 leaves, which necessitates a rather large number of grades. Following is a brief description of Burley grades: (1) At the bottom of the stalk are one or more small, thin, light-colored, often ragged leaves known as *flyings* or *sand leaves*. (2) Next above the *flyings,* are the *trash* leaves. These differ from the flyings in being of good size and fairly sound, but are light in body, and colory. (3) Next are the *lug* leaves. These are full size, sound and have more body than the trash leaves. They are not quite so colory as the latter. (4) Above the lugs is the grade known as *bright leaf*. The leaves in this grade are large, very sound and have good body. The under side of the leaf is considerably lighter than the upper side, differing in this respect from the trash and lugs. (5) The upper leaves form the grade known as *red leaf*. This is light red to dark red in color, has much body and usually is somewhat coarser in texture than the other grades. In some crops and in some seasons some of

10 days after cutting or as soon as the seeds are thoroughly dry, begin threshing and *finish it as soon as possible. Prompt* threshing prevents heavy loss by shattering if the shocks are blown over; it also prevents damaged seeds if the rainy season sets in; and the heavy toll which birds sometimes take if the shocks stand very long.

Do not attempt threshing when the hemp is damp, either from rain or dew. Hemp comes in case each night and in fair weather dries out by noon. Therefore start threshing at noon and continue into the afternoon as long as the hemp is dry.

Spread the threshing canvas (21″ x 21″) on the ground between the shocks. Cut the stalks used to support the shock. With a man on each side of the shock and one at the back, push it over quickly so that the shattered seed in the top of the shock will fall on the canvas rather than on the ground. To thresh the seed, beat the stalks with clubs about 1½ to 2 inches in diameter and 6 feet long. Turn the stalks frequently with the aid of the clubs and beat until they are free of seed. Then remove the threshed stalks from the canvas and repeat the process with the other shocks.

Clean Seed Before Marketing

Leaves, pieces of branches, dirt, and so on must be removed from the seed before it is marketed. Two steps are necessary; screening and fanning. You may screen and fan at one operation by using a combine or thresher, but generally for small crops you rub the seed through a "podder" or screen to remove the coarse material. Separate the fine material from the seed with a fanning mill. Directions for making a podder or cleaning screen, and for using the fanning mill may be obtained from your county agent or local leader.

Market Seed as Soon as it is Cleaned

Deliver the seed to established receiving points as soon as cleaned. The receiving points will be announced in the fall before the seed is ready for delivery, by your county agent.

TIME SCHEDULE FOR HEMP-SEED PROJECT

January— Select well-drained, fertile land for the crop.
February— Apply stable manure.
March— Work soil thoroughly. Apply phosphate broadcast and work it into soil.
April— Get a permit for growing hemp. Get seed for planting.
May— Work soil again thoroughly. Plant seed. Replant missing hills. Cultivate like corn.
June— Thin crop. Leave 3 plants to the hill. Continue cultivation.
July— Keep crop clean of weeds, especially morning-glories.
August— Remove male or blossom plants after pollen has dropped.
September—Cut and shock early crop. Beat out seed after 8 to 10 days in shock.
October— Cut and shock late crops. Beat out seed after 8 to 10 days in shock. Clean seed.
November—Finish cleaning seed and deliver to designated receiving station.

HEMP SEED RECORD

	Date work done	*Club member hours*	*Help hours*	*Horse, mule, or tractor hours*
Breaking land				
Disking and dragging				
Applying fertilizer				
Planting				
Cultivation				
Thinning				
Removing male plants				
Cutting and shocking				
Beating out seed				
Cleaning				
Marketing				

Yield (bushels) _____ Value $_____

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15M—3-43

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Hemp Seed Project

★★ for 4-H Clubs ★★

Uncle Sam has asked Kentucky to produce in 1943 the hemp seed for the nation. Some of the seed will be used in 1944 to grow another seed crop, but most of it will be used to grow hemp for fiber. Growing hemp gives 4-H Club members a real opportunity to serve their country in wartime. It requires a small amount of fertile land and little or no special machinery; labor requirements do not interfere with school work.

Grow at least half an acre of hemp; one to two acres would be better. Land that will produce 50 or more bushels of corn per acre will make 12 to 15 bushels of hemp seed per acre. Club members know how to tackle a new task; try this one.

Leaflet 25

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

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Select fertile soil.— Select an old feedlot, an old garden spot, or any other fertile area. Better yields are obtained on well-drained bottom soil, but good yields are obtained on productive upland. Only land capable of growing good burley tobacco or 50 to 60 bushels of corn an acre, should be selected. Good drainage is essential.

Use plenty of fertilizer.— Use complete fertilizer on most soils. Apply 200 to 400 pounds of 4-12-8, 4-10-6, or similar analysis, at the hill. If applied broadcast, use 400 to 600 pounds an acre. For soils outside the Bluegrass area, use in addition 200 to 300 pounds of 20-percent superphosphate broadcast. Stable manure is an excellent fertilizer for hemp.

Prepare seedbed carefully.— Plow in late winter or as early as possible. Disk and drag at once. Pulverize all clods. Immediately before planting, smooth the ground with a light drag or roller, or better still, with a cultipacker. A well-prepared seedbed is essential in getting a stand.

Buy your seed.— About 1½ to 2 pounds of seed will plant an acre. Purchase extra seed as it is often necessary to plant the crop over.

Plant by hand.— Plant by hand in hills spaced 4½ to 5½ feet apart. Check for two-way cultivation. Use the wider spacing for rich bottom land, the closer for upland. Mark off the field with a light sled marker so that the furrows will be shallow. Drop 12 to 15 seeds at each furrow crossing, spreading them out slightly to make thinning the plants easier. Cover with the foot, pressing the soil down firmly. Unless the soil is quite dry, cover not more than 1 inch. Deep-planted seeds may not germinate, especially if a heavy rain occurs after planting. It is very important to press the soil firmly over the seeds, for they sprout soon and unless the soil over them is solid and compact it will dry out very quickly and the sprouted seeds will die. Getting a stand is one of the biggest problems in growing hemp, therefore *plant the seeds with the greatest care.*

Thin and transplant, or plant over to get proper stand.— Most of the hemp seed is produced on the branches of the plant. When too many plants are in a hill, branches form only near the top of the plant and produce a low yield of seed. With hills spaced 4½ feet apart, there should be 2 to 3 plants per hill on very productive bottom land; 3 to 4 plants on upland. If the spacing is 5 to 5½ feet, there should be 3 plants per hill on bottom land; 3 to 4 on fertile upland. The more productive the soil, the fewer the plants per hill.

If plenty of plants come up in at least three-fourths of the hills, fill out the missing hills by transplanting from other hills with too many plants in them. Follow the method used in transplanting tobacco or tomatoes. Transplanting should be done when the soil is moist, after a rain. If the stand is too poor to be filled out in this way, rework the ground and plant a second time.

As 12 to 15 seeds are planted to the hill it is always necessary to thin out some of the hills. A good time to thin is after a light rain when the plants are large enough to get hold of easily with the fingers—about 8 to 10 inches tall. Roots of larger plants become matted and it is difficult to pull out one of them without injuring the others. As in thinning corn, thinning hemp is best done when the ground is fairly moist. If the plants are a foot or more high, either wait for a rain before thinning, or cut out the plants instead of pulling them.

Cultivate same as corn.— Hemp requires about the same cultivation as corn. Cultivate the crop both ways as soon as the plants are 2 to 4 inches high, even if it is impractical to get close to the hills. Hemp grows so fast that it usually chokes out the weeds in the hills. Use a riding cultivator equipped with good fenders. Because the rows are so far apart, run through the middles with a one-horse cultivator. Discontinue row cultivation after the plants are about 2½ feet high, but cultivate the middles somewhat longer in order to keep down weeds.

Cut out the male plants.— Hemp produces both male and female plants. Because flowers on the female plant produce no pollen they must be fertilized by pollen from the male plants in order to make seed. After the pollen is shed and the male plants begin to die cut them out to give the female plants more room to develop. Male plants interfere seriously with harvesting because the hard strokes necessary to cut the male plants will shatter seed from the seed plants.

Harvest after the seed begins to shatter.— Hemp plants do not ripen uniformly. The date of maturity of plants in the same field varies from 2 to 3 weeks. For this reason it is difficult to determine when the crop should be cut. But these are the signs that it is ready to cut: plants have dropped the large leaves; branches have yellowed; red spots or streaks have appeared on the bark; the clump of small leaves and shuck around the seed have turned brown; and seed on the middle branches have begun to shatter. Examine plants closely every few days after mid-September to determine when to harvest.

In cutting, use a strong, heavy corn knife. Be sure the knife is sharp enough to cut the plant with one stroke. Avoid jarring the stalk as the seed of ripe hemp shatters easily. Cut the plant a few inches below the lower branches.

Make strong shocks.— Select 3 or 4 strong plants, one from each of 3 or 4 hills, to make a support for the shock, as in shocking corn. Remove the branches from these plants. Bend them toward each other and tie their tops together. Make a bundle of the branches which have been cut off and place it on top of the support. Put 50 to 100 hills into each shock, depending upon the height and size of the plants. Shocked seed hemp is easily blown down; therefore great care thould be taken in shocking. Spread out the base of the shock, draw in tight near top and tie. Bind the shocks above the center with two hemp stalks to prevent their blowing down. Two or 3 days later re-tie the shock to strengthen it and also to help it retain shattered seed. Place shocks about 24 feet from each other.

Thresh as soon as dry.— Handle ripe hemp gently to avoid shattering the seed. From 8 to



Hints on Marketing FARM TIMBER

By William E. Jackson
Extension Forester

Harvest timber and sell it with the same care as any other crop on the farm. To maintain the farm woods in the best condition market the timber yearly or at regular periods, and protect it from fire and livestock grazing. In such a woods timber grows profitably and perpetually as a crop. Use good judgment in the selection of trees to be cut, and cut and log only those trees. Lack of proper care in the protection and cutting of trees has ruined many pieces of valuable timber-producing land.

Cutting small trees that are sound and well-formed is not profitable. The overhead cost of

Leaflet 26

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Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1943

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For:

HINTS ON MARKETING FARM TIMBER

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating

50M—3-43

logging and handling 1,000 board feet of lumber from small trees is much greater than the cost of producing 1,000 board feet from large trees. Large trees, as a rule, make higher quality wood products than small trees.

EIGHT HELPS IN MARKETING TIMBER

1. Select what you have to sell. List it by kind, grade, and quantity. Get experienced help, if necessary, in preparing the list.

2. Never make a sale by "boundary." Such a sale usually makes it impossible to receive income from your timber for a good many years to come.

3. Advertise what you have to sell in local and nearby newspapers that all buyers may have an opportunity to bid on your timber.

4. Get at least three bids before closing sale.

5. Before making a sale, discuss the marketing of timber products with neighbors and the county agent, or extension forester, so as to benefit from their experience.

6. Insist on a written agreement, especially if the timber is to be cut by the purchaser. Contract forms for this may be secured from the county agent.

7. Anticipate market demands and try to sell at the right time. Remember that standing timber can wait over a period of low prices without rapid deterioration.

8. Be sure you sell to a responsible purchaser. This assures quick returns and prevents loss.

HOW TO MEASURE TREES AND LOGS

Logs and standing trees are usually estimated in board feet. To find the board feet of a standing tree measure its diameter, including the bark, at breast height (4½ feet above the ground) and measure or estimate the number of 8, 10,

12, 14, or 16-foot logs contained in it. With the aid of a prepared volume table for the purpose, use these measurements to find the board feet in the tree. Such tables are at the extension forester's office for all species of trees growing in different regions.

To find the board feet in a log, measure its length and its diameter inside the bark at the small end. With the aid of a log rule for the purpose use these measurements to get the amount of board feet in the log.

It is very important to consider what log rule is to be used, because much depends upon it in measuring and selling timber. The Doyle rule, although very inaccurate, for small timber, is probably most commonly used in the United States. To find the number of board feet in a log by this rule, deduct 4 inches from the diameter of the small end, measured inside the bark; square one-fourth of the remainder; and multiply the product by the length of the log in feet.

POINTS ON FARM WOODS MANAGEMENT

Destructive cutting practices deplete the timber stand; good cutting practices provide future timber crops, a better cash return, and a sustained supply of farm wood products.

Harvest mature trees now. Cut stumps as low as possible. Cut no trees below 14 inches in diameter, measured 4½ feet from the ground. Cut dead, diseased, and bug-infested trees of all sizes for fuel wood or for use on the farm for repair and construction. Cut during winter or slack seasons.

Leave plenty of thrifty young trees, of all heights and sizes, to grow for a future crop. Protect them from grazing by all kinds of livestock.

Prevent woods fires. Cooperate with your neighbors and State and Federal agencies.

Manage the farm forest as a crop for continuous production.

ing. Where possible, however, ryegrass should be sown in the fall rather than in the spring, because fall seedings produce much more pasture.

In many pastures it may be preferable to reestablish the permanent grasses rather than to provide a temporary increase in grazing. If so, orchard grass, Kentucky bluegrass, redtop, and timothy should be sown, preferably in the fall, and the soil disked lightly. Hop clover is a winter annual legume, similar in growth habits and soil requirements to Korean lespedeza, and provides considerable grazing in the spring. The seed should be sown in the fall. Other pasture legumes are sown in late winter or early spring. On limed soil, sweet clover is one of the best legumes for improving pasture, provided it is not grazed close during the first year.

The value of reseeding pasture depends largely on correcting the causes of poor sod in the first place, such as low fertility, over-grazing, or competition from weeds.

Prevent Competition From Weeds

Unpalatable weeds in pasture reduce grazing by using up plant food, moisture, and sunlight. Where weeds are thick, they should be mowed once or twice during the summer. Some grubbing may be necessary to control bushes. Fields infested with broomsedge should be mowed during late summer and early fall as often as necessary to prevent this weed from seeding.

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50M—3-43

Managing OLD PASTURE

By E. N. Fergus, Ralph Kenney, W. C. Johnstone

PASTURE provides cheaper feed at less labor than other crops and, at the same time, produces as large a yield of digestible nutrients per acre as cultivated crops in a good rotation on the same kind of soil. Thought, money, and labor spent in improving and maintaining the permanent pasture are therefore among the best investments a livestock farmer can make.

Too many permanent pastures in Kentucky are thin, weedy, and provide too little grazing. These conditions can be corrected to a large extent with little labor and at moderate expense by following the suggestions given in this leaflet.

Provide Necessary Plant Food

Many permanent pastures in Kentucky are poor because of low soil productivity. Soil acidity and a lack of phosphorus are the chief troubles to be corrected before lasting improvement can be brought about. An application of 2 tons of limestone and 200 pounds of superphosphate per acre is recommended, but 1,000 pounds per acre of a mixture of two parts fineground limestone and one part superphosphate will give excellent results. Light application of manure or tobacco stalks, especially on the less

Leaflet 27

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
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Thomas P. Cooper, *Dean* and *Director*

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Good bluegrass pasture on a poor soil in west Kentucky. It is kept productive by top-dressing with 200 pounds of 20-percent superphoshate per acre every 2 years. One ton of ground limestone is applied also every 8 to 10 years. Beef production has been decidedly profitable on this treated pasture.

fertile spots, is very beneficial to pasture. Light feeding of livestock during winter on thin spots in the pasture is helpful in improving such areas. Manure dropped on the pasture by livestock is more valuable if spread with a light harrow or drag. Fertilization of pasture not only increases the growth, but also improves the nutritive value of the forage.



Pasture on the same type of poor soil as the one shown in the preceding picture, but it has had no top-dressings of limestone and phosphate. Though it has been seeded with good legumes and grasses and has a fair stand of some of them, it produces very little forage. The vegetation is largely weeds.



Special fall, winter, and spring pasture provides needed pasturage when permanent pasture should not be grazed. The pasture shown in this picture is winter barley and crimson clover. Other small grains and domestic ryegrass and hairy vetch may also be used.

Avoid Overgrazing

Some pastures are poor because they are grazed too close; others are not grazed close enough. Very early spring grazing and close grazing during late fall should be avoided. Overgrazing may be avoided to a large extent by fuller use of supplementary pasture, such as small grain, crimson clover, vetch, and ryegrass, during the fall, winter, and early spring, and Sudan grass during the hot months of summer. Permanent pastures should not be allowed to get more than 5 inches tall. If sufficient stock is lacking to keep the growth down, the pasture should be mowed and the excess growth made into hay or silage.

Reseed Thin Stands

Sowing suitable seed in thin pasture and in thin areas of better pasture is a quick way to increase the feed from permanent pasture acreage. Korean lespedeza, sown 10 to 20 pounds per acre, is the best plant for thickening up old pasture. Ten pounds of ryegrass and 10 pounds of lespedeza is a good mixture. When these are seeded in early spring, no special preparation or covering is needed. For later seeding the ground should be harrowed either before or after sow-

cloth bag or cheesecloth spread on rack or colander; (6) salt to taste and add cream if desired.

Bitter Milk — Bitter Butter — Difficult Churning

Bitter milk, which makes especially bitter butter, is frequently produced by family cows late in their milking period. This is usually caused by a very active enzyme which changes the butterfat so as to liberate strong-smelling and strong-tasting butyric acid. This acid in the cream causes the foaming which is so common in cases of difficult churning.

Don't blame your cow. She probably will produce normal milk again following her next calving. Try heating fresh milk or cream (immediately after milking) to 165° F for about five minutes, and then cool promptly. Such heating usually makes this enzyme inactive and prevents its damaging effects.

Keep the Calves Healthy

Breed the cows to a good dairy bull. A good heifer calf is worth raising, to be added to your milking herd. If a dairy bull cannot be had, breed to the best beef bull available and raise the calves for home butchering. Arrange to breed so as to have one or more cows in milk all the time.

The worst enemies of small calves are: (1) over feeding, (2) dirty feed buckets and stalls, (3) hot weather and flies, (4) cold draughts of air, and (5) irregular feeding of milk varying in temperature.

Hand feed 3 quarts to a gallon of whole milk daily to a new-born dairy calf after 3 days with its dam. Increase the milk allowance very gradually as the calf gains weight. It is wasteful to feed more than a gallon of milk daily. Leaving the calf with the cow longer reduces her year's milk production about 15 to 20 percent. It is difficult to bring the cow to her full production after 6 to 10 weeks of nursing a calf. Raising the calf on a nurse cow is easy, but is also the most wasteful way. The result is a needlessly

fat calf, because it receives more whole milk than it needs or deserves for thrifty growth and development.

When the calf is about a month old let it nibble on hay and grain. Continue the milk for another month and then gradually reduce the amount fed until the calf is on grain and hay. If skimmilk is available it is excellent feed to 5 or 6 months of age. A thrifty well-grown dairy calf 4 to 5 months old will develop very satisfactorily on bright, leafy legume hay or pasture and grain for another 3 months. Good pasture and other roughages in season can then be relied upon to carry the heifer until three months before her first calving. Then she should be fed grain to prepare her for a milking period.

Good Cows Deserve a Dry or Rest Period

Though good cows often milk up to calving, they would produce 15 to 20 percent more during the next milking period if they were turned dry and fed liberally 6 to 8 weeks before calving. They will dry up if *you stop milking them.* Partial milking or irregular milking merely prolongs the job of drying off. Don't milk at all for a week; then carefully drain a little milk from the lower part of the udder.



THIS FOLDER was prepared by the Dairy Department of the College of Agriculture and Home Economics, and is given to you by

who has voluntarily agreed to bring this and other important war information to families in your neighborhood.

350M—3-43



MORE MILK from FAMILY COWS

By Fordyce Ely

Milk, cream, butter, buttermilk, cottage cheese, and dishes made from these products go a long way toward making family meals healthful and appetizing. This puts the family cow into the front line of Kentucky's wartime Live-at-Home Program. Since about 60 percent of all Kentucky milk comes from family-size herds, the family cow also finds herself in the front ranks of the wartime dairy-production program. Now is the time to give these cows the best care and feed in order to increase and maintain production of milk and milk products.

Leaflet 28

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Service

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1943

Provide Good Pasture

Cows can harvest about half of their annual feed from good pasture, and pasture costs only about one-third what other farm feeds would cost.

For good pastures—

1. Top-dress pasture with manure, and with limestone and phosphate, in late fall or early spring.
2. Keep cows off pasture in the spring until the grass is 4 inches high.
3. Spread manure clumps in the pasture by dragging with a tooth harrow.
4. Clip weeds to prevent their going to seed.
5. Don't overgraze the pasture. Use supplementary pasture lots or feeds.
6. For winter and early spring pasture use Balbo rye and other small grains.

Guard against off-flavor from weeds.— Any strong-flavored weed (such as onion, garlic, ragweed) will give an off-flavor or odor to milk if cows eat it shortly before milking. Cows are more likely to eat these weeds if better pasture is not obtainable. Keep your pastures free of weeds, or, if you have trouble, take the cows off the pasture 4 to 6 hours before each milking. Onions are the first green thing in the spring in an onion-infested pasture. Let some heifers or other stock eat them off before milk cows are turned in.

Two Tons of Legume Hay Per Cow

Legume hay is second only to pasturage as an important feed. Cut hay when in half to full bloom, so that it may carry more leaves, contain more protein, more green color (source of vitamin A) and be more digestible than hay cut in seed stage. Feed what they will clean up when not on pasture.

Feed Grain

Winter.— Good producing cows need and deserve grain throughout the year. Crushed corn and cobs 3 parts, mixed with 1 part oilmeal (soybean, cottonseed, or linseed) fits well in a

program of better feeding. If protein-rich meal cannot be bought in the war emergency, it is especially important that legume hay of good quality be fed.

Feed 1 pound of grain to each 3 to 4 pounds of milk, or 2 to 3 pounds per gallon of milk produced. This provides for good production when the hay is of good quality; if the hay is not of good quality, feed more grain.

Late summer.— In late summer and fall milk production usually falls off greatly. Good legume hay, grass, or corn silage, and some grain will supplement dry pasture and help to prevent the usual decline in production. Once production has dropped it usually does not come up again until next freshening.

Keep Only Good Milkers

Low producing cows, nonbreeders or otherwise unprofitable cows should be slaughtered, because meat is also a vital need in the war effort. Feed and labor will thus be released for the better-producing cows. All cows should be negative to tests for tuberculosis and Bang's disease.

Milk More Cows

Kentucky farmers are asked to enlarge their herds for 1943. About 5 percent more cows will need to be milked in 1943 than were milked in 1942. As a rule, one or two more cows could be added to small herds without increasing the labor load on such farms appreciably. Such increases, plus better feeding and care, would go a long way toward helping Kentucky to produce her share in the national milk-for-freedom program.

Practice Cleanliness

In producing milk and cream that can be used as a first-class food, cleanliness is more important than expensive equipment.

1. Keep the cows clean and healthy, and the milkers also should be clean, healthy, and dry-handed.
2. Thoroughly wash and scald all utensils after each time they are used.

3. Arrange to cool milk or cream to as low a temperature below 70° F as practical. Lower the temperature as soon as possible after milking. A running-water barrel cooler, spring house, or something more pretentious may be used.

Keep Milk for Family Needs

Keep enough milk to meet the needs of the family—1 quart for each child and nursing or pregnant mother; 1 pint for each adult; and enough more to make about ½ pound butter per person per week.

Sell Surplus Milk and Cream Promptly

Milk and cream not needed by the family will bring a good price if sold promptly. Sell milk daily and cream at least 2 or 3 times a week. Your nation needs it.

Make Your Own Butter and Cottage Cheese

For good home-made butter follow these steps: (1) milk clean and dry handed; (2) cool the cream promptly to as near 50° F as possible; (3) churn often in small quantities while cream is sweet or slightly sour; (4) scald and cool the churn before using; (5) don't guess the temperature—use a thermometer, and churn at 52° to 56° in summer and 56° to 62° in winter; (6) wash the butter granules thoroughly in water about the same temperature as the cream; and (7) salt to suit the taste and work thoroughly. (8) Wrap the pound prints in parchment paper. (9) Pack them snugly into a suitable crock and cover with salt brine (1 part salt and 2 parts water by weight). (10) Store in as cool a place as possible.

For cottage cheese, follow these suggestions: (1) allow milk to sour at as near 70° as possible; (2) when the curd breaks cleanly from the side of the vessel cut it as uniformly as possible into pieces ½ to 1 inch in diameter; (3) using double boiler and thermometer, heat to 100° to 110° F and hold about a half hour, stirring gently; (4) drain off whey and wash the curd once or twice with cold water—the more washing the less sour to the taste; (5) drain in cheese-

day. Provide some good disinfectant, such as creolin. Disinfect the hands and knife before each operation. Remove the tail at a joint about an inch from the body. In castration, cut off about half of the scrotum and remove the testicles one at a time with the fingers. Apply disinfectant to the scrotum before the operation but do not put any in the wound.

If you are inexperienced in these operations, get a neighbor to show you or arrange with the county farm agent for a demonstration at which you and other club members and farmers may be taught the correct procedure.

Creep-Feed the Lambs

Push lambs as rapidly as possible from birth to market. Supplement the ewes' milk with grain and leafy legume hay in creeps until plenty of pasture is available. If pasture is poor, provide a movable creep and continue feeding the lambs on pasture. Feed cracked grain until the lambs are five or six weeks old and then feed whole grain. Corn alone is satisfactory and economical. Lambs usually begin to eat before they are 2 weeks old.

Shearing

May is the usual time for shearing sheep in Kentucky. The sooner the sheep are sheared after there has been a few days of warm weather to start a flow of yolk, which puts the fleece in good condition for shearing, the better. Shear on a clean floor or tarpaulin. Remove the fleece in one piece; turn it over with the flesh side out, turn the sides in, roll in a compact bundle, and tie with paper twine. Remove all tags or filthy locks before tying.

Marketing Lambs

Market lambs as they are ready to go, deep and firmly fleshed and weighing 80 to 100 pounds. Try to get as many lambs as possible marketed at these weights by early July and before parasites and hot weather affect their development. Wean by July 15 all lambs still on hand, shear immediately, place on clean pasture, and market when finished and when their pelts will have at least ½ inch of wool so as to grade No. 1 shearlings.

Culling

Cull all barren, unthrifty ewes and those with broken mouths and spoiled udders. Keep these culls after shearing until their fleeces have enough wool to make at least No. 2 shearlings, or better, No. 1. A "No. 2 shearling" requires a wool length of ¼ to ½ inch; "No. 1," ½ to 1 inch. These pelts are needed for making warm clothing for aviators.

Control of Internal Parasites

Sheep are subject to various types of internal parasites. To control them—

1. Start with sheep as free from parasites as possible.
2. Quarantine for at least a week in barn or drylot all incoming sheep, with the exception of ewes direct from the ranges or the Northwest, and treat with phenothiazine.
3. Treat all sheep with phenothiazine in the late fall or early winter and again after lambing.
4. Provide as wide a system of pasture rotation as is practical and ask your county agent about treatments needed during the summer.

RECORD

Number of ewes..... _____

Type of ewes (Western or Native).. _____

Breed of ram used..... _____

Number of lambs produced..... _____

Amount received for lambs..... $_____

Pounds of wool produced..... _____

Amount received for wool..... $_____

Cost or value of grain..... $_____

Cost or value of hay and silage..... $_____

Other expenses..... $_____

Net income..... $_____

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5M—3-43

Wartime Sheep Project for 4-H Clubs

By Richard C. Miller

The purpose of this war-time sheep project is to produce more lambs, more wool, and shearing pelts. Start, preferably in summer, with at least five ewes; ten would be better. As experience justifies, gradually increase to a flock of 25 to 30 ewes.

Kind of ewes.— Buy ewes of good size and conformation that are healthy and vigorous, and comparatively free from parasites. Yearlings are usually the best buy. Most older ewes on the market have been culled as nonbreeders, poor producers, or for other good reasons. Western ewes usually are hardier, earlier breeders, freer of parasites, and heavier producers of wool than natives.

How to purchase.— Buy ewes from reliable dealers or commission agencies. Try to pool your order with those of other club members and get a capable experienced sheepman to help in selection. Quality rather than price should be the primary consideration.

Use Only Purebred Rams

The ram should be a purebred and at least average size for the breed, masculine, vigorous, active, and of the thick, compact, low-set type.

Leaflet 29

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

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He should stand wide on all four feet and have a close, even fleece. Buy only from a healthy flock, to avoid introducing unnecessary trouble into your flock.

Use a ram in the general flock, where possible; or run several club member flocks together during the breeding season. One member should own the ram and the others pay him a small fee for the breeding of their ewes. A yearling is usually the best buy. Avoid older rams unless it is known that they are proved breeders.

Breeding Season

Breed early so that most of the lambs can be finished before hot weather and parasites slow their growth. Condition the ewes for breeding by putting them on extra good pasture a week or two before breeding starts, and keep them gaining throughout the breeding season. Feed a little grain if necessary. Unless the number of ewes per ram is small, allow the ram with the ewes only at night or for an hour or two in early morning and late afternoon. Give the ram a daily feed of grain.

Feed for the Ewes

Pasture.— Make liberal use of pasture, both permanent and temporary. Pasture should ordinarily provide all the feed of the flock from early spring to late fall. Small grain and other cover crop pastures, or bluegrass that made good growth in the fall, should provide much winter pasture as well.

Hay.— Provide 1 ton of good legume hay for every seven ewes. Cut feed costs by feeding some corn silage when available, both before and after lambing. Legume silage may be used in place of hay or, better still, in connection with it by feeding the silage at one feed and hay at the other.

Concentrates.— Corn alone, or barley, or a combination of the two, when used in connection with a legume roughage, makes a balanced ration for breeding ewes. When mixed hay is used, 1/10 to 1/5 lb daily of linseed oilmeal, cottonseed meal or soybean oilmeal will improve the ration. One-half pound, or one ear, of corn, or its equivalent in other grain, daily for

the last three weeks or a month preceding lambing is generally enough but the amount should be increased after lambing. To avoid "pregnancy disease" the ewes must be kept gaining right up to lambing time.

Pregnancy Trouble

Pregnancy trouble (or ketosis) which causes the loss of many ewes during the last few weeks of pregnancy, can be prevented by proper feeding. Feed the ewes as previously suggested but be sure that the use of harvested feed starts as soon as pastures begin to fail and that the ewes get enough to keep them gaining up to lambing time.

If pregnancy disease appears in the flock, drench affected ewes as soon as detected 2 or 3 times daily with 2 ounces of molasses mixed with 2 to 4 ounces of warm water. Continue treatment until the ewes are back on feed. Correction of the ration for the flock as a whole and the addition of molasses to the feed at the rate of 2 ounces a ewe per day is added insurance against further trouble.

Shelter and Equipment

Barn.— Shelter for sheep in Kentucky need not be expensive. The tobacco barn, which is the usual sheep shelter in this state, can be made comfortable for lambing at small cost. Nail boards over cracks in the walls or stack bales of straw along the sides. Doors should be left open at one end of the barn, except in extremely cold weather.

Feed troughs and bunkers.— Improper construction of feed troughs and bunkers that enables the lambs to get their feet into them makes feed unpalatable and spreads coccidia, a parasitic trouble which causes the loss of many young lambs and can be controlled only through sanitation.

Lambing pens.— Unless the flock is small, individual lambing pens should be used. Two panels or hurdles four feet long and three feet wide, hinged in the middle, can be set across a corner of the barn to form a pen. These panels should be ready before lambing starts so that they can be set up as needed.

Lamb creep.— A lamb creep or enclosure with a grain trough and hay rack, where the lambs can eat without being bothered by the ewes, should be provided. Allow 8 inches between the slats for the lambs to go in and out.

Dipping vat.— A dipping vat is valuable equipment but is not justified for a small flock. With such flocks, it is more economical in the end to have the sheep dipped on the portable vat plan or go in with other club members or sheepmen and build a community vat.

Other equipment.— There is certain other necessary equipment, such as drenching bottle or 4-ounce syringe, a sharp knife, and pair of blade shears for tagging, that should be convenient and available whenever needed.

Lambing Time

See that the lambing quarters are cleaned, disinfected and well bedded before the lambing season starts. A coal-tar sheep dip is a good disinfectant. Bring up the ewes every night as the season approaches but do not put them into individual lambing pens until after lambing. Be on hand during the lambing season. Keep in close touch with the flock during the day and visit it a number of times during the night. Be ready to give assistance to any ewe that may require it, but don't attempt to give help until it is needed. See that the lamb nurses and that all is well with the ewe and her offspring before they leave the lambing pen.

Make every ewe capable of nursing a lamb raise one: if not her own then an orphan or one of twins or triplets not getting enough milk from their mother. Cut down on the feed of heavy-milking ewes for a few days after lambing until the lambs are taking all the milk, and then gradually increase to about a pound of grain a day per ewe in addition to plenty of good roughage. Ewes with twin lambs may need more.

Docking and Castrating

Dock all lambs and castrate all ram lambs when 1 to 3 weeks of age. Both operations may be performed at the same time. Pick a bright

Protect Your Poultry from COCCIDIOSIS

Suggestions on prevention and control

Leaflet 30

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College of Agriculture and Home Economics
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For:

PROTECT YOUR POULTRY FROM COCCIDIOSIS

15M—9-42
25M—3-43

Protect Your Poultry from Coccidiosis

By T. P. Polk

Coccidiosis is a very widespread disease of poultry that causes death losses, unthrifty birds, and lowered egg production. It is caused by very small parasites called "coccidia." When eaten by poultry, these parasites live in the intestine walls and multiply rapidly. In a few days they develop into egg-like form and leave the intestines in the droppings. In the presence of air, warmth and moisture they develop in 18 to 48 hours into the harmful stage and will cause coccidiosis if eaten by poultry. There are at least six kinds of coccidia but only two of these cause blood to appear in the droppings. Coccidia may live in soil or poultry droppings for one year or more.

How to Recognize this Disease

Chicks do not have coccidiosis when they are hatched. They are most likely to have it when they are one to four months old and during May, June, and July. The symptoms are paleness of beak, shanks, and visible membranes; drowsiness and ruffled feathers; drooping wings and diarrhea. In two forms of coccidiosis blood appears in the droppings of the infected birds. The death rate may be high.

When chickens show symptoms of coccidiosis, start control measures at once.

Control

Coccidiosis cannot be cured by any known remedy. Disinfectants usually destructive to germs do not kill coccidia. In fact moisture of any kind aids the development of this disease. Control therefore depends on intensified preventive measures.

1. As soon as coccidiosis appears confine the chicks to the brooder house and sunporch.
2. Dry clean the brooder house each morning by scraping and sweeping. Do not use water or disinfectants. Cleaning can be done more quickly if a small amount of litter is used.
3. Keep feed and water containers clean.
4. Daily cleaning should continue until symptoms of coccidiosis disappear, usually 5 to 10 days.
5. If the chicks appear cold supply more heat.
6. The use of milk in any form is of value as an addition to the regular feed. Keep liquid milk before the chicks instead of water for 5 to 10 days. Sweet or sour milk may be used. Do not change from one to the other. Dried milk may be used at the rate of 4 pounds to each 6 pounds of mash. Feed for two days, skip two days, and feed for two days. A commercial flushing mash may be used. No other changes in feeding are recommended.

Prevention

Coccidiosis can be prevented by raising the chicks in clean brooder houses on clean ground away from other poultry. Preventive measures that are effective for coccidiosis will also aid in the prevention of other diseases and parasites of poultry.

1. Do not depend on medicines or any particular kind of feed to prevent coccidiosis.
2. Clean the brooder houses in the fall or winter before moving them to clean ground. Scrape and sweep the ceiling, walls and floor until all litter and droppings have been removed. Scrub the house and all equipment with hot lye water (one can of lye to five gallons of water). Wait one hour and rinse with hot water. Spray with a 5-percent solution of cresol compound. The house is now ready to move to clean ground. **Clean ground is ground that has not been used for any kind of poultry for at least two years.**
3. Provide a sunporch and range shelter for each brooder house. See Extension Circular No. 157 for details on their construction.
4. Avoid carrying infection into the brooder house. Keep overshoes to wear only in the brooder house.
5. Construct the feed hoppers and drinking vessels so that the feed and water will not become contaminated with droppings.
6. Clean the brooder house when it needs cleaning. Keep a deep litter on the floor.
7. Until the droppings can be removed to a place remote from the poultry houses and ranges, keep them in containers that protect from insects and poultry.
8. Coccidiosis may be carried from house to house or from flock to flock by the poultryman, visitors, feed sacks, water pails, poultry crates, animals, birds, insects and especially flies. Don't encourage visitors to enter your brooder house or poultry lot. Anything that will draw flies should be removed from the poultry houses and yards. Fly traps help to control flies. Ask your county agricultural agent how to make them.

Other Poultry

This information deals with coccidiosis in chickens. The control and preventive measures outlined, however, are also effective for this disease in other farm poultry and for trichomoniasis or hexamitiasis in turkeys.

FOWL PARALYSIS

. . . a poultry disease

This disease is also called "paralysis," "range paralysis," "lymphomatosis," "big liver disease," and "avian leukosis complex." Because no medicine controls this disease, poultrymen should use the most rigid measures of cleanliness and careful poultry management to prevent or control it.

Leaflet 31

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15M—9-42
25M—3-43

Fowl Paralysis

Avian Leukosis Complex

By F. E. Hull

"Fowl paralysis" is the general name given to a disease which causes a variety of closely related conditions, such as paralysis, lameness, blindness, big liver, and tumor-like growths in various parts of the body. All breeds of fowls contract this disease. Younger birds are more susceptible to it than older ones. Fowl paralysis develops slowly; symptoms are not usually observed before chickens are about 4 months old. Many poultrymen fail to recognize it because of its slow development and also because its symptoms resemble similar conditions caused by poor feeding, parasites, and other infectious diseases.

Symptoms of This Disease

Paralysis of the legs or wings is a symptom of the disease. Usually this condition starts with lameness in a leg or drooping of a wing. Next the head and neck twist to one side or fall backward. Finally the bird becomes completely prostrate and lies on its side with its legs outstretched, probably one leg extended forward and the other backward.

Gray eyes, another symptom of this disease, does not occur in all affected chickens but when it does the change in eye color takes place slowly, a gray color replacing the normal reddish-bay color, and the chickens become blind. Gray eyes appear when birds are 6 to 8 months old; one or both eyes may be affected. Blindness often hastens the death of the victim of this disease for, altho the appetite of the bird may be good, it is unable to find feed.

Tumors on the skin and internal organs of chickens frequently appear with fowl paralysis. Examination of a dead chicken may show swelling of the nerves and, very frequently, the enlargement of the spleen, kidneys, and liver, the latter often twice its normal size.

Control and Prevention

Despite much investigation the cause of fowl paralysis is not definitely known. Probably a virus causes it. Increased susceptibility and increased resistance may be inherited. Some evidence shows that the virus is transmitted thru the egg to the chick and that the disease is spread by contact with infected birds and contaminated surroundings. On account of the uncertainty about the cause and transmission of fowl paralysis no remedy for it is known. At present poultrymen should use the following approved sanitary measures and flock management procedure for its control and prevention.

1. Remove from the flock all birds showing visible symptoms of the disease.

2. Clean the laying quarters, runways, and containers for feed and water. Remove all dirt and caked material from the floor, roost poles, dropping boards, side walls and ledges. If necessary soak the floor and dropping boards to loosen this material. Disinfect with a spray made of one can of lye to 5 gallons of water or with a 4 percent cresol compound.

3. Break up and reseed old yards and ranges.

4. Separate young stock from old, and rear the young birds on ground on which neither chickens nor turkeys have been kept for at least 2 years. Let different attendants look after the chicks and the old birds. Provide pullets with laying quarters separated from the old flock. Clean the laying quarters before putting the pullets in, and then keep them clean.

5. Breed for increased resistance by retaining healthy survivors of an outbreak of this disease. Hatch eggs from hens 2 or more years old in your own incubator.

6. Dispose of the entire flock and replace it with new stock. This procedure may not bring the desired end because no assurance can be given that the new flock will be free of fowl paralysis. A proved resistant flock is hard to find.

7. Support the preventive measures for fowl paralysis by feeding the flock properly, by taking due precautions to prevent worms, and by observing the control measures for coccidiosis and other poultry diseases.

KEEP FOWL POX out of your flock

The best way to keep fowl pox out of a healthy flock is to vaccinate before the disease makes its appearance. Consult your county agricultural agent for more information on buying and using vaccine.

Leaflet 32

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky August, 1942

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating

U. S. Department of Agriculture
EXTENSION SERVICE
WASHINGTON, D. C.

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Penalty for Private Use to Avoid Payment of Postage, $300

For:

FOWL POX

15M—8-42

Keep Fowl Pox Out of Your Flock

THIS DISEASE is also called chicken pox, avian diphtheria, canker mouth, and contagious epithelioma or sore head. It is caused by a living infectious agent known as fowl pox virus. Until a way is found to kill this virus poultrymen must seek to prevent its appearance in their flock.

By T. P. Polk

How to Recognize the Disease

Sores on the unfeathered parts of chickens and turkeys usually are symptoms of fowl pox. These sores (pox scabs) are little inflammatory bumps that develop on the comb, wattle, and skin of the birds. Sometimes pus accumulates in the eyes and in the cavities of the head; and matter, having the appearance of cheese, forms in the mouth and throat. In the former case blindness may result; in the latter, death by suffocation.

When fowl pox appears in a mild form the general health of the birds is not seriously affected and the egg production of the hens is only slightly decreased. But in severe cases the birds become droopy, rapidly lose flesh, and may quit laying eggs. Birds affected with colds have some of the symptoms of fowl pox. Unless they have the pox scabs or sores, however, such fowls do not have this disease.

How the Disease is Spread

Fowl pox is a highly contagious germ disease. Its virus is spread from bird to bird by contact, though mosquitoes, flies, and other insects may be carriers of it. Persons who go from one flock to another may spread the disease by carrying the virus on the hands, clothing, shoes, or any material contaminated by an infected bird. The time from exposure to the development of visible lesions (scabs) varies from 3 days to 2 weeks.

Fowl pox is most likely to occur in late summer, fall, or winter. The virus is very resistant to drying and disinfectants, and may remain alive in poultry houses and protected places from one season to another.

Vaccination is Only Control Method

When symptoms of fowl pox are present in a flock or when it is known that the flock was infected the previous year, vaccinate every bird. For healthy, young fowls 3 to 4 months old, use Fowl Pox Vaccine after the surplus cockerels are sold. For infected flocks and flocks in egg production, use Pigeon Pox Vaccine. This vaccine is milder than Fowl Pox Vaccine; therefore, it causes less severe reaction and is safer to use on laying hens in infected flocks. The "mixed avian bacterin vaccines" are not recommended.

When vaccinating against fowl pox use either the stab or feather follicle method but use only the feather follicle method when Pigeon Pox Vaccine is applied. The person applying the vaccine should not handle the birds because his hands, contaminated by the virus, might spread the disease.

litter. It should not be allowed to become damp or packed down.

A dry, fluffy, deep litter may be better than one that is shallow but cleaned often, with the necessary disturbance of the chicks. A disease such as coccidiosis makes daily cleaning of the brooder house a necessity. At this time the use of a minimum amount of litter makes frequent cleaning less difficult.

Clean ground.— Put growing chickens on ground not used for any kind of poultry during the past two years. All the work of keeping a brooder house clean is lost by placing the chickens on a range infested with parasite eggs. Provide 3 or 4 ranges, at least 100 yards apart, and use a different one each year. Cultivate (in garden, for example) or mow frequently the ranges not in use. Do not allow weeds, brush, boards, or other trash to accumulate on any poultry range. Trash harbors insects that serve as intermediate hosts for parasites of poultry.

Disposal of dead fowls.— Burn immediately or bury deep the fowls that die. Dead baby chicks may be burned in the brooder stove. Killing and burning all sick chickens often stops a poultry epidemic.

Cleaning the laying house.— Breeding and laying flocks are a constant source of parasites and parasite eggs. Hens and pullets allowed free range void more than 50 percent of the droppings in the house. The house should be cleaned thoroughly and disinfected at intervals of 6 months. (See instructions for cleaning the brooder house.) Spray the house for mites and treat all poultry for lice at these times. More frequent cleaning may be necessary in damp weather.

Water containers and feed hoppers.— Feed hoppers and water containers should of course permit the poultry to get at the feed and water readily, but should prevent poultry from getting into or roosting on them. The water utensils should be set upon wire platforms to prevent litter and droppings from being thrown into the water. Feed and water may be the means of spreading disease. They should therefore be kept clean and free of poultry droppings.

20M—9-42
25M—3-43

POULTRY PARASITES

For:

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

U. S. Department of Agriculture
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POULTRY PARASITES

Control • Prevention

Some points to remember---

- Chicks, when they hatch, are free from parasites.
- Chicks don't get parasites unless they come in contact with the parasites, parasite eggs, or "intermediate hosts."
- Intermediate hosts — flies, grasshoppers, and so on — spread no poultry parasites unless they have had access to droppings from birds having parasites.
- Chickens having parasites are sick chickens, and usually fail to make a complete recovery.
- Poor health, unthriftiness, and unproductiveness of poultry are often directly traceable to parasites or to improper feeding, or both.
- Prevention by proper care, feeding, and management is the best defense against parasites.
- Methods of prevention that are effective against the common parasites of poultry are also effective against other parasites, and are an important aid in controlling most poultry diseases.

Leaflet 33

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky September, 1942

Poultry Parasites

By F. E. Hull

Roundworms, tapeworms, lice, and mites cause a continuous loss to poultry raisers, especially among young birds. These parasites cause general unthriftiness, paleness of head and shanks, loss of flesh, diarrhea, or constipation, and loss of appetite in advanced cases. The modern practice of raising large numbers of fowls on small areas has increased the losses from parasites.

Examining Fowls for Worms

The presence of intestinal parasites in a flock can be discovered by examining the intestines of chickens killed for table use. All chickens that die should be examined. Remove the intestines from the dead bird and slit them open with a small knife or a pair of scissors. If the opened intestines are placed in a pan of warm water the smaller worms will be easier to see.

Common Parasites

Roundworms are yellowish-white worms 1 to 4 inches long, found in the intestines of fowls. The mature female worms produce eggs in large numbers which pass in the droppings. When the droppings get into the feed and water of chickens the roundworm eggs often enter the intestines of fowls and hatch worms which mature in 3 or 4 weeks.

Roundworm eggs are resistant to heat, cold, and disinfectants. They may remain on the ground or in the chicken house more than a year and still be capable of producing worms. For this reason, clean the chicken house frequently, and remove the droppings to ground not used by poultry. For chickens known to have roundworms give a tablet or capsule containing nicotine or tetrachlorethylene. These capsules or tablets can be obtained from local veterinarians or from dealers in poultry supplies.

Tapeworms are white, flat, segmented, ribbon-shaped parasites, some so small that it is impossible to see them without a microscope; others larger. The

head of the tapeworm fastens itself to the intestinal wall of the fowl. The last segments are oldest; when mature they contain numerous eggs, break off, and are passed in the droppings. Tapeworm eggs do not cause tapeworms in chickens if the eggs themselves are eaten by the chickens. The tapeworm eggs are eaten by flies, grasshoppers, earthworms, snails, slugs, or beetles, and when these in turn are eaten by chickens the tapeworms that are partly developed in these insects or worms continue their development in the chickens. The flies, grasshoppers, and so on, that eat the tapeworm eggs are called "intermediate hosts." It is not good poultry practice therefore to feed liquid milk, distillery slop, or wet mash in warm weather, because it attracts flies and other intermediate hosts and brings them in contact with poultry droppings.

No effective treatment for tapeworms in poultry is known. Control depends on prevention rather than treatment. This requires a longtime sanitation and poultry management program.

Lice.— Head lice infest baby chicks; body lice and feather lice appear when chickens begin to feather. Lice spend their entire life on the infested fowl and deposit their eggs singly or in clusters on the bases of the feathers. The heat of the chicken's body hatches the eggs in one week, and the lice mature in 10 days. They pass readily from one chicken to another, but they die very quickly when off the fowl.

A 40-percent solution of nicotine sulfate will kill lice. Apply it to the perches half an hour before the birds go to roost, or place a small amount on the feathers below the vent, under each wing, and at the back of the neck.

Sodium fluoride also may be used to kill lice. Apply it by the pinch method or in warm weather by dipping. Use 1 pound of sodium fluoride to 10 gallons of warm water to make the dip. For the pinch method apply a small amount under each wing, under the vent, at the base of the neck, and at the base of the tail. Rub thoroughly to the skin. One treatment will not destroy lice eggs; therefore repeat the treatment 3 times at intervals of 7 days.

Mites.— Poultry serve as hosts for several different kinds of mites. Red mites are found in most flocks. They are blood-sucking parasites that feed almost entirely at night and leave the chickens during the day to hide in the chicken house. They deposit their eggs in cracks and crevices on the perches, ceiling, walls, floor, and nests. Mite eggs hatch in 2 days, and the mites mature in 5 days.

Red mites as well as other poultry mites, are not hard to kill, but it is hard to reach them in their hiding places. The first step is to get rid of the hiding places. Remove loose boards and other unnecessary material from the chicken house.

After cleaning, spray with 1 part kerosene and 3 parts crankcase drainings or with creosote or carbolineum, driving the spray thoroughly into the cracks. Spray ceiling, walls, floor, perches, nests, and any other part of the poultry house that might furnish a hiding place for mites.

Prevention of Parasites

Prevention of parasites requires proper disposal of droppings, clean brooder and laying houses, clean ground, clean water containers and clean feed hoppers. Such a program must continue over a period of years.

Disposal of droppings.— Because the droppings of a fowl having roundworms or tapeworms contain parasite eggs, proper disposal of droppings is essential to good poultry management. Place the droppings in a container such that neither insects nor poultry can get to them. Empty the container in a place remote from the poultry house and yards.

Cleaning the brooder house.— Parasite prevention demands that chicks be kept away from the parasites and their eggs. Clean the brooder house before the chicks arrive and move it to clean ground. Do not use water, disinfectants, or sprays for cleaning the brooder house after the chicks have been placed in it. Dry cleaning by scraping and sweeping is better. Moisture of any kind aids the development of worms, as well as coccidiosis and other diseases. The frequency of cleaning depends upon the condition of the

Don't Burn Off Broom Sedge

Feed the good grass.— Burning does not kill broom sedge, but it is likely to kill some of the desirable grasses growing with it. After burning, the broom sedge comes back quicker than the other grasses and replaces them. When limestone and phosphate are applied to most unburned pastures, the forage plants grow vigorously and tend to drive out the sedge, especially if the pasture is heavily grazed in early summer. Best farmers in Kentucky never "burn off" a meadow or pasture.

Mow before broom sedge seeds.— Mowing pastures before broom sedge has seeded is necessary to the control of this weed in permanent pasture. The cut sedge is good for "galled spots" and for bedding.

Plow under sedge.— Broom sedge can be destroyed by turning it under with a heavy plow and growing a cultivated crop for a year or two. Given enough time, the turned under broom sedge decays and improves the soil with organic matter. Plant decay is nature's way of building up soil.

How to Keep Fires Down

1. **Initiative.** — When fire is located be the first one to help in putting it out, even if it isn't on your land; the next one may be.

2. **Organization.** — Keep your community organized into a volunteer fire-fighting crew.

3. **Education.** — Talk the fire situation over with your neighbor. Do this until you are certain all your neighbors are informed about the damage done by fires and the methods of fire control. Agree how you will help each other in case of fire.

4. **Determination.** — Ninety-nine percent of our fires are caused by man. Few fires will start if a community is determined to prevent them. Those that start will be quickly extinguished.

50M—1-43
50M—4-43

STOP FIRES IN WOODS AND FIELDS

For:

Cooperative Extension Work in Agriculture and Home Economics, University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

U. S. Department of Agriculture
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STOP FIRES
in Woods and Fields

Suggestions on preventing and controlling fires

Leaflet 34

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky

April, 1943

Stop Fires in Woods and Fields

By W. E. Jackson

When Burning Brush

1. **Pile brush.**— Put brush in small piles at a safe distance from woods and fences.

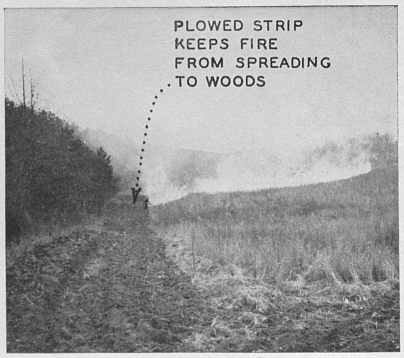
2. **Clear strips.**— Plow clean strip all around field wide enough to keep fire from getting out of control.

3. **Have tools and help.**— For an emergency have rakes, axes, shovels, and water ready. Call neighbors if needed.

4. **Burn into wind.**— Test wind by firing a small pile. Start brush pile on uphill side of field. Fire only as many piles at one time as you know you can control.

5. **Put fire out before leaving.**— Keep one man on job until every spark is out.

6. **Select a quiet, moist day.**— Burn after 4 p.m. when air moisture is increasing. Don't burn in a strong wind. Be particularly careful during the fire months—March, April, October, and November—when there are strong winds and much dry matter on the ground.





Forest Fires and Lumber

Destruction of lumber. — Wood is one of the chief materials in houses, barns, furniture, and farm implements. Trees supply this material. Fires in woodlands destroy many trees, stunt the growth of others, and prevent their normal development. When fires burn in the woods a potential home is in flames; it may be your home, your children's or your grandchildren's.

Poor grades of lumber. — Thousands of trees in Kentucky would have made valuable timber if they had not been stump-scorched while small. Many fire-scorched trees heal over if not continually burned but the inside of such trees never heals up. Diseased and inferior, they yield a reduced amount of sound wood.

High prices of lumber. — Except for the past two years homes were built and furnished at reasonable cost because of the moderate price of lumber. Today because of an actual shortage of timber, lumber prices are going up. Fires in wood and forest have been the one great cause of this shortage and therefore of the scarcity of lumber. As scarcity increases prices will advance.

Growing trees for lumber. — Never graze woodlands. Grasses among trees, due to the absence of sunlight, have little food value. Timber grows better when livestock are kept away from it. Burning woodlands increases soil erosion especially when the woodlands are on hillsides. Repeated burning and grazing causes sprout growth, destroys tree seedlings, and damages mature trees. Give the woodlands a chance to produce the best lumber.

What Fire Destroys in Woods and Fields

1. Destroys grass, tree seeds, and seedlings.
2. Destroys nature's mulch of decayed plant growth. Mulch prevents the sun from drying water out of the soil and protects roots of young plants from freezing out the first winter. It also slows the runoff of water and therefore helps to prevent erosion and the loss of rich top soil.
3. Destroys the home of wild life that scatter and plant many valuable seeds.
4. Destroys fences, crops, timber, and often farm buildings.
5. Destroys grass seed and allows the heavier, earlier maturing weed seed to become embedded in the soil, where safe from fire it eventually takes the pasture.

by the number of hours shown in this table. After this is done, attempts can be profitably made to spread or shift the peaks by using different crops, varieties, or planting dates.

Get More Production per Hour of Work

By carefully examining each farm job, ways can be discovered that will save a considerable amount of labor. Many of the short cuts or new methods will take more energy for a shorter time, but will result in much reduction of total time required. Possibilities for getting along with one or two fewer men should be considered.

Tobacco.— About 336 hours are necessary to grow, cure, and market an acre of burley tobacco, 227 hours for dark air-cured, and 256 for dark fire-cured. The labor peaks occur at setting, cutting, housing, and stripping. Setting can be spread over 2 to 4 weeks if the plant beds are watered and cared for after each "pulling," so that good plants will be available over a longer period. By spreading the setting dates, the ripening dates may also be more favorable to a small labor force working longer at the job. The peak for stripping may be reduced by spreading the stripping operation over a longer period and by using "stripping lights" when obtainable. Building a stripping room and providing heat in it, would on most farms increase the efficiency of the workers and permit working on cold days.

Corn.— Farms using tractor equipment and harvesting from the standing stalk can produce an acre of corn with 14 hours of labor. Farms with horse equipment and harvesting from the standing stalk require 21 hours. If the corn is cut, shocked, and snapped, 10 more hours per acre are taken. Important considerations on many farms for best use of labor for corn are: (1) harvesting from the standing stalk when conditions permit, (2) doing winter breaking to avoid the spring rush, (3) preparing the land thoroughly before planting to avoid hoeing and reduce cultivations, (4) planting hybrid corn for a good stand, early maturity, and ease in

harvesting, (5) cultivating only to control weeds, meaning fewer cultivations, and (6) using "bang boards" and "scoop boards" on wagon beds for harvesting.

Small grain.— When a combine is used, about 6 hours per acre are required to harvest small grain. When the grain is cut, shocked, and threshed with a threshing outfit, about 9 hours are necessary. Consequently, where the services of a combine can be had, much labor can be saved. On large farms, to avoid a peak at sowing and harvesting, more than one kind of small grain can be sown; for example, wheat, barley, Balbo rye, or Fulwin oats. Another way to spread the small-grain seeding is to disk the lespedeza fields and sow barley or rye.

Hay.— To produce hay requires 7 to 10 hours per ton. To get all the hay required for a sizable livestock program from one kind of hay may cause a serious labor peak at cutting time. If more than one kind of hay is grown or if the alfalfa acreage is increased, serious peaks may be avoided. Other good practices are (1) hiring a pick-up baler operated by a man of judgment and experience in hay making, (2) cutting lespedeza early when it does not conflict too seriously with tobacco cutting, (3) stacking hay with a sweeprake, (4) using a sweeprake to put the hay in a nearby tobacco barn and moving or baling it later during a slack season.

Livestock.— Labor connected with livestock is considered chore labor. In this area nearly one-third of the productive labor is used in caring for livestock. The greatest saving of labor on livestock will be realized through farmstead conveniences such as the arrangement of gates, self-feeders, barn stalls, and lanes to pastures. Easy access to water, handy methods of disposing of manure, and nearness of feed to livestock all contribute toward efficient livestock management. Practices such as chopping corn, grinding feed for hogs, beef cattle, or sheep; and slopping livestock take considerable labor and may be hard to justify.

BM—4-43

FARM LABOR (Pennyroyal Area)

Cooperative Extension Work: Agriculture and Home Economics, University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, Cooperating

For:

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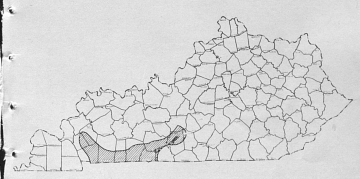
How to Use Farm Labor Effectively

(PENNYROYAL AREA)



Leaflet 36

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky

April, 1943

How to Use Farm Labor Effectively

(Pennyroyal Area)

By Ernest J. Nesius and Max M. Tharp

Tobacco production takes 34 percent of the labor spent on crops and livestock in the Pennyroyal. Corn requires 17 percent; small grains harvested, 2 percent; all hay, 4.5 percent, and livestock, 38 percent. Of the time spent on crops alone, tobacco takes 56 percent; corn, 28 percent; all small grains harvested, 4 percent; and hay, 8.5 percent.

Spread Out the Rush Periods

Rush periods for crop labor come mainly at the busy seasons for tobacco and corn, with tobacco causing most of it. The peak periods are largely caused by the hand labor in setting, cutting, housing, and stripping tobacco, and in shucking corn.

From 200 to 250 working days usually are suitable for outdoor work during the year. These days, this year, must be spent to best advantage. By determining in advance when the peak periods are likely to occur, adjustments can frequently be made to shift or spread them. When no satisfactory adjustments appear possible, more labor or the services of a custom operator should be arranged for in advance.

The demand for labor can be fairly uniform if more than one kind of grain is grown, such as corn, wheat, barley, and possibly oats, and if more of the hay is from alfalfa. The first cutting of alfalfa conflicts with tobacco setting, but the remaining cuttings do not seriously conflict with other operations.

The accompanying table shows by half months the average number of hours necessary to care for crops and livestock. These figures are averages in a normal season, but from them a fairly good idea can be obtained of the busy periods on an individual farm. Use a form similar to the one under the table and multiply the crop acreages and livestock numbers on your farm

HOURS OF WORK PER ACRE OF CROPS AND PER HEAD OF LIVESTOCK

(Averages in a normal season, Pennyroyal Area)

Item	March		April		May		June		July		August		September		October		November		December		January		February		Total
	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Burley tobacco	2	*	6	9	7	20	22	13	5	12	25	33	37	1	—	6	29	35	34	19	14	4	5	8	336
Dark air-cured tobacco	4	7	5	2	3	8	18	13	11	37	6	18	18	5	*	7	6	8	11	11	10	10	3	5	226
Dark fire-cured tobacco	4	4	3	4	7	11	15	9	5	21	10	18	24	11	4	4	1	1	34	21	25	13	1	6	256
Corn—Tractor equipment																									
Harvest from standing stalk	*	1	1	1	1	1	1	1	*	—	—	—	—	—	1	3	2	1	—	—	—	—	—	—	14
Cut, shocked and snapped	*	1	1	1	1	1	1	1	*	—	—	—	2	4	3	2	4	2	—	—	—	—	—	—	24
Corn—Horse equipment																									
Harvest from standing stalk	*	2	3	1	2	1	2	2	1	—	—	—	—	—	1	3	2	1	—	—	—	—	—	—	21
Cut, shocked and snapped	*	2	3	1	2	1	2	2	1	—	—	—	2	4	3	2	4	2	—	—	—	—	—	—	31
Hemp seed	*	1	2	2	4	2	6	6	1	—	2	3	5	1	12	13	4	*	—	—	—	—	—	—	64
Soybean seed	—	—	—	2	3	1	—	*	1	—	—	1	1	*	—	—	—	—	—	—	—	—	—	—	8
Sweetpotatoes	—	1	10	18	20	11	7	6	4	—	—	—	—	16	38	9	—	—	—	—	—	—	—	—	140
Strawberries, first year	7	19	5	9	11	9	2	11	8	7	9	5	2	*	—	—	—	—	—	—	—	—	—	—	110
Strawberries, second year	—	—	—	—	14	182	102	17	5	5	3	2	—	—	—	—	—	—	—	—	—	2	5	3	340
Wheat																									
Threshed	—	—	—	—	—	*	1	1	2	1	*	—	*	1	2	1	—	—	—	—	—	—	—	—	9
Combined	—	—	—	—	—	—	*	1	1	*	*	—	*	1	2	1	—	—	—	—	—	—	—	—	6
Barley																									
Threshed	—	—	—	—	—	1	1	*	3	*	*	*	1	2	1	—	—	—	—	—	—	—	—	—	9
Combined	—	—	—	—	—	—	1	1	*	*	*	*	1	2	1	—	—	—	—	—	—	—	—	—	6
Oats	—	—	—	—	—	—	1	2	2	1	*	*	*	1	1	*	—	—	—	—	—	—	—	—	8
Rye	—	—	—	—	—	1	1	1	2	1	*	—	1	*	1	1	*	—	—	—	—	—	—	—	9
Alfalfa hay	—	*	1	*	2	6	2	2	4	2	*	1	*	—	—	—	—	—	—	—	—	—	—	—	20
Lespedeza hay	—	—	—	—	—	—	—	—	—	—	1	2	4	1	—	—	—	—	—	—	—	—	—	—	8
Clover, timothy, alone or mixed	—	—	—	—	—	1	4	5	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10
Other tame hay	—	—	—	—	—	—	6	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7
Sowing grasses and legumes	*	*	*	—	—	—	—	—	—	—	—	—	—	—	*	*	—	—	—	—	—	*	*	*	1
Soybean hay	—	—	—	2	2	1	1	*	—	—	3	5	3	*	—	—	—	—	—	—	—	—	—	—	17
Lespedeza seed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*	1	1	—	—	—	—	—	—	—	3
Red clover seed	—	—	—	—	—	—	—	—	—	1	2	1	*	—	—	—	—	—	—	—	—	—	—	—	4
Crimson clover seed	—	—	—	—	—	—	2	2	1	2	2	*	—	—	—	—	—	—	—	—	—	—	—	—	5
Grass seed	—	—	—	—	—	—	*	1	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
General truck	*	10	20	29	20	20	20	20	20	10	10	10	10	*	10	*	—	—	—	—	—	—	—	—	200
Milk cows	6	6	7	7	7	7	5	5	5	5	5	5	3	5	6	6	6	6	6	6	6	6	6	6	140
Other cattle (beef)	1	1	1	1	1	1	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	12
Sheep	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	6
Sows (including hogs raised)	4	4	3	3	3	3	3	3	3	3	3	3	4	4	4	4	3	3	3	3	3	3	4	4	80
Chickens (per 100)	11	11	14	14	14	14	11	11	4	3	4	3	4	3	6	5	5	5	6	6	6	6	7	7	180
Workstock	2	2	2	2	2	2	1	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	45

* Less than ½ hour per half month.

To plan your labor needs draw a form like the one below. In column marked "Item" write the names of your crops and each kind of livestock. List in column marked "Acres or numbers" the number of acres of the various crops and the number of each kind of livestock you will have this year, and multiply each by the hours shown on the above table. For example, the calculated labor needs for 3 acres of corn by half-months are written on the first line of the suggested form. When all entries and calculations are made, add the columns. The totals you obtain at the bottom of the columns represent very closely the need for productive labor on your farm, by two-week periods.

Item	Acres or Numbers	March		April		May		June		July		August		September		October		November		December		January		February		Total
		1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Corn	20	*	20	20	20	20	20	20	20	*	—	—	—	—	—	20	60	40	20	—	—	—	—	—	—	280

prises, make changes in your farm practices, or arrange for custom machine work, so as to avoid times when there would otherwise be more work to do than men to do it.

Best Way to Use Labor

Careful examination of each farm job may show ways to spread the peaks or save labor. Use improved methods and short cuts. Try some of the suggestions which follow.

Corn.— Farmers using tractor equipment can produce an acre of corn with 15 hours of labor when the corn is husked from the standing stalk. With usual horse equipment the total time is about 21 hours. Cutting, shocking, and husking from the shock increases the labor 8 hours per acre. Some ways to get the best use of labor in producing corn are: (1) winter breaking to avoid rush periods in the spring; (2) thorough preparation of seedbed to avoid hoeing and to reduce the number of cultivations; (3) planting high-yielding, adapted hybrids to ensure a good stand, early maturity, and ease in harvesting; (4) using a spike-tooth harrow for the first cultivation; (5) cultivating only as many times as are necessary to control weeds; (6) using a mechanical picker and other labor-saving machinery; (7) hogging down in small fields (large fields may be hogged down if done a section at a time); (8) shifting some corn acreage to barley. See Kentucky Extension Leaflet 16, "Grow More Corn With Less Labor."

Tobacco.— About 315 hours of labor are required to produce an acre of burley tobacco; about 224 hours for an acre of dark air-cured tobacco. Setting, cutting, housing, and stripping cause labor peaks. These may be spread by: (1) setting over a period of 2 to 4 weeks, a method that requires keeping a supply of good plants on hand by watering and in other ways caring for the bed after each pulling; (2) setting two good varieties with slightly different maturity dates, a practice that spreads the cutting and housing season for a small labor force; (3) spreading the stripping time and using "stripping lights" to provide longer working hours; (4) providing a heated stripping room.

Hay.— To produce a ton of hay 7 to 10 hours of labor are needed. When a farmer depends upon a single kind of hay for his livestock enterprise, a serious labor peak may develop at cutting time. He may avoid this peak by using one or more of the following suggestions: (1) grow more than one kind of hay; (2) hire a pick-up baler operated by a man of judgment and experience in hay making; (3) make full use of the sweeprake in stacking, loading, and hauling hay to nearby barns.

Small grain.— About 6 hours are required to produce an acre of small grain where a combine is used. When the grain is cut with a binder, shocked, and threshed with a stationary thresher, about 9 hours per acre are needed. To spread the labor peaks or save time on small grain: (1) disk the land instead of breaking it; (2) seed small grains early in disked lespedeza fields to provide more grain and pasture; (3) harvest with a combine; (4) sow more than one kind of small grain or use varieties which have different maturity dates; (5) pasture barley or other small grain when there is not enough labor for harvesting.

Livestock.— The labor demands for livestock are fairly uniform throughout the year, but small daily savings of labor may be made by using some of the suggestions which follow: (1) have lots, lanes, fences, gates, and stalls conveniently arranged; (2) provide easy access to water; (3) use handy methods for disposing of manure; (4) crush or shell corn in large quantities; (5) store feed close to the livestock, or haul a full load to the feed lot; (6) use self-feeders for hogs and fattening cattle; (7) avoid grinding or soaking corn for hogs, or chopping corn by hand; (8) provide pasture for late fall, winter, and early spring (small grains, especially Balbo rye) so as to supplement the regular pasture and have grazing the year round. Labor requirements for pasture are very low.

935—4-43

FARM LABOR
(Lower Ohio Valley)

Cooperative Extension Work in Agriculture and Home Economics, University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating

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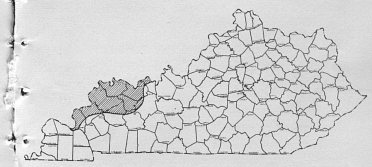
How to Use Farm Labor Effectively

(LOWER OHIO VALLEY)



Leaflet 37

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky April, 1943

How to Use Farm Labor Effectively

(Lower Ohio Valley)

By Ernest J. Nesius and Max M. Tharp

Around 22 percent of all labor used on crops and livestock in the Lower Ohio Valley area of Kentucky is spent on corn production; 17 percent on tobacco; 8 percent on hay; 4 percent on seeds; and 44 percent on livestock. Of the total time spent in growing crops alone, 39 percent is required for corn, 34 percent for tobacco, 14 percent for hay, and 8 percent on seeds.

Meeting the war production goals in 1943 will require careful handling of the labor force on farms in this area. This leaflet is intended to help find the periods when labor needs are greatest and to offer suggestions for meeting these needs.

Spread Out the Rush Periods

Because several crops and a number of livestock enterprises on a farm require attention at the same time, the demands on farm labor, during certain weeks, are very heavy. Piling up of necessary jobs often makes it impossible for a farmer to get all his work done without hiring extra help. These peak periods come in the spring during the planting season and again in the fall during harvest.

The accompanying table shows, by half months, the average number of hours necessary to produce an acre of crop and to care for one head of livestock. Since the figures in the table are based on a normal season, variations from them may occur from season to season or farm to farm. To find the labor peaks on your farm use a form similar to the one below the table. Multiply the acreages of crops and numbers of livestock by the hours shown for each half month in the table, and enter the result in the space for this purpose. Add the columns for each half month. These totals are your probable labor needs by two-week periods. Some are high; some are low. Since you know in advance the labor needs of your enter-

SEASONAL DISTRIBUTION OF HOURS PER ACRE OF CROPS OR PER HEAD OF LIVESTOCK, LOWER OHIO VALLEY

Item	March		April		May		June		July		August		September		October		November		December		January		February		Total
	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Burley tobacco	5	3	5	7	4	17	25	13	3	1	8	39	46	2	*	4	21	26	36	35	3	1	....	1	315
Dark air-cured tobacco	3	2	5	9	7	15	9	10	14	17	6	18	30	9	....	2	1	5	19	19	14	6	2	2	224
Corn—Tractor equipment															1	3	3	1	....	....	....	....	....	....	15
Harvest from standing stalk	....	....	*	1	2	2	1	1	*	....	....	....	....	....	3	5	1	....	....	....	....	....	....	....	23
Cut, shocked and snapped	....	....	*	1	2	2	1	1	*	....	....	....	....	7	1	3	2	1	....	....	....	....	....	....	21
Corn—Horse equipment															3	5	1	....	....	....	....	....	....	....	29
Harvest from standing stalk	....	....	1	2	3	3	2	2	1	....	....	....	....	7	1	3	2	1	....	....	....	....	....	....	62
Cut, shocked and snapped	....	....	1	2	3	2	2	2	1	....	....	....	....	....	1	3	2	1	....	....	....	....	....	....	8
Hemp seed	....	....	1	2	3	4	6	6	*	....	2	3	5	*	7	16	7	*	....	....	....	....	....	....	9
Soybean seed	....	....	....	1	1	2	1	1	*	....	....	....	....	....	1	1	*	....	....	....	....	....	....	....	6
Wheat																									
Threshed	....	....	....	....	....	....	1	2	1	1	*	*	*	1	2	1	....	....	....	....	....	....	....	....	9
Combined	....	....	....	....	....	....	1	1	1	*	*	*	*	1	2	1	....	....	....	....	....	....	....	....	6
Barley																									
Threshed	....	....	....	....	....	1	1	2	1	*	*	*	1	2	1	....	....	....	....	....	....	....	....	....	9
Combined	....	....	....	....	....	....	1	1	1	....	*	*	1	1	1	....	....	....	....	....	....	....	....	....	6
Oats	*	1	*	....	....	*	2	1	2	*	*	*	1	1	....	....	....	....	....	....	....	....	....	....	5
Rye	....	....	....	....	....	....	....	....	1	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	9
Alfalfa hay	....	....	1	*	....	5	1	2	5	....	*	3	4	*	....	....	....	....	....	....	....	....	....	....	21
Lespedeza hay	....	....	....	....	....	....	....	....	....	....	1	3	3	1	....	....	....	....	....	....	....	....	....	....	8
Clover, timothy, alone or mixed	....	....	....	....	....	2	6	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10
Other tame hay	....	....	....	....	....	....	....	....	2	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7
Sowing grasses and legumes	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	*	1
Soybean hay	....	....	*	1	1	2	1	*	....	....	....	2	6	1	....	....	....	....	....	....	....	....	....	....	14
Lespedeza seed	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	1	1	....	....	....	....	....	....	2
Red clover seed	....	....	....	....	....	....	....	....	....	1	1	1	*	....	....	....	....	....	....	....	....	....	....	....	3
Grass seed	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	2
General truck	*	10	20	20	20	20	20	20	20	20	10	10	10	*	*	*	....	....	....	....	....	....	....	....	200
Milk cows	6	6	7	7	7	7	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	140
Other cattle (beef)	1	1	1	1	1	1	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	12
Sheep	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	6
Sows (including hogs raised)	4	4	3	3	3	3	3	3	3	3	3	3	4	4	4	4	3	5	3	3	3	3	4	4	80
Chickens (per 100)	11	11	14	14	14	14	11	11	4	3	4	3	4	3	6	5	5	5	6	6	6	6	7	7	180
Workstock	2	2	2	2	2	2	1	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	45

* Less than ½ hour per half month.

To plan your labor needs draw a form like the one below. In column marked "Item" write the names of your crops and each kind of livestock. List in column marked "Acres or numbers" the number of acres of the various crops and the number of each kind of livestock you will have this year, and multiply each by the hours shown on the above table. For example, the calculated labor needs for 3 acres of corn by half-months are written on the first line of the suggested form. When all entries and calculations are made, add the columns. The totals you obtain at the bottom of the columns represent very closely the need for productive labor on your farm, by two-week periods.

Item	Acres or Numbers	March		April		May		June		July		August		September		October		November		December		January		February		Total for the year
		1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Corn	60	....	....	*	60	120	120	60	60	*	....	....	....	....	....	60	180	180	60	....	....	....	....	....	....	900

Best Way to Use Labor

By careful examination of each farm job you will find ways to get the best use of labor. You may be able to use some of the suggestions which follow.

Burley tobacco.— About 305 hours of labor are required to produce an acre of burley tobacco. Much of it is hand labor. Setting, cutting, housing, and stripping tobacco cause labor "peaks." These peaks may be spread or reduced by: (1) spacing plants and rows to have 7,500 to 9,500 plants per acre, depending upon fertility and slope of land. This practice does not decrease yield but saves labor on every occasion; (2) setting over a period of 2 to 4 weeks, always keeping a supply of good plants on hand by watering and in other ways caring for the bed after each pulling; (3) setting two good varieties with different maturity dates to spread the cutting and housing season; (4) having sticks, wagon, and barns ready in advance of the cutting season; (5) spreading out the stripping time and using "stripping lights," when available, to provide longer working hours.

Corn.— By using tractor equipment farmers can produce an acre of corn with about 20 hours of labor when husking is done from the standing stalk. With usual horse equipment the total time is about 27 hours. Cutting, shocking, and husking from the shock increases the labor about 11 hours per acre. Some ways to get the best use of labor in producing corn are: (1) winter breaking to avoid rush periods in the spring; (2) thorough preparation of seedbed to avoid hoeing and reduce the number of cultivations needed; (3) planting high-yielding, adapted hybrids to ensure a good stand, early maturity, and ease in harvesting; (4) using a spike-tooth harrow for the first cultivation; (5) cultivating only as many times as needed to control weeds; (6) shucking as much corn from the standing stalk as possible; (7) throwing the corn directly into the wagon box when husking from the shock; (8) hogging down small fields (large fields may be hogged down if done a section at a time). See Kentucky Extension Leaflet 16, "Grow More Corn with Less Labor."

Hay.— It takes 7 to 10 hours of labor to produce a ton of hay. When you depend on one kind of hay

for all your livestock a serious labor shortage may develop at cutting time. You may avoid this difficulty by using one or more of the following suggestions: (1) grow more than one kind of hay; (2) hire a pick-up baler operated by a man of judgment and experience in hay making; (3) use a sweeprake to move hay to stack or nearby barns.

Small grain.— About 6 hours are required to harvest an acre of small grain with a combine. When the grain is cut with a binder, shocked, and threshed with a stationary thresher, about 10 hours per acre are required. To spread the labor peaks or save time on small grain: (1) drill barley in disked lespedeza fields for additional grain or small-grain pasture; (2) use a combine; (3) sow more than one kind of small grain or use varieties which have different maturity dates to spread the harvest season; (4) pasture small grain when not enough labor for harvesting is available.

Livestock.— The labor demands for livestock are fairly uniform throughout the year. Some ways to save labor in caring for livestock are: (1) have lots, lanes, fences, gates, and stalls conveniently arranged; (2) provide easy access to water; (3) crush grain in large quantities; (4) have convenient feeding arrangements; (5) haul a full load of feed to the feedlot; (6) use self-feeders for hogs, poultry, and beef cattle; (7) eliminate feed preparation that is hard to justify, such as grinding or soaking corn for hogs, slopping hogs, or hand-chopping corn; (8) provide pasture for late fall, winter, and early spring (small grain, especially Balbo rye) so as to supplement the regular pasture and have grazing the year round. Labor requirements for pasture are very low.

FARM LABOR

(Outer Bluegrass Area)

8M—4-43

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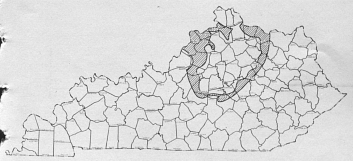
How to Use Farm Labor Effectively

(OUTER BLUEGRASS AREA)



Leaflet 38

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky

April, 1943

How to Use Farm Labor Effectively

(Outer Bluegrass Area)

By Ernest J. Nesius and Max M. Tharp

About one-third of the total labor spent on crops and livestock in the Outer Bluegrass is for burley tobacco production; 11 percent is for corn; 5 percent hay, 1 percent small grain, and 45 percent for livestock. About 61 percent of the time spent on crops alone is for tobacco; 20 percent corn; 10 percent hay; and 2 percent small grain. During the war how can these labor needs best be met?

This leaflet gives a plan which will help farmers in this area determine their labor needs for each half month throughout the year, and suggests the best way to meet those needs.

Finding Your Labor Needs

How to use the table.— The accompanying table shows the average number of hours of man labor required to produce an acre of crop, or to care for one head of livestock. Though actual needs may vary some from farm to farm, the table can be used as a general guide to the labor needs on farms. Use it to plan your labor requirements by half months throughout the year. If you know in advance what the labor needs for your various farm enterprises will be, you can make changes in your farm practices, or arrange in advance for custom machine work, so as to avoid times when there would otherwise be more work to do than men to do it.

How to use the form.— To determine your labor needs use a form similar to the sample below the table. Enter the acreages of crops and numbers of livestock and multiply each by the half-monthly figures shown, putting the result in the space for this purpose. The totals for the half months will probably differ considerably. To take care of the half months that show unusually high or low requirements, make shifts in crops, or change practices, varieties and possibly planting dates. Other suggestions are given on pages 6 and 7 of this leaflet.

SEASONAL DISTRIBUTION OF HOURS PER ACRE FOR CROPS AND PER HEAD OF LIVESTOCK, OUTER BLUEGRASS AREA

Item	March		April		May		June		July		August		September		October		November		December		January		February		Total
	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Burley tobacco	7	6	4	6	4	16	19	18	10	6	9	39	34	8	....	6	38	39	27	3	3	....	....	3	305
Corn—Tractor equipment																									
Harvest from standing stalk	*	1	*	1	2	1	1	1	1	....	....	....	....	....	2	6	3	....	....	....	....	....	*	1	20
Cut, shocked and snapped	*	1	*	1	2	1	1	1	1	....	....	....	....	10	9	3	....	....	....	....	....	....	*	1	31
Corn—Horse equipment																									
Harvest from standing stalk	1	1	1	2	2	2	2	2	1	....	....	....	....	....	3	6	3	....	....	....	....	....	*	1	27
Cut, shocked and snapped	1	1	1	2	2	2	2	2	1	....	....	....	....	10	9	4	....	....	....	....	....	....	*	1	38
Hemp seed	1	*	1	1	3	3	6	6	2	....	....	....	3	8	8	14	7	*	....	....	....	....	*	1	64
Hemp fiber (machine broken)	1	1	3	2	....	....	....	....	....	....	....	1	2	2	3	5	3	3	6	4	2	*	*	*	38
Soybean seed	....	....	....	1	2	2	1	....	....	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	9
Wheat																									
Threshed	....	....	....	....	....	....	....	2	2	2	*	....	....	1	3	1	....	....	....	....	....	....	....	....	11
Combined	....	....	....	....	....	....	....	*	1	*	....	....	....	1	3	1	....	....	....	....	....	....	....	....	6
Barley																									
Threshed	....	....	....	....	....	....	1	2	2	1	....	*	1	2	1	....	....	....	....	....	....	....	....	....	10
Combined	....	....	....	....	....	....	....	1	1	....	*	*	1	2	1	....	....	....	....	....	....	....	....	....	6
Oats	....	1	1	....	....	....	*	1	1	1	*	....	1	1	....	....	....	....	....	....	....	....	....	....	7
Rye	....	....	....	....	....	....	*	2	1	2	*	....	....	....	1	2	1	....	....	....	....	....	....	....	9
Alfalfa hay	....	1	1	*	....	2	6	....	5	2	3	1	*	....	....	....	....	....	....	....	....	....	....	....	21
Lespedeza hay	....	....	....	....	....	....	....	....	....	....	*	3	3	2	....	....	....	....	....	....	....	....	....	....	8
Clover, timothy, alone or mixed	....	....	....	....	....	....	....	2	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10
Other tame hay	....	....	....	....	....	....	....	3	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7
Sowing grasses and legumes	....	*	*	*	....	....	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	*	1
Soybean hay	....	....	....	1	3	2	1	....	....	....	....	....	7	4	....	....	....	....	....	....	....	....	....	....	18
Small grain hay	....	....	....	....	....	2	2	1	1	....	....	....	....	1	2	*	....	....	....	....	....	....	....	....	9
Lespedeza seed	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	2	1	....	....	....	....	....	....	....	3
Red clover seed	....	....	....	....	....	....	....	....	....	....	1	*	*	1	1	....	....	....	....	....	....	....	....	....	3
Grass seed	....	....	....	....	....	*	2	3	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5
General truck	2	12	18	19	21	19	19	19	17	15	9	9	7	4	7	3	....	....	....	....	....	....	....	....	200
Milk cows	6	6	6	6	6	6	6	6	5	5	4	5	5	5	5	5	5	5	6	6	7	7	6	6	135
Beef cattle	1	1	1	1	1	1	*	*	1	1	*	*	*	*	*	1	*	*	1	1	1	1	1	1	15
Sheep	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	....	....	*	*	*	1	1	1	5
Sows with their litters	4	4	3	3	3	3	3	3	2	2	3	3	3	3	4	4	3	3	3	3	3	3	3	3	74
Chickens (per 100)	7	7	8	8	9	9	8	8	6	6	7	7	6	6	6	6	9	9	8	8	7	7	9	9	180
Workstock	2	2	2	2	2	2	1	1	1	1	1	1	2	2	1	1	2	2	2	2	2	2	2	2	40

* Less than ½ hour per half month.

To plan your labor needs draw a form like the one below. In column marked "Item" write the names of your crops and each kind of livestock. List in column marked "Acres or numbers" the number of acres of the various crops and the number of each kind of livestock you will have this year, and multiply each by the hours shown on the above table. For example, the calculated labor needs for 3 acres of burley tobacco by half months are written on the first line of the suggested form. When all entries and calculations are made, add the columns. The totals you obtain at the bottom of the columns represent very closely the need for productive labor on your farm, by two-week periods.

Item	Acres or Numbers	March		April		May		June		July		August		September		October		November		December		January		February		Total
		1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Burley tobacco	3	21	18	12	18	12	48	57	54	30	18	27	117	102	24	....	18	114	117	81	9	9	....	....	9	915

cause labor peaks on many farms because of the rush to get the corn cut so that small grain may be seeded.

If the total number of days required in any half month is much greater than the number of days which your labor force has to give, try to spread or shift these peaks. This can usually be done by using different crops, varieties, or planting dates, or by adopting new methods and labor-saving practices. You may find in the following suggestions ways to spread the labor peaks.

Tobacco.— About 298 hours are required to produce an acre of burley tobacco. Setting, cutting, housing, and stripping cause the peaks in labor requirements. These peaks may be spread by: (1) spacing the plants and rows to have 7,500 to 9,500 plants per acre, depending on slope of land and soil fertility, a practice that does not decrease yield but saves labor on every operation; (2) spreading the planting dates over a period of 2 to 4 weeks, a method that calls for keeping a supply of good plants on hand by watering and in other ways caring for the bed after each pulling; (3) setting two good varieties which have different maturity dates to spread the cutting and housing season for a small labor force; (4) spreading the stripping time and using "stripping lights" to provide longer working hours.

Corn.— Farmers using tractor equipment can produce an acre of corn with 17 hours of labor when the corn is husked from the standing stalk. With usual horse equipment the total time is 25 hours. Cutting, shocking, and husking from the shock increases the labor 13 hours per acre. Suggestions for the best use of labor in producing corn are: (1) thorough preparation of the seedbed to eliminate hoeing and to reduce the number of cultivations; (2) planting high-yielding adapted hybrids to ensure a good stand, early maturity, and ease in harrowing; (See Kentucky Extension Leaflet 16, "Growing More Corn with Less Labor"); (3) using a spike-tooth harrow for the first cultivation; (4) cultivating only as many times as are necessary to control weeds; (5) shucking from the standing stalk; (6) throwing the corn directly into the wagon box as it is husked from

the shock, instead of piling it on the ground; (7) speeding up husking by not trying to remove all the "ribbons" from the ear.

Hay.— To produce a ton of hay requires 7 to 10 hours of labor. When only one kind of hay is harvested a serious labor peak may develop at cutting time. Harvesting more than one kind of hay or growing more alfalfa to meet hay needs spreads out the labor peaks at cutting time. Other suggestions are: (1) hiring a pick-up baler operated by a man of judgment and experience in hay making; (2) using a sweeprake for stacking or putting hay in a nearby barn, baling it later during a slack season.

Livestock.— The amount of labor needed for livestock is fairly uniform throughout the year except at lambing time. Small daily savings in the "chores" in livestock production amount to a considerable total saving over the course of a year. You can save labor by: (1) having lots, lanes, fences, gates, and stalls conveniently arranged; (2) providing access to water to avoid hauling; (3) crushing grain in large quantities; (4) storing feed close to the feedlots; (5) using self-feeders for hogs, poultry, and in some instances beef cattle; (6) eliminating practices difficult to justify, such as grinding corn, soaking grain for hogs, or chopping corn by hand. (7) Provide pasture for late fall, winter, and early spring (small grain, especially Balbo rye) so as to supplement the regular pasture and have grazing the year round. Labor requirements for pasture are very low.

6K-4-43

FARM LABOR
(Central Bluegrass Area)

For:

Cooperative Extension Work in Agriculture and Home Economics, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

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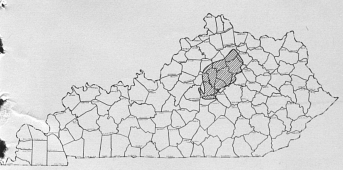
How to Use Farm Labor Effectively

(CENTRAL BLUEGRASS AREA)



Leaflet 39

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky April, 1943

How to Use Farm Labor Effectively

(Central Bluegrass Area)

By Ernest J. Nesius and Max M. Tharp

Nearly half of all farm labor spent in producing crops and livestock in the Central Bluegrass area is used in the production of burley tobacco. Eight percent is used for corn; 4 percent for hay; 2 percent for small grain; 35 percent for livestock. Of the total time spent on crops alone 73 percent is used on burley tobacco, 13 percent on corn, 7 percent on hay, and 3 percent on small grain.

During the war farmers in the Central Bluegrass must solve their labor problems by long-time planning. This leaflet describes a plan by which farmers can find their labor needs for each half month throughout the year, and gives ways for the best use of labor.

Finding Your Labor Needs

How to use the table.— The accompanying table is intended to help plan the labor needs of farmers in the Central Bluegrass area. It shows the average number of hours of man labor needed to produce an acre of crop or to care for one head of livestock. The labor requirements are shown by half months throughout the year. Though actual needs may vary some from farm to farm, the table may be used as a general guide to determine labor needs. Use it to plan your labor needs by half months throughout the year.

How to use the form.— Make a form similar to the sample below the table. Multiply the acreage of each crop or number of livestock which you plan to have, by the half-monthly requirement from the table, and enter the results in their proper places in the form. These figures will show about how much labor you will need in each half month.

The heaviest demands for crop labor occur in August during tobacco curing and housing, and in November and December when stripping is in full swing. Corn cutting and small-grain seeding also

SEASONAL DISTRIBUTION OF HOURS PER ACRE OF CROPS AND PER HEAD OF LIVESTOCK, CENTRAL BLUEGRASS AREA

Item	March		April		May		June		July		August		September		October		November		December		January		February		Total
	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Burley tobacco	8	4	3	3	3	9	21	15	8	5	49	40	3	....	....	15	28	28	24	21	11	....	....	....	298
Corn—Tractor equipment																									
Harvest from standing stalk	....	*	1	2	2	1	1	*	....	....	....	....	....	....	2	5	3	....	....	....	....	....	....	....	17
Cut, shocked and snapped	....	*	1	2	2	1	1	*	....	....	....	....	....	8	12	3	....	....	....	....	....	....	....	....	30
Corn—Horse equipment																									
Harvest from standing stalk	....	2	2	3	3	2	2	1	....	....	....	....	....	....	2	5	3	....	....	....	....	....	....	....	25
Cut, shocked and snapped	....	2	2	3	3	2	2	1	....	....	....	....	....	8	12	3	....	....	....	....	....	....	....	....	38
Corn silage	....	1	1	1	....	*	2	2	1	1	....	....	6	15	4	....	....	....	....	....	....	....	....	....	24
Hemp seed	1	1	2	4	9	6	2	....	....	....	....	2	7	*	8	6	9	4	3	*	....	....	....	*	64
Hemp fiber (machine broken)	1	1	3	3	....	....	....	....	....	....	*	1	2	2	3	4	4	3	6	4	2	*	....	*	38
Hemp fiber (hand broken)	24	4	3	2	....	....	....	....	....	....	*	1	2	2	1	*	*	2	4	6	26	26	21	20	144
Soybean seed	....	....	....	1	2	2	1	....	....	....	....	....	1	1	*	....	....	....	....	....	....	....	....	....	8
Wheat																									
Threshed	....	....	....	....	....	....	....	1	2	2	1	....	....	*	2	1	....	....	....	....	....	....	....	....	9
Combined	....	....	....	....	....	....	....	....	2	....	....	....	....	*	2	1	....	....	....	....	....	....	....	....	5
Barley																									
Threshed	....	....	....	....	....	....	1	2	2	1	....	....	3	1	....	....	....	....	....	....	....	....	....	....	10
Combined	....	....	....	....	....	....	*	2	....	....	....	....	3	1	....	....	....	....	....	....	....	....	....	....	6
Oats	....	1	1	....	....	....	*	1	2	1	*	....	1	1	....	....	....	....	....	....	....	....	....	....	8
Rye	....	....	....	....	....	....	*	1	1	1	*	....	....	....	1	2	1	....	....	....	....	....	....	....	7
Alfalfa hay	....	1	*	....	....	1	6	1	3	3	....	3	3	4	....	....	....	....	....	....	....	....	....	....	21
Lespedeza hay	....	....	....	....	....	....	....	....	....	....	....	....	4	4	....	....	....	....	....	....	....	....	....	....	8
Clover, timothy, alone or mixed	....	....	....	....	....	....	....	2	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10
Other tame hay	....	....	....	....	....	....	1	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7
Seeding grasses and legumes	....	*	*	*	....	....	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	1
Soybean hay	....	....	....	1	2	2	1	*	....	....	....	....	6	4	....	....	....	....	....	....	....	....	....	....	16
Small-grain hay	....	....	3	....	....	....	....	....	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10
Lespedeza seed	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	1	1	1	....	....	....	....	....	....	3
Red clover seed	....	....	....	....	....	....	....	....	....	....	*	2	1	....	....	....	....	....	....	....	....	....	....	....	3
Grass seed	....	....	....	....	....	....	3	1	*	*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4
General truck	*	10	20	20	20	20	20	20	20	10	10	10	10	*	10	*	....	....	....	....	....	....	....	....	200
Milk cows	6	6	6	6	6	6	6	6	5	5	4	5	5	5	5	5	5	6	6	7	7	6	6	135
Cattle (beef)	1	1	1	1	1	1	*	*	1	1	*	*	*	*	*	1	*	*	1	1	1	1	1	1	15
Sheep	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	....	....	*	*	*	1	1	1	5
Sows with litter	4	4	3	3	3	3	3	3	2	2	3	3	3	4	4	3	3	3	3	3	3	3	3	3	74
Chickens (per 100)	7	7	8	8	9	9	8	8	6	6	7	7	6	6	6	6	9	9	8	8	7	7	9	9	100
Workstock	2	2	2	2	2	2	2	2	1	1	1	1	2	2	1	1	1	1	2	2	2	2	2	2	40

* Less than ½ hour per half month.

To plan your labor needs draw a form like the one below. In column marked "Item" write the names of your crops and each kind of livestock. List in column marked "Acres or numbers" the number of acres of the various crops and the number of each kind of livestock you will have this year, and multiply each by the hours shown on the above table. For example, the calculated labor needs for 3 acres of burley tobacco by half months are written on the first line of the suggested form. When all entries and calculations are made, add the columns. The totals you obtain at the bottom of the columns represent very closely the need for productive labor on your farm, by two-week periods.

Item	Acres or Numbers	March		April		May		June		July		August		September		October		November		December		January		February		Total
		1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Burley tobacco	3	24	12	9	9	9	27	63	45	24	15	147	120	9	....	....	45	81	84	72	63	33	....	....	....	894

Then plan to arrange your farm work to fit your labor force. Probably the totals for the half-monthly periods will differ considerably. For the semi-monthly periods showing unusually high or low labor requirements shift crops, or change practices, varieties and possibly planting dates.

Best Way to Use Labor

Examine each farm job carefully. You may discover ways to help meet your labor problems. The suggestions which follow have been used with success. Try them.

Corn.— By using tractor equipment and husking from the standing stalks, farmers in this area can produce an acre of corn with about 17 hours of man labor. When usual horse equipment is used the time required is about 26 hours. Cutting, shocking, and husking from the shock increases the labor 9 hours per acre.

Some ways to get the best use of labor in producing corn are: (1) winter breaking where loss from erosion is not a problem; (2) thorough seedbed preparation to avoid hoeing and to reduce the number of cultivations; (3) planting a high-yielding, adapted hybrid (at the desired thickness to save thinning) to ensure a good stand and early maturity; (4) using a spike-tooth harrow for the first cultivation; (5) cultivating only as many times as are necessary to control weeds; (6) shucking as much corn from the standing stalk as possible; (7) shifting some corn acreage to barley. See Kentucky Extension Leaflet 16, "Grow More Corn With Less Labor."

Tobacco.— About 257 hours are needed to grow an acre of dark fire-cured tobacco and 319 hours for burley tobacco. The labor peaks on tobacco come during the setting, cutting, housing, and stripping seasons. Setting may be spread over several weeks if the plant beds are watered and properly cared for after each "pulling." This practice will ensure good plants over a longer period. By spreading the time of setting, the ripening dates will likewise favor a small labor force. Having sticks, wagons, and barns ready in advance of the cutting season will save valuable time during the housing period. It is possible

to reduce the labor peak at stripping time by spreading this operation over several weeks.

Topping and suckering dark fire-cured tobacco requires a large amount of hand labor, and careful consideration of ways to shorten this job will save many days. Consequently, every farmer should plan short cuts that will reduce the hours of labor needed for these operations. Some burley tobacco growers follow the practice of setting 10,000 to 12,000 plants per acre. However, experiments show that spacing the plants and rows so that 7,500 to 9,500 plants, depending on the fertility and slope of land, are set per acre saves labor on every operation and does not reduce yield.

Hay.— Seven to 10 hours of man labor are needed to produce a ton of hay. When only one kind of hay is grown for all the livestock, a labor peak may develop during the cutting season. Growing two or more kinds of hay, to be harvested at different times, or depending more on alfalfa instead of soybeans or cowpeas, distributes the labor needs more evenly. Other suggestions for saving labor during hay harvest are: (1) hire a pick-up baler, operated by a man of judgment and experience in hay making; (2) use a sweeprake to stack hay or to haul it to a nearby barn; (3) cure soybean and cowpea hay without shocking on shock poles.

Livestock.— Labor demands for livestock are fairly constant throughout the year, but small daily savings of labor may be made by using some of the suggestions which follow: (1) have barn lots, lanes, fences, gates, and barn stalls conveniently arranged; (2) provide easy access to water; (3) use handy methods to dispose of manure; (4) crush or shell corn in large quantities; (5) store feed close to the livestock, or haul a full load to the feed lots; (6) use self-feeders for hogs; (7) avoid grinding or soaking corn for hogs or chopping corn by hand; (8) provide pasture for late fall, winter, and early spring (small grain, especially Balbo rye) so as to supplement the regular pasture and have grazing the year round. Labor requirements for pasture are very low.

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FARM LABOR (Purchase Area)

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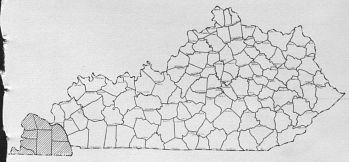
How to Use Farm Labor Effectively

(PURCHASE AREA)



Leaflet 40

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky April, 1943

How to Use Farm Labor Effectively

(Purchase Area)

By Ernest J. Nesius and Max M. Tharp

Corn requires about one-fifth of the total days of labor used in producing crops and livestock in the Purchase area; all types of tobacco require another one-fifth; the care of livestock about two-fifths. Minor crops such as hay, strawberries, and cotton take the remainder. Corn and tobacco require about one-third, each, of the total time spent in producing crops alone.

Making the best use of farm labor in producing crops and caring for livestock will be extremely important during the war period in the Purchase area. This leaflet describes a plan by which farmers can find their labor needs for each half month throughout the year, and suggests ways to meet these needs.

Spread Out the Rush Periods

Because several crop and livestock enterprises on a farm require labor at the same time, the demands on the farmer's labor force during these peak periods are very heavy. Often adjustments in the weekly labor needs can be made by changing certain practices if the probable requirements are known ahead of time. If it is not possible to shift or spread the labor peaks, then arrange in advance to hire extra help or to get a custom operator to do the job.

The accompanying table shows the average number of hours of man labor required to produce an acre of crop or to care for one head of livestock. Though actual needs may vary some from farm to farm, the table can be used as a general guide to the labor needs on farms.

To find the labor needs on any farm make a form similar to the sample shown below the table. Enter the acreage of each kind of crop and the number of each kind of livestock, and multiply each by the half-monthly figures in the table putting the result in the space for this purpose. Add the columns to get your labor needs for each half month.

SEASONAL DISTRIBUTION OF HOURS PER ACRE OF CROPS OR PER HEAD OF LIVESTOCK, PURCHASE AREA

Item	March		April		May		June		July		August		September		October		November		December		January		February		Total
	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Burley tobacco	6	4	2	1	1	16	27	16	6	8	43	40	5	....	....	9	46	44	28	1	*	4	5	7	319
Dark fire-cured tobacco	....	....	2	6	6	10	16	15	6	8	18	32	31	11	3	4	20	20	20	16	2	4	3	2	257
Corn—Tractor equipment																									
Harvest from standing stalk	....	*	1	1	1	1	1	2	2	....	....	....	....	....	1	3	3	1	....	....	....	....	....	....	17
Cut, shocked and snapped	....	*	1	1	1	1	1	2	2	....	....	....	4	5	....	1	4	3	*	....	....	....	....	....	26
Corn—Horse equipment																									
Harvest from standing stalk	*	1	2	3	2	2	3	3	3	....	....	....	....	....	1	2	3	1	....	....	....	....	....	....	26
Cut, shocked and snapped	*	1	2	3	1	2	3	3	3	....	....	....	4	5	....	1	4	3	*	....	....	....	....	....	35
Hemp seed	....	....	3	4	2	4	6	5	2	....	....	6	4	2	14	13	1	....	....	....	....	....	....	....	66
Soybean seed	....	....	....	1	2	2	1	1	*	....	....	....	....	....	1	1	1	*	....	....	....	....	....	....	10
Sweetpotatoes	....	1	10	18	20	11	7	6	4	....	....	....	....	16	38	9	....	....	....	....	....	....	....	....	140
Sorghum for forage	*	2	2	2	3	2	2	2	*	....	....	....	....	13	7	....	....	....	....	....	....	....	....	....	35
Strawberries, first year	7	19	5	9	11	9	8	11	8	7	9	5	2	*	....	....	....	....	....	....	....	....	2	5	110
Strawberries, second year	....	....	....	....	14	183	102	17	5	5	3	2	....	....	....	....	....	....	....	....	....	....	....	....	340
Wheat	....	....	....	....	....	....	1	2	1	1	....	*	*	1	2	2	....	....	....	....	....	....	....	....	10
Threshed	....	....	....	....	....	....	1	1	*	....	*	*	*	1	2	2	....	....	....	....	....	....	....	....	7
Combined																									
Barley	....	....	....	....	....	1	1	*	1	2	*	1	2	2	....	....	....	....	....	....	....	....	....	....	10
Threshed	....	....	....	....	....	....	*	1	1	*	*	1	2	2	....	....	....	....	....	....	....	....	....	....	7
Combined																									
Oats	....	....	....	....	....	....	1	2	2	1	*	*	*	1	1	*	....	....	....	....	....	....	....	....	8
Rye	....	....	....	....	....	1	1	1	2	1	*	....	1	*	1	1	*	....	....	....	....	....	....	....	9
Alfalfa hay	....	....	....	....	....	....	5	2	3	4	1	5	1	....	....	....	....	....	....	....	....	....	....	....	21
Lespedeza hay	....	....	....	....	....	....	....	....	....	....	....	....	2	4	3	....	....	....	....	....	....	....	....	....	9
Clover, timothy, alone or mixed	....	....	....	....	....	....	2	3	....	....	2	4	....	....	....	....	....	....	....	....	....	....	*	1	11
Sowing grasses and legumes	*	....	....	....	....	....	....	....	....	....	....	....	*	*	....	....	....	....	....	....	....	....	....	....	1
Soybean hay	....	....	....	*	2	2	2	1	....	....	....	....	2	9	4	....	....	....	....	....	....	....	....	....	22
Cowpea hay	....	....	....	*	2	2	2	*	....	....	....	....	3	10	5	....	....	....	....	....	....	....	....	....	24
Lespedeza seed	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	1	1	*	....	....	....	....	....	....	2
Grass seed	....	....	....	....	....	....	....	....	*	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Cotton	1	3	2	1	2	9	9	9	....	....	....	....	....	17	25	22	13	....	....	....	....	....	....	*	122
Cowpea seed	*	1	1	1	2	1	1	*	....	....	....	....	....	....	1	1	1	*	....	....	....	....	....	....	11
All other tame hay	....	....	....	....	....	....	....	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7
Truck	2	12	18	19	21	19	19	19	17	15	9	9	7	4	7	3	....	....	....	....	....	....	....	....	200
Milk cows	6	6	7	7	7	6	6	6	5	5	5	4	5	5	6	6	6	6	6	6	6	6	6	6	140
Other cattle (beef)	1	1	1	1	1	1	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	12
Sheep	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	6
Sows, gilts and their products	4	4	4	4	3	3	3	3	3	3	3	3	3	4	4	4	3	3	3	3	3	3	3	4	80
Chickens (per 100)	11	11	14	14	14	14	11	11	4	3	4	3	4	3	6	6	5	5	6	5	6	6	7	7	150
Workstock	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	41

* Less than ½ hour per half month.

To plan your labor needs draw a form like the one below. In column marked "Item" write the names of your crops and each kind of livestock. List in column marked "Acres or numbers" the number of acres of the various crops and the number of each kind of livestock you will have this year, and multiply each by the hours shown on the above table. For example, the calculated labor needs for 3 acres of corn by half-months are written on the first line of the suggested form. When all entries and calculations are made, add the columns. The totals you obtain at the bottom of the columns represent very closely the need for productive labor on your farm, by two-week periods.

Item	Acres or Numbers	March		April		May		June		July		August		September		October		November		December		January		February		Total
		1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	
Corn	20	....	20	40	60	40	40	80	60	60	....	....	....	....	....	20	40	60	20	....	....	....	....	....	....	520

suffer from lack of protein, minerals, and vitamins. In Kentucky, however, it is possible to plan a year-round supply of good pasture. Small grains serve the dual purpose of cover crop and winter pasture. Bluegrass or other grass pasture not grazed during September and October will provide much winter forage of fair to good quality. With plenty of *really good* winter pasture there is not likely to be any lack of protein, minerals (other than salt), or vitamins. Give steamed bonemeal as well as salt to cattle on poor pasture or wintered on dry roughage without grain.

If cattle are wintered on corn stover, corn silage, grass hay or other feeds low in protein, feed them 1 to 1½ pounds of cottonseed meal or soybean oilmeal per head per day. Since 3½ to 4 pounds of good legume hay provides the same amount of protein as 1 pound of protein supplement, cattle receiving 6 to 8 pounds of such hay need no additional protein. Silage made from grasses or legumes is very high in protein, minerals, and vitamins; and 15 to 20 pounds of it provides enough protein, minerals, and vitamin A for any beef animal.

Complex Mineral Mixtures not Needed

High-priced, complex mineral mixtures are not needed. Cattle on good pasture need only salt, and those given a fair grain allowance with good pasture or legume hay need only salt. If the pasture or hay is of poor quality, feed ground limestone also to cattle receiving some grain, or steamed bonemeal when no grain is fed. The cheapest and best way to feed these minerals is to have each available in a separate box at all times. Keep it clean and protected from the weather. Cattle that get some yellow corn or a fair amount of green feed (fresh or dry) and a moderate amount of sunshine should not suffer from lack of vitamins.

Healthy Cattle Make More Profit

Keep cattle free from internal and external parasites, tuberculosis, infectious abortion, and other infectious diseases. The most successful followers of the cow-and-calf plan make a practice of vaccinating all calves for blackleg. The common cattle grubs, also known as ox warbles or "wolves," irritate the cattle and ruin much-needed leather by making holes in the hides. The adult stage of this parasite is the heel fly which makes cattle run about the pasture in the spring, causing them to lose much weight.

Squeeze out and kill these grubs by hand in the early spring or apply one of the low-cost effective treatments now available.

Lice, very prevalent during the winter, suck blood from cattle, bite them, or otherwise irritate them and cause them to be unthrifty and to make poor use of their feed. The grub treatment applied to the lousy area, will also kill the lice. Dusting with rotenone louse powder or dipping in any of the standard dips is also very effective.

Provide shade in the summer and some protection from the weather in winter. Keep clean water available at all times.

Feed Supplements with Distillery Slop

In using distillery slop for steers, feed 3 to 4 gallons of slop daily per 100 pounds live weight. In addition give them ½ to 1 pound of sound roughage per 100 pounds live weight per day. Corn fodder, corn stover, hay, straw, or cottonseed hulls are satisfactory for this purpose. Feed 3 to 6 pounds of ground yellow ear corn per steer per day to get better use of the slop. Give all slop-fed cattle free access to ground limestone and salt. A gallon of the new wheat slop is equal in feeding value to about ½ to ¾ pound of shelled corn. Steers to be carried on slop for more than 3 months without yellow corn or green roughage should receive fish oil to supply about 10,000 units of vitamin A per steer per day.

Keep Shotes with Grain-Fed Steers

Shotes following steers fed broken ear corn in drylot gain about 1 pound for every 4 gained by the steers. If cattle are fed shelled corn, the shotes gain 1 pound for every 5 or 6 pounds gained by the cattle. When the corn is ground, the shotes gain only about 1 pound to every 20 pounds of gain by the steers. Shotes weighing 50 to 150 pounds are best for following cattle—1 shote for every 2 steers on a full feed of unground corn, or every 4 steers on half feed of unground corn. Unless they are on good pasture the shotes should also have 1/3 pound of tankage or ½ pound of soybean oilmeal each per day.

Market at Heavier Weight

Wartime demand for more beef calls for carrying cattle to heavier weights before marketing, wherever it is practical to do so—feed, labor, equipment, and quality and finish of the cattle taken into consideration. Not fatter cattle, but larger, meatier cattle are needed. The way to produce them with our limited supplies of grain and labor, is to make more use of pasture and roughage and carry the cattle until they are older. Market discrimination against heavy beef has disappeared under the urgent demand for more meat, unless the animals are too fat. Excessive finish (fatness) is costly in peacetime, and not only costly but wasteful in wartime. Still another practical reason for carrying cattle to heavier weights is the high price of replacements.

Prevent Bruising and Other Losses in Marketing

Much meat is made unfit for human consumption by rough handling or other unwise practices just before slaughter. Do not use sharp sticks or clubs. Provide adequate loading facilities free from sharp corners, protruding nails or other objects that may bruise the animals. Proper feeding and management will result in stronger animals and smaller losses from crippling and death, in marketing.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

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MORE BEEF from Kentucky Farms

By W. P. Garrigus

DEMAND FOR BEEF of all grades is now almost unlimited. Farmers will therefore be led both by patriotism and desire for profit, to produce more beef. Since meat rationing and ceiling prices tend to reduce the premium paid for steers of extra high finish, and since supplies of grain may be very short before the war is over, it looks as though good use of our forage resources will be more and more important. Any improvement in management that brings even a small improvement in feed or labor utilization should not be overlooked during the war emergency.

Planning the Beef Enterprise

Each farmer must plan his beef production program to suit his supplies of harvested feed and pasture, his personal inclination and experience, and the availability of replacements. It is well known that young cattle make cheaper gains than older cattle. Yearlings require 25 percent more feed per pound of gain than calves, and 2-year-olds about 50 percent more. On the other hand, calves have less capacity for roughage and must be handled somewhat differently from older cattle.

Heifers fatten younger than steers. If time and feed are limited, heifers may therefore fit into the program better than steers. Because of wartime de-

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Leaflet 41

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
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Thomas P. Cooper, *Dean* and *Director*

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mand for beef, there is less than usual discrimination against heifers.

Old, thin cows sometimes can be bought at a very low cost per pound. Such cows make good use of low-grade roughage (corn fodder, straw, and so on) and, if healthy, gain and fatten rapidly. However, they require about twice as much feed per pound of gain as young heifers or young steers. The advantage of the thin cows is that they can use a larger amount of roughage and make rapid gains.

Feeding tests have shown that the lower grades of feeder cattle gain about as rapidly, on about the same amount of feed, as the better grades. The better grades, however, produce more desirable carcasses and consequently sell for a higher price per pound. Generally speaking, the quality of cattle bought should depend on the length and nature of the fattening program. If the feed available is mainly pasture, and it is planned to feed little or no grain but to market the cattle with a very moderate degree of finish, it would be better to buy medium to good feeder cattle than to pay a fancy price for the best grade and fail to finish them to the point where they will bring a price in keeping with their quality.

More Heavy Beef Calves From Milk and Grass

For several years Kentucky farmers have produced heavy beef calves on their dam's milk and grass, with little or no grain, to be marketed at 8 to 10 months of age.

Under a cow-and-calf plan good health of the animals is absolutely essential (see page 6). Another essential is the use of a high-quality purebred beef bull, to get uniform thrifty calves resembling their sire in type and quality.

With good-milking cows.— For heavy fat calves to be raised and marketed without grain, the cows must milk at least 10 to 12 quarts a day when fresh and continue to milk well for 8 to 10 months. Such cows are usually at least half dairy breeding, but dual purpose cows or heavy-milking beef cows fit into the program equally well. Breed them to purebred beef bulls of very good type, so as to calve within the first 2½ months of the year. Winter them on home-grown roughage, with some protein supplement if the roughage is low in quality and good winter pasture is not available. Young heifers and very thin cows may need some grain also in order to calve in reasonably good flesh. If pasture is not good such animals will continue to need a little grain after

calving, until really good pasture is available. From spring to late fall there must be plenty of palatable, nutritious forage for this plan to work well. If the cows hold up well in milk, the calves will gain and fatten rapidly on their mother's milk plus such pasture forage.

In order to get the most possible beef from the feed used, sell the calves "off the teat" in October or November if they have reached 500 to 750 pounds weight and good finish. Late calves and those that have not had enough milk may have to be weaned and fed some grain along with high-quality pasture and harvested roughage for several months, in order to reach proper market finish and weight. The heavier the calves the more profitable they will be, not only because of their greater weights but because they bring more per pound. Calves from cows with part dairy breeding should not be kept much beyond a year of age, because their dairy characteristics become more evident as they grow older.

This cow and calf plan will produce beef that fits well into wartime market needs (small cuts and very little waste fat), that requires little or no grain and very little labor (which of course means more meat from the total feed and labor supplies), and that uses to very good advantage large amounts of roughage. In addition, only a small outlay is needed at the start, for cross-bred dairy-beef heifers in thin-to-moderate flesh can be bought at a reasonable cost.

With cows of beef breeding.— A second cow-and-calf plan should be followed if the cows are of good beef type but do not produce enough milk for the first plan. Under this plan the cows are bred to purebred beef bulls and the calves are run with their dams on pasture until about 7 months old. They are then weaned and fed out to produce either baby beeves or older market cattle, depending on the feed supply and the quality of the calf. Calves that are to be pushed to market as baby beeves should be creep-fed grain for at least a month before weaning so that they will have less setback at that time.

Use Home-Grown Roughage

Pasture and harvested roughage are the basis of profitable beef rations in Kentucky. The most practical feeding program therefore makes full use of these low-cost home-grown feeds. Breeding cattle can make good use of such roughage at all times; fattening cattle eat roughage best early in the feeding period when they are still thin and have keen appe-

tites. Grinding or chopping roughage results in less waste but does not increase the feeding value; the saving is usually too small to warrant the cost.

Silage.— The way to use a corn crop most completely, where a silo is available, is to make it into silage, usually the first week in September. An acre of corn made into silage will produce about 50 percent more beef than an acre of similar corn matured and fed as ear corn and stover. Making grass silage of surplus pasture forage or of hard-to-cure hay crops also conserves feed and labor.

Stover.— Corn stover allowed to stand in the shock loses about half its feed value by January 1 and the remaining half rapidly thereafter. It is necessary therefore to feed fodder or stover during the early part of the winter, or to protect it from the weather, to prevent serious loss of feed value.

Hay.— Hay made from alfalfa, red clover, lespedeza, or other legumes is much higher in protein and calcium than that made from grasses. Such hay should be cured and stored properly to prevent great loss in feed value. Too much exposure to sunlight, shattering of leaves, rain, or incomplete curing results in very serious loss of feed value.

Pasture.— Fertile, well-managed pasture supplies cheaper and better feed with less labor than any other farm crop; but beef cannot be produced profitably on infertile, mismanaged pastures, no matter how favorable the season. Tests by the Kentucky Experiment Station have shown that adding the basic soil needs to infertile pasture land results in the production of three times as much beef per acre at one-third the cost per pound. Money spent for improvement of pasture therefore returns as much profit as money spent for any other farm need.

Five pounds of really good pasture forage has a feeding value equal to 1 pound of shelled corn. Seven pounds of such pasture forage contains as much protein as 1 pound of cottonseed meal or soybean oil-meal. A thrifty yearling steer in moderate flesh eating 75 to 100 pounds of this excellent pasture forage a day therefore gets as much nutrients as he would on a heavy high-protein drylot ration.

Pasture forage that is mainly legumes, except Korean lespedeza, will sometimes bloat cattle. Plenty of salt and water and some bright, dry roughage or crushed ear corn every day, will greatly reduce this hazard.

Poor pasture is so unpalatable that a steer will not eat enough of it. It is also lacking in feed value.

Then, too, the steer must travel farther to get his feed and consequently use up more energy than he would on good pasture. Steers grazing a thin, run-down pasture have to travel far enough to increase their feed requirements per pound of gain by 50 to 75 percent.

Use Grain to Best Advantage

Some grain is usually needed to produce a high finish on cattle marketed under 3 years of age, except heavy fat calves produced from heavy-milking cows on good pasture. In strictly drylot feeding, choice to prime steers can be produced on 50 to 65 bushels of corn per steer. But the steers can be kept on good pasture and harvested roughage until 2 or 3 months of marketing, and then finished off on grass and a moderate feed of grain. Under this plan each steer gets 15 to 30 bushels of corn and reaches a good to choice finish. Good to choice feeder cattle make very satisfactory gains on such a program and produce good to choice carcasses. Since drylot gains cost about three times as much as gains made on good pasture alone, it is evident that, under our present conditions, a long feed in drylot seldom can be justified in Kentucky, except for slop-fed steers.

Tests at the Kentucky Agricultural Experiment Station have shown that it is more profitable to feed corn to steers on grass than to take them from grass and finish them in drylot, and that most of the grain to be fed should be saved for the latter part of the feeding period.

Cattle wintered so as to gain much more than 1½ pounds per day usually make little gains for the first month on pasture. Therefore winter them just well enough to maintain growth but not to improve their condition materially, unless they are to be continued on grain and sold by midsummer. Spring and summer calves need better care during the winter than older cattle. A good daily ration for such calves would be 5 lb corn-and-cob meal, 5 lb legume hay, ½ to 1 lb protein supplement plus what corn stover or other cheap roughage they will eat.

Feed Balanced Rations

Beef cattle must get enough protein, minerals, and vitamins if they are to make good use of their feed. Good pasture supplies enough of all three, and no other source of these nutrients is needed, except salt. If any addition is to be made to pasture forage it should be corn or a suitable substitute for it.

Cattle wintered on low-quality roughage alone may

Grade the Seedlings

Grade the seedlings as to size as they are removed from the bed. Cover the roots as soon as the plants are dug and keep them from the sun and drying wind while they are being graded. Tie them into bundles of 50 to 100 (depending on size) and place them in a "heeling in" trench to prevent the roots from drying out. Place no soil on the seedling tops. Keep the soil over the roots moist by watering, if necessary, while they are "heeled in."

Planting the Seedlings

Plant no less than 1,200 trees to each acre of soil. Replace as soon as possible which die from any cause. This keeps the tree plantation full and provides for taller and straighter trees.

Due to the spreading root system of the Black Locust, it is of great value in checking soil erosion. In gullies, plant the trees close together (possibly 2 to 3 feet apart) after check dams (of logs, rock, brush, etc.) have been constructed across and at right angles to the gully.

In soil of average quality the growth of the locust tree is very rapid as compared with the growth of other hardwood trees. Under normal conditions where the soil has a limestone foundation, posts 5 to 6 inches in diameter may be cut from trees 8 to 10 years old.

The Black Locust (sometimes called Yellow Locust) is one of the most desirable trees on the farm because of its dense, durable wood which is excellent for many farm uses.

Fence Livestock Out

When livestock graze in the locust plantation growth of the trees is retarded, sprouts appear, and trees are killed. Keep livestock away from the woods.

For more information see your county agricultural agent or write to your Extension Forester at the College of Agriculture and Home Economics, Lexington.

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GROWING LOCUST SEEDLINGS

Cooperative Extension Work in Agriculture and Home Economics, University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

For:

U. S. Department of Agriculture
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How to Grow Black or Yellow Locust Seedlings

By William E. Jackson, Extension Forester

Growing tree seedlings in a prepared bed on the farm provides a supply of young trees, ready-at-hand, to be transplanted in the fall, winter, or spring, at times when other farm work permits. Seedlings can be drawn from a bed in small or in large numbers, to fit the period of time which can be given to transplanting them. Growing your own plants gives you fresh-dug seedlings which have not had their roots dried out from exposure in shipping from a distance.

Leaflet 42

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College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

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Sprouts *versus* Seedlings

A tree seedling, originating from a seed or nut, has roots of its own which enable it to draw food and moisture from the soil when it is transplanted. This self-sufficiency causes the seedling, when planted right, to live and grow quickly into a healthy tree.

Tree sprouts are offshoots from roots or underground stems of older trees, and may not have roots of their own. Lack of roots usually causes a high mortality in transplanting sprouts. Because sprouts are usually of various sizes, a plantation of them makes unsightly and irregular growth.

How to Get the Seed

Get locust seed for planting from trees or buy them from a reliable dealer. If from trees, gather the pods containing the seed in late summer or fall after they are mature and dry. Hull the pods and carefully pick out the larger, better-filled, plump seeds. Growing good, strong locust seedlings from home-grown seed depends on planting *good* seed. It is likely to be disappointing if the seeds are not carefully selected and too many small, imperfect seeds are planted. Locust seeds which have been carefully selected and recleaned are highly fertile and germinate 60 to 80 percent, and even more, if normal moisture conditions prevail during the first 30 days after the seeds are planted.

Number of Seed Per Pound

The number of black locust seeds to the pound varies according to the plumpness and size of the seed. One pound averages 22,000 to 24,000 seeds. The area of ground a pound of seed will sow depends upon the width of the rows and the distance the seeds are apart in the row. On an average one pound of seed will plant about 1/10 acre, or 7 rows, 100 feet long, with 18 inches between the rows.

Preparation of the Seedbed

Select a deep, sandy loam, fertile and well-drained, with a northern exposure. Plow, harrow, and smooth the soil, getting it into a good, fine, workable shape just as carefully as if it were a tobacco seedbed. Make shallow rows, about 2 inches wide and ¾ inch deep, 18 inches apart, running lengthwise of the bed. Do not burn the bed, or place a cotton canvas over it, or use phosphate or any commercial fertilizer before or after the seeds are planted.

The small, tender locust seedling does not grow well and may die if overtopped by other trees, weeds, and grasses. Therefore do not broadcast or scatter seed on the field site where the locust trees are to grow. The best way to get a good plantation is to transplant seedlings grown in a bed.

Planting the Seed

Plant April 15 to May 15. Good seedlings have been grown from seed planted in June, but earlier planting is much better. Use either dry seeds or those soaked in lukewarm water 3 to 4 hours. Avoid oversoaked seed because they are so soft that they dry out too readily when placed in the ground. Drop the seed about an inch apart in the row, and cover them ½ inch deep, with woods or sandy loam soil which will not crust or bake in the sun after rain.

To Grow Good Seedlings—

1. Prepare the seedbed well. Pulverize all clods. Give the soil as fine tilth as a tobacco bed.
2. Plant the seed between April 15 and May 15—no earlier; no later.
3. Don't plant the seed too deep. From ⅜ to ½ inch is best. Firm the soil well, but don't pack it.
4. Keep the bed free of grass and weeds.
5. Don't make a seedbed on a dry site such as a ridge or an exposed hillside. This soil is inclined to dry and bake, thereby preventing the seeds from germinating and growing.
6. Protect the roots in transplanting. More seedlings are killed from exposure of roots to sun and wind at transplanting than from any other one cause.

Care of the Seedbed

Make the soil over the seeds firm by laying a plank on the row and tapping it along its length with a shovel or hoe. DO NOT WALK ON THE BOARD OR ROW.

Keep a light mulch of clean straw or leaves over the bed to maintain sufficient moisture and warmth in the soil during the normal germination period (14 to 21 days). Mulched seeds germinate much more quickly. Remove most of the mulch as soon as the plants show through the ground. Pull the remaining mulch to the space between the rows, thereby better conserving moisture in the bed.

Place poultry netting of sufficient height around the bed if the young seedlings are threatened by chickens or rabbits.

During a drouth, especially in the early stages of the seedlings, water the bed *in the evening* enough to keep the seedlings from drying out and being killed.

Cultivation of Seedlings in Seedbed

Cultivate the surface of the ground during the growing season, keeping the seedlings free of grass and weeds. If the growing season is normal, with enough moisture, the seedlings should reach a height of 24 to 36 inches by fall.

Seedlings 12 to 18 inches high are the best sizes to transplant, and will stand a better chance of surviving after transplanting than taller ones. If seedlings are more than 24 inches high, cut off the tops 6 to 8 inches above the ground before they are transplanted. Cutting back the tops of taller seedlings gives a smaller top stem to be fed from the roots while the roots are getting established in their new location.

Grow only the best planting stock possible – a plant having a medium-height top and a well-developed, fleshy main root shaped something like a long white radish. Consider seedlings without a fleshy main root, culls. Discard them.

Removing the Seedlings From the Bed

After the seedlings have dropped their leaves in the fall, the sap is dormant and they may be safely removed from the growing bed for transplanting. Use a garden fork or long-handled shovel for this purpose. Press the digging tool well into the soil, so as to cut any holding roots and protect the main stem of the seedling. A small turning plow may be used to break the seedlings loose from the soil, if care is taken to keep the point of the plow away from and to one side of the center of the seedling row.

REGISTRATION OF "PUREBREDS"

A breed is a group of animals having certain definite characteristics transmitted from generation to generation, which clearly differentiate it from all other groups. In order of numbers, the five leading dairy breeds in this country are (1) Holstein Friesian, (2) Jersey, (3) Guernsey, (4) Ayrshire, and (5) Brown Swiss. In Kentucky the Jersey is first, Holstein-Friesian second, Guernsey third, Brown Swiss fourth, and Ayrshire fifth.

To safeguard the "purity of breeding" of their cattle, the associations of breeders sponsor registration in a "Herd Book," in which eligible animals are registered and known as "Purebred." In common practice a purebred is an animal sired by a registered sire and from a registered cow. A more selective system of registration is used for Jersey males. A growing trend among breed associations to insist on more evidence of merit in animals receiving registration certificates may in time give the term "purebred" even greater importance than it now has.

The names and addresses of breed associations are:

AMERICAN JERSEY CATTLE CLUB, 324 West 23rd St., New York City
HOLSTEIN-FRIESIAN ASSOCIATION OF AMERICA, Brattleboro, Vermont
AMERICAN GUERNSEY CATTLE CLUB, Peterboro, New Hampshire
BROWN SWISS CATTLE BREEDERS' ASSOCIATION OF AMERICA, Beloit, Wisconsin
AYRSHIRE BREEDERS ASSOCIATION, Brandon, Vermont

JERSEYS

Jersey cattle come from the Island of Jersey in the English Channel. In this country they are relatively most numerous south of the Ohio river, where for many years they have been the family cow. With more emphasis on commercial dairying, many southern herds recently have been increased.

Characteristics.— Because the breed for many years enjoyed the isolation of an island home it has definite and well-fixed characteristics. Its color is a shade of brown, fawn, or black, with or without white markings. A mature cow in milk in this breed weighs about 1,000 pounds. Horns incline forward, are incurving, small at base, refined, medium length, and tapering toward tips.

Milk.— Jersey milk is rich, containing on an average 5.2 percent butterfat. It is nationally advertised as "Jersey Creamline Milk" and meets the demand of fancy trade. The Jersey has repeatedly demonstrated her ability as an economical producer of butterfat.

HOLSTEIN-FRIESIANS

Holstein-Friesian cattle, as known in this country, originated in Hollard. This old breed, widely distributed throughout Dutch and British possessions, is known by a variety of names. Found in the United States wherever wholesale milk is sold, Holstein-Friesians are most numerous in the Eastern states and across the Northern states into Wisconsin. Relatively few are in the South.

Characteristics.— Members of this breed have black and white markings clearly defined. Color markings which bar registry are solid black, solid white, black in switch, black belly, black encircling leg touching hoof, black from hoof to knee or hock, black and white intermixed to give color other than distinct black and white. Mature cows in milk should weigh about 1,500 pounds. Horns incline forward, are incurving, small at base, refined, medium length, and tapering toward tips.

Milk.—Holsteins are known as heavy milkers. Their milk tests about 3.5 percent butterfat. Their milk is in demand wherever it is made into cheese, or is evaporated, powdered, or otherwise valued in terms of its total solids, and in general around fluid milk markets.

GUERNSEYS

Guernsey cows originally came from the Island of Guernsey, near the Island of Jersey. They are widely distributed in Northern, Eastern, and Western United States, but relatively few are in the Middle and Deep South.

Characteristics.— The color of this breed of cattle is a shade of fawn with white markings clearly defined. Black or brindle markings are objectionable. Skin shows golden yellow pigmentation. When other points are equal, a clear or buff muzzle is favored over a smoky or black muzzle. Mature cows in milk weigh about 1,100 pounds. Their horns, inclining forward, are small and yellow at base, refined, medium in length, and tapering toward tips.

Milk.— Guernsey milk contains about 5.0 percent butterfat. Its rich, yellow color is appreciated by fancy trade. Much Guernsey milk is sold under the nationally advertised trademark "Golden Guernsey Milk."

BROWN SWISS

Brown Swiss, probably one of the oldest of our breeds and typical of the many "Highland" breeds of

Central Europe, came from Switzerland. Cattle of this breed are found chiefly in the Northern States, and some have been brought into Kentucky in the past few years.

Characteristics.— Brown Swiss is a strong and vigorous breed; extreme refinement not desired; size and ruggedness with quality preferred. The color is a shade of brown varying from a silver to dark brown, the hair inside the ears being a lighter color than the body. Nose and tongue are black, with a light colored band around the nose. Color markings which bar registry are: white switch; white on sides, top, head, neck, or on legs above knees or hocks. White on belly or lower legs is objectionable. A mature cow in milk weighs about 1,400 pounds. Calves are especially large and vigorous at birth. Horns incline forward and slightly up, are moderately small at base, medium length, and taper toward black tips.

Milk.— The milk of Brown Swiss cows averages about 4 percent butterfat. This breed does not milk as heavily as Holstein-Friesians, nor test as high as Jerseys or Guernseys. Brown Swiss have a reputation for longevity, sound udders, vigor, and excellent ability as rustlers.

AYRSHIRES

Ayrshire cattle originated in the county of Ayr in southwest Scotland and represent a Scotchman's ideal of a dairy cow. In this country the breed is found chiefly in the northeastern states.

Characteristics.— The color of Ayrshire cattle is red of any shade, mahogany or brown, or any of these with white; or white with each color clearly defined. Distinctive red and white markings preferable; black or brindle markings strongly objectionable. A mature cow in milk weighs about 1,150 pounds. Horns, inclining upward, are small at base, refined, medium length, and tapering toward tips.

Milk.— Ayrshire milk averages about 4 percent butterfat. The cows are good rustlers and the udders quite symmetrical.

Prepared by
FORDYCE ELY of the Dairy Department
Kentucky Agricultural Experiment Station

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

10M—4-43

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Breeds of DAIRY CATTLE

Characteristics and their evaluation

Leaflet 43

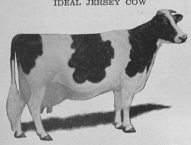
UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky

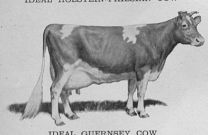
April, 1943



IDEAL JERSEY COW



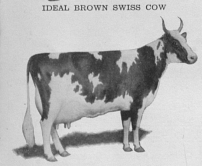
IDEAL HOLSTEIN-FRIESIAN COW



IDEAL GUERNSEY COW



IDEAL BROWN SWISS COW



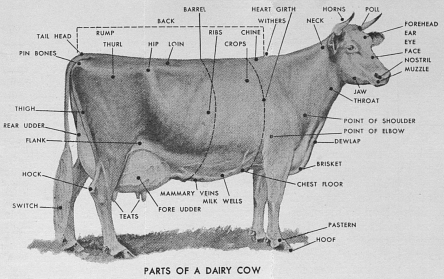
IDEAL AYRSHIRE COW

DAIRY-COW SCORE CARD

Ideals of type and breed characteristics must be considered in the application of the terminology of this score card.

Based on Order of Observation		Perfect Score	Cow A	Official Score	Cow B	Official Score
1. GENERAL APPEARANCE		30				
Attractive individuality, revealing vigor, femininity with a harmonious blending and correlation of parts. Impressive style and attractive carriage with a graceful walk.						
BREED CHARACTERISTICS (see below)	12					
HEAD—medium in length, clean-cut; broad muzzle with large open nostrils; lean, strong jaw; full, bright eyes; forehead broad between the eyes and moderately dished; bridge of nose straight; ears medium size and alertly carried.						
SHOULDER BLADES set smoothly against chest wall and withers, forming neat junction with the body.	—					
BACK strong and appearing straight with vertebrae well defined.						
LOIN broad, strong and nearly level.						
RUMP long, wide; top-line level from loin to and including tail head.	10					
HIPS wide, approximately level laterally with back, free from excess tissue.						
THURLS wide apart.						
PIN BONES wide apart and slightly lower than hips, well defined.						
TAIL HEAD slightly above and neatly set between pin bones.						
TAIL long and tapering with nicely balanced switch.						
LEGS wide apart, squarely set, clean-cut and strong with fore legs straight.	—					
HIND LEGS nearly perpendicular from hock to pastern. When viewed from behind, legs wide apart and nearly straight. Bone, flat and flinty, tendons well defined. Pasterns, of medium length, strong and springy. Hocks cleanly moulded.	8					
FEET short and well rounded, with deep heel and level sole.	—					
2. DAIRY CHARACTER		20				
Animation, angularity, general openness, and freedom from excess tissue, giving due regard to period of lactation.						
NECK long and lean, blending smoothly into shoulders and brisket; clean-cut throat and dewlap.						
WITHERS well defined and wedge-shaped with the dorsal processes of the vertebrae rising slightly above the shoulder blades.	20					
RIBS wide apart. Rib bone wide, flat and long.						
FLANK deep, arched and refined.						
THIGHS incurving to flat from the side; wide apart when viewed from the rear, providing sufficient room for the udder and its attachment.						
SKIN of medium thickness, loose, and pliable. Hair fine.	—					
3. BODY CAPACITY		20				
Relatively large in proportion to size of animal, providing ample digestive capacity, strength and vigor.	12					
BARREL deep, strongly supported, ribs wide apart and well sprung; depth and width tending to increase toward rear of barrel.	—					
HEART GIRTH large, resulting from long, well sprung foreribs, wide chest floor between front legs, and fullness at the point of elbow.	8					
4. MAMMARY SYSTEM	—	30				
A capacious, strongly attached, well carried udder of good quality, indicating heavy production and a long period of usefulness.						
UDDER—CAPACITY and SHAPE, long, wide and of moderate depth. Extending well forward, strongly attached, reasonably level floor. Rear attachment, high and wide. Quarters evenly balanced and symmetrical.	25					
TEXTURE soft, pliable and elastic. Well collapsed after milking.						
TEATS uniform, of convenient length and size, cylindrical in shape, free from obstructions, well apart and squarely placed, plumb.	—					
MAMMARY VEINS long, tortuous, prominent and branching, with numerous large wells. Veins on udder numerous and clearly defined.	5					
	TOTAL	**100**				

The "Dairy-Cow Score Card" and the "Guide to Evaluation of Defects in Judging Cows" are taken from the score card approved by and published by the Purebred Dairy Cattle Association, 1942. Pictures of ideal cows of the several breeds were furnished by the breed associations.



PARTS OF A DAIRY COW

GUIDE TO EVALUATION OF DEFECTS IN JUDGING COWS

NOTE: In a show ring, disqualification means that the animal is not eligible to win a prize. Any disqualified animal is not eligible to be shown in the group classes. In slight to serious discrimination, the degree of seriousness shall be determined by the judge.

ABSENCE OF HORNS
An animal that has been cleanly and neatly dehorned, and whose head shows true breed character: *No discrimination.*

LACK OF SIZE
Slight to serious discrimination.

UDDER
1. One or more blind quarters: *Disqualification.*
2. Abnormal milk (bloody, clotted, watery): *Possibly disqualification. A slight to serious defect.*
3. Udder definitely broken away in attachment: *Serious discrimination.*
4. A weak udder attachment: *Slight to serious discrimination.*
5. One or more light quarters, hard spots in udder, side leak or obstruction in teat (spider): *Slight to serious discrimination.*

EYES
1. Total blindness: *Disqualification.*
2. Blindness in one eye: *Slight discrimination.*

PARROT JAW
Slight to serious discrimination.

SHOULDERS
Winged:*Slight to serious discrimination.*

CAPPED HIP
Slight discrimination.

WRY TAIL
Serious discrimination.

LEGS AND FEET
1. Marked lameness—apparently permanent and interfering with normal function: *Disqualification.*
2. Lameness—apparently temporary and not affecting normal function—bucked knees, crooked hindlegs, weak pasterns: *Slight to serious discrimination.*
3. Enlarged knees: *Slight discrimination.*

DRY COWS
In case of cows of apparently equal merit: *Give preference to cows in milk.*

OVERCONDITIONED
Serious discrimination.

TEMPORARY OR MINOR DEFECTS
Blemishes or injuries of a temporary character not affecting animal's usefulness: *Slight to no discrimination.*

EVIDENCE OF SHARP PRACTICE
1. Animals showing signs of having been operated upon or tampered with for the purpose of concealing faults in conformation, or with intent to deceive relative to the animal's soundness: *Disqualification.*
2. Heifer calves showing evidence of having been milked, in an attempt to deceive regarding natural form of udder: *Serious discrimination.*

give flying sparks a chance to cause a fire. Keep the stove covered with wet sacks for the first two weeks after it is built so that the mortar will cure instead of drying out. This process greatly increases the final strength of the mortar.

Fuel

Green hardwood is the most satisfactory wood for fuel because it holds fire longest. Cut the sticks 6 or 8 inches in diameter and 2 feet long. The amount of wood required depends upon the weather, the size and construction of the brooder house. Provide 2 cords to run a brood through the season.

If coal or coke is to be used as fuel make the brooder stove one course of brick higher than for wood and not more than 4½ bricks long. Provide a grate made of 9 pieces of ¾″ pipe placed ¾″ apart, fastened with bolts or rivets to three ⅜″ x 1″ steel cross bars. Set a 2″ angle iron across the stove at the front end of the grate to act as a coal stop. Do not allow ashes to bank up the grate bars from beneath, causing them to burn out. Other construction details are the same as used for the stove burning wood. By using a removable metal grate mounted on 6 bricks the stove may be used for burning coal or wood. Provide a ton of coal to run a brood through the season.

Operating the Stove

Start firing the brooder stove two or three days before you put the chicks into the house. This dries out the house and floor and gives the operator experience in firing. Hang a thermometer in the house to make certain you keep the proper temperature. Keep the temperature at the floor near the stove 90°, and near the walls not less than 70°. Lower the temperature about 5° each week as the chicks grow older. If the chicks hover around the stove in the day-time, this shows that the house is too cool, and the damper should be opened a little more. After the fire is well started the draft regulator can usually be shut and the damper partly closed. Watch the chicks closely for the first few evenings and, if necessary, set up a wire fence around the front of the stove to keep them from being crowded against the sheet metal door.

Materials for Construction

(Bill of materials—without brick floor, hearth or grate.)

103 common brick, new or used	6 ⅜″ x 1½″ x 24″ bars
10 pounds of lime	1 pr. 3″ strap hinges
1 sack of cement	4 joints of 6″ stovepipe
¼ cubic yard of sand	1 6″ stovepipe damper
1 pc. of heavy sheet metal, 24″ x 30″ (or an old stove door and frame)	1 6″ galv. stovepipe thimble
	1 6″ roof flange

For a coal-burning brick brooder stove, add to the bill 19 bricks and the materials for the grate.

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Homemade Brick Brooder Stove

By J. B. Kelley and J. E. Humphrey

A brick brooder stove is one of the most popular means of heating brooder houses because it is low in cost, easy to build and simple to operate. Where wood is plentiful, the fuel cost is very low. There are no mechanical parts to rust out or get broken; there is plenty of brooding space to prevent crowding of chicks; and the bricks hold enough heat to keep up the temperature in the house even when the fire gets low.

Making the Floor for the Stove

If the stove is to be built in a house with a wooden floor, cut a hole 3 feet by 6 feet through the floor, midway between the ends of the house and not less than 18 inches from the rear wall. Box this opening with boards down to the ground, and fill it with clay

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Leaflet 44

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
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Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky April, 1943

or stone up to the floor level. If clay is used moisten and tamp it thoroughly so that no settling will occur later to crack the walls of the stove. If concrete or stone is laid on the earth fill for a floor of the stove, as some farmers do, it should not touch the surrounding wood floor. The earth fill or concrete slab should extend 15 to 18 inches in front of the stove so that any live coals raked out will not start a fire. The illustration shows a stove 3 bricks wide and 5½ bricks long, suited for use in a 10′ x 12′ house. However, it would be more desirable if the house were 12′ x 14′, as losses occasionally occur from overheating in the smaller houses when this type of stove is used.

Never build the stove directly on a wood floor, even though sheet metal and one or more layers of brick and mortar are used on the wood, for actual tests have shown that the wood may get hot enough to burn.

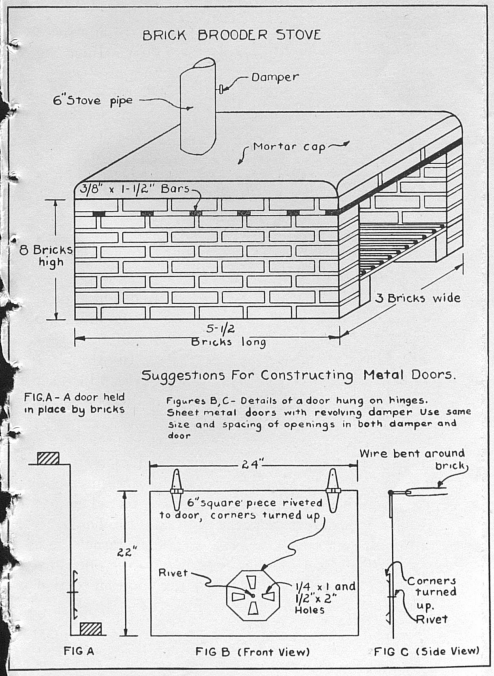
Laying the Walls

When building the brooder stove face it toward the front if possible. Lay the bricks in a mortar of 1/10 part of lime to 1 part of cement and 3 parts of screened sand, making the mortar joints ¼″ thick and breaking joints as shown in the illustration. Some farmers have laid the bricks in clay instead of cement mortar, adding one pound of salt to each bucketful of wet clay, and mixing thoroughly. A mixture of about equal parts of clay and sand is good. In laying the bricks for the front of the stove be careful to lay them even, so the door will fit tight against the bricks.

Putting on the Top

When 6 courses of brick have been laid, put six ⅜″ x 1½″ flat iron bars across the walls to support the brick-and-mortar cap. Thinner bars are likely to bend when hot, causing the mortar to crack. Lay the brick top over the bars, providing, at this time, for the stovepipe and hinges for the door. Set a 6″ galvanized stovepipe thimble or a castiron part from an old wood-burning stove in the brick top to hold the stovepipe. This should be close to the rear wall of the brooder.

After the brick top has been laid cover it with a mortar or concrete cap 2 or 3 inches thick, or with another layer of brick laid so as to break joints, and then plaster it. If a solid concrete cap in place of brick is used, imbed in it a piece of hardware cloth or hog fencing 24″ x 46″ to prevent cracking when the stove is fired. If desired, small crushed stone or gravel may be mixed with the mortar for the cap, so that less cement will be required. Instead of the mortar cap, some farmers run a row of brick around the edge of the top and fill in with sand level with the brick.



Brick brooder stove for burning wood or coal. The grate and one course of brick can be left out if coal is not to be used as fuel.

Adjusting the Stovepipe

Put a damper in the first length of stovepipe. Cut the hole in the brooder house roof 12″ larger in diameter than the stovepipe, and use a good metal roof flange. Protect the top of the stovepipe from rain by a conical metal cap.

Making and Hanging the Door

Make a door for the front of the stove from a piece of heavy sheet metal or an old stove door. Hinge the sheet metal door at the top with a pair of 3″ or 4″ strap or T hinges. Rivet half of each hinge to the sheet metal with flat-headed tinner's rivets, being careful to keep the hinge on the side of the door away from the bricks, so the door closes flat against the bricks. Wires may then be put through the holes in the other half of the hinges and bent around the bricks that form the front of the top of the stove. Do this when the top is being laid. Set the hinges in the mortar so that they are held firmly in place.

If the door is to hinge at the top, it is impossible to determine in advance just what its height should be to reach exactly to the floor. Fasten the hinges to one end of the sheet and cut enough off the other end to leave the door about 22″ x 24″. Use the piece cut off to make a draft-regulating device. Place it about 2 or 3 inches from the edge at the bottom of the door.

As soon as the brick top of the stove is in place measure its height from the floor and trim off the bottom edge of the door to fit this measurement. This is unnecessary if the hinges are placed at the bottom of the door since, in that case, the height of the door may vary considerably. Some farmers use a removable sheet-metal door similar to the one illustrated. The sheet is bent at top and bottom so that it may be held in place by weights.

Curing the Mortar

Build the brooder stove a month before it is to be used to give the mortar time to cure thoroughly, otherwise it will crack when the stove is in use and

From poults to maturity.— Reduce the amount of protein in the feed of growing turkeys, beginning when the poults are about 10 weeks old. To reduce the protein in a corn, wheat, soybean oilmeal, and skimmilk ration, quit feeding skimmilk and give water as a drink instead. This change during the summer reduces the danger of tapeworm infestation. About October, when the weather is cooler and the flies are gone, give skimmilk again. Feed grain in hoppers at this time. Turkeys will eat more grain during the cool weather near the end of the finishing period.

Turkeys fed properly from the time they are hatched need no special fattening rations. As the weather gets cold feed more grain, especially yellow corn. Feed oats and wheat too, if not too high in price. Turkeys like them.

In general, it takes about 64 pounds of feed to raise a 16-pound turkey.

Control Diseases and Parasites

Keep turkeys and chickens apart.— The blackhead organism is carried by the cecal worm that infests both turkeys and chickens. Blackhead is not a common disease of chickens, but it is a serious disease of turkeys. Therefore turkeys should not be raised with chickens or allowed to range on ground chickens have used within the preceding two years.

Keep grounds and shelters clean.— Unthrifty appearance, ruffled feathers, and drooped wings indicate blackhead. A greenish-yellow diarrhea is sometimes a symptom. The only sure way to know whether your sick turkeys have blackhead is to kill one so that its liver and ceca, or blind guts, may be examined. If the liver is enlarged and has sunken spots varying from the size of a pea to a half dollar; if the ceca are much enlarged, inflamed, and contain bloody, cheesy material, blackhead is in your flock.

Neither medicine nor vaccination cures or prevents blackhead. The germ lives from year to year in the soil. Contaminated soil is one of the greatest dangers to raising turkeys. The best protection against blackhead is range rotation, clean brooders and sanitary shelters. Proper sanitation is also the best way to keep worms out of your flock. When worms appear, treat the turkeys. Try the remedy on a few turkeys. If the results are good treat the entire flock. See Kentucky Leaflet 33, "Poultry Parasites."

Intestinal disorder from new corn.— In early fall, symptoms resembling blackhead often appear when the real trouble is an intestinal disorder caused by eating new corn in the milk stage. For relief give a tablespoonful of castor oil to each turkey. If it is impossible to keep the turkeys away from the field of corn, give them a good feeding of old corn each morning before they leave their shelters. Old corn is always best for turkeys. Feed new corn only when it is dry enough to shell and grind for milling.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating

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How to Raise TURKEYS

TURKEYS are not hard to raise if good methods are followed. They deserve a place on more Kentucky farms. Main points to remember are:

1. Raise the turkeys apart from chickens
2. Use strong, vigorous, healthy breeding stock
3. Feed a well-balanced ration
4. See that the eggs are properly incubated
5. Provide good brooding arrangements
6. Control parasites and diseases

Leaflet 45

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky April, 1943

How to Raise Turkeys

By J. E. Humphrey

Use Strong, Healthy Breeding Stock

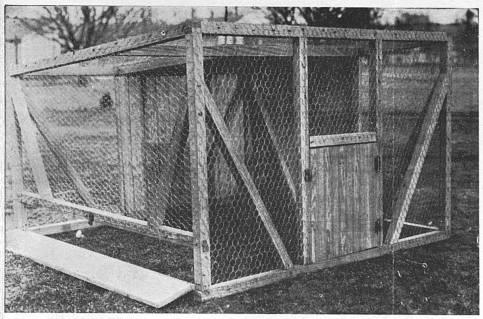
In the fall before turkeys are sold choose the breeders for next year's crop of poults. Choose only those that are strong, active, and rapid growing. Mate up to 15 hens with one tom, and keep an extra tom. Never inbreed turkeys.

During the breeding season keep breeders in a small lot or pasture where there is plenty of green feed (alfalfa is best). If necessary to keep the hens in the lot, clip one wing; but never clip the tom's wings. Old barrels lying on their sides, or brush in tepee style make good nesting places. Hens 1 year old or older lay larger eggs than younger hens, but not so many. Younger hens usually lay earlier.

Feed the breeders a good laying ration starting in early January, or 4 to 6 weeks before eggs will be wanted for hatching. Use one of the following rations: (1) feed any good chicken laying mash in one hopper and yellow corn (or a mixture of yellow corn, wheat, and oats) in another hopper; (2) feed a protein supplement (about 32 percent protein) in one hopper and yellow corn (or yellow corn, wheat, and oats) in another hopper; (3) feed skimmilk (1 gallon to 12 hens) and grain as in No. 1 or No. 2. Give water as soon as the skimmilk is consumed. Regardless of the ration used always keep fresh water (unless skimmilk is fed) and either oystershell or limestone before the turkeys. For more information read Kentucky Circular 372, "Feeding Laying Hens."

Hatching the Eggs

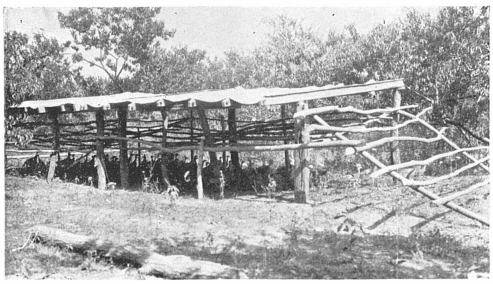
Usually medium-sized eggs hatch better than large ones. Set the eggs within 10 days after they are laid. While holding them keep them at a temperature from 40° to 60° F. Incubators usually give a better hatch than hens; and chicken hens hatch them as well as turkey hens. Select hens free of lice; dust them with sodium fluoride when set, and again 8 to 10 days later. Put not more than 10 eggs under a chicken hen, and not more than 18 under a turkey hen. The eggs take 28 days to hatch. In Kentucky, set the eggs in April, May, or early June.



Turkey brooding coop for hen and 15 to 20 poults. The coop is 5 feet square, and has one corner protected with top and sides. For blueprint plans write to the College of Agriculture and Home Economics, Lexington, and ask for blueprint No. Ky. 11-7171. A small charge is made for these plans, to cover the cost of making them.

Brooding the Poults

Use any brooding equipment for poults that is satisfactory for chicks. Never crowd the poults; put about half as many in a brooder as you would chicks. For more information on brooding read Kentucky Circular 157, "Brooding Chicks," and Kentucky Leaflet 17, "How to make a Lantern Brooder." You may get a copy of each free from your county agricultural agent or by writing to the College of Agriculture and Home Economics, Lexington.



Roosting shed for turkeys in a peach orchard

Farmers brooding poults with hens have had success with the brood coop shown on page 3. Keep both hen and poults in the coop until the poults are 7 to 10 days old. Keep the hen inside for another week but let the poults out by the long door. At the end of this time both hen and poults may leave the coop. Put them inside again at night. Close the door to keep out rats and other vermin. Never let the hens and poults out on stormy or rainy days.

Use the coop as a shelter until the poults are large enough to roost out in the open, just as if you were using brooder houses and sun porches. Then let the poults roost in sheds like that pictured on page 3. Move the sheds to a yard or pasture near the residence in the fall when the turkeys are more tempting to thieves. If the turkeys are very far from the residence, place torches (similar to those used on highways under repair), lanterns, or electric lights on or near the roosting poles. Aided by the lights you can easily see whether the turkeys are all right.

Feed a Balanced Ration

Poults.— During the first 4 or 5 weeks feed poults as you would chicks, except give them more protein and vitamins. To supply more vitamins and protein use a commercial turkey starter containing 24 percent protein. Or use a commercial chick starter and feed liquid skimmilk with it to supply the additional protein. Put the skimmilk in fountains, not in the starting mash.

When the poults get out in the sunshine on green grass, feed cracked yellow corn, whole wheat, soybean oilmeal to which is added 2 percent table salt, steamed bone meal, and liquid skimmilk except in flytime. Keep these feeds in separate containers before the poults at all times. When milk is fed no water is needed. Feed no milk in warm weather (June to October), for milk draws flies and flies carry tapeworm eggs.

When the poults are raised indoors use either mash mentioned above. Have the mash in the feeders when you put the poults in the brooder. Give each poult 2 inches of feeder space until they are put on range, then 3 to 4 inches. After the second week feed oats and equal parts of cracked corn and whole wheat. When the poults are about 3 weeks old, start feeding a hard, insoluble grit.

the clay mixture to harden, dries out the house and floor, and gives the operator experience in firing. If concrete is used between the drums, allow it to cure about two weeks before starting a fire in the stove. Also do not allow the concrete to freeze during the curing process.

Fuel

Use either wood or coal in the metal-drum brooder stove. If coal is burned make a grate of several pieces of ¾″ pipe placed ¾″ apart, fastened with bolts or rivets to three ⅜″ x 1″ steel cross bars. Clean out the ashes frequently from under the grate bars; otherwise the bars will burn out.

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Homemade Metal-Drum Brooder

By J. E. Humphrey
James B. Kelley

Brooder stoves made of 2 metal barrels or oil drums have been successfully used in Kentucky for several years. The stove has one disadvantage, frequently the inner drum burns out at the end of the first season or in the second year; but it has the following merits: (1) it can be built at low cost; (2) it is easily made at home; (3) it can be removed easily from the brooder house as soon as the brooding season is over, and stored for another year; (4) it may be mounted on any kind of floor; (5) it burns either wood or coal as fuel.

Directions for Constructing Stove

1. Cut out the head of a 50-gallon oil drum with a cold chisel and hammer. Save the head to use for a stove door.
2. Cut out the head of a 30-gallon oil drum.
3. Lay the 30-gallon drum on its side and mark a 6″ circle on it, locating the center of it 6″ from the bottom of the drum, as shown in Fig. A.
4. Make a hole at the center of the circle and cut the metal in the circle into 8 equal parts along

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Leaflet 46

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Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky May, 1943

lines 1, 2, 3, 4, and so on, as shown in Fig. B. Form a flange by bending each of the eight sections upright at edge of hole. This flange will hold the stovepipe in place when the stove is assembled.

5. Lay the 50-gallon drum on its side and cut a 6″ hole in it so that the center of the hole is 9″ from the bottom of the drum.

6. Place the 50-gallon drum upright and fill the bottom with about 3″ of moist clay or concrete, tamping it in place. Add a sufficient amount of clay or concrete so that when it is leveled off it supports the inner drum at such a height that the two stovepipe openings are opposite each other.

Make the concrete mixture of ¾ of a sack of cement, 1½ cu. ft. of sand, 3 cu. ft. of stone and 4½ gal. of water. If clay is used to fill between the drums, thoroughly mix 1½ gal. of coarse salt with 3 cu. ft. or about 22 gal. of pulverized clay, adding a sufficient amount of water to make the clay stick together. The concrete mixture conducts heat better than the clay and is more durable.

7. Place the smaller drum in the center of the larger drum and put the stovepipe in position.

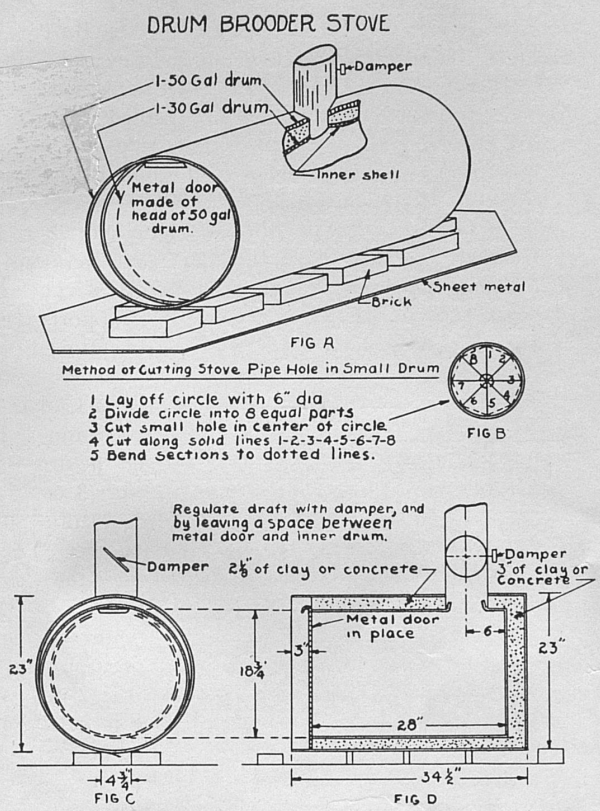
8. Fill the remaining space between the 2 drums with the moist clay or concrete, tamping it well. Be careful not to disturb the stovepipe, but be certain that the mixture is packed closely around it.

9. After the space between the drums is completely filled, smooth off flush with the top end of the inner drum.

10. Make a stove door out of the metal head removed from the 50-gallon drum, shaping it as shown in Fig. D. The door must fit tight around the edges of the opening. The door may be held in place by a metal pipe or bar braced against it.

11. Place a damper in the first joint of stovepipe to control the draft.

12. If the stove is to be used in a brooder house having a wooden floor, place a sheet of metal 2 feet by 5 feet on the floor and mount the stove 1½″ to 1¾″ above the floor on two rows of bricks as shown in Fig. A. Space the bricks so as to permit air to circulate under the drum, but close enough to keep the



Details of metal-drum brooder stove

chicks from going through the openings. Also place bricks at each end of stove.

13. Cut a hole in the brooder-house roof about 18″ square and fit a good metal stovepipe roof flange over the opening to guard against fire. Complete the installation.

14. Punch 3 or 4 holes in the corrugated bands on the 50-gallon drum to allow moisture to escape from the clay or concrete mixture the first time the drum is heated.

Operating the Stove

Start firing the brooder stove two or three days before the chicks are put into the house. This causes

Hot-Water-Bath Method

A hot-water bath can be used for all fruits and vegetables, but is particularly recommended for fruits and tomatoes. A lard can, wash boiler, large kettle, or a commercial water-bath canner may be used. The lid should fit close to keep the water from boiling away. The canner must have a rack or false bottom so water will circulate under the jars and prevent breakage; and it must be 6 or 8 inches deeper than the jars.

Have the water in the canner boiling hot; then lower the filled jars slowly onto the rack. Have 2 inches of water over the top of the jars. Cover the canner and bring the water quickly to boiling. Begin counting time when the water begins to boil. Keep boiling through the entire processing period, adding boiling water as needed. When processing time is up, take jars from canner and complete the seal immediately.

Pressure-Cooker Method

A pressure cooker is recommended for canning non-acid vegetables because they can be processed at a higher temperature than in a water bath and there is thus less danger of spoilage.

Follow the directions in your pressure-cooker book of instructions. A few important points to keep in mind are: (1) Pour enough water into the cooker to cover the rack at least an inch, and heat it to boiling before putting the filled jars in place. In enamel cookers put in at least 2 quarts of water. (2) If the cover is fastened with clamps, screw them down gradually from opposite sides until every one is tight. (3) Put the pressure cooker over a hot fire to run the pressure up quickly. (4) Leave the petcock open until all the air has escaped—about 7 minutes; then close the petcock and watch the gage. Begin counting time when the desired pressure is reached. (5) Adjust the heat so as to maintain an even pressure throughout the processing. (6) Remove canner from the stove, allow temperature to go to zero, and open petcock gradually before unclamping the cover. (7) Take jars from the canner and complete the seal according to directions.

Products Needing Special Methods

Fruit juices from soft fruits (blackberries, raspberries, loganberries, huckleberries, cherries, or grapes).—Wash fruit, crush, add 2 c water to 1 gallon crushed fruit. Simmer until juices flow freely, strain through several thicknesses of cheesecloth. Add 1 c sugar to 1 gallon juice, reheat to simmering point, pour in hot sterilized jars and process at simmering point (175° to 185° F) 30 minutes in water bath.

Canned strawberries.— Wash, cap, crush a few berries for juice. Add ½ c sugar and 2 tablespoons juice per quart of berries. Bring slowly to boil. Remove from fire, cover, let stand several hours to plump the berries. Pack berries in hot sterilized jars, reheat syrup, fill jars, process 20 minutes in water bath.

Soup mixture.— Use any combination of vegetables. A good combination is 1 quart tomato pulp, 1 pint corn, lima beans, peas or soybeans, ½ c chopped sweet pepper, 1 pint okra and 1½ teaspoon salt. Bring to boil, pack hot, seal, process 180 minutes in water bath, or quarts 70 minutes and pints 60 minutes in a pressure cooker at 10 pounds.

Tomato juice.— Select firm, ripe tomatoes; wash, remove core; cut in quarters. Heat to simmering in covered kettle until juice flows freely. Strain quickly. Add 1 teaspoon salt per quart. Reheat to boiling point. Pour into hot sterilized jars. Seal completely. Process 5 minutes in water bath.

Canned tomatoes, quick method.— Wash, core, cut in quarters without peeling. Pack in jars tightly so that tomatoes are covered with their own juice; add 1 teaspoon salt per quart. Seal according to "Directions for Sealing Jars"; process in a pressure cooker 15 minutes at 5 pounds pressure, or 45 minutes in a hot-water bath. Complete the seal.

This method preserves more vitamin C than any other method. Juice can be extracted when the jar is opened, or by removing the skins with a fork the tomatoes can be used for soups or stews.

Work quickly
Practice cleanliness
Follow directions



THIS FOLDER was prepared by the Home Demonstration Department of the College of Agriculture and Home Economics, and is given to you by

who has voluntarily agreed to bring this and other important war information to families in your neighborhood.

500M—5-43

CAN Fruits and Vegetables for VICTORY!

By Florence Imlay and Pearl J. Haak

CAN ONLY FRESH, sound, firm products picked in their prime. Discard all over-ripe, decayed, or injured parts. Gather at one time only as much as can be prepared for processing within the hour.

Check jars and lids carefully to see that bails are tight, that lids fit, and that there are no nicked or chipped places around the rims.

Use new rubber rings of the best quality. Use only one ring on a jar. Do not stretch the rings except to place them on jars. Screw tops on slowly to prevent the ring skidding from under the top.

Scald jars, lids, and rubbers.— Just before gathering products to can, wash jars and lids in hot, soapy water, rinse thoroughly with boiling water, and set jars, tops down, on clean cloth. About half an hour before packing jars with product, put the jars, upside down, and the lids into about 2 inches of hot water in a pan. Heat to boiling and keep simmering until ready to use. Scald rubbers and vacuum-seal tops in boiling water just before using. Place ring on jar before jar is packed.

Leaflet 47

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky May, 1943

DIRECTIONS FOR SEALING JARS

Before processing

Glass top.— Partly seal by putting upper bail in place and leaving lower bail up.

Screw top.— Partly seal by screwing until tight and turning back just enough to break seal, about ½ inch.

Vacuum seal (2-piece or self-sealing top). —Completely seal before processing, by putting cap in place and turning ring down tight.

After processing

Glass top.— Completely seal by pressing down lower bail immediately after taking jar from canner.

Screw top.— Completely seal by screwing lid slowly until tight, immediately after taking from canner.

Vacuum seal.— Completely seal before processing. Don't turn the ring after processing. Let stand until cold, then remove outside ring.

Place jars several inches apart, out of a draft, to cool. Store the canned product in a cool, dry place.

FRUITS: Directions and Timetable for Canning

Fruits will keep if canned without sugar; but they have a better flavor, color, and texture and less sugar is required to sweeten them if canned in syrup. To save sugar, a thin syrup may be substituted for a medium and a medium for a thick.

Product	Directions for preparing fruits for processing	Kind of syrup	Processing time Hot-water bath
			minutes
Apples	Wash—pare—cut in quarters—place in salt water to keep the color, using 1 tablespoon salt per qt water—precook in syrup 5 min—pack in hot, sterilized jars—fill jar with the boiling syrup—seal (see directions)—process—complete the seal.	Sweet apples, thin Sour apples, medium	15
Berries	Wash in colander—stem—pack in hot sterilized jars—cover with boiling syrup; OR	Medium	20
	Wash in colander—stem—precook by simmering in syrup 3 to 5 min, using one-fourth as much syrup as fruit by measure—pack in hot sterilized jars—seal (see directions)—process—complete the seal.	Medium	5
Cherries	Wash—pit—pack in hot, sterilized jars—cover with syrup; OR	Sweet, medium	25
	Wash—pit—add sugar as desired—bring to boil and pack in hot, sterilized jars—seal (see directions)—process—complete the seal.	Sour, thick	20
Peaches or Apricots	Wash—blanch—cold dip—remove skins—cut in halves—drop in salt water to keep the color, using 1 tablespoon salt per qt water—precook by simmering in boiling syrup 3 to 5 min—pack in hot, sterilized jars, placing halves in overlapping layers, concave side down—fill jars with the boiling syrup—seal (see directions)—process—complete the seal.	Medium	15
Pears	Pare—cut in halves—core—drop in salt water to keep the color, using 1 tablespoon salt per qt water—precook in boiling syrup 4-8 minutes—pack in hot, sterilized jars, concave side down—fill with the boiling syrup—seal (see directions)—process—complete the seal.	Medium	20
Plums	Select slightly underripe fruit—prick with a fork to prevent bursting—precook in boiling syrup 5 min—pack in sterilized jars—fill jars with the boiling syrup, OR	Medium	15
	Prick with a fork—pack in hot, sterilized jars—cover with boiling syrup—seal (see directions)—process—complete the seal.	Medium	20
Rhubarb	Wash—trim—cut in 1- to 2-in. pieces—measure—add one-fourth as much sugar as rhubarb—cook without water or bake until tender—pack in hot, sterilized jars—seal (see directions)—process—complete the seal.		5

SYRUP TABLE

Thin syrup ..... 1 c sugar to 3 c water Medium syrup ... 1 c sugar to 2 c water Thick syrup ..... 1 c sugar to 1 c water	Mix water and sugar, stir until dissolved, and bring slowly to boil. Use fruit juice instead of water, if desired.

VEGETABLES: Directions and Timetable for Canning

Product	Directions for preparing vegetables for processing	Processing time: Steam pressure, 10 lb — Quarts	Processing time: Steam pressure, 10 lb — Pints	Processing time: Hot-water bath
		min.	*min.*	*min.*
Asparagus	Wash—grade for size—cut in 1- to 2-in lengths—precook 2 to 4 min—pack in hot, sterilized jars—cover with boiling liquid in which cooked—add 1 teaspoon salt per qt—seal (see directions)—process—complete the seal.	35	30	120 (2 hr)
String beans	Wash—string—cut in convenient lengths. Precook 5 min in uncovered container—pack in hot, sterilized jars—fill with liquid in which cooked—add 1 teaspoon salt per qt—seal (see directions)—process—complete the seal.	35	30	180 (3 hr)
Lima beans	Shell—grade—precook 5 min—pack loosely—fill jar with liquid in which cooked—add 1 teaspoon salt per qt—seal (see directions)—process—complete the seal.	55	50	180
Soybeans	Preparation same as for Lima Beans.	90	80	180
Beets	Can only small, tender beets. Leave 1 to 2 in. top on beets. Wash—boil until skins slip (about 15 min)—peel—pack in hot, sterilized jars—cover with boiling liquid in which cooked—add 1 teaspoon salt per qt—seal (see directions)—process—complete the seal.	35	30	150 (2½ hr)
Carrots	Wash—scrub with stiff brush or scrape—slice, dice, or leave whole—precook 5-8 min—pack in hot, sterilized jars—cover with water in which cooked—add 1 teaspoon salt per qt—seal (see directions)—process—complete the seal.	35	30	150 (2½ hr)
Corn	Select corn in milk stage—shuck—silk—cut from cob—measure—add 1 part boiling water to 3 parts corn—heat to boiling—add 1 teaspoon salt per qt—pour mixture into hot, sterilized jars—cut through mixture with spatula or knife—seal (see directions)—process—complete the seal.	70	60	180 (3 hr)
Greens	Use fresh, crisp greens—wash thoroughly in several waters—steam in covered container, using smallest possible amount of water, until completely wilted — pack loosely into hot, sterilized jars — cover with water in which precooked—add 1 teaspoon salt per qt—seal (see directions)—process—complete the seal.	65	60	180 (3 hr)
Peas	Select young, tender peas—shell—wash—precook 3 to 5 min—pack in hot, sterilized jars—cover with liquid in which cooked—add 1 teaspoon salt per qt—seal (see directions)—process—complete the seal.	60	45	180 (3 hr)
Pumpkin or squash	Wash—cut in pieces—cook until tender—pack in hot, sterilized jars—seal (see directions)—process—complete the seal.	75	60	180 (3 hr)
Sauerkraut	Pack in sterilized jars—add no water or salt—seal (see directions)—process—complete the seal.			30
Tomatoes	Wash—blanch—cold dip—peel—remove core—pack whole or in quarters in hot, sterilized jars—cover with boiling tomato juice—add 1 teaspoon salt per qt—seal (see directions)—process—complete the seal.	10 min at 5 lb		45

When you open home-canned vegetables, boil them 10 minutes before serving them as a safeguard against botulinus poisoning.

Blanching peaches and tomatoes is putting them in boiling water a short time to loosen skins.

Cold dipping is putting blanched products quickly in cold water to make it easier to handle them.

Precooking is cooking the product a short time before processing — vegetables in just enough water to cover them, and fruits in syrup. Precooking sets the color, improves flavor and texture, shrinks the product, and gives a better pack.

Packing is putting the product in the jar.

Processing is cooking the prepared product in the jars to prevent spoilage. This leaflet gives directions for the two most satisfactory methods of processing foods at home.

Protecting Stored Beans and Cowpeas

In tight containers.— After the treatment with either heat or carbon disulfide, the seeds should be placed in closed containers that will keep out adult weevils.

Use of hydrated lime.— Beans and cowpeas in storage can be protected from the bean and cowpea weevils by treating with hydrated lime. This treatment will not kill immediately the weevils already in the seeds, but will stop the breeding and development of more weevils. Quantities of such seed piled in a bin should be covered with a layer of lime to a depth of about half an inch. Small quantities of seed should be mixed with lime at the rate of 1 pound of lime to 4 pounds of beans or peas. The mixing should be thorough and it can be done satisfactorily by rolling or shaking the container holding the lime and seed. The lime treatment should be made immediately after harvest. Such treatment does not interfere with germination and does not affect the edibility of the product.

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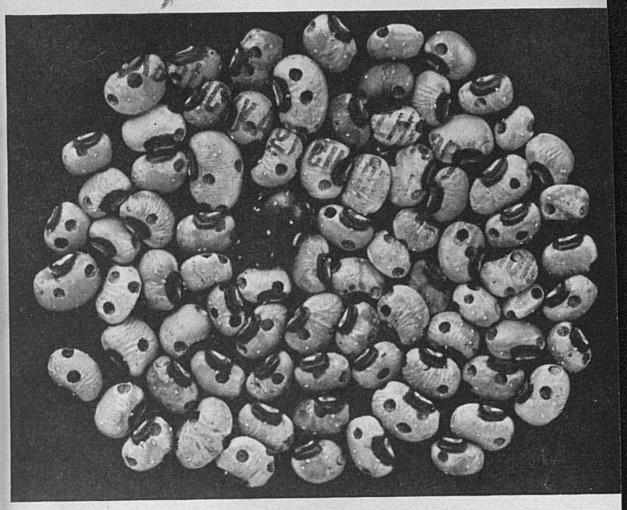

How to Stop Weevil Damage to Stored BEANS and PEAS

By W. A. Price

DRIED BEANS AND PEAS of all kinds are attacked by weevils which ruin them for consumption and for seed. Four different species of these weevils are common in Kentucky. The bean weevil has a preference for navy beans and kidney beans though it will attack seeds of other plants, such as peas or cowpeas. The cowpea weevil and the four-spotted cowpea weevil confine their activities largely to cowpeas. The pea weevil attacks only peas.

Eggs of all four species mentioned are laid on the green pod of the host plant in the field. The female

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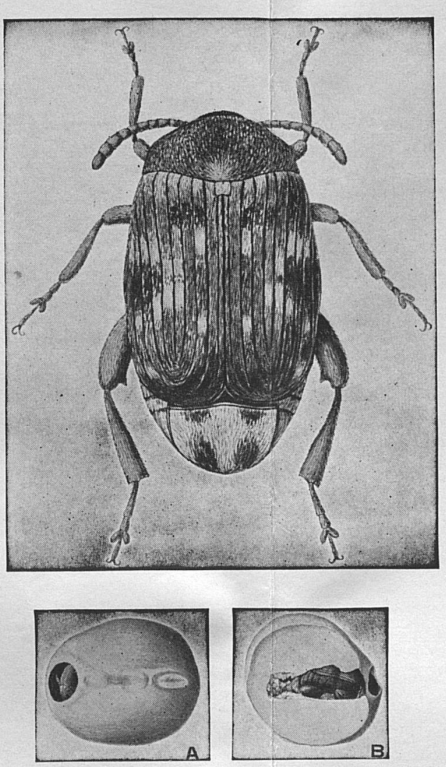
Leaflet 48

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

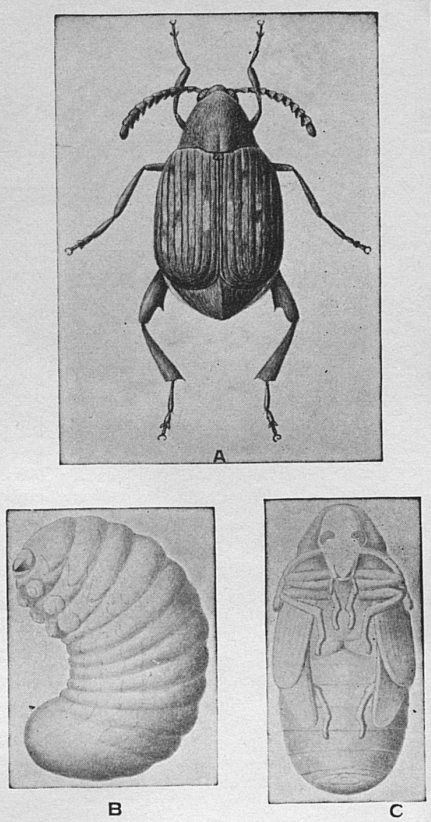
Lexington, Kentucky June, 1943

of the bean weevil places her eggs in small holes chewed along the seam of the pod. Eggs of the other three species are glued to the outside of the pod.

After three to thirty days the eggs hatch and the minute, whitish grubs burrow through the pod and into the tender seeds where they develop eventually into the adult, or beetle. For the bean and cowpea weevils the entire period of development from egg to adult is three to eight weeks, depending upon the temperature and moisture content of the seeds. Breeding of the bean and cowpea weevils continues in storage and many generations may be produced during the year. Eggs are never laid on dried garden peas and there is no increase in numbers of the pea weevil in storage.



Pea weevil magnified 10 diameters: (*A*) a pea containing a weevil ready to emerge: (*B*) a section of the same, both magnified 2½ diameters. (After H. Garman.)



(*A*) The bean weevil; (*B*) its grub; (*C*) its pupa. Magnified 10 diameters. (After H. Garman.)

Methods of Control

Fumigating with carbon disulfide.— Since the infestation is brought from the field in peas and beans, they should be fumigated after the harvest as soon as they are well dried. Any receptacle, such as a barrel, lard can, milk can, or mason jar, that will hold the fumes in is satisfactory. The seed should be put into the container with some gunny sacking or loose cloth placed over them. Three pounds of carbon disulfide for each 100 cubic feet of air space in the fumigation chamber or, on a smaller scale, 3 tablespoons in a barrel, or 1 teaspoon in a gallon container, is recommended. The carbon disulfide is poured over the cloth, and the lid is put in place. Receptacles having no lid can be made satisfactory for fumigation by tying several sheets of newspaper over the opening. After fumigating for 24 hours the seeds should be removed from the vessel and allowed to air out. A day when the temperature is above 70°F is best for the work. Since its fumes are very inflammable and explosive, lights and fires must be kept away from the carbon disulfide. It is recommended to be used only in the open or in a small building at some distance from the house, barn, or warehouse. This treatment does not injure the beans or peas for use either for seed or food.

Killing the weevils with heat.— Heat may be used also to kill the weevils. Seeds in a cloth bag may be hung in cold water which is heated immediately to 140°F. The seeds are then spread at once on a surface where they will dry quickly. Another method is to place the seeds in shallow pans, 1 or 2 inches deep, in an oven which is held at a temperature of 135°F for 3 or 4 hours. If the temperatures mentioned are not exceeded the germinating qualities of the seed will not be affected. A cooking thermometer should be used.

used start drying at 115° to 120° F. and gradually increase temperature to 140° F.
5. Stir frequently at beginning of drying.

Okra

1. Select tender pods.
2. Wash okra and cut in ½ inch lengths.
3. Blanch in steam 4 to 8 minutes, according to size of pod.
4. Place on trays and dry in sun, over the stove or in the oven, starting at 125° and increase to 140° F.

Directions for Drying Fruits

Apples

1. Select apples that have good cooking qualities: Winesap, Stayman, Jonathan, Grimes Golden, Rome Beauty, Delicious, Baldwin, Ben Davis and Horse apple.
2. Pare, core and trim to remove discolored or decayed spots.
3. Cut into slices or rings ¼ inch thick.
4. Sulfur 30 minutes.
5. Arrange on trays and place in the sun or in indoor drier. If thermometer is used, start drying at 130° F. and gradually increase to 165° F. Finish drying at 145° to 150° F.

Peaches

1. Select firm, well-ripened fruit of the following varieties: Elberta, Georgia Belle, Hale and Hale Haven. Handle carefully to prevent bruising.
2. Wash, peel, remove stones.
3. Sulfur 35 minutes.
4. Arrange on trays and place in the sun or indoor drier. If indoor drier is used, start at 130° F. and gradually increase to 175° F. Lower temperature at end of drying to 150° F. The drying process is complete when a handful of slices have an elastic, stringy feeling, and separate when pressure is removed.

Pears

1. Pick pears when firm but readily loosened from the tree when slightly lifted with the hand. Bartlett pears are best for drying.

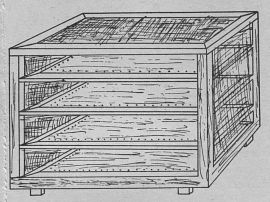


Fig. 4—A screened case for trays to be used in the sun. Change position of trays frequently.

2. Store in crates for about one more week until ripe but still firm.
3. Core and cut into halves or quarters.
4. Sulfur 25 minutes.
5. Place in the sun or an indoor drier. If oven is used, start drying at 130° F. and increase the temperature to 175° F.

Cherries

1. Wash cherries and remove stems and imperfect fruit.
2. Spread in a single layer on trays.
3. Dry indoors at 120° F. Never allow the temperature to rise above 150° F.

Care of Dried Products

Since fruit and vegetables will not be uniformly dried, it is a good plan to keep them in flour sacks 2 or 3 weeks, stirring daily to assure complete evaporation. Before packing, pile loosely on trays, return to the oven and heat to 160° to 175° F. for 10 to 15 minutes. Pack the finished product in small bags or jars which can be completely sealed to exclude air. Several bags may be placed in large tightly covered containers which will keep out insects. Store in a dry place.

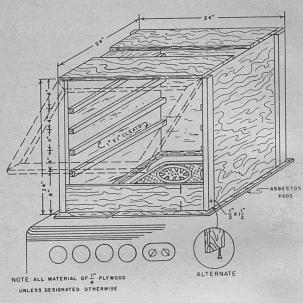


Fig. 5.— Fruit and vegetable drier for gas, kerosene, and electric stoves. Use the dimensions in the drawing as a guide. Measure your stove top (size and position of burners) and build the drier to fit it. Put the lower tray 8 to 10 inches above the surface of the stove and space the other trays about 3 inches apart. Use waterproof plywood, ordinary lumber, or material from boxes. Select lumber free from knots. At drying temperatures knots in some lumber give off pitch. Make the door of the same material as the sides. A metal heat spreader to go over the gas and kerosene burners is sometimes desirable.

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50M—6-42
50M—6-43

HOME DRYING of *Fruits • Vegetables*

By Florence Imlay and Pearl J. Haak

By drying part of the fruits and vegetables for winter, farm families can give variety to the diet and at the same time save jars for canning other products. Apples, peaches, apricots, pears, cherries, berries, corn, peas, string beans, okra, and herbs are most suitable for drying. This leaflet tells how to select and prepare the products, describes the equipment needed, explains the methods used, and points the way to store the dried fruits and vegetables.

Successful drying of fruits and vegetables depends upon the selection of good-quality products to start with, upon methods of preparing and drying that cause the least change in flavor, texture, and food value, and upon methods and equipment that will bring about quick drying.

Use Only the Best Fresh Products

Vegetables that are mature but tender, and fruits well ripened but firm make the most satisfactory dried products. One piece of decayed fruit or vegetable may spoil the flavor of the entire lot.

Leaflet 49

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Thomas P. Cooper, *Dean* and *Director*

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Prepare Fruits and Vegetables Carefully

The products for drying should be gathered in the cool of the morning and prepared as soon as possible. Satisfactory dried fruits and vegetables cannot be made from wilted or inferior fresh products.

Vegetables should be blanched in boiling water or steam to help retain their color, flavor, and texture. Fruits should not be blanched in water or steam, but apples, peaches, and pears should be treated with sulfur to preserve their color, texture, flavor, and food value.

Blanching sets the color, removes objectionable flavors, hastens drying, checks ripening, prevents undesirable changes in flavor after drying, and partially cooks the products so that after drying they refresh in water rapidly and cook quickly. Blanching in steam is especially desirable because it dissolves less of the valuable mineral substances and the water-soluble vitamins. To blanch by steam:

1. Put several inches of water into a large container having a close-fitting cover, and bring the water to a boil. A large kettle or lard can is satisfactory, but a steam pressure cooker is better.
2. Place the prepared vegetables in a wire basket fitted with a bail, or in a colander.
3. Place the basket of vegetables on a rack 3 or 4 inches above the vigorously boiling water and cover the container to confine the steam.
4. Keep the products in this live steam according to the directions given for each product.

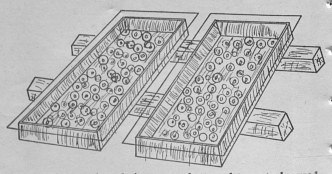

Fig. 1—For outdoor drying, screen-bottomed trays to be used on table or roof should be covered with screen, glass, or loosely woven cloth. There should be several inches of air space underneath the trays.

Sulfuring should be done out of doors. Place 1 teaspoon of sulfur per pound of prepared fruit in a small piece of paper, roll it loosely and twist the ends. Put the sulfur into a pan in the bottom of a barrel, a big wooden box, or beside stacked trays. Place a thin layer of the sliced fruit in a loosely woven basket and hang in the barrel or box so that it will not come in direct contact with the sulfur; or place the fruit on trays and stack the trays on blocks of wood with pieces of thin lath between the trays. Light the paper with a match, and quickly cover the box or barrel containing the basket, or place a box over the trays. Leave in the sulfur fumes 20 to 30 minutes. The covering should be tight enough to prevent loss of the fumes.

For further instructions on preparation see the directions given for each product, pages 5 to 8.

Provide Suitable Equipment

When the kitchen does not provide enough equipment for drying make additional articles from materials available in most farm homes. Drying trays may be fashioned of frames made of scrap lumber with bottoms of screen wire, heavy cloth, cardboard or light-weight boards. Household trays, baking sheets, pie pans, platters or any shallow containers may be used. Racks holding several screen trays may be easily built of scrap lumber, orange or apple crates, covered with screen or mosquito bar to protect from flies and hung from the ceiling over the kitchen range. Provide a thermometer to check and control drying temperatures.

Watch the Starting Temperature

When drying fruits and vegetables the temperature should be gradually raised and the food dried quickly. If fresh-cut fruit or vegetables are rapidly heated to the highest favorable drying temperature the small cells often burst, with the result that flavor and nutritious material are lost. This may be overcome by starting drying at a low temperature or by spreading the food in the sun early in the morning

before the heat is extreme. If dried in the sun, all products should be brought indoors at night.

Know When Drying Is Over

The time needed for drying varies with temperature, kind of food, and size of pieces. Vegetables must be "bone dry" and brittle before storing. Fruits should be dried until leathery but not hard. By removing a piece of the fruit occasionally and allowing it to cool, the proper degree of dryness may be determined. Thoroughly dried fruits, when pressed lightly in the hand, will not be sticky and will have a tendency to spring apart when the grip is released. Fruits when hot will always appear softer and less dry than when cool.

Directions for Drying Vegetables

Sweet corn

1. Use only young, tender sweet corn when it is in milk stage.
2. Husk corn and cut away any worm injuries.
3. Blanch in steam or boiling water 10 to 12 minutes to set the milk.
4. Drain, cool, and cut kernels off the cob.
5. Spread corn on trays ½ to ¾ inch thick and dry

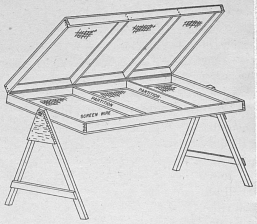

Fig. 2—Outdoor drier screened on bottom and top, constructed so that it can be tilted to the sun.

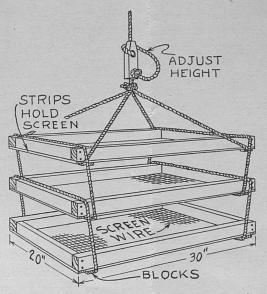

Fig. 3.— Trays fastened together by loops of rope or wire, and hung over the stove. The ropes shown here are not all in one piece. Trays may be fastened also by 4 hooks like those used to hold a gate when closed. Fill top tray and dry for several hours before filling and attaching the second; then dry again for several hours before filling and attaching the third.

in sun, over the stove or in the oven at 130° to 140° F.

6. Stir frequently to separate grains. When sufficiently dried, kernels will be hard and will rattle in tray.

String beans

1. Select beans that are mature but not husky.
2. Wash, and break or cut into short lengths.
3. Blanch in live steam 15 to 30 minutes.
4. Spread on trays and dry in the sun, over the stove or in the oven at 140° to 155° F.

Lima beans and peas

1. Gather and shell when seeds are mature but tender.
2. a. Steam lima beans 15 minutes or hold in boiling water 10 minutes.
   b. Steam peas 10 minutes or hold in boiling water 7 to 8 minutes.
3. Drain and spread on trays ½ to ¾ inch deep.
4. Place in sun or indoor drier. If thermometer is

Hiring Inexperienced Workers

Some suggestions to farmers on starting new workers at their jobs

1. Show new workers around the place.— Acquaint the worker with the farm house and surroundings. Explain arrangements for eating, sleeping, washing, and other facilities. Perhaps nothing would make the worker, especially a boy or girl, feel at home quite so quickly as to be shown the "cookie jar," a supply of cooled milk, or of fresh fruit. Point out the different crops, location of fields, and pens for livestock. Explain uses and names for various farm machines.

2. Check over worker's clothing.— See if work shoes, gloves, and wearing apparel are suitable. Advice may be needed as to kind, quality, and prices of clothing and where it can be bought.

3. Explain about fire hazards on farms.— If the worker smokes, point out "no smoking" areas. From experience of farmers generally it is usually better to point out safe places for smoking than to attempt to prevent it entirely. Tell the worker to *always* "put out" all used matches and step on *all* cigarette butts and pipe ashes.

4. Working hours.— Explain your usual starting and quitting times and the importance of having such jobs as milking and feeding done on a regular schedule. Point out that emergency situations may call for some unpaid overtime.

5. The first job.— Start the new worker in on a job that can be done easily but not on one that will seem unimportant. By all means don't start with a disagreeable job. If possible, choose a task that you can do with the worker. If this is not possible, have some other *experienced* person, who is capable and *willing,* at hand to explain how the work is done.

6. Give them a chance to toughen up.— You wouldn't risk hitching a green colt or a horse that has been standing around all winter to a disk harrow and keeping him there ten hours on a hot day. You would also make sure that the collar on the horse is fitted properly and you would "watch his shoulders." Use the same judgment in breaking in the new workers by not keeping them too long on a heavy job and by watching out for blistered hands and sunburn.

Leaflet 50

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Lexington, Kentucky June, 1943

7. Don't laugh at honest mistakes.— When a mistake is made, explain why it is a mistake and show the right way but don't embarrass the worker by laughing. Sitting down on the wrong side of a cow or walking in on the wrong side of a horse is due to *lack of experience* rather than lack of intelligence.

8. Give some definite time off.— Arrange so there will be *some* time off and the worker can get it without having to ask for it. Most workers would rather have one night off from chores every two weeks or at least once a month, if he knows he will have it and can plan ahead on it, than to have more time off with no advance notice.

9. Help the worker get acquainted in the community.— Hired workers, especially younger people, will probably have been used to seeing more people than will be seen on a farm. Attendance at social functions in the community and inviting other young people into your house will help keep these young workers contented and will tend to provide better company and entertainment than they are likely to find if left to their own devices.

10. Be businesslike and systematic about wages.— Make sure that the worker understands at the start how much and when to expect pay. Make sure that such questions as pay for overtime, loss of pay for time off, holding part of pay till the end of the season, and so forth, are settled and understood by both parties before the worker begins work. A written memorandum covering terms, even if unsigned, is better than memory and frequently saves misunderstanding.

11. Show the worker how to keep from getting injured by animals and machinery.— Explain ways of talking to a horse or cow before going into the stall, and warn against chances with a bull or similar animals. The danger of catching clothing in bolts or gears of machinery should be emphasized. Never allow a new worker to start working around a machine without showing the safety devices, and then make sure that the safety devices are used. Be sure the worker knows how to throw a power-driven machine out of gear and how to stop it.

12. The final score.— When the worker leaves at the end of the season, if he asks to return next year, and likewise you want him or her to return, this will be ample proof that both you and the worker have done your part. This may be a most important factor toward getting experienced help next year.

Prepared by the
Department of Farm Economics

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15M—6-43

Barrel storage provides a convenient, safe place to keep the vegetables for daily use after they have been removed from a pit or bank storage structure.

For information on basement and cellar storage structures see your county agent or write to the College of Agriculture and Home Economics at Lexington.

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STORAGE STRUCTURES For Vegetables

(Mound, Bank, Pit, and Barrel)

By J. B. KELLEY

BY RAISING MORE FOOD for home use we can help to meet the wartime shortage, *if* we take good care of the food that is raised, and store it so that it will keep into the winter and spring. To raise the food and then let it spoil from freezing or drying out or decay, is a foolish waste of time and energy. For those who have no good storage cellars, this leaflet tells how to build simple and useful storage structures outdoors, in the ground, with no cash outlay.

Beets, cabbage, carrots, parsnips, turnips, oyster plant, and white potatoes can be kept successfully in these outdoor storage structures. Apples can also be kept in this way, but may absorb a decided earthy flavor. Turnips and beets should be topped, leaving the stubs about 1 inch long to prevent bleeding. Roots of cabbage should be cut off. Parsnips and oyster plant can be left over winter in the ground where grown if desired. Carrots also can be left in the ground but the row should be protected with straw or leaves.

Mound Storage

The simplest and least expensive storage place for vegetables is a mound structure. To build one, level off a well-drained place, 4 to 6 feet in diameter, in the garden or other suitable location; dig two small trenches (about 6 inches wide and 6 inches deep) in it, crossing each other [+], to provide ventilation and

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Leaflet 51

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drainage. Cover these trenches with stiff woven wire or boards, leaving small spaces between the boards. Then make a flue of woven wire about 4 inches in diameter, or a square flue of rough boards, leading straight up from the point where the trenches cross. Cover the earth floor with 4 or 5 inches of straw, hay, dry crabgrass, or other clean, dry litter. Place the vegetables in a cone-shaped pile around the flue; cover them with 4 or 5 inches of litter, and cover both vegetables and litter evenly with 8 to 10 inches of soil, leaving a little of the flue sticking out at the top. Cover the end of the flue with a board to keep out rain; leave the ends of the trenches and lower end of the flue open for ventilation until freezing weather makes it necessary to close them to protect the vegetables. Make a ditch around the mound to carry off surface water.

When some of the stored vegetables are needed, take out all of them. Don't try to patch up the mound after it has once been opened, for it is almost impossible to make it water-tight again. For this reason and, because vegetables tend to heat and decay if stored in too large amounts, make several small mounds, 4 feet to 6 feet in diameter, rather than one large one. Put several kinds of vegetables in the same mound, separated by litter, so that a variety of products may be obtained with little trouble. (But don't store apples in the same mound with cabbage or turnips, for the apples will absorb the flavor of the others.)

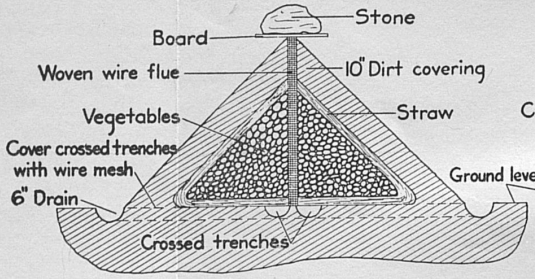

FIG. 1 VEGETABLE STORAGE MOUND
(Cross-section)

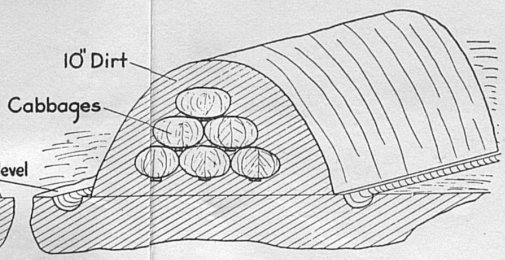

FIG. 2 CABBAGE STORAGE-LONG BANKS
(Cross-section)

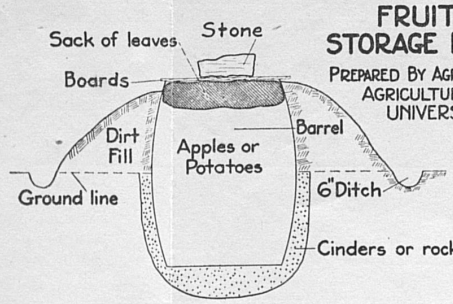

FIG. 3 BARREL STORAGE-MOUND
(Cross-section)

FRUIT AND VEGETABLE STORAGE IN MOUNDS AND BANKS

PREPARED BY AGRICULTURAL ENGINEERING DIVISION
AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF KENTUCKY

Bank Storage

Store heads of late cabbage in conical mounds or in a long pile as shown in Fig. 2. Make a trench on each side of the pile to drain surface water away. Bank earth over the cabbage to shed water and prevent freezing. Cut off the cabbage roots; otherwise it is difficult to cover them. If left uncovered they are likely to rot and to spread the decay to the head of the cabbage.

Cabbage may also be left in the ground, protected by bending the heads over carefully into a small hole and covering them with straw or leaves and 6 to 10 inches of earth.

Pit and Barrel Storage

Store apples or potatoes and other vegetables in barrels as in Figs. 3 and 4. In storing apples, select sound fruit which is ripe but not mellow; keep it continually cool and pack it in the barrel with extreme care. Early on a dry, cool morning dig a pit in a bank or well-drained level site and place the barrel as shown in the picture, covering with a sack of leaves, clean litter and boards or earth. This makes it easy to remove the contents of the barrel as desired. A bed of cinders or crushed stone beneath the barrel improves drainage. A barrel may also be laid on its side on a bed of litter in a well-drained place and covered with litter and soil. Under any of these conditions, surface water should be carried away by a ditch.

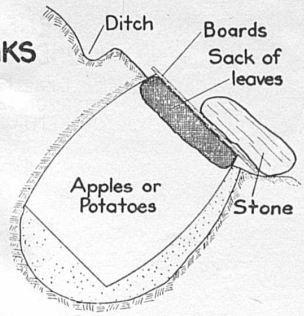

FIG 4 BARREL STORAGE-BANK
(Cross-section)

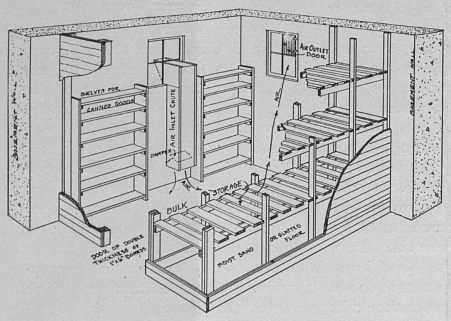

Fig. 5.— Plan for a basement storage room; 10 ft. by 12 ft., for a family of five

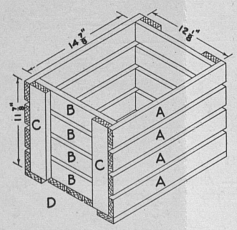

Fig. 6.— Bushel crate

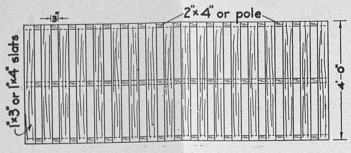

Fig. 7.— Removable slat platform for barrels, boxes, baskets, crates

Temperature Control

During the warm days and cold nights of autumn when the temperature inside the room is often too high for good storage, the ventilators should be opened at night to allow the cool air to enter and warm air to escape. In the morning, when the room is filled with cold air, the ventilators should be closed. During the winter, the ventilators are kept closed except on warm days when it may be desirable to air the room.

Moisture Control

The storage room should be moist to prevent shrinkage of the vegetables. Moisture content of the air should not be so high, though, as to cause condensation on the walls, ceiling, floor, or stored product. Excess moisture in the air can be removed by ventilation on warm, dry days. If the room is too dry, sprinkle the floor occasionally with water, more often with concrete floor than with dirt floor. Water-soaked sacks, old carpet, or a layer of moist sand on the floor is more convenient than sprinkling.

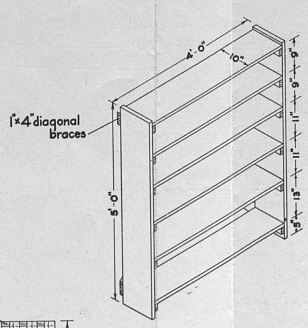

Fig. 8.— Fruit-jar rack

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25M—7-43
25M—3-44



Basement and Cellar STORAGE STRUCTURES

By Jesse B. Brooks

Though small quantities of fruits and vegetables can be stored successfully in temporary structures, as described in Leaflet 51, a permanent structure in basement or cellar should be provided if considerable quantities are to be stored each year.

Storage structures built according to the plans in this leaflet provide a dark, cool, moist atmosphere needed for storing Irish potatoes, cabbage, beets, turnips, carrots, parsnips, celery, Brussels sprouts, and apples. These fruits and vegetables keep well in bulk and retain their quality.

Ventilation is very important where apples are stored. Since apples absorb odors easily, they should not be placed near turnips, cabbage, or onions.

Sweetpotatoes, pumpkins, squashes, and cushaws cannot be stored in the structures described

Leaflet 52

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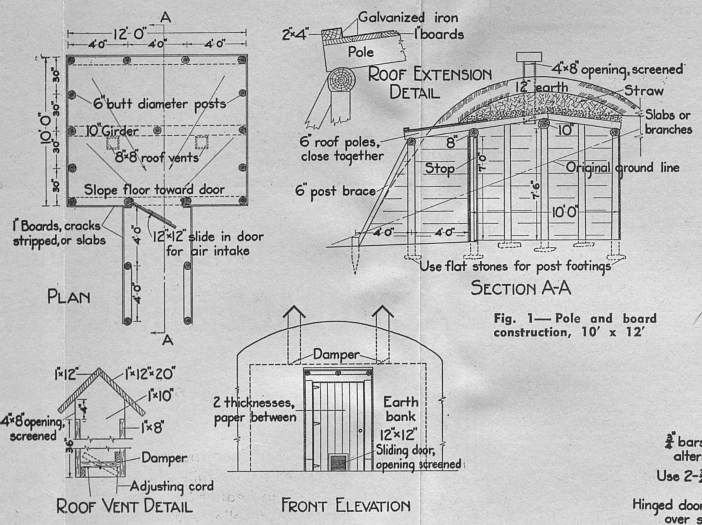

Fig. 1— Pole and board construction, 10' x 12'

Building a Cellar

An outdoor cellar in a bank or hillside is more convenient and easier to build, as a rule, than one on level ground. Making the floor at ground level avoids steps, and good floor drainage is easily provided (see Fig. 1). A very satisfactory and economical storage cellar, somewhat temporary but suited for emergency use, can be built of poles and slabs. On many farms in Kentucky, lumber is scarce but stone is plentiful and in these cases stone walls as shown in Figs. 2 and 3 may be used. A concrete cellar is shown in Fig. 4. Since the cellar should be moist, most of those in these plans have dirt floors.

Building a Basement Storage Room

Where a furnace in the basement is used, the storage room should be partitioned off to protect the vegetables from the warmth and drying effect of the furnace. The partition walls may be of wood, stone, brick, or concrete. The room should be in one corner of the basement so that the basement walls may serve as two of the sides. The room should have at least one, and preferably two, windows for ventilation. Details for placing the air inlet shaft and the air outlet door in the windows are shown in Fig. 5.

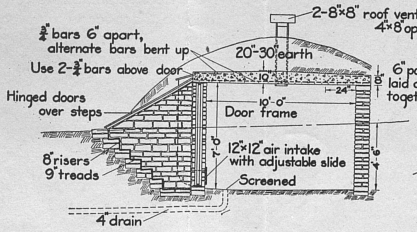

Fig. 2— Masonry construction; concrete roof; floor below ground level

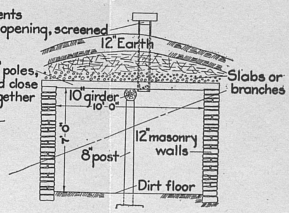

Fig. 3.— Masonry construction; pole roof; grade entrance (not shown)

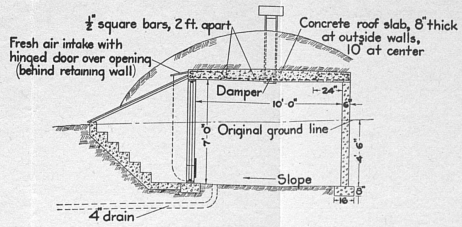

Fig. 4.— Concrete construction; floor below ground level

in this leaflet. These vegetables must be kept in a warm, dry place such as found in the attic of the home or a separate room where heat can be used. Onions should be kept in a cool, dry place.

Essentials of a Good Storage Room

1. The storage room should be large enough to store a year's supply of food for the family. A 10 x 12 foot room is large enough for the average farm family.

2. The storage space should be as close as possible to the kitchen, for convenience.

3. An adequate ventilation system, including air inlet and outlet should be provided for removing odors, regulating temperature, and controlling moisture. The vent openings should have an area of about 1 square inch for each square foot of floor space in the room.

4. Floor drainage should be provided if there is danger of water rising in the room.

5. The room should be deep enough in the ground or banked with enough earth, or otherwise insulated to prevent freezing inside.

6. Slatted floor, bins and crates assure better air circulation throughout the storage room. Shelves should be provided for canned goods. See Figs. 6, 7, and 8.

7. If a trap-door leading to the basement or cellar storage must be used, it should have proper railing to prevent accidents. Plan the entrance carefully and avoid steep, narrow steps.

8. Dark rooms are preferable for good storage. All openings except the vents should be covered during the storage period.

SOYBEAN WHOLE-WHEAT MUFFINS

½ c soybean flour
1½ c whole-wheat flour
1 egg
¾ c sweet milk
1 t salt
3 t baking powder
1 T melted fat

Sift flour, measure, add salt and baking powder, and resift into mixing bowl. Beat egg well. Add milk and melted fat to well-beaten egg. Make a well in flour and pour into it the liquid ingredients. Stir rapidly until all flour is dampened. Put into greased muffin pans and bake in a hot oven (425° F) about 20 minutes.

SOYBEAN NUT-FRUIT BREAD

2/3 c soybean flour
1½ c white flour
1/3 c sugar
½ t salt
1 c dried fruit
3 t baking powder
1 egg, well beaten
2 T melted fat
1 c milk
½ c nuts

Sift flour and measure. Add dry ingredients. Mix the well-beaten egg, fat, and milk, and add to the dry ingredients. Stir the nuts and fruit into the mixture. Bake in a greased loaf pan for 1 hour in a moderate oven (375° F).

SOYBEAN BREAD

2 c milk
3 T fat
2 T sugar
1 t salt
1 c soybean flour
5-6 c white flour
1 cake Fleischmann's yeast

Heat milk; add fat, sugar, and salt. Cool to lukewarm; add crumbled yeast and sifted soybean flour and enough white flour to make a dough as soft as can be handled. Place in greased bowl and set in a warm place to rise until double in bulk. Shape into loaf or rolls and again allow to rise until light. Bake loaf in a moderate oven (375° F) about 50 minutes and rolls about 15 minutes.

SANDWICH FILLING

2 c cooked mashed soybeans
¼ c chili sauce
½ c nuts

Combine ingredients and mix well. Store in a cool place.

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50M—7-43

SOYBEANS as FOOD

By Florence Imlay
Pearl J. Haak

For centuries soybeans have been used as food in the Orient, but it is only recently that people of the Western hemisphere have become interested in them. Now that we are looking for substitutes for meat, attention turns to soybeans because of their high protein quality.

FOOD VALUE OF SOYBEANS

Soybeans contain excellent protein which may take the place of meat protein in the diet. They are also an excellent source of calcium. If milk is rationed as part of our war program, soybeans will become an important substitute for milk and cheese. For generations many Chinese children have been fed soybean milk and curd in place of cow's milk. Soybeans are also an excellent energy food. Because they are rich in fat they need little seasoning.

VARIETIES

A number of varieties of soybeans have been developed especially for table use and are listed by seed companies as "edible varieties." Some of these garden varieties are Bansei, Funk's Delicious, Rokusum, Jogum, Hokkaido, and Easy Cook. If garden varieties are not available a number of field varieties are suitable for eating. Most people prefer the light tan-colored beans rather than the black or mottled ones. Field varieties especially good for table use are Dunfield, Manchu, Illini, and Mammoth Yellow.

Leaflet 53

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky

July, 1943

HOW TO GROW SOYBEANS

The culture of soybeans is easy. Plant them the same as lima beans, after the soil is warm, about May first. Successive plantings will furnish beans through the late summer and fall. Quickly maturing varieties such as Bansei may be planted as late as July first. Mexican bean beetles usually do not seriously injure soybeans.

RECIPES

BUTTERED GREEN SOYBEANS

1 pt shelled beans
¾ t salt
1 T butter

Pick beans when they are still green or yellow-green and tender. Cover pods with boiling water and allow to stand about 10 minutes. Drain, open pods, and remove beans. Cover beans with boiling water; add salt and cook about 10 minutes, or until tender. Add butter and serve. (Add more water if necessary.)

COOKING DRY SOYBEANS

Dry soybeans should be washed, covered with water, soaked for several hours, and then cooked slowly as other beans on top of the stove or in a pressure cooker for 1 hour at 10 pounds pressure. Some dried beans become tender more quickly than others, but even most yellow field varieties can be cooked on top of the stove in 2½ or 3 hours. After they are tender they may be served in many ways such as: buttered, in loaves, casseroles, and sandwich fillings.

BAKED SOYBEANS

2 c soybeans
½ t salt
¼ lb salt pork
¾ t mustard
1 small onion
1 T brown sugar
2 T molasses
¾ c boiling water
1 c tomatoes

Pick over the soybeans, wash, cover with one quart of hot salt water (1 T salt to 1 qt water) and allow to soak overnight. In the morning bring the beans slowly to the boiling point. Cut the onion in thin slices and arrange in the bottom of a pan or casserole. Drain the beans and pour half of them into the pot or casserole. Score the salt pork and place on the beans. Pour the remainder of the beans into the pot or casserole. Dissolve the salt, sugar, and mustard in the hot water and mix with molasses and tomatoes. Pour mixture over the beans and add more

water if needed to cover beans. Bake in a moderate oven (300°-350° F) about 8 hours, or cook in the steam pressure cooker for 1 hour at 10 pounds pressure.

SOYBEAN SOUP

1 c mashed, cooked soybeans
2 T chopped onion
2 T crushed dried celery leaves
1 c water
¼ c crisp bacon
3 c milk
½ t salt
Pepper
2 T chopped parsley

Cook onion and celery leaves a few minutes in water; add other ingredients except parsley. Serve and sprinkle with parsley.

U.K. SOYBEAN LOAF

3 c soft bread crumbs
3 c baked soybeans
1 medium onion
½ t salt
1 c milk
2 eggs, well beaten
½ c nuts

Run baked beans, onion, and nuts through food chopper; mix with other ingredients and shape into a loaf. Bake about 45 minutes in a slow oven (250°-300° F). Serve with tomato sauce.

SOYBEAN CASSEROLE

4 c cooked green or dried soybeans
1 c cooked celery
1 small chopped onion
2 T chopped green pepper
1 c tomatoes
1 T butter or bacon fat
½ c water
1 t salt
½ c buttered bread crumbs

Cook onions and green pepper in fat and water for a few minutes. Add other ingredients except bread crumbs and mix well. Pour into a baking dish and cover with buttered bread crumbs. Bake in a moderate oven (350° F) about 30 minutes, or until brown.

SOYBEAN SOUFFLE

3 c mashed cooked soybeans
1 c milk
2 T butter
4 T flour
2 T chopped parsley
½ c chopped nuts
½ t salt
3 eggs
1 T chives

Melt butter in saucepan. Add flour and blend well. Remove from stove, add milk, and stir until smooth. Replace on stove and cook about 2 minutes, stirring constantly, until very thick. Separate eggs and beat yolks until light and fluffy. Add egg yolks, soybeans, nuts, and seasoning to white sauce. Fold mixture into stiffly beaten egg whites and pour into greased baking dish. Put baking dish into a pan of water and bake in moderate oven (325° F) about 30 minutes, or until firm.

Supplementary Pasture

One of the most satisfactory ways of providing cheap feed during summer when regular pastures are not actively growing is supplementary pasture. Sudan grass, lespedeza and millet are among the best crops for this purpose. Most dairy farms could well use a small area of sudan grass. It will provide plenty of pasture, and help to avoid overgrazing the permanent pasture.

CAUTION: When sudan grass and related crops are making rapid growth after a rain following a summer drouth there is some danger of prussic-acid poisoning of animals grazing on it. At such times it is good practice to keep the animals off the pasture for a few days.

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To 9-42:50M
40M—7-43

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Summer Feeding of DAIRY COWS

By Lynn Copeland

THE PASTURE SEASON offers an opportunity for low-cost dairying. How well a dairyman takes advantage of it depends on his skill in pasture management and the extent to which he supplies the feeds needed to supplement the pasturage. The cost of nutrients from pasture is about one-third their cost in other feeds. Also, cows can get nearly half their yearly feed requirement from good pasture. When grain is scarce it is even more important than usual for farmers to take full advantage of pasture feeding. At such times every farmer who milks cows should give extra attention to his pastures and his hay crops, so that he will need to feed only a minimum of grain and still will attain the milk production so urgently needed now.

Many farmers turn their cows out to pasture with little thought as to the supply of feed actually available. Young pasture grass stimulates cows to make more milk than when on winter feed; yet it is impossible for heavy-milking cows to eat enough pasture forage to furnish the nutrients needed for heavy production. Such cows therefore lose flesh on pasture and if the pasture becomes dry and scanty in midsummer they fall off greatly in milk yield.

Leaflet 54

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky July, 1943

When to Feed Grain on Pasture

The economy of feeding grain to a cow on pasture depends upon her milk production. A cow can eat enough good pasture to produce 2 to 2.5 gallons of milk a day without loss of flesh. Cows giving less than that on pasture without grain usually will not give enough more milk when fed grain to pay for the extra feed. However, it is a serious mistake not to feed some grain to high-producing cows. Even though such cows may not show a great increase in milk production, the extra grain fed helps maintain their heavy milk flow during the usual mid-summer slump and prevents them from losing flesh. Also, they will milk more the following winter.

Keep the Pastures Growing

Young pasture grass is about 85 percent water, while average grain feed is about 10 to 12 percent water. If a pasture has been well limed and phosphated however, the young grasses and legumes supply enough protein, vitamins (especially vitamin A) and minerals for high milk production.

As the season advances, a cow gets from the average pasture only enough feed for 1 to 1½ gallons of milk a day. As the grass grows older it has more fiber and less protein, and it produces less forage because of slower growth, and the cows fall off considerably in milk production unless they get extra feed. However, keeping the pasture fertile and mowing it when it begins to head out tends to keep the grasses growing and rich in protein throughout the season.

How Much Protein Is Needed in Grain Mixture

As protein is usually the most expensive part of the feed for cows, dairymen should take full advantage of the cheap protein furnished by pasture. Too often they feed a grain mixture containing much more protein than is needed for cows on pasture. The percentages needed with pastures of different quality are given in the following list:

	Percent needed
On excellent pasture	10 to 12
On good pasture	12 to 14
On fair pasture	14 to 16
On poor pasture	16 to 18

Corn, barley, and wheat are usually the cheapest supplements for spring pasture. As pasture becomes poorer and older, a high-protein feed such as distillers' dried grains, or soybean or cottonseed oilmeal should be added to supply the needed protein.

How Much Grain to Feed

The following general rules are helpful in determining the amount of grain to feed.

Feed 1 pound of grain daily for each 2 pounds of milk (4 pounds of grain for each gallon of milk) produced over and above the amounts given in the following list:

	Gallons milk	*Pounds milk*
JERSEYS OR GUERNSEYS		
On excellent pastures	2¼	20
On good pasture	1¾	15
On fair pasture	1¼	10
On poor pasture	¾	5
OTHER BREEDS		
On excellent pastures	3	25
On good pasture	2¼	20
On fair pasture	1¾	15
On poor pasture	1¼	10

Hay as a Supplement to Pasture

When pasture grows old, tough, and less palatable the cows should be given all the hay they will clean up. They will eat no more than they need. The best time to feed hay is after the evening milking, before the cows return to pasture. Hay, however, cannot take the place of grain for heavy-producing cows on pasture.

Summer Silage

Some dairymen feed grass or alfalfa silage as a pasture supplement. When grass is most abundant in the spring, dairymen often have more pasturage than their herds can use. By ensiling the excess grass, or the first crop of alfalfa, and feeding it when pastures become short, they have a more uniform and dependable supply of feed. However, silage costs more than hay, and a fairly deep layer (about 4 inches) must be removed daily to prevent spoiling.

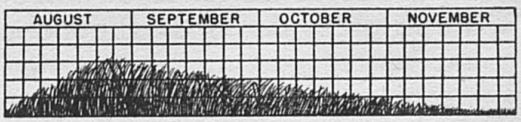
Inquire of your county agricultural agent for other leaflets on dairying and pasture management

How to Succeed with WINTER PASTURES

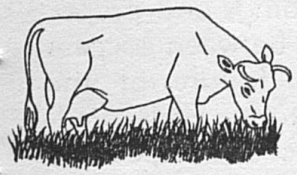
(5 important things to do!)

By W. C. JOHNSTONE

1. Sow early.—Seeding of crimson clover, vetch, and ryegrass may begin soon after August 1. Winter oats should be seeded in late August, and rye and barley in September. To avoid Hessian fly, wheat seedings should be delayed until after the fly-free date (ask your county agent about that.) Later seedings than these generally result in much less growth in the fall, and subject the crops to greater hazards of winter-killing.



← Sow early → ← Not late →



2. Good soils produce the best pasture — build yours up!—Winter pastures are more luxurious and more nutritious when seeded on fertile soils. Many failures are the result of lack of plant food in the soil. Fertilizers and lime materials for winter pastures usually pay large dividends. Better check your needs before sowing.

Leaflet 55

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky July, 1943



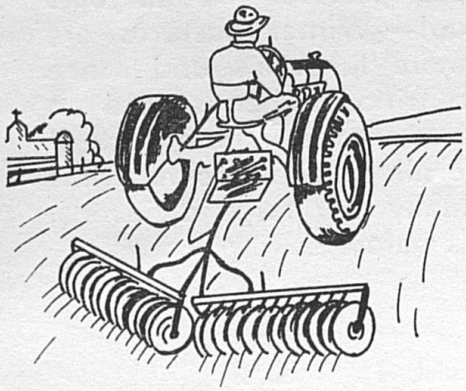
3. Inoculate legume seed.—Vetch and crimson clover are legumes. Some soils are naturally inoculated for crimson clover, but it is essential to inoculate vetch before planting unless vetch has been grown successfully on that land before.

4. Sow plenty of seed.—Small grain and winter legumes should be seeded heavily where pasture production is the chief aim. Ask your county agent for seeding rates.



To assure enough seed for winter pastures next year, farmers should consider the advisability of producing such crops especially for seed. Balbo rye, vetch, and selected varieties of wheat, barley, and oats are in great demand. Production of seed for sowing winter pastures may help increase the farm income.

5. Prepare a good seedbed and cover well.—A good firm seedbed, careful seeding, and proper covering may mean the difference between success and failure of the pasture. Early-seeded crops especially need good covering. Vetch should be sowed deep; crimson clover shallow. Cultipackers are particularly valuable for fall seeding.



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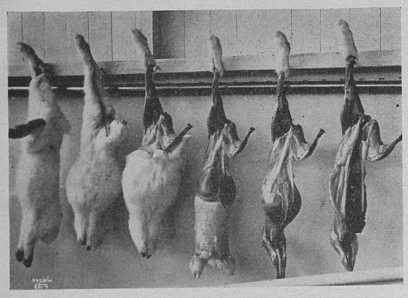

Steps in slaughtering and skinning rabbits
Courtesy of U. S. Dept. Interior

4. Do not feed whole corn, as the rabbits will eat the germ and waste the rest.

5. Each mature rabbit will normally eat about ⅓ pound of grain and concentrate mixture daily.

6. Always keep a small block or container of salt in the hutch.

7. Water daily. Keep containers clean.

DISEASES AND PARASITES

Combat diseases and parasites by keeping hutches clean, dry, and well ventilated. Insanitary conditions and contaminated feed and water utensils lead to disease and parasitic troubles.

Be on the alert constantly for symptoms of disease or parasitic troubles. Those most commonly found are snuffles, coccidiosis, sore hocks, urine burns, diarrhea, and ear canker.

Snuffles.— Avoid the introduction of snuffles by careful inspection and selection of all new purchases. Isolate or destroy any infected individuals.

Coccidiosis.— Control coccidiosis by strict sanitation and daily cleaning. Self cleaning floors prevent access to droppings.

Urine burns.— Prevent urine burns by replacing bedding frequently.

Sore hocks.— Prevent sore hocks by using perforated sheet metal floors. Avoid sagging wire floors or rough spots which cause injury. Mild cases of sore hocks respond to daily treatment with a mild disinfectant and healing salve; others should be destroyed. Solid wooden or earth floors are helpful during the treatment.

Diarrhea.— Too much green feed may cause diarrhea. Do not give rabbits large amounts of green feed until they are accustomed to it. Increase it gradually.

Ear canker is caused by a small mite. Irritation of the skin causes the scabs and later a canker. Clean and treat with a 1-percent solution of carbolic acid in glycerin.

SLAUGHTERING AND SKINNING

1. Stun with blow back of ears.
2. Suspend on hook or nail at tendon of hind leg.
3. Quickly remove head to insure a good bleed.
4. Cut off tail, front feet, and the free hind foot at hock joint.
5. Slit skin from hock of suspended leg to the root of tail and continue to hock joint of the free hind leg.
6. Separate edges of skin from flesh so as to leave fat and pull down over carcass. Make no other cuts in the skin.
7. Open belly along middle. Remove entrails, leaving liver, heart, and kidneys in place.
8. Remove the remaining hind foot at hock joint.
9. Cleanse the carcass in cold water to remove animal heat. Refrigerate until used.



Courtesy of U. S. Dept. Interior

CARE OF PELTS

While the skin is still warm, stretch it over a previously prepared wire or board spreader, flesh side out, and both the front legs on the same side. Hang it in the shade to dry, and where there is good protection from mice and rats. Use no salt on rabbit skins.

Use P.D.B. crystals (paradichlorobenzene) or moth balls if skins are stored.

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How to Raise Rabbits

By Eugene S. McConnell
Revised by E. T. Wightman

- Meat of domestic rabbits (it is all white and fine grained) is always in season and is superior to that of wild rabbits, both in flavor and texture.
- It requires only 90 days from the time the doe is mated until her young are ready for the table.
- A doe may raise 4 litters each year.
- Rabbit meat is produced at low cost: about 5 pounds of feed produces 1 pound of live weight; rabbits eat much waste food; when 60 days old they dress about 2 pounds.
- Pelts are marketable when properly prepared. Rabbit manure is a good fertilizer.
- Space in the back yard, just large enough for the hutches, is all that is needed to raise rabbits.
- Hutch-raised rabbits rarely, if ever, get tularemia (rabbit fever).

Leaflet 56

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College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky August, 1943
(Revised, August, 194[illegible])

STARTING THE RABBITRY

Whenever possible get rabbits from a local breeder. This reduces the cost of transportation, and gives an opportunity for examining them for diseases and for asking the breeder about caring for them. In the absence of a local breeder get the names and addresses of breed organizations from the College of Agriculture and Home Economics of the University of Kentucky. New Zealand Whites and Flemish are the most popular breeds for meat. White rabbits are best suited for both meat and fur. Angoras are used for wool production.

HUTCHES AND EQUIPMENT

1. Provide an individual hutch for each breeding doe or buck.

2. Use a portable hutch for convenience and protection. Place it under shade, or near or in a building that is well ventilated.

3. Make the hutch at least 4 ft. long, 2½ ft. wide, and 2 ft. high, inside measurements. For heavy breeds make hutch 5-6 ft. long.

4. Provide self-cleaning floor of ⅝-inch mesh hardware cloth or use 1-inch to 1½-inch hardwood slats spaced ⅝ inch apart. Perforated sheet metal is more expensive but gives a much smoother surface which aids in preventing sore hocks.

5. Use scrap lumber for frame and roof, and odd pieces of 1-inch poultry netting for side, back, and front. Fasten netting to inside of frame to protect the wood from gnawing rabbits. All-metal hutches made from heavy poultry wire may be used inside a building.

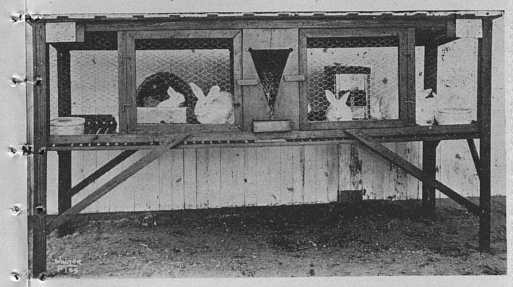
6. Make V-shaped hay mangers of 1-inch wire netting (or 1″x2″ square-mesh wire) in partitions between pens. Have outside opening for easy filling. If 1″x2″ square-mesh wire is used for the manger, use a door over the outside opening to keep rats out. Rats will kill the young rabbits.

7. Make drawer-type feed trough, pulling to outside, directly under manger. This catches shattered hay leaves and makes the feeding of grain easy.

8. Put slats at 3-inch intervals over feed trough to keep out the young rabbits.

9. Provide water in shallow crocks or heavy pans 8 inches in diameter.

10. Make nest boxes from nail kegs, apple boxes or similar containers. A removable top makes it easier to observe a new litter without disturbing the nest.



An inexpensive 2-compartment rabbit hutch
Courtesy of U. S. Dept. Interior

BREEDING PRACTICES

1. Mate medium-weight breeds when 6 to 7 months old.

2. Provide 1 buck for 10 does.

3. Take the doe to the buck's hutch for mating.

4. Keep a record of breeding dates.

5. Return the doe to the buck on 5th and 18th days following first mating to insure conception.

6. Expect the baby rabbits 31 to 32 days after mating.

7. Wean young rabbits when 2 months old, to get 4 litters each year.

8. Rebreed the doe immediately after weaning her litter, if she is in good condition; otherwise wait 2 or 3 weeks.

9. Take good care of the doe and she will breed for 3 years or longer.

HOW TO TELL THE SEX OF YOUNG RABBITS

Press open the sexual aperture just below the anal opening. Females have a longitudinal slit; males have a round opening. The penis of the male may be made to protrude.

CARE OF YOUNG

1. Place nest box in doe's hutch 4 days before the young are due. Put a 3-inch layer of straw in the nest. The doe will line it with fur from her body.

2. If several does have young about the same time, equalize their litters within 3 days. For best results a doe should not be allowed to nurse more than 7 or possibly 8 in one litter.

3. Keep mother and litter on full feed for rapid growth. The young will eat solid food at 3 weeks of age.

4. When the litter reaches weaning age (2 months), separate the males from the females if they are to be used as breeders. They may be kept together if raised for fryers.

5. Fryer rabbits are ready for slaughter at 2 to 3 months of age. Live weight should be 4 to 4½ pounds to dress out about 2½ pounds. Heavier rabbits are required for roasting.

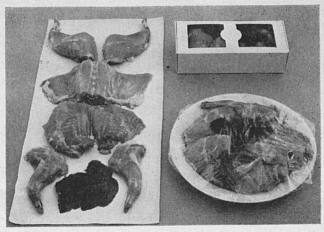
6. Handle rabbits by grasping loose skin over shoulders with one hand and supporting weight at rump with the other. Never catch by ears or legs.

FEEDING

1. Rabbits eat many things that would otherwise go to waste such as bread, table scraps, trimmings from the vegetable garden, lawn clippings, and palatable weeds. Do not feed any sour or greasy food.

2. Provide high quality legume hay at all times (alfalfa, lespedeza, vetch, soybean, kudzu, cowpea). Cut into 4-inch lengths to avoid waste.

3. Keep the feed trough filled with a mixture of 2 parts whole grain (oats, wheat, barley, rye) and 1 part plant protein supplement (soybean, peanut, linseed) in pea size or pellets. If the protein supplement is in meal form, grind part of the small grain, mix with protein supplement, and dampen lightly just before feeding.



Method of cutting up a fryer rabbit, and suitable containers for the carcass
Courtesy of U. S. Dept. Interior



This cow developed rabies six weeks after being bitten by a rabid dog. She was aggressive, excitable, gritted her teeth, was unable to eat or drink, and bellowed at frequent intervals.

HOW TO PREPARE A HEAD FOR EXAMINATION

1. Use rubber gloves in handling the animal and preparing the head. Take no chances.

2. Kill the animal in a way that does not injure the brain; by a shot through the heart, for example. A satisfactory examination cannot be made of a brain that has been damaged by a bullet, crushed by a blow, or that is in a state of decomposition.

3. Remove the head by cutting the neck a short distance from the skull, preferably with a saw to avoid spattering blood.

4. Apply formaldehyde solution, or mercury bichloride solution or borax powder, to the cut surface, the mouth, eyes and ears, to retard decomposition.

5. Enclose the head in a suitable container, such as a metal can with a tight-fitting or soldered cover. In warm weather, pack the container in another vessel, with enough ice to last until the package reaches the laboratory.

6. Write the name of the owner of the animal, and his address, on the *shipping tag*, and send the head to the nearest laboratory, by express, as promptly as possible. Prepay transportation charges. Send to:

The Public Service Laboratories
Experiment Station Building,
Lexington, Kentucky
or to
The State Department of Health
620 South Third Street,
Louisville, Kentucky

Shipment of the entire body is not desirable,

though permissible if the animal is small, such as a cat or small dog.

CLEAN AND DISINFECT THE PREMISES

After a case of rabies, the place where the animal was kept should be thoroughly cleaned and disinfected. Wear rubber gloves to protect the hands against infection. Burn the carcass or bury it as directed by the law governing the disposal of the bodies of animals dead from infectious diseases. Burn bedding and rubbish which the animal may have infected. Scrape the floor and walls and scrub them with strong lye water; then thoroughly disinfect by spraying or otherwise applying a disinfectant to all the surfaces. Some readily available disinfectants are:

Compound cresol (or sheep dip), 4 parts in 96 parts of water
Bichloride of mercury, one 7½-grain tablet in one pint of water (very poisonous)
Chlorinated lime (dry powder), also called bleaching powder, 4 ounces to 3 gallons of water

Special care should be taken in the use of bichloride of mercury, as it is very poisonous.

GENERAL SUGGESTIONS

1. Don't handle sick animals with the bare hands. Take no chances; wear rubber gloves when there is any possibility of rabies.

2. If an outbreak of rabies occurs in the neighborhood, insist that the city or county act to have all dogs tied up and all stray dogs killed,

3. Call a veterinarian if an animal has symptoms of rabies.

4. If a person is bitten call a doctor at once.

VACCINATION OF DOGS AND OTHER ANIMALS

As a protection of dogs against rabies, it is suggested that three injections of anti-rabic vaccine be used on unexposed animals. Vaccination should be repeated every 12 months as the immunity produced by vaccination may not last much longer than that.

KILL OR VACCINATE EXPOSED ANIMALS

Horses, cattle, sheep, and pigs that are known to have been bitten by a rabid dog should be placed in confinement and either vaccinated or killed. If severely injured they should be killed, especially pigs and sheep. These animals should be kept in confinement for six months even if vaccinated. Other animals in the herd, though they may show no evidence of having been attacked, may also have been

exposed; therefore, all animals in the herd should be watched carefully and any animal showing any abnormality should be removed and placed in confinement at once.

Unless the exposed animal is valuable it usually is better to kill it humanely than to depend on vaccination to prevent rabies. Too much is at stake to take the chance that it may develop rabies and cause another outbreak in spite of treatment.

If, however, the exposed animals are to be vaccinated, six or more injections should be given. Best results are obtained if the treatment is started at once, after exposure. If 5 days have elapsed after definite exposure before it is possible to start using antirabic vaccine, there is less chance of its being effective.

Exposed vaccinated animals should be confined securely, in strict quarantine, and observed for not less than six months before being allowed to return to normal life.

RECENT LABORATORY EXAMINATION OF HEADS

The prevalence of rabies in Kentucky is fairly well measured by the number of heads of animals sent to the laboratories of the State Department of Health at Louisville and the Public Service Laboratories of the Agricultural Experiment Station at Lexington. During 1942, 565 heads were examined at these laboratories, of which 353 were found to contain Negri bodies which identify rabies. During the first 6 months of 1943, a total of 417 heads were examined, of which 259 contained Negri bodies. The heads which were "positive," that is, those which contained Negri bodies, were of the following sorts:

	1942		1st 6 months, 1943	
	Positive	*Total*	*Positive*	*Total*
Human	1	1	1	1
Dog	295	440	215	317
Cat	25	63	17	35
Cow	18	25	7	17
Calf	3	11	4	6
Steer	0	0	1	5
Sheep and goat	3	4	0	11
Horse and mule	1	3	0	3
Hog	0	4	3	7
Fox	4	4	4	4
Squirrel	1	4	1	1
Other animals	2	6	6	10
Total	353	565	259	417

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15M—8-43



Though this dog appeared healthy he suddenly bit his child owner severely. Examination of his brain proved that he had rabies.

RABIES

(Hydrophobia or "Mad-dog")

By Tasker P. Polk and Linwood A. Brown

RABIES IN KENTUCKY has been increasing during the past few years—in spite of the fact that measures for its control and even its complete eradication are known and are comparatively easy to carry out. Each year it causes untold anxiety, suffering, and expense. Thousands of dollars worth of farm stock and many valuable dogs are destroyed by it each year; and the number of persons required to take the Pasteur antirabic treatment because of exposure to the disease is each year becoming greater.

By simple but thorough-going measures, rabies can be and has been completely stamped out of entire countries—for example, England, Ireland, Denmark, Norway, Sweden, Holland, Australia, and Hawaii. The measures for controlling and finally stamping

Leaflet 57

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

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out the disease are (1) the humane destruction of all ownerless or stray dogs; (2) the quarantining, for a six-month period, of all dogs when the disease is known to be present in a community; (3) the annual vaccination of all dogs; and (4) strict quarantine, for not less than six months, of all dogs brought into the region.

Though other animals than dogs (in fact, all warm-blooded animals) are subject to rabies, the natural biting habits of dogs and their close association with other domestic animals and man, cause them to be the chief offenders in spreading the disease.

PREVENTION BUT NO CURE

After symptoms of rabies have developed, no treatment is known by which the disease can be arrested or changed in its course, either in animals or in man. The only hope for persons who have definitely been exposed to rabies is to take the antirabic (Pasteur) treatment. This treatment must be begun very soon after exposure—within five days if possible.

HOW RABIES IS SPREAD

The saliva of a rabid animal carries the virus which causes the infection. If the saliva gets into a wound or any broken or scratched place on the skin, by a bite or in any other way, it is likely to introduce the infection. The saliva of an animal with rabies is infectious, even before decided symptoms appear.

Not all animals bitten by a rabid animal develop rabies, though a majority do. A bite through clothing is less dangerous than one through bare skin because the fabric may prevent saliva from being carried into the wound. If the saliva gets into the eye (by petting a dog in the early stages, for example, and then rubbing the eye with the hand) it is very likely to produce the disease.

INCUBATION PERIOD VARIES

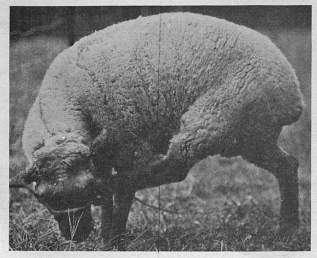
The incubation period (time between exposure and appearance of symptoms) in rabies is not at all uniform. A person or animal bitten on or near the head develops symptoms sooner than one bitten on a hand or foot. Most infected animals show evidence

of the disease in 15 to 45 days. Dogs, cats, swine, sheep, and goats, on the whole, show symptoms earlier than horses and cattle. One cannot be reasonably sure until at least 6 months after exposure, that rabies will not develop.

BEHAVIOR OF RABID DOGS

Dogs may have rabies in one of two forms—"furious rabies" and "dumb rabies."

Furious rabies.— In furious rabies the dog may first be noticed to seek the company of its master, or to seek dark, secluded places. He makes sudden starts toward objects or from unusual noises. He also has a tendency not to obey orders. These early symptoms may last two or three days. There is much saliva, but not necessarily "foaming." The saliva usually becomes thick and stringy. As the dog becomes more restless, he wanders about, and often leaves home and travels a long distance. During this wandering he is likely to be irritable and vicious, and to bite dogs and other animals or people. As a rule he returns home and appears completely tired out. He refuses to eat or drink, is irritable, and has a tendency to chew and swallow such things as stones, sticks, dirt, feathers, rags. Usually there is some paralysis



This sheep developed rabies after a rabid dog had attacked the flock. Excitability, unrest, and stamping the feet were symptoms. The head is swollen and scarred from butting against a wall, trees, and other objects.

of the throat, causing the voice to be changed. Unless death occurs first, the dog finally becomes paralyzed, first in the hind legs and later in other parts of the body. The entire period of sickness may last 5 to 10 days.

Dumb rabies.— In dumb rabies there is more often a tendency to hide away in a dark place. Usually there is distinct paralysis of the lower jaw, with protruding tongue and drooling saliva, making the dog look as if he had a bone stuck in his throat. Though unable to eat or drink, he may try to take objects into his mouth. The paralysis may extend to other parts of the body. Death occurs in a few days.

SYMPTOMS IN OTHER ANIMALS

The symptoms of rabies in other domestic animals are not unlike those in dogs. Pigs have a marked tendency to chew and gnaw the feed trough, the fence, or other solid objects, even tearing out their front teeth. Like the dog they refuse to eat or drink but tend to swallow bones, pieces of wood, straw, and so on. They are likely to bite people or other animals. Horses with rabies often are vicious and have been known to injure people seriously by biting. They are irritable, excitable, and difficult to control. Cattle and sheep have no tendency to bite, but they charge at a person or at fence posts or any object, the tendency in cattle being to hook and in sheep to butt, both very viciously. In all animals there is drooling of saliva, there may be paralysis of the lower



Eight weeks after being bitten by a rabid dog this pig developed rabies. Soon after the disease developed his legs became paralyzed, he was nervous and excited when touched, champed the jaws, and produced more saliva than usual. Note the pool of saliva near the head.

jaw, a change in tone of the voice, and frequently paralysis of the hind quarters.

Though the foregoing symptoms are the common ones, animals have been known to die of rabies without showing at any time the symptoms that suggest rabies. Animals with rabies have been treated for indigestion, paralysis, or other sickness, those administering the treatment never suspecting rabies, though examination of the brain afterward has shown that the disease was rabies. In every doubtful case which possibly may be rabies, the brain should be examined. This is particularly important with dogs that have bitten other dogs or persons, and with other animals if they have been handled or given medicine by the mouth, thus exposing persons to possible infection.

WHAT TO DO WHEN EXPOSED

First, wash the wound with soap and water and apply tincture of iodine or some other good disinfectant. Do not try to stop bleeding at once, unless it is profuse.

If the animal that did the biting shows unmistakable symptoms of rabies consult a physician and the city or county health officer about the Pasteur treatment for rabies. Don't delay the treatment if the dog is known to have rabies, or if there *are* rabies in the community. If the animal escapes and his exact condition is unknown it may be advisable to take the treatment on the advice of a physician. If possible, the animal should be killed and the brain examined, though if the animal does not show positive symptoms, it should *not be killed immediately* but should be confined and watched. An animal killed in the early stages of rabies may not show Negri bodies in the brain, by which the disease is identified.

If the dog remains normal and shows no further symptoms to indicate rabies, probably it will not be necessary to kill him. On the other hand, if he really has rabies, pronounced symptoms should appear in 2 to 5 days. On the appearance of symptoms, the dog should be killed and the brain sent to the laboratory for examination. If he then proves not to have rabies, the Pasteur treatment need not be taken; or if already begun, it can be discontinued.

Do not use a "mad stone." So called "mad stones" have no value whatever in preventing rabies, notwithstanding the popular belief in them.

ognized that plant-bed treatment will not always prevent the disease in the field.

Set only clean plants.— In an average year plants from a bed treated with bluestone-lime will remain free or nearly free from the bacterial leaf spots until cutting time. Therefore use plants only from treated beds. Crops set with clean plants from a treated bed have been ruined by resetting from an untreated one.

Build up soil fertility.— It is a common observation that the most severe outbreaks of angular leafspot and wildfire in the field occur where the soil is not very fertile. In very fertile soils neither of these diseases is destructive, as a rule. Consequently, selection of a fertile piece of land for the tobacco field and the liberal use of manure and fertilizer will help prevent field injury and increase the yield and quality of the tobacco.

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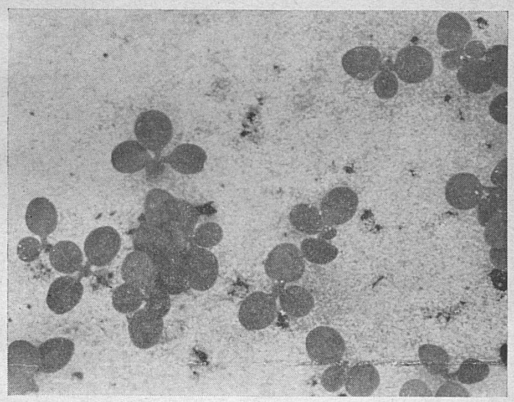
For:

Recommendations for the Control of Wildfire and Angular Leafspot of Burley Tobacco



The first application of bluestone-lime should be made when the largest plants are this size.

Leaflet 58

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky November, 1943

Recommendations for the Control of Wildfire and Angular Leafspot of Burley Tobacco

W. D. Valleau, E. M. Johnson, and Russell A. Hunt

ANGULAR LEAFSPOT, or rust, is a common disease each year in burley plant-beds in all parts of Kentucky. In wet springs wildfire may also be commonly found in both burley and dark tobacco plant-beds. Rust may injure plants in the bed considerably, and may therefore delay setting a few days; but a severe outbreak of wildfire may destroy large areas of plants in a bed, especially if infection occurs early. There is no way of predicting whether one or both of these diseases will appear in an untreated plant-bed. Wildfire is often mistakenly thought to be blue mold.

Control in the Plant-Bed

These bacterial diseases may be completely controlled in the plant-bed by two applications of liquid bluestone-lime mixture applied to the surface of the soil (1) when the plants are just established in the bed and producing the first true leaf, and (2) ten days later. **Caution:** These treatments must be made early; otherwise the diseases may develop before treatment and be carried to the field in spite of later treatment. In a wet season apply at the recommended time, but choose a time when it is not actually raining.

Treating the beds with dry bordeaux mixture is not recommended.

How to Prepare Bluestone-Lime Mixture

1. Fill a clean 50-gallon barrel or oil drum three-fourths full of water strained through a cloth.
2. In one container thoroughly mix 4 pounds of commercial hydrated lime in 3 or 4 gallons of strained water. Hydrated lime is the powdered lime in paper sacks commonly sold by lumber dealers. **Caution:** Use fresh hydrated lime. Old lime changes chemically, cakes, and does not make a good mixture. **Do not use ground limestone.**
3. In a separate container, preferably a wooden bucket or crock, dissolve 3 pounds of powdered bluestone in about 4 gallons of water. If powdered bluestone, which dissolves readily, is not available, beat the crystals into a fine powder, place them in a cotton sack, and suspend just below the surface of the water until dissolved. Hardware dealers can get powdered bluestone for you.
4. Pour the lime paste into the barrel of water and stir vigorously. While stirring, add the bluestone solution slowly.
5. Add enough water to make 50 gallons.
6. Stir the mixture each time the sprinkling can is filled. **Caution:** The water, barrel, and other containers should be free from bits of material which will clog the nozzle of the sprinkler. The nozzle should be easily removable for cleaning.

How to Apply

The mixture is applied to the bed without removing the cotton cover. An ordinary 10-quart sprinkling can is used. Logs or boards used to frame the bed should also be sprinkled. A 50-gallon container of the mixture will treat 200 square yards, or 66 linear yards of bed 9 feet wide, or 50 linear yards of bed 12 feet wide. This is at the rate of 1 quart per square yard.

Caution: Bluestone-lime does not injure plants, so do not attempt to wash it off after applying. Do not mix nitrate of soda with bluestone-lime.

Cost of Bluestone-Lime Mixture

The cost of materials for treating 200 square yards of bed twice should be about one dollar. The protection of plants in the bed, resulting in healthier, more vigorous plants and greater freedom from leafspot diseases in the field, will pay for the trouble and cost many times.

Control in the Field

The bluestone-lime treatment has been found to give complete control of angular leafspot and wildfire in the plant-bed. In the field a severe outbreak of angular leafspot, and less frequently of wildfire, may occur after a long rainy period if the lower leaves of rapidly growing plants become water-soaked. The bacteria, which appear to be present in some field soils, enter the water-soaked areas of the leaves. While conditions for this type of field infection are rather rare, it must be rec-

careful not to pierce the seared surface of the meat when turning. Sprinkle with salt, using about 1 teaspoon of salt per pound of lean meat. Add 1 cup of boiling water to drippings in the roasting pan and place in a hot oven for 30 or 40 minutes, to brown. When the meat is nicely browned, and about one-third done, pack in hot, sterilized jars to within three-fourths of an inch of the top. If desired, a small amount of the boiling liquid from the roasting pan may be poured over the meat. Wipe the fat from the tops of the jars. Partly seal glass jars, process, and completely seal; or exhaust tin cans, seal, and process. (See time table, page 4.)

Steak.— Cut steak 1½ inches to 2 inches thick and into sizes convenient for serving, or which can be rolled for packing. All cutting should be done before searing. Wipe with a damp cloth and remove bone, if too large for convenient packing. Sear in a hot broiler or in hot fat until nicely browned; season, allowing 1 teaspoon of salt per pound of meat; and pack while hot in hot jars. Wipe the fat from the top of the jars. Partly seal glass jars; process and completely seal; or exhaust tin cans, seal, and process. (See time table, page 4.)

Chops.— Cut chops 1 to 1½ inches thick. Trim the fat and, if desired, remove the bone. Sear quickly in a broiler or in a small amount of hot fat until a light brown. Season, allowing 1 teaspoon of salt per pound of meat; pack into hot jars to within ½ inch of top of jars or cans. Partly seal glass jars, process, and completely seal; or exhaust tin cans, seal, and process. (See time table, page 4.)

Sausage or hamburger.— Shape ground meat into small cakes and heat to a delicate brown in hot frying pan or oven, being careful not to cook the meat thoroughly as over-cooking produces a dry product and gives a warmed-over flavor. Drain off fat and pack in hot jars. Add 1 to 2 tablespoons of drippings into each jar. Wipe the fat from the top of the jar. Partly seal glass jars, process, and completely seal; or exhaust tin cans, seal, and process. (See time table, page 4.)

Tongue.— Wash the tongue, drop it into boiling water and simmer for about 45 minutes until the skin can be removed. Skin; can whole or cut into pieces convenient to pack in the jar, and reheat to simmering in broth; pack into hot jars. Add 1 teaspoon salt per pound and cover with boiling hot broth. Wipe fat off the top of the jar. Partly seal glass jars, process, and completely seal; or exhaust tin cans, seal, and process. (See time table, page 4.)

Liver.— Slice liver about 1 to 2 inches thick. Remove skin and large blood vessels. Brown on both sides in hot fat, or steam until heated through, and add 1 teaspoon of salt per pound of meat. Pack while hot into hot jars. Wipe the fat from the top of the jar. Partly seal glass jars, process, and completely seal; or exhaust tin cans, seal, and process. (See time table, page 4.)

Heart.— Wash the heart, remove the thick connective tissues, and cut into convenient size for packing. Simmer in water 15 or 20 minutes. Pack while hot into hot jars. Wipe the fat from the top of the jar. Add 1 teaspoon of salt per pound of meat and cover with hot broth. Partly seal glass jars, process, and completely seal; or exhaust tin can, seal, and process. (See time table, page 4.)

Soup stock.— Stock in which meat has been cooked may be canned. Remove excess fat, reheat, pour hot into hot jars. Partly seal glass jars, process, and completely seal; or exhaust tin cans, seal, and process. (See time table, page 4.)

Chicken.— It is economical for the farm family to can slacker hens and extra cocks in the fall and thus save the expense of feeding them through the winter. The ideal chicken to can is a plump hen 1 or 2 years old not profitable to keep through the winter for laying. Older fowls have more flavor and better texture after canning than young fryers and broilers. Young fowls are much overcooked by the long processing necessary to prevent spoilage.

Cut the fowl into the usual pieces as for cooking. Steam in a small amount of water, sear in a pan or put into a greased pan and into a hot oven until the fowl begins to brown. The chicken fat may be used for searing the meat. Sprinkle with salt using 1 teaspoon per pound of meat. Pack while hot into hot jars. Partly seal glass jars, process, and completely seal; or exhaust tin cans, seal, and process. (See time table, page 4.)

It is economical of jar space to cook the bony pieces (backs and necks) in as small amount of water as possible, remove the meat from the bones, reheat in the broth in which they were cooked, pack in hot jars and process.

The giblets should also be canned separately by precooking in boiling water about 10 minutes, packing into hot jars, covering with the boiling stock in which they were cooked, and processing.

STORING CANNED MEATS

Canned meats should be stored in a cool place. If in glass they should be stored where it is dark.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

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HOME CANNING of MEATS

By Florence Imlay and Pearl J. Haak

All kinds of meat can be preserved by canning. Farm housewives who can several kinds of meat each year — beef, pork, lamb, chicken, sausage, tongue, liver—then have a variety of meats ready for use throughout the year.

EQUIPMENT FOR CANNING MEATS

Glass jars.— Only pint and quart jars made for canning should be used for canning meats. Jars in which salad dressing, peanut butter, or pickles were bought usually cannot be sealed tight enough and sometimes are not strong enough to stand the pressure necessary in canning meat.

Tops.— If one-piece screw-top jars are used, the lids should be new. If glass-top jars with metal bands are used, there should be no nicks or cracks in the glass tops. If vacuum-seal metal tops are used, the sealing composition on the under-side of the tops should be smooth. Wires on glass tops should be checked by putting a little water in the jar, sealing it, and inverting it to be sure there is a complete seal. If the jar leaks, remove the top bail and bend it slightly to make it tight enough

Leaflet 59

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
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Thomas P. Cooper, *Dean* and *Director*

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to click when the bail is brought up over the top of the jar. Recheck for leakage.

Rubber rings.— Only the best quality new rubber rings should be used in canning meats as they must stand the high temperature at which meat is processed. Do not stretch rings except to place them on the jars. Screw the covers on slowly to prevent the ring skidding from under the top.

Tin cans.— Only the type of tin can that can be sealed with a mechanical sealer is satisfactory for meats. CANS SEALED WITH SEALINGWAX SHOULD NEVER BE USED FOR CANNING MEATS. If the cans are lined with enamel, the fat may cause the enamel to peel off. Although this does not harm the meat, it makes it unattractive.

Pressure cooker.— The pressure cooker is recommended for canning all meats because the high temperature at which the meat is processed makes certain the killing of heat-resisting bacteria in a fairly short processing time. Though it takes much longer to do it, meat can be canned successfully in a water bath **if all the following directions are carefully followed:**

(1) Use only pint or quart jars.
(2) Be sure the jars are clean and hot.
(3) Pack and seal jars according to directions on page 4.
(4) Exhaust tin cans before sealing. See page 4.
(5) Be sure the jars are covered with at least two inches of water during the entire processing period.
(6) Do not start counting time until the water comes back to a rolling boil after the jars are in the water bath.
(7) Keep the water boiling vigorously throughout the entire processing time.
(8) Remove jars at end of processing time and complete the seal immediately.
(9) When a jar is opened for use, always boil the meat, in the liquid in which it was canned, for at least 15 minutes before even tasting it. It may be boiled either on top of the stove or in the oven.

PREPARATION OF MEAT FOR CANNING

1. Can meat only from healthy animals, to avoid spreading disease to persons who eat the meat.

2. Handle the animals and fowls carefully before killing, so as not to bruise them and form blood clots. Use proper methods of killing in order to have the best quality canned meat.

3. Allow enough time between killing and canning for the carcass to be thoroughly cooled. Keep the meat in a refrigerator or cold place until it is canned. The same careful attention should be given in killing chickens as in killing animals. For detailed instructions see U. S. Dept. Agr. Farmer's Bulletin 1415, which may be obtained from the County Extension Office or the University of Kentucky. Kentucky Circular 261 gives directions for butchering hogs.

4. Beef, veal, pork, lamb, and mutton should be wiped with a clean, damp cloth before canning. Housewives usually remove the bones (except in chickens, spareribs, and small game) to make it easier to pack the meat in the jars.

5. Meat that has been frozen does not make the best quality of canned product.

PACKING MEAT IN JARS OR CANS

Meat should be precooked (see recipes, pages 5-8) before packing in glass jars. When tin cans are used, it may be either precooked or packed raw, because it will be heated in exhausting the can before the can is sealed. Precooking helps to shrink the meat so that it packs to better advantage and ensures thorough processing. Meat should not be packed too tight, however. Leave 1 inch of space at the top of glass jars. When packing sliced meat, put it in the jar "up and down" rather than flat, to allow for circulation of liquid and good penetration of heat. Wipe all grease from the top of the jar, or a seal will not be made.

HOW TO SEAL GLASS JARS

BEFORE PROCESSING

Screw top (one piece).— Partly seal by screwing until tight and turning back ¼ turn.

Glass top (wire bail).— Partly seal by putting upper bail in place and leaving lower bail up.

Two-piece metal vacuum seal.— Completely seal before processing, by putting cap in place and turning ring down tight.

Two-piece glass top.— Partly seal by fitting the rubber ring around the projection on the under side of the lids. Place the lid so the rubber lies between the lid and top edge of jar. Place the band over the top and screw it tight, then loosen about ¼ turn or until the band fits loosely.

AFTER PROCESSING

Screw top (one piece).— Completely seal by screwing lid slowly until tight, immediately after taking jar from canner.

Glass top.— Completely seal by pressing down lower bail immediately after taking jar from canner.

Two-piece metal vacuum seal.— Completely sealed before processing. Don't turn the band after processing. Let stand 24 hours, with the jars several inches apart, out of a draft, to cool. Then remove outside ring. Store the canned product in a cool, dry place.

Two-piece glass top.— Screw the band tight to complete seal. Remove the band 12 to 24 hours after canning.

HOW LONG TO PROCESS MEATS AND SOUP STOCK

	In water bath	In pressure cooker, at 15 lb pressure	
		Quart glass jars or No. 3 tin cans	Pint glass jars or No. 2 tin cans
All meats (beef, pork, fowl, liver, etc.) ...	3 hours	60 minutes	55 minutes
Soup stock	3 hours	45 minutes	40 minutes

(Some people prefer the texture of meat canned at 10 pounds pressure rather than at 15 pounds. If 10 pounds pressure is used the time of processing must be increased to 90 minutes for both pints and quarts and both No. 3 and No. 2 tin cans.)

HOW TO SEAL TIN CANS

Since tin cans have to be completely sealed before they are put in the cooker, the air must be exhausted before sealing. This is done by placing the filled cans in a bath of boiling water that comes to within 1½ to 2 inches of the top of the can. Cover the bath and heat 40 to 60 minutes until the meat is steaming hot in the center (170° F) and has lost its raw color. Remove the cans from water bath, place covers on tops of cans, completely seal with commercial sealer immediately.

FLAVOR AND TEXTURE OF CANNED MEAT

Canned meat does not have the same texture and flavor as fresh steaks and roasted meats. The long processing necessary to prevent spoilage of canned meat makes the meat very tender, and in texture much like swiss steak, stew, or pot roast. Canned meat has an excellent flavor, can be prepared for serving in a variety of ways, and has the same food value as fresh meat. The flavor developed by different methods of precooking (searing, boiling, or baking) carries somewhat to the finished product and helps give variety to canned meats.

RECIPES

Roast meats.— Cut into as large pieces as possible to go into the jars, remembering that meat shrinks about one-third in precooking. Heat 2 or 3 tablespoons of fat in a pan, put in meat and sear quickly on all sides, in a hot oven, being

To Assure Your Success in Growing Your Own Food Supply

PLANT A SUCCESSION OF CROPS to furnish a variety of vegetables for the family table, from the earliest to the latest possible date.

PLANT YOUR CANNING CROPS in your early garden, because:

1. Most early crops are better in quality.
2. There are fewer insects to fight.
3. There are fewer weeds to fight.
4. There is less danger of crop loss from drouth.
5. The hardest work is done before the heat of midsummer.

PLANT YOUR STORAGE CROPS in your late garden, as vegetables grown in late season are more suitable for storage.

CHECK YOUR SUPPLIES and equipment for growing and conserving your food supply now and buy needed seed, fertilizer, fruit jars, rubbers, lids, pressure cooker, garden tools. If you wait until you need to use them, it may be too late.

PROVIDE GOOD STORAGE for canned goods. A dry place, protected from light and as cool as possible is desirable. If you do not have a good place to keep your canned food, why not build a storage cabinet now before the spring rush?

BUILD PERMANENT STRUCTURES FOR STORING fresh fruits and vegetables for winter use. NOW is a good time to do it. For instructions, see Kentucky Extension Leaflet 52, "Basement and Cellar Storage Structures."

For printed helps on how to produce the various foods listed in this folder, see your county agricultural or home demonstration agent, or write to the College of Agriculture and Home Economics, Lexington.

THE NEIGHBORHOOD LEADERS — THE STRENGTH OF THE NATION

THIS FOLDER is given to you by

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Lexington, Kentucky

December, 1943

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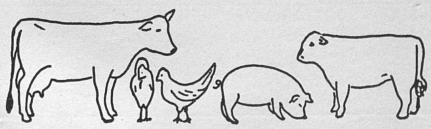
FRUIT — CEREALS — VEGETABLES

Grow Your Own Food

If you grow your own food you can have all you want of what you need for health and vigor, at small cost.

Leaflet 60

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*



MILK — EGGS — MEAT

You Need These Foods EVERY DAY	This Is What They Will Do For You	To Get Them at Low Cost, Produce Them
DAIRY PRODUCTS One pint of milk if you are an adult. One quart of milk if you are under 20 years of age. Three tablespoons of butter.	Milk and milk products help to make strong bones and teeth, build firm muscles, promote growth, and maintain health and vigor.	Keep two good milk cows, one freshening in the spring and the other in the fall. These will provide your family with fresh milk for drinking and cooking, cream for churning your butter supply, buttermilk, and skimmilk for making cottage cheese.
VEGETABLES AND FRUITS One or more servings of citrus fruit or tomatoes. One or more servings of leafy green vegetables or yellow vegetables. Three or more servings of other fruits and vegetables, including potatoes, some raw and some cooked.	Vegetables and fruits help to prevent constipation, poor digestion, skin trouble, and "that tired feeling." They are needed for health and normal growth. Leafy green vegetables and yellow vegetables help to make red blood, to build up resistance to infections, such as colds, and to protect normal vision. Raw fruits and vegetables, particularly citrus fruits and tomatoes, help to build firm gums, sound teeth and bone, and healthy blood vessels.	1. Raise a garden of about $^1/_{10}$ acre for each member of your family, with at least 15 varieties including tomatoes, leafy green vegetables and yellow vegetables. 2. Raise a home fruit supply to include at least two of the following: (1) Orchard of at least 12 fruit trees, several varieties. (2) 200 strawberry plants. (3) 10 grape vines. (4) 100 berry bushes — all varieties. 3. Can for each person in your family about 50 quarts of fruit and 50 quarts of vegetables, including liberal amounts of tomatoes and leafy green vegetables. 4. Store for each member of your family 7 bushels potatoes, root crops, and tree fruits; 10 cabbages; 1 gallon kraut; 5 quarts dried beans; 5 squashes or pumpkins.
MEAT, INCLUDING POULTRY AND FISH One or more servings.	Lean meat helps to build firm muscles, good red blood, and steady nerves. It promotes normal growth, vigor, and vitality.	Butcher for home use for an average family of five two medium-size hogs, one baby beef or veal calf, one lamb or sheep, and 50 to 75 chickens.
EGGS One or more eggs, including those used in cooking.	Eggs help to develop firm muscles and are excellent for normal growth.	Keep a permanent laying flock of at least five hens per person. Raise at least 15 chickens for each person in your family. Keep at least 5 laying pullets for each person to replace old hens in laying flock. Use the remaining chickens and old hens to supply the poultry meat mentioned above.
GRAIN PRODUCTS Three or more servings of whole or enriched grain products (breads, breakfast cereals, and so on).	Whole grain products help to prevent constipation. Whole and enriched grain products help to promote good digestion, keep nerves steady, furnish energy and satisfy the appetite.	If you grow corn and wheat, save about 3 bushels of each for each member of your family, to grind at home or have ground at your local mill into flour, meal, and cereal.
SUGAR, SORGHUM, HONEY, FAT In moderation	Fats and sweets produce energy, make food palatable, and help to satisfy the appetite.	1. Raise ⅛ to ¼ acre of sorghum cane if you have home or local facilities for making sorghum. 2. Render the fat from home-butchered meat for home baking and cooking.
WATER — 6 to 8 glasses		

in rows 3 feet apart, and then between June 15 and July 15, to plant late tomatoes, late sweet corn, late beans, late cabbage, between the potato rows.

How to Keep the Insects From Ruining Your Garden

For insects that eat the leaves or other parts of the plant put poison where they feed. The best poison is rotenone dust or spray. Another is a dust made by mixing 1 part calcium arsenate, or arsenate of lead, or magnesium arsenate, with 6 parts lime. Or, a wet spray may be used, 2 rounded tablespoons of any of the arsenates dissolved in 1 gallon of water. Because of danger of poisoning people, don't use the arsenates on greens, cauliflower, cabbage in head, or beans in pod. Rotenone, however, is safe on these. Except for bean beetle and cucumber beetle, begin dusting or spraying at the first sign of damage.

For plant lice, that kill plants by sucking the sap, spray or dust with rotenone, hitting the insects direct. Rotenone should kill them almost at once.

For squash bugs, and harlequin bugs (on cabbage and greens), both sucking insects whose bodies when full grown are too tough for rotenone to have effect, watch for the eggs to hatch and then spray the soft-bodied young with rotenone.

For corn-ear worm, whose debris spoils sweet corn, proceed as follows: on the 4th day after two-thirds of the silks have browned, clip off the end of the shuck about ½ inch from the tip of the cob.

For the Mexican bean beetle, don't wait until there are holes in the leaves, but begin dusting or spraying when the first egg-clusters are seen on the underside of the leaves, and then dust or spray again in 10 days, and perhaps in 10 days again. Dusters or sprayers with up-turned nozzles must be used, to put the material where the beetle always feeds, the undersides of the leaves, and covering should be complete.

The striped cucumber beetle, sometimes called the "melon bug," is the cause for the early death of cucumbers, melons, and squash. Dead plants have their side-roots eaten away, by worms that hatched from the beetle's eggs laid in the first soil cracks the seedlings made as they came up. Start poisoning, therefore, when the soil over the hills begins to "hump." Use rotenone, or this dust:

Calcium arsenate, 1 part by weight
Gypsum or "fiber plaster," 15 parts

Sift the dust through a loosely woven sack over the middle of the hill. Repeat the dusting every 3 days, for at least 10 times; 20 times is better.

Protect Your Garden From Diseases

Vegetable diseases are of three kinds — "wilt," "blight," and a "general" kind that causes the crops to do poorly. The last is usually a sign that rotation has not been practiced. No vegetable should be planted where it grew last year; there should be a gap of at least one year.

Wilt dries up cabbage, tomatoes, and watermelons, and is caused by germs that live in the soil. The only way to combat it is to use resistant varieties. The resistant varieties are named in the paragraph on "fresh seed."

Blight may be caused by several germs, but the result is the same: the spotting and final killing of the leaves. As the germs are carried by the wind, the control is to "copper coat" the leaves, by spraying with bordeaux mixture. Start when the spotting first is seen (on the lower leaves) and repeat in 2 weeks. *Complete covering* is necessary, with a good sprayer: "splashing on" will not do.

Bordeaux may be bought ready-mixed at drug-stores or seed stores, needing only to be stirred into water according to the directions printed on the package. Or it may be home-made, easily, and in garden amount, as follows:

1. In a stone crock, dissolve 1 lb. of bluestone in 5 quarts of water, the bluestone hung in a cloth sack so that its tip is just in the water. This is "bluestone stock."
2. In the sprayer tank (preferably brass), put 9 quarts of water, 1 quart of "bluestone stock" and ¼ pound of screened lime, and if insects are present, the proper amount of any of the arsenates named under "Insect Control."
3. Close the sprayer, and shake it end-wise, 10 to 15 times. The result is 2½ gallons of 4-4-50 bordeaux.

This leaflet is prepared by
JOHN S. GARDNER, Field
Agent in Gardening.



THIS FOLDER is given to you by

who has voluntarily agreed to bring this and other important information to families in your neighborhood.

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

250M—12-43

YOUR Vegetable Garden

- What to plant
- How to plant it
- How to take care of it

THE FIRST STEP in having a garden that will feed your family well, both summer and winter, is to PLAN the garden well. In a garden that is "just put in" the vegetable supply is likely to be uneven — sometimes too much; at other times not enough — and it may fail to provide enough vegetables, of the right kinds, for canning and storage for the winter.

The time to plan the garden is before the planting season. The way to start it is to make an exact map of the garden spot, on cardboard. Whether or not your garden is similar in size or shape to the sample garden planned here, does not matter. The main thing is that your plan shall fit your garden, and that you provide for the vegetables you will need. The sample plan can help you in spacing the rows and deciding how much of the different vegetables to plant and when to plant them.

The sample garden shown on this sheet should supply five persons 21 servings a week during the fresh vegetable season, and 12 servings a week of canned and stored vegetables through the winter. This garden is ¼ acre (100 feet by 100 feet). A horse-

Leaflet 61

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Thomas P. Cooper, *Dean* and *Director*

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worked garden, to do the same, should be nearly ½ acre.

Smaller gardens may be made to produce more by making replantings immediately when early crops are through bearing. This is good practice even in larger gardens.

Keep the Garden Soil Rich

Plow under stable manure, if you can get it, at the rate of 10 tons an acre. Plow about 10 inches deep. As manure by itself may cause the vegetables to "grow to top," it should be balanced by broadcasting 20-percent superphosphate, 400 pounds per acre, after breaking, working it in as the seedbed is being finished. When enough manure cannot be got, use a complete fertilizer (4-8-6 or 5-10-5) at a rate of 400 to 1,000 pounds per acre, in the same manner as just described for superphosphate.

Make a Fine, Deep Seedbed

In a good seedbed the top 3 to 6 inches of soil is as fine as the smallest seed to be sown. The right depth to sow seed is 8 times the least thickness of the seed. There is more likelihood of planting too deep than too shallow.

Use Fresh Seed of Good Varieties

Only fresh seed assures full vegetable rows. Before using left-over seed, test it for germination by planting a certain number of the seeds in a box in a warm place, and counting the number that come up. On all packages of seed 1 pound or more, sold in Kentucky, the percentage of germination and the year the seed was grown must be stated.

Plant only adapted varieties of vegetables. Those listed in the plan have proved themselves as being reliable, but your own favorites should not be dropped.

If tomato wilt has crept into your garden, you should plant only the *resistant* Marglobe or Rutgers, or the earlier Break O' Day. Where Yellows (sometimes called "wilt") of cabbage has made cabbage growing with ordinary varieties impossible, choose Wisconsin All Seasons (or any other the seedsmen quote as "resistant"). Where watermelons have been failing regularly, use Kleckley No. 4 (or any others listed as being wilt-resistant). If Golden Bantam sweet corn fails to make satisfactory ears, use instead any of the Bantam "crosses."

Keep the Weeds Out

The reason for cultivating a garden is to stop the weeds, not merely to loosen the soil. In fact, deep working and chopping with a hoe, even in the middles of the rows, can do serious damage to the roots.

Weeds can be stopped easiest when they are small, before they rob the vegetables of plant food and moisture. They can be *scraped off* with a sharp hoe or with the scuffle-hoe attachment of a garden plow, without digging deep into the soil. If a horse cultivator is used, the 16-tooth cultivator is best.

Keep the surface of the garden smooth at all times; don't make hills and ridges. It takes extra work to make them, and in scraping soil away from the middles of the rows to make the ridges you rob the vegetables of valuable moisture and sometimes ruin part of the roots.

White Potatoes

This garden plan takes for granted that 1,500 to 2,000 feet of row of potatoes will be grown in a separate patch, outside the garden. But if the potatoes must be grown in the vegetable garden, one way to have them and still not have to do without the other vegetables, is to plant them early (before April 10)

SAMPLE GARDEN PLAN for a FAMILY OF FIVE

(Recommended varieties, when to plant, and planting distances; the heavy border represents the boundary of the 100 ft. x 100 ft. garden. Rows in this plan are spaced for hand cultivation. Where horse cultivators are used, the rows should be 3½ to 4 feet apart.)

WHEN to plant	Feet between rows	WHAT and HOW MUCH to plant (rows 100 ft. long)
(Perennial)	2	ASPARAGUS *(Martha Washington)*, 2 ft. apart in the row
	4	ASPARAGUS *(Martha Washington)*, 60 ft. —— RHUBARB *(Victoria)*, 40 ft., 3 ft. apart
March 15 to April 1	3	PARSNIPS *(Guernsey)*, 75 ft., thinned to 2" in row —— SWISS CHARD *(Lucullus)*, 25 ft.
	2½	PEAS *(Alaska)*, 1½ lb. seed sown 1 to 2 inches apart
	2½	PEAS *(Telephone)*
	2	LETTUCE *(Wonderful, Grand Rapids)*, 30 ft. —— RADISHES *(White Tip Scarlet)*, 70 ft. 2 plantings
	2	MUSTARD *(Southern Curled)*, 50 ft. —— SPINACH *(Bloomsdale)*, 50 ft
	2½	CABBAGE *(Golden Acre)*, 100 plants
	2½	CABBAGE *(Succession, Copenhagen,* or *Wisconsin All Seasons)*, 100 plants
April 1 to April 15	2	ONIONS *(Yellow sets)*, 1 gallon of sets planted 2 to 3 inches apart
	2	BEETS *(Crosby's Egyptian)*, 2 oz. seed: thin to 3 inches
	2	CARROTS *(Chantenay)*, 1 oz. seed; thin to 2 inches
	2½	BEANS *(Valentine)*, 50 feet, 1 lb. seed; *Henderson Bush* lima, 50 ft., 1 lb. seed
April 15 to May 1	3	SWEET CORN *(Adams)*, 1 oz. seed; in hills 2-3 ft. apart, or drilled ½ ft. apart
	3	SWEET CORN *(Adams)*
May	3	SWEET CORN *(Golden Cross Bantam)*, with 20 hills of CUSHAWS *(Green-Striped)*
	3	SWEET CORN *(Golden Cross Bantam)*
	3	TOMATOES *(Earliana, Break O'Day)*, 35 plants, staked
	3	PEPPERS *(Ruby King)*, 50 ft., 25 plants —— EGGPLANT *(New York)*, 50 ft., 20 plants
	3	SQUASHES *(Summer Straightneck)*, 30 hills
	3	SQUASHES *(Table Queen)*, 20 hills
	3	OKRA *(White Velvet)*, 50 ft., 1 oz. seed: thin to 18 in. —— BEANS *(Stringless Greenpod)*, 50 ft.
	3½	SWEETPOTATOES *(Porto Rico)*, 75 slips set 15 inches apart
	4	SWEETPOTATOES *(Porto Rico)*
June 1 to June 15	4	TOMATOES *(Marglobe, Greater Baltimore)*, 25 plants, mulched
	4	TOMATOES *(Marglobe, Greater Baltimore)*, 25 plants, mulched
	4	TOMATOES *(Marglobe, Greater Baltimore)*, 25 plants, mulched
	3½	BEANS *(Stringless Greenpod, Kentucky Wonder)*
	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
June 15 to July 1	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
	3	SWEET CORN *(Stowell's Evergreen, Bantam Evergreen)*
	3	BEETS *(Detroit Dark Red)*, 2 oz. seed; thin to 3 inches
Late crops following early crops		LATE CABBAGE, in *Alaska* pea row
		BEANS *(Stringless Greenpod)*, in mustard-and-spinach row
July 1 to 15		BEANS *(Stringless Greenpod)*, in half of *Telephone* pea row
July 15 to August 1		BEANS *(Stringless Greenpod)*, 50 ft. in rest of *Telephone* pea row
		KALE *(Siberian)*, 100 ft. in lettuce row, or TURNIPS *(Purple Top Globe)*, 100 ft., 1 oz. seed
August		SPINACH *(King of Denmark* or *Norfolk)*, in *Golden Acre* cabbage row
		KALE *(Scotch)*, 50 ft.; and CHINESE CABBAGE, 50 ft., in one of *Adams* corn rows
September		GREENS or TURNIPS in other *Adams* corn row and in early beet row
		Remove harvested crops and sow rye or barley for winter cover crop. Continue this through October, using *Balbo* or *Rosen* rye.

growing chickens in the summer, as it draws flies and they are spreaders of the chicken tapeworm.

Lice can be controlled by dusting the hens with sodium fluoride or treating the roost poles with nicotine sulfate. To kill mites use old crankcase oil and kerosene on the roost poles and in cracks and crevices around the roosting quarters.

Cull Hens That Don't Lay

Hens which quit laying in June, July, and August should be culled and either eaten, canned, or sold. Culling reduces the feed cost and increases the profit. The nonlayers of the yellow-skin breeds can be recognized by their yellow beaks and wilted combs.

How to Preserve Eggs

To preserve eggs when they are plentiful, for use in the fall or winter when production may be low—

1. Select a 5-gallon crock, wash thoroughly, and scald. (Half-gallon jars can be used instead.)
2. Boil water; when cool put 9 quarts in the crock.
3. Add 1 quart of water glass and stir thoroughly.
4. Place eggs in the crock and put in a cool place. Allow 2 inches of water glass solution to cover the eggs. If there are not enough eggs available at one time, they may be added from time to time.
5. As needed, to offset evaporation, add boiled water which has been allowed to cool.

Hatching and Brooding With Hens

There are many advantages in buying chicks and raising them with a brooder. However, the following suggestions are given for those who use hens:

1. Use a clean nest, free from mites and well bedded.
2. Dust the hen with sodium fluoride or a good louse powder before the eggs are placed under her and again about 10 days after she has been set.
3. Don't dust the chicks until they are full feathered.
4. Use a coop which is rat proof, clean, movable, and has a floor in it. One hen can brood 30 chicks.
5. Feed the chicks as suggested in this leaflet.



Prepared by Poultry Department, College of Agriculture and Home Economics, and given to you by

who has voluntarily agreed to bring important information to families in your neighborhood.

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Keep
Chickens and Eggs
for
Home Use

EVERY FARM FAMILY and many village families will want to keep enough chickens to produce the eggs and some of the meat needed for the family. With good care a flock of 5 hens or pullets for each member of the family will produce enough eggs. To keep up a flock of this size and to provide poultry meat, start 15 chicks in the spring, for each member of the family. For both eggs and meat, such breeds as Barred Rocks, White Rocks, Rhode Island Reds, or New Hampshires are best. Suggestions for taking proper care of the growing chicks and the laying hens are given in this folder.

Leaflet 62

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College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

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Buying and Starting the Chicks

Start chicks in March or early April. Buy them from a reliable hatchery close to home.

It is best to brood early chicks in a brooder. The homemade lamp or lantern brooder is excellent for 75 or fewer chicks. It is easy to build and operates at low cost. (Ask your county agent for a plan for building this brooder.) A brick brooder may be used if a house 10 x 12 feet is available.

Start the brooder 2 days before getting the chicks. A temperature of 90° to 95° is best. Watch the chicks to see that they are comfortable. Gradually reduce the temperature about 5° a week for 4 or 5 weeks.

Feeding the Chicks

Feed the chicks as soon as they are put in the brooder. Feed a good chick starter mash for at least four weeks. See that they have plenty of water. As soon as the chicks are allowed range and sunshine, use one of the following methods of feeding until the chicks are 12 weeks old. By "self-feeding" is meant to keep the feed before the chickens *all the time,* so that they can eat all they want whenever they want it.

1. Self-feed cracked corn or cracked corn and wheat, soybean meal (add 1 lb salt and 8 lb steamed bonemeal to each 50 lb), water, and green feed.
2. Self-feed commercially prepared supplement (26-32 percent protein), grain, water, and green feed.
3. Self-feed grower mash, grain, water, and green feed.

Feeding the Growing Stock

From the 12th week until the 26th week, feed the growing pullets one of the foregoing three rations, with whole corn instead of cracked corn.

Feeding the Laying Hens

If hens are to lay as many eggs as they should, they must be fed for egg production. The following methods are recommended, with green feed in addition.

1. Self-feed, in different hoppers, skimmilk or buttermilk and yellow corn.
2. Self-feed a mash made of 37 lb ground yellow corn, 40 lb soybean meal, 10 lb alfalfa leaf meal, 9 lb steamed bonemeal, 2 lb ground limestone and 1 lb salt. Self-feed this mash with yellow corn.
3. Self-feed a commercially prepared protein supplement (26-32 percent) with yellow corn.
4. Feed a commercial laying mash with corn.

Whatever the ration, see that the hens get green feed. Alfalfa and bluegrass are most reliable the year round. A patch of rye, wheat, barley, or oats will help.

In winter, feed green leafy alfalfa or lespedeza hay.

Also, with all the above rations, self-feed oystershell, or coarse-ground limestone, and water. The ground limestone pieces should be about the size of a grain of corn.

Some further suggestions on feeding hens:

1. Provide plenty of feeder space — 1 inch for each chick; 2 inches for each growing bird, 4 to 24 weeks; and 3 inches for each hen.
2. Supply plenty of fresh clean water.
3. Don't change the hens from one ration to another, but choose a good one and stay with it.
4. Plenty of green feed aids greatly in growth, egg production, and economy in feeding.

Make the House Comfortable

A comfortable, well-arranged laying house keeps the flock in good condition and requires less labor to keep clean. Old houses may be remodeled or unused sheds may be used. The building should be tight on three sides, with ventilation provided by an opening in the south or east side. Some suggestions—

1. Don't overcrowd the house. Allow 3½ to 4 square feet of floor space per hen.
2. Provide 8 to 10 inches of roosting space per hen.
3. Place windows on the south side for light.
4. Have 1 square foot of open screen front for each 10 square feet of floor space, for ventilation.
5. Make a dropping pit — for less labor and a healthier flock.
6. Stop drafts by stripping the cracks. Stack fodder around the house in winter.
7. Provide 1 nest for each 4 hens. Orange crates are good.
8. When adding to the house, make it deep from front to back.
9. If the roof is high, add a straw loft 7 feet above the floor.
10. Use a deep litter of straw, planer shavings, or shredded fodder on the floor.

Keep the Flock Healthy

Careful management will help to keep death losses low. Wherever possible keep the young chickens and old hens away from each other. Don't feed young chickens in yards or runs where the old hens are. Cull and destroy any sick chickens as soon as noticed. A screened dropping pit or dropping board will keep the hens from working in the droppings. Clean the laying house and brooder house often enough to prevent accumulation of filth. Feed all feed from hoppers and not on the ground. Use water containers that chickens cannot get into. Don't feed milk to

zers to furnish the potash. When a mixed fertilizer is applied at a rate to supply more than 40 pounds per acre of potash, use one made from sulfate to avoid the injury from muriate previously pointed out.

Use on phosphatic soil.— Practically all mixed fertilizers are made to contain phosphate mainly because most soils on which they are used need phosphorus. Also the phosphate helps to keep the fertilizer in good condition. For use on the phosphatic soils of the Bluegrass region, mixed fertilizers should contain at least as much nitrogen and potash as phosphoric acid. Of the fertilizers for sale in Kentucky in 1944, 6-8-6 most nearly does this.

While phosphate is not needed on the highly phosphatic soils of the Inner Bluegrass, there is no objection to using a fertilizer containing some except the cost of the phosphate and this is small compared with the value of the crop. However, when a mixed fertilizer is used on highly phosphatic soil, crop response comes mainly or entirely from the nitrogen and potassium in it and to use one high in phosphoric acid and low in nitrogen and potash is very poor practice.

Farm manure is a balanced fertilizer for phosphatic bluegrass soils. When ten tons or more per acre are applied, no commercial fertilizer is needed for the tobacco crop. However, as stated above, if you are not sure there is plenty of phosphorus already in the soil, apply fertilizer phosphorus.

High-grade fertilizer best.— The rates of fertilizer application suggested in this leaflet for burley tobacco are much heavier, particularly of nitrogen and potassium, than those commonly used in the state, but if nitrogen and potassium are needed, it is almost useless to apply the small amounts contained in 200 to 300 pounds of mixed fertilizer containing less than 4 percent each of nitrogen or potash. Crop response from such applications must come mainly from the phosphorus.

How to apply.— Because of the phosphorus and potassium, apply mixed fertilizer at the row when the plants are set, or near this time. Place all fertilizers applied at the row in two bands, one on each side of the row, 3 to 4 inches from the plants, and at least 3 inches below the surface of the soil. This applies to fertilizers containing only nitrogen, only phosphorus, or only potassium, as well as to mixed fertilizers, except that fertilizers containing only nitrogen are fairly effective applied as side-dressings. Fertilizers may be applied at the row with fertilizer attachments to setters or by using a one-row fertilizer distributer after the plants are set.

Make moderate to heavy applications of commercial fertilizer far enough away from the row so that it does not come in contact with the plant roots; otherwise it may cause a poor stand, particularly if the weather is dry when the plants are set. Commercial fertilizer properly applied does not injure burley tobacco in dry seasons; generally it improves it.

When more than 800 pounds of commercial fertilizer is applied per acre, it may be better to apply part or all broadcast, disking as deeply into the soil as possible. Heavy applications also may be just as effective plowed under, particularly if the season is dry. Special attachments to plows are on the market for applying fertilizer at the bottom of the furrow. This may be a very effective way to apply fertilizer heavily for burley.

Do Not Over-Lime

Land to be used from time to time for burley tobacco should be limed no more than necessary for the legumes in the rotation.

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FERTILIZING BURLEY TOBACCO

By P. E. Karraker, Russell A. Hunt, and E. J. Kinney

A LARGE SUPPLY of plant food is necessary for the production of high-yielding excellent-quality burley tobacco. Very little land is fertile enough to produce such crops without application of farm manure or commercial fertilizers or both.

Need for Phosphorus, Potassium and Nitrogen

Provide a liberal supply of phosphorus and potassium.— A deficiency of either of these plant foods greatly reduces both yield and quality of burley tobacco. Lack of potassium especially lowers quality and often causes destructive leaf diseases. The cost of supplying these nutrients is small compared with the value of the crop. Larger applications than the crop needs are not harmful and most of the unused fertilizer remains in the soil for succeeding crops. In commercial fertilizers, phosphoric acid (P_2O_5) refers to the phosphorus present and potash (K_2O) refers to the potassium present.

Provide enough nitrogen to produce a satisfactory yield.— A good supply of nitrogen also improves quality. When nitrogen is much deficient, the lower leaves of the plants turn yellow and waste away while the upper leaves are green and immature. To cut such tobacco early to save the wasting lower leaves, reduces yield and the immature upper leaves cure red. If such tobacco is left until the upper leaves

Leaflet 63

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are mature, high-priced lower leaves are lost unless priming is done.

By the time for burley to mature the available nitrogen in the soil should be used up so that the crop will be yellow and ripen into good quality. But the crop is severely injured when nitrogen is used up long before this time, especially in a dry season.

When to Add Phosphorus

Outside the Bluegrass region nearly all land in Kentucky lacks phosphorus and needs a fertilizer containing phosphorus for burley tobacco. About half of the land in the Inner Bluegrass is so highly phosphatic that crops will not respond to added phosphorus. The remaining land in the Inner Bluegrass and most land in the rest of the Bluegrass contain only a moderate amount of phosphorus and fertilizer containing phosphorus should be used for burley. High and low phosphate land may be on the same farm. Ask your county agricultural agent to make a chemical soil test for you. Moreover make a field test yourself by applying phosphorus fertilizer to representative small plots in the field to find whether the crop responds to this nutrient. Because the cost is small compared with the value of the crop, apply phosphorus fertilizer for burley tobacco unless you definitely know the crop will not respond to it.

Amount to use.— On most soils in the state, apply a fertilizer containing phosphorus at a rate to furnish about 80 pounds per acre of phosphoric acid. This amount is contained in 400 pounds of 20-percent superphosphate. Also, unless phosphate is applied to the small-grain crop in the rotation in which the grasses and legumes are seeded, apply 300 pounds of 20-percent superphosphate or its equivalent broadcast and disk well into the soil on low phosphate soils.

Farm manure contains about 2 pounds of phosphorus per ton; it contains much more nitrogen and potassium—on the average, 10 and 8 pounds per ton respectively. Even when farm manure is applied for tobacco, a fertilizer containing phosphorus should be used except on soils that you definitely know contain enough phosphorus.

How to apply.— Apply a fertilizer containing phosphorus when the plants are set, or near this time. Plenty of phosphorus stimulates early and rapid growth. Unless used heavily, apply at the row. However, if all the phosphorus fertilizer used in the rotation is applied to the tobacco, broadcast half of it for more even effect on succeeding crops.

Raw rock and colloidal phosphates, though good fertilizers for long-time soil-improving programs, do not have enough immediate effect on tobacco and most other intensive crops to be suitable for direct use on these crops.

When to Add Potassium

On very fertile land which has not been heavily cropped, or on land to which 10 or more tons per acre of farm manure has been applied, good burley tobacco is grown without potassium fertilizer. Use this fertilizer on other land. Potassium deficiency is a common cause of poor tobacco in the state.

Lack of potassium produces characteristic symptoms in tobacco plants. Bronze-yellow areas appear, usually at the tips and edges of lower leaves but sometimes on higher leaves. If the deficiency is great, the yellow areas appear over the entire leaf; it becomes distorted; parts of it die and fall out.

Amount to use.— Where needed for burley tobacco, apply a fertilizer containing potassium at a rate to supply 40 to 75 pounds of potash (K_2O) per acre. This is contained in 80 to 150 pounds of potassium sulfate (sulfate of potash). Use the higher rate on land from which large crops have been removed for several years with but little or no return of crop residues or farm manure; for example, land in alfalfa cut for hay. In fact, after alfalfa cut for hay, a still heavier rate may be profitable. On most land in the state an application of 50 pounds of potash (K_2O) per acre (100 pounds of sulfate) should be sufficient.

How to apply.— Apply fertilizer containing potassium at the row when the plants are set, or near this time.

When to use muriate of potash.— Potassium chloride (muriate of potash) is cheaper than potassium sulfate and is entirely satisfactory for use up to 40 pounds of potash (K_2O) per acre. Above this amount, use the sulfate because, when too much muriate is used, the chloride, taken up by the plants, injures the quality of tobacco.

When to Add Nitrogen

A very fertile field of heavy old sod which has been pastured only moderately, or one with a heavy growth of a legume crop, or a reasonably productive field which has received 10 tons or more of farm manure per acre should furnish enough nitrogen for good burley tobacco. Use a fertilizer containing nitrogen on less productive land. Too little nitrogen reduces yield and quality of much burley each year.

Amount to use.— In experiments on moderately productive soil on the Experiment Station farm, fertilizer nitrogen increased yield of burley 6 pounds for each pound of nitrogen applied. Using this as a basis, the application, for example, of 50 pounds of fertilizer nitrogen per acre should increase the yield of burley 300 pounds, when other growth conditions are satisfactory. This amount of nitrogen is contained in 300 pounds of sodium nitrate, 250 pounds of ammonium sulfate, or 150 pounds of ammonium nitrate. Growers should find it profitable to plan for yields of 1500 or more pounds of burley per acre.

How to apply.— Most land suitable for burley if plowed early in the spring supplies enough nitrogen during early growth. The additional nitrogen needed thus may be effectively supplied by side-dressing with a soluble nitrogen fertilizer. However, it is just as well to apply the nitrogen at the row when the plants are set and, if land is plowed late, particularly if a nonlegume cover crop is turned under, the application should be made at or before setting.

Follow by cover crop.— Considerable soluble nitrogen (50 to 100 pounds per acre) forms in the soil in the fall after tobacco. Soluble nitrogen does not leach from Kentucky soils during the summer but all leaches out in most winters. Tobacco should be followed by a cover crop to prevent this leaching and to reduce soil erosion.

Use of Mixed Fertilizers

Where nitrogen, phosphorus, and potassium are needed, a mixed fertilizer may be used which contains all three. The analysis or grade, as given on the guaranty tag, shows the plant food in the fertilizer. The analysis 4-10-6, for example, shows that the fertilizer contains 4 percent of nitrogen, 10 percent of phosphoric acid, and 6 percent potash.

How much to use.— First estimate how much each of nitrogen, phosphoric acid, and potash will be needed. Then, from the analyses, select a fertilizer and a rate of application which gives the desired amounts of the three nutrients. For example, to add 50 pounds of nitrogen or potash per acre requires 833 pounds of a 6-8-6 mixed fertilizer. To add 80 pounds of phosphoric acid requires 1000 pounds of this fertilizer.

Avoid injury from muriate.— Muriate of potash and sulfate of potash are both used in mixed fertili-

limed land well supplied with phosphorus, it probably will be profitable to topdress permanent pasture with a potassium fertilizer every few years at the rate of 10 pounds of potash per acre per year.

Supplement Farm Manure and Tobacco Stalks With Phosphate

An application of 10 to 15 tons of average farm manure per acre or 1½ to 2½ tons of tobacco stalks per acre in the rotation will supply the nitrogen and potassium needed for good yields of general farm crops in Kentucky. But as these materials are low in phosphate, 300 pounds per acre of superphosphate should be added except on those soils in the Bluegrass region which contain a moderate to high phosphate content.

How to Apply Commercial Fertilizers

On row crops, commercial fertilizer, unless applied heavily (more than 600 pounds per acre) is most effective applied in two bands, one on each side of the row, 3 to 4 inches from the row and at least 3 inches below the surface of the soil. The fertilizer should not come in contact with the seeds or roots of plants when set, and should be deep enough to be in moist soil during dry periods. Special fertilizer attachments to planters or setters apply fertilizers fairly well in this way, or a one-row fertilizer distributor can be used. The application should be made shortly before, during, or shortly after planting or setting, except that often nitrogen will be just as effective applied later. On corn it may be more effective to apply at least most of the nitrogen when the plants are about knee high. If the only application is a few pounds of nitrogen in the hill at planting, the plants will grow faster at first but yield probably will not be larger.

When fertilizer is applied heavily on row crops, there are good reasons for applying only a part or none of it at the row. The bulk or all of the fertilizer may be broadcast after plowing and disked in deep or broadcast before plowing and plowed under, the latter having an especial advantage in dry years. A better way would be to drill the fertilizer in deep with a grain drill, or perhaps it is better yet to apply it at the bottom of the furrow in plowing. Attachments to plows to do this can be bought or made locally. When the fertilizer is plowed under or applied in the furrow, 100 to 300 pounds per acre should be applied at the row to start the crop, particularly tobacco. When fertilizer is broadcast and disked in, or broadcast and plowed under, at least half again as much phosphorus and potassium must be applied to get the same crop response, during the year of application, as if applied at the row.

Commercial fertilizer can best be applied to small grain crops through the fertilizer attachment to the grain drill. Broadcasting and disking-in also is fairly satisfactory.

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40M—1-44

How to Buy and Use FERTILIZERS

By P. E. KARRAKER

"Commercial fertilizers" are manufactured products used to supply the plant foods lacking in many soils. The nutrients or plant foods commonly supplied are nitrogen, phosphorus, and potassium — the three most likely to be lacking.

A commercial fertilizer may contain only one, any two, or all three of these nutrients. Fertilizers containing two or more of them are called "mixed fertilizers." Those containing only one are called "straight fertilizers." Fertilizers containing only one nutrient may be applied directly to the soil, or used in making mixed fertilizers.

How Amount of Nutrients in Fertilizers is Shown

The amount of nutrients in commercial fertilizers is shown by stating the percentages present. For example, sodium nitrate with 16-percent nitrogen contains 16 pounds of nitrogen in 100 pounds of the material. The percentages may be marked on the bag, **but they must always be shown on the Experiment Station guaranty tag attached to the bag.** This tag is the official guarantee and no fertilizer should be bought without it. Percentage of phosphorus in fertilizers is stated as phosphoric acid (P_2O_5) and percentage of potassium is stated as potash (K_2O). To find the amount of phosphorus, divide the amount of phosphoric acid by 2.3; and to find the amount of potassium divide the amount of potash by 1.2.

The grade (or analysis) of a mixed fertilizer shows the percentages of nutrients present. Percentage of nitrogen is always stated first, phosphoric acid next, and potash last. A 4-10-6 grade, for example, contains 4 percent of nitrogen, 10 percent of phosphoric acid, and 6 percent of potash.

Leaflet 64

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Amount of Nutrients is What Counts

The important thing to have in mind in buying commercial fertilizers is **how many pounds of plant food you are getting for the money.** In general, nutrients are cheaper per pound in the higher grade mixed fertilizers than in those of lower grade, though the cost per bag of the lower grade may be less. Sand and other materials of little or no value in the fertilizer may be used in making low-grade mixed fertilizers. While the amount of nutrients in commercial fertilizers mainly determines their agricultural value, the availability of the nutrients (that is, how readily plants can take them up) or some special effect of the fertilizer on the quality of the crop may also affect the value.

Need for Commercial Fertilizers

Phosphorus and potassium.— About the only way to increase the amount of phosphorus and potassium in soils is to apply commercial fertilizers containing them. The phosphorus content of most soils is too low for good crop yields. This is true of all soils in Kentucky except part of the soils in the Bluegrass region, particularly in the Inner Bluegrass, and the most productive bottomland soils. It is very profitable to use fertilizer phosphorus on low-phosphorus soils.

Most soils in Kentucky are well supplied with potassium, but often it does not become available fast enough for large crops. Most of the potassium in crops is in the roots, stalks, stems, and leaves. If these parts of the crop are carefully returned to the soil either as crop residues or as farm manure, fairly good yields of most crops can be produced without using potassium fertilizers. If this is not done, these fertilizers must be used on most soils for continued production of good crops. Tobacco and corn are the first crops to suffer from lack of potassium. Alfalfa is close behind. On soils needing them, both phosphorus and potassium can be used profitably even when crop prices are low.

Nitrogen.— Most soils in Kentucky are low in nitrogen. Constant attention must be given to have enough for crops. Enough nitrogen can be maintained by growing legumes and by returning part or all of the top growth to the land, or by feeding them and returning the manure. Whether it is advisable to supply in this way all the nitrogen needed, or to buy some in fertilizers, depends partly on the acre-value of the crops grown and the cost of the fertilizer nitrogen, and partly on the extent to which livestock or livestock products are produced on the farm. When production of livestock or livestock products is a main farm enterprise and a considerable acreage of legume crops is grown for feed and pasturage, enough nitrogen should be furnished by the legumes for good crop yields.

Whether to Buy Mixed Fertilizers or Straight Fertilizers

If only one nutrient is needed, a fertilizer containing only that nutrient should be bought. If more than one nutrient is needed, the cost will be more in mixed fertilizers than in the straight fertilizers because of certain additional costs in manufacturing the mixed fertilizers. At present a ton of mixed fertilizer costs about $7 more than the quantity of straight fertilizers furnishing an equal amount of nutrients. Mixed fertilizers, however, are usually in better condition for applying than most straight fertilizers, and there is some advantage in having all the nutrients in one material.

How to Tell How Much Fertilizer to Apply and Which Grade of Mixed Fertilizer to Buy

In determining which fertilizer or fertilizers and the quantity to buy, one should first decide what plant foods and the amount of each are needed per acre. Then from the analyses the fertilizer or fertilizers can be selected and the rate of application figured to meet these needs.

Nitrogen.— Fertilizer nitrogen will have most of its effect on the immediate crop. In a seasonable year, on soil needing nitrogen but not lacking phosphorus and potassium, the proper application of nitrogen should give increases as large as the following: corn, one bushel for each 2 to 3 pounds applied; wheat, one bushel for each 3 pounds applied; tobacco, 5 pounds for each pound applied; and grass hay crops, 50 pounds for each pound applied. Estimate the crop yield if no nitrogen is used, and apply enough to obtain the yield wanted. On land capable of giving moderate to high yields without addition of nitrogen, the increases from adding nitrogen would probably be smaller than these. Nitrogen fertilizers usually are not profitable on meadows and pastures where legumes make up over half the herbage.

Phosphorus.— On low-phosphate land phosphorus should be added in fertilizers at the rate of 20 pounds of phosphoric acid per acre per year. Half this amount should be enough on soils of moderate phosphorus content in the Bluegrass region. None is needed on the high-phosphorus soils of the Inner Bluegrass. The entire quantity for a rotation usually should be applied to the small-grain crop in which the legumes and grasses are seeded. Another application, however, furnishing 60 to 80 pounds of phosphoric acid per acre should be made on tobacco. Also before a new seeding of alfalfa, an application should be made to furnish 20 pounds per acre of phosphoric acid for each year the crop is to occupy the land. Permanent pastures should be topdressed every few years with enough phosphorus fertilizer to add 10 pounds of phosphoric acid per acre per year.

Potassium.— For most crops, where potassium fertilizer is needed, it should be applied at a rate to supply a total of 25 to 50 pounds of potash per acre during a 3- to 4-year rotation. Usually this can be applied most conveniently on the small grain in the rotation. If this has not been done and potassium deficiency is expected, a potassium fertilizer also should be applied on corn at a rate to furnish 20 to 40 pounds of potash per acre. Also enough potassium fertilizer should be applied on tobacco to supply 40 to 80 pounds of potash per acre unless it is certain that the soil has enough potassium for tobacco. For a new seeding of alfalfa, 20 to 30 pounds of potash should be applied for each year the crop is to occupy the land. On

in rows 3 feet apart, and then between June 15 and July 15, to plant late tomatoes, late sweet corn, late beans, late cabbage, between the potato rows.

How to Keep the Insects From Ruining Your Garden

For insects that eat the leaves or other parts of the plant put poison where they feed. The best poison is rotenone dust or spray. Another is a dust made by mixing 1 part calcium arsenate, or arsenate of lead, or magnesium arsenate, with 6 parts lime. Or, a wet spray may be used, 2 rounded tablespoons of any of the arsenates dissolved in 1 gallon of water. Because of danger of poisoning people, don't use the arsenates on greens, cauliflower, cabbage in head, or beans in pod. Rotenone, however, is safe on these. Except for bean beetle and cucumber beetle, begin dusting or spraying at the first sign of damage.

For plant lice, that kill plants by sucking the sap, spray or dust with rotenone, hitting the insects direct. Rotenone should kill them almost at once.

For squash bugs, and harlequin bugs (on cabbage and greens), both sucking insects whose bodies when full grown are too tough for rotenone to have effect, watch for the eggs to hatch and then spray the soft-bodied young with rotenone.

For corn-ear worm, whose debris spoils sweet corn, proceed as follows: on the 4th day after two-thirds of the silks have browned, clip off the end of the shuck about ½ inch from the tip of the cob.

For the Mexican bean beetle, don't wait until there are holes in the leaves, but begin dusting or spraying when the first egg-clusters are seen on the underside of the leaves, and then dust or spray again in 10 days, and perhaps in 10 days again. Dusters or sprayers with up-turned nozzles must be used to put the material where the beetle always feeds, the undersides of the leaves, and covering should be complete.

The striped cucumber beetle, sometimes called the "melon bug," is the cause for the early death of cucumbers, melons, and squash. Dead plants have their side-roots eaten away, by worms that hatched from the beetle's eggs laid in the first soil cracks the seedlings made as they came up. Start poisoning, therefore, when the soil over the hills begins to "hump." Use rotenone, or this dust:

Calcium arsenate, 1 part by weight
Gypsum or "fiber plaster," 15 parts

Sift the dust through a loosely woven sack over the middle of the hill. Repeat the dusting every 3 days, for at least 10 times; 20 times is better.

Protect Your Garden From Diseases

Vegetable diseases are of three kinds — "wilt," "blight," and a "general" kind that causes the crops to do poorly. The last is usually a sign that rotation has not been practiced. No vegetable should be planted where it grew last year; there should be a gap of at least one year.

Wilt dries up cabbage, tomatoes, and watermelons, and is caused by germs that live in the soil. The only way to combat it is to use resistant varieties. The resistant varieties are named in the paragraph on "fresh seed."

Blight may be caused by several germs, but the result is the same: the spotting and final killing of the leaves. As the germs are carried by the wind, the control is to "copper coat" the leaves, by spraying with bordeaux mixture. Start when the spotting first is seen (on the lower leaves) and repeat in 2 weeks. *Complete covering* is necessary, with a good sprayer; "splashing on" will not do.

Bordeaux may be bought ready-mixed at drug-stores or seed stores, needing only to be stirred into water according to the directions printed on the package. Or it may be home-made, easily, and in garden amount, as follows:

1. In a stone crock, dissolve 1 lb. of bluestone in 5 quarts of water, the bluestone hung in a cloth sack so that its tip is just in the water. This is "bluestone stock."

2. In the sprayer tank (preferably brass), put 9 quarts of water, 1 quart of "bluestone stock" and ¼ pound of screened lime, and if insects are present, the proper amount of any of the arsenates named under "Insect Control."

3. Close the sprayer, and shake it end-wise. 10 to 15 times. The result is 2½ gallons of 4-4-50 bordeaux.

Winter Storage

Harvest and store vegetables in late September or early October. Look well to the condition of the vegetables and to storage arrangements. Choose mature vegetables, free from disease infection, bruises, cuts, and other wounds. Squashes, cushaws, and sweetpotatoes require a temperature of 50°; controlled ventilation ("sweating" may cause them to rot); and dry storage place. Turnips, beets, carrots, cabbage, and potatoes require a temperature between 34° and 38°, and a moist storage place.

4-H GARDEN RECORD

1. Kind of garden (check below)
   Home Victory Garden ( )
   Individual Victory Garden ( )
   Special Crop Victory Garden: potatoes ( ) tomatoes ( ). If some other crop write name _____.
2. Size of garden: _____ feet long _____ feet wide.
3. How many kinds of vegetables? _____
4. Estimate total hours worked _____
5. Number of days vegetables used fresh from garden _____.
6. Bushels of Irish potatoes, cabbage, etc., stored for the winter _____.
7. Total quarts of all vegetables canned from the garden _____.
8. Amount sold from garden $_____.
9. Size of fall garden_____. Names of vegetables in it _____

Name of member_____
Town _____
County_____ Neighborhood_____
Age_____ Years in club work_____
Name of Leader _____

_____
Signature of County Agent or Home Demonstration Agent

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.
60M—1-44

GARDEN PROJECTS for 4-H Clubs

Start Your Plans Early

Success with a garden calls for thought, plans, and good use of ground, moisture, fertilizer, seeds, tools, insecticides, and the club members' time.

Early plans should include location for the individual garden or the special-crop garden, and should take into account all that will be needed to get it ready to plant and later on to care for the crop. Study this leaflet and talk over your plans with others in the family. Their help with your plans will make the work easier and more interesting.

Select the Type of Garden and Keep a Record

Three types of gardens are recommended for 4-H club members. Choose the plan that suits your needs best. Some club members grow more than one type. If you also wish to grow more than one type keep a separate record for each type. The garden record, page 8, is a summary record. More complete records should be kept on a separate sheet and included in your final report. A story and picture of your garden will help your report.

Leaflet 65

UNIVERSITY OF KENTUCKY
Thomas P. Cooper, *Dean* and *Director*
Agricultural Extension Service
College of Agriculture and Home Economics
Lexington, Kentucky January, 1944

Individual garden.— This garden may be either a plot by itself or a definite part of the home garden. In either case all of the work should be done by the 4-H member. Parents or older folks may help with the hard jobs such as plowing. Plant at least four of the following vegetables: beans, tomatoes, potatoes, onions, carrots, greens, cabbage. It is better to plant larger amounts of four or five commonly used vegetables than just a little of many kinds.

The size of this garden will depend on the strength and age of the club member, the space available for the separate garden, and the use to be made of the vegetables produced. A small garden may be 20 feet by 40 feet, and a large garden an acre or more.

Special-crop garden.— Club members grow special crops of 1/10 acre or more, using a crop that can be marketed or stored for home use. Crops suggested are Irish or sweet potatoes, sweet corn, tomatoes, beans, onions, and cucumbers. The club member should study other information on growing the special crop, and should be well informed on both growing the crop and disposing, preserving, or storing of it afterward. Of the three garden types offered, this type offers the best opportunity for a cash income.

Home garden.— Older club members may take complete charge of the home garden. They plan it; prepare the seedbed; plant, cultivate, spray, and harvest the vegetables for daily use, canning, storage and sale.

Plant enough vegetables to satisfy the family needs, unless there is a market for surplus. Plant beans, peas, tomatoes, corn, cabbage, onions, beets, potatoes, greens, carrots. For fall planting add turnips, spinach, seven top, kale, mustard, and chinese cabbage to this list.

For a family of five a home victory garden should be from ¼ to ½ acre. A plot 100 feet by 100 feet is about ¼ acre. The way a garden is managed, however, is much more important than its size. A small garden well fertilized, properly cultivated, and full of growing crops will produce more than a larger garden not handled well.

The sample garden shown on this sheet should supply five people 21 servings a week during the fresh vegetable season, and 12 servings a week of canned and stored vegetables through the winter. This garden is ¼ acre (100 feet by 100 feet). A horse-

worked garden, to do the same, should be nearly ½ acre.

Smaller gardens may be made to produce more by making replantings immediately when early crops are through bearing. This is good practice even in larger gardens.

Keep the Garden Soil Rich

Plow under stable manure, if you can get it, at the rate of 10 tons an acre. Plow about 10 inches deep. As manure by itself may cause the vegetables to "grow to top," it should be balanced by broadcasting 20-percent superphosphate, 400 pounds per acre, after breaking, working it in as the seedbed is being finished. When enough manure cannot be got, use a complete fertilizer (4-8-6 or 5-10-5) at a rate of 400 to 1,000 pounds per acre, in the same manner as just described for superphosphate.

Make a Fine, Deep Seedbed

In a good seedbed the top 3 to 6 inches of soil is as fine as the smallest seed to be sown. The right depth to sow seed is 8 times the least thickness of the seed. There is more likelihood of planting too deep than too shallow.

Use Fresh Seed of Good Varieties

Only fresh seed assures full vegetable rows. Before using left-over seed, test it for germination by planting a certain number of the seeds in a box in a warm place, and counting the number that come up. On all packages of seed 1 pound or more, sold in Kentucky, the percentage of germination and the year the seed was grown must be stated.

Plant only adapted varieties of vegetables. Those listed in the plan have proved themselves as being reliable, but your own favorites should not be dropped.

If tomato wilt has crept into your

garden, you should plant only the *resistant* Marglobe or Rutgers, or the earlier Break O' Day. Where Yellows (sometimes called "wilt") of cabbage has made cabbage growing with ordinary varieties impossible, choose Wisconsin All Seasons (or any other the seedsmen quote as "resistant"). Where watermelons have been failing regularly, use Kleckley No. 4 (or any others listed as being wilt-resistant.) If Golden Bantam sweet corn fails to make satisfactory ears, use instead any of the Bantam "crosses."

Keep the Weeds Out

The reason for cultivating a garden is to stop the weeds, not merely to loosen the soil. In fact, deep working and chopping with a hoe, even in the middles of the rows, can do serious damage to the roots.

Weeds can be stopped easiest when they are small, before they rob the vegetables of plant food and moisture. They can be *scraped off* with a sharp hoe or with the scuffle-hoe attachment of a garden plow, without digging deep into the soil. If a horse cultivator is used, the 16-tooth cultivator is best.

Keep the surface of the garden smooth at all times; don't make hills and ridges. It takes extra work to make them, and in scraping soil away from the middles of the rows to make the ridges you rob the vegetables of valuable moisture and sometimes ruin part of the roots.

White Potatoes

This garden plan takes for granted that 1,500 to 2,000 feet of row of potatoes will be grown in a separate patch, outside the garden. But if the potatoes must be grown in the vegetable garden, one way to have them and still not have to do without the other vegetables, is to plant them early (before April 10)

SAMPLE GARDEN PLAN for a FAMILY OF FIVE

(Recommended varieties, when to plant, and planting distances; the heavy border represents the boundary of the 100 ft. x 100 ft. garden. Rows in this plan are spaced for hand cultivation. Where horse cultivators are used, the rows should be 3½ to 4 feet apart.)

WHEN to plant	Feet between rows	WHAT and HOW MUCH to plant (rows 100 ft. long)
(Perennial)	2	ASPARAGUS (*Martha Washington*), 2 ft. apart in the row
	4	ASPARAGUS (*Martha Washington*), 60 ft. — RHUBARB (*Victoria*), 40 ft., 3 ft. apart
March 15 to April 1	3	PARSNIPS (*Guernsey*). 75 ft., thinned to 2" in row — SWISS CHARD (*Lucullus*), 25 ft.
	2½	PEAS (*Alaska*), 1½ lb. seed sown 1 to 2 inches apart
	2½	PEAS (*Telephone*)
	2	LETTUCE (*Wonderful, Grand Rapids*), 30 ft. — RADISHES (*White Tip Scarlet*), 70 ft. 2 plantings
	2	MUSTARD (*Southern Curled*), 50 ft. — SPINACH (*Bloomsdale*), 50 ft
	2½	CABBAGE (*Golden Acre*), 100 plants
	2½	CABBAGE (*Succession, Copenhagen,* or *Wisconsin All Seasons*), 100 plants
April 1 to April 15	2	ONIONS (*Yellow sets*), 1 gallon of sets planted 2 to 3 inches apart
	2	BEETS (*Crosby's Egyptian*), 2 oz. seed; thin to 3 inches
	2	CARROTS (*Chantenay*), 1 oz. seed; thin to 2 inches
April 15 to May 1	2½	BEANS (*Valentine*), 50 feet, 1 lb. seed; *Henderson Bush* lima, 50 ft., 1 lb. seed
	3	SWEET CORN (*Adams*), 1 oz. seed; in hills 2-3 ft. apart, or drilled ½ ft. apart
	3	SWEET CORN (*Adams*)
May	3	SWEET CORN (*Golden Cross Bantam*), with 20 hills of CUSHAWS (*Green-Striped*)
	3	SWEET CORN (*Golden Cross Bantam*)
	3	TOMATOES (*Earliana, Break O'Day*), 35 plants, staked
	3	PEPPERS (*Ruby King*), 50 ft., 25 plants — EGGPLANT (*New York*), 50 ft., 20 plants
	3	SQUASHES (*Summer Straightneck*), 30 hills
	3	SQUASHES (*Table Queen*), 20 hills
	3	OKRA (*White Velvet*), 50 ft., 1 oz. seed; thin to 18 in. — BEANS (*Stringless Greenpod*), 50 ft.
	3½	SWEETPOTATOES (*Porto Rico*), 75 slips set 15 inches apart
	4	SWEETPOTATOES (*Porto Rico*)
	4	TOMATOES (*Marglobe, Greater Baltimore*), 25 plants, mulched
June 1 to June 15	4	TOMATOES (*Marglobe, Greater Baltimore*), 25 plants, mulched
	4	TOMATOES (*Marglobe, Greater Baltimore*), 25 plants, mulched
	3½	BEANS (*Stringless Greenpod, Kentucky Wonder*)
	3	SWEET CORN (*Stowell's Evergreen, Bantam Evergreen*)
	3	SWEET CORN (*Stowell's Evergreen, Bantam Evergreen*)
	3	SWEET CORN (*Stowell's Evergreen, Bantam Evergreen*)
June 15 to July 1	3	SWEET CORN (*Stowell's Evergreen, Bantam Evergreen*)
	3	SWEET CORN (*Stowell's Evergreen, Bantam Evergreen*)
	3	BEETS (*Detroit Dark Red*), 2 oz. seed; thin to 3 inches
Late crops following early crops		LATE CABBAGE, in *Alaska* pea row
July 1 to 15		BEANS (*Stringless Greenpod*), in mustard-and-spinach row
July 15 to August 1		BEANS (*Stringless Greenpod*), in half of *Telephone* pea row
		BEANS (*Stringless Greenpod*), 50 ft. in rest of *Telephone* pea row
		KALE (*Siberian*), 100 ft. in lettuce row, or TURNIPS (*Purple Top Globe*), 100 ft., 1 oz. seed
August		SPINACH (*King of Denmark* or *Norfolk*), in *Golden Acre* cabbage row
		KALE (*Scotch*), 50 ft.; and CHINESE CABBAGE, 50 ft., in one of *Adams* corn rows
September		GREENS or TURNIPS in other *Adams* corn row and in early beet row
		Remove harvested crops and sow rye or barley for winter cover crop. Continue this through October, using *Balbo* or *Rosen* rye.

Weeds Compete for Plant Food and Moisture

Weeds in corn fields reduce the yield of corn many thousand bushels in Kentucky each year. Good preparation of the seedbed and early cultivation of the crop are essential to control weeds.

Don't Waste Corn Stover: It's a Valuable Feed

About one-fourth of the crude protein and one-third of the total digestible nutrients of the corn crop are in the stover.

Some suggestions for handling corn stover:

1. Feed shocked corn stover early. It loses its feed value rapidly out in the winter weather.
2. Shred your stover if you can. Shredding reduces waste, makes the stover easier to handle, and makes excellent bedding material.



3. Corn stover is low in protein. Supplement it with a legume hay or a high-protein concentrate.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agricutlure, cooperating.

1000M—2-44

For:

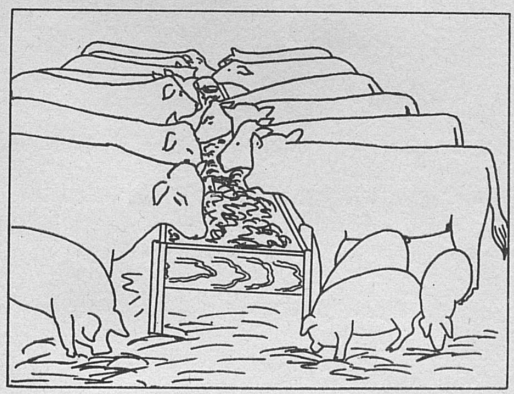
U. S. Department of Agriculture
EXTENSION SERVICE
WASHINGTON, D. C.

OFFICIAL BUSINESS

Penalty for Private Use to Avoid Payment of Postage, $300

Produce MORE CORN

- **Use adapted hybrids**
- **Use fertilizer as needed**
- **Plant on contour**
- **Get good stands**
- **Control weeds**



Shortage of corn will limit livestock, dairy, and poultry production on many Kentucky farms in 1944.

Leaflet 66

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky

February, 1944

PRODUCE MORE CORN

By William C. Johnstone

KENTUCKY FARMERS need to produce more corn for feed. To do this it is more important to improve corn-growing practices than to increase the acreage. This leaflet calls attention to the most important ways to improve corn yields per acre.

Adapted Hybrids Increase Yields

Use of seed of *adapted* hybrid corn is an important factor in assuring a good yield of corn. In 25 tests in Logan county in 1943 with certified Kentucky hybrids, the average increase over open-pollinated varieties was 9¾ bushels, or 31¼ percent. In these tests each dollar invested in hybrid seed increased the production almost 10 bushels. The hybrids grew better during drouth. They had stronger stalks and larger root systems. Their earlier maturity permitted earlier seeding of cover crops.



These hybrids are recommended for Kentucky:

(White) **Ky. 69, Ky. 72, Ky. 72B,** and **Ky. 203.**

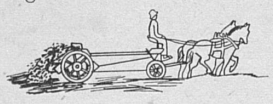
(Yellow) **U. S. 13, Ky. 102,** and **Ky. 103.**

CAUTION: Do not use corn produced from hybrid seed for planting. Such corn produces 15 to 25 percent lower yields than true hybrid seed.

Further information about adapted hybrids may be obtained from your county agent.

Plenty of Available Plant Food Is Necessary

Fertilizer requirements of hybrid corn vary according to the natural fertility of the soil and past management of the land. The following applications of fertilizers are recommended:



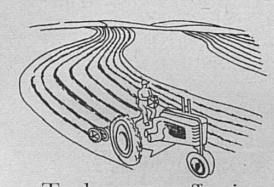
(1) On well manured, highly fertile soil, use 200 pounds or more of 20-percent superphosphate per acre.

(2) On moderately fertile soil, where legume residues have been plowed under, use at the row 300 pounds per acre of a fertilizer high in phosphorus and potassium, such as a 0-12-12.

(3) On soils low in fertility, apply at the row 500 pounds per acre of 6-8-6, or other fertilizer high in nitrogen and potash. Larger than usual applications of fertilizers for corn are practical during periods of relatively high prices.

Contour Tillage Saves Soil and Moisture

A profitable, yet simple practice to use on sloping land is contour planting and cultivation. By checking run-off of water, this method of tillage saves both fertile topsoil and moisture, and may result in considerable increase in yield, especially in dry seasons.



To be most effective, contour tillage should start with the breaking of the land and be supported by sod waterways, cover crops, and other conservation measures. Ask your county agent for further information on this practice.

Right Spacing and Good Stands Increase Yields

Other conditions being favorable, highest yields of corn are obtained when the right number of plants are well distributed over the field. The best number of plants per acre varies with the fertility of the soil. On soils of very high fertility, capable of producing over 100 bushels per acre, 18 to 20 thousand plants per acre are needed for highest yield. On soils of low fertility 6,000 plants may be enough. In the table below is shown what is regarded as the best spacing of plants in rows 3½ feet apart for producing highest yields of hybrid corn on soils of different fertility levels. Hybrid corn can be planted 20 percent closer than open-pollinated varieties.

Fertility level	*Distance between plants, drilled*
Less than 30 bushels per acre	25 inches
30 to 45 bushels per acre	21 inches
45 to 60 bushels per acre	18 inches
60 to 75 bushels per acre	16 inches
75 to 100 bushels per acre	14 inches
100 or more bushels per acre	12 inches

About the same number of plants per acre should be grown where corn is planted in hills.

To get a good stand of corn it is necessary to have a suitable seedbed, and to use well-graded seed of high germination and the right planter plates for the size and shape of the seed. Certified hybrid seed corn meets high germination and grading requirements, and therefore better stands are usually obtained from it than from ordinary seed.

CANNING RECORD AND REPORT

Date	Name of foods canned	Number of quarts
	Total on this page.....	

[5]

Date	Name of foods canned	Number of quarts
	Total on this page.....	
	Total on page 5	
	Total	

Name:_____ Age_____

Address:_____ _____
(County)

Approved by { _____ *(Leader or Mother)*
_____ *(County Extension Agent)*

[6]

CANNING PROJECTS for 4-H Clubs

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Enlist now in a 4-H Canning Project. Select what you can do, according to your age. Do all you can. For information on how to can, use Kentucky Extension Leaflet 47, "Can Fruits and Vegetables." Obtain this from the County Extension Agent.

Leaflet 67

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky February, 1944

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director.* Issued in furtherance of the Acts of May 8 and June 30, 1914.

50M—2-44

For Girls 8 to 10 Years Old

Because canning requires working with hot food and hot jars, and lifting large things, we suggest that your mother or older sisters do the actual canning, and that you help them. You can do such things as gathering food, preparing, peeling and shelling, washing jars, labeling jars, keeping fires going, helping to store the canned foods.

These services are just as important as canning the food yourself. Learn to do your work well. Ask those whom you are helping to *show* you how to do it. There are good ways and poor ways of doing things. Keep a record in this leaflet showing the hours you have spent in helping with canning. Do at least 25 hours of work as your project.

For Girls 11 to 13 Years Old

You are old enough now to prepare and pack food by yourself. You still may be too young to manage the hot cooker or water bath. Let someone help you to do this. Can 20 to 30 quarts of fruits and tomatoes. Besides this, you may help others with canning. Write down each day in this leaflet how many hours you helped others with canning jobs. We suggest this help be at least 25 hours. Include in your record the number of quarts you canned and the number of hours you spent in helping others with canning.

For Girls 14 to 16 Years Old

4-H Club girls of your age generally have had some years of canning experience and may now increase the varieties canned and also the number of containers. By now you should be anxious to grow choice fruits and vegetables to can, as well as to can them. Learn what makes a canned product "choice." Strive to have your canning of high quality. That is, be sure it *looks* good, *tastes* good and *is* good because it was canned by the method that retains its food value. Can at least 50 quarts of fruits and vegetables. The more you can, the more variety you will have next winter. Be proud of your work and show your neighbors and other girls how to

can. Include in your record not only the number of quarts of food you canned, but also the number of hours you spent in assisting others with their canning.

For Girls 16 Years Old or Older

As you have been a 4-H Club girl for a few years, you are probably an experienced canner by now. Conserve and save. Devote your time to perfecting your skills so that each quart you can will be one of excellent quality. At least 100 quarts of fruits and vegetables is your minimum goal. You may also can meats. For information on this, get Kentucky Extension Leaflet 59, "Home Canning of Meats," at the County Extension Office. Plan your Canning and Storage Budget at the beginning of the season, using the Canning and Storage Budget and Record Card, H.E. 378, which you can get also at the County Extension Office. Help with canning the foods listed in this budget for your family. In addition to canning, you will help with drying and storage. At the close of your work, turn in the Budget Card and also your record kept in this leaflet. Your work is a service to yourself, your family, and your country.

Guideposts Along the Canning Road

1. Check jar supply early; buy needed jars, tops, rubbers.
2. Follow the specific canning directions for each product as given in Kentucky Extension Leaflet 47, "Can Fruits and Vegetables." Every farm family has or can have a copy of this by asking the County Home Demonstration Agent or County Agent.
3. Select products at the right stage for canning.
4. Can products as soon as picked.
5. Wash and sterilize all jars and tops.
6. Keep yourself, your equipment, and all food spotlessly clean.
7. Process food the time required.
8. *Seal jars according to manufacturers' instructions.*
9. Store canned foods where it is cool in summer, and where they will not freeze in winter.
10. Labeling is desirable.

WORK RECORD AND REPORT

Name:_____ Age_____

Address:_____ _____
(County)

Date	Assistance in canning (nature of work)	Number of hours
	Total.....	

Approved by _____
(Leader or Mother)

_____
(County Extension Agent)

PROJECT INSTRUCTIONS

1. Work and keep record for at least the following number of hours. To receive credit for a completed project:

   100 hours if 8 to 11 years of age
   150 hours if 12 to 14 years of age
   250 hours if 15 to 20 years of age.

2. Keep a record of work done in the home and on the farm, in this leaflet. Turn the record in to the County Extension Agent at the close of the project.
3. Only hours between October 1 and September 30 may be considered in this year's record. Work should be spread over a period of six or more months.
4. County, district, and state champions will be chosen in both the farm and home phases of this labor project.
5. A written story is necessary in addition to this record if the member wishes to be considered for Club or county championship. The story should tell of improved ways of doing the jobs. The amounts of time recorded will not be the chief consideration in selecting winners.
6. Boys and girls living on farms should do a large amount of this project on the home farm and in the farm home.
7. Credit will be given for farm and home work and not for professional or commercial work or jobs.

Kind of Work That May be Done

Farm work

Planting and harvesting crops
Operating farm machinery
Care of livestock
Milking and care of dairy cattle
Cultivation of garden
Fencing, grubbing sprouts and other farm work

Home work

Housecleaning, care of children
Sewing, washing and ironing, preparing meals and other home work.

Credit on this project will be given for all farm and home work done except work done on other 4-H projects. To get the most out of this project, study the methods of doing each job and try to improve them. All work done should be worthwhile.

PROJECT RECORD

Person or persons I worked for:

Name _____

Address _____

Name _____

Address _____

Name _____

Address _____

Total number of hours worked _____

Name of member _____

Age _____ Address _____

County _____ Year 194____

This is to certify that _____ has worked the number of hours indicated in this record.

_____
Signature of Parent

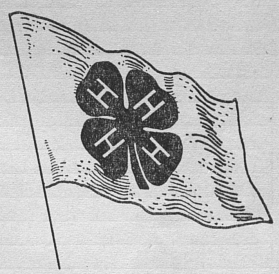
_____
Approved: County Extension Agent

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

30M—4-44
30M—3-45

FARM or HOME LABOR-SERVICE PROJECT For 4-H CLUBS

A project for boys or girls who learn and practice better ways of doing the jobs about the farm and home.



Leaflet 68

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky February, 1944
(Revised, March 1945)

RECORD OF WORK ON LABOR-SERVICE PROJECT

Month and day	Kind of work	Hours worked, today or this week	Month and day	Kind of work	Hours worked, today or this week	Month and day	Kind of work	Hours worked, today or this week

size of the pellets. Pellets or boluses are now available in two sizes. The larger contains about 12½ grams, two of which are needed for a standard dose for a mature sheep and one for lambs about 60 pounds. The smaller pellet for younger lambs usually contains about 8 grams of phenothiazine.

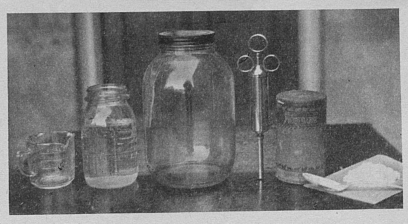
The drench method of dosage is now most widely used. Phenothiazine powder containing a suspending agent and requiring only water (as per directions on the container) to make a satisfactory drench is now available, and usually sells at the same price per pound as pure phenothiazine. However, a satisfactory suspension may be made from the pure phenothiazine powder by first making a paste of 3 tablespoonfuls of flour and 1½ pints of water, then mixing this thoroughly with 1 pound of phenothiazine. This will make enough to drench 18 sheep, using 2 ounces per sheep. Break up all lumps in the phenothiazine thoroughly before mixing. Wide-mouthed gallon jars, such as are used extensively for fountain syrups, pickles, and other products, are ideal for mixing. It is important to stir the mixture frequently when in use, so as to keep the suspension as nearly uniform as possible. A 2- or 4-ounce syringe is more convenient for drenching sheep than a bottle and there is less danger of wasting the drench.

Commercial suspensions also are available but are more expensive than the suspensions made at home. Some require addition of water as per directions; others do not.

Farmers in buying phenothiazine should be cautious about buying so-called "worm remedies" containing cheap filler and very little phenothiazine. Some of these are now on the market. Purchase from reliable sources and look for a statement on the container showing the proportion of phenothiazine. Drench grades will seldom contain more than 3 percent of inert matter which is the suspending agent.

Phenothiazine-salt mixture.—The free-choice administration of phenothiazine with salt during the warm months gave excellent results in Kentucky in 1943. Many experimental tests have shown that the effect of the salt method is two-fold. First, it makes the eggs of the principal gastrointestinal roundworms infertile so that they will not hatch to reinfest the flock. Second, it materially reduces the number of mature roundworms in the digestive tract.

Feeder for phenothiazine-salt mixture.— Plans for a simple feeder that protects the mixture from the weather can be obtained from county farm agents or the College of Agriculture, Lexington.



Equipment and material for making a phenothiazine suspension and drenching sheep: A measuring cup, a quart jar, wide mouth gallon jar, a 2-ounce syringe, phenothiazine, flour, and a tablespoon. Flour is not needed if the phenothiazine used carries a suspending agent.

Fertile, Well-Managed Pastures Produce the Best Feed

Much evidence is at hand to show that lambs can be produced more cheaply by building up the productivity of pastures through proper fertilization and management than by supplementing infertile pastures with grain. Before a control measure for nodular worms was found, some lamb producers took the late lambs off pasture in July and barn-fed them as the only way to get them in desirable market finish by late fall. The worth of this practice was supported by experimental work, but with the proper use of phenothiazine it has been found that satisfactory gains can be made on average bluegrass pastures without grain from July through October. Lambs respond to a frequent change of pasture and make especially good use of lespedeza, clover, alfalfa, and temporary pasture crops such as oats and rape.

Shorn Lambs Make Faster Gains During Hot Weather

Considerably faster gains may be expected from lambs sheared in late July or early August than from similar lambs in the fleece. Of 52,000 Kentucky lambs in 1942 on which records were taken at marketing in October and November, the lambs sheared in late July and August averaged 4 pounds more per lamb and had a better finish than similar lambs in the wool. Results just as favorable to the shorn lambs were obtained in three experimental tests at the Kentucky Experiment Station. Late lambs usually yield 2 to 3 pounds of wool, the sale of which more than offsets the cost of shearing and any discount in price that the shorn lambs may suffer at marketing time.

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15M—3-44

More Profit from LATE LAMBS

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By Richard C. Miller

FOR YEARS, Kentucky's more progressive sheep raisers have sought some practical means of bringing their late lamb crop (marketed after mid-July) up to the standard of quality and profitableness of their early spring lambs. Most of these late lambs have been unthrifty. Usually when marketed they have averaged 10-12 pounds lighter than lambs marketed in spring and early summer, and have brought less per pound because of thin condition. It has been estimated that the failure to grow out these late lambs to good market weights and finish has cost Kentucky sheep growers as high as a million dollars a year.

The main reason for this unthriftiness of late lambs has been failure to control internal parasites, especially nodular worms. Fortunately, the key to this late lamb situation has been found—phenothiazine, effective against stomach worms, nodular worms and several other species of intestinal roundworms. By using phenothiazine in a good program of sheep management quite a number of Kentucky farmers during the past two or three years have produced late lambs that have been as thrifty, as good in quality, and very nearly as profitable as the early lambs.

The way to solve the late-lamb problem is described briefly in a 12-point program to be used in connection with other generally recognized good practices in feeding, breeding, and management of sheep in Kentucky.

Leaflet 69

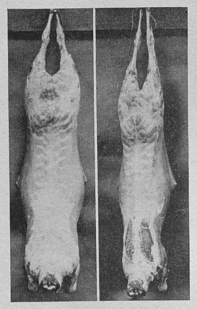
UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1944

Kentucky 12-Point Management Program

1. Don't save late ewe lambs for breeding ewes. Cull from the flock all late-lambing ewes and replace with early-breeding strains of westerns. Generally a ewe that breeds late one year will always be a late breeder.

2. Don't buy parasites into the flock when adding new sheep. Often a ram is the means of infesting an otherwise healthy flock. All rams and ewes, except possibly those direct from the ranges of the Northwest, should be treated with phenothiazine immediately on bringing them to the farm, and should be kept in a barn or drylot at least a week before being turned on pasture.



(Left) Carcass of a late lamb kept thrifty and finished at good weight on pasture; *(right)* carcass of a lamb of same age heavily infested with nodular worms.

3. Dose all sheep with phenothiazine in the late fall or early winter, but don't dose pregnant ewes within one month of lambing time. Repeat the phenothiazine treatment after lambing.

4. See that the flock is well fed. A sheep or lamb that doesn't get enough to eat is far more likely to be injured by parasites than one well nourished.

5. Have clean quarters at lambing time. See that feed racks and bunkers are made so as to prevent sheep and lambs from getting into them with their feet or otherwise befouling the feed.

6. Don't spread sheep or cow manure on fields that will be used for the flock that season.

7. Keep a mixture of 1 part phenothiazine and 9 parts salt where the flock can get to it readily, from May 1, through September. Drench at weaning times any lambs that appear to need it.

8. If tapeworm segments are found in the droppings, dose the flock once or twice during the summer with the cunic mixture (4 ounces of bluestone and 3 ounces of "Blackleaf 40" in 3 gallons of water).

9. Provide as wide a system of pasture rotation as is practical on your farm, and if possible make use of temporary pasture at least part of the year.

10. Keep fences in good enough repair to prevent the sheep going from field to field at will.

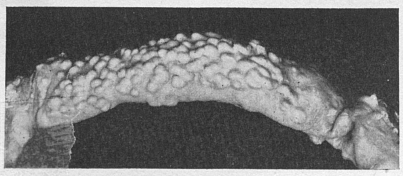
11. See that the flock can get to fresh water readily at all times. Running water is usually safer than pond water. Small, stagnant ponds should be avoided whenever possible.

12. Finish for May and June marketing as many lambs as possible. Wean not later than the middle of July any lambs still on hand and turn them on the cleanest pasture available—stubble or other fields that sheep have not been on during the season. Shear lambs to be kept until fall, because shorn lambs make better gains in hot weather than lambs in the wool.

Parasites the Greatest Enemy of Late Lambs

Of the parasites affecting Kentucky sheep, the common stomach worm and nodular worm are the most important. A program that keeps these under control is also effective against most of the others. Lambs get their first stomach worms early in the season though normally, except in heavily parasitized flocks, the infestation does not become severe enough to affect their condition noticeably before late June or early July. Lambs become more heavily infested with stomach worms than older sheep and the effects on the lambs are more severe.

Nodular worms appear later in the season than stomach worms and Kentucky lambs marketed before August do not usually show the effects of this parasite. At any packing plant where Kentucky lambs are being slaughtered in the fall or early winter one can get a vivid picture of the damage done by this parasite. It is the cause of the nodules or knots in the walls of the intestines which make the intestines useless either for sausage casings or for surgical suture material. By the last week in August, in 1942, about 25 percent of the intestines from Central Kentucky lambs slaughtered in a local packing plant had so many nodules that they were unsuitable for sausage casings or surgical sutures; in October, about 60 percent of the intestines were worthless for these purposes; and by December, it was necessary to reject nearly all of them.



A section of a lamb intestine showing the nodules or knots caused by nodular worms.

This loss of the intestines, while important in itself, is small compared to the loss in meat and wool brought about by the unthriftiness of the lambs—a loss both in quality and in pounds of lambs produced.

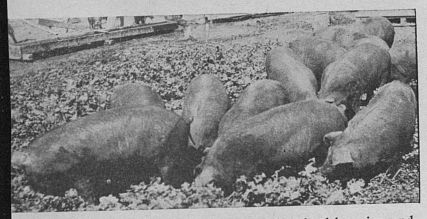
Phenothiazine Controls Both Nodular Worms and Stomach Worms

Phenothiazine is highly effective not only against the common stomach worm but against other gastro-intestinal round worms, including the nodular worm. It is the only efficient anthelmintic now available for control of nodular worms. It is not effective against tapeworms nor against lung worms. Tapeworms, however, do not affect lamb gains very much unless the infestation is heavy. Furthermore, tapeworm infestation is easily recognized by finding segments of the parasite in the droppings, and where a heavy infestation is indicated a dose or two of the cunic mixture (4 ounces of bluestone and 3 ounces of "Blackleaf 40" in 3 gallons of water) can be given during the summer at the rate of 4 ounces for mature sheep and 2 ounces or less for a lamb, depending on size.

Care should be taken in handling phenothiazine, as contact with the skin or inhalation of the dust may cause skin irritation to some persons.

Annual phenothiazine schedule.— While there is much yet to learn about phenothiazine, the information now available indicates that for best results sheep in this state should be dosed twice a year with phenothiazine (once in the late fall or early winter and again after lambing) and a mixture of 1 part phenothiazine and 9 parts salt should be kept before the flock continuously from early May through September. Also, under some conditions, it may be advisable to dose at weaning time any lambs still on hand.

Dosage.— The standard dose of phenothiazine for mature sheep is 25 grams—18 doses to the pound. It may be administered in the feed, as a drench, or in the form of pellets or boluses. The feed method is the simplest when the sheep are on feed but has one disadvantage that some animals eat more than others. To get the sheep to clean up this mixture at one feeding, skip one feeding and then give them the one containing the phenothiazine. The pellet method, while convenient for those experienced in administering the pellets, is the most expensive method and some farmers report difficulty in administering the drug in this form because of the large



Pigs on Rape Pasture. Good forage makes healthy pigs and cheaper gains.

the waste of corn is only about a third as much. Even then, ½ pound of high-grade protein supplement or 3 pounds of skimmilk daily for each pig from before weaning up to at least 150 pounds increases net returns over $20 a litter, at current prices of hogs, corn and supplement.

One pound of good protein supplement costs about 4 cents compared to 2½ cents for a pound of corn, but when fed to thrifty drylot pigs it saves 6 pounds of corn, worth 15 cents. To hogs on pasture each pound of supplement saves 3 pounds of corn, worth 7½ cents. Whether the pigs are fed on pasture or in drylot, the use of a good protein supplement shortens the feeding period by several months.

Healthy pigs receiving corn and supplement on pasture market the corn at about 19 cents a bushel higher than they would if no supplement were fed.

Feeding Without Pasture Costs $30 to $50 a Litter

Good pastures save up to 18 percent of the feed in growing and fattening hogs. One acre of good legume, small grain, rape, or mixed pasture will carry 2 to 3 litters of full-fed shotes from weaning to marketing and will replace up to $100 worth of feed. Each sow and litter fed on pasture requires 13 to 21 bushels less corn and 330 to 550 pounds less supplement than similar sows and litters fed in drylot. With corn at $1.40 a bushel and supplement at $4.00 a hundred pounds, good pasture saves from $30 to $50 worth of feed to the litter.

Marketing at 275 Pounds Wastes $6 to $8 Worth of Feed per Litter

Fat hogs weighing 225 to 275 pounds use 15 percent more feed for each pound of gain, than the average required by lighter animals. The last 400 pounds put on a litter of 8 pigs fed to 275 pounds requires

225 to 275 pounds more feed than would be used by lighter pigs making the same amount of gain.

APPROXIMATE PROFIT OR LOSS PER LITTER

(Corn at $1.40 per bushel; supplement, $4.00 per 100 pounds; fat hogs, $13.35 per 100 pounds. Pasture is not charged; the cost is balanced by value of manure for fertilizer.)

1800 pounds pork the "Healthy Way" (8 pigs, 225 pounds each, in 6 months)			1230 pounds pork the "Wormy Way" (6 pigs, 205 pounds each, in 8-10 months)	
Feeds	Amount used[1]	Profit or loss	Amount used[1]	Loss
Grain	120 bu	$53.20	130 bu	—$39.80
Pasture	½ acre		½ acre	
Supplement	550 lb		550 lb	
Grain	150 bu	26.20	164 bu	— 65.40
Pasture	½ acre		½ acre	
Grain	138 bu	6.00	150 bu	— 89.80
Supplement	1100 lb		1100 lb	
Grain	240 bu	—92.80	260 bu	—199.80

[1] Including feed for brood sow from breeding to weaning.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

40M—3-44

For:

U. S. Department of Agriculture
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WASHINGTON, D. C.

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Shall I Feed Hogs in 1944?

By R. W. Pifer



IN THIS "dollars and cents" discussion of raising hogs, the costs and returns are figured with corn at $1.40 per bushel; supplement, $4.00 per 100 pounds; fat hogs, $13.35 per 100 pounds. Hogs may sell for more than $13.35 during 1944, but this figure is used because it is the lowest government support price (announced to hold until October 1, 1944, to the extent of funds available) for slaughter hogs at any Kentucky market. The calculations are based on results with hogs in Kentucky and neighboring states.

Leaflet 70

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1944

Thrifty Pigs Still Market Corn at a Profit

Hogs are "corn on foot" to the farmer who feeds corn to hogs. Whether corn on foot is worth more or less than the local cash price of corn depends largely on how good a job the farmer does with his hogs. With good feeding and management, corn can be marketed through $13.35 hogs at $1.82, or more, a bushel, while with poor methods it brings only a third to half as much. The approximate values of corn marketed through $13.35 hogs, on different rations, the "healthy way" and the "wormy way," are shown in the following tabulation:



Feeds	*Value of corn when pigs are raised—* The "Healthy Way"	The "Wormy Way"
Corn, Protein Supplement, Pasture	$1.82 bu.	$1.09 bu.
Corn, Pasture	1.60	1.00
Corn, Protein Supplement	1.42	.80
Corn alone	1.00	.63

By following proved production methods, the average hog grower in Kentucky could sell one-third of his brood sows (as recommended in 1944 goals in order to bring hog numbers into line with feed supplies) and still produce as much pork as before, **and do it with half to two-thirds as much grain and supplement!** This would be the best possible way to carry out the appeal of the War Food Administration to put every crop acre and every farming facility to its most productive use this year. The tonic needed by more than nine-tenths of Kentucky hog raisers is *more efficiency!*

Worms Cost $80 to $100 a Litter

A litter of 8 healthy pigs fed corn and supplement, on good forage, markets corn at $1.82 a bushel, while a wormy litter receiving the same feeds markets it at only $1.09, a difference of 73 cents a bushel in favor of the thrifty pigs. Therefore, at present prices, Kentucky farmers cannot afford to market the crop through hogs *unless the pigs are kept healthy by raising them on clean pastures according to proved sanitation practices.*



Not all wormy pigs are so stunted as this one, but whenever the worms are there they rob the profit. Such pigs may be "wormed," but they never are as profitable as pigs raised the "healthy way."

Worms cut the production of one brood sow by nearly 600 pounds to the litter, rob one bushel of corn out of every barrel fed, rob 20 pounds of supplement out of every 100-pound bag fed, and add 3 to 6 months to the feeding period. This loss of feed and pork costs the swine grower $80 to $100 a litter. *Nearly $100 increase in the net returns from each thrifty litter is the pay for doing three easy jobs:*

(1) Scrub the farrowing quarters with boiling lye water.
(2) Wash the sow's udder, legs, and sides before she farrows.
(3) Keep the little pigs out of contaminated fields and ponds until they weigh 100 pounds or more.

Dead Pigs Cost $25 to $30 a Litter

Fifteen percent of the feed used in pork production is wasted by the 4 pigs per litter that, on the average, die before they reach market. A pig lost at farrowing wastes 140 pounds of feed; at weaning, 260 pounds; at 4 months, 360 pounds; at marketing, 990 pounds.

Farrowing losses lower the value of corn marketed through healthy hogs by the following amounts:

Number of pigs saved per litter	*Value of corn per bushel*	*Loss in value of corn, per bushel*
8	$1.82	.....
7	1.78	$ .04
6	1.73	.09
5	1.66	.16
4	1.57	.25
3	1.44	.38
2	1.23	.59
1	.81	1.01

The chief reason for this cumulative loss is that the smaller the litter that goes to market the greater the sow's feed bill per pig!

Well-bred sows, properly fed and cared for from breeding to weaning, farrow and save large litters of pigs weighing 2½ to 3½ pounds each—the kind that live and make a profit when full-fed under sanitary conditions. Pregnant sows and gilts need 1¼ to 1¾ pounds of feed daily for every 100 pounds of live weight. From ¼ to ½ pound of high-grade protein supplement, or 1 gallon of skimmilk, should be fed daily for 6 weeks before farrowing. Pasture, limestone-salt mixture, fresh water, protection from the weather, and exercise help sows to produce bigger, more vigorous pigs.

Two pigs per litter, on the average, are crushed by the sow soon after farrowing, thus lowering the value of corn marketed through hogs about 9 cents a bushel. This loss can be much reduced by having sows farrow on sloping floors and having a "pig hover" along the lower wall. The sow then lies with her back up grade and the little pigs make their nests along the wall, under the hover, which helps to keep them warm and protects them from overlaying. Results are best when the floor slopes about 1½ inches to the foot. The hover should be 10 inches off the floor and extend 12 inches out from the back wall. Very little bedding should be used; otherwise it works down under the hover, clogging the space for the pigs.



Sloping floor and pig hover saves pigs from crushing.

Feeding Without Supplement Costs $20 to $140 per Litter

Feeding corn alone in drylot wastes over 100 bushels of corn per litter. If the pigs have good forage

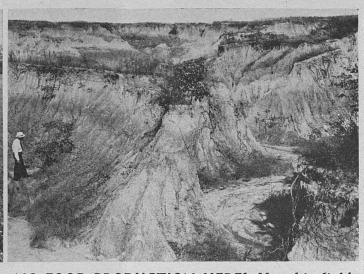
Save Your Soil — and Keep It Working



CONSERVATION FARMING on this field will produce big crops year after year, though its slope is about the same as that of the ruined field on the next page

How to Conserve Your Soil —

1. Fit the cropping system to the capabilities of the land.
2. Keep up soil fertility.
3. Grow good pastures and meadows to the fullest extent feasible.
4. Control erosion and conserve moisture on sloping land.
5. Drain wet land to permit full use of bottomland.
6. Use farm reservoirs where needed.
7. Manage farm woodland as a crop.
8. Protect and encourage the development of wildlife resources, and control erosion, by planting and maintaining suitable vegetation along fence rows, woodland borders, and all such places not used for crop or pasture production.



NO FOOD PRODUCTION HERE! Yet this field was in corn about 25 years ago!

If You Do These Things You Will Destroy Your Soil —

1. If you crop your land with little or no regard to its ability to produce without soil loss.
2. If you fail to keep up soil fertility.
3. If you plow land too much, or leave it idle to "rest."
4. If you fail to use erosion-control and moisture-conservation practices.
5. If you leave bottomland poorly drained while overworking hill land.
6. If you cultivate steep land instead of using it for pasture, because of the lack of a dependable source of water for livestock.
7. If you burn, graze, and mismanage woodland areas.
8. If you fail to protect and utilize fence rows, woodland borders, and other small areas usually classed as idle land.

Soil Conservation is both a wartime and a peacetime necessity. Though we must have high production of farm products for war, there is no reason why the high production should ruin our land. We CAN increase production and at the same time save our soil!

Your soil-conservation district organization, and the agencies cooperating in the soil-conservation program in your county, can help you to plan and apply the practices needed to increase your production and at the same time to save your soil.

See your COUNTY AGENT for more information.

This leaflet was prepared by
Wm. G. Survant, of the Department
of Agronomy.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

20M-3-44

U. S. Department of Agriculture
EXTENSION SERVICE
WASHINGTON, D. C.
OFFICIAL BUSINESS

For:

Penalty for Private Use to Avoid Payment of $300

CONSERVATION FARMING
Keeps Your Soil Producing

Increases crop yields
Lowers costs of livestock production
Saves soil and water
Increases net farm income



It takes good soil to grow tobacco like this — but it can be done, even on rolling land, by "conservation farming."

Leaflet 71

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1944

USE These Practices — NOW, and at Every Opportunity!



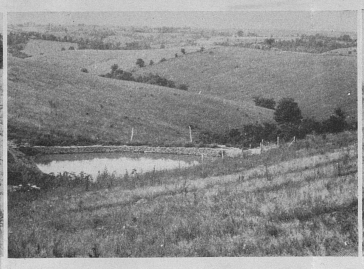
CONTOUR FARMING WITH PROTECTED WATERWAYS

This Way of Farming —

1. Reduces soil losses
2. Conserves moisture
} **and therefore INCREASES CROP YIELDS**
3. Requires no additional labor or equipment.
4. Helps to prevent gullies by protecting the waterways.

CONTOUR FARMING is an important practice that any farmer can easily follow. Even moderately sloping land should be plowed, prepared, planted, and cultivated on the contour. This practice helps hold back the water from summer showers, allowing more of it to soak into the ground for growing crops.

Leave a wide strip of grass in the draws when plowing as a protection against the forming of gullies. It is easier to leave grass waterways than to jump gullies.



GOOD PASTURE AND WATER FOR LIVESTOCK

Good Pasture —

1. Produces cheap home-grown feed high in protein and minerals.
2. Holds soil and water losses to a minimum.

Farm Reservoirs — serve for stock water and fish production.

A good pasture program should provide (1) a thick cover of adapted grasses and legumes on the regular pasture fields; (2) plenty of alfalfa, lespedeza or other drouth-resistant crops for grazing when regular pastures are short; and (3) small-grain or other cover crops to lengthen the pasture season.

For success with pastures:

1. Use lime, phosphate, and other fertilizers where needed.
2. Use mixtures of grasses and legumes known to do well in your locality.
3. Seed in the manner and at the time that have proved best in your locality.
4. Give full attention to reseeding of bare spots, mowing, and other details.



DRAINAGE OF WET LAND FOR CROPS

Good Drainage of Wet Land —

1. Adds productive acreage to the farm, and makes greater production possible.
2. Provides bottomland for intensive cropping, permitting use of steeper land for meadow or pasture.

DRAINAGE of wet land increases agricultural production immediately. Many farms have some poorly drained land which can be made the most productive land on the farm, by drainage. The cost of draining such land usually is more than repaid by the increased production the first year.

WET AREAS on many farms in Kentucky may be drained by:

1. Making or repairing drainage ditches where proper outlets are available.
2. Installing field drain tile to drain "wet spots."
3. Making diversions or terraces where needed to protect bottomland from runoff water from hill lands.



COVER CROPS FOR SOIL PROTECTION AND WINTER PASTURE

Cover Crops —

1. Produce fall, winter, and spring pasture.
2. Increase total production from the farm.
3. Reduce erosion and leaching losses.

CROPS commonly used for cover crops in Kentucky are wheat, rye, barley, vetch, crimson clover, or mixtures of two or more of these crops. Cultivated fields and lespedeza fields can be used to extend the pasture season while they are being protected from erosion losses by growing a good cover crop.

TO GROW GOOD COVER CROPS: (1) plant early; (2) build up the fertility of the soil; (3) inoculate the seed when sowing vetch and crimson clover; (4) use plenty of seed; and (5) prepare a good seedbed and cover well.

FREDONIA — New; promises to be the best early black variety.
MOORE EARLY — An old standard; quality only fair.
SHERIDAN — New; a promising grape similar to Concord but ripens later and has better quality.
WORDEN — Good quality; shatters and cracks.

Wine varieties
CATAWBA, CLINTON, DIANA, IVES, NORTON.

CONTROL OF INSECTS AND DISEASES

(See the "spray schedule" on page 7.)

Black rot, the most serious disease of grapes in Kentucky, is carried from year to year on old canes and spread to young shoots and leaves when growth starts in the spring. It appears on the half-grown grapes, as small black or brownish spots that enlarge rapidly. Finally the berry becomes shrivelled and mummified. **Sprays to be effective must be applied early,** when new growth is just starting, and again just before and just after blossoming time (see spray schedule).

Berry moth adults lay early eggs on the grape blossoms and later eggs on the berries. Larvae from the early eggs feed on the blossoms and small berries, usually webbing together the berries in the cluster. The larvae from the later eggs feed on the inside of the berries, which develop purple spots, usually followed by cracking and rotting, commonly confused with the rot disease. See spray schedule.

Grape flea beetles, glossy, greenish-blue insects somewhat under ¼ inch long, are not numerous every year. They attack the grape buds just as they are swelling, and eat the heart out of them. Add 1½ pounds lead arsenate to each 50 gallons of the delayed dormant spray or cluster-breaking spray, if grape flea beetles appear.

Grape leaf-folders fold the leaves over on the top surface and feed from the inside of the folds. Lead arsenate used in the spray is effective, and hand picking of the folded leaves in small vineyards is recommended. Winter clean-up of the vineyard also aids in control.

Green June beetles attack the ripe fruit and destroy the clusters. Arsenical sprays cannot be used. The best protection in a small vineyard, if this pest is troublesome, is to pin paper bags over the clusters of grapes (see front cover). Otherwise the fruit should be picked as soon as ripe. Sometimes it is practical to jar these clumsy beetles from the fruit into a pan of water and kerosene. Usually jarring must be repeated daily for several days.

Leafhoppers of several species attack grapes in Kentucky. All are very small, triangular-shaped insects which pierce the leaves and suck the sap. In late July they may appear in large numbers on the undersides of the leaves, causing at first small, whitish or yellowish spots on the leaves. In severe attacks the leaves become brown or yellowish and may wilt and fall. Spraying is most effective just before the oldest hoppers develop wings. See spray schedule. Spray the **undersides** of the leaves, using pressure. Apply in the middle of the day, when the temperature is high. For 3 gallons of solution, use ¼ ounce of nicotine sulfate solution and 1½ ounces of soap.

Rootworm.— The adult is a beetle which feeds on foliage, making chain-like marks on the leaves. The larvae eat the smaller roots and strip the bark and eat out pits and burrows from the larger ones. The vines become stunted or may be killed. Since the adults feed on the leaves, control consists in spraying with lead arsenate (see spray schedule).

Scale insects.— Occasionally grape canes are attacked by two species of scale insects, the grape scale and the San Jose scale. Of these the San Jose scale is by far the most destructive. Both may be controlled by dormant spraying as indicated in the spray schedule. Spraying is not recommended unless the insects are present.

SPRAY SCHEDULE

The following spray schedule is suitable for commercial vineyards, and may be varied to suit conditions found in the home vineyard. The sprays marked with an asterisk (*) should always be used. Thorough spraying with good pressure is important.

When to apply	*What to use*	*For control of—*
1. Dormant season.	Oil emulsion 2% or Lime-sulfur 1-8	Scale (omit if no scale).
*2. Delayed dormant. New growth about 1 in. long.	Bordeaux 8-10-100	Black rot, mildew.
3. Cluster-breaking, when shoots are 4 to 8 in.	Bordeaux 8-10-100	Black rot.
*4. Preblossom, when first blossoms are opening.	Bordeaux 8-10-100 Spreader (see note)	Black rot.
*5. Postblossom, bloom nearly complete.	Bordeaux 8-10-100 Lead arsenate 5 lbs. Spreader (see note)	Black rot. Berry moth.
6. Just before berries touch, or when size of pea.	Bordeaux 8-10-100 Lead arsenate 3 lbs. Spreader (see note)	Black rot. Berry moth. Root beetle.
7. June 22-25.	Nicotine sulfate, 40%, 2/3 pt. Soap, 2 pounds Water, 100 gallons	Leaf-hoppers (Spray under leaves).
8. July 22-25.	Repeat spray No. 7 if leaf-hoppers still numerous.	

NOTE. The use of a spreader, beginning with the preblossom spray, increases effectiveness. For 100 gallons use 1 pint of fish oil (made for spraying), or 2 pounds of fish oil soap, or 2 pounds of cheap toilet soap. (Dissolve soap in hot water.)

HOW TO MAKE BORDEAUX MIXTURE

For 100 gallons.— Dissolve 8 pounds of finely powdered bluestone (copper sulfate) in water in a wooden or "granite iron" bucket (if crystals are used, use hot water and suspend in cloth sack 2 inches into the water). Mix 10 pounds of chemical hydrated lime with water into a thin paste and strain into the tank or barrel containing 50 to 60 gallons of water. Dilute the bluestone solution to 8 to 10 gallons and add it to the lime water, stirring well. If poison is to be added stir 3 pounds of lead arsenate into the paste, dilute, and pour into spray tank while stirring. Add water to make 100 gallons of spray. Use while fresh.

For 3 gallons.— If only a little bordeaux is needed, use 4 ounces of bluestone, 5 ounces of chemical hydrated lime, 1½ ounces of lead arsenate, and 3 gallons of water, and mix as directed above.

WINTER CLEANUP

When winter pruning is done, remove and burn mummified fruits, dead wood, prunings, fallen grape leaves, tall grass and weeds, and other trash. Anything that can be done to destroy hibernating quarters helps to control insects.

PROTECTION BY SACKING

Sacking the clusters is practical in a small vineyard, to protect from diseases, insects, and birds. Use grocer's 2-pound paper sacks, or 3-pound sacks for exceptionally large clusters. Put them on soon after the blossoming period, while the grapes are about ⅛ inch in diameter. Cut the sacks from the top 1½ inches down on each side; pinch off the leaf attached opposite the cluster, draw a sack up over the cluster, fold it over the stem, and pin it snugly above the fruit.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

15M—3-44

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Grapes for the Home

By A. J. Olney

GRAPES are well adapted to the home garden. They come into bearing within 3 or 4 years after planting, can be trained over walls, fences, or buildings if ground is scarce, and the few insects and diseases that attack them are relatively easy to control.

STARTING THE VINEYARD

Layering.— The easiest way to propagate a few new vines from an old one is to bend a cane to the ground and cover part of it with soil so that roots will form, thus making a new plant. A year later the original layered cane is cut where it enters the ground, and the new vine may then be planted wherever desired. Layering is done best in early spring.

Leaflet 72

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky March, 1944

This leaflet is a revision of Circular 209

Hardwood cuttings.— If many vines are needed, use hardwood cuttings made in late fall from mature vines. Cut well-ripened canes of medium size into sections 7 to 10 inches long, having 2 or 3 buds each. The lower cut should be close below a bud, and the upper an inch or two above a bud. Tie in bundles of 25 or more, with the tops all one way. Then bury the bundles upside down in damp moss, sand, or other earthy material, in a cool cellar, or place them under a mound of soil in a well-drained place, with the earth packed firmly around each bundle and all the bundle covered with at least 4 inches of soil. In late March or early April dig the bundles and plant the cuttings one by one, 6 to 8 inches apart, in straight rows 3 feet apart. Cultivate the young vines frequently. They may be planted in their permanent locations after one or two seasons in the nursery row.

Soil and planting.— In Kentucky any good, well-drained corn, potato, or tobacco land may safely be selected for the vineyard.

The details of planting are simple but important. Make the hole large enough not to crowd the roots—usually about 18 inches across and 10 inches deep. Put some topsoil in the bottom of the hole, then put the plant in place about the same depth it grew originally, spread out the roots, cover with soil, and tramp firmly. Finally, fill the hole to the ground level.

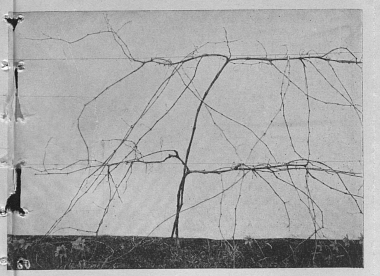
Vines may be planted either in spring or fall. If planting in fall, cover the tops with soil after setting, and remove the covering in spring before the buds swell. If planting in spring from a nursery, order the vines early enough to get them planted while still dormant. Standard planting distance is 10 feet apart in the row, and rows 8 or 9 feet apart. Preferably the rows should run north and south.

Remove all canes on the newly set vine except the strongest one, and cut that one back to 2 or 3 buds. The young vine may run on the ground the first season, or be tied to a stake.

PRUNING AND TRAINING

When to prune.— Prune in early spring, after severe cold weather is past. Don't prune while the wood is frozen, because frozen canes are brittle and the vines may be damaged. "Bleeding" occurs if pruning is done in late spring, but there is no evidence that such bleeding is harmful.

Training to the trellis.— If the young vine has not made vigorous growth the first season, cut it back again, leaving only 2 or 3 strong buds on the best



Two-trunk Kniffin system: a vine in winter, before pruning.

cane. These produce shoots that will be used the following year to form the permanent trunk or trunks of the mature vine.

One of the most satisfactory systems of training is the "Kniffin System." This system requires a trellis of two wires. A stout post of durable wood, 8½ or 9 feet long, is set at each end of a row, firmly braced and thoroughly tamped. The intermediate posts should be not less than 7½ feet long, set about 20 feet apart (spaced for two vines between) and about 2 feet deep. Stretch No. 10 or No. 11 galvanized iron wire along the row, one close to the tops of the intermediate posts, and the other 2 feet lower. Staple these to the posts, but not tightly to the intermediates, and leave the wires on one end post long enough to be released easily for restretching.

One form of the Kniffin system requires two upright main trunks, one extending only to the lower wire, the other to the upper. Another form of this system uses only one trunk with branches extending out on both wires; otherwise the treatment is practically the same. There is little difference in yield.

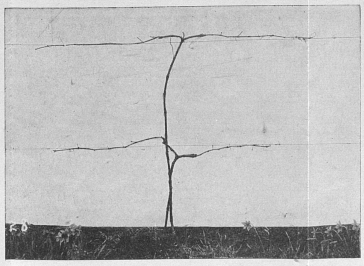
In developing a 2-trunk Kniffin system, choose two strong shoots near the base of the vine, and tie them at intervals to a stake so that they will make straight trunks. Have the trellis ready. When one shoot reaches the lower wire pinch off its tip. When the other reaches the upper wire pinch off its tip. This pinching back usually causes the development of side branches. Train two of these side branches in opposite directions on each wire, and tie loosely. Remove all other shoots. In the spring a strong shoot commonly grows from each bud of these horizontal canes, and upon the first few joints of these spring shoots the flowers and fruit are produced.

The next year, examine the head of the trunk and the base of the arm to find, on each side, the best well-matured cane of medium size and length. Save these four canes, and prune out the old wood and the other canes of the current year's growth. Cut the canes to be saved back to 6 to 10 buds each, and train them along the wires. One or two of the other canes near the head of the trunk may be "spurred," that is, cut back to one or two buds from which shoots are likely to grow in spring for use as renewal canes a year later.

Pruning a neglected vine.— Often many old trunks of a long-neglected vine must be given drastic cutting if the vine is to be properly shaped and trained. A number of healthy canes which matured their wood and buds the previous season should be kept to bear fruit. These may be selected almost anywhere on the vine, but to bring the vine finally under better control, save enough of the best canes near the base, or at least on a central trunk, and remove all other branches, both young and old. To produce crops from the old vine while new vines are growing to maturity, the easiest method is to cut back all young canes to two buds.

CULTIVATION

The grape, like the orchard fruits, is benefited by regular shallow cultivation, particularly in the early part of the growing season. If cultivation is not practicable a mulch of grass clippings or straw may be used to advantage.



Same vine after pruning. The same method of pruning is used with a single-trunk vine.

COVER CROP

A good practice is to sow a cover crop in August, to prevent winter washing of the soil, make winter pruning easier, and provide humus when turned under in spring. Rye, barley, or oats are often used, sometimes with the addition of winter vetch.

FERTILIZERS

Usually it is possible to maintain the fertility of the vineyard by applying barnyard manure each year. If manure cannot be had, the use of nitrate of soda or sulfate of ammonia is suggested, at the rate of ½ pound scattered thinly around each vine in early spring. Nitrogen seems to be the most important element needed, though phosphorus also is needed, to promote the growth of cover crops, except on the phosphatic soil of the Bluegrass region. Whether or not to use commercial fertilizer may be demonstrated best by supplying fertilizers to one section of the vineyard and observing the effect on vigor and yield of fruit.

VARIETIES

Concord is a standard variety in Kentucky. It succeeds practically everywhere, and no other variety is so likely to continue in productiveness, vigorous health, and hardiness, combined with good quality. Planting other varieties also, however, gives a choice of kinds and prolongs the season of ripe fruit.

Not all the varieties suitable for home use are included in the following list, but those included offer a fairly wide choice.

Red varieties

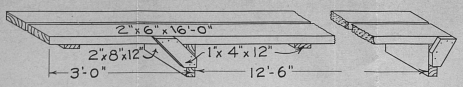
AGAWAM — Quality excellent; productiveness variable.
BRIGHTON — Quality excellent; lacks productiveness; self-sterile.
CACO — A good general-purpose variety; does not always color well.
CATAWBA — An old standard variety. Also used for wine.
DELAWARE — The standard of quality; berries small; vine weak.
LUCILLE — Good quality; productive, but cracks badly.

White varieties

GOLDEN MUSCAT — Handsome late variety; excellent dessert quality.
NIAGARA — The standard midseason white dessert grape.
PORTLAND — An excellent early dessert variety.

Black varieties

CONCORD — Probably the best general-purpose grape.



Plan of a plant-bed board (for a 12-foot bed) that can be moved by one man from one end. This board is easily moved by pressing down on the extended end and swinging the other end into position, then lifting the extended end over to where it is wanted.

MATERIALS NEEDED:

Top	2 pcs. 2"x6"x16'
Legs	2 pcs. 2"x8"x12"
Cleats and braces..	7 pcs. 1"x4"x12"

FARMERS recognize that in almost every community there are a few who get their work done quicker and easier than others. For all sorts of farm jobs, habits and customs of work prevail, and from time to time special knacks and short-cuts are developed and passed along from father to son or neighbor to neighbor. Such skills, that get the job done in the shortest time with the least effort, are of great value to farmers, especially in these times when labor is scarce and every farmer is trying to produce the very utmost possible.

Knowing that such differences in ways of working exist, and that all farmers like to know how the others do the job in order to get suggestions for improving their own practices, the Kentucky Agricultural Experiment Station studied the methods of work of a number of outstanding farmers with a view to passing along to others (with the full consent of the farmers visited, of course) the best of the practices found. Ways of doing many kinds of farm work were studied, but this leaflet deals only with pulling tobacco. Other leaflets on other kinds of farm work are planned.

To get the information on pulling plants, 20 farmers in central Kentucky were visited, all of whom had been pointed out by farmers or others as being good tobacco growers or especially skillful in pulling plants. Among these 20 farmers, the time taken to pull enough plants to set 1 acre (about 8,500 plants) ranged from 4 to 14 hours—a difference of one full 10-hour day.

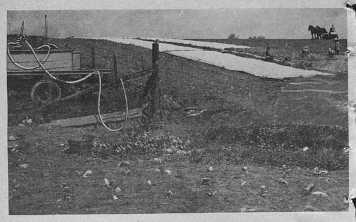
This leaflet describes the best of the practices found, those that got the job done with least effort in the shortest time. Among other farmers who read this leaflet there may of course be certain still better practices than those described here—and in that event the authors would be glad to learn about them, so that they too might be passed along and made a wider part of our general skills in getting farm work done.

The Quick Way Is the Easy Way

It is reasonable to expect that the quickest and easiest way of pulling plants would be the way in which no time and effort are wasted by doing unnecessary things. So it proved in this study. The farmers who worked in the most natural positions and handled the plants the least in getting them from the bed to the field, pulled the most plants with the least effort. They handled the plants **in the hands** only twice, whereas those who followed the usual longer way of doing it handled them **in the hands** four separate times. The extra handling not only caused waste work but increased the chance that mosaic would be spread among the plants. The various steps in handling the plants the short way and the usual way were as follows, the items with asterisk (*) being those in which the plants are handled **in the hands:**

Short Way	Usual Way
* Pull plants and pass them to holding hand	* Pull plants and pass them to holding hand
* Place plants in basket or on sack on plant-bed board	* Place plants on board
Carry basket or sack to edge of bed after pulling a strip across the bed	* Pick up handfuls of plants scattered along board and pile them in small pile at edge of bed
Take baskets or sacks to the field	* Pick up plants from small pile and place in container
	Take container to the field

Pulling the plants is tiring at best, but the use of a plant-bed board to sit on while pulling across the bed does away with much of the standing, stooping, or squatting that otherwise is necessary. This one device alone, which many farmers have not been using, speeds up the work and does much to make it easier.



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304M—4-44

Easier Ways To Do Farm Work

Pulling Tobacco Plants

By George B. Byers
Earl R. Young
Ernest J. Nesius



On 20 sample farms in central Kentucky last year the time taken to pull 8,500 plants to set 1 acre ranged from 4 to 14 hours. This leaflet describes the methods farmers used in doing it the easiest and quickest way.

Leaflet 73

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky April, 1944



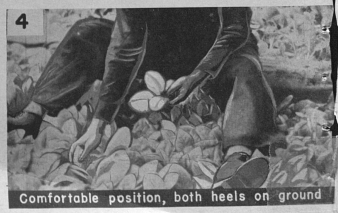
1 Moving far end of plant-bed board



2 Moving near end of board



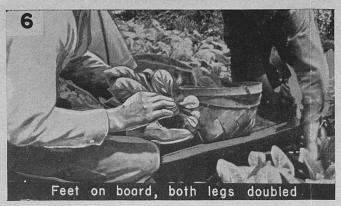
3 Comfortable position, one heel on ground



4 Comfortable position, both heels on ground



5 Feet on board, one leg doubled



6 Feet on board, both legs doubled

10 Ways to Save Work in Pulling Plants

1. **Use a plant-bed board that can be moved by one man from one end of the board.** See illustrations 1 and 2 and the drawing on the back of this sheet.
2. **Sit in a comfortable position on the board.** See illustrations 3, 4, 5, and 6. Using one position for a while and then changing to another is restful and therefore speeds up the pulling. If the feet are to be kept out of the bed, pull a few handfuls with the feet outside, then pull across the bed with the legs doubled as in illustrations 5 and 6.
3. **Pull the plants in a systematic way to avoid pulling over the same area more than once.** See illustrations 7 and 8.
4. **Pull one plant at a time.**
5. **Pull by grasping the lower part of the leaves with the thumb, first finger, and second finger. Keep the palm of the hand toward the ground.**
6. **Pass plants to holding hand after pulling 3 or 4 plants.** See illustration 10.
7. **Keep the holding hand near the pulling hand.** See illustration 9.
8. **Fill the holding hand comfortably full (25 to 30 plants)** before putting plants in container. See illustration 11.
9. **Keep pulling while putting the plants in the container. Watch the pulling hand, not the holding hand.** See illustration 12.
10. **Put the plants on a sack or in a basket to be handed direct to the setters or droppers.** This reduces the number of handlings of the plants to the least possible. See illustrations 6 and 12.



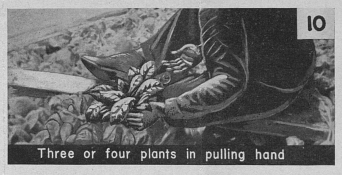
7 Pulling first semicircular area



8 Pulling second semicircular area



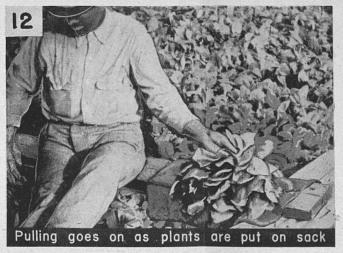
9 Keeping holding hand near pulling hand



10 Three or four plants in pulling hand



11 Filling the holding hand comfortably full



12 Pulling goes on as plants are put on sack

If more than one sample is sent in from the same field, draw a map of the field in the space below, showing the different areas. Number each area, and number each sample the same as the number of the area from which it came. State the estimated yield of corn and the type of land (ridge top, fairly steep, etc.) for each area. If liming, fertilizer treatment, and cropping practices have been different on the different areas, describe these for each sample.

(MAP)

Lexington, Kentucky April, 1944

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15M—4-44

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EXPERIMENT STATION
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SOIL TESTS for Lime and Fertilizer

By P. E. KARRAKER

CHEMICAL TESTS furnish useful information on the lime and fertilizer needs of the soil, but other indications of the needs of the soil should not be neglected. Lack of nitrogen, potassium, and some other nutrients is shown by definite symptoms in plants. Much, too, can be told about how to lime and fertilize a soil from a knowledge of its past cropping, liming, manuring, and fertilization. Treating plots in a field, to observe the effects, is a very useful guide. Ask your county agent about nutrient deficiency symptoms in plants and about making the field tests.

Tests Made By Experiment Station or County Agent

On soil samples properly taken, marked, and sent in, the Experiment Station will make chemical tests for (1) degree of soil acidity, (2) content of available phosphorus, and (3) content of available potassium. These tests indicate whether the soil needs lime, and phosphate and potash fertilizers. No test will be made for available nitrogen, because the content of it in the soil, particularly in soil samples, changes rapidly. How much nitrogen a soil will furnish to a crop can be fairly well judged from the recent manuring and cropping. Because of the large amounts of fertilizer or manure usually applied to gardens and the relatively low cost of

Leaflet 74

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

manuring and fertilizing these small areas, testing garden soil generally is of little value.

Soil samples for these tests must be taken very carefully. The tests are useless, and wrong advice may be given, if the sample does not fairly represent the soil. Follow the directions given below. Fill out the Soil Sample Record sheet attached to this leaflet and send it in with your soil sample so that the recommendations can be based both on the tests and on the history of the soil.

Many county agents are prepared to make these tests. In counties where this is done, it is better that the tests be made in the county and not at the Experiment Station because the county agent knows local soil conditions and he and the farmer can discuss taking the samples, what the tests show, and how the soil should be treated. If your county agent does not make such tests, send the samples to the Department of Agronomy, Experiment Station, Lexington, Ky.

How to Take Soil Samples

Fields or areas in fields that differ in productivity, or which have been cropped or fertilized quite differently in the recent past, should be sampled separately.

From each uniform field or area in a field take an equal amount of soil from 8 to 10 places distributed over the area. If you don't have a soil auger (the most satisfactory tool for sampling soil), use a spade. Remove grass and weeds. Make an opening to the plow depth with one straight side, from which remove a slice of uniform width and thickness from top to bottom. In choosing the places for sampling, avoid spots that are not representative, such as places where straw or haystacks recently stood, or near a row if fertilizer was applied in the row last year, or near a highway where the soil may be affected by limestone dust blown from the highway. Put the soil from the different places together, mix well, and remove about one-half pint for the sample to be sent to the Experiment Station. Spread this out in a place where it will not be disturbed and allow it to dry. Don't dry it over a stove or furnace. Place it in a clean container and label it properly. Take the samples, preferably, when the soil is not too wet to plow.

(Tear off here and send with soil sample)

Soil Sample Record

Name .....

Address..... County.....

Farm is on.....road, ...miles,

.....direction, from.....
(church, school, village, etc.)

Sample No..... Date.....

Sample taken from:

Check (√) the one which applies

( ) ridge top
( ) fairly steep slope
( ) gently rolling to level upland
( ) poorly drained bottom
( ) well drained bottom
( ) second bottom

Crop grown this year....., 1 year ago....., 2 years ago.....,
3 years ago....., 4 years ago.....

Has field ever been limed?....., when.....,
kind of material....., tons per acre.....?

What kind of fertilizer and how much per acre was used this year....., 1 year ago....., 2 years ago.....,
3 years ago....., 4 years ago.....

Tons of manure applied per acre this year.....,
1 year ago....., 2 years ago.....,
3 years ago....., 4 years ago.....

Estimated bushels of corn per acre the land would produce in an average year.....

Why is test wanted?.....
.....
.....
.....
.....

9. Plan definite work for each member of the crew.

For example, in fertilizing with an attachment on the plant setter, one man (usually the driver) fills the water barrel, one of the setters gets plants, and the other man fills the fertilizer hopper. This saves time and gives the setters a change of position, which is restful.

10. If possible, use two persons on the setter about equal in quickness and skill.

Unless the setters are well matched in ability, the faster one will skip plants because of the tediousness of holding back, while the slower one will skip plants because of the strain of hurrying.

11. Cross-set ends of field with machine setter.

Even though some plants will be plowed up in cultivating later on, which is no disadvantage, setting the ends with the machine rather than by hand saves labor.



End of field cross-set with machine setter.

12. Set plants farther apart in row, with rows wider than usual.

Though there is of course some variation in practice according to quality of land, the usual planting distance for burley in central Kentucky is 18 inches apart in the row, with rows 38 inches apart. At this distance, the setting time is about 8.5 man-hours per acre. Where scarcity of labor is a critical problem, however, time can be saved in setting (and later on also in cutting, housing, and stripping) by setting the plants farther apart, as is shown in the following tabulation. When the plants are set 20 inches apart in rows 40 inches apart, the setting time is reduced to 7.3 man-hours

per acre; and at the rate of 24 inches apart in rows 42 inches apart, the time is about 5.8 man-hours per acre. Both yield and quality of tobacco are influenced by planting distance, but there are no thorough-going data available to guide farmers in deciding what is the best distance for best yield and quality on soils of different levels of fertility. In general it is known that plants can be set somewhat farther apart than is customary, with little difference in yield and quality. Each farmer must therefore determine for himself which planting distance will return most for his labor and land.

Table 2.— Setting time is lower with fewer plants per acre

Inches between plants in row	*Rows 38 ins. apart*		*Rows 40 ins. apart*		*Rows 42 ins. apart*	
	Plants per acre	Man-hours per acre	Plants per acre	Man-hours per acre	Plants per acre	Man-hours per acre
16	10,317	9.6	9,801	9.1	9,334	8.6
18	**9,171**	**8.5**	8,712	8.1	8,297	7.7
20	8,254	7.6	7,840	7.3	7,467	6.9
22	7,503	7.0	7,128	6.6	6,789	6.3
24	6,878	6.4	6,534	6.0	6,223	5.8

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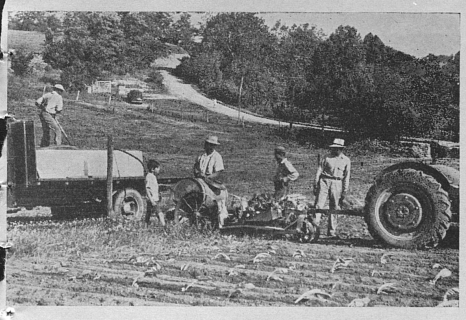
For:

Easier Ways To Do Farm Work

Machine Setting of BURLEY TOBACCO

By George B. Byers
Earl R. Young
Ernest J. Nesius



ON 10 SAMPLE FARMS in Kentucky in 1943 the time used in setting burley tobacco ranged from 6 to 17 man-hours per acre. By using the best of the methods found on these farms, 2 men setting and 1 man driving should reasonably expect to set 4 to 5 acres of tobacco per day, spaced 18 inches apart in rows 38 inches apart. This leaflet describes the methods used by the farmers who got the job done in the shortest time and with the least effort. It is the second in a series on easier ways to do farm work (the first being Leaflet 73, on saving work in pulling tobacco plants) resulting from a study by the Kentucky Agricultural Experiment Station working directly with farmers who

Leaflet 75

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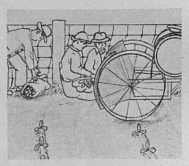
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky April, 1944

were pointed out as being good tobacco growers or especially skillful in setting plants. Twelve ways were found to do the job easiest and quickest.

1. Use a sack or basket for the plants.

Have the pullers put the plants on a sack or in a basket to be brought to the field, and placed directly into the lap of the setter (see Leaflet 73). This makes less handling of the plants, saves time, and reduces likelihood of spreading mosaic.



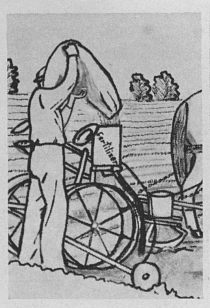
Plants set from sack spread out on lap.



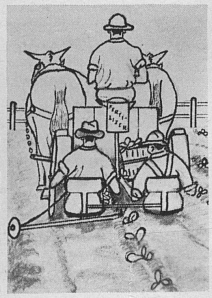
Plants set from basket on lap.

2. Mark the rows, apply the fertilizer, and pull the setter all at the same time.

To do these three things separately, as they usually are done (with 3-row sled marker, 1-horse drill, and machine setter without fertilizer attachment or marker) takes about 11.5 man-hours per acre. Using a 2-row corn planter with fertilizer attachment to drill the fertilizer and mark the rows



Drilling fertilizer and marking rows in one operation.



Drilling fertilizer, marking rows, and setting in one operation.

at one time, saves about 2 man-hours per acre. And to use a setter with fertilizer attachment and marker saves almost another hour, getting these three tasks done at one time in an average of 8.7 man-hours per acre.

A still greater saving of labor can be made by pulling **two** plant setters with one tractor. Only 6 2/3 man-hours per acre are taken this way.

3. Move the hands no more than necessary.

Picking up several plants at a time and moving this hand with the plants over and down toward the point where plants are set, speeds up setting.



Holding several plants near setting hand to reduce movements.

4. Keep the eyes on the setting hand.

Even when reaching for a handful of plants with the other hand, keep the eyes on the setting hand. Looking back and forth causes eye strain and tires the neck muscles, and therefore reduces the number of plants set per day.



Watching the setting hand while reaching for plants with the other hand.

5. Drive at a speed that makes the best rhythm and ease in setting.

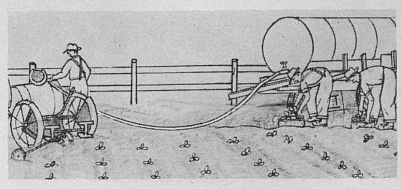
In a test in which the setter was being pulled by a tractor, a speed of 176 feet per minute (about 2 miles per hour) was best. At this speed the distance between plants was most nearly uniform, fewer plants were missed, and the speed of setting (50 plants per man per minute of setting time) was very satisfactory.

Table 1.— Influence of rate of travel on speed and regularity of setting

Rate of travel, feet per minute	128.0	162.7	168.0	**176.0**	200.0
Plants set per minute per man	39.4	46.0	47.0	**50.0**	57.0
Distance of plants in row					
Range, inches	14-27	7-24	14½-35	**13-26**	10-26
Average, inches	19.5	19.5	20.1	**19.8**	18.7
Percent of plants missed	1.2	2.1	1.0	**.4**	10.0

6. Haul the water in two trips a day.

Use a tank or tanks with enough capacity to furnish water for half a day's setting. Most plants per day are set when the crew works half a day at a time without interruption from hauling water.



Filling the water barrel from a large tank with a long "gravity-flow" hose.

7. Use gravity flow hose to fill the water barrel.

Put the water tank on a truck or wagon above the level of the water barrel of the setter, and use an outlet hose and valve attached at the bottom of water tank so that the water will flow from the supply tank to the water barrel. One man places the hose in the tank and looks after it until the barrel is filled, and no pumping is needed.

8. Have long enough hose to service 10 to 12 rows.

Having a long outlet hose saves time because the water barrel on the setter can be filled more times without moving the water tank.

this leaflet may offer suggestions for further increasing his efficiency.

In cutting tobacco, where the same operation is done over and over again, a small saving of time on each stick makes quite a difference in the number of sticks cut in a day. Even one slight change in method (such as reducing the number of steps taken or changing the method of positioning the stick) may result in an increased output of 15 to 25 percent.

Even though spearing is faster than splitting, and speared tobacco is easier housed and stripped, it must be recognized that splitting is more desirable for curing if the weather is unfavorable for curing.

How to Learn This Method

Most persons who read this leaflet will have had experience in cutting burley tobacco, and many will have formed habits of doing it differently from the way described here. For those to whom this method may seem to be an improvement or for those who have had no experience in cutting tobacco, we make the following suggestions for learning this method:

1. Before trying to put the method into practice, be sure you have a clear idea of it in mind.

2. Learn the method **as a whole,** not part by part. In other words, don't practice spearing without at the same time doing the other things that go along with it—cutting the plant, footwork, and handling the knife, spear, and stick. Such skills as striking at the spear, jabbing the stick in a slanting position, and getting the hands and feet to work together require considerable practice. Remember that practice makes perfect and that accuracy should be learned before speed.

3. Give the method a fair trial by using it in the field long enough to form a habit of it and become skillful in the movements.

4. Check yourself frequently to see that you are doing the job as you intend.

FOOTWORK IN CUTTING AND SPEARING PLANTS

The right placing of the feet can save much effort and time in cutting and spearing tobacco. For a right-handed man of average height and reach, the footwork shown in the following six pictures is about right.



When the spear is put on the stick (see drawing No. 3 on back of page) the left foot is placed about right for cutting the first plant, but the right foot must be dropped back. When the first plant is struck onto the stick, the right foot is brought up beside the stick, about 12 inches out from the row. The right foot is kept in this same position in cutting all the remaining plants. In cutting plants 2, 3, and 4 the left foot is stepped toward the plant for cutting and is swung back toward the stick for striking. In cutting Plant 5 the left foot is stepped toward the plant, but in striking with plant 5 the weight is still on the right foot and the left foot is dropped back into position for cutting Plant 6. When plant 6 is cut the left foot is brought around forward to face the stick.



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For:

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Easier Ways To Do Farm Work

Cutting and Spearing Burley Tobacco

By Ernest J. Nesius
Earl R. Young
George B. Byers



CUTTING 1,000 or more sticks of tobacco day after day is an accomplishment reached by relatively few men. Such men are proud of their records. Usually they are credited with being unusually skillful and rapid workers. Very careful study of the way 16 such men did this work in 1943, however, showed that the **method** they used had a great deal to do with their being able to cut so much more than the average number of sticks per day. Other men, just as skillful and rapid workers, but using a poorer method, could not cut so many.

In this leaflet the method of cutting used by the very best of the cutters is described. The drawings and photographs, made from a moving-picture film taken of one of the most expert of these cutters, present an authentic record of this method. To one who is already highly proficient, a comparison of his own procedure with the method described in

(Continued on page 6)

Leaflet 76

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky June, 1944

TIME-SAVING WAY TO CUT AND SPEAR TOBACCO

(Drawings made from moving pictures of an outstanding workman)

Stick grasped near end, ready to jab. Note that knife and spear are held in left hand, leaving right hand free for jabbing. Sticks sharpened on both ends, for ease in jabbing and to let the spear fit solid.

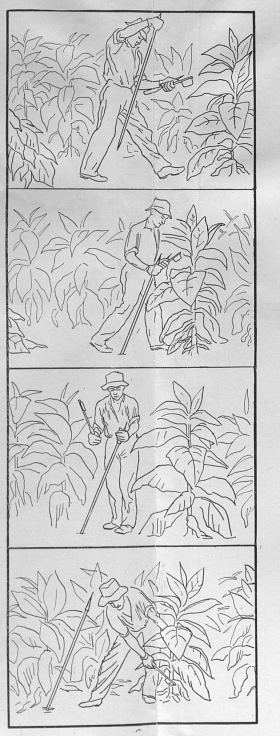
Stick is jabbed at an angle as workman walks toward next plant. Point of spear should be same distance from plant as if the stick were not slanting. If ground is stony or hard, pushing may be necessary, but pushing takes about twice as long as jabbing.

Right hand takes knife as left hand puts spear on stick. Use a spear with a long hard steel point, for ease in spearing, and with base no larger than necessary to fit over the **sharpened** stick.

Using a sharp tomahawk-type knife and a quick chopping swing, the first plant is cut. At same time the left hand has grasped the plant, bent it toward left leg, and started the pull back toward the stick.

Order of cutting plants that takes fewest steps:

4th	3rd
5th	2nd
6th	1st
	•
	(stick)



Strike the plant onto the spear rather than placing it on the spear-point and then pulling it down. Keep hands far enough apart, and eyes focused on spear point. Throw tails of plant forward. To prevent burning this may mean cutting in opposite directions in morning and afternoon.

Just as hands let go of plant (**not before!**), look for the next plant to be cut. Let your eyes **lead** your hands instead of following them. Keep the eyes on the place where the plant is to be cut, until it is cut; then look back at the spear point. Plants 2 and 3 are cut in same manner as Plant 1, except for length of step.

In cutting 4th plant (on second row), keep right foot in same place near the stick and step with left foot toward the plant. Bend plant toward left knee; don't push it away. Slightly less time is taken and movements are more rhythmic in cutting 2 rows than in cutting 3.

By slanting the stick forward the plant need not be lifted so high as when the stick stands straight up, and can be brought back onto the slanted stick in a curve rather than being lifted to a stop and then struck down onto the stick.



Fast way, 1 movement **Slow way, 2 movements**



When 6th plant is on stick, tap base of spear with back of knife to loosen the spear. Eyes are looking at the spear. (If the stick is sharpened smoothly and evenly the spear will not grip it and tapping will not be needed.)

When spear is loosened and grasped with left hand, the eyes are directed toward the next stick to be picked up. The sticks should be spaced at a uniform distance in the row according to the number of rows to be cut and the distance between plants in the row.

As the first step is taken toward the stick to be picked up, the knife is passed from the right hand to the left.

Stick is grasped with right hand at the end, and raised into position for jabbing. Sticks sharpened on both ends can be grasped at either end, depending on how they are lying in the row.





PRIMING
Burley Tobacco

By RUSSELL A. HUNT

PRIMING, if done the right way, is the answer to the question growers often ask, "What can be done if the bottom leaves are burning badly while the rest of the plant is still immature?" Most growers, when this happens, cut the tobacco—all of it. By so doing they get 6 to 8 excellent leaves per plant, 4 to 6 leaves of passable quality, and 6 or 8 immature leaves hardly worth marketing. If instead of cutting at this time they would go through the field and pick off 2 to 5 bottom leaves per plant, and wait to cut until the middle and upper leaves were mature, they would get a total of 16 to 20 good-to-choice leaves per plant.

The reason for such priming (removing leaves from the standing stalk) is that the leaves of tobacco plants do not ripen all at the same time. The flying and trash leaves ripen before the middle and upper leaves, and by the time the lug and bright leaves are ready for harvest, the lower leaves often are burnt and damaged badly, especially in dry seasons. By priming, the bottom leaves are removed as they mature, and while they are sound enough to produce the best smoker grades. Usually one priming is enough; but if the crop is quite immature and burning is bad, two or more primings may be profitable.

Leaflet 77

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Ecnoomics

Agricultural Extension Division

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky June, 1944

PRIMING BURLEY TOBACCO

WHY? . . .

Saves lower leaves

Permits upper leaves to ripen

Saves more leaves

Increases yield of smoker grades

Increases total yield

Brings highest returns

For:

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Does Priming Pay?

Because priming tobacco takes extra labor, the first question a grower asks is "Does it pay?" In most years it is definitely profitable. Though farmers have not generally adopted the practice of priming tobacco, those who have tried it have found they can increase their yields of leaf, on an average, 300 to 400 pounds an acre. Also, more of the tobacco is smoker grade, and the average quality of the crop is improved where priming is done. It therefore brings a higher price. In recent years primed leaves of burley have averaged 20 to 25 percent above the season's average market price. Returns of $100 to $150 more per acre where priming is done have been reported. The amount a farmer can earn per hour for time spent in priming of course depends on how fast and skillfully he works, on the amount of tobacco needing priming, and on the price of tobacco. It has not been unusual, however, to earn $1.00 to $1.50 an hour in this way.

Especially Important to Growers with Small Tobacco Acreage

Though priming is practical for all tobacco producers, it is especially useful to those who have 2 or 3 acres, or less. It enables them, by putting in a little more work on harvesting, to definitely increase their income from tobacco. Of the 120,000 farms in Kentucky producing burley tobacco, some 81,000 grow less than 2 acres per farm, and only about 14,500 produce more than 4 acres per farm.

When to Prime

Priming may be done at any time after the bottom leaves or flyings mature and begin to yellow thoroughly or burn at the tips. To get the greatest number of leaves in the best possible condition, they should be primed before they are badly burnt. Many growers wait until the bottom leaves are practically cured or until the plants are harvested, then go through the field and pick up leaves. In a dry season this may prove satisfactory, but in a damp season it may result in serious loss of leaves and in poorer quality. Cured or partly cured leaves attached to the growing plant or lying on the ground, darken rapidly and may be entirely lost in three or four days, if the the weather is warm and rainy.

Method of Housing

If the bottom leaves are yellow priming may be done at any time of the day. If, however, the leaves are partly cured, the work must be done when the bottom leaves are in case to prevent shattering, usually in the early morning or on a cloudy day. Pull the leaves from the plant, take them to the barn, sort them according to soundness and quality, and tie them to tobacco sticks with light wrapping twine. If both yellow leaves and partly cured leaves are primed, sort them out and tie them separately. A simple half-hitch knot is satisfactory for fastening leaves to the stick. If the leaves have fat stems, don't tie more than two at one place. If the stems have dried, then 3 or 4 leaves may be tied at a place. After the sticks are filled, house them at the rate of 15 to 18 sticks to the 12-foot tier rail. If only a few sticks are housed, hang them high in the barn where good curing conditions prevail. If several rails are filled at a time the housing should be done so as to make it easy to use heat.

Method of Curing

Curing primed leaves is easier than curing the entire plant. The important thing is to keep the leaves dry most of the time. Since primed leaves are well yellowed, or even partly cured, when harvested, there is practically no danger of setting a green color, or of too rapid curing. Enough ventilation should be provided and heat may be used to advantage if the leaves stay in case longer than one day. Usually curing is finished in ten days to two weeks. The tobacco should then be taken down, tied loosely in hands of 20 to 25 leaves, placed on sticks the same as other tobacco and bulked in hollow bulks, covered but not weighted. If the leaves are permitted to hang indefinitely in the barn they fade, losing the bright, flashy color that characterizes high-quality smoker leaf. Don't hang fresh-harvested tobacco under cured primed leaves because the moisture from the fresh tobacco soon causes the primed leaves to discolor or even to houseburn.

Primed leaves may be mingled with comparable grades from the crop or marketed separately. Either way is satisfactory, according to reports of farmers, as well-handled leaves saved by priming are equal in value to leaves harvested in the regular way.

Such an arrangement saves time and helps assure a good supply of water at all times.

Shade.— During the hot weather, pullets do best if they are comfortable. Keep the feed and water in the shade. If there is no natural shade make a brush arbor, or board-covered open shed for shade.

Some Range Management Suggestions

1. Use a range shelter and move it occasionally.
2. Move feed and water utensils to avoid bare spots on the range.
3. Mow the range to promote new growth of green feed.
4. Watch for disease; get an early diagnosis.
5. Cull and sell, or eat slow-growing pullets.

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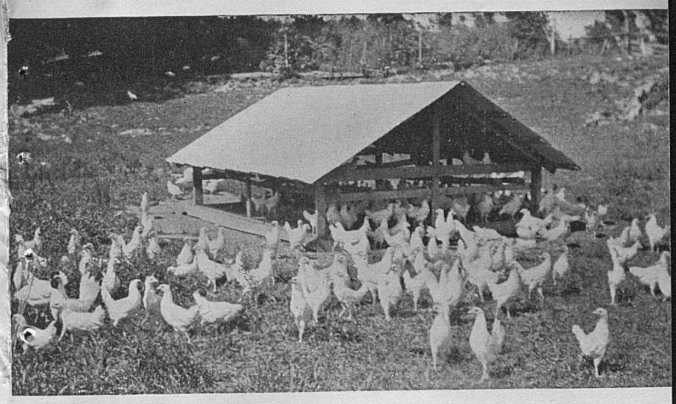


Range shelter

Summer Management of PULLETS

By STANLEY CATON and J. E. HUMPHREY

Many farmers make the mistake of letting their pullets hustle for themselves during the summer after the cockerels have been sold, canned, or eaten. Consequently when winter approaches and the price of poultry products is highest, these birds are not laying eggs. Pullets, properly managed through the growth period should begin laying by the time they are about 6 months old.

Put Pullets on Clean Ground Away From the Old Flock

Keeping the pullets on clean range with plenty of room is a safeguard for their health, because certain parasites and the germs of some

Leaflet 78

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Division

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky June, 1944

diseases survive a year or more on poultry ranges. Moreover, when the pullets are by themselves it is easier to feed them properly. Ground is considered clean for chickens if neither chickens nor turkeys have been on it during the last 2 years.

Build a shelter or summer home for the pullets on their clean range. The one shown on the front page was built at little cost.

Full-Feed the Pullets Throughout the Summer and Fall

One of the biggest mistakes poultry raisers can make is to underfeed the growing pullets. The object of full-feeding is to get the pullets large enough to begin laying at 6 to 7 months. A good growing mash, grain, pasture, and water are necessary for good growth.

Growing mash is the most neglected part of the ration. The mash contains protein, minerals and vitamins needed for good growth. Pullets which do not get enough protein grow slowly and take longer to reach laying size. Feed the mash in outdoor feeders as shown in Figure 1. Two of these are enough for 100 pullets. Good self-feeders will save feed. Feed costs money, so don't waste it.

Grain.— Yellow corn is one of the best grains for feeding growing pullets and is better than

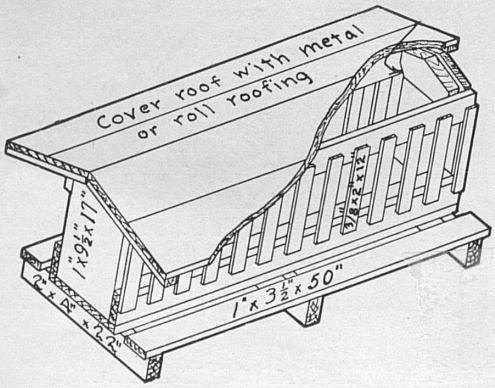


Fig. 1.— Provide at least 2 self-feeders like this for each 100 pullets.

white corn. It should be fed whole; cracking it does not increase the feed value. Barley, wheat, and oats also are very suitable grains for feeding growing pullets. These grains also should be fed whole. When white corn, wheat, barley, or oats are fed, provide plenty of good green pasture because these grains do not contain vitamin A.

Self-feed the grain in hoppers the same as the mash. A mixture of grains may be fed, particularly if corn is hard to get.

Pasture.— A good green pasture not only reduces the amount of other feed needed but also provides some of the necessary growth elements. Rape and oats sowed together make a good early pasture. These grow rapidly, are cool-weather crops, and are relished by chickens.

A temporary summer pasture can be provided by sowing Sudan grass either in rows or broadcast. Turn the growing flock on it when it is about 8 inches tall. For best results mow the Sudan grass when it is 18 to 20 inches tall. New green sprouts will then furnish fresh green feed. Lespedeza also furnishes pasture for summer grazing. A permanent alfalfa and bluegrass range is best for year-round pasture.

Water.— The least expensive and often the most neglected part of the summer feeding program is water. Wherever possible place a barrel on a sled with a float at the bottom of the barrel to keep a proper water level in a pan (Figure 2).

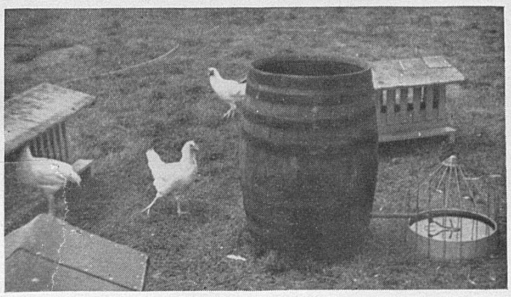
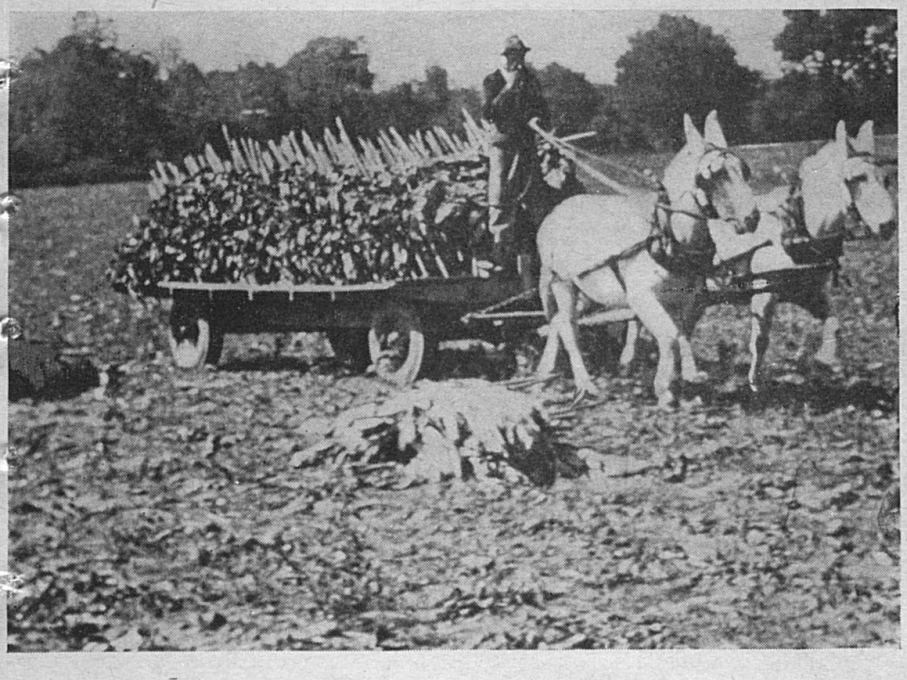


Fig. 2.— Note the outdoor feeders, the water barrel which can be moved easily.

Easier Ways To Do Farm Work

Cutting and Housing BURLEY TOBACCO

By Ernest J. Nesius
Earl R. Young
George B. Byers



This leaflet is the fourth in a series on easier ways to do farm work. All are based on careful records (including motion pictures) of the methods used by farmers who were reported to be good at the particular task being examined; and all the leaflets describe the best of the methods found.

Leaflet 79

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

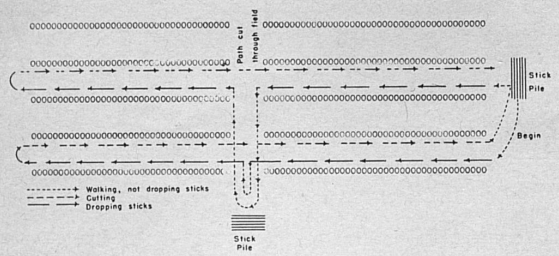
Lexington, Kentucky July, 1944

DROPPING THE TOBACCO STICKS

Walking to and from the stick pile or back from the far end of the field after dropping sticks takes about half the total time spent in dropping. Nearly all this extra walking can be avoided by following a plan that accounts for the length of rows, the number of sticks a worker can easily carry, and the distance between the dropped sticks. The following suggestions are useful.

1. Pile the sticks in handy locations close to the uncut tobacco, then drop sticks across field and cut tobacco back. This method saves about two-fifths of the walking. In a patch 250 feet long, with the sticks piled at one end, the dropper loads up (about 55 sticks make an armful), drops all the way across to the other end, and cuts back. Then he drops for another row and cuts back. Fifty-five sticks are needed for a 250-foot row when 2 rows are cut and the plants are about 18 inches apart in the row. If the field is 500 feet long, plants 18 inches apart, and 2 rows are being cut, the sticks should be piled in two places: at one end and half way to the other end (see diagram). In this case, cut a path beforehand, 1 stick-row wide crossways through the field.

Adapt this plan to fit the length of rows in your field and number of rows cut per stick-row.



Well located stick piles save steps

2. Walk in same row in which sticks are being dropped. Spacing is easier and more accurate, and fewer leaves are broken off when the sticks are dropped in the same row in which the worker walks.

3. Space the sticks uniformly in the row according to distance between plants and number of rows cut. Spacing the sticks too close together or too far apart causes the cutter to lose time reaching for or going after sticks. Spacing the sticks according to the following tabulation will aid the cutter, and can usually be done by any member of the crew. If many plants are missing, make a small allowance for them.

Inches between plants in row	*Cutting 2 rows* *Inches between ends of sticks (50-inch sticks)*	*Cutting 3 rows* *Inches overlap of ends of sticks (50-inch sticks)*
17	1	16
18	4	14
19	7	12
20	10	10
21	14	8
22	16	6

In tests made, leaning the sticks against the plants was of no advantage. Uneven stands and extra time taken to lean the sticks against the plants caused the cutter to lose time, as a rule.

CUTTING TOBACCO

Both spearing and splitting the stalk are common methods used in cutting burley tobacco in Kentucky. With split tobacco there is less danger than with speared tobacco from houseburning or improper curing due to unfavorable weather and seasonal or barn conditions. On the other hand spearing can be done about 40 percent faster than splitting; the speared tobacco can be housed and taken out of the barn with less labor; fewer leaves are lost; the tobacco is easier stripped, when thoroughly cured, because the tip end of the stalk is more rigid for removing the tip leaves; and there are no split stalks to entangle the leaves.

Some Points That Apply to Both Methods

Whether you spear or split your tobacco, these are time-saving practices to use. (For more specific directions on cutting and spearing, see Kentucky Leaflet 76.)

1. Sharpen sticks on both ends. Sharpened sticks are easier to jab in the ground. The time used for sharpening during a slack season will pay for itself several times during the cutting season.

2. Jab the sharpened stick into the ground. Pushng the stick takes almost twice as much time. On land that is stony or hard, pushing may be necessary.

3. Put each plant directly on the stick as cut. Cutting,



Jabbing the stick

laying the plant on the ground, and later putting it on the stick takes 50 to 75 percent more time and energy, than putting it directly on the stick as cut.

4. Cut steadily and comfortably fast. Such a gait provides a rhythm of movement which is less tiring than a sluggish and broken gait.

5. Use the eyes to speed the movements of hand and body. The eyes should lead, not follow, the movements. Right use of the eyes is a great help in forming the right habits in cutting.

6. Avoid strained and awkward positions. Twisting the body into unnatural positions and failure to keep a good balance soon becomes tiring.

Further Points for Spearing Method

If you use the spearing method, these additional practices will be helpful. If you split your tobacco, turn to the further points for splitting method, on page 5.

1. Use a sharp tomahawk-type knife with a quick chopping stroke.



2. Use a spear with a long, hard steel point. The base of the spear should be no larger than necessary to fit snugly over the sharpened stick.

3. Slant the stick in direction of cutting, to permit a curved motion of the plant to the stick.



Slanting stick permits spearing with one movement.

4. Cut two rows at a time. Less travel and more convenient movements make it easier to cut 2 rows than 3. It takes less time per stick to cut two rows than three, but the difference is not great.

5. Cut the plants in the order which takes fewest steps and least effort. The best order is to cut in front of the stick, plants 1-2-3; and then cut back in the second row, plants 4-5-6. By this method a right-handed cutter keeps the right foot near the stick and steps a short distance with the left foot to cut each of the six plants.

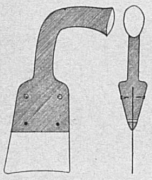
6. Strike at the spear. This method is much faster than putting the plant on the spear point and then pulling it down.

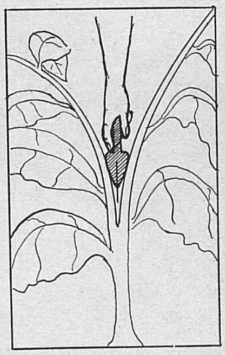
7. Spear the plant with the tails in the direction of cutting if hot sun permits. This method avoids twisting the body to throw the tails behind or sidewise. To do this may mean cutting in opposite directions in morning and afternoon.

Further Points for Splitting Method

For cutting and splitting, these practices save time and effort. They are used in addition to the practices that apply to both splitting and spearing, on page 3.

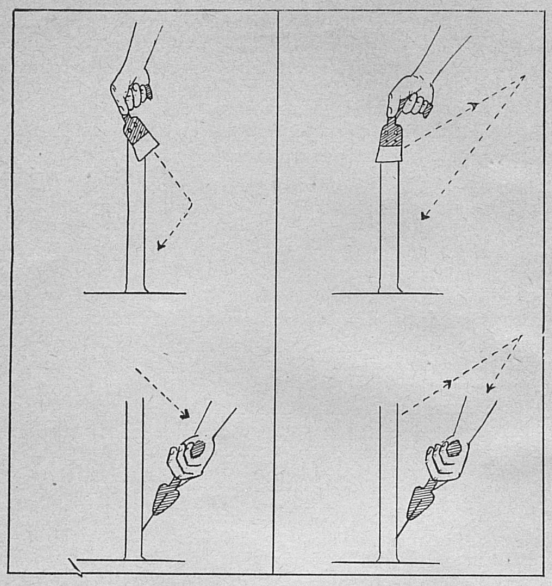
1. Use a pistol-grip knife, with a shoulder behind the blade thick enough to split the stalk after entry of the knife blade. The shoulder splits the grain of the stalk as a wedge splits wood. The blade merely starts the split.





Wide shoulder on knife splits the stalk after the blade starts the split.

2. Split and cut with one movement of the arm (see illustration on page 6). This requires practice; practice it as you work. In one downward movement the knife splits the stalk and cuts the plant. With the split stalk gripping the shoulder and the blade free.



Fast way: 1 movement **Slow way: 2 movements**

the knife can be tilted and pushed out of the stalk while still going down. Then, while still going down, the blade is directed against the stalk (by turning the wrist) and with a strong thrust the stalk is cut. This method is much faster than splitting, pulling the knife up, and then cutting.

3. Follow down the stalk with the left hand,



Both hands go down the splitting stalk at same time. Left hand grasps the plant while right hand cuts off the stalk.

to grasp the plant, as the stalk is split. This is quicker than waiting until after the stalk is split to reach down and grasp the plant.

4. Flip the first plant on the stick by keeping the thumb of the left hand in the split, toppling the split plant over onto the stick without lifting the plant up. The stick must have been jabbed fairly close to the plant.

5. Wedge the split stalk against the stick so that the two split sections grip the stick. If this is not done the plants may fall off of the stick when piling, loading, and hanging.



Thumb in crotch of split holds halves of plant apart so that plant can be flipped over onto the stick.

No field tests were made on the best order to cut the plants when splitting. However, it was noted that the order of cutting was affected by the height of the tobacco. When tall plants had to be lifted over tall uncut plants some time was lost. Also, no tests were made on the direction the tails of the plant should be thrown. All cutters observed threw the tails behind them. No tests were made on cutting 2 rows versus 3 rows, but all the cutters observed cut 3 rows.

PILING AND LOADING vs. LOADING FROM STANDING STICKS

In a test using the same men on the same wagon in the same field, loading from the standing stick took less time than piling and loading from piles.



Piling took 4 man-hours per acre



Loading from piles took 2.9 man-hours per acre — a total of 6.9 man-hours per acre for piling and loading



Loading from standing sticks, without piling the tobacco, took 5 man-hours per acre

In this test 2 rows of tobacco had been cut at a time. Consequently, the standing sticks were about 4½ feet apart in the row. Had 3 rows been cut, the sticks would have been closer together and the advantage of loading from the standing stick would have been slightly greater.

Since, however, most farmers felt that piling was necessary to keep the tobacco from sunburning in the field, or to "case or order" the lower cured leaves, a section on piling the most efficient way is presented.

PILING TOBACCO

Time taken to pile tobacco before loading ranged from 2.5 to 5 man-hours per acre. A considerable amount of time and much walking around, both in piling and later in loading, can be saved by a systematic method of piling. The following practices were the best of those used in piling tobacco on the farms visited.

1. **Use one man per row of piles; or if necessary to use 2 or 3 men, then use one man per stick row.** More than one man per stick row increases time and travel per acre.

2. **Put 3 stick-rows to a pile-row when 2 rows have been cut, or 2 stick-rows when 3 rows have been cut.**

3. **Put 10 sticks to the pile.** Ten sticks to the pile take the least time when considering both piling and loading.

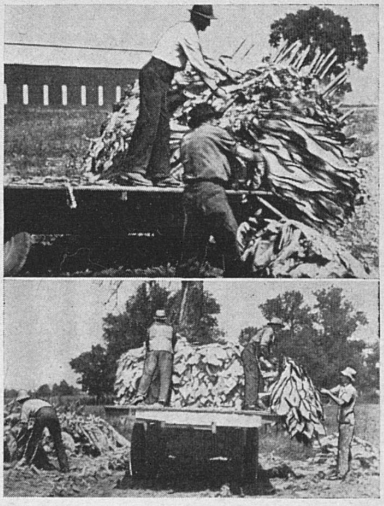
4. **Space the piles so as to make rows both lengthwise and crosswise of the field.** This will mean less moving of the wagon in loading, by having the piles in the same position on each side of the wagon.

5. **Carry two sticks at a trip to the pile** if the tobacco is not too heavy. This will reduce the walking in piling by about one-third.

LOADING

Time spent in loading ranged from 2 to 11 man-hours per acre in 22 cases studied. The wide differences were due to the number of men per wagon, the method of loading, the spacing and distance between piles, and size of the tobacco. The most efficient practices were:

1. **Use either 2 or 4 men per wagon.** In tests where 3 men per wagon were used (2 handing up

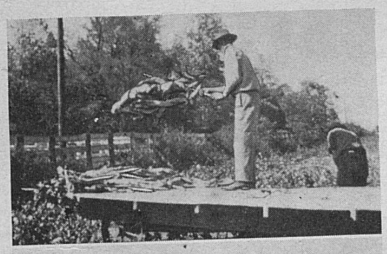


One man handing up for each man on the rack makes for best use of time

and 1 loading) the man-hours per acre for loading were increased about one-third because one man cannot load as fast as two men, working steadily, can hand up.

2. Make as large a load as possible without damaging the tobacco. Depending on the size of tobacco and type of wagon the best size of load was 175 to 300 sticks. The best method of loading was to build a "coop" on the back of the wagon or front of the truck, and then "rack" the rest of the load.

A "coop" is usually built by piling the sticks of tobacco at the back of the frame until 3 to 4 feet high, with the butts of the plants at or over the side edge of the wagon frame. Enough sticks are placed in the center to keep the pile level and "tie in" the



Starting the "coop"



Racking



The finished load

sticks. The rest of the load is racked by standing the sticks up with the butts of the plants toward the outside of the load, and the tails toward the center. The advantage of this method over loading with the butts pointing up and the tails extending forward on the wagonbed is that the tobacco is easier to load and

unload without tramping on the tails, and a larger load can be put on the wagon.

3. Load the piles on both sides of the wagon before moving the wagon. One man handing up can walk around the wagon as quickly as the wagon could be moved to the next pile.

4. Load from the standing stick unless piling is necessary to the quality of the tobacco. (See page 8).

5. Have the man on the ground drive the team from pile to pile. Saves several minutes per load.

HAULING TOBACCO

The following table shows the number of man-hours per acre in hauling tobacco in different sized loads and distances, using a team for power. For example, if a crew of 3 men ride to and from the barn a distance of 1400 feet, they spend 16.5 man-hours per acre if they haul 50 sticks, or 4.2 man-hours per acre if they haul 200 sticks. This table clearly shows that the greater the distance from barn to field, the more advantage it is to haul good-sized loads.

Time taken in hauling tobacco from field to barn with horses, as affected by size of load and distance

Distance hauled	Number of sticks per load					
	50	100	150	200	250	300
	(Hours per acre)					
200 ft	1.6	.8	.5	.4	.3	.3
800 ft	3.5	1.8	1.1	.9	.7	.6
1400 ft	5.5	2.7	1.8	1.4	1.1	.9
2000 ft	7.4	3.7	2.4	1.8	1.5	1.2
3000 ft	10.6	5.3	3.4	2.7	2.1	1.8
4000 ft	13.9	6.9	4.5	3.5	2.8	2.3
5000 ft	17.1	8.6	5.5	4.3	3.4	2.9

To get the number of MAN-HOURS per acre, multiply by the number of men riding back and forth, including the driver.

TEAMS, TRACTORS, OR TRUCKS FOR HAULING

Unless the driver helps load, no advantage in man-hours per acre is gained by use of a truck instead of the use of a team, unless the field is more than 2,000 feet from the barn. However, using a truck for shorter distances may be justified if it causes less waiting by the housing crew.

In tests there was no advantage in using a tractor instead of a team to haul tobacco, unless the barn was more than a mile from the field.

HOUSING TOBACCO

Time is lost in housing when any member of the crew must wait even a few seconds between sticks. Fifteen crews were observed and timed on Kentucky farms in 1943. Frequently time was lost by the man on the wagon being slow, or not keeping the load positioned so that a stick could be grasped and passed up without moving more than one step. Also time was lost when there were too many or too few men hanging, for the number passing or handing up. Again, time was lost in filling the sheds when the tobacco had to be passed from the driveway.

The following practices were best among all those observed.

1. Put one of the best workers on the wagon to hand up. Workers cannot pass and hang tobacco any faster than they get it. When the man handing up is slow, all the crew lose time.

2. Space the workers up and down in the barn so that there are no long reaches to cause extra tiring and perhaps injury to workers.

3. Have enough men hanging to avoid short waits by those handing up and passing. In a test with 1 man hanging, 1 passing, and 1 handing from the wagon, the passer waited on the hanger 29 percent of the time and the man on the wagon waited 20 percent of the time. When the man on the wagon hands up rapidly, 3 men hanging are probably best.

4. Keep the wagon positioned under the passers and hangers so that the man on the wagon takes no more than one step to get a stick of tobacco. In tests, when the man handing up took only 1 step per stick, he handed up 10 sticks per minute. When he took several steps, he handed up about 6 sticks per minute.

5. Have doors all the way across ends of barn so that the loads can be driven into the sheds as well as into the driveway. Having the wagon directly under the place where the tobacco is hung in the sheds usually means that 1 fewer passer is needed. Damage to plants in passing over the rails in barns tiered lengthwise is avoided.

6. Work out a system of signal calls. In the best crews the men hanging call for a stick a second or so before they need it. This enables the crew to work steadily and smoothly.

7. Try different arrangements. No one arrangement is best in all barns. Work out a plan for your crew and your barn. A good goal is 9 to 12 sticks of tobacco in the barn per minute, per man on the wagon.

PLANNING THE WORK OF THE CREW

Of the crews studied in 1943, two types were common: *Specialized crews* and *semispecialized crews.* For the specialized crews, 10 to 25 workers were divided into groups, each group doing only one kind of work. As a rule the specialized crews had a suckering group, a cutting group, a loading and hauling group, and a housing group. In several instances boys were doing light work such as suckering, or dropping sticks. On the other hand, the semispecialized crews, usually 5 or 6 workers, all worked as one group in doing most of the work. The crew would sucker first, then cut, then part or all would pile, load and haul, and house the tobacco.

No one best size of crew can be recommended for all farms. Size of load and distance from field to barn influence the number of wagons or trucks needed. Position in the barn where tobacco is being hung influences the number of men needed at the barn. Speed of cutters, and whether they are spearing or splitting, influences the number of cutters needed. The operator has to consider all these factors in balancing his crew or groups for best results.

Specialized Crews

On one farm a specialized crew of 16 workers suckered, cut, and housed 3,500 to 4,000 sticks per day, using this arrangement:

4 workers suckering
5 workers cutting
1 worker piling
2 workers loading and hauling 600 feet
4 workers housing.

For hanging in the top of the barn, one of the cutters was brought in from the field to make a 5-man group at the barn. Two wagons and teams were used. If the distance from field to barn had been much greater another wagon, team, and worker would have been needed, or the loads would have been made larger. The driver did not unload, although by having 2 drivers and 3 workers at the barn with the drivers unloading, the result would have been the same.

Semispecialized Crews

One good crew of 6 workers cut half a day, then piled and housed half a day. Frequently they cut in

the afternoon, when the plants were less brittle, and piled in late evening or as the dew dried in the morning. In the morning 4 workers loaded one load and went to the barn with it. The other two men piled, or cut, or suckered while the first load was being loaded; then they loaded another wagon, and one worker took the second wagon to the barn and returned with the empty first wagon. The worker in the field cut, piled, or suckered between loads. Three workers stayed at the barn after helping to load the first wagon; 2 workers operated 2 wagons, and 1 man stayed in the field to help load and to cut or sucker between loading periods.

Such a crew works well if a definite system is followed. Frequent changing of jobs by the crew members and having the crew ride back and forth to the barn with the load results in loss of time. Six workers are about the fewest for a crew to work to best advantage, if 4 men are needed to unload and hang the tobacco.

Fundamentals for an Efficient Crew

1. **Keep the crew on the same job as long as possible without interruptions.** Every change in job causes some loss of time.

2. **Fit the workers to the jobs** they can do best.

3. **Tell each worker about your plan of work and his place in the crew, and what he is expected to do.**

4. **Plan the order of work** so that unnecessary walking or riding is kept to the least possible.

5. **Have the before-hand things done before the cutting, loading, and housing begins.** These things include cleaning the barn, cutting necessary paths across the ends or through the field, piling sticks in the field in the right places, providing a whetstone for each cutter, and sharpening the sticks on both ends.

6. **Have proper equipment,** such as wide flats, on wagons or trucks for carrying a good-sized load.

7. **Encourage short rests,** every hour or so, when the workers are on the same job continuously.

EARLIER LEAFLETS in the series on easier ways to do farm work —

Pulling tobacco plants—Leaflet 73

Machine setting of burley tobacco—Leaflet 75

Cutting and spearing burley tobacco —Leaflet 76

These may be had on request from your County Agent or from the College of Agriculture and Home Economics, Lexington.

CUTTING AND HOUSING BURLEY TOBACCO

- Dropping sticks
- Cutting
- Piling
- Loading
- Hauling
- Housing
- Planning work of crew

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

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31M—7-44

EACH FARMER MUST SOLVE HIS OWN FEED PROBLEMS

The most important problem now facing Kentucky livestock producers is to make the most effective use of available feed supplies. Three suggestions seem to be in order:

1. Cull diseased, nonbreeding, or low-producing animals from the breeding herds and flocks. Prevailing prices for fat cows, bulls, ewes, sows, and poultry offer an additional incentive for such culling now.

2. Increase your efficiency of feed utilization for all your livestock enterprises. Many farmers could produce as much as they are now producing with ¼ to ½ less feed if they would adequately control parasites and diseases, balance their rations, use selected stock, make full use of home-grown pastures and roughages, and use proper equipment and supervision.

3. Change from heavy-grain-consuming to minimum-grain-consuming fat-stock enterprises. Depending on the class of livestock to which it is fed, 100 pounds of corn properly supplemented with protein, good pasture forage, and harvested roughages will produce—

	20 dozen eggs
or	300 pounds of 4-percent milk
or	380 pounds of milk-fat heavy calf
or	118 pounds of spring lamb and 9 pounds of wool
or	100 pounds beef on a feeder calf wintered with grain, then grazed without grain
But only	26 pounds of pork on pasture
or	21 pounds of pork in drylot feeding
or	16 pounds of beef in drylot feeding

Good pastures save feed. Few Kentucky farmers are getting as much livestock feed from pastures as they should. Greater use of cover crops and of surplus forage on permanent pastures for winter grazing, should be practiced on every farm. Good year-round pastures save 20 percent of the feed for growing stock and laying hens. Suitable swine pasture will save up to 15 percent of the grain and 50 percent of the protein supplement for both fattening stock and breeding animals. Dairy cows can obtain over half of their feed from good year-round pasture. Sheep, beef cattle, and (on most farms) workstock can get three-fourths or more of their total feed from a well-planned pasture supply.

Better roughage saves feed.— Much feed value is lost each year on Kentucky farms through poor haying practices and wasteful use of hay. Top-grade legume hay has 6 times as much vitamin A, 1/3 more protein, and 1/10 more fattening value than the average legume hay now produced. Corn stover has a feeding value equal to that of average timothy hay when fed in early winter, but it loses half its feeding value by January 1 if left to stand in shocks in the field.

Balanced rations save feed.— The present high cost and scarcity of feed make it imperative that balanced rations be fed whenever possible. Tests show that one pound of tankage (or its equivalent) will save 6¼ pounds of corn with pigs fed in drylot. Faster gains, more eggs, and more milk also result from the feeding of balanced rations.

For PRINTED HELPS dealing with practices in feeding and feed production, see your county agent or write to the College of Agriculture and Home Economics, Lexington.

This leaflet was prepared by members of the Animal Industry department.

Lexington, Kentucky July, 1944

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

How Much LIVESTOCK Can You Keep?

Use this leaflet to figure whether your feed supplies will last thru the coming feeding season.

Leaflet 80 . . . College of Agriculture and Home Economics, Extension Division, University of Kentucky
Thomas P. Cooper, *Dean* and *Director*

70M—7-44

For:

U. S. Department of Agriculture
EXTENSION SERVICE
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BALANCE YOUR FEED NEEDS WITH YOUR AVAILABLE SUPPLIES

List the number of units on your farm, and estimate the amount of feed you will need and the amount you are likely to have.

Feed requirements listed are approximate requirements per year, unless otherwise stated. These requirements assume the use of good management practices, including year-round pasture, balanced rations, control of parasites and diseases, and adequate equipment. Where such practices are not followed, the feed requirements will be 50 to 100 percent higher than those listed here. Suggestions for making allowance for different practices are given in the paragraphs at the right.

Unit of livestock	Feed needed per unit			Number of units on farm	Total feed requirements			Additional information
	Corn	Protein supplement	Hay (legume or mixed)		Corn	Protein supplement	Hay	
	Fill in the figures for your farm here							
Dairy cattle	*bu.*	*lb.*	*tons*		*bu.*	*lb.*	*tons*	Good legume hay is always preferable. Three pounds of silage will replace 1 pound of hay. On a weight basis, oats or barley may replace corn. Wheat bran or ground wheat may replace up to ½ of the corn.
Milk cow or bull, over 2 yr.	27	500	2					
Heifer or bull—1 to 2 yr.	14	200	1½					
Calf through first year	7	200	½					
Poultry								100 chicks started will produce 40 laying pullets; roosters sold, culls, and dead birds account for remainder. Protein supplement at present time usually a commercial mash.
100 chicks, pullets to laying	14	800	—					
100 laying hens	80	3000	—					
Sheep								If hay is poor, count on using 1/5 ton plus 20 pounds protein supplement. Control parasites with phenothiazine.
Ewe and lamb for year	1½	—	1/7					
Hogs								Add 1/5 more feed if pigs are wormy; add ½ more supplement and ⅛ more corn if good pasture is not available; and double the corn requirement if no protein supplement is fed.
Sow and 1 litter to weaning	24	100	—					
Sow and 2 litters to weaning	39	200	—					
Pig, from weaning to 220 lb.	13	56	—					
Feeder pig, per 100 lb. gain	7	25	—					
Workstock								Ration should be adjusted to amount of work being done. Healthy horses freed from bots use less feed. At least half the hay should be green and leafy.
Horse or mule, medium size doing medium work	30	—	2					
Colt under working age	15	—	1½					
Beef cattle								Good to choice finish can be put on quality steers carried to 30 months of age on good pasture and home-grown roughage, with not more than 10 bushels of corn fed per steer during their first winter. Another 10 bushels per steer is required if steers are marketed younger, or if pasture is poor. The Kentucky cow-and-calf plan makes beef with a minimum use of grain.
Cow or bull	—	—	1½					
Wintering feeder calf	10	—	1					
Wintering and finishing quality yearling	10	120	1					
Drylot fattening, 2-yr-old, per 100 lb. gain	14	25	1/5					
TOTAL FEED REQUIREMENTS FOR 1944-45								One bushel of wheat, 1¼ bushels of barley, or 2 bushels of heavy oats are about equal to one bushel of corn.
TOTAL FEED SUPPLY AVAILABLE								

How to Succeed with WINTER PASTURES

Which should be more profitable?

Leaflet 81

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Division

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky August, 1944

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For:

GOOD COVER-CROP PASTURES stretch the supplies of harvested feeds. Sow small grain (especially Balbo rye), vetch or crimson clover, or ryegrass either alone or in mixture with small grain and legumes.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

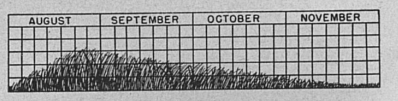
50M—8-44

How To Succeed With Winter Pastures

By W. C. JOHNSTONE

FAST GROWING cover crops make excellent pasture in fall, winter, and spring—at the times when permanent pastures are not very productive. Such cover-crop pastures reduce feed costs, save other feeds, improve the health and production of the animals, and protect the soil from erosion and leaching. Success with winter pastures depends a a great deal on doing 5 important things:

Sow early



← Sow early → ← Not late →

The earlier cover crops are seeded, the more winter pasture they produce and the earlier they can be grazed.

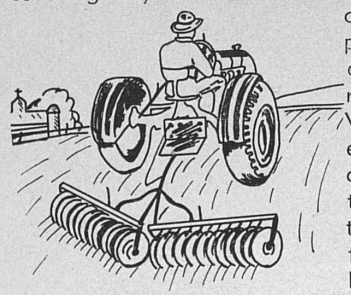
The following are recommended dates for seeding:

	Best date	*Latest safe date*
Crimson clover	Late August	September 15
Vetch	Late August	October 1 to 10
Winter oats	Early September	October 1
Barley	Early September	October 5
Rye	Early September	November 1 to 15
Ryegrass	August	September 15
Wheat	September	November 1

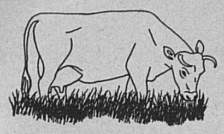
Early sown wheat or barley may be damaged by hessian fly. See county agent for fly-free date.

Prepare a good seedbed and cover well

A good firm seedbed, careful seeding, and proper covering may mean the difference between success and failure of the pasture. Early-seeded crops especially need good covering. Vetch should be sowed deep; crimson clover shallow. Cultipackers are particularly valuable for fall seeding. Grazed lespedeza fields or those where hay or seed has been harvested, may be prepared for sowing winter pastures by disking when the ground is moist.



Build up your soil fertility



Winter pastures are more luxurious and more nutritious when seeded on fertile soils. Many failures are the result of lack of plant food in the soil. Fertilizers and lime materials for winter pastures usually pay large dividends. Better check your needs before sowing.

Sow plenty of seed



Small grain and winter legumes should be seeded heavily where pasture production is the chief aim. More pasture and better protection of the soil results from the heavier seedings. Lighter seedings are satisfactory where grazing is not possible, and are desirable where grasses and legumes are to be established in ungrazed fields.

	Recommended seeding rates	
	Least	*Best*
Crimson clover*....	12 pounds	20 pounds
Vetch*	15 pounds	30-40 pounds
Winter oats	1½ bushels	3 bushels
Barley	1¼ bushels	2 bushels or more
Rye	1 bushel	2 bushels or more
Ryegrass	15 pounds	20-30 pounds
Wheat	1 bushel	1¼ to 2 bushels

* To produce more pasture and better protection small grain or ryegrass should be seeded with crimson clover or vetch.

Inoculate vetch and crimson clover



Vetch and crimson clover are legumes. Some soils are naturally inoculated for crimson clover, but it is essential to inoculate vetch before planting unless vetch has been grown successfully on that land before.

Small grain for pasture on other fields

Sowing small grain on old red-clover and sweet-clover fields, and on many of the old thin alfalfa stands, will produce large amounts of forage for Kentucky farmers. A few Kentucky farmers have followed this practice for some time, and many in other states have followed it. There is a total of about 300,000 acres of such fields available in Kentucky.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

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SOW Small Grain on Lespedeza Fields for Pasture

Leaflet 82

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*
Lexington, Kentucky August, 1944

SOW SMALL GRAIN ON LESPEDEZA FIELDS FOR PASTURE

By RALPH KENNEY

THE largest reservoir of land on which to grow more feed in Kentucky is the lespedeza land. Of about 9 million acres of lespedeza grown alone or in mixtures, perhaps 3 million acres could be made more productive by sowing small grain on them in either fall or spring. These are the fields that are all lespedeza or that have less than half a stand of grass mixed with it. Such fields can be made to produce $15 to $25 worth of grazing per acre (at present prices), depending upon fertility and distribution of rains. The small grain would be pastured off and the lespedeza would establish itself, as usual, in volunteer stand.

What to sow

Wheat, rye, barley, or winter oats may be sown on such lespedeza fields. Any of them can be sown early in the season, but later the choice narrows to only wheat and rye, and after November 1 perhaps rye is best. Except on seedings made in late August or the first half of September, followed by good rains, there is usually not much grazing to be had in the fall. The spring growth comes on early and controls weeds. By combining a small-grain crop with continuous lespedeza, full seasonal use of the land is had.

Seedbed preparation

Plowing is impractical and costly for preparing a seedbed on lespedeza. It covers the lespedeza seed too deep to ensure new stands. Where the land is not too dry and hard and where there is not much vegetation, the ordinary disk harrow is a good tool for preparing the seedbed. With heavy vegetation or hard ground, a field cultivator is better. Tractor-drawn tools do the job best on dry, hard ground.

In preparing the seedbed it is desirable to leave a considerable portion of the lespedeza stubble at or near the surface of the ground. This allows immature seed to mature, ensuring a good volunteer stand. The ground in such condition will hold snow, allow rains to penetrate more easily, and tend to prevent erosion. On rolling land, the operations of seedbed preparation should be done on the contour.

Time and rate to sow

To produce additional feed as soon as possible, sow early. The same rate of seeding as for grain production is satisfactory, though heavier seedings (up to double or three times the usual rate) will return more grazing.

Use of fertilizer

Since the sowing of small grain on lespedeza involves continuous use of fields for small grain and lespedeza for several or many years, it is necessary to apply reasonable amounts of fertilizer some time in the program. The usual procedure is to apply 100 to 300 pounds of 20-percent superphosphate per acre, drilling it in the same operation as when the seed grain is planted. If this cropping practice is long continued, an application of 100 pounds of muriate of potash per acre will likely be profitable.

Effect on Lespedeza

Lespedeza, and grass and lespedeza mixed, tends to become rapidly less productive as the soil hardens from year to year. Weeds occupy more of the land and water runoff is encouraged. Where small grain is grown on the lespedeza, however, weeds are well controlled in most fields, and the lespedeza, though thinner in stand, grows taller than in volunteer stands alone. Such fields of lespedeza and small grain produce more pasture, hay, and seed of lespedeza, in addition to the small-grain pasture crop.

continued for 2 to 3 weeks when the cows are turned into spring pasture. This practice also will help to prevent "grass tetany." A low-cost, low-protein grain mixture should be used, because the grass itself is high in digestible protein. Corn-and-cob meal is quite satisfactory as a supplement to early pasture.

2. On mature or dry-weather pasture: Unless the cows get extra feed, milk production falls off during July and August when pastures dry up or the grass becomes tough and unpalatable. Supplementary pasture, such as Sudan grass or one of the legumes, helps to prevent this. Feeding corn silage or grass silage, or hay and grain, to the fresh or heavy-producing cows helps to keep them in production at this time. Dry off cows heavy in calf. A clean, cool, darkened milking barn is a haven of refuge from flies.

3. During the winter: This is the period of heavy production on hay and dry feed. Don't waste high-priced feed on poor-producing cows. The amount and kind of grain should depend on the price of milk, the price of feed, and the quality of the roughage it supplements. Feed heavy producers liberally. Quick action when lice appear will prevent a loss in production. Regular treatment for grubs should begin in January. Ask your county agent for details.

FEED GOOD COWS LIBERALLY WHEN THEY ARE DRY

Feed enough hay and grain to dry cows, regardless of the time of year, to assure strong, healthy, vigorous condition at time of freshening. Good cows are hard workers and need and deserve a 6-weeks to 2-months dry or rest period to rebuild their strength for another milking period.

BREED FOR GOOD DAIRY REPLACEMENTS

Every good cow inherits her ability as a producer from her immediate ancestors. Careful selection and breeding should therefore go along with a better feeding program. This is where many Kentucky farmers are doing a poor job! Too many,

even though the sale of milk or cream is an important source of income for them, depend on "trucked in" cows for replacements. Moreover, many farmers breed their milk cows to beef bulls to obtain a quick-growing veal calf, and then save the heifer calves for herd replacements. Such cross-bred heifers usually are disappointing as producers.

What is wrong?

1. "Trucked in" cows or heifers are usually someone else's culls.

2. Too often the "trucked in" cattle are diseased.

3. Heifer calves by a beef-bred sire cannot be expected to produce milk and butterfat efficiently.

4. The owner of a milking herd who buys the "trucked in" replacements or uses a beef bull is breeding himself out of business.

A better plan

A good breeding program can be worked out for every herd, regardless of size. Such a program will mean a **better herd,** not a poorer one, as the heifers come into production.

1. Choose a breed. If the sale of milk or cream is an important item of income on the farm, choose a dairy breed. If the sale of beef is more important, choose one of the beef breeds. Cross-breeding is not advised, so continue within a single breed. If your herd is now of mixed breeding, choose a sire of the breed you want, and develop a herd of useful grades of that breed.

2. Choose a sire whose immediate ancestors have transmitted good producing ability to their offspring.

3. Use your new, carefully chosen sire on the cows you already have if they are healthy and sound. Herd improvement is most easily and surely accomplished through careful sire selection.

VEAL CALVES

In many areas of Kentucky, veal calves are an important source of cash income. Whether or not producing veal calves is profitable depends on (1) the price of veal; (2) the value of milk; and (3) the size of the calf at birth.

It takes 10 pounds of whole milk to produce a pound of veal. Calves small at birth usually are not profitable vealers. This is why many farmers use beef bulls on their milk cows. But, as already mentioned, heifers by beef bulls cannot be expected to grow into good milk cows. Using Milking Shorthorn or Brown Swiss bulls on the milk cows is much more satisfactory. Their large calves make quick veal and their heifer calves can be raised with some assurance that they will be good milk producers. The longer a calf nurses, the less is the annual production of the dam.

RAISE STRONG, VIGOROUS CALVES ON LESS MILK

In raising dairy heifers, about 3 million gallons of milk could be saved annually in Kentucky if more care were used in bucket feeding of limited amounts of milk per calf during the first month or six weeks —or until the calf has a good, vigorous start and can be fed a carefully prepared grain mixture, plus hay and water.

1. Leave the calf with its dam 3 days to receive the colostrum milk rich in much-needed vitamin A.

2. Bucket-feed the dam's milk—about 10 percent of calf's weight daily, divided into two feeds, for 4 to 6 weeks. For example, a calf weighing 80 pounds will get 4 pounds of whole milk twice a day, or 8 pounds a day. More calves suffer from overfeeding than from underfeeding.

3. When the calf is 4 to 6 weeks old gradually cut down the milk feeding and get it to eating grain and hay or grass. Use either a homemade or a commercially prepared calf starter. If you buy a "calf starter" follow the directions which come with the feed.

4. Cleanliness, sanitation, regular feeding, and freedom from dampness and drafts also will prevent many troubles in raising calves.

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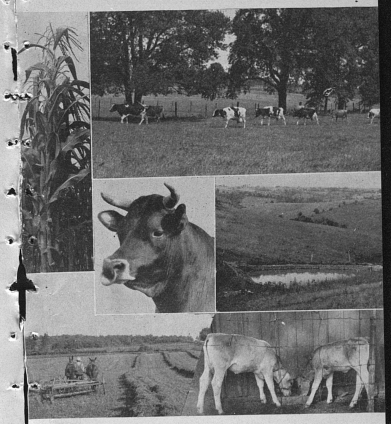
MORE PROFIT FROM YOUR MILK COWS

1. Grow More and Better Feed
2. Breed Better Replacements



A good breeding program, plenty of hay and grain, and pastures with shade and water are a sound basis for milk profits.

Leaflet 83

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College of Agriculture and Home Economics
Thomas P. Cooper, *Dean* and *Director*

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More Profit From Your Milk Cows

1. Grow More and Better Feed
2. Breed Better Replacements

By Fordyce Ely and Lynn Copeland

PROFITABLE milk production depends a great deal on the ability of the farmer and his farm to produce an abundance of good feed at low cost. Most Kentucky farmers milk a few cows. For these men it is particularly important that most of the feed needed by the herd be grown on the farm. Only an especially attractive milk market justifies the purchase of any considerable part of the feed for a herd of cows. A good job of raising feed, then of feeding and caring for the cows and breeding and raising better replacements is the foundation on which profitable dairying is built.

MAKE A FEED BUDGET

A farm should grow, **for each cow of milking age in the herd —**

2½ tons of high-quality hay
1½ tons of grain (usually corn)

"High quality" hay means good, leafy, green, legume hay. If silage is produced, it can be substituted for one half of the hay at the rate of 3 pounds silage for 1 pound of hay.

This budget for the cows of milking age also provides what is needed for the usual quota of calves and heifers, and for the herd bull.

The more good hay and pasture grown, the less grain is necessary. Nutrients furnished in pasture are the cheapest.

GROW CROPS THAT YIELD HIGH PER ACRE AND PER HOUR OF WORK

Crops differ a great deal in the "total digestible nutrients" they will return per acre and per man-hour of work spent on them. The smart dairy farmer takes this into account in deciding what crops to grow. Some average differences in crops in Kentucky are brought out in the accompanying table, "Yield of Crops and Amount of Work Required."

About 9 pounds of digestible protein and 75 pounds of total digestible nutrients are required to produce 100 pounds of milk. Considering both the nutrients produced and the labor, improved pasture, alfalfa hay, and corn are the outstanding crops for the farmer who milks cows.

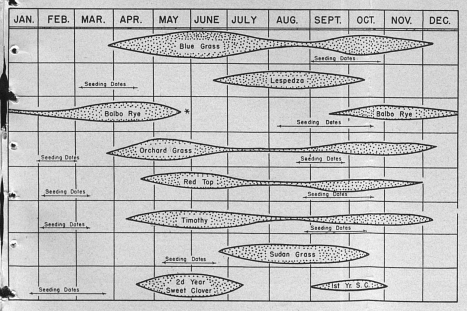
YIELD OF CROPS AND AMOUNT OF WORK REQUIRED

Crop	*Average yield per acre*	*Digestible protein per acre (pounds)*	*Total digestible nutrients per acre (pounds)*	*Days man labor per 100 pounds TDN*
Improved pasture	.....	350	1500	.04
Alfalfa hay	2.4 tons	508	2414	.82
Corn				
Shocked fodder and 35 bushels of ears	1.2 tons	168	2689	1.41
Silage	7 tons	154	2436	1.44
Lespedeza hay	1.2 tons	206	1253	.88
Clover hay	1.2 tons	168	1246	.88
Grass hay	1.0 tons	66	1000	1.00
Barley	28 bu.	120	1058	1.04
Soybean hay	1.2 tons	287	1285	1.18
Soybean, beans	15 bu.	303	830	1.58
Wheat	11 bu.	56	552	1.63
Oats	32 bu.	99	696	1.72

(These figures are averages recorded by the Department of Farm Economics.)

PROVIDE YEAR-ROUND PASTURES FOR YOUR CATTLE

The cheapest milk is made on pasture. Extend your pasture season by using supplementary pastures and winter pastures, including legumes.



* Other cereal grains can be used instead of Balbo rye but they will not provide as much grazing. Vetch and crimson clover may be seeded with small grain. Do not leave land bare during the winter.

IMPROVE PASTURE, HAY, AND GRAIN YIELDS

Here are ten practices which may be used to increase the supply of high-quality feed.

1. Increase hay production by sowing more alfalfa-grass mixtures. Alfalfa is dependable on well-drained soil when fertilized and seeded properly. Alfalfa and grass together provide more feed over a period of years than alfalfa alone.

2. Improve hay quality by cutting in the early-bloom stage and curing in the windrow. Strive for leafy-green quality.

3. Sow Balbo rye or other winter pasture crop to lengthen the grazing season. Winter pasture on land used for tobacco, corn, and lespedeza offers one of the best opportunities to increase feed production.

4. Make better use of farm manure. Kentucky farmers lose many times more plant food from careless handling of manure than they buy in commercial fertilizers.

5. Improve crop yields by using limestone and phosphate where needed. For each dollar invested in these materials, on certain soils, crop values (yield and quality) have been increased about $6.

6. Use ammonium nitrate on feed crops other than legumes. This new, economical nitrogen fertilizer stimulates growth and increases yield. It is particularly valuable for pastures, small grain, and corn.

7. Use adapted hybrids to increase yields of corn. It is possible to increase production ⅓ with little additional labor and no increase in acreage.

8. Use corn stover early. Store under shelter when possible, or feed in early winter before the feeding value is largely leached away.

9. Provide silage when possible. Investigate the possibility of ensiling grass and legumes.

10. Avoid the summer slump in pasture by using Sudan grass, to supplement regular pasture crops.

Your county agent can supply more detailed information and furnish leaflets and bulletins especially applicable to your farm.

FIRST GROW IT; THEN FEED IT WISELY

There are no simple rules to take the place of common sense in feeding cows. Bear in mind that everything in milk originates in the feed and water the cow eats and drinks.

1. On early spring pasture: Early flush pasture may contain 70 to 85 percent of water, and for this reason a high-producing cow cannot eat enough of it to provide all the nutrients needed for heavy production. She needs some grain in addition. The early grass, however, is excellent feed, as is evident from the heavy increase in milk production when cows go on grass. By spring, many cows and heifers in Kentucky are thin and run down (many also temporarily sterile) from lack of feed and deficiency of vitamins A and C. Early spring grass supplies these vitamins in abundance.

Tendency to bloat is greatly reduced and milk production increased if hay and grain feeding are

in the left hand until enough leaves are stripped to tie.

11. Strip one grade only, then pass the stalk to the next worker unless most of the stalks have only one or two leaves of the next grade, or unless the next grade is the tips. At the same time you pass the stalk to the next worker, look for the next stalk to strip and the place to grasp it. Hold the main grade in the hand until tying and lay down the next grades having only one or two leaves per stalk. When most of the stalks had three leaves of the next grade per stalk it made no difference in pounds stripped per hour, on the farms studied, whether one or two grades were stripped at a time. Where there were four or more leaves per stalk there was a definite advantage in stripping only one grade at a time.

12. Strip tips on speared tobacco with one grasp of the right hand after passing the main grade to the left hand for holding. Hold the tip of the stalk with thumb and first finger of left hand and remove the tip leaves in one movement of the right hand.

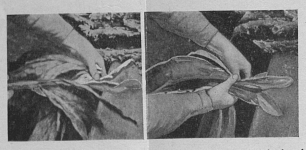


Fig. 8.— Removing all tip leaves with one grasp of right hand while the left hand holds the tip of the stalk.

13. Hold 50 to 60 leaves per hand before tying. It takes almost as much time to tie a small hand as a medium-size hand, and more time to tie a large hand than a medium-size hand because the tie-leaf may break or the worker may fumble the leaves.

14. Pull a tie-leaf from the hand of leaves being held unless the quality of the tobacco is such that good tie-leaves are scarce, in which case choose a tie-leaf while stripping and lay it on the table.



Fig. 9.— Tie-leaf is pulled from hand and folded tip is placed between 1st and 2d fingers of left hand, in position for wrapping around butts of leaves.

15. Tie by placing tip of folded leaf between first and second fingers of left hand while pushing the tie-leaf against the butts of the hand of leaves (Fig. 9). Pull tie-leaf firmly against butts of leaves with the right hand and rotate the hand of leaves counter-clockwise (Fig. 10) with the left hand.

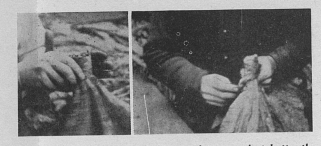


Fig. 10.— With tie-leaf held firm and taut against butts, the hand of leaves is whirled counter clockwise by the left hand, leaving about 3 inches of stem of tie-leaf to be pushed through the hand of leaves to hold the tie.

16. Pass stem end of tie-leaf through the hand of leaves to keep the tie-leaf tight (Fig. 10).

17. Place tied hand of leaves directly on stick (Fig. 11).

18. Support the stick in the stripping bench convenient to the worker (Fig. 2).

19. Practice these steps as a whole until they become rhythmic and automatic.

20. Plan definite rest periods and really relax during the rest period.



Fig. 11.— Tied hand of leaves is placed directly on stick.

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Easier Ways To Do Farm Work

STRIPPING BURLEY TOBACCO

By George B. Byers
Ernest J. Nesius
Earl R. Young



FARMERS often speak of stripping 100 pounds of tobacco as a good day's work. They know that the amount of tobacco stripped per day is influenced by distance of the bulked tobacco from the stripping room, quality of tobacco, arrangement of pressing facilities, and type of lighting of the stripping room.

In every community a few farmers are recognized as good tobacco strippers and are proud of their records of 150, 200, or even 250 pounds per day. These men often are thought of as having special abilities or knacks. Careful study of 24

Leaflet 84

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such men at work in 1943 showed, however, that their method of stripping had a great deal to do with it. They are all expert tobacco strippers who strip many acres of tobacco every season. Other men, just as skillful and rapid workers but using poorer methods, did not strip as much.

A daily (8-hour) accomplishment of 134 pounds per man of stripped tobacco of all grades was averaged by 10 crews studied in detail in 1943. The lowest crew stripped 82 pounds per man per day and the highest crew stripped 220 pounds per man per day, each with tobacco that made about 1,600 pounds per acre.

THE TIME-SAVING WAY

1. Have the stripping room attached midway along the side of the tobacco barn, to avoid unnecessary walking in carrying the tobacco. Where the stripping room is away from the barn the cost of moving it will be justified by the saving of time over the next two or three years.

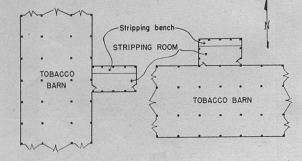


Fig. 1.— Stripping room attached midway along side of tobacco barn, with bench arranged to get north light in stripping room.

2. Use a stripping table of the right height for the workers, to do away with unnecessary stooping or raising of arms and shoulders. Have the table just high enough to reach the lower edge of the closed hand when the worker is standing. Make the table fit the tallest worker, then fit the other workers to it by arranging boards for them to stand on.



Fig. 2.— Table adjusted to height of tallest worker; other workers adjusted to height of table.

3. Arrange bench in stripping room to strip flyings and trash just inside the door from the barn. (Note arrangement of door and stripping bench in Fig. 1, page 2.) This reduces walking to carry tobacco to be stripped. Further, the stripped stalks will then be thrown in a pile near the outside door of the stripping room.

4. Pick up the stalk just below the bottom leaf so that thumb and first finger of the right hand grip the stem of the first leaf to be removed.

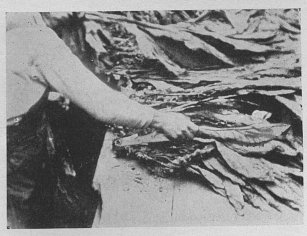


Fig. 3.— Grasping stalk with 2d, 3d, and 4th fingers so that thumb and 1st finger hold the first leaf ready to pull it off.

5. Hold stalk between right forearm and body (see Figs. 5 and 7) in such a manner as to leave the right wrist and hand free to pull off leaves.

6. Pull leaves with the right hand by gripping the stem of the leaf on the underneath side near the stalk with the thumb and first finger. Pull at right angle to the stalk.



Fig. 4.— Leaf is pulled with right hand by grasping it with thumb and forefinger and rolling the hand to the right.

7. Hold the stripped leaves with the second, third, and fourth fingers of right hand as thumb and first finger pull a leaf (Fig. 4). As the hand moves to the next leaf to be pulled, the thumb and first finger grip all leaves while the other fingers grasp the leaf just pulled.

8. Strip with the left hand the leaves that come up convenient for the hand. Hold the stripped leaves already in the hand with the 2d, 3d, and 4th fingers. Hook the first finger over the leaf where it joins the stalk and, with the thumb pressing at the joint, pull the leaf back. As the leaf comes back clasp it with the fingers while the thumb holds the butts of all the leaves in the hand.



Fig. 5.— Hooking first finger of left hand over leaf to be pulled.

9. Pass the stalk back between the body and right forearm by grasping the stalk with the thumb and finger of the left hand when left hand is not stripping leaves. Strip with right hand while the stalk is being passed back.

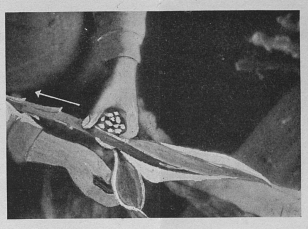


Fig. 6.— Shifting stalk, with left hand, back between body and right forearm.

10. Pass the leaves stripped with the right hand to the left hand when the grade is completely stripped from the stalk. Hold the stripped tobacco



Fig. 7.— Leaves gathered in right hand are passed to left hand when leaves of that grade are all stripped from the stalk.

the hands thoroughly scrubbed before going to the plant bed, and the workers should not smoke or chew while working at the plant bed. Dipping the hands in a strong solution of trisodium phosphate from time to time when weeding or pulling plants will eliminate the danger of mosaic infection nearly completely. **Take precautions when weeding plant beds, pulling plants, and setting plants.**

11. In dry weather water the bed thoroughly every 4 to 6 days. Use 50 to 60 gallons for each 8 feet of 12 foot bed. Watering a large bed is laborious, but in some seasons is necessary if strong, thrifty plants are to be produced. Tobacco growers can well afford to provide equipment for watering plant beds rapidly.

12. To destroy cutworms use 1 part of paris green and 25 parts of wheat bran mixed with enough water to make a mash which crumbles readily. Scatter thinly over the bed late in the afternoon.

13. To control flea beetles, dust the plants with a mixture of 1 part of paris green, 5 parts of lead arsenate, and 4 parts of hydrated lime. Apply at the rate of ¾ pound per 100 feet of bed 9 feet wide, or use dust containing 1 percent rotenone applied with a rotary hand-operated duster at the rate of ½ pound per 100 feet of bed 9 feet wide.

14. When setting and resetting is finished, destroy the remaining plants in the bed to help prevent diseases from spreading, and to help control insects.

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

30M—1-42
10M—9-44
25M—2-45

Tobacco PLANT-BED Management

By Russell A. Hunt

PLENTY of healthy, vigorous, stocky plants must be ready for transplanting early if high-quality tobacco is to be produced. Enough plant-bed area should be prepared to provide the plants needed for the entire crop at the first and second pullings. The first plants pulled from beds are generally free from mosaic, but at each later pulling the plants are likely to carry more mosaic, which of course causes more disease in the field. Vigorous, stocky plants are a real help in getting a good stand. They recover quickly from the effects of transplanting, and are not easily killed by bad weather, wireworms or other insects.

Leaflet 85

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky February, 1945

Some Points to Remember

1. Select fertile, well-drained land for the bed, preferably with a slight southern or eastern slope, free from shade, especially in the forenoon. This is helpful in preventing blue mold. Use a new site for the plant bed each year, a great help in avoiding black root-rot and blue mold. Be sure that the site is free from bull nettles and ground cherries, as these may carry mosaic.

2. Where tobacco is to be grown on land which has grown tobacco in recent years, choose a variety resistant to black root-rot. Burley Ky. 16, Ky. 41A, Ky. 19, and Ky. 52 are recommended. Dark fire-cured varieties Ky. 120, Ky. 134, and Ky. 141 are root-rot resistant and have proved satisfactory at the Western Kentucky Experiment Substation. On virgin land a variety not resistant to root-rot may be as satisfactory, if one can be found which yields as well as Ky. 16 or Ky. 41A. Where fusarium wilt is present, Ky. 33 should be grown.

3. Provide 35 to 75 feet of bed 12 feet wide for each acre of burley tobacco to be grown, and at least 20 feet of bed 12 feet wide for each acre of dark tobacco.

4. Before steaming or burning, prepare the seedbed thoroughly so that only a very light raking will be necessary before sowing the seed. Deep stirring results in weedy beds.

5. Fertilize a steamed bed with a complete fertilizer such as 6-8-6 or 4-8-4, at the rate of not more than 40 pounds for each 100 feet of bed 12 feet wide, and rake in very lightly. A low-potash fertilizer such as 4-12-0, is preferable for a heavily burned bed. **Caution:** Heavy fertilizing of plant beds may put too much soluble salts in the soil, which in dry weather causes the plants to yellow and die.

6. Sow 2 to 3 level teaspoons of cleaned and tested seed to 100 feet of bed 9 or 12 feet wide. Seeding may be done as soon as weather permits, which is usually the last half of February, or March. Perhaps the most favorable time for seeding is from the first to the middle of March in southern and western Kentucky, and from March 10 to March 30 in central and northern Kentucky. It is a mistake to work the ground when it is wet in order to sow early.

7. To distribute the seed evenly, mix it with screened wood ashes, fine sand, or commercial fertilizer. Going over the bed several times, sowing part of the seed each time, assures even distribution.

8. Box the bed tight, using 1" x 6" material. Use a good grade tobacco cotton. Draw it over the top of the boxing boards and fasten to the side of the board. This will keep out flea beetles and cutworms, and will double the life of the tobacco cotton.

9. Control wildfire and angular leafspot in the plant bed. When the first true leaf appears apply bluestone-lime mixture (3 pounds copper sulfate, 4 pounds lime, and 50 gallons of water) with a sprinkling can, through the canvas, and then again 8 to 10 days later. This should be applied at the rate of 1 quart per square yard. Be sure to sprinkle all the plant bed including the sides of the bed that may not be covered by the canvas. For very large beds the mixture may be sprayed directly from a tank on a wagon through a hose equipped with a large nozzle of the type used on a sprinkling can.

10. Control mosaic. Plants become infected with mosaic from the hands of workers who chew or smoke barn-cured or "homespun" tobacco. To prevent mosaic the pockets of the workers should be brushed clean and

tobacco from the tier rail to the stripping room. Still more time and energy are saved by having the door into the stripping room located near the end of the stripping bench on which the tobacco is to be laid. A second door near where the stripped stalks will be placed saves time in carrying out the stalks. In order to maintain proper ventilation, ventilating doors should be made in the stripping room similar to the ventilating doors in the barn.

Height of stripping bench suited to the tallest workers and boards placed on the floor to adjust the shorter workers to the bench reduces the stooping or raising of arms and shoulders.

The following method of stripping was found to be the best of those observed:

1. Pick up the stalk just below the first leaf to be stripped so that the thumb and first finger grip the first leaf to be pulled.
2. Hold the stalk between the forearm and body so that the hand is free to pull leaves.
3. Strip with both hands (Picture 8).
4. Pass stripped leaves from right to left hand when the grade is completely stripped for each stalk.
5. Strip one grade only before passing the stalk to the next worker, unless most stalks have only one or two leaves of the next grade or unless the next grade is tips.
6. Pull the tip leaves on speared tobacco with one grasp of the hand after the leaves of the main grade have been passed to the other hand.
7. Make a hand of 50 to 60 leaves.

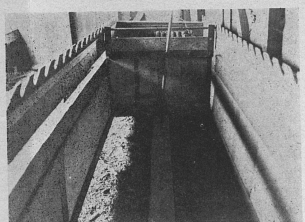


Stripping with both hands. *(Picture 8)*

8. Pull a tie-leaf from the hand of leaves rather than placing a tie-leaf on the bench to be picked up when the hand is to be tied—unless tie-leaves are scarce because of low quality and case of tobacco.
9. Place each tied hand of tobacco directly on a stick held in the stripping bench convenient to the worker.

PRESSING

Wall-presses and vertical and horizontal bed presses are the usual types used by burley growers. A horizontal bed press in which the sticks are pressed downward and held in line saves time in filling and emptying the press. Time is saved in that two, three, or more sticks can be placed in the press with one opening of the press, without removing any stick to make room for others. Further saving of time is possible because the press holds about the amount of tobacco that a crew of four good workers can strip in a half day. Thus twice each day the men working as a crew remove the pressed tobacco and coop it. Time is saved because the tobacco is placed directly in the coop from the press and one man stays on the coop to place the sticks of tobacco.



Horizontal-bed press that holds 45 to 50 sticks of stripped tobacco. Door hinged at top to press tobacco both downward and back. *(Picture 9)*

CREW ORGANIZATION

A crew of four workers, systematically placed, stripped 880 pounds of tobacco in 8 hours, or an average of 220 pounds per worker. More tobacco was stripped per day by placing the fastest and most experienced workers at the bench to strip and place the tied hands on sticks. A worker who was less experienced in stripping but knew all grades kept the workers supplied with tobacco from the bulk, placed the sticks of tied hands of tobacco in the press, carried out the stripped stalks, and kept a supply of empty sticks near each worker. He also stripped or picked up and tied leaves whenever a worker at the bench was unable to keep up. Crew organization of this type allows each worker to specialize in one phase of the stripping work, with the result that he becomes especially skilled.

Cooperative Extension Work in Agriculture and Home Economics: University of Kentucky, College of Agriculture and Home Economics, and the United States Department of Agriculture, cooperating.

20M—10-44

U. S. Department of Agriculture
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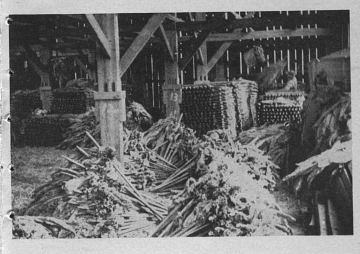
For:

Penalty for Private Use to Avoid Payment of Postage, $300

Easier Ways To Do Farm Work

Taking Down, Bulking, Stripping, and Pressing Burley Tobacco

By George B. Byers
Ernest J. Nesius
Earl R. Young



CAREFUL RECORDS (including motion pictures) of the methods used by farmers who are recognized as particularly good at certain operations in stripping burley tobacco are reported in this leaflet, the sixth in a series on easier ways to do farm work. All these leaflets describe the best of the methods observed.

Leaflet 86
UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*
Lexington, Kentucky
October, 1944

TAKING DOWN TOBACCO

Burley tobacco is taken down from the tier rail by dropping, passing from man to man, or letting down with a rope. When dropped or passed from man to man, the plants are pushed together by grasping the stick and pushing tobacco against the tier rail or by allowing the stick to slide through one hand as the stalks are pressed together (Pictures 1 and 2). When the tobacco is let down with a

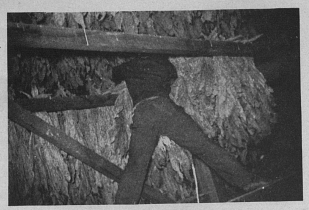


Bunching the tobacco on the stick by pushing the tobacco against tier rail. *(Picture 1)*

rope, 8 to 10 sticks are pushed together on the rails, the rope is placed underneath the sticks between the center stalks of each stick, and a ring on the end of the rope is placed over the end of the center stalks on the stick farthest from the worker (Pic-



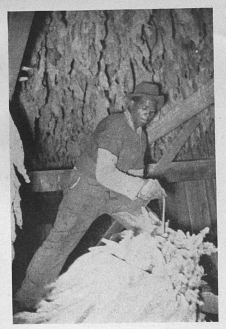
Bunching tobacco on stick in the tier by pushing the stick through the hand. *(Picture 2)*



Bunching 8 to 10 sticks and placing rope for lowering. *(Picture 3)*

tures 3 and 4). Then, when the sticks are down, the plants on each stick are bunched by pushing to one end of the stick (Picture 5).

For the 1st through the 6th tiers tobacco in good case, with the stalks pushed to one end of the stick before dropping, can be dropped from the tier rail into an orderly pile on the ground, ready to be carried to the bulk, 2 to 4 times faster than in either



Lowering 8 to 10 sticks of tobacco with a rope. *(Picture 4)*



Bunching tobacco by pushing plants to end of stick. *(Picture 5)*

passing, dropping and catching, or letting down with a rope. Some leaves may be damaged in dropping. For the 7th and higher rails a rope can be used to substitute for extra men necessary in passing. Two men using a rope take down as much tobacco per man per day as 3 men, one pushing plants to end of the stick and passing the stick to a second person who drops the stick to the third worker on the ground who catches and places the sticks.

BULKING

Locating the bulk near the center of the barn reduces walking to carry the tobacco to the bulk and later to the stripping room. In bulking the tobacco from a 5-bent barn with two sheds 4 tier rails high, about 4 miles of travel are required if the tobacco is bulked in one shed midway along the side of the barn, while 5.5 miles of travel are required to bulk the tobacco at one corner of the barn. By bulking the tobacco for stripping near the center of a 60 foot by 40 foot barn, 1.5 miles of walking may be saved when ½ rail of tobacco is carried at each trip.

Time is saved in bulking tobacco if one man pulls out each stick while the tobacco is in the pile where it was placed when taken from the tier rail. A right-handed worker places his left leg against the pile of tobacco near the stick, grasps the stick and pulls it out. Where the tobacco had been placed in orderly piles as it was taken from the tier rail, one man bulked an acre of tobacco in 1½ hours.



Pulling out sticks from tobacco dropped in piles from tiers. *(Picture 6)*

In contrast, carrying the piled tobacco on sticks to the bulk where two men removed the sticks and placed the tobacco in the bulk required approximately 5 hours of labor per acre.

The empty sticks are left in orderly bunches of 8 to 12 sticks which can be picked up quickly and placed in a rick.

STRIPPING

(Stripping is described in more detail in Leaflet 84, "Stripping Burley Tobacco.")

A stripping room attached midway along the side of the barn reduces the walking required to get the



Piling empty sticks in rick. *(Picture 7)*

Calf Management

To raise healthy, vigorous calves, good care and management are necessary. The milk should always be fed regularly. When being fed milk, the calves should be tied or placed in separate stanchions or pens so they cannot suck one another afterwards. Grain boxes should be checked and left-over grain removed so it will not mold and become maggoty. Fresh hay should be placed in the racks twice a day.

Housing is important. Calves need clean, light, well-ventilated quarters. If possible, small calves under 8 to 12 weeks should be kept apart. Small, separate pens with solid partitions are ideal for small calves. Try to avoid drafts and keep the bedding clean and dry. Turn the calves out on warm, bright days so they can get plenty of exercise and sunlight.

Water.— Even though a calf drinks milk, it also needs water after two or three weeks of age. Provide fresh, clean water so that the calf may drink as often as it wants to. When the calf starts to eat grain and roughage it should also have salt all the time.

Horns can be prevented by using caustic potash or soda when the horn buttons begin to show. Clip the hair close around the button. Apply vaseline liberally around the poll, around the horn buttons and above the eyes, to prevent severe burns. Wrap the stick of caustic in paper with one end exposed. Moisten the exposed end and rub on each button making a raw spot the size of a nickel. Be sure to rub around the base of each horn button. Do not rub too long but make sure each horn button is well rubbed and raw. Take care not to allow any caustic to run down the animal's head or get in its eyes. Keep the calf by itself, under shelter, the rest of the day.

Extra teats can easily be clipped off with sharp scissors when the calf is a few days old.

Keep the Heifers Growing

Sometimes calves are raised well, up to three or four months, and then are allowed to "rough it" until they come into milk. The secret of growing dairy heifers into good cows of satisfactory size is to keep them growing **continually.** Heifers once stunted, rarely develop into cows of good size at maturity. Most of the skeletal growth is completed by the time a heifer is two years old.

Heifers past four months of age should be allowed pasture. However, heifers under six months of age should not be expected to get all their feed from pasture. They need two or three pounds of a good grain ration daily plus ample salt and minerals to keep them growing. As for minerals, steamed bonemeal is the most satisfactory. Boxes of steamed bonemeal and salt should be available to the growing heifers at all times. Heifer calves should be separated from the bulls at about four or five months of age and the heifers raised by themselves. Do not allow these older heifers to suck one another. During the winter, shelter is necessary and they should have all the good bright leafy green hay they will eat plus enough grain to keep them growing. Silage is excellent for growing heifers. Too often the heifers receive only what the milking herd refuses to eat.

Age to Breed

Dairy heifers should be well developed before being bred, and the age of breeding will depend somewhat on their size. Jerseys and Guernseys, if well developed, may be bred at 15 to 16 months of age and the larger breeds at 18 to 20 months. If a heifer is small, let her grow another two months before breeding. Within each breed the larger cows are the more profitable. Heifers should be well developed and grown out to make good herd replacements.

Common Calf Ailments

Prevention by good feeding and strict sanitation is the best treatment for calf troubles. When illness does occur, if the owner cannot competently detect and treat the trouble, a veterinarian should be called.

Scours.— Common scours may be caused by overfeeding, dirty pails, cold or sour milk, or often by a nutritional or vitamin deficiency. When scours occur keep the calf by itself and reduce the milk one-half. Vitamin capsules rich in vitamin A and the B complex or teaspoonful doses of fish-liver oil, very often help a great deal. Do not overload the calf's stomach with a lot of medicines. Two tablespoons of castor oil in milk is sometimes helpful. Sulfaguanidine is proving very effective but should be given under the direction of a veterinarian. Clean and disinfect all pens thoroughly.

Colds and Pneumonia.— Colds are frequent among calves, and if neglected may develop into pneumonia. Poor nutrition, exposure, bad ventilation, and drafts are frequent causes. Animals become weak and listless and breathing is labored. Capsules rich in vitamin A and B complex, or fish-liver oil, are helpful. One of the sufa drugs prescribed by a veterinarian is recommended as the best treatment.

Ringworm.— This disease is caused by a fungus. The crust should be removed and the affected spots or areas treated with tincture of iodine.

Lice.— Lice are found especially during winter. Use the ordinary Rotenone powder. Dust on the affected parts and repeat the treatment in twelve to fourteen days to get the new lice that have hatched. There are also numerous commercial louse powders on the market.

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

25M—2-45

Raising Dairy Calves

By Lynn Copeland



THE BEST WAY to improve Kentucky milk cows is to breed all milk cows to good dairy bulls and then to raise the herd replacements. Proper feeding and management of the calves and growing the heifers out are important, because it is what they are at maturity that counts. The productive capacity bred into a calf will not be realized unless the heifer is well grown out and well developed. Starved, stunted heifers rarely develop into good producing cows.

Leaflet 87

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky February, 1945

Your calves of today will be your herd of tomorrow. If a calf is worth raising at all it is worth raising well. Care and attention pay. Grow your calves out and keep them growing. Own a better herd two years from now.

Care of Cow Before and at Calving

Raising the calf begins with the care of the dam. She should be a good cow, worthy of being the mother of a future member of the herd. She should be dried off and have a rest period of at least 6 or preferably 8 weeks. During this time she should be well fed on good leafy hay (or good pasture) plus a grain ration to condition her for another profitable milking period and to develop the fetus. Liberal feeding during the dry period is especially important.

The cow should calve in a clean, disinfected, dry stall, or in the summer she may calve in the pasture. Clean calving quarters are important. In winter, care should be taken that the cow does not get wet from rain or snow and she should not get chilled. In very cold weather it is advisable to blanket the cow immediately after calving. Take the chill off the drinking water; in fact, a good drink of slightly warm water is good for a cow just after the calf is born. The cow need not be milked completely dry for forty-eight hours after calving. This may aid in preventing milk fever.

Sometimes the afterbirth or fetal membranes stick to the calf's nose and mouth. If this happens, it must be removed immediately to prevent smothering. Usually the cow licks the calf dry at once. If she does not, then rub the calf dry with a burlap sack or cloth. In real cold weather, cover the calf with a blanket made from a burlap sack to prevent chilling. Paint the navel cord with iodine to aid in preventing infection.

Care of the New-born Calf

Strong, well developed calves usually get to their feet and nurse within an hour. Weak calves, unable to stand, should be held up to nurse. To encourage sucking, insert the teat into the calf's mouth and strip the milk into the mouth. It is very important that the calf receive the colostrum milk from the mother for three or four days. This milk is laxative, rich in protein, and high in vitamins which the calf needs. It promotes growth and helps prevent scours and infections.

The calf should remain with the mother for two to four days. If removed at less than four days it should receive the mother's milk immediately after each milking. After three to four days the calf should be removed from the cow, taught to drink from a bucket and then raised by the method most practical under the conditions prevailing on the farm. In teaching the calf to drink it is best to let it go unfed for several hours so that it will be hungry. Then straddle the calf's neck, back it into a corner, put two or three fingers in its mouth so that it will suck on them, hold its nose in the bucket and let it drink by sucking milk through the fingers. Hold the pail up so that the calf can keep its head up fairly well. Teaching some calves to drink is a test of patience, but it can be done. The older the calf, usually the more stubborn it is in learning to drink. Some farmers use nipple pails that are now on the market, and these are all right if kept clean and sterile. Small, weak calves may be raised on a quart bottle with a lamb's nipple. Teaspoonful doses of fish-liver oil or vitamin capsules, rich in vitamin A, are helpful in getting weak calves started.

Feed the milk to the calves as soon as possible after milking, or else warm it to body temperature. Cold milk causes stomach upsets and scours. Cleanliness is vital. Keep all calf buckets spotlessly clean and sterile and always feed at regular intervals.

Raising Calves on a Minimum of Milk

Good calves can be raised on relatively little milk, especially if they are given a good start on normal amounts of whole milk and are taught to eat a good "calf starter" and good hay. Don't overfeed. One pound of milk for each 10 pounds of body weight of the calf is enough at the start. This means about 6 pounds or 3 quarts a day for small breeds and 8 pounds or 1 gallon a day for the larger breeds. After the first few days whole milk may be fed according to the following schedule:

	Small breeds (pounds daily)	*Large breeds (pounds daily)*
1st and 2nd weeks	6	8
3rd and 4th weeks	8	10
5th and 6th weeks	6	8
7th and 8th weeks	4	6
Total	336 lb.	448 lb.

At two weeks start feeding a good calf meal or starter. Numerous formulas for calf starters have been developed. If desired, those which have been proved satisfactory, can be obtained from the Dairy Department, University of Kentucky. At present, however, it is difficult to buy in small quantities all the ingredients to make a good balanced "starter," so it is probably advisable for farmers raising only a few calves to buy and feed a good commercial starter, well balanced and fortified with vitamins, especially vitamins A, B complex, and D. After sixteen weeks the starter can be replaced by a less expensive, home-mixed heifer-growing ration.

As the milk is gradually reduced, feed all the "starter" the calves will clean up twice daily. Start feeding hay at two to three weeks. It is important that the hay be good—bright, green, and leafy. Legume hay is excellent. Also good mixed hay or oat hay cut in the dough stage is fine.

Raising Calves on Skimmilk

Where cream is sold there is skimmilk for the calves, hogs, and poultry. Where fresh skimmilk is available it should by all means be used to raise the calves. The calves should be started on whole milk as explained on the preceding page. Then, after about four weeks they should be switched to skimmilk. The change should be made gradually. The amount of skimmilk can be increased until a calf is getting 10 to 14 pounds a day at ten weeks. Not much more than that should be fed, to avoid "pot bellies."

In feeding skimmilk, be sure it is fresh, sweet, and warmed to body temperature. With skimmilk, a complete, balanced, calf starter is not so essential. A mixture of cracked yellow corn and oats is satisfactory. Young calves can eat whole grains fairly well, but coarse grinding is recommended. The amounts of grain and hay recommended are the same as when calves are raised on a minimum of whole milk.

Nurse Cows

Too often in Kentucky, calves are raised by allowing them to nurse their dams for six to ten weeks following birth. This may produce good calves but it is the most expensive method. A calf nursing a cow for eight to ten weeks takes about 1,000 pounds of milk. Also if a calf nurses its dam for several weeks, the dam usually will not milk as well during the balance of the lactation as she would if the calf had been taken away a few days after birth.

Frequently farmers use one cow as a nurse cow for calf raising. If the cow is a good milker and will adopt strange calves, she may raise four to six calves during a lactation. **However, cows with garget or mastitis should not be used as nurse cows for raising heifer calves.**

WHAT THE TRUCKER CAN DO!

The Truck is the Cornerstone of the Trucker's Income

Why should truckers conserve trucks?

The trucker receives his income from the sale of transportation services. He must conserve his truck to maintain his job and his income, as well as to do his part in winning the war. The commercial trucker can attain maximum conservation only by cooperating with farmers, dealers, service agencies, and others.

How can a trucker conserve his truck?

(1) **Drive carefully** even at slower wartime speed.

(2) **Operate the truck carefully and maintain it** in as good condition as possible to prevent breakdowns.
For details of "preventive maintenance program" see local garages, ODT district offices, and ODT field representatives.

(3) **Use parts-locating service of the ODT when in need of repair parts.**

(4) **Haul capacity loads but avoid overloading.**

(5) **Reduce empty mileage to a minimum.**

(6) **Set up a time schedule,** where regular collection routes are operated, and follow it as closely as possible. Arrive at farm on time if appointments are made.

(7) **Obtain return loads when feasible.** If necessary, contact the ODT for assistance in securing return loads. Lease truck to another operator if he has a return load for your neighborhood.

(8) **Where a traffic clearing house is available, use it to secure return loads.**

(9) **Cooperate with other truckers** in the community by exchanging listings (patrons and type of load) so that duplicate services can be eliminated.

(10) **Plan pick-up trips** in order to reduce mileage to a minimum.

(11) **Avoid rough, rocky, or muddy lanes and roads.**

WHAT TRUCK SERVICE AGENCIES CAN DO!

Service Is An Essential Part of Conservation

Why should service agencies conserve trucks?

Effective service and maintenance programs will prevent many serious time- and labor-consuming breakdowns. The slogan of the service agency should be "keep 'em rolling" instead of "we fix 'em." With a shortage of skilled mechanics, greater service can be rendered to the industry by stressing maintenance service rather than strictly repair. Not only is it financially advantageous to all service agencies during the emergency to make trucks and tires last longer, but it is also their patriotic duty.

How can service agencies help in truck conservation?

(1) **Cooperate with truckers, farmers, and others** in organizing and operating a maintenance program to prevent breakdowns while trucks are in service.

(2) **Cooperate with ODT** and others in getting out information on the maintenance program.

(3) **Provide priority service to motor vehicles engaged in essential wartime transportation on the home front.**

(4) **Render superior service in repairs and related matters.**

(5) **Use parts-locating service offered by the ODT district offices.**

(6) **Provide information to users of tires** as to methods of prolonging useful life of such tires, whether made from natural or synthetic rubber.

(7) **Stress with truck owners and operators that greater damage can be done to the truck by overloading, or by unbalanced loading, or by fast driving, than can be corrected by mechanics.**

CONSERVE YOUR TRUCK FOR YOUR COUNTRY

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.
8M—2-45

TRUCK CONSERVATION *begins with* YOU!

By
C. D. Phillips

Leaflet 88

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division, Lexington

Thomas P. Cooper, Dean and Director

February, 1945

WHY CONSERVE TRUCKS?

1. **Fewer trucks today than at the beginning of the war**
   Military trucks, mobile guns, tanks, and planes have for the past three years taken the materials and labor which would otherwise have been used in the production of trucks for civilian use.
2. **Only a few new trucks for civilian use in 1945**
   Although materials have been allocated for some new trucks for civilian use, those produced will supply only a fraction of the number needed for replacement.
3. **Trucks now in use are less dependable than a year ago**
   Trucks now in use are older and have had harder use than in normal times, and consequently are not in as good condition.
4. **Critical repair parts are not always available**
   Although supplies of critical repair parts are larger now than at the beginning of the war, needs for these parts are much greater.
5. **Shortage of tires**
   Because of a labor shortage the supply of tires is far below requirements, large-sized (8.25 and up) truck tires being especially critical. There is little prospect for improvement during the immediate future.
6. **Shortage of skilled mechanics, garage help, and drivers**
   With increasing demand for labor in critical war production there may be even less labor available for repair work.
7. **Not enough gasoline to meet the need**
   Gasoline stocks for civilian use are 43 percent below those of three years ago, and even though refineries are operating at capacity there is little hope of increased supplies for civilian uses until after the war in Europe is won.

WHAT CAN BE DONE?

Cooperative action among farmers, truckers, dealers, and service agencies is essential now to bring about substantial conservation of trucks and tires. Individual action also is necessary in order that the present supply of trucks can be made to last until the emergency is over and new trucks are available. Do everything in your power today and every day to get the greatest possible use out of the trucks you use. Even after the war is won, farmers, truckers, and others will continue to reap the benefit of a more efficient transportation system developed from this cooperative action.

CONSERVE YOUR TRUCK FOR YOUR COUNTRY

WHAT FARMERS CAN DO!

The Country's Food Supply Moves on Trucks

Why should farmers conserve trucks?

Since practically all farm products leave the farm by truck it is essential that farmers do all they can to make the present trucks last until new ones are available. Production on the farm might be largely wasted if trucks were not available to move the products to market. Farmers should conserve all types of transportation not only as a protection for our armed forces, but also as a safeguard for their own incomes.

Most of the trucking of farm products in Kentucky is on trucks hired for the purpose, consequently close cooperation with truckers is necessary to secure maximum conservation. It is also important, however, that farmers using their own trucks conserve them for use on the farm and for hauling feed and supplies.

What can a farmer do to conserve his own truck?

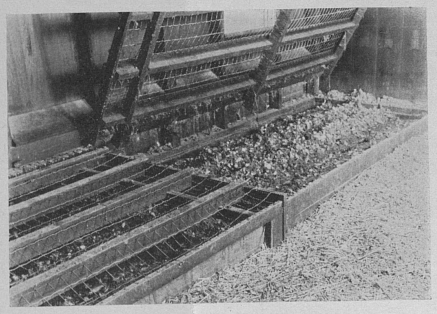
(1) **Follow a planned truck-maintenance program.**
(2) **Load carefully and do not overload.**
(3) **Plan each trip for maximum use of the truck.** When hauling a load to market, plan to bring back a load of feed, fertilizer, or other farm or home supplies. Find out whether neighbors need hauling that can be done on this trip—either products for market or supplies to bring back. Remember that under present regulations it is permissible to haul a neighbor's produce to market and to bring back farm supplies for them.
(4) **Be sure the trip is necessary** and cannot be delayed.
(5) **Use the truck only for transporting farm products** to market or supplies to the farm. Do not use it as a passenger car.

What can a farmer do to conserve the "commercial for hire" truck?

(1) **Help get a full load in his neighborhood.**
(2) **Make arrangements with the trucker well in advance** (a week or ten days) so that he can plan his trip.
(3) **Have livestock or other produce ready** to load when the truck arrives.
(4) **Have farm products hauled to nearest satisfactory market by the shortest route.**
(5) **Be willing to give up choice of trucker or choice of day of shipment** when conservation can be substantially promoted by using a trucker living closer or by combining shipment with neighbors on a different day.
(6) **Do not ask truck drivers to return checks or make small purchases for you in town.**
(7) **Provide adequate loading facilities.**
(8) **Plan marketings when roads are in best condition,** and when roads are muddy postpone marketings until the roads are in better condition.
(9) **Plan farm needs** so that the trucker can deliver a load of supplies when coming after a load of produce.

DROPPING PITS

Dropping pits are very popular with farmers in Kentucky because of their convenience. A picture of an approved type of dropping pit is shown below.



Dropping pit with 2"x2" roost poles 14 inches on center, and covered with 1"x2" mesh wire. Poultry wire is not heavy enough. Half of the roosts are shown raised, in position for cleaning out the pit.

Dropping pits need not be cleaned more than two or three times a year. This means a great saving in time and labor. Phosphate fertilizer scattered in the pit frequently, especially during rainy weather, will help to keep it dry. Other desirable features of the pit are: (1) hens are kept away from the droppings which is an aid to disease control and to the production of clean eggs; (2) the double wall in the back of the house and the overhead ceiling are not needed. This allows the windows to be placed higher and gives more even distribution of light; (3) permits the use of a ventilation door in the back which makes the house cooler in summer.

12 POINTS

1. Be sure the house is on well-drained soil.
2. Allow 3½ to 4 sq. ft. of floor area per bird.
3. Provide 8 to 10 inches roosting space per bird.
4. Have 1 sq. ft. of open screened front per 10 sq. ft. of floor area for ventilation.
5. Add windows to admit sunlight (See plan).
6. Wooden or concrete floors improve sanitation and add warmth in house.
7. Build a dropping pit 19 inches deep and screen in under roost poles.
8. Strip all cracks. Fodder may be stacked around house during winter.
9. Provide at least 24 nests for each 100 hens. Build nests so that they can be easily removed and cleaned.
10. Provide adequate feeding equipment and watering stands. Have 3 reel-type mash hoppers for each 100 birds.
11. When increasing size of house make the house deep from front to rear and place the roost poles in the back of the building.
12. If the roof is high, a straw loft about 6½ to 7 ft. above the floor will make the house warmer (See plans).

For more information refer to Kentucky Extension Circular 351 "Housing Farm Poultry." See your county agent.

Lexington, Kentucky April, 1945

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.

10M—4-45

Hints on Remodeling POULTRY HOUSES

By JESSE B. BROOKS

Better henhouses mean more eggs and larger profits. If your hens live in a dark, damp or drafty, dirty, crowded house, you can very likely make some inexpensive changes to give them a more comfortable house. Perhaps also you can give them the care they need with less work and trouble by making a few changes in equipment. This leaflet gives some practical suggestions for making such improvements.

Leaflet 89

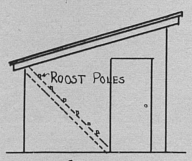
UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics

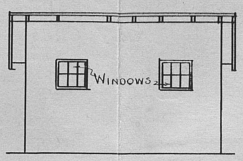
Agricultural Extension Division

Thomas P. Cooper, Dean and Director

Improving The Shed Type House

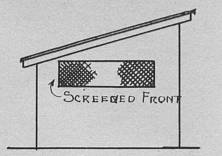


• Side •



• Front •

• Old House •



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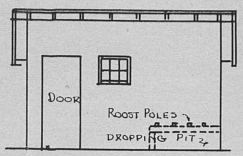
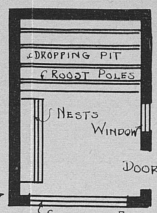


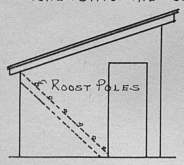
• Front •



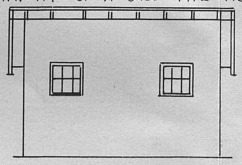
Floor Plan

• Plan For Remodeling •

Increasing The Capacity Of A Shed Type House

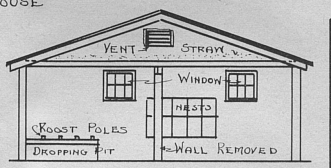


• Side •



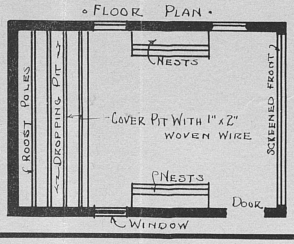
• Front •

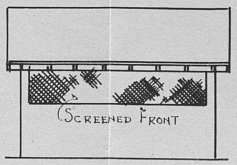
• Old House •



• Plan For Remodeling •

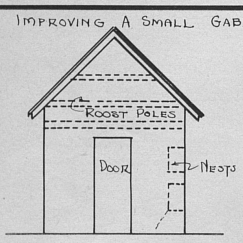
• Floor Plan •



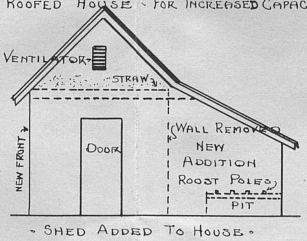


• New Front •

Improving A Small Gable Roofed House - For Increased Capacity

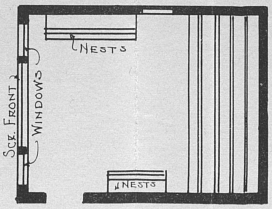


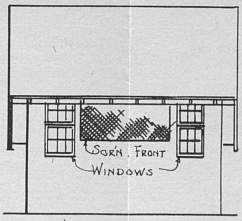
• Front •



• Shed Added To House •

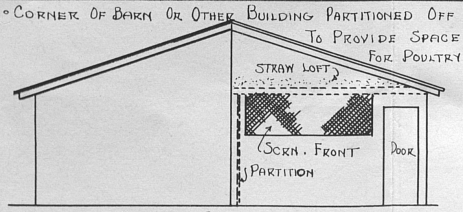
• New Floor Plan •



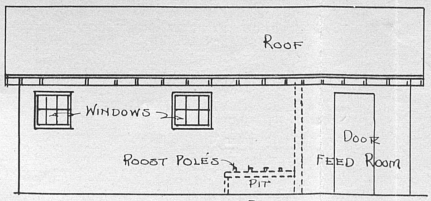


• New Front In Side Of Old House •

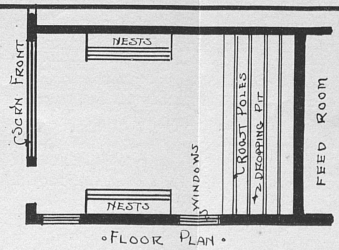
• Corner Of Barn Or Other Building Partitioned Off To Provide Space For Poultry •



• End Of Building •



• Side Of Building •



• Floor Plan •

ONE-MAN BOARD

FOR PULLING TOBACCO PLANTS
AND WEEDING BEDS

LIST OF MATERIAL

2 pcs. 2"x6"x16'-0" Top
2 pcs. 2"x 8"x12" Legs
7 pcs. 1"x4"x12" Braces & cleats

Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914. 10M—4-45

Easier Ways To Do Farm Work

How to Save Time in Pulling Tobacco Plants

By George B. Byers
Earl R. Young

Average savings of 10 hours per man, in pulling plants to set 1 acre, were made in 1944 by using the method described in this leaflet.

Leaflet 90

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky April, 1945

ONE-MAN BOARD

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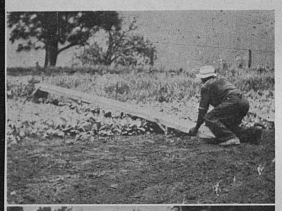
TEN WAYS TO SAVE TIME IN PULLING TOBACCO PLANTS



Use a 1-man plant-bed board .....**1½ hrs. saved**



SIT COMFORTABLY .. **1½ hrs. saved**

Position 1:
Feet outside the plant bed



Position 2:
Feet in bed, wide apart; only the heels on ground



Position 3:
Legs crossed, one heel on ground

These ten procedures save an average of about 10 hours in pulling the 8,500 plants to set 1 acre of tobacco. This was the difference in average time taken by workers who used these methods (5 hours) and those who did not (15 hours), in trials in Central Kentucky in 1944. All the workers were experienced and skillful. The differences in time were due to the differences in ways of working.

The time-saving value given to each procedure indicates the importance of that procedure in determining the rate and ease of pulling plants.





Turn at end of board, and pull plants along other side of board .....**1½ hrs. saved**



Pull 1 plant at a time, but get 3 or 4 plants in pulling hand before passing to holding hand....**½ hr. saved**



Grasp plant by thumb and first finger, with palm of hand down....**½ hr. saved**

Keep holding hand near pulling hand .... **1 hr. saved**



Fill holding hand comfortably full (25-30 plants).. **1 hr. saved**

Look ahead for next operation so that eyes lead the hand..... **1 hr. saved**



Put plants directly in basket ..... **1 hr. saved**

Move basket when moving to next position .....**½ hr. saved**

Total .....10 hrs. saved in pulling plants for 1 acre

Drainage Makes for Good Land Use



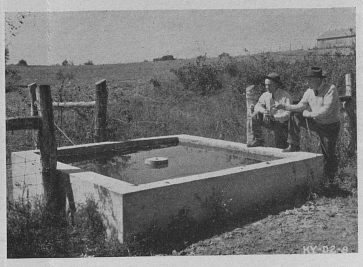
When Practical, Drain Wet Land That Will be Productive —

1. **Provide adequate surface and tile drainage.**
2. **Protect low land by diverting water from sloping land above.**

Some land that is now producing no crops, or very poor crops, can be made highly productive by drainage. Well drained bottom land can be used intensively for cultivated crops, making possible the use of steeper land for meadow or pasture.

The method used to drain an area must be determined by the condition to be remedied, by the availability of an outlet, and the cost. Surface ditches, tile drains, and diversion ditches are commonly used on Kentucky farms. The cost of draining good bottom land is frequently more than repaid by increased crop production the first year.

Water for Livestock Necessary in Pasture Program



Provide an Adequate Water Supply —

1. **Build reservoirs, develop springs or other sources of water.**
2. **Use farm reservoirs for fish production**

Pastures cannot be used to good advantage without a dependable supply of water for livestock. On some farms this can be provided by developing existing springs, by making use of streams flowing through the farm, or by using wells. However, in some sections of the state farm reservoirs are the most practical means of providing adequate water supplies. Such reservoirs, if properly made and managed, are very satisfactory sources of water. When possible, reservoirs should be fenced and the water piped to troughs outside the enclosure instead of permitting the livestock to get into the reservoir.

In addition to supplying water for livestock, reservoirs may be used for fish production. A properly stocked and carefully managed reservoir will produce an abundance of fresh fish for the family.

Farm Woodlands Save Soil and Produce a Profitable Crop



Use Good Farm Woodland Management —

1. **Prevent fires.**
2. **Avoid grazing.**
3. **Use selective cutting.**

Like grass, trees are nature's means of conserving soil and rainfall. On many Kentucky farms some land can be used to produce timber more profitably than for any other crop. Often this land has been cleared and cultivated, and has become seriously eroded. Such areas should be reforested with adapted species of trees.

Where sloping land is now growing trees, it should be managed to improve the stand and to make possible the harvesting of a profitable crop of timber as the trees mature.

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25M—6-45



SOIL CONSERVATION PRACTICES for Kentucky Farms

By W. G. Survant

No one soil-conserving practice does the job alone. What is needed is a combination of practices that give good production and at the same time protect the land so that it will continue to produce well.

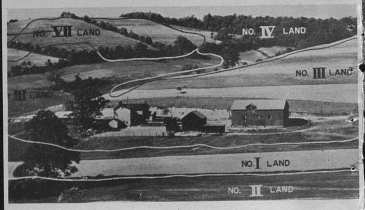
Leaflet 91

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Service
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky

June, 1945

The Starting Point in Conserving the Soil is the Right Use of Land



In the above picture, land suitable for cultivation is No. I land, which needs good soil-management practices only; No. II land, which requires moderately intensive conservation practices; No. III land, which needs intensive conservation practices; and No. IV land, which needs perennial vegetation with infrequent cultivation. No. VII land is not suitable for cultivation, but should be used for pasture, hay, woodland, and wild life.

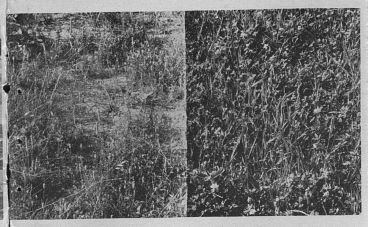
Wise Use of Land —

1. **Limit cultivated crops to the land least subject to erosion.**
2. **Use other suitable land for meadow or pasture.**
3. **Grow trees on land not suitable for cultivated crops, meadow, or pasture.**

Some land can be used for cultivated crops, while other land in the same field may be too steep, too stony, too thin, or too wet for cropping. Land not suitable for cultivation may make good meadow, pasture, or woodland.

One of the first steps toward sound use of land on Kentucky farms is to reorganize farm layouts to fit the land. Fences should be rearranged to group land suitable for the same use and to permit contour farming on sloping fields. When fences are to be changed or new ones built, their location should be carefully planned for full, economical, and safe use of every acre on the farm.

Built Up Soil Fertility Means Greater Production and Less Soil Wastage



Increase and Maintain Soil Fertility —

1. **Lime acid soil and supply needed mineral nutrients.**
2. **Keep up the nitrogen supply with grass-legume sods supplemented when profitable with fertilizer nitrogen.**
3. **Conserve and use manure and crop residues.**
4. **Grow cover crops.**

Many Kentucky soils are so poor that they cannot be farmed so as to save the soil without first improving the soil. To correct this condition, the needed plant foods should be determined for each field and supplied. Lime, phosphate, nitrogen, and potash are the materials most likely to be needed. Some soils need boron and other mineral elements.

Much can be done toward increasing and maintaining soil fertility by carefully saving and using manure, tobacco stalks, and other crop residues. Winter cover crops reduce erosion and leaching losses, and increase the organic matter and nitrogen content of the soils. They also provide early spring and winter pasture.

Slow Down Run-Off Water to Save Moisture and Control Erosion



Control Run-Off and Conserve Moisture —

1. **Plow, plant, and cultivate on the contour.**
2. **Use terraces and diversions where needed.**
3. **Protect waterways and other critical areas with sod.**

Sloping land cannot be farmed safely by methods commonly used on level land. Straight rows usually run up-and-down hill on at least part of the field. They serve to increase the speed of run-off water, which causes greater loss of soil. Farming practices which slow down the run-off should be used on sloping land.

Contour tillage and the use of terraces and diversions where they are needed are important in saving the soil. These practices, along with other good soil-management practices, make it possible to cultivate sloping fields with a minimum loss of soil. They also permit more water to enter the soil to be used by the growing crop. This frequently results in greater yield.

Natural waterways, terrace outlets, and other critical areas should be protected by a vigorous grass-legume sod.

Good Pasture Holds the Soil and Water



Establish and Maintain Good Pastures —

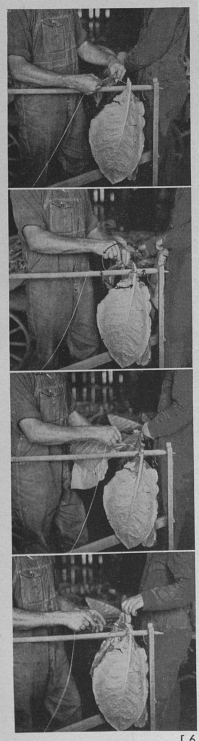
1. **Use adapted grass-legume mixtures.**
2. **Provide supplemental pasture.**
3. **Control weeds and follow other good management practices.**

A good pasture program is one of the most important and practical ways of conserving soil. Such a program should provide for (1) a thick cover of adapted grasses and legumes on the land regularly used for pasture; (2) a drouth-resistant supplemental pasture for grazing when the regular pasture is short; and (3) small-grain or other cover crops to lengthen the pasture season.

To establish a satisfactory pasture, after the mineral plant food has been supplied, a mixture of grasses and legumes adapted to the soil of the field should be planted. Planting should be done at the time and in the manner proved best for the locality.

To maintain pasture effectively, full attention must be given to mowing, regulating grazing, and other details of good pasture management.

STRINGING LEAVES ON STICKS (continued)



How to tie the leaves on the side of the stick next to the worker:

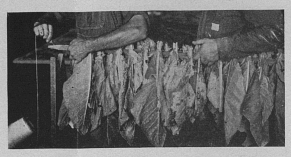
1. Put the stems **under** the string.

2. Wrap the string **under and back over the stems.**

3. With the left hand draw the tips of the leaves toward you, end up so that the butts turn to the left, away from you, and **under the string.** As soon as the butts of the leaves have gone under the string, drop the tips.

As the leaves drop into place, they are held tight by the string. Tie 35 to 40 bunches on each stick.

The average time for 2 men to put the stick on the rack, slit it, pass and tie about 80 leaves per stick, and put the stick of tied leaves on a low rail, was just under 4 minutes per stick. By the method described here they tied 152 sticks a day. By the method used before, they tied 122 sticks.



When the last bunch is tied, pull the string tight into the slit in the stick. Then wrap the string around the stick once and break it.

The worker who passed the leaves takes away the stick of strung leaves, and the other worker puts another stick in the stand.

HANGING STICKS OF LEAVES IN BARN

Hanging the sticks of tied leaves on the rails for curing is the same as hanging stalk-cut tobacco. The sticks of primed tobacco are usually lighter and faster to hang.

PLACING THE CURED TOBACCO IN HANDS



Hand down the sticks of cured tobacco the same as stalk-cut tobacco. Put them, one stick at a time in the stand used in tying. Loosen the string from the slit. Then pull each small bunch of tobacco out of the loop of string with a backward and downward movement.

Usually about ⅔ of a stick makes a medium-size hand of tobacco. If the yellow-ripe leaves and the brown over-ripe leaves have been strung on separate sticks the hands are tied as a grade ready for pressing and bulking until marketed.

HOURS OF MAN-LABOR USED IN PRIMING 1 ACRE OF BURLEY TOBACCO

(One pulling, 3 to 4 leaves per plant)

Use of the procedures described in this leaflet saved 19.5 man hours per acre on level land and 21.4 man hours per acre on hill land. Most of the saving in time was made by following automatic and rhythmic movements in picking up and tying the leaves by two men working as a crew. Time was saved by pulling the leaves from two rows on level land and one row on hillside land. Use of sacks and circular travel saved time in picking up leaves. Cutting a passway every 500 to 600 plants avoids walking idle-handed through the field in carrying out the primed leaves.

Priming pays well for the labor used. It saves leaves that otherwise would fall off or be damaged or lost in harvesting. It lets more of the crop ripen into high-priced smoker tobacco. It thus increases both the yield of harvested leaves and the quality of the crop as a whole.

Man-hours per acre
(Once over the field, removing 3 or 4 leaves per plant)

Method	Pulling leaves	Picking up leaves	Hauling to barn	Tying leaves on stick	Hanging sticks on rail	Taking off stick and tying in hands	Total man hours per acre
Priming on level land							
Old method	8.6[a]	7.3	1.0	36.0	2.7	19.8	75.4
New method	5.8	4.6	1.0	22.0	2.7	19.8	55.9
Time saved	**2.8**	**2.7**	**0.0**	**14.0**	**0.0**	**00.0**	**19.5**
Priming on hill land							
Old method	12.8[b]	7.3	1.0	36.0	2.7	19.8	79.6
New method	8.1	4.6	1.0	22.0	2.7	19.8	58.2
Time saved	**4.7**	**2.7**	**0.0**	**14.0**	**0.0**	**00.0**	**21.4**

[a] Old method was to pull leaves from 1 row or ½ of 2 rows at a "through."
[b] Old method was to pull leaves from inside half of 2 rows at a "through."

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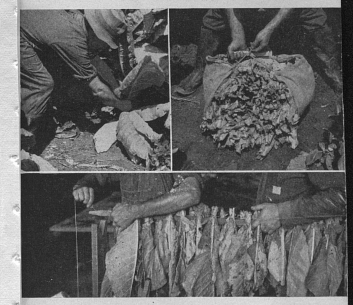
Easier Ways To Do Farm Work

How to Save Time in Priming Burley Tobacco

By George B. Byers
Earl R. Young
Paul M. Pinney



About 20 man-hours of work per acre were saved by farmers in Central Kentucky who used the method of priming burley tobacco described in this leaflet.

Leaflet 92
UNIVERSITY OF KENTUCKY
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Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*
Lexington, Kentucky June, 1945

PULLING LEAVES FROM STANDING STALK



Usually there are 3 or 4 ripe leaves on each plant. Take all these off in 2 motions —

1. Put both hands around the stalk just above the highest leaf to be taken.
2. Push down to snap off all the leaves, and grip the leaves in both hands as the last leaf snaps off.

Keep these leaves in the hands while priming from 1 or 2 more plants. Pile the leaves from about 8 plants in each pile.

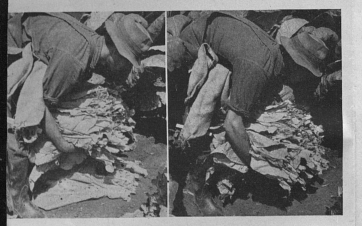
On level land, prime 2 rows at a "through" and pile the leaves between the rows.

On hillsides, prime 1 row at a time, on the uphill side. Pile the leaves so that those from the next row can be put on the same piles. This saves time in picking up the piles of leaves.

PICKING UP AND HAULING LEAVES

Burlap sacks, with a loop of stout cord at each end and a stick tied in one loop, are handy in gathering the piles of leaves. Take 3 sacks at a time, and work in from the end of the field. Tuck the 3 empty sacks in the bib of the overalls or under the belt.

Pick up the first pile of leaves with both hands, put it on the second pile and scoop both up together. Put these on the third pile — and so on until 18 to 20 piles are picked up.

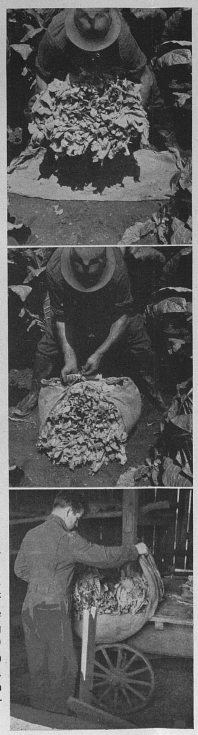


PICKING UP AND HAULING LEAVES (continued)

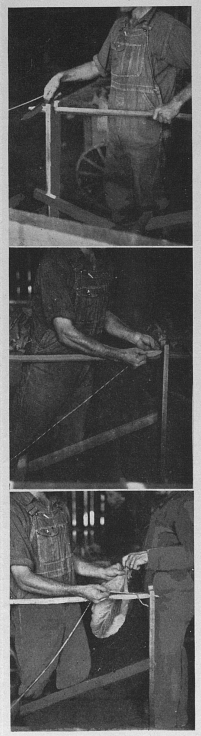
Holding the leaves with one arm, spread a sack on the ground with the other, put the leaves on it, and fasten the cords with the stick.

Leave the first two filled sacks in the row while filling the third. Then carry all three at one trip to the wagon or sled. A low-wheel wagon of table height saves time at the barn if you work directly from it in stringing the leaves. It saves unloading and putting the leaves on a table.

In large fields cut passways for the wagon, to save long trips in carrying the bundles of primed leaves. Make the passways by cutting one stick (5 to 7 plants) of tobacco from each row across the field, about 550 plants from the end or from another passway.



STRINGING LEAVES ON STICKS



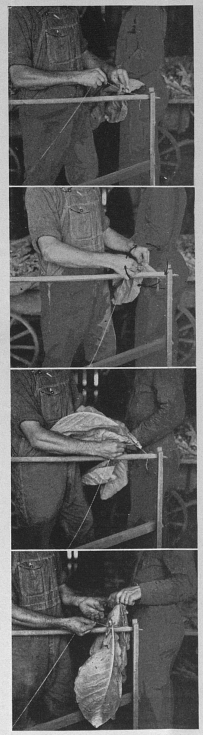
Two persons work together to good advantage in tying leaves on sticks. One worker ties, the other passes the leaves to him.

A tobacco stick, a stand for holding the stick, a heavy knife, and a spool of ordinary lightweight wrapping string are the equipment needed for tying the leaves.

Hold the string in the right hand while (by a right-handed person) placing the stick on the stand, cutting a slit in it, and stringing the leaves.

The worker who ties the leaves, puts the stick in the stand, cuts a slit in each end of the stick and pulls the end of the string tight in the forward slit.

The other worker picks up 2 or 3 leaves with his right hand, grasps them in his left hand by the butts of the stems with the tips hanging down, then passes them to the worker tying. The worker tying grasps the leaves just below the fingers of the worker passing. He ties the leaves, one bunch on one side of the stick, the next bunch on the other side.



How to tie the leaves on the far side of the stick:

1. Put the stems of the leaves **on top** of the string.

2. Wrap the string **over and back under** the stems.

3. With the left hand flip the leaves over the right hand. Be careful to allow the string to twist with the butts of the leaves. **Be sure that the butts of the leaves move to the left and above the string while the tips of the leaves pass to the right over the right arm and hand.**

If made exactly this way the tie will hold the leaves firm. The heavier the leaves or the more pull on them, the tighter the string is drawn around them.

The "tie" is shown at right.



DEEP LITTER



A deep litter helps to keep the house dry, and it need not be changed so often as when less litter is used. Start with new litter in a house that has been thoroughly cleaned and disinfected. Add to this litter as it becomes soiled. Stir the litter each week to keep it from packing. Clean out wet spots which may form around the water container or where rain blows into the house, and add fresh litter at these places. It is not necessary to clean out the entire house unless all the litter is wet. Use shredded fodder, ground corncobs, planer shavings, sawdust, or straw for litter.

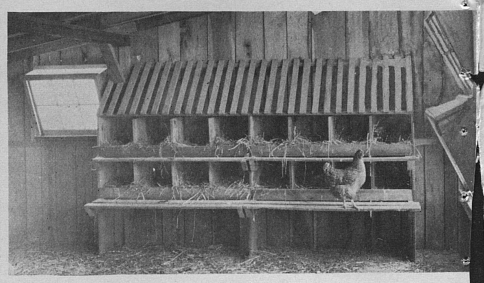
HOUSE MANAGEMENT

Keep the laying house as dry as possible. To do this, see that there is good ventilation, without drafts on the hens. Also, see that no water is spilled on the floor, and that the house is not overcrowded. Allow 3½ to 4 square feet of floor space per hen.

CULLING

High production from the flock is necessary for good profits. Cull all hens as they go out of production. Cull all slow-growing pullets when the flock is housed in the fall. Unless hatching eggs are to be produced, don't keep male birds in the flock.

NESTS



Provide at least 1 nest for each 4 hens. Having plenty of nests means cleaner eggs and fewer broken eggs. Nests built in rows, as in the above picture, are easy to make and easy to keep clean.

DISEASE CONTROL

Common diseases of the laying flock are range paralysis, chicken pox, and colds. For range paralysis cull hens which have the "gray-eyed condition" or are lame. Grow pullets on clean range away from the older birds.

Prevent pox by vaccinating pullets when they are about 12 weeks old. Vaccinate this year if an outbreak occured on your farm or in your neighborhood last year.

Colds can be "sold off." Sell all old birds, clean the laying house, and leave it idle for 30 days before putting the pullets in. Be sure to sell **all** old birds.

Prepared by
STANLEY CATON of the Poultry Department
Agricultural Extension Division College of
Agriculture and Home Economics

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20M—7-45



LAYING FLOCK MANAGEMENT

By STANLEY CATON

CASH VALUE OF GOOD FLOCK MANAGEMENT

Eggs per hen per year	Income over cash expenses, per hen
100 to 120	$0.62
121 to 140	0.90
141 to 160	1.60
161 to 180	2.07

Based on Demonstration Flock Reports for 1934-1936

A good laying house with the right kind of feeders, water containers, droppings pit, and nests means more eggs and more profits, and less work in caring for the laying flocks. But good equipment and good stock will not do it all! Don't blame failure on the hens if **YOU** have not done your part in giving them the care they need.

Leaflet 93

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
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FEEDERS AND FEEDING



Supply at least 1 foot of feeder space for each 4 hens. Use feeders that set fairly low to the floor, just high enough to keep litter from being scratched into them. Hens eat more from low feeders, and there is less cannibalism than where high feeders are used. A box feeder with a reel on top is suitable. The one in the picture above is 4 feet long. At least 3 of these are needed for 100 hens. Don't fill them over half full.

The "cafeteria system" of feeding is easy and effective. Put the laying mash and grain in separate hoppers and let the hens eat all they want of each. Use good laying mash containing at least 20 percent protein. For grain use corn, wheat, and oats either mixed together or fed separately. Add fresh mash every day. Always stir the mash in the hopper when going through the henhouse. Keep the feed in the light, not in shadow. Place the end of the feeder toward the light.

Green feed such as rye, wheat, or barley sowed early in the fall helps keep production up and reduces feed costs. Feed leafy alfalfa or lespedeza hay in racks on days when the hens are kept in.

Moist mashes or pellets may be fed to increase feed consumption. Feed the moist mash at noon, as much as the hens will eat in about 20 minutes. Usually 2½ to 3 pounds of dry mash will make enough moist mash for 100 hens.

WATER CONTAINERS



The bucket and stand shown here will supply drinking space for 50 hens. The stand is 8 inches tall—high enough to keep litter from being scratched into the water. Much of the water which falls from the hens' beaks is trapped in the box and does not spread in the house. This waterer will not tip over.

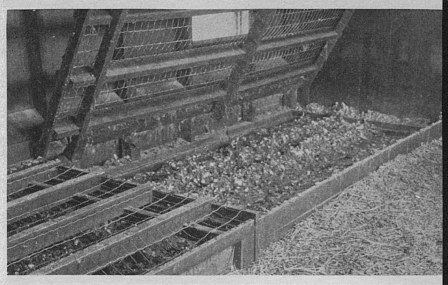
An egg is two-thirds water. Heavy production of eggs to a great extent depends upon a good supply of water. Warm the water in winter.

USE OF LIGHTS

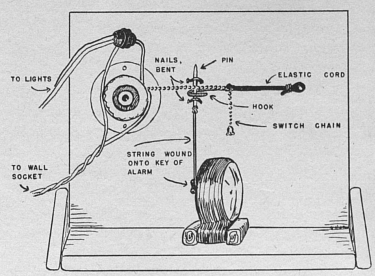
Use of lights in fall and winter will mean more eggs at that season. Put the lights about halfway from front to back of the house, and about 6½ feet from the floor. Use 1 40-watt bulb for each 200 square feet of floor space if lights are used only in the morning. For lights on all night use 15-watt bulbs. Either is successful.

For morning lighting, turn lights on early enough to provide a 12- to 14-hour day. Use an alarm-clock device (shown on page 4) or a commercial clock switch to turn on the lights. Use lighting from early October to late March. If you start once, don't quit until spring.

DROPPINGS PIT



A droppings pit saves a great deal of work in taking care of a laying flock, because it needs to be cleaned only 3 or 4 times a year. A pit can be made in any laying house. It can be used to replace a droppings board without reducing the capacity of the house. To keep down odors, spread phosphate fertilizer on the droppings once a week — 6 to 8 pounds per 100 hens. This also makes a better-balanced fertilizer of the droppings.



Alarm-Clock Device for Turning on Lights

The string winds around the key when the alarm goes off, and pulls a pin from under the bent nails. This releases a stretched elastic cord which pulls the chain and turns on the light. Use an alarm clock whose winding key turns when the alarm goes off; and set the alarm for the time you want the lights to turn on.

CANNING FRUIT WITHOUT SUGAR

or

WITH LESS SUGAR THAN USUAL

By Florence Imlay and Pearl J. Haak

IN ORDER TO USE their sugar supplies to best advantage most homemakers will use less sugar than usual in canning fruit this year. It is better to have plenty of unsweetened or lightly sweetened canned fruit than not to have enough fruit canned. Sugar used in canning does not add to the keeping quality of the fruit, but helps to give it a better flavor, firmer texture, and a more natural color.

CANNING WITHOUT SUGAR

All fruits may be canned without sugar by using fruit juices extracted from fresh fruit or water instead of the usual sirup.

Soft Fruits (Blackberries, huckleberries, raspberries, and plums)—

Wash the berries or plums and discard imperfect ones.

Make a juice by heating a few berries or plums to simmering. Strain and pour the juice over the fruit to cover it.

Adjust lids and process quart jars 20 minutes in a boiling water bath. Remove the jars from the canner and complete the seal.

Hard Fruits (Apples, peaches, and pears)—

Follow instructions in Kentucky Leaflet 47, except use boiling water instead of boiling sirup.

Leaflet 94

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Fruit Juices (Blackberry, elderberry, grape, and plum)—

Follow the directions in Kentucky Leaflet 47 except add no sugar.

Fruits canned without sugar may have sugar added just before serving. Add sugar to the juice of the canned fruit, heat it to simmering to dissolve the sugar, and pour it over the fruit. Sugar may be dissolved in the juice of the canned fruit by stirring, but heating increases the sweetness.

USING SOME SUGAR, BUT LESS THAN USUAL

The sugar supply can be stretched by using thin sirup in canning instead of medium sirup, or medium instead of heavy sirup. Even though heavy sirup is preferred, the canned fruit may be very palatable if canned with a medium or thin sirup—or even with no sirup at all.

One-third of the usual amount of sugar in a canning recipe may be replaced with light-colored corn sirup without appreciable difference in quality of the canned fruit. Of course, more of the sugar can be replaced by corn sirup if it is so desired, but the sirup used in larger amounts is likely to give a flavor which may be objectionable. Dark corn sirup also could be used, but it gives different flavor to canned fruit which many people do not like.

CANNING SIRUP GUIDE

Ingredients	For Thin sirup	For medium sirup	For heavy sirup
Water	**3 cups**	**3 cups**	**3 cups**
White corn sirup	**None**	**½ cup**	**1 cup**
Sugar	**1 cup**	**1½ cup**	**2 cups**

Plan to can 50 quarts of fruit for each member of your family

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50M—7-45

calves or heifer's calves lacking in weight and finish can be weaned and fed out. Don't keep calves of half dairy blood beyond an age of 10 or 12 months. The older they get the plainer they look. Don't keep heifers sired by a beef bull for herd replacements unless they are out of heavy-milking cows. Under no circumstances should such heifers be used in a commercial dairy herd.

10. Buy breeding-herd replacements 6 to 12 months old. This avoids animals culled by other breeders because of shy breeding, disease, and low production. Buying at this age also means a lower purchase price.

If you raise your own replacement heifers and your cows don't produce enough milk, use a Milking Shorthorn or Red Poll bull. The steer calves will have fair-to-good beef type and the heifers will milk better than those sired by a beef bull.

11. Quarantine all replacements for at least a month. Then test for tuberculosis, vaccinate for blackleg, and carefully inspect for footrot, lice, and mange before adding the new animals to the herd. Bang's disease must be controlled if this enterprise is to succeed. Calfhood or even adult vaccination with strain-19 vaccine seems well adapted to this enterprise, since a large and healthy calf crop is far more important than a "clean" test, and it is often possible to prevent infection of "clean" herds from outside sources.

12. Winter the dry cows on home-grown roughage, pasture, and such protein supplement as may be needed to balance the ration. The average winter feed bill per cow should be about ¾ ton of good green legume hay and ¾ ton of cheap roughage such as straw, stover, or grass hay. The cheaper roughages (especially corn stover and fodder shocked in the field) should be fed largely during the early winter before they lose much of their feeding value and before the cows freshen. Under-sized heifers and thin older cows may need a little grain just before calving and until good pasture is ready.

(See Leaflet 96 for details of cow-and-calf plan for raising high-quality feeder calves.)

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10M—7-45



Kentucky Cow-and-Calf Plan

550- to 850-pound calves for slaughter at weaning

By W. P. GARRIGUS

SOIL IMPROVEMENT on a large scale throughout Kentucky will mean a marked increase in our already sizable supply of pasture forage and harvested roughage. This in turn will call for more livestock enterprises of the kind to make profitable use of these home-grown feeds. The "Kentucky Cow and Calf Plan" is such an enterprise. It has already proved well adapted to all sections of the state, and bids fair to rival our famous spring-lamb enterprise both in profit and in stability.

Good results from this cow-and-calf plan depend on the care that is given to these 12 practices.

1. Choose healthy, thrifty heifers, or cows of fair-to-poor dairy breeding or of mixed dairy and beef breeding capable of producing 2 to 3 gallons of milk daily when fresh, and of maintaining fair production for 8 to 10 months. The better dairy

Leaflet 95

UNIVERSITY OF KENTUCKY

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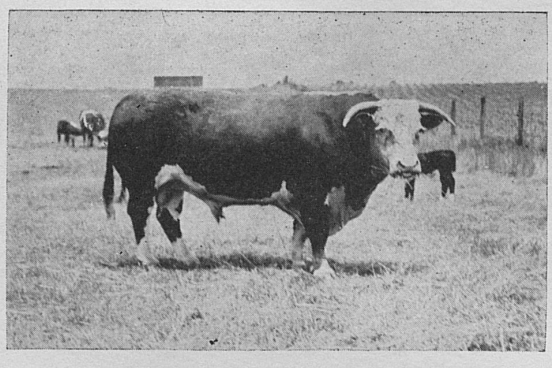

A high-quality beef bull gives good beef type to his calves



cows give too much milk for one calf and may be more profitably used in regular dairy herds. Most high-grade or purebred beef cows sell too high and don't give enough milk for this plan. Fair-quality cattle of the dual-purpose breeds such as Milking Shorthorns and Red Polls are very well suited for this plan but they often cost too much. Sell shy breeders and barren cows as soon as they are fat enough to market.

2. Use high-quality purebred beef bulls. Calves by such bulls sell for $10 to $20 more per head at market time. The type of the bull and his ability to give good beef type to his calves are more important than his breed. Watch the herd closely during the breeding season to be sure the cows are "settling" in calf promptly. Since the calves are the only source of income, any reduction or delay in the calf crop is a very serious matter and should be guarded against. Sell sluggish, diseased, or sterile bulls for slaughter promptly.

Be cautious about breeding cows for the neighbors, as trichomoniasis (an abortion disease) is often introduced into the herd this way. With trichomoniasis the calves usually are lost early in the gestation period; with Bang's disease they are aborted late. Trichomoniasis is spread only at time of service.

3. Breed cows so that the calves will come during December, January, or February. Early calves have more finish and are heavier at the end of the pasture season than calves dropped later. The cow milks less during late winter when the calf is young and can't take much milk. When the calf is old enough to use more milk, the dam's milk flow is increased by spring pasture. Sell late-calving cows as soon as their calves are weaned, and replace

them with heifers bred to calve at the right time.

4. Breed heifers 15 to 20 months old, depending on their development and the season of the year (so as to have calves in winter).

5. Be with the cow at calving time to be sure the calf is delivered safely, owned by its dam, protected from the other cattle until able to take care of itself, and properly nourished during the first few hours after birth. Careful management at this time pays well. When the calves are 1 to 3 months of age, vaccinate them for blackleg and castrate the males.

6. Provide plenty of high-grade pasture throughout most of the year. A good year-round pasture program is essential because it saves much harvested feed, increases the flow of milk, and results in heavier, better-finished calves at marketing time. Winter grazing saves much hay and grain. Cover crops supply much good feed when other grazing is scanty. Korean lespedeza is one of the best late summer and fall pastures for finishing calves for market. Fertile, well-managed pastures produce more feed than poorer pastures, also more nutritious feed, more palatable feed, and feed that may be obtained with less effort.

7. Supply salt, fresh water, and shade at all times. Steamed bonemeal also should be available during the winter.

8. Creep-feed shelled corn or cracked small grain whenever there is not enough milk and pasture forage. Place the creeps near shade and water so that calves can use them without going very far from their mothers.

9. Sell calves "off the teat" in early November. Calves should weigh 550 to 850 pounds then. Late

quires a taste for grain. The principal grain ration for creep feeding should be 7 or 8 parts corn and 1 part protein supplement. Ground oats, barley, or wheat are good substitutes for part of the corn.

Keep salt, fine-ground limestone, and fresh water where calves can get what they want of these materials from the time they are a few weeks old until they are marketed.

Vaccinate all calves against blackleg when 6 months old. This produces permanent immunity. If infection seems likely, vaccinate the calves soon after birth. These should be vaccinated again after they are 6 months old, for permanent immunity.

Four Plans for Marketing the Calves

Plan 1.— Creep-feed the calves from the time they are old enough to eat grain until they reach baby-beef weight and finish at between 700 and 800 pounds. Calves handled under this plan should be from fairly heavy-milking cows, and sold when they reach satisfactory weight and finish. This plan is very similar to the "Kentucky-cow-and-calf plan" except that more grain and less milk are required in this than the Kentucky cow-and-calf plan.

Plan 2.— Creep-feed the calves for at least 6 weeks before weaning, and full-feed grain after weaning until the calves reach market weight and finish at 700 to 900 pounds. At weaning time it is a good plan to take the cows from the calves and leave the calves in the field to which they are accustomed. Cracked corn alone is a good feed for calves having plenty of high-quality pasture forage. On poor pasture or in drylot the feed should be 7 parts of corn-and-cob meal or cracked corn and 1 part of protein supplement, together with a satisfactory roughage.

Plan 3.— Two or 3 weeks after the cows are taken from the calves, separate the heifers from the steers, and finish the heifers on a full feed of grain until ready for market at 700 or 800 pounds. This is in order to market the heifers before they show evidence of being with calf, in case they might have been bred by the bull running in pasture with

the cows. Some beef heifers will take the bull at 5 months.

If it is certain that the heifers have not been bred, they can, if so desired, be handled according to Plan 4. In this case also, separate them from the steers so as to avoid disturbance to both steers and heifers when the heifers are in heat. If heifers are fed out as yearlings they will finish sooner and grade fully as high if bred.* However, they should be bred at a time when they will be in calf not over 4 months before marketing. It is well to keep in mind that heifers mature and fatten younger than steers, and can be marketed 6 to 8 weeks earlier if both are started on feed at the same time.

Plan 4.— To carry the steer calves to a long-yearling weight of 900 to 1,200 pounds, follow this feeding plan. During the fall grazing season feed in addition to the pasturage 3 or 4 pounds per head daily of a mixture of corn-and-cob meal 7 parts and a protein supplement 1 part. If the pasture is of poor quality, give the calves some corn stover and hay in addition to the grain, to keep them gaining. Never allow these calves to shrink in weight—shrinkage is always costly. Beginning about December 1, feed each calf 5 pounds of corn-and-cob meal, ¾ pound of protein supplement, and at least 4 pounds of good mixed or legume hay daily, together with such straw or corn stover as he chooses to eat. If corn silage is fed, use 3 instead of 5 pounds of the corn-and-cob meal, and 1 pound of the protein supplement and the mixed hays daily. Turn the calves on pasture about May 1, and graze them for 3 months without grain. Then gradually accustom them to a mixture of 7 parts corn-and-cob meal and 1 part protein supplement. Full-feed this mixture until a marketing weight of 900 to 1,200 pounds is reached. Each steer on this plan uses about 20 bushels of corn.

* This fact was established in experiments at the University of Illinois.

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10M—7-45



Raising and Fattening High-Quality FEEDER CALVES

A Cow-and-Calf Plan

By E. S. Good

Some Kentucky farmers who have enough good pasturage and harvested roughage to carry a considerable number of cattle through the winter and the following summer, find it profitable to produce high-quality feeder calves and to finish them out as "baby beeves" weighing 700 to 900 pounds or as "long yearlings" up to 1,200 pounds. If the calves are fed liberally after weaning so that they do not lose their "baby fat," they can be finished into high-quality baby beeves at a light weight.

Whether to use this cow-and-calf plan instead of the "Kentucky cow-and-calf plan" (see Leaflet 95), which calls for a different type of cow and for

Leaflet 96

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Division
Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky July, 1945

selling the calves at weaning, depends largely on whether there is plenty of pasture and hay to carry the larger number of animals through the winter and the following summer.

Kind of Cows to Use

Cows for producing high-quality feeder calves should be high grades or purebreds of beef breeding. Cows carrying much dairy blood are not suitable because their calves show more and more dairy type after they reach an age of 10 months. Cows capable of giving at least a fair amount of milk, 15 to 20 pounds when fresh, should be selected. It is best to choose unbred heifers for replacements, as they are usually free from infectious diseases and also are cheaper than bred heifers or cows. Then, too, there is the advantage of being certain that they are bred to a good purebred beef bull.

All animals should pass the test for tuberculosis. Bang's disease should be controlled by frequent testing of the herd or by calfhood vaccination with strain-19 vaccine. If a number of animals in a herd become infected, or if the herd cannot be protected from infection, it is recommended that the calves and even the adults be vaccinated.

Kind of Bull to Use

Use a purebred bull of one of the beef breeds. He should be of good size, deep and wide of body, short of leg, and should have considerable natural flesh especially in the high-priced cuts of the upper rib, loin, and rear quarters. Don't use a tight-hided, shallow-bodied, upstanding bull. It is a good plan to buy a 2-year-old bull that has never been in service. Bulls of this age can be safely pasture-mated to 12 to 15 cows, or hand-mated to 25 to 30 cows. Bulls 3 years old and over can be pasture-mated to 20 to 25 cows or hand-mated to 40 to 50 cows.

Be cautious about breeding cows for the neighbors, as trichomoniasis (an abortion disease) is often introduced into the herd this way. With trichomoniasis the calves usually are lost early in

the gestation period; with Bang's disease they are aborted late. Trichomoniasis is spread only at time of service.

When to Have the Calves Dropped

Cows conceive more readily after they have been on pasture 2 to 3 months. This results in more spring, summer, and fall calves and fewer winter calves. Summer calving is not as desirable as spring and fall calving because of the heat and flies. Spring calving has the advantages of a low winter feed bill for the dry cows, calves old enough to easily withstand the rigors of the following winter, heavier milk flow from the dams, lower labor requirement, and only one wintering of the calf. Fall calving, on the other hand, avoids the summer heat and flies, provides more favorable calving conditions, results in weaned calves moving directly to pasture instead of to dry feed, and permits hand-mating by fewer bulls but with more labor. Since all bull calves should be castrated when a few weeks old, and since this operation cannot well be done during fly time or during severe weather unless clamps are used, early spring and late fall calvings have this further advantage.

Feeding the Breeding Herd

Coarse roughages, properly supplemented, should be fed liberally during the winter. Such roughages are corn stover, corn silage, and oat, wheat, barley, and soybean straws. These by themselves do not supply enough protein, vitamin A, and mineral matter to produce a strong, healthy calf. In addition feed 3 or 4 pounds of green, leafy legume hay per cow per day to furnish the needed protein and vitamin A. Timothy or any other grass hay will be about as good as a legume hay if cut in the early bloom stage and cured during fair weather. If you don't have good hay, give the cows, until spring pasture comes on, 1 pound of protein concentrate daily, and 2 to 3 hours daily grazing on a cover crop or permanent pasture to furnish the additional protein and the essential vitamin A.

Where a good permanent bluegrass pasture is left ungrazed during late summer and early fall it will furnish about all the additional feed necessary for wintering cows allowed all the coarse roughage they will consume. To prevent a nutritional disease called "grass tetany" some roughage should be fed the cows grazing on early spring pasture until May 1, when the pasture again contains considerable nutrients and less water.

Keep salt where the cattle can get to it each day. Also offer fine-ground limestone and steamed bonemeal in separate containers. These will be eaten only as needed, mostly during the winter and late summer. They can be fed from a covered container having separate compartments for the salt, limestone, and bonemeal. Built on runners, this feeder can be hauled easily to any pasture. Plans for it (Blueprint Ky.—11.772-14) can be obtained from the Division of Agricultural Engineering, University of Kentucky, Lexington.

Feeding and Managing the Calves

All calves that are to be finished as baby beeves at 700 to 900 pounds should be creep-fed for at least 6 weeks before weaning. This gets them used to grain and lessens the shock of weaning. Creep feeding can also be used to advantage when the calves are not to be made into baby beeves, if the milk or the pasture forage supplies are too low for good growth of the calves.

The creep should be built so as to let the calves enter yet keep the cows out. Put it near shade and water, where the cows and calves gather several times during the day. Sometimes an older, experienced calf will lead the younger calves into the creep. Calves are naturally inquisitive and when the cows are nearby they will eventually find their way into the creep. Put the grain in a trough protected from rain. Calves start eating grain when about 1 month old. It is best to grind or crack their grain until they are 3 months old. Some mix wheat bran with the grain at first, since the mixture sticks to the calf's nose and in licking it off he soon ac-

the same temperature as the butter. However, if the butter is soft, use water a few degrees colder than the butter. Wash the butter twice to remove all the buttermilk which was not drained off. This helps to prevent off flavor, especially in butter made from poor-flavored cream.

Salting and Working the Butter

Salt the butter to suit the taste, usually about one-half to one ounce of salt per pound of butter. In power churns the butter can be salted and worked in the churn, but in hand churns it may be necessary to remove the butter to work the salt into it evenly. The butter should be worked just enough to distribute the salt evenly; too much working makes it weak-bodied, sticky, and greasy. If it is not worked enough it may be gritty and uneven in color.

Keeping the Butter Fresh

Until the finished butter is used it should be kept cool and in a tight container in order to preserve the flavor and prevent absorption of foreign flavors, which are readily taken up by butter.

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10M—7-45

How to Make Farm Butter

By Henry B. Morrison

MAKING BUTTER at home is a good way to provide the farm family with an excellent food at a low cost. Butter made from fresh cream is a superior food. It is not difficult to make butter on the farm, but constant attention must be paid to details if butter of good quality is to be made. The most important of these details have to do with cleanliness and accurate control of the temperature of milk and cream.

Cleanliness Is Important

Cleanliness should be practiced from the time the cow is milked until the butter is finished. In keeping dirt out, one also keeps out bacteria which may cause bad flavors to develop and may even cause disease. The cow's flank and udder should be cleaned thoroughly just before milking. Utensils should be scalded well before using. If a separator is used, it should be taken apart and cleaned

Leaflet 97

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Division

Thomas P. Cooper, *Dean* and *Director*

Lexington, Kentucky July, 1945

thoroughly and scalded after each time it is used. If the separator is not thoroughly cleaned each time, bacteria will develop and cause off flavors in the cream and butter.

Cool as Quickly as Possible

If a separator is not used, cool the milk immediately to as close to 50° F as is practical, both to prevent the growth of bacteria and to aid the creaming, which is more complete at low temperature. Cream from the separator should also be cooled to 50° F and held until enough is on hand to make a churning. Don't mix warm cream with the cooled cream. Cool it first and then place it with the cream already cooled. Ice water gives the best results in cooling cream, although cold well or spring water is often used satisfactorily. If running water is available, cream may be readily cooled in a small tank made from a half barrel placed in the line between the well or spring and the stock watering trough.

Richness of Cream

The richness of the cream is an important factor in churning. For best results it should contain 30 to 35 percent of fat. If the cream is too thin it does not churn readily, while if it is too rich it tends to stick to the sides of the churn and prolong churning.

Sweet or Sour Cream

Many persons think that cream must be sour in order to churn, but this is not true. Cream may be churned either sweet or sour, according to the taste of those who are to eat the butter. While butter made from sweet cream does not have quite so high a flavor, most persons like it better than sour-cream butter after they have become used to it. In addition, where sweet cream is churned there is less chance that off flavor may develop in the cream and be carried into the butter. If it is desired to make butter from sour cream, the cream should be kept sweet until enough is collected for a churning and should then be kept at 70° F until it is sour, before churning. The fact

must be emphasized that the longer the cream is held before churning the more chance there is for deterioration, due to the action of microorganisms, and the quality of the resulting butter is likely to be lowered.

Preparation of Churn

Before churning, thoroughly clean and rinse the churn with scalding water; then chill it by rinsing with cold water. If this is not done the temperature of the cream will be raised during churning and the butter will be soft and greasy. Paddles and other utensils coming in contact with the butter should be treated in the same way to prevent butter from sticking to them. Strain the cream into the churn to break up lumps and to remove particles of curd or foreign material. To get the best results fill the churn one-third to one-half full. If the churn is too full the cream will not be agitated properly, while if it is not full enough, the butter will not gather readily.

Control Temperature Accurately

The temperature at which the cream is churned is very important in making good butter. Temperature cannot be guessed accurately by dipping a finger in the cream or feeling the can, but should be determined with a thermometer. A thermometer costs little. The right temperature is one which causes the butter to come in about half an hour, in small flaky granules. Usually a lower temperature is required for churning in summer than in winter—52° to 56° F in summer and 56° to 62° F in winter. If the cream is churned at too low a temperature it may whip and take a long time to churn. If churned at too high a temperature the butter will be soft and greasy. Churning should be stopped when the butter grains reach the size of wheat kernels. If the butter is overchurned and forms in large lumps, it carries too much buttermilk, which often causes off flavor in the butter.

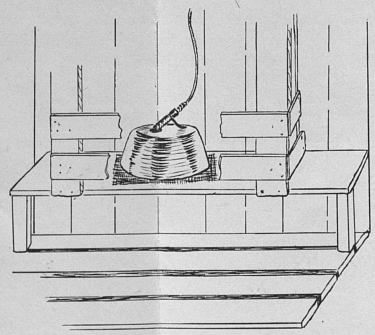
Wash Butter Thoroughly

After churning is completed, draw off the buttermilk and wash the butter with water at about

PIG HOVER IMPORTANT

The pig hover (protecting board) along the lower wall should be 12 inches wide and 10 inches off the floor. It must be strong and well braced. The floor sloping toward the hover encourages the pigs to nest under the hover. Much of the success with sloping floors depends on proper construction of the hover and the proper amount of bedding under it.

Some farmers who have electricity put a reflector and bulb in the top of the hover to keep the pigs warmer. Also, the light and heat help to attract the pigs to the nest.



For an electric warmer a hole is cut in the hover board, covered with wire netting, and the bulb and reflector placed over the hole. A strong guard 2 or 3 boards high must be put around the reflector to prevent damage by the sow. The reflector can be made from a dishpan.

BED LIGHTLY

Use bedding only under the hover. If bedding is put in for the sow, it will work down under the hover and clog the space needed by the pigs. Since lack of bedding at farrowing time makes sows restless, it is all right to put straw in for a farrowing bed provided it is removed when the pigs have come. Most sows then lie with their udders close to the hover where the pigs are nesting. This makes it warmer for the pigs and also makes it easy for them to reach the teats while they still are under the hover.

FIRST WEEK IS CRITICAL PERIOD

Where the farrowing season is spread over a couple of weeks, as it is on most hog farms, only 1/3 to 1/2 of the farrowing pens need to be fitted with sloping floors. When the litters are 5 to 7 days old, they are out of serious danger of being crushed by the sow and can be moved to a level stall so that another sow can be put on the sloping floor to farrow. The pigs should be taken to a clean pasture field by the time they are 1 week old. If they must be kept inside longer because of bad weather, throw a piece of clean sod into the pen each day. This helps to prevent anemia.

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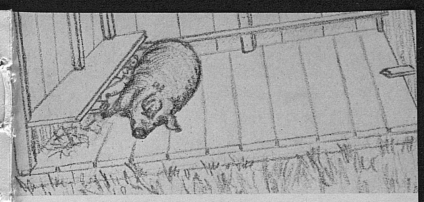
20M—8-45



SLOPING FLOORS SAVE NEW-BORN PIGS

By R. W. PIFER

The pigs rest under the hover at the foot of the slope. The sow lies with her head or back up the slope. On 49 Kentucky farms where records have been kept, with 385 litters, an average of only 1 pig out of 30 farrowed has been mashed on sloping floors. On the same farms, on level floors, nearly 1 pig out of 4 was mashed! A sloping floor can be fixed in most kinds of farrowing quarters.

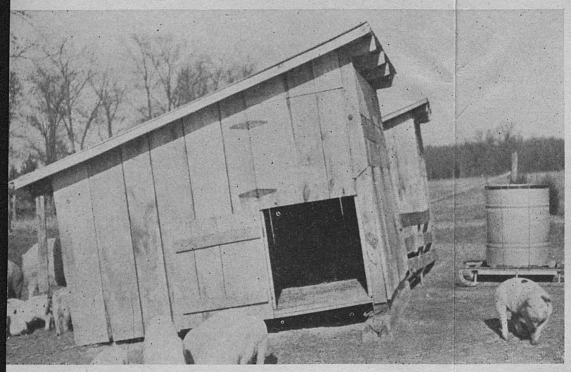
Leaflet 98

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics
Agricultural Extension Division

Thomas P. Cooper, *Dean* and *Director*

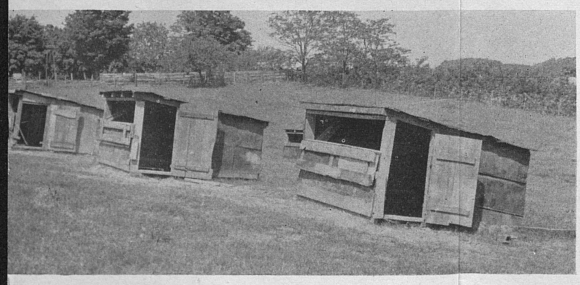
Lexington, Kentucky August, 1945

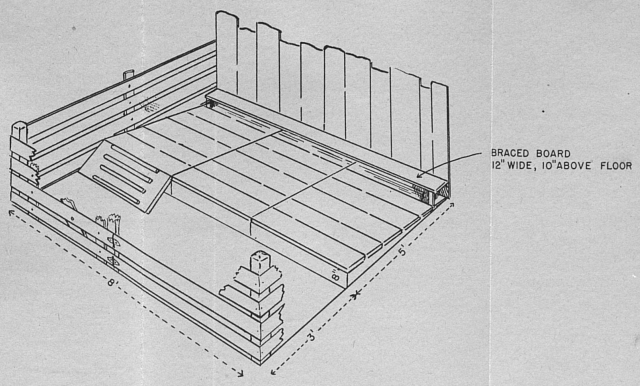


INDIVIDUAL FARROWING HOUSES set on level land can be blocked up in front to get the right slope of floor. About 12 inches high is right for a standard-size 8′ by 8′ house. Tilt the house so that the floor boards run across the slope rather than up and down. This lets water drain through between the boards and helps to keep the pigs' nest dry. Several shovelfuls of dirt before the door make it easier for the sow and pigs to get in and out of the house.

On rolling land the farrowing houses can usually be set on a hillside that will give the right slope to the floor without putting blocks under one end. Several houses set on sloping land are shown in the picture below. It is important in this case also to set houses with floors so that the floor boards run across the slope.

Don't use much bedding on sloping floors. It will work down and clog the pigs' nest. If the floor is slick, nail wooden cleats across it, ½ inch thick and 2 inches wide, every 8 to 12 inches.

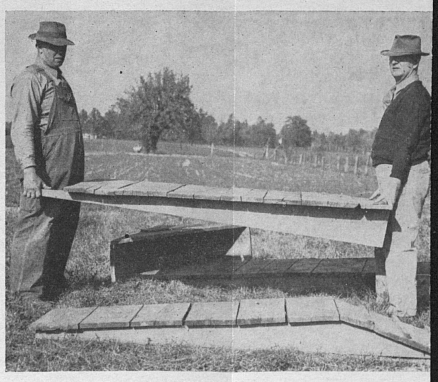




CENTRAL FARROWING HOUSES, tobacco barns, and horse stalls used as farrowing quarters can be fitted with sloping floors made in sections, to be put in the farrowing pens when needed. Build the sections with the boards running across the slope, and with enough space between the boards for water to drain through instead of running down into the pigs' bed. If necessary, to prevent slipping, nail wooden strips ½ inch by 2 inches across the floor every 8 to 12 inches. On floors of rough lumber these cleats usually are not needed.

Some Kentucky farmers cover the entire floor of the farrowing pen with the sloping false floor. Others leave a flat feeding space about 3 feet wide, at the front of the pen, next to the feed alley, and put a sloping floor on the rest of the pen. Both plans are satisfactory. However, farmers who have the flat space at the front claim an advantage in feeding and in keeping the pigs' bed clean and dry. In hot weather, if a flat space is left at the front of the pen, a partition and gate are needed so that the sow can be shut on either the sloping floor or the feeding space. Otherwise she may lie on the cooler concrete or dirt in front of the sloping floor. This partition is not needed when the weather is cool. If a partition is used, the stall must be large enough to give a feeding space at least 5′ x 8′ and a farrowing space 5′ x 8′.

BELOW— This sloping floor for a farrowing pen in a central house, was made in 3 sections for ease in handling.



he is thrown, his legs can be tied securely and the hoofs may then be trimmed easily.

HOUSING THE BULL

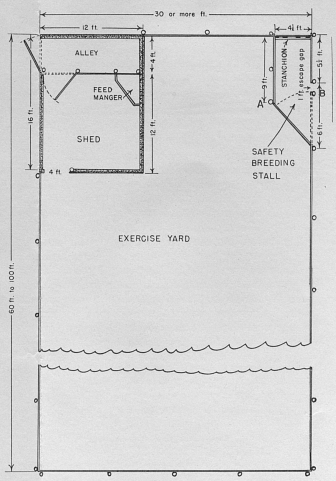
All dairy bulls are naturally mean, and they tend to become vicious as they grow older. Too often the practice is to replace the bull every 2 years. As a result many good sires go to slaughter before their value is realized.

It is not advisable to house the bull in the dairy barn where the cows are kept. If possible, he should have a separate shed and a separate lot or pen where he may find shelter and obtain needed exercise. The ideal lot should contain an acre or so in order to furnish some grazing. Most lots, however, are made smaller to lower the expense. The size and shape may suit the owner's preference and convenience. It should be not smaller than 20 x 80 feet and should be located where the drainage is good. A long, narrow lot will provide more exercise than a square one of equal cost.

SAFETY PEN

Safety bull pens have been developed and are in common use. They are not expensive, and every farmer owning a bull should build one. The safety bull pen enables older bulls to be used without danger to the handler, and also provides needed exercise to keep the bull in good breeding condition. It eliminates the necessity of having to handle the bull every time he is fed or every time a cow is bred. The illustrations show the construction of the pen and the safety breeding stall. There should be a shed in one corner of the pen, preferably with the open door facing south, through which the bull may enter at will. This shed should be partitioned so that the bull can be fed without the caretaker actually entering the stall with him.

Obviously the pen must be built strong. The posts should be large and set deep. In building the fence, various materials can be used. In elaborate pens iron pipe (usually old boiler flues) set in concrete posts make an attractive, long-lasting pen. Wood planks, 2"x6" or 2"x8", bolted or spiked to the inner sides of the posts, are very satisfactory. Woven wire, not lighter than No. 9, with stay wires

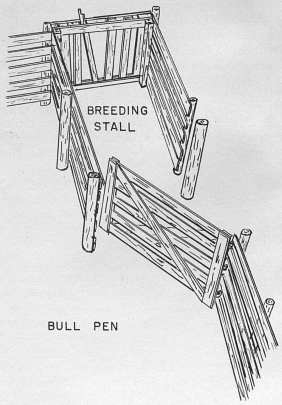


spaced 6 inches apart, can be used. A barbed wire placed at the top of this will prevent the bull from riding the fence down with his neck. Long, straight poles bolted or spiked to stout posts make a cheap, satisfactory fence. Also an electric fence wire installed inside the fence and connected to an approved controller or "charger" will help confine the bull and protect the fence. In all cases the fence should be not less than 5 feet high.

SAFETY BREEDING STALL

The chief feature of a properly built pen is the safety breeding stall. It is designed so that a strong gate swings across the open end of the stall striking

a post on the opposite side. With the gate closed (Position A) the stall is open to the outside so that a cow may be led into the stall and secured in the stanchion built in the front of the stall. Then the gate is opened (Position B), letting the bull in with the cow. After the service is completed the bull is pushed back into the pen and the gate closed (Position A). It is never necessary to handle the bull, and the owner can keep the fence or gate between himself and the bull at all times. An escape gap is provided for the caretaker to assist the bull in breeding the cow. The gate should be strong and well-hinged. For Jerseys and Guernseys a 4-foot stall width is ample. For the larger breeds a width of 4½ feet is suggested.



BULL PEN

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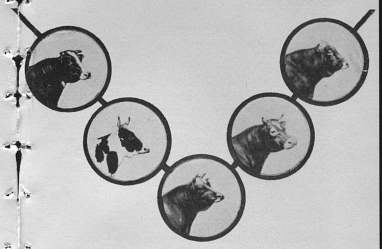
10M—9-45

DAIRY BULLS



Selection • Feeding • Management

By Lynn Copeland

Finding a good herd sire is a problem all dairymen face time and again. Nearly all who milk cows know the part a bull can play in building up or ruining a herd. Dairy Herd Improvement Association records have shown again and again the profit that comes from wise or fortunate selection of a bull whose daughters are better than their dams. The better the herd, the more care and thought are needed in choosing the herd bull. The old saying that the bull is half the herd is often an understatement because a poor bull, if kept long enough, can ruin a herd. A cheap bull may, in the long run, prove the more expensive. On the other hand, price alone is no measure of a bull's real value.

After a good bull has been found, the problem then is to feed and manage him so as to keep him

Leaflet 99

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics

Agricultural Extension Division

Thomas P. Cooper, *Dean* and *Director*

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September, 1945

vigorous, and to provide the needed fencing and housing to prevent his being a danger to those who work with him.

WHICH BREED?

The choice of a breed is relatively unimportant. However, there is usually some advantage in choosing a breed that is numerous in the community. There are both good and poor animals in every dairy breed, and every breed has certain advantages and disadvantages. Personal preference is important. In any case, if you are breeding grade cattle, choose one breed and stick to it. A succession of 2 or 3 dairy bulls, all of the same breed, will change a nondescript herd into a uniform herd of dairy cattle.

SELECTING THE HERD SIRE

Registration certificate not enough.— A variety of methods have been used by dairymen in choosing herd sires. A number of years ago, when most dairy herds were lower in production, it was advocated that only "registered" bulls be used. While, on the average, registered cattle produce more than grades, there are many inferior registered animals. A registration certificate alone is, therefore, little guarantee of excellence.

Sons of high-record cows not necessarily good sires.— When it was realized that a registration certificate was not enough, breeders then wanted a registered bull with a high-record dam. It was assumed, for instance, if the dam had a record of 600 pounds of butterfat, she would transmit her producing ability to her son and he would pass it on to his daughters. This method alone has not proved very reliable, for the record of a cow is not a very good indication of her transmitting ability.

Good proved sires safest choice, but seldom obtainable.— Experience has shown, over and over, the value of using a bull who has proved his ability to sire high-producing daughters. However, in actual practice, good proved sires are almost impossible for the average breeder to obtain. It is necessary for most breeders to use young unproved bulls. Unfortunately, there is as yet no way of knowing with absolute certainty just what kind of

cows a young bull will sire. Much of the gamble in selecting a bull can be avoided, however, by looking for and emphasizing certain facts in the pedigree.

Son of a good proved sire and a worthy dam likely to be a good choice.— Probably the first thing to insist upon in buying a young bull is that the sire should be a really good proved bull with a number of unselected daughters all with good records and with uniformly good conformation. This does not mean that the sire transmits more to the calf than the dam. It is more difficult to evaluate the dam's transmitting ability, for her own individual record does not tell the whole story. The dam of the calf should of course be a cow with a good record and of desirable conformation. She should also be a daughter of a really good proved bull. In other words, she should come from a good family and should have a number of good-type and good-producing half-sisters and full sisters. In addition to this, if the dam is what we call a good "brood cow," with 2 or 3 really good-type and good-producing daughters, this and the records of her sisters are probably a better indication as to what she may transmit to her son than is her own individual record.

Most pedigrees are difficult to evaluate because of incomplete data. This is one reason for so many failures in herd bulls. Also, not every bull calf, even though he has the right kind of pedigree, will prove out. However, most of the great proved bulls of all breeds have had in their pedigrees the requirements mentioned here.

In general, don't wait to buy your bull until you must have one old enough for immediate service. Plan a year or two in advance. Take time, look around, visit as many good, established herds as possible, where several generations of cows may be observed. Study pedigrees carefully and do not be misled by "pedigree padding" and printer's ink. Also don't be misled by the distance from which a bull may come, or by his having won a blue ribbon at a state or national show; or by his sire or dam having sold for a high figure. Likewise, the fact that a herd has achieved national prominence does not mean that every cow in that herd is fit to be the mother of a herd bull.

HANDLING THE YOUNG BULL

Bull calves to be raised for breeding purposes should be handled much the same as young heifers. They should be separated from heifer calves at 5 or 6 months of age. Feed the bull calf liberally and give him every opportunity to grow to his maximum size. If a bull is stunted and small at maturity there is no way of knowing whether it is due solely to poor feeding or partly to inheritance.

When the calf is weaned from milk give him all the good, green, leafy hay he will clean up plus enough grain to keep him growing rapidly. Teach him to lead and put a ring in his nose when he is 10 or 12 months of age. Then teach him to lead by the ring. Generally it is advisable to dehorn the young bull. This may be done by caustic soda or potash when the calf is a week old. Some breeders prefer to wait until the bull is about 2 years old and then saw the horns off. If the horns are left on and the bull is tied by the ring, the chain should be placed in a loop around the horns and then down through the ring. If this is done there is not much danger of tearing the ring out. Another precaution in tying a bull is to tie him with a heavy strap or rope around the neck, with the strap tied a little shorter than the chain through the ring. Then if he suddenly pulls back, the first strain will come on the strap around the neck and not on the ring.

AMOUNT OF SERVICE

If well developed, a young bull may be used at about 1 year of age, but not to exceed one service a week and not over 2 or 3 per month until he is 18 months old. From 2 to 5 years the maximum breeding power is reached, and the bull can care for a herd of up to 50 cows if the distribution of service is fairly uniform throughout the year. With proper care and management a bull may retain his breeding ability up to 12 or even 15 years. One service at a time is enough and no more should be permitted.

The bull should not be allowed to run with the cows. This practice exhausts the bull unnecessarily, the heifers are bred too young, and it is impossible to keep a record of breeding dates. Then there is always danger if a bull is running loose. He may

always have been gentle, but there is no way of telling when he may become vicious.

HANDLING THE MATURE BULL

Too often the herd bull is the most neglected animal on the farm. He should be kept in good breeding condition. This does not mean that he should be kept fat—in fact, he should not—but he should be maintained in a good, thrifty condition. This means **good feeding** plus **exercise.**

The bull should have as good-quality hay as is fed to the milking herd and enough grain to keep him in good physical condition. Leafy, green hay is important to furnish enough vitamin A. With normal rations there is rarely, if ever, a deficiency of the anti-sterility vitamin E. Salt should always be provided and plenty of clean, fresh water should be available at all times. Silage, especially grass silage, is good in small amounts, but too much may tend to develop paunchiness and may make the bull slow in serving.

If necessary to handle the bull he should always be led by the ring in his nose, and preferably with a staff. Always handle him in a firm manner and never trust him.

Bulls kept closely confined, with little exercise usually develop long toes. These may become painful and prevent the bull from walking readily and may interfere with breeding. The hoofs may be trimmed with a long-handled chisel, or one leg may be tied up with a hoist and the hoof trimmed with hoof trimmers. Sometimes it is necessary to throw the bull so the soles of the feet can be trimmed and pared down carefully. The bull can be thrown with a ¾-inch rope about 50 feet long. Loop one end around the neck or the horns and tie with a knot that will not slip. Next, take a half-hitch around the chest, just behind the front legs, and then take another half-hitch around the rear flanks. The hitches should be down just a little from the withers and the back of the animal. The bull should be tied securely with a rope around his neck and by the ring. Then by pulling hard on the free end of the rope the animal can be thrown. If the bull is large it may be necessary to tie a second rope to one hind foot so that one leg can be pulled out from under him. **Be sure to have plenty of help at hand.** When

White Twistbud, Yellow Burley, Yellow Twist Bud, and Warner. In addition to these a number of unnamed local varieties that were sent in by farmers for trial were also tested and found to be susceptible. In these tests no old variety, or old variety renamed as a new variety, or selection from an old variety, has proved to have enough resistance to black root rot to make it safe for general use in infested soil.

QUALITY OF THE ROOT-ROT-RESISTANT VARIETIES

In tests at the Experiment Station the quality of Ky 16 and Ky 41A has consistently equaled that of any other variety widely grown in Kentucky. Manufacturers buy the root-rot-resistant varieties as readily as any of the old varieties. Actually the average quality of the resistant varieties is likely to be higher than that of the susceptible varieties because of the greater uniformity of plant type resulting from careful selection and because the plants grow more uniformly in the field.

YIELD OF THE ROOT-ROT-RESISTANT VARIETIES

Ky 16 and Ky 41A have consistently equaled in yield or outyielded the susceptible varieties in tests at the Experiment Station on land free of the fungus which causes black root rot. Differences in yield from 200 to 500 pounds per acre in favor of these resistant varieties are not unusual on land not infested with this fungus. On land infested with black-root-rot fungus the resistant varieties have yielded from a few hundred to 1,500 pounds more per acre than the susceptible varieties, in these tests.

HOW RESISTANT VARIETIES ARE PRODUCED

The question is often asked, "Can a named variety be treated to make it resistant to black root rot?" The answer is, No. There is no treatment that will make a variety resistant to black root rot. The resistant varieties are just as distinct from the susceptible varieties as two breeds of livestock are from one another.

The resistant varieties are developed by crossing and backcrossing known resistant tobaccos from some other part of the world with burley tobacco until a satisfactory burley variety is developed. The varieties which are finally introduced are the result of years of breeding and comparison, on infested and uninfested soil, not only with other newly developed varieties but with the best of the old named varieties also. Unless a new variety is resistant to black root rot and has some distinct advantages over the old varieties, it is discarded. Only thoroughly tested varieties are listed for certification. Once a resistant variety is developed, it will remain resistant as long as it is not allowed to cross with a susceptible variety.

RECOMMENDATIONS

To avoid all chance of loss from black root rot, and increase yield per acre even on land not infested with black-root-rot fungus, choose one of the high-yielding root-rot-resistant varieties. If you believe you are now getting superior results from a susceptible variety, grow a few stick-rows of a resistant variety through a field of the susceptible variety and keep accurate records of yield, quality, and dollars produced per acre. Keep the records on a limited number of plants of the two varieties growing side by side. It is never safe to compare one year's crop with one grown previously, or a crop of one variety with a crop of another variety grown in a different field.

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BLACK ROOT ROT Of Burley Tobacco

By W. D. Valleau, E. M. Johnson, and Russell A. Hunt



TWO VARIETIES of burley tobacco pictured here were set the same day under identical conditions on a farm near Lexington. The large plants on each side are Ky 41A, a root-rot-resistant variety developed at the Kentucky Agricultural Experiment Station. In the center are 2 rows of one of the several popular named varieties susceptible to black root rot. The roots of the plants in the center rows were blackened and bore spores of the fungus which causes black root rot.

Leaflet 100

UNIVERSITY OF KENTUCKY

College of Agriculture and Home Economics

Agricultural Extension Division

Thomas P. Cooper, *Dean* and *Director*

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UNUSUALLY HEAVY LOSSES FROM ROOT ROT IN 1945

In 1945, burley tobacco growers in Kentucky lost several million dollars because of black root rot. This loss could have been avoided if root-rot-resistant varieties had been used instead of the old susceptible varieties. The loss was heavier than usual in 1945 partly because of a swing back to susceptible varieties on the part of a good many farmers, and partly because the summer of 1945 was one of the coolest on record in Kentucky, and ideal for the development of black root rot.

Black root rot causes severe damage every year when a susceptible variety of tobacco is set in infested soil. This is proved by the fact that susceptible varieties grown on infested land at the Experiment Station each year for the past 25 years have yielded about half as much as the same varieties grown on root-rot-free land.

CAUSE OF BLACK ROOT ROT

Black root rot is not caused, as so many growers think, by water flowing over the land after tobacco has been set, or by beating rains. It is caused by a specific fungus or mold which lives in the soil. The spores of this fungus can always be found by microscopic examination on the roots of plants affected by black root rot, making diagnosis certain. The disease is more common and injurious in years when the temperature is low and the rainfall high in late May and June.

BLACK ROOT ROT IN THE PLANT BED

Plant beds, particularly burned beds, which are used a second time and are sown with a susceptible variety, even after a period of 15 years, are likely to be a partial failure because of black root rot. Early growth of plants may be satisfactory, but as the roots penetrate to the unheated soil

of a burned or steamed bed they develop root rot, grow slowly, and the leaves may turn yellow or the plants may wilt during the middle of the day.

Plants affected with black root rot in the plant bed usually make poor growth in the field unless the soil is very acid or the temperature very high after setting.

BLACK ROOT ROT IN THE FIELD

Healthy plants of a susceptible variety set in soil infested with the black-root-rot fungus, or diseased plants set from an old bed, do not start quickly after setting but sometimes appear smaller after a month than when set. Affected plants usually wilt in the middle of the day even though the soil is moist. In other fields the plants may start off slowly but irregularly and eventually make a fair crop. Crops of this kind, even though the yield may be reduced several hundred pounds, may not be recognized as affected by black root rot without careful examination of the roots.

In an average season, severely affected plants usually do not begin rapid growth until about August, when new roots are developed near the surface of the ground, and a small late crop is produced. In 1945 many affected crops were not harvested at all.

NOT ALL ROOT ROT IS BLACK ROOT ROT

Black root rot should not be confused with brown root rot, which is sometimes found where tobacco follows sod. The wilting of the plants may be similar and the general appearance of the roots is similar except that the dead roots are brown in the case of brown root rot and coal black in the case of black root rot. All of the burley varieties now grown are more or less susceptible to brown root rot.

HOW TO PREVENT BLACK ROOT ROT

Losses from black root rot can be prevented both in infested plant beds and in fields if a variety of burley resistant to black root rot is grown. A field in which a susceptible variety failed because of black root rot one year can be planted to a resistant variety the next year without danger from the disease. This has been done repeatedly in Kentucky, with success.

A grower can obtain a satisfactory black-root-rot-resistant variety of burley tobacco if he buys seed certified by the Kentucky Seed Improvement Association and bearing the blue seal of certification. Some seed growers and dealers also offer for sale the root-rot-resistant varieties Ky 19, Ky 22, Ky 34, or Ky 52, but these are not certified because they are still in the trial stage.

WHICH VARIETIES ARE RESISTANT?

All numbered varieties of burley, such as Ky 16 and Ky 41A, developed by the Kentucky Agricultural Experiment Station, are resistant to black root rot and will make excellent growth in infested beds and fields, provided other conditions are satisfactory. A variety known as Canadian also has considerable resistance to the disease, but there are other varieties also called Canadian which are highly susceptible.

During 25 years of tobacco breeding and testing at the Kentucky Agricultural Experiment Station most of the old burley varieties commonly grown in Kentucky have been tested. The following varieties have been found in these tests to be susceptible to black root rot: Barnett or Barnett Special, Bell's Bourbon White Burley, Bell's Gold Back Burley, Chestnut Oak, Drake, Gay's Yellow, Golden Burley, Greenbriar, Halley, Halley's Special, Judy's Pride, Kelley's Improved Standingup White Burley, Logsdon, Pepper, Savage Long Trash, Shipp's Standup White Burley, Stokeley,

