OCTOBER, 1947 BULLETIN 509

UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
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Missouri Peach Culture

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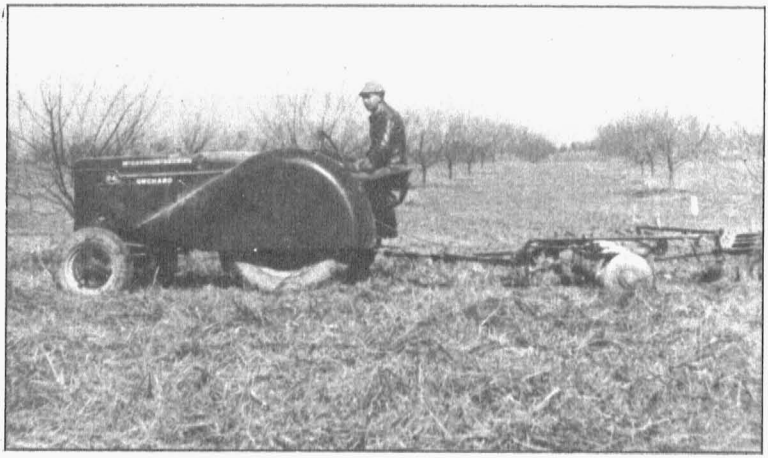


Stubble mulch or trashy cultivation with tractor in young peach orchard.

COLUMBIA, MISSOURI

Summary of Harvesting and Packing Suggestions

1. Pick fruit when ground color is yellow and attractive but before material softening occurs.
2. Picking each block every other day may prove profitable.
3. Picking foremen should be trained to help and instruct picking crews.
4. Place the fruits in picking containers and empty them carefully, avoiding dropping and bruising.
5. Handle crates gently and drive carefully.
6. Inspect carefully grading equipment and make repairs including adequate padding to lessen bruising.
7. A moderate slope of packing table may cut down bruising damage.
8. Fruit should never be dropped at any operation.
9. Keep fruit pile on packing table to moderate size.
10. Trim finger nails. They may do as much damage as exposed tacks and nails in the padding.

Missouri Peach Culture

(Revision of Bulletin 455)

T. J. TALBERT

The peach is grown throughout Missouri as a home orchard fruit. Commercial plantings are also found from the northern districts to the southern border. The chief production, however, is largely confined to St. Louis County, southeast Missouri, and the extreme south central and southern parts of the State.

Winter temperatures of 15° F. or more below zero generally destroy a large portion of the peach fruit buds regardless of variety, maturity of tree tissues or stage of the rest period. Even –10° F. late in the winter or following warm periods that initiate growth activities may cause the killing of practically all of the fruit buds. Also temperatures that drop to 18° or 20° below zero may do injury to the wood tissues, particularly in the crotches of the large limbs and at the base of the tree trunks. Consequently the more frequent occurrence of these low winter temperatures makes peach growing in central and north Missouri generally more hazardous than in the southern and particularly in the south central and southeastern areas of the State.

Bearing peach trees produce an abundance of fruit buds; in fact, many more than can be developed into mature fruits. Perhaps not more than about five per cent of a good bloom, if well distributed, is needed for a satisfactory fruit crop. Certainly ten per cent under such conditions should be ample.

With favorable soil and climatic conditions from 3 to 5 years are required for a peach orchard to come into commercial bearing, and 2 or 3 additional years are needed to bring the planting into full production. In most sections the average life of an orchard does not in general exceed 10 or 12 years. Under southeast Missouri conditions, however, with proper care, trees may continue to be profitable until they are 18 or more years old. Average yields of mature orchards during good crop years of from 3 to 4 bushels per tree are considered very satisfactory, although much larger yields may be produced. The bulk of the Missouri peach crop is harvested during late July, August, and early September.

Winter Injury

The wood of peach trees will withstand without injury considerably lower temperatures than their fruit buds. When buds are dormant and the trees vigorous, there is less likelihood of injury than when opposite conditions of trees and buds exist. Furthermore, low temperatures of short duration may be less damaging than if prolonged for a considerable period. Temperatures several

degrees above zero in early winter, following late fall growth, may cause injury to both trees and fruit buds.

Mild or unseasonable weather in January or February may cause peach fruit buds to start growth or swell enough to become tender to cold. If even normal cold weather follows such warm spells, much damage to fruit buds may be done. The total or partial loss of crops through these more or less wide ranges in temperatures is in general more prevalent in the southern peach districts than is the loss from low temperatures in the northern districts.

Spring frosts that occur during blossoming time may also cause great losses to the peach crop. In fact, if severe spring frosts appear year after year at blossoming time, commercial peach growing is not practicable. Danger points of temperature at the blossoming period, as given by many investigators throughout the country, range from 25° to 30° F.

When the wood of trees has been injured by very low temperatures, it is advisable to postpone care until late enough in the spring to determine the extent of injury. Winter injured trees require very careful treatment. If the injury is not severe, the dead parts should be removed and the remainder of the tree pruned thoroughly to stimulate growth. The cutting should not be heavy because the trees may have already lost a considerable amount of their potential leaf-bearing surface. Since the leaves manufacture food for growth, it is important that a sufficient area of leaf-bearing wood be left for good growth. In overcoming winter injury, thorough cultivation and fairly liberal fertilization are generally helpful.

Sites and Locations

Site.—The chief factors to be considered in the selection of an orchard site are soil, topography and climatic conditions. The site deserves thought and consideration because even the hardiest and best varieties will not succeed on poor sites. Moreover, since winter killing is the greatest disadvantage to peach growing in Missouri, a site should be selected, if possible, that will reduce winter injury to the minimum.

An ideal site should be high enough to allow cold air to drain off readily, and without bare slopes above which will permit cold air to drain down through the orchard. The aspect or direction of the slope is important. North slopes are generally cooler in both winter and summer and possess deeper and more fertile soil than south exposures. Since warm spells in January and February are more likely to start fruit bud growth on south slopes, northern exposures are generally preferred. Slopes in other directions may show differences in temperature and soil fertility but usually not as marked as that of north and south exposures.

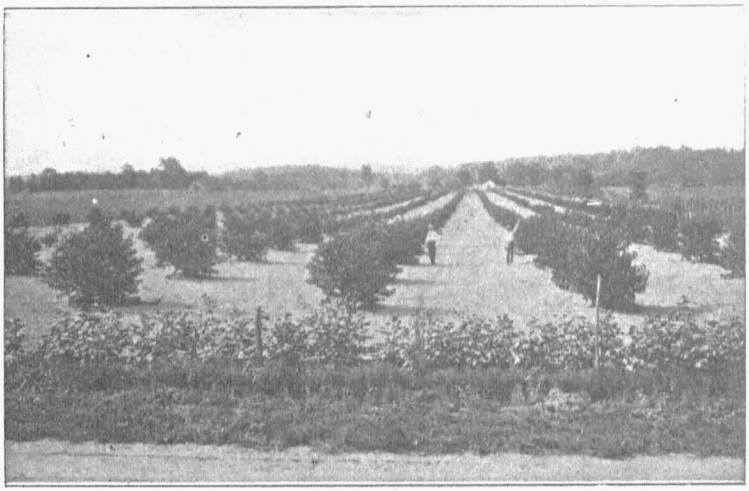
Location.—Peach growing in a location where the fruit is produced extensively has advantages. Supplies and repairs to ma-

chinery may be more quickly and easily obtained, growers may have less difficulty in keeping informed on the best orchard practices, grading and packing can often be done in a cooperative plant, and such concentrated plantings may aid materially selling operations.

On the other hand, peach orchards located in areas where the plantings are scattered may have advantages of local, independent markets and outlets not found in regions where extensive commercial orchards have been established. It is also true that the isolated peach plantings may suffer less from the build-up of injurious insects and diseases harmful to the peach.

Choosing Peach Orchard Soils

Peach trees may produce profitable crops on a great range of different soil types. They usually thrive best, however, on the light sandy, gravelly, or rocky loams which are fairly fertile. The trees will not endure wet or water-logged soils. In fact, regardless of type, the soil must be well drained. A subsoil of 2 or 3 feet of gravel or sand underlaid with a more compact layer may prove valuable. While peach trees will succeed on poor soil, yet the best results may be secured on moderately fertile, loamy, deep, well aerated soil.



An excellent young peach orchard in southeast Missouri. Note the low-headed spreading trees, light sandy soil and row of cotton plants along the fence row.

It is well known that soil alone may often cause a marked and outstanding difference in yield. The extent and depth of the root systems of peach trees has an important effect upon their productiveness and length of life. The character of the soil and subsoil influences the distribution of the roots.

On the other hand, light poor soils may fail to produce trees of sufficient size and bearing capacity to be profitable. Poorly drained soils are known to be one of the main factors causing peach tree losses. After the orchard site is plowed, disked and harrowed, if let stand a few days the wet spots can be easily located because the surface soil will remain moist on them. Fields with many such wet spots should be avoided if possible.

Selecting Peach Varieties

There is no perfect variety of peach and the kinds or varieties planted may "make" or "break" the grower. Fertile soils and good culture will not make poor sorts profitable or low-yielding kinds fruitful. Often returns from one variety may barely cover production and harvesting costs, while those from another net substantial profits.

Varieties, however, cannot be valued entirely on the basis of yield. Relative susceptibility to insect and disease attack, earliness of bearing, regularity of cropping, length of life, percentage of fruit that grades out, market demand and price must all receive careful consideration. Hardiness in wood and bud to winter and spring cold and resistance to injury from the heat and dryness of summer are also of great importance.

Peach varieties are impressed upon consumers and dealers generally because of outstanding quality and appearance. Undesirable features have caused fruits practically to disappear from the markets while other varieties have persisted in popularity for a long period. A few comparatively recent sorts have gained enormous popularity due to desirable qualities not found in the old varieties. Consequently the selection and planting of the most suitable kinds may insure greater profits. The history of the great number of varieties named, introduced and offered for sale shows that practically all have disappeared rather shortly after their introduction.

It is obvious that definite varieties cannot be recommended as "the best" under all circumstances. In each fruit-growing district there are generally four or five well known and established sorts which can be relied upon. The bulk of new plantings should be selected from this list. New varieties should be planted in limited numbers as several years' observation by investigators and experienced growers is needed before their commercial value can be determined. This makes the acceptance of newcomers slow.

Pollination Requirements

The peach, with the exception of a few varieties, is self-fertile. Single varieties, therefore, may be planted in solid blocks. All agree, however, that better sets of fruit may often be obtained if several varieties are planted in strips of two to four rows each, al-

ternating with each other across the orchard. The self-unfruitful varieties, possessing non-viable pollen are:

Candoka	Halberta	Japan Cling	Sargents
Chili	Hope Farm	Mikado	Tuscan Cling
Chinese Cling	J. H. Hale	Pacemaker	Vimy

For these varieties provision for thorough cross-pollination should be made. Practically all of the so-called standard sorts such as Elberta, Champion, Red Bird, Belle of Georgia, and others should prove very effective in cross-pollination if planted in alternate blocks of 2 to 4 rows each across the orchard.

Evaluating Peach Varieties

Without doubt, the most important development in the Missouri peach industry during the past twenty-five years has been the change in the variety situation. Before the introduction of the early, yellow fleshed freestone sorts, which represent a good percentage of the total number of trees in the state, the only Missouri peaches on the markets in competition with Elberta and J. H. Hale from the south were white fleshed fruits, consisting usually of cling or semi-cling varieties.

Perhaps no other fruit industry is so largely built upon one variety as the peach. Many varieties meet important needs, but the Elberta peach dominates the industry. For home and nearby markets, a succession of varieties is usually desirable in order that the season of use may be extended over a long period. The list which follows is made up of some of the best varieties for home and commercial requirements. There may be, however, other sorts that for certain districts and special needs are better suited for planting than those listed. The list does, however, include some of the best varieties for general culture throughout the State and particularly in the southern districts of south central and southeast Missouri where peach growing is most profitable. Dates of fruit ripening or harvesting are based chiefly on the varieties as they are grown in the southern one-third of the State. The same varieties there generally ripen about 7 days ahead of those in central Missouri and about 10 days earlier than the same kinds when grown in North Missouri.

Mikado.—This is a very attractive peach, earliest good yellow, with a bright blush, round, medium sized, good quality, semi-cling, season southeast Missouri about July first. The buds are very hardy. The fruit is of particular value for local markets and should be handled carefully as it softens rapidly and bruises easily. The trees are vigorous and productive and may require cross-pollination. They also tend to overbear and require thining.

Golden Jubilee.—The fruit is attractive, yellow, with a slight blush, oval, freestone, large, good quality, bruises easily, but is generally

valuable for local markets. The fruit may lack color if trees are over-vegetative. The tree is vigorous, buds hardy, productive, and the harvest season is a few days after Mikado—July 4 to 10 in the southern districts.

Halehaven.—The fruit is large, very attractive, yellow, more red color than Elberta, excellent quality, freestone, tough skinned, short pubescence, colors early, softens slowly and handles well. The tree is vigorous, productive and hardy. It usually sets fruit so heavily, fruit thinning is needed. At this time it is one of the most promising new varieties for Missouri peach growing districts. It ripens about 17 days before Elberta or during the last week in July for southeast Missouri.

Red Bird (Red Bird Cling).—The tree is hardy, bears early and abundantly, is a regular cropper and the fruit buds are resistant to cold. Since the fruit is harvested early, the trees withstand drought conditions in late summer and fall much better usually than commercial varieties that ripen their fruit later. The fruit is large, bright glowing red, clingstone, and ripens in southern Missouri about July 25. Growers commend it as an abundant and regular cropper, good for handling, adapted to truck trade and a profitable variety. When compared with other varieties, it may be found to be low in quality. Both attractiveness and quality can, however, be improved by harvesting riper fruit.

Cumberland.—The first good early white free stone. The fruit is good size, carries a heavy blush and very good. The tree is vigorous and productive. The fruit ripens with Golden Jubilee or about one month before Elberta.

Rochester.—The tree is large, vigorous, hardy and productive. Although yellow peach varieties are considered less hardy in the bud than white ones, yet Rochester ranks as one of the most resistant to cold of the yellow sorts. The fruit is medium to large size, lemon yellow changing to orange yellow blushed and mottled with dark red which may prove unattractive. The flesh is yellow stained with red near the pit, highly flavored, very good in quality, and the stone is free. Fruit is harvested in middle July. It is worthy of limited planting.

Eclipse.—The fruit resembles Belle of Georgia, its parent, but it is better in quality and possesses a yellow color. It is medium in size, attractive, hangs well to the tree. The flesh is yellow and high quality. It ripens about 16 days before Elberta. The variety is outstanding in hardiness and perhaps ranks first in this respect among the yellow-fleshed sorts.

Champion.—The tree is excellent in form and shape, vigorous, hardy, productive, distinguished by luxuriant green foliage, bears early, and is suited to fertile soils. The fruit matures in early mid-season or about last week in July. It is attractive, excellent quality, and medium in size. The flesh is tender, white, juicy, and has a

pleasant flavor. Its color is pale green to creamy white with splashes of carmine mingled with a blush of dark red and the stone is free. Because of high quality of fruit, good growth, tree vigor, hardiness, and regular abundant production, Champion is usually considered one of the best early to mid-season sorts for home uses and local markets.

Belle (Belle of Georgia).—The trees are large, spreading, vigorous, hardy and very productive. It is a southern variety and reaches its best development toward the south. Of all the commercial varieties, this is one of the hardiest in the fruit bud. Consequently, it is one of the surest croppers. The fruit is medium size, matures about one week before Elberta, and is roundish oval in shape. The skin is thin, tender, greenish white to creamy white blushed and mottled with light and dark red. The flesh is white tinged with red at the pit, juicy, tender, sweet and mild. It has a semi-free to free stone. The quality is good and the variety ranks high for home uses and the local markets.

Elberta.—Elberta is still the most popular peach on the markets. Its wide and favorable reputation on local and distant markets gives it a distinct and marked sales advantage. Elberta is also outstanding on account of its handling and shipping qualities. These advantages, coupled with the tendency of the trees to bear regular and abundant crops, make the Elberta a leading commercial variety. The trees are not as hardy in bud or wood as some other less desirable sorts, and the fruit cannot be rated high in quality.

The fruit is medium to large size and roundish oblong in shape. The skin is thick, tough, deep yellow partly overspread with red and mottling. The flesh is yellow, juicy, stringy, firm, tender and good. The stone is large and usually entirely free from the flesh. It ripens about August 10. With no other variety to replace it for shipping quality or as favorably known on the distant commercial markets, Elberta may continue to be a favorite for a long time, particularly for distant shipments.

Shipper's Late Red.—The tree is a good grower, quite hardy and very productive. It ripens about 7 days after Elberta. The fruit is round in form, firm, yellow freestone and the solid red color makes a beautiful appearance. The variety is rated as a good peach for its season.

Late Varieties.—Varieties such as Salwey, Heath Cling, Krummel and others may be found of value for late season use. These late sorts are not now rated as high as formerly because they are very susceptible on account of their late ripening period to attacks of the Oriental Fruit Moth. Consequently, as methods for the control of this pest are not very satisfactory, growers are turning to the early and mid-season varieties as they generally show much less injury from the moth than the late kinds.

VARIETIES OF PEACHES IN ORDER OF RIPENING FOR HOME OR MARKET PRODUCTION

Variety	Flesh Color	Adhesion of pit	Days ripe before Elberta
Red Bird	white	cling	44
Arp	yellow	cling	40
Mikado	yellow	semi-cling	37
Early Rose	white	cling	35
Raritan Rose	white	free	33
Golden Jubilee	yellow	free	30
Alton	white	semi-cling	30
Cumberland	white	free	30
Red Haven	yellow	free	30
Fair Beauty	yellow	semi-free	23
Rochester	yellow	free	21
Goldeneast	yellow	free	20
Pacemaker	yellow	free	20
Midway	yellow	free	20
July Elberta	yellow	free	19
Vedette	yellow	free	18
Halehaven	yellow	free	17
Triogem	yellow	free	17
Newday	yellow	free	17
Golden Globe	yellow	free	17
Eclipse	yellow	free	16
Valiant	yellow	free	14
Hiley	white	free	12
Red Rose	white	free	12
Champion	white	free	10
Polly	white	free	10
Sungold	yellow	free	7
Belle	white	free	3
Early Elberta	yellow	free	3
Elberta	yellow	free	0
White Hale	white	free	0
Shipper's Late Red	yellow	free	—7
Wilma	yellow	free	—10
Salberta	yellow	free	—14
Frank	yellow	cling	—20
Heath	white	cling	—25
Krummel	yellow	free	—35

Summary of Peach Varieties for Missouri

The varieties which follow are suggested for distant shipments, including large car lot movements and for roadside market sales. They may, however, be equally well suited for home culture. Still other varieties for certain conditions and particular districts may be as good or better than the sorts that have been listed. Additional numbers of varieties may also be required for special needs.

In growing peaches for home uses, the producer may desire a larger number of varieties than for marketing purposes. He may, therefore, grow the kinds preferred even though they are not pofitable on local or distant markets.

Commercial Varieties

Early.—Red Bird and Halehaven.

Mid-season.—Belle and Elberta.

Late.—Salberta, Frank (Clingstone) and Krummel.

For Home Use or Roadside Market

Early.—Red Bird, Mikado, Cumberland, Golden Jubilee, Rochester, Fair Beauty, Vedette, and Halehaven.

Mid-season.—Hiley, Belle, Champion, Eclipse, Sungold and Elberta.

Late.—Shipper's Late Red, Wilma, Salberta, Frank, Heath and Krummel.

Soil and Moisture Conservation

Contour planting of peach trees is recommended as a standard soil and water saving practice for use on all erosive sites where cultivation is to be practiced to any significant extent as a part of the cultural system. The only exception to this plan would be where an uneven topography makes contour planting impractical in which case other conservation methods such as mulching should be substituted to as great a degree as possible for the first 2 or 4 years when special attention is necessary for the establishment of the planting.

It should be thoroughly understood that contour planting is without merit unless used as a basis for other soil and water saving practices such as terracing, ridging and simple contour cultivation. Contour planting and the practice of terracing, therefore, are helpmates of each other. Either may not be successful without the aid of the other.

In general, contours and terraces cannot be laid out properly without the use of surveying instruments by competent persons. The county extension agent may be depended upon to either give the assistance needed or refer the grower to reliable individuals or sources where help can be procured.

On sloping grounds that tend to erode or wash badly, strip cultivation 6 to 8 feet wide along the rows of trees on the contour may be practiced. On still steeper slopes or hillsides cultivation may be confined to hoeing or spading at intervals of about 2 weeks, an area about 4 to 6 feet in diameter around the individual trees in spring and summer until they become established. Under such conditions mulching may often be substituted for cultivation with equally good results. Where the mulch can be reinforced with manure or nitrogen fertilizers, this will be especially true.

Preparation of Land for Planting

On fairly level land which is not likely to erode badly, the soil may be prepared thoroughly by plowing, disking and harrowing, just as one would prepare land for the planting of wheat, corn or potatoes. Trees generally respond markedly in growth and development to good soil preparation before planting.

What, When and How to Plant

The best nursery stock obtainable is usually the cheapest in the long run. It is false economy to plant inferior or low grade trees. The best trees are more likely to be true to name. Well matured healthy stock withstands transplanting better, is more resistant to

dangerous insects and fungous diseases, comes into bearing earlier, and develops into a more profitable orchard than small, stunted, and less desirable trees.

Better results usually may be secured in the southern districts of the state through late fall and early winter planting. For central and north Missouri, however, on account of danger of winter injury to the roots, spring planting as early as soil and weather conditions permit has been general. However, equally as good or better results may be secured by late fall planting if the soil about the trees is mulched with straw or other litter to a depth of 3 or 4 inches soon after planting.

One-year-old thrifty trees are preferred and they are set from 22 to 24 feet apart each way. Broken or injured parts of roots should be removed before planting. Dig the planting hole large enough to allow the roots to be spread without cramping and the trees to stand about an inch deeper than they stood in the nursery. As the soil is filled in around the roots, firm it by tramping.

Handling Young Peach Trees

Tree Growth.—At the beginning of each growing season the problems of obtaining satisfactory tree growth and the hastening of the profitable bearing period present themselves. It is important, therefore, that the grower be able to interpret or recognize his own tree growth problems. To do this he must learn to identify a few of the symptoms of nutrient deficiencies. Some indications and clews may be obtained from:

(1) The length of terminal growth made the previous year.
(2) The color of the leaves.
(3) With bearing trees, the yield, size and color of fruit.
(4) The amount or abundance of the cover crop or weed growth

Starved Condition.—If moisture conditions are satisfactory, short terminal growth, yellow leaves and sparse cover crop or weed growth are indications of a starved condition or a lack of a sufficient amount of available soil nutrients. It is true, however, that all the trees of one variety or all the trees of several sorts do not have the same food requirements.

Balanced Growth Needed.—In general the producer should strive to secure on young non-bearing trees an average yearly growth of about 30 to 40 inches and on bearing trees a terminal growth of 10 to 14 inches is desirable. Slight variations in these growth figures may not affect adversely the health, growth and fruitfulness of the trees when they come into bearing. But marked reductions (3 to 4 inches total) or accelerations (30 to 40 inches or more) in growth may affect profoundly both the time and amount of fruiting. It is common knowledge that young peach trees have a tendency to make greater growth and to grow later in the season than bearing peach trees.

Weak Trees Respond to Nitrogen.—Trees that fail to make the desired amount of growth will usually respond favorably to applications of nitrogenous fertilizers. The Missouri Station has also found that rapid growing young trees generally form wider angle scaffolds than slow growing trees. Furthermore, the wide angle, strong crotches are less subject to injury by winter cold. Trees that have been forced to grow twice as much as a reasonable amount may be very susceptible to winter injury and the time of bearing may be delayed a year or two. Of the two evils, too little growth is likely to occur in most instances.

Good Early Growth Desirable.—With good cultural practices and proper fertilization the trees should start growth early and begin to slow down for the season by about the middle of July. This will give the new wood plenty of time to ripen and harden off for the winter cold. On the other hand, if the trees continue to make a rank and succulent growth through August and into September, wood ripening and hardening for winter conditions may not have a chance to take place before the leaves are killed by the frost and cold of winter.

Soil Management Practices

Until recently it has been the general consensus of opinion of peach growers and experiment station workers that the soil of peach orchards for best results should be cultivated regularly and thoroughly. However, the emphasis which has been placed in the past few years upon the importance of preventing soil erosion and the saving of soil moisture and nutrients has given added interest and enthusiasm to studies designed to improve soil management practices.

Cultivation and Cover Crops.—On sites that are fairly level and where erosion is not a serious problem, the peach grower may, as has been the common practice, cultivate early in the season and sow a cover crop in late spring or early summer. Producers everywhere, however, are now giving the matter of erosion control more attention. Grass or sod strips in depression areas and elsewhere are left uncultivated in order to facilitate the removal of water without the washing away of the soil. Up and down hill cultivation has been entirely eliminated. The great value of maintaining an adequate supply of humus in the oil at all times to lessen leaching and erosion and to accelerate growth is appreciated more among producers generally than ever before.

"Stubble Mulch" or "Trashy Cultivation."—In this type of cultivation which is adapted to both old and young orchards, varying amounts of the cover crop residues, whether consisting of weeds and grass or a seeded crop, are left on the soil surface. The litter, trash

and roughness of the soil surface may eliminate soil erosion and washing almost entirely except on comparatively steep slopes. Even on very steep hillsides and inclining areas soil washing may be prevented except when unusually heavy rains occur in short periods of time. The "stubble mulch," therefore, aids not only in soil erosion control but prepares the soil for the absorption of all the rain that falls.

The "stubble mulch" practice has in a few years assisted in building up very materially the soil moisture reserve which may mean the difference between success and failure, especially in droughty periods. This subsurface cultivation may be accomplished through the use of almost any orchard implement with the exception of the turning plow. Special types of implements are now on the market which stir the soil without covering the stubble.

While a disk is generally employed, other types of implements that will break up, disarrange and only partly cover the sod or soil may prove to be satisfactory. After disking both ways in a sodded orchard area, the surface of the ground is left "trashy." Only part of the cover crop growth has been covered, but the whole surface of the soil has been cut, disturbed and penetrated in such a way as to form a great reservoir for rain water. In fact, the cover crop may be just as valuable when left on the surface as when incorporated in the soil.

Moreover, a tremendous amount of water in the form of rain would be required to produce erosion. This is true because the absorption area includes every square foot of soil and rain water finds its way to the subsoil rapidly. Consequently it does not have a chance to collect in rivulets and streams of sufficient size to cause soil washing.

Fertilizing Young Trees.—If the young trees make a satisfactory growth from the stubble mulch culture or from mulching the whole area, nitrogen fertilization may be omitted. In most orchards, however, fertilization is usually needed for best results. This may be especially true when there is a soil erosion problem. Nitrogen fertilizers used at the rate of about one-half pound for each year of the tree's age is suggested. Cover crops should also prove valuable.

Shortly after transplanting when growth starts, an application of readily available nitrogen is generally needed. About 1/3 pound is applied to the soil a few inches distant from the base of the tree trunks. The amount of fertilizer applied is increased about ½ pound each year. For example, when the tree is 4 years old, 2 pounds of ammonium nitrate or sulphate of ammonia is applied.

Continuous Growth Valuable.—The Missouri Station has found that in general both old and young peach trees should make a continuous growth from early spring until late fall or early winter.

This suggestion applies particularly to peach growing in the south central and southeastern part of the state. It is usually desirable to secure if possible maximum growth in May and early June with a gradual slowing down for the months of July and August and finally a stoppage in late October and early November.

Under such growing conditions the trees remain active and are able to manufacture food materials for use in root, wood, bud and leaf development and for storage in the tree tissues. Trees that continue their growth until fairly late in the growing season go into the so-called rest period later and are thus less likely to be influenced by unseasonable warm, spring-like weather that may occur in January and February.

Trees that grow late also usually possess more vigor and vitality than those that stop growth early and lose their leaves. The former may, therefore, be less likely to have their fruit buds killed by low winter temperatures and damage done to wood in the crotches of branches and at the base of the tree trunks. Even if low temperatures occur in November as was true in 1940, the trees that make a continuous growth from spring until late fall may not suffer materially worse than the trees that stop growth early. The trees growing late ripen their wood tissues and buds more normally and they store more concentrated food materials and may actually withstand extreme cold of mid-winter and later with less injury to wood and buds than those that stop growth in late summer and early fall.

Need of Soil Oragnic Matter.—Peach trees thrive best in a soil well supplied with organic matter. Cover crops fill this need adequately. Such crops as cowpeas and soybeans may be sown as soon as cultivation ceases. Hairy vetch and rye may be preferred, and seeded about the middle of August. Wheat, rye, barley and winter oats with vetch, crimson clover, and bur clover are also sometimes sown during late August and early September. The legumes may also be sown alone. The cover crop may be left on the surface and trashy cultivation adopted instead of plowing it under and practicing clean cultivation as has been the practice in many orchards.

To get the largest amount of growth, it may be well to fertilize the cover crop. Where this is necessary, a light dressing of a complete commercial fertilizer may be found of great value. Legume crops, particularly, will respond profitably to phosphorous-carrying fertilizers.

Use of Fertilizers.—As the trees come into bearing it will usually be necessary to supplement the cover crop culture for building and maintaining the soil organic matter and nitrogen with applications of nitrogen fertilizers like nitrate of soda, sulphate of ammonia and ammonium nitrate. Both spring and fall applications have been profitable. Fertilizing at blooming time or shortly before is generally practiced. The amount used then is largely dependent upon the prospects for a crop. Regardless of the amount of bloom, if the

trees need more growth, they should be fertilized. Trees 5 to 6 years old in most cases will need 2 to 3 pounds yearly and older trees may require as much as 3 to 5 pounds per tree for good growth and fruitfulness.

Manure may be particularly valuable in bearing orchards on very poor soil or where there is too much shade for the growth of a good cover crop. Moreover, it is important that manure, which is slowly available, be applied in the winter or very early in the spring. Applications made late in the spring or in summer may induce a late tree growth. This would delay maturity, lessen the color of the fruit, and increase the likelihood of winter injury.

In every planting, whether to fertilize and how much to use are questions that must be considered. The best answer will usually be found in a study of the growth and yield records of the trees. If an annual growth of less than 20 to 30 inches is being made on young trees and less than 10 to 14 inches on bearing trees, a nitrate fertilizer should prove worth while.

Trees in moderately good condition may not require fertilizer treatment unless they bear a crop. Furthermore, the increased set of fruit produced by an early application of nitrogen merely increases the work and cost of crop thinning. By waiting until danger of frost is past, the proper amount of fertilizer to be used can be ascertained by the prospects of a crop and should late frosts kill all the blossoms, the fertilizer may be withheld until it is needed.

Applications of phosphate, potash and lime have not in general influenced beneficially the growth and yield of peaches. It is true, however, that in peach-growing sections of Southeast Missouri, a complete fertilizer has proven beneficial. Cover crops are also benefited.

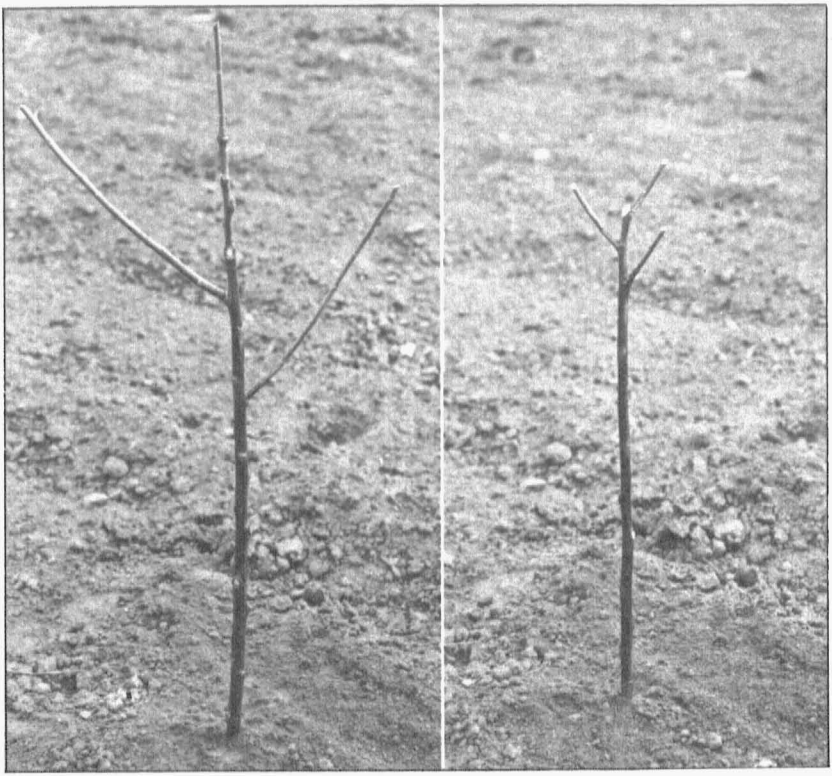
The amount of fertilizer to use on peach trees will depend on the fertility of the soil and the condition and size of the trees. On the average a moderate application of manure for large bearing trees would be about 1/5 ton per tree. The same trees would receive in commercial nitrogen about 3 pounds of sodium nitrate, 2¼ pounds of ammonium sulphate, or 2 pounds of cyanamid. Young trees 2 or 3 years old will not usually require more than ½ pound of sodium nitrate, 1/3 pound of ammonium sulphate or ammonium nitrate to a tree. In special cases, the exact amount to be used must be determined by the grower on the basis of judgment and experience.

Chemical fertilizers for fruit trees are usually broadcast by hand or drilled in between the rows of trees. Care should be taken to keep the fertilizer away from the tree trunks as there is danger of burning the bark. The distribution may extend a greater distance from the trunk than the branches, as an abundance of feeding roots may be found beyond the branches.

Pruning the Peach

Young Trees.—The sooner a peach tree can be grown to bearing size and proportions the quicker it will begin to bear paying crops. The least amount of pruning required therefore to train and form a strong and well balanced tree, the better. The pruning for peach trees is generally fairly severe, yet heavy pruning has a dwarfing effect upon young trees and delays and decreases early crops.

Open-Center Method.—Most varieties of peaches are inclined to form an open-center type of tree head. Trees are generally headed back soon after planting to a height of 18 to 24 inches, the greater



Trees pruned following planting to be trained to the Three Scaffold Branch Method. When three good branches can be found fairly close together at a height of 18-24 inches, they are cut back to 10 or 12 inches in length as shown at left.

If three branches at the proper height lack satisfactory vigor and uniformity, they may be cut back to short stubs 2 to 3 inches long as shown at the right. Shoots growing from basal buds may be selected and trained toward the Three Branch Scaffold Method.

height being used for large vigorous trees and the smaller for less vigorous ones. Low headed trees are desired because they make orchard operations such as pruning, thinning, spraying and harvesting easier and less expensive.

In the open-center tree from three to five scaffold branches may arise from a relatively short space on the trunk. If more than three of these main branches are retained, there is danger from the formation of narrow, weak crotches and poor unions. When three scaffold branches, fairly close together, and well distributed around the trunk are chosen, they may form a compact strong tree head.

If the scaffold branches are large and uniform in size they are generally headed back to a length of about 10 or 12 inches, but if they are comparatively slender, weak and uneven in development, it is usually advisable to cut them back to short stubs about 2 to 3 inches long. Three new shoots arising from the basal buds of the short branches and well distributed around the tree head are selected for the main scaffold branches.

In two or three weeks after planting and pruning, all of the new shoots arising from the trunk and shortened branches should be removed except the three that are selected and left to form the main head. Another inspection of the young trees should be made in two or three weeks after the first one. At this time additional corrective shoot thinning and removal may be required.

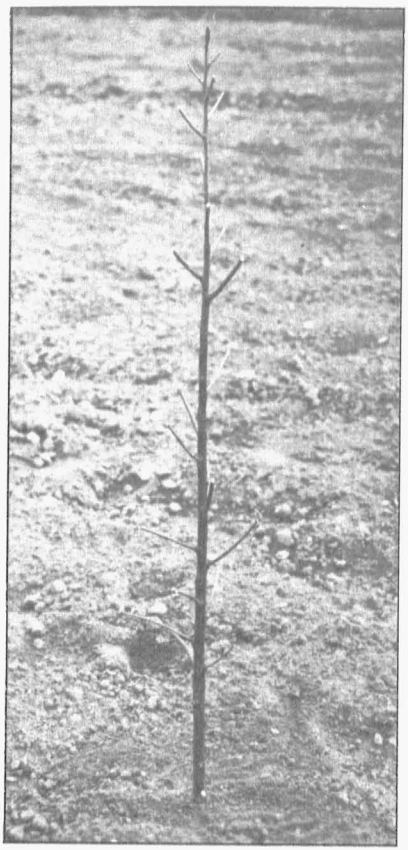
Such timely attention to the matter of the selection of the main scaffold branches and the removal of superfluous and interfering shoots and the shortening back of rangy branches will make the pruning problem of the following or second year a light one. Pruning for the third year should also be light and of a corrective nature. By the third year the trees should have in general assumed the shape and form of bearing or mature trees.

In this formative period of three to four years, the object is to develop a strong balanced framework. The general appearance of the trees should be spreading and bowl-shaped in order that high-colored fruit can be produced. More danger arises from too much pruning than too little. Trees making a poor growth are pruned heaviest while those producting strong shoots and laterals are pruned least.

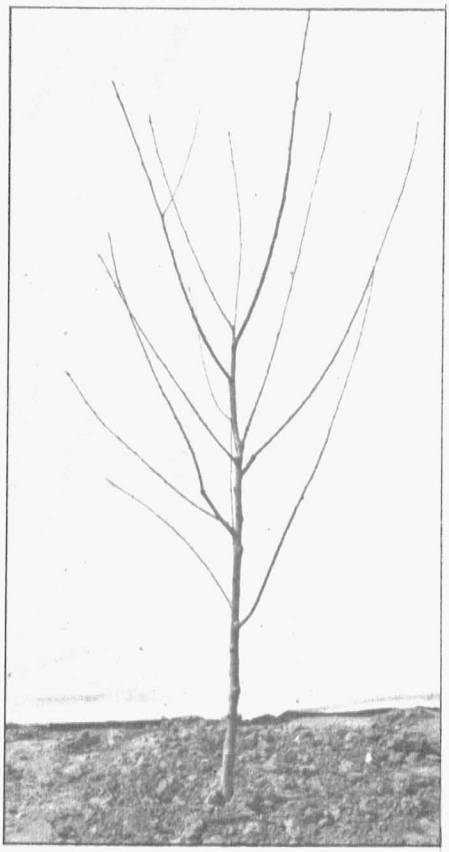
Young trees do not require general cutting back of branches to obtain open heads. Only those branches that are more thrifty and that grow in the wrong directions or interfere with other limbs should be tipped. During the first two or three years, trees trained to about three well placed scaffold branches may need only thinning of shoots in the center. An abundance of renewal wood for fruiting purposes can be secured by removing upright branches and by thinning shoots without cutting back the main limbs to upright stubs.

The chief problem in pruning a young orchard is to extend the frame-work and bearing surface of the trees so heavy loads of fruit may be carried without breaking the branches. The center of trees should be kept fairly open, allowing a few shoots to grow inward and

upward. It is important that young trees be headed low and that the fruiting wood be kept near the ground and not too far from the main trunk in order to prevent breakage and to facilitate picking, spraying, and pruning operations.



Large, growthy peach trees may lend themselves at transplanting time to training toward the Modified Leader Method. All the branches have been cut back to stubs 2-3 inches long and the tree headed at a height of about 40 inches.

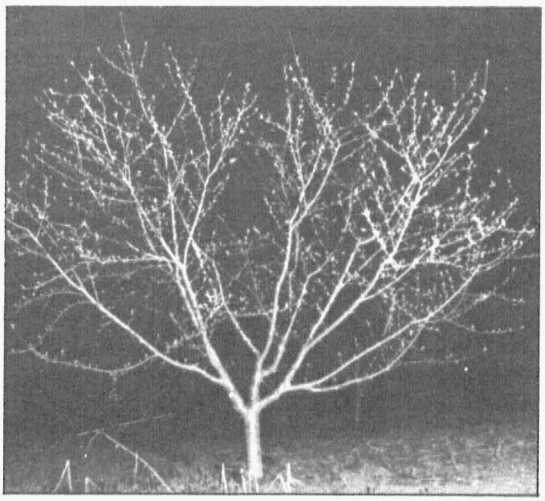


Young peach tree at end of first year of growth. It was pruned at planting time to the Modified Leader Method.

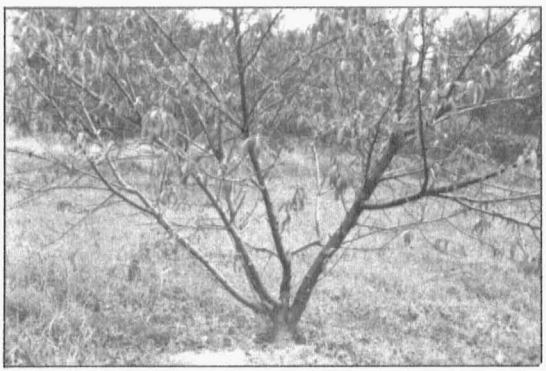
The Modified Leader Method.—In this method the central stem or leader located in or near the center is allowed to gain the ascendency. The system for peach trees is not quite comparable to apple or pear trees for example. This is true because the central stem or leader as a rule instead of developing upright grows at an angle of about 45 degrees.

Strong vigorous trees lend themselves better to this type of pruning than medium or small sized trees because it is necessary to

select the scaffold branches during the first year. Consequently it will usually be better to train the less growthy trees to the open-center method.



A four-year-old peach tree developed by the three scaffold method of training. Note the strong, wide-angle crotches and a trunk and top in excellent condition.



The result of leaving too many scaffold branches. Crowding has caused the development of narrow weak crotches, giving rise to conditions conducive to injury by winter cold and severe breakage of branches.

The trees are headed at a height of about 36 to 40 inches and beginning at a height of 10 to 12 inches from the ground the limbs are cut back to stubs about 2 to 4 inches in length. The main or scaffold branches are then selected at the end of the first year of growth.

In training and pruning peach trees toward the modified leader method greater care and skill is required than in pruning apple trees to this system because the peach is inclined to form an open-center head. Neither the upper nor lower scaffold branches should be allowed to dominate the other. Care must be taken to prevent the development of a two-story tree consisting of both a lower and upper set of branches with an open space between.

In the second and third years particularly it is important that a tree be produced with wide angle branches arranged about 6 or 8 inches apart up and down and around the trunk. In the first growing season it may be best to leave all the scaffold branches so that a choice of branches with wide angles may be made the second year.

Pruning Bearing Peach Trees

The peach tree bears fruit on 1-year-old wood which tends to grow farther out on the ends of the branches each year. The first problem, therefore, confronting the grower in pruning bearing trees is the fact that fairly heavy pruning at least once in 2 or 3 years is required to keep the trees in bounds and prevent the breakage of branches. It is also equally important to know that there is no other method of stimulating the production of this 1-year-old fruiting wood back toward the center of the tree except by heading back the branches.

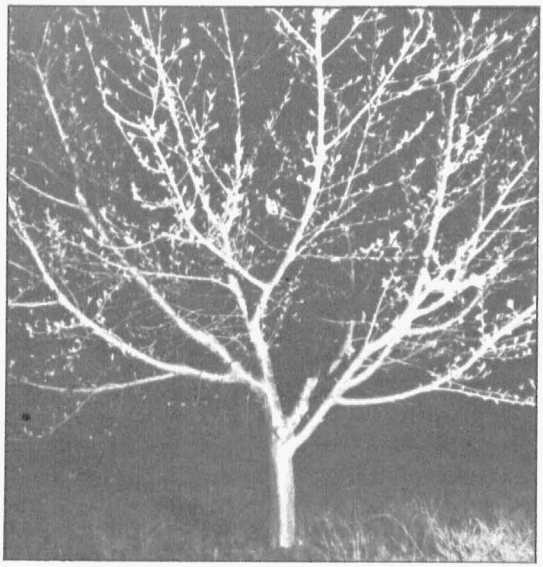
Very little pruning of this kind will be needed on vigorous 5 to 7 year old trees. With older trees, however, that begin to slow down in growth to less than 12 inches annually, heading back may be needed. The cuts should, if possible, be made to side branches in two and three year old wood. Shortening back one year old wood only is not likely to stimulate the renewal of fruiting wood far enough back toward the center. Such cutting may also tend to produce a thick growth of shoots that may interfere with fruit coloring. Judgment and discretion are required in cutting and training to control the spread and height of the branches.

Trees four or more years old are generally considered in full bearing. The amount and kind of pruning will depend a great deal on the prevalence of fruit buds at blooming time. Since the early crops are borne on the small twiggy growth on the scaffold branches near the center, this growth should not be removed.

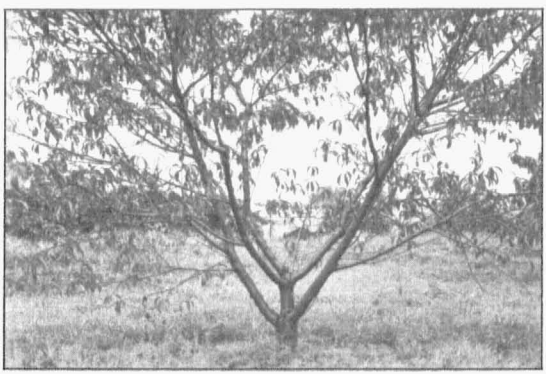
There is always danger of injury to the fruit buds by both winter cold and late spring freezes and frosts. The bulk of the pruning in many commercial and home peach orchards is, therefore, delayed until the blooming period when the crop is generally safe from winter cold.

The amount of pruning, both heading and thinning, but more particularly the severity of the heading, may then be regulated by the abundance of the bloom and the indications of a crop. In case a heavy crop is expected, the tree may be headed back more severely,

and perhaps one-fourth to one-third of the previous year's growth removed with a large number of fruit buds on the shoots. This procedure lightens the subsequent work of crop thinning. The smaller the prospective crop, the less severe the heading should be to insure a full crop.



A typical four-year-old Elberta peach tree trained and pruned to the Modified Leader Method. Note the strong, wide angle crotches of the scaffold branches with the main trunk and the well balanced symmetrical top.



An open center type of pruning where the lower scaffold branches have been allowed to grow faster than the upper ones. Heavier pruning of the lower scaffolds may prevent them from crowding and shading out the upper scaffolds.

In large commercial orchards it may be impractical to leave all the pruning until the trees blossom. Growers who are unable, for practical reasons, to avail themselves of the advantages of delayed spring pruning should know that the hardier buds usually occur near the center and toward the base of the previous year's growth. With a moderate heading back of the fruiting whips by a removal of ¼ to 1/3 of the length growth, the prospects of a crop are not likely to be decreased to any great extent, even when a considerable percentage of the fruit buds have been winter-killed.

This does not apply to thinning, however, for even a small amount of thinning done during the winter may make serious inroads on the crop in a season following excessive winter injury. It is therefore wise to confine the winter pruning for the most part to heading and leave the thining until blooming time or soon after. The work of thinning the trees can then be partly combined with thinning the crop. It is possible then to correct the tendency of trees to grow away from the direction of prevailing winds. This is accomplished by cutting back the longest branches on the leeward sides of the trees to good primary laterals. The trees should be kept symmetrical, and their centers made fairly open.

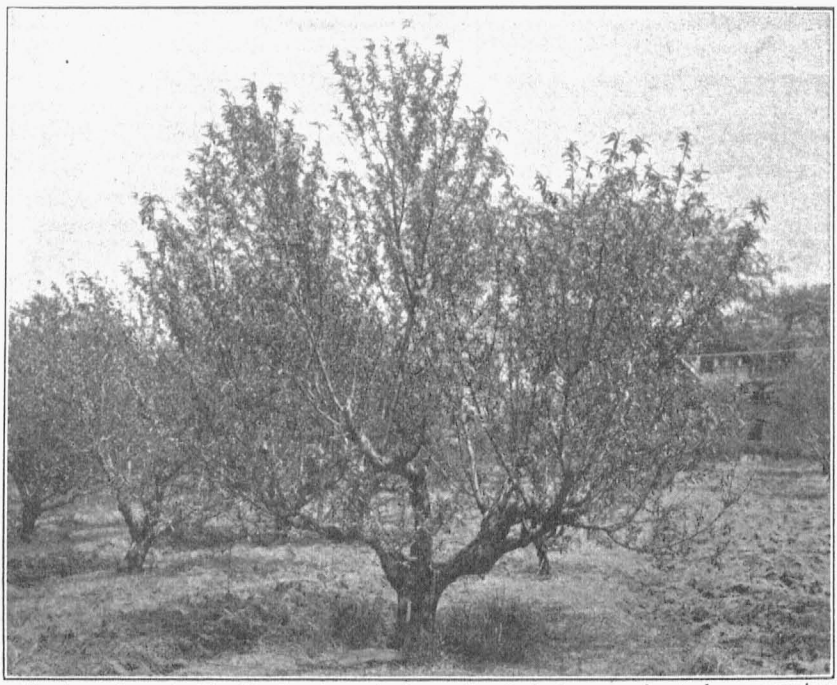
Pruning After Winter Injury

If the entire crop is destroyed by winter cold or spring frosts, the orchardist may take advantage of the situation and head the trees fairly severely, cutting back into as much as 2-3-year-old wood. This may be needed as the peach tree bears fruit on 1-year-old wood which tends to grow farther out on the ends of the branches each year. The exact amount of pruning may be greater or less, depending on the shape and condition of the tree and the amount of injury to the wood, if any. If a similar treatment was required the previous year, the heading need not be quite so severe now, though much of the past season's growth may be removed.

Every cut should be made to a fairly good side branch if possible. This will facilitate wound healing. Large pruning wounds do not heal rapidly and may provide entrances for wood-destroying diseases and insects. It is generally best to prune with moderate severity each year if enough live buds can be left for a satisfactory crop. In so doing, the purpose is to keep the tree spread and height from becoming too great.

Where crops have been borne for a number of years, the destruction of all fruit buds by low winter temperatures or spring frosts affords an opportunity to lower the top and correct the shape of the tree. Under such circumstances it may be advisable to cut back into 2- and 3-year-old wood. When trees are so pruned, the new growth is usually very rank and should be thinned out early in the summer to aid the formation of fruit buds for the following year. It should be thoroughly understood, however, that cutting back into

Old peach trees cut back to 3 and 4-year-old wood after their fruit buds were killed by late spring freezes. The cutting should have been less severe and confined to 1, 2 and 3 year old wood with as many cuts as possible made to healthy side branches.



The trees shown in Fig. 10 after two years' growth. In both years, due to heavy pruning, the new growth was a little too vigorous for good fruit production.

wood three or more years old lessens the likelihood of fruit bud formation and reduces the crop prospects for the following year, even though weather conditions may be favorable. Such heavy pruning is rarely necessary except where the wood has been injured seriously or killed by cold.

More moderate cutting back helps maintaining regular fruiting. Heavy pruning must be avoided in the off-year of vigorous young trees. Moreover, heavy general heading back of all main branches on young growthy trees may cause an abundance of unfruitful shoot growth This in turn shades the fruit buds in the interior of the tree and may delay early production and reduce yields.

Treatments After Serious Cold Injury.—From the experience in November, 1940, and similar damage resulting from cold in other years, it is believed that peach growers will profit usually by postponing severe treatments until after the growth and fruiting results of the following season have been obtained. It is common knowledge that severely injured peach trees are often pruned too heavily. This is true because the trees need generally as much leaf surface as possible in overcoming damage through growth and development. Moreover, there is plenty of evidence indicating that injured trees recover better if left practically unpruned.

Getting Rid of Pruning Brush

The removal of the pruning brush from the orchard generally constitutes quite a problem for the average grower unless he is properly prepared for the job. Many different kinds of home-made brush burners, carriers and pushers have been developed from time to time by producers as the needs arose. Manufacturers are also handling an implement known as the brush rake.

An implement similar to the old buck rake may be placed in front of a tractor and the brush pushed to the place of burning. Brush burners may also be constructed from old oil barrels split open, spread out, bolted together and placed properly on iron skids or wooden skids protected against injury by fire.

The Michigan Agricultural Experiment Station reports that a wooden rake, six feet long, two feet wide with 5 to 8 tapered teeth made of hard wood, and with wire braces extending from the handle to cross-bar makes a very serviceable tool for dragging the brush to the center of the row in preparation for the brush pusher.

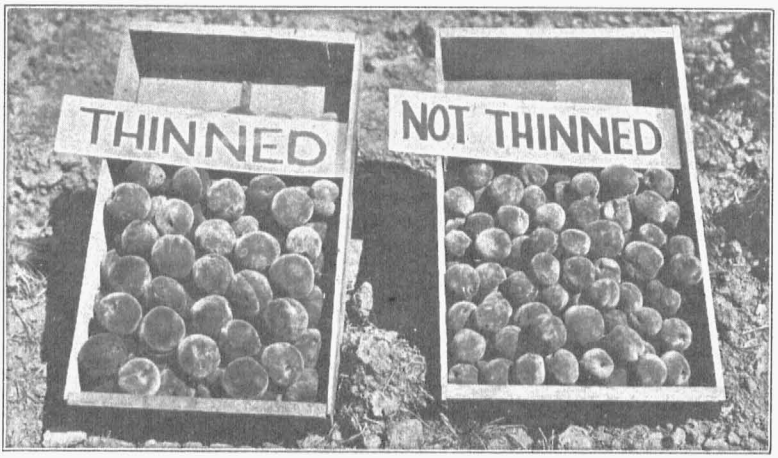
CAUTION.—Where the orchard has been mulched with straw or other litter, the brush burner should not be used in dry weather on account of the risk of starting dangerous fires. Where the trees are close together and rather strong winds blowing, there is danger of fire damage to the trees.

Moreover, in burning the brush in or near the orchard, there is always danger from the spread of fire. Trees and branches subjected to a comparatively small amount of heat may be seriously injured.

With the idea of a brush burner or pusher in mind, nearly any producer who is mechanically minded may construct a very useful implement for brush removal. Since every orchard is an individual problem, an outfit suitable for one may be entirely out of place in another. It is possible, however, to make adjustments and adaptations that will cause an implement to become satisfactory for the needs at hand.

Thinning the Fruit

When heavy crops are produced, proper fruit thinning in June should be practiced. Cold injury may reduce the set of fruit buds to such an extent that fruit thinning is unnecessary. But when trees are heavily loaded, thinning the fruits until they are about 4 to 6 inches apart leads to greater uniformity in fruit size and usually enables the grower to market the product more readily and at higher prices. Fruit thinning may also favor tree hardiness under good nutritional conditions.



Comparison of peach yields from thinned and unthinned trees.

Thinning is done by hand when the peaches are about the size of the end of the thumb or after the regular late May or early June drop. The cost of the practice will vary in different localities but should average about 15 cents per tree. A profit is generally shown from hand thinning by the difference in quality, uniformity in size and the price received for high grade fruit.

Thinning when properly practiced does not reduce the number of bushels or pounds of fruit which the tree would ultimately bear if unthinned. The fruits left grow larger in size and make up for the difference in numbers. Vigorous, strong trees are better able to produce a large crop of than those lacking in vigor; consequently

the fruits need not be thinned to as great a distance apart on vigorous trees as on weak ones. A spacing of four inches between fruits may be satisfactory for a small fruiting variety, while five or six inches is none too great for larger fruiting sorts, such as Elberta. It is obvious that all deformed and injured peaches should be removed. Varieties susceptible to the attack of brown rot may be benefited greatly by thinning. For best results the work should be done soon after the natural or so-called June drop, yet thinning may be continued profitably to within a month or six weeks of harvest time.

Use of Honeybees for Pollination

In general, we cannot depend upon the wind as a satisfactory agent for cross-pollination at blooming time. Jarring or shaking the limbs may aid in distributing the pollen from the anthers to the pistils of the same flower and thus facilitate a set of fruit on self-fruitful varieties. This alone, however, cannot be relied upon in securing a set of fruit year after year even for self-fruitful varieties.

A great deal of convincing evidence has been accumulated to show that honeybees are of great value for the pollination of peaches, apples, pears, sour cherries and other fruits. If the orchardist does not keep bees and there are none in the neighborhood, then there is plenty of reasons for securing enough bees to do the pollination work at the blooming period.

For young orchards just coming into bearing, one good colony for every 3 to 5 acres should be sufficient. In old orchards where there is a much greater spread and height of trees giving an extensive and large blooming area, one good hive of bees per acre may be needed.

Insects

(See also Spraying Program)

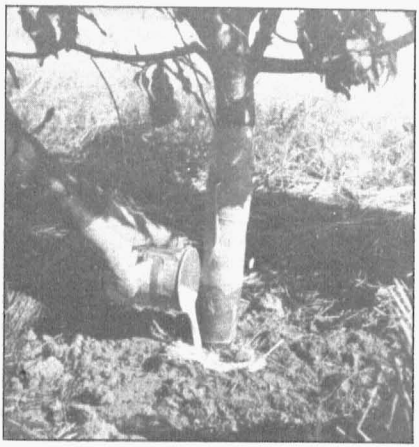
Plum Curculio.—This is perhaps the most serious pest of the stone fruits; in fact, it is even more serious upon these than it is upon the apple, pear and quince. It is chiefly responsible for the worms in peaches, cherries, and plums, and its feeding punctures may prove a means of entrance for the brown rot fungus. Since this fungus causes the fruit to rot very quickly, unsprayed or improperly sprayed fruit may rot upon the trees or in transit to market as a result of its attack. For this reason, it is important that special attention be directed toward the control of the curculio.

Peach Tree Borer.—The peach tree borer is the most important insect affecting peach trees in Missouri. Even with the widespread publicity given control measures through the use of ethylene dichloride emulsion and paradichlorobenzene (P.D.B.), the peach borer causes the death of huge numbers of peach trees every year. Moreover, it is indirectly responsible for the death of additional great numbers of trees by weakening them to such an extent that

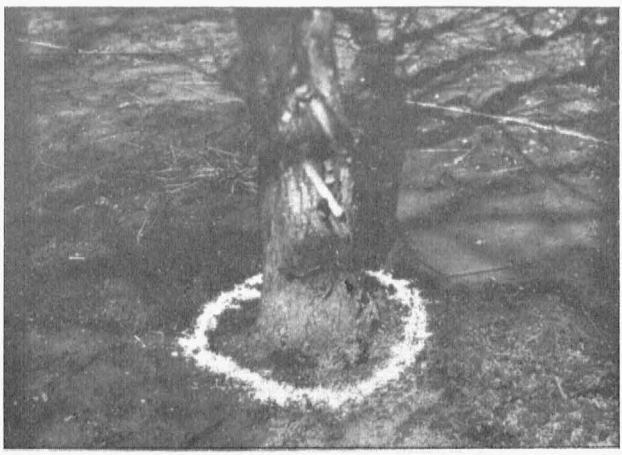
they become easy prey for other insects. Trees so devitalized and weakened are also subject to great losses from drought conditions.

The old treatment of digging the borers out of the base of the tree trunks through the use of a sharp knife and a moderately stiff wire is still satisfactory especially for small numbers of trees under three years old.

For trees four years old or over, both ethylene dichloride emulsion and P. D. B. are now considered generally to be efficient and practical for treatment. The emulsion kills peach tree borers at lower temperatures than paradichlorobenzene (P.D.B.). To avoid possible injury to the trees, both chemicals should be used carefully. Spray chemical companies sell the products and complete directions on dilutions suitable for trees of various ages are included. It is important that these directions be followed carefully for good results and to prevent injury to the trees. Both spring and fall treatments may be given if ethylene dichloride emulsion is used. Fall treatments, however, may be sufficient. There has been some information collected recently that shows the emulsion to be more dangerous to peach trees when applied late in the fall and when the soil is wet. Also, pouring it on the soil several inches away from the tree trunk is less injurious



Applying ethylene dichloride emulsion a few inches away from the trunk of a two-year-old peach tree.



Peach tree being treated with Paradichlorobenzene (P.D.B.) for borer control.

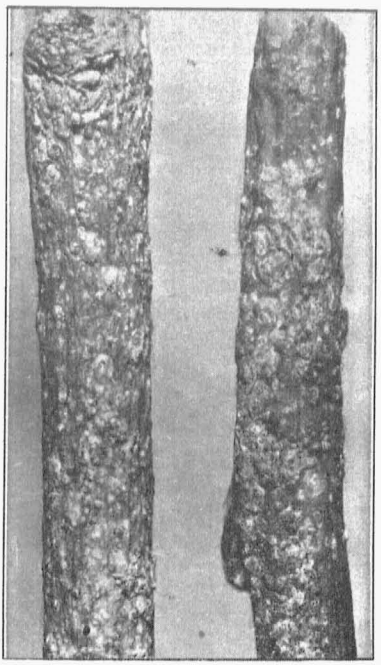
than when applied to the base of the trunk. Injury from both chemicals is more likely on trees from 1 to 3 years old.

Paradichlorobenzene has during recent years given excellent control when placed in a ring about the base of the trees and covered with soil from about September 25 to October 15. For average four to five-year-old trees, from one-half to three-fourths of an ounce of the white crystals is satisfactory and from one to two ounces are used for older and larger trees. Two ounces, if properly used, should be effective for large old trees.

In applying P.D.B., the grass, rocks and litter should be removed from the tree base. The crystals are then placed on the ground in a closed ring around the trunk and covered with two to three inches of friable, mellow earth. This is then firmly pressed down with the foot or back of a hoe or shovel. With trees under four years of age, it should be remembered that the mounds and crystals should be removed in 10 to 14 days after treatment while in the case of older trees mound and crystal removal following treatment is not required until the following spring. They should be removed at that time so the next generation of borers will not infest the trunk at a higher level making it more difficult to apply treatment the following year.

San Jose Scale.—San Jose scale is generally ranked as one of the most dangerous and serious pests of the peach. Several factors combine to make it the most difficult scale insect to control. For example, it is so inconspicuous or difficult to identify on the trees that it is often overlooked and the trees may be killed before the owner or producer is aware of what is wrong.

While the attack varies with the different varieties of the same fruit, yet practically all of our fruit crops may at times be seriously injured. The rapid multiplication and inconspicuous spread of this pest soon enable it to infest fruit plants badly. Unless sprays are applied thoroughly they may be of little or no value. It is also of equal importance that the right dilution of the spray be made; otherwise ineffective results will follow. Dormant sprays are required because such caustic application, if made when the trees are in leaf and fruit, might do great injury.

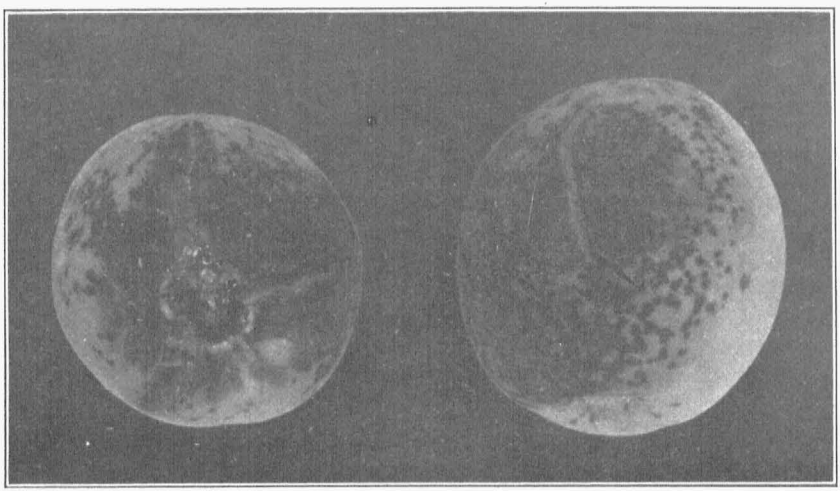


Young peach twigs showing a serious infestation of San Jose scale.

Diseases

(See also Spraying Program)

Peach Scab.—Peach scab is known also as freckles and black spot. The infected area of scab is black and a considerable portion of the surface may be injured, in which case the fruit often cracks and becomes misshapen. This disease may be controlled readily by spring applications of any of the standard peach fungicidal sprays.



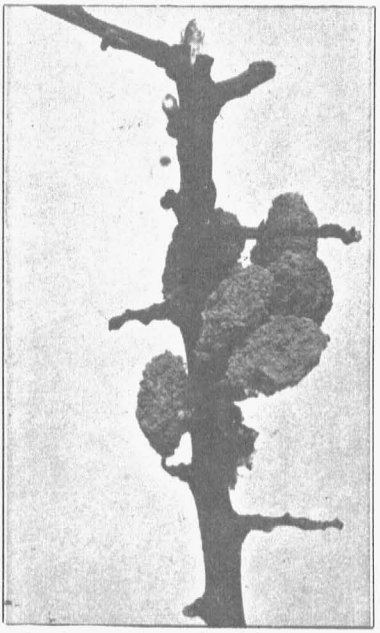
Injury of "freckles" or peach scab to peach fruit.

Bacterial Shothole.—This disease is also known as black spot and, as the name indicates, is caused by bacteria. It occurs on the peach, apricot, cherry, nectarine and plum, though the peach and plum usually suffer most. It is known in all the peach, cherry, and plum growing regions of the United States. The greatest damage is most frequently done in warm, humid regions and where the trees are weak and suffer from neglect or a lack of cultivation, fertilization, proper pruning, and spraying. The injury to the fruit may be serious and as a result much may fall before ripening.

The leaves also become badly infected. Small circular spots of a dark color appear on their surface and a little later the infected area may break away from the surrounding tissue and leave a small hole, thus giving the shothole appearance. The twigs too are injured, dark-colored spots developing on the youngest growth, and when the disease is serious, the entire twig tip may be blackened and finally killed.

Vigorous, productive trees appear to be more resistant to the disease than weak and devitalized ones. Thus any treatments such as cultivation, fertilization, pruning, and spraying which tend to build up or increase tree vigor generally aid in control.

Brown Rot.—Brown rot is generally most destructive to stone fruits in warm climates and it has caused enormous losses, especially of peaches during seasons favorable to the fungus. Its attack on the fruit begins shortly before the ripening period when it may bring about the complete destruction of the crop before the producer can harvest and market it. Brown rot also develops on the limbs and twigs, causing a leaf and twig blight. The latter is followed by the formation of cankers. The blossoms may be injured too, as in the case of blight on pears and apples, but the chief loss is confined to the rotting of the fruit.



Peach mummies produced by brown rot still adhering to the peach twig. These should be removed and plowed under deeply or burned.

In the control of brown rot, orchard sanitation should be emphasized. All dried fruit or mummies which are left hanging on the trees after harvest and during the winter should be removed and burned or plowed under. A dormant spray consisting of lime sulphur may also help. Following the dormant spray, however, spring and summer applications of standard peach sprays should be made. Special attention should be given to the control of curculio, since the majority of brown rot infections may follow attacks by this pest.

Peach Leaf Curl.—In unsprayed or poorly sprayed orchards, peach leaf curl may be one of the most destructive diseases. Losses are due mainly to defoliation of trees. In severe cases the trees may be so completely stripped of leaves that the fruit will not ripen properly and new shoots and leaves may start into growth. This is a drain on the trees and as a result they may be greatly weakened. Thus injured during two or three seasons, trees may become much less fruitful and less resistant to the attacks of borers, San Jose scale and other pests.

The fungus attacks the twigs, leaves and blossoms of the current season's growth. The infected leaves become puffed and folded and the edges may curl inward, causing the surface of the leaf to become wrinkled. A purplish tint, very characteristic of the malady, may also develop. The foliage finally turns yellow or brown and falls off. The fungus rarely extends into the previous year's growth. Sprays applied after growth starts in the spring do not control peach leaf

curl. It is therefore essential that they be applied sometime during the dormant season and before growth starts.

Peach foliage showing injury by the fungous disease known as peach leaf curl.

Protection Against Rabbits

In general, rabbits are not as likely to girdle the trunks of peach trees in the late fall and winter as they are apple, pear and plum trees. In cold weather, however, with snow on the ground and the rabbits hungry, one and two year old peach trees particularly may be seriously injured if not protected.

Repellent washes and sprays applied to the trunks of the trees are not effective when rabbits are numerous and hungry. Wraps consisting of old newspapers, other types of paper, gunny sacks torn in strips 6 to 8 inches wide, screen wire, hardware cloth, wood-veneer wrappers and other materials may be used as tree trunk wraps.

The wraps will do no material harm for the first two years if left on the trees during the spring and summer, providing the ties around the trunks are not tight enough to cause girdling. It is important, therefore, that the wraps be given timely and needed attention.

Spraying Program for Peaches

Thoroughness in application is one of the most important essentials in spraying. The right materials must be applied at the right time and in the right way, otherwise poor results or injury may follow.

Moreover, if the spray does not entirely cover all parts of the tree, foliage and fruit needing protection, is likely to be attacked.

Dormant Spray.—This spray is applied chiefly for the control of scale insects and peach leaf curl.

Use lime-sulfur solution, 12½ gals. in 100 gals. of spray or dormant oil according to directions on container with Bordeaux 6-6-100. For good control of peach leaf curl, it is essential that the spray be applied *before the buds swell.*

Lime-sulfur is less effective against the lecanium or terrapin scales and mites, than are the oil sprays.

For curl alone (in orchards where scale is not present), use Bordeaux 6-6-100 or lime-sulfur, 7 gals. in 100 gals.

Petal Fall Spray.—(For extreme south and southeast Missouri where curculio injury has been serious. Not needed usually in other sections). This spray is made immediately after the petals drop and before the shucks slip from the tiny young fruits. It is directed mainly toward the control of the plum curculio and may be one of the most important applications for this purpose. It is believed to be particularly essential in south and southeast Missouri where the peach trees may be in full leaf before the shucks fall from the young fruits. In central and northern sections of the state, this spray may not be needed and the grower may begin with the First Summer Spray.

Use 2 lbs. lead arsenate in 100 gals. with a zinc-lime mixture made of 2 lbs. zinc sulphate and 3 lbs. of hydrated lime. See method of mixing and cautions.

First Summer Spray.—This spray is used mainly for the control of the plum curculio. Apply 10 to 14 days after the blooming period when the shucks are half to two-thirds off the young fruit.

Use 2 to 3 lbs. lead arsenate to 100 gals. of water with a zinc-lime mixture made of 2 lbs. of zinc sulfate and 3 lbs. of hydrated lime. (The zinc sulfate-hydrated lime mixture is used to reduce arsenic injury to foliage and fruit).

Should a zinc-lime mixture not be used, 8 to 10 lbs. of high grade fresh hydrated lime should be added to each 100 gals. of spray containing 2 lbs. of lead arsenate.

Where curculio is serious, it may be advisable to repeat the First Summer Spray in 3 or 4 days or as soon as the first application has been completed.

Second Summer Spray.—For curculio and peach scab. Apply in about 10 days after the first summer spray. Use the spray chemicals in the same proportion as recommended for the First Summer Spray. However, where trouble has been experienced with peach scab or brown rot, or when susceptible varieties are being grown, add wettable sulfur at the rate of about 6 lbs. in 100 gals. or at recommendation of manufacturer.

Third Summer Spray.—For this spray, use the same material in the same proportions as for the second summer spray and apply 2 or 3 weeks later. For early peaches this application will usually be sufficient.

Fourth Summer Spray.—Midseason and late varieties some seasons may require this application against brown rot. If needed apply about one month ahead of harvest. With rainy weather and brown rot threatening, use about 6 lbs. of wettable sulfur for each 100 gals. of spray, or at recommendation of manufacturer. Ordinarily, lead arsenate is neither required nor advisable, but if curculio is abundant, one may add 1 or 2 lbs. of lead arsenate to 100 gals. of spray with a 2-3-100 zinc-lime mixture to reduce arsenical injury.

Later Sprays.—Spraying should be discontinued about a month before picking time except where brown rot and Oriental fruit moth are serious. With brown rot serious, sprays may be required to within a few days of harvest. When this is true, applications of wettable sulfur, 6 lbs. in 100 gals. are suggested, at intervals of about 10 days, if necessary, to within 3 or 4 days before picking. *Do not use lead arsenate or zinc sulfate and lime in these near harvest sprays, because they mar the appearance of the ripe fruit.*

Oriental Fruit Moth.—This pest bores into and kills much of the tip growth during the early part of the season and later attacks the fruit. As the wood growth begins to harden, the attack of the pest is centered more and more upon the fruit. Early summer sprays have no appreciable effect on the early broods of worms working in the tip growth. However, DDT sprays, 2 pounds to 100 gallons, applied just prior to ripening may greatly reduce damage to fruit. There is danger, however, of destroying parasites harmful to the moth. Also, the use of DDT about three weeks before harvest brings to the fore the spray residue problem. Four applications of a sulfur-oil dust made at intervals of about one week have given fair control. Varieties which ripen later than Elberta have been much more difficult to protect than earlier ripening varieties.

Spraying and dusting practices as suggested above may increase materially the amount of clean fruit at harvest time. However, on account of the additional expense involved, as well as the comparatively low per cent of control in orchards when the moth and worm population is large, spraying and dusting have not been found very satisfactory.

An encouraging means of control appears to be through use of parasites. Thirteen species of larval parasites of the Oriental fruit moth have been recorded in Missouri. Mass liberation experiments in recents years in several peach growing states, if made when the first and second brood of the peach moth larvae are feeding in the peach twigs, indicate that marked reduction in fruit infestation may be expected. Experiments have not been extensive enough as yet

to warrant definite statements as to the number of parasites necessary to give control.

Moreover, parasites under favorable conditions may give a high percentage of control, while under unfavorable conditions, the control may be very poor.

Making Zinc-Lime Mixture

The spray tank (for 200 gal.) is partly filled with water and powdered zinc sulfate 2 lbs. is added. (If a granular form is used which does not dissolve quickly, it should first be dissolved in a bucket of water or a stock mixture made ahead of time). With the tank nearly filled with water, add the hydrated lime 3 lbs., which has previously been made into a thin paste in a separate container. Then add the lead arsenate, 2 to 3 lbs. which has also been made into a thin paste. Wettable sulphur 12 lbs. or some other peach fungicide may also be added if needed. Finish the filling of the tank, allow agitation for a few minutes and spraying may begin.

Dusting.—When properly timed, dusting has given good control of brown rot. An 80-10-10 sulphur-lime-lead dust, or in the absence of fungus, 90-10 lime-lead arsenate dust may be important for early applications against curculio. In late dusting for brown rot control, a 90-10 sulphur-lime mixture is suggested.

Harvesting and Marketing

The successful marketing of peaches is determined to a considerable extent by the care used in harvesting, handling, grading and packing. The time of picking or stage of fruit maturity will depend a great deal upon the method of selling. For the best size, color and quality the fruits should be left on the trees as long as possible.

If the fruit is sold largely through local roadside markets, it may be held on the trees until it begins to soften. For long distance shipments by train or truck, it should be picked when hard ripe. This stage develops when the flesh loses its hard character and becomes springy to the touch. One familiar with varieties can usually tell when the fruit is ready to pick merely by looking at it.

*The Illinois Agricultural Experiment Station has reported significant information on the influence of time of harvesting Elberta peaches on total yield, size of fruit and keeping quality. Harvesting began on August 15 and their statement follows: "If 100 bushels were harvested on August 15, 107.9 bushels could have been harvested on August 17, 116.5 bushels on August 20, and 124.4 bushels on August 22."

"On August 15 but 47.8 per cent of the fruits were 2¼ inches and above, 70.9 per cent were in this grade on August 17, 84.9 per cent on August 20, and 93.7 per cent on August 22."

"These storage studies point clearly to the fact that fruit harvested as much as seven days later than is normally done in Illinois,

*McMunn, R. L. and Dorsey, M. J.—"Investigation on Delayed Harvesting of Elberta Peaches,"—Trans. Ill. State Hort. Soc., Vol. 68, pages 491-502, 1934.

will hold up in transit, and for at least two weeks in storage with no more loss than is encountered in harvesting at a more immature stage, and at the end of the storage period the fruit of the late picking will be of more attractive color and of better quality."

Perhaps no better evidence can be cited of the tremendous losses incurred by growers in picking too early. In so doing, not only the grade and quality is lowered materially, but substantial losses occur in yield. The time of harvesting alone, therefore, is important enough to "make" or "break" a producer in a few years.

The length of the picking season depends very largely on the prevailing weather conditions. Hot weather causes the fruit to develop rapidly and brings harvesting on without delay, while cool weather slows up the ripening processes and retards picking operations.

Several pickings from each tree may be needed. The number required to obtain the fruit in the best condition will depend on the season and the varieties. It will usually be necessary for good color, size and quality to make three pickings. Some successful producers pick as many as five or six times for good results.

Careful grading is of paramount importance for the best prices and if the fruit is run over a grader or sizing machine, it must be at the hard ripe stage or much injury will be done. However, modern peach grading and defuzzing machinery will handle peaches to as ripe a stage as they can be safely ring-packed in standard baskets. Most grading is done by hand on sorting tables in a shed or packing house. To build up a profitable trade, a uniformly high quality pack is very necessary.

Since peaches soften and go down rapidly at moderate temperatures, they should be put in a cool cellar or cold storage as soon as possible after picking. This precaution is particularly important if the fruit is to be sent to distant markets.

Successful marketing is largely dependent upon high quality and an attractive uniform pack. Yellow-fleshed varieties usually sell better than white-fleshed kinds. Good size for the variety is also desirable

A new practice now in use in most packing plants consists of defuzzing the peaches at the time of grading and before they are packed. Machines are available which brush the fuzz from the fruits. Markets may pay a premium for peaches from which the fuzz has been removed.

Defuzzed peaches are more susceptible to brown rot than those which have not been treated, due to the removal of the sulphur residue. Some machines have been equipped with parts for dusting the peaches at the close of the cleaning process. When dusting is not available after defuzzing, growers will find that an application of sulphur dust in the orchard about a week before packing will help materially to keep down an attack of brown rot.