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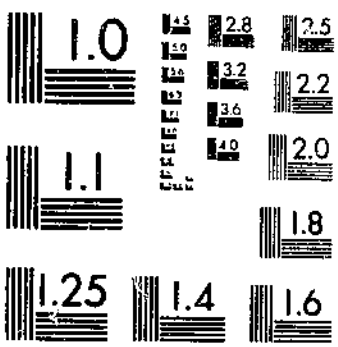
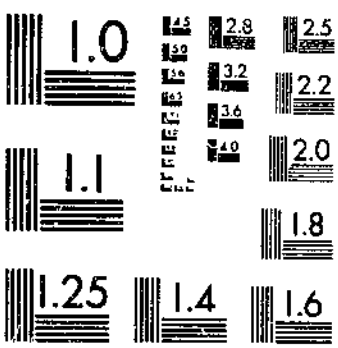


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



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LABOR USED for FRUITS and TREE NUTS

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Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

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LABOR USED FOR FRUITS AND TREE NUTS

By Earle E. Gavett, agricultural economist, Farm Economics Research Division, Agricultural Research Service

INTRODUCTION

In 1954, growers of fruits and tree nuts in the United States produced 16,943,000 tons of fresh fruits and nuts.[1] To produce crops that depend on proper timing as greatly as fruits requires an ample supply of labor throughout periods of seasonal activity. Fruit trees must be sprayed at the proper time, or insects and diseases may ruin the crop. A heavy set must be thinned and branches propped before limbs are broken and trees damaged. Fruit must be harvested at the proper time or excessive drop will occur, quality will deteriorate rapidly, and growers' incomes will suffer. Timeliness in the harvesting of nuts is also necessary to maintain high quality of the product.

The need for labor should be anticipated so that an adequate labor force may be ready when it is needed. Data in this publication should be useful to orchardists, extension workers, and others who help farmers plan the organization of their farm business. It should also help seasonal labor-placement supervisors in deciding how many workers to recruit and what transportation and housing will be needed. The data should also be useful in future farm-adjustment studies in indicating the levels of labor needed.

This publication contains tables showing State average man-hours used per acre in 1954 for each fruit and tree nut for which production is estimated annually by the Agricultural Estimates Division of the Agricultural Marketing Service. For most crops, estimates are given for both bearing and nonbearing acreages.[2]

The labor requirements shown in the tables are State averages. In individual orchards or group of orchards, the number of man-hours used per acre may be considerably above or below average because of conditions on these farms. These estimates are not a result of any special survey; they were developed from available data collected by State and Federal agencies.

In some instances, estimates were made by modifying data from nearby States having similar topographical, cultural, and climatic conditions. For this reason, caution should be exercised in using these estimates for minor producing States. Caution should also be exercised in using yield-per-acre figures, which are for the 1954 crop. They are not "typical" or "normal" yields; they are estimates of actual production per acre in 1954. Such unusual weather as hurricanes in the East and drought and killing frosts in the Southern Plains affected yields materially in some States.

Estimates of number of man-hours per acre include only man-hours needed for direct work, such as planting, spraying, fertilizing, pruning, picking, farm grading, packing, and marketing. They do not include the time needed for indirect labor or overhead work, such as service and maintenance of buildings, equipment, fences, or land improvements.

Terminology

Bearing Acreage.--Acreage of trees that have reached bearing age.

Trees or Vines per Acre.--The average number of bearing trees or vines per acre, excluding replacements not yet in production that may have been set in bearing orchards. These estimates were also used in developing estimates of bearing acreage and yield per acre.

Preharvest Labor.--The labor used per acre for all work prior to harvest. It includes such jobs as land preparation and seeding cover crops, pruning, brush disposal, fertilizing, spraying, irrigating, mowing, thinning, propping, and protection from frost. Preharvest labor does not include the time used to plant or maintain interplanted crops. These labor requirements assume that the fruit or nut trees are the only occupants of orchard land.

Harvest Labor.--The handling of the crop from picking to primary market.

Picking, Loading, and Hauling.--The labor used in picking, loading, and hauling

[1] U. S. Agricultural Marketing Service, Fruits, Noncitrus, by States, 1949-55, Revised estimates, United States, 1934-55. U. S. Dept. Agr. Statis. Bul. 192, 88 pp., 1956; Tree Nuts, by States, 1949-55, Revised estimates. U. S. Dept. Agr. Statis. Bul. 195, 14 pp., 1956; Citrus Fruits, by States, 1949-50-1955-56, Revised estimates. U. S. Dept. Agr. Statis. Bul. 201, 12 pp., 1957.

[2] For comparable estimates for 1939, see Labor Requirements for Crops and Livestock, by M. R. Cooper and others. U. S. Bur. Agr. Econ. F. M. 40. [Processed.]

fruits and nuts includes that of distributing boxes, picking, loading, hauling to either farm or community storage or to a processing plant, and supervision of crews.

Farm Grading, Packing, and Marketing.--The number of man-hours used in farm grading, packing, and marketing includes the time spent in grading, prepackaging or boxing the crop for market, hauling it to market, and disposing of off-grade products. These data include only estimates of labor performed by a farmer, or a crew under his supervision, on his own crop, in his own storage or packing shed. They do not include estimates of labor performed by workers in nonfarm packing sheds.

All Harvest Labor.--The average number of man-hours used in picking, loading, and hauling to storage or processor, and in farm grading, packing, and hauling to market the products from an acre of fruits or tree nuts weighted by the percentage of the acreage that is farm graded and packed.

Total Man-hours per acre.--The sum of preharvest and all harvest labor.

Percentage of Crop Farm Graded and Packed.--The part of the crop that is graded and packed on the farm by farm crews.

Yield per acre.--Data from the 1954 United States Census were used to estimate yields for all States except California. The yields for California are estimates published by the California Crop and Livestock Reporting Service. The Crop Reporting Board of the United States Department of Agriculture publishes State estimates of production, but not acreage, of the principal fruits and tree nuts. Therefore, official estimates of State average yields per acre are not available for States other than California. For procedure in using the census data, see footnote 2, table 1, page 19.

Nonbearing Acreage.--The acreage of trees that have not reached bearing age.

Trees or Vines per Acre.--The number of trees or vines originally planted when an orchard is established.

Man-hours to Establish Orchard.--The sum of the hours spent in land preparation, marking, planting, spraying, and performing other cultural practices during the year in which the orchard is planted.

Years to Maintain Orchard.--The average number of years after the planting year until the trees reach bearing age.

Man-hours to Maintain Orchard.--The average number of man-hours used per year to maintain an acre of nonbearing trees until they reach bearing age. This includes such cultural practices as cultivating, fertilizing, spraying, pruning, and shaping.

Total Man-hours to Bearing Age.--The number of man-hours required to establish an orchard plus the sum of the man-hours needed to maintain the trees until they reach bearing age.

Annual Average Number of Man-hours per Nonbearing Acre.--The average number of man-hours per acre required per year from time of planting to bearing age.

LABOR USED FOR EACH KIND OF FRUIT AND NUTS

In 1954, the weighted average amount of labor required per bearing acre of all fruits and tree nuts was 111 man-hours. Labor requirements for the three groups of crops--noncitrus fruits, citrus fruits, and tree nuts--differed widely from the average. The noncitrus group required the greatest amount of labor and tree nuts the smallest. Noncitrus fruits required 134 man-hours, or 20 percent more labor per acre than the average (fig. 1). Citrus fruits required 117 man-hours per acre, or slightly less than 5 percent above the average. Tree nuts, for which only 40 man-hours per acre were needed, required only 36 percent as much labor as all fruits and nuts.

Many things determine the amount of labor needed for the various crops. Some of the more important factors in determining preharvest labor needs are number of trees per acre, size and shape of tree, resistance to insects and diseases, growth habits, and adaptability to climate. Size of fruit, yield, resistance to bruising, and extent to which the crop is handled by the producer in preparing it for market also help to determine harvest labor requirements. Many of the crops in these three groups have one or more dissimilar factors, which cause their labor requirements to differ from others in the same group.

Noncitrus Fruits

Labor requirements for noncitrus fruits average 134 man-hours per bearing acre in 1954 but ranged from a low of 87 for avocados to a high of 306 for pineapples and pomegranates (fig. 2). Of the 18 crops reported in this group, 15 are tree fruits, 2 are vine fruits, and the other is the pineapple.

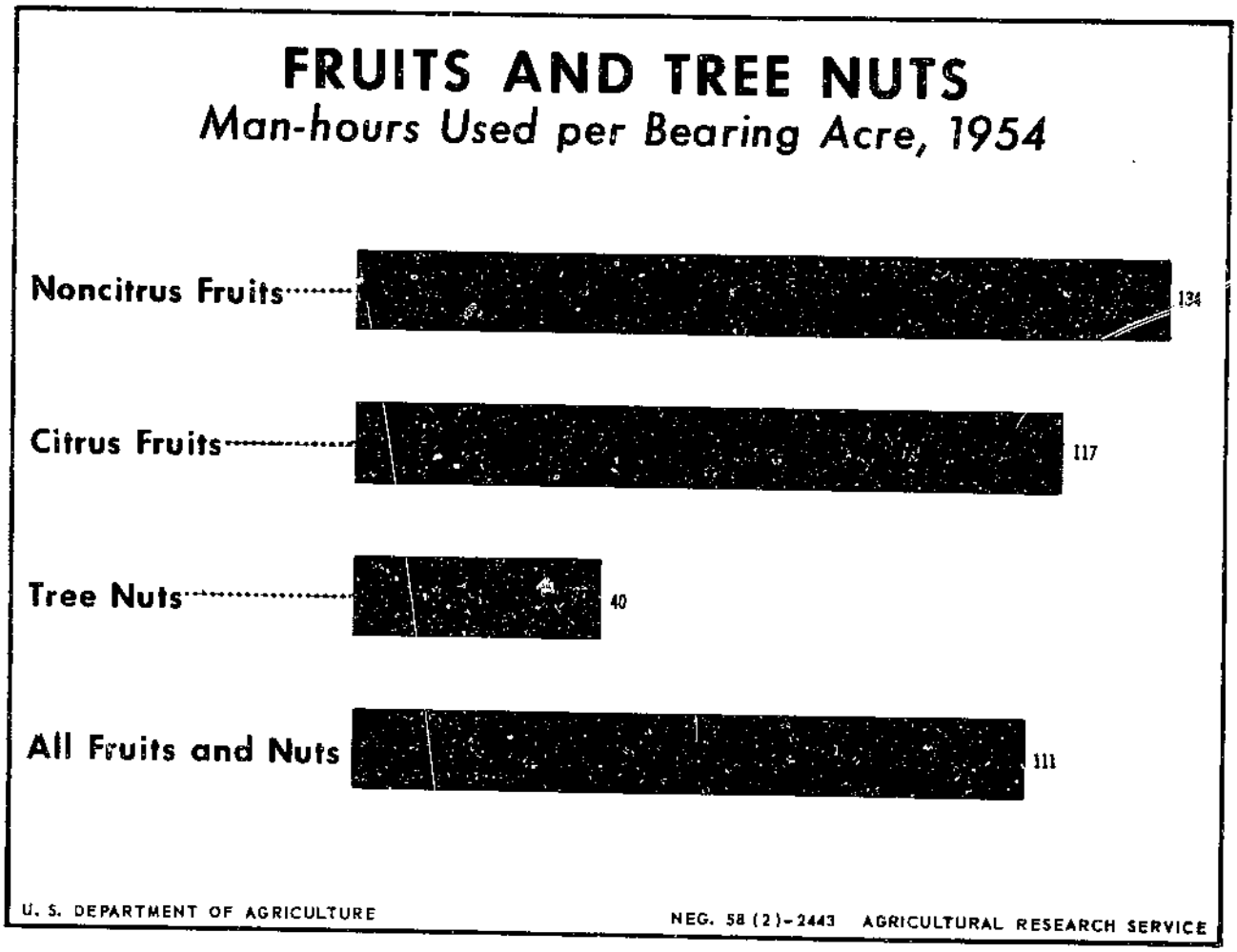

Figure 1

Great dissimilarities in growth habits are evident in this group, even between cranberries and grapes, the two vine fruits. Among the tree fruits, size of tree ranges from the low avocado and fig trees to the tall apple and pear trees and the stately date palms. The pineapple is unlike any other crop in the group.

Most of the noncitrus fruits are highly susceptible to insect pests and diseases. Apples, for example, require a dozen or more timely sprays to prevent insect infestations or diseases that could spell economic ruin for the grower.

Growth habits differ for each of the 18 noncitrus fruits and for the different varieties of each kind of fruit. Peach trees grow rapidly and must be pruned heavily each year. Apple trees grow more slowly and need less pruning to remain fruitful.

Many of the noncitrus crops bloom and set fruit so heavily that part of the fruit must be removed to prevent damage to the tree and to allow the remaining fruit to attain proper size. The thinning operation is performed in several ways. Some fruits may be thinned successfully with a chemical spray; others must be thinned or knocked off by hand. Hand thinning predominates; it accounts for a sizable part of the preharvest labor requirements.

Climate determines to a considerable extent the number of man-hours required per acre for noncitrus fruits. Many of these noncitrus fruits are grown in areas in which natural rainfall is insufficient and labor is required for irrigation. Although frost protection is less important for noncitrus than for citrus fruits, some form of frost protection is required for several of the noncitrus fruits. Cranberries must be flooded, and apricot growers burn smudge pots to prevent untimely frosts from killing buds and reducing yields.

The size of fruit has a direct bearing on harvest labor requirements--cranberries,

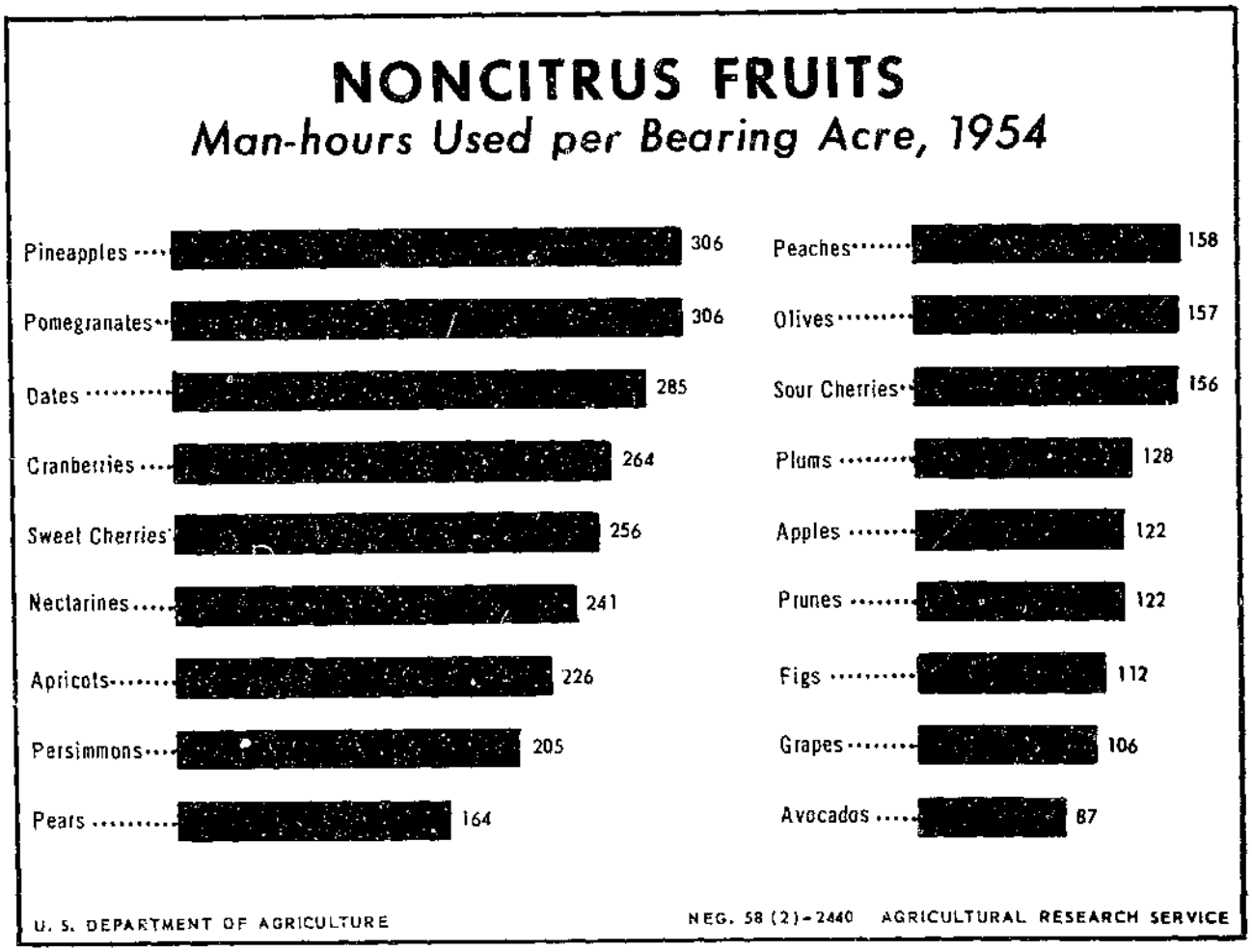

Figure 2

cherries, and dates require considerably more harvest labor per unit of production than do grapes, apples, peaches, and pears.

Another and probably the most important factor in harvest labor requirements is yield per acre. A low-yielding crop, such as avocados, requires far less labor than a high-yielding crop like pineapples.

Some crops are resistant to bruising. For instance, the soundness of the cranberry is determined by the height to which it will bounce. Such crops as cherries, peaches, and nectarines must be handled with great care to prevent bruising their tender flesh. Most noncitrus fruits bruise easily; they require considerably more care in handling than do citrus or nut crops.

Much of the noncitrus fruit produced is readied for the market by the growers. Some exceptions are sour cherries, juice grapes, and olives. In some areas, growers of apples, peaches, cranberries, and several other fruits have cooperative or consolidated storage-packing organziations that take field-run fruit from the farmer and prepare it for market. Much farm labor, however, is needed to prepare noncitrus fruits for market.

APPLES

Apples are the most widely grown fruit in the United States. They are produced in all of the 48 States and are grown commercially in 35 States. The number of man-hours of labor used in producing apples in 1954 averaged 122 per bearing acre and 37 per nonbearing acre (table 1). Of the time spent per acre of bearing orchards, preharvest work accounted for 58 hours. For most of the country, preharvest labor ranged from 35 to 60 man-hours, but in States in the Mountain and Pacific regions, it ranged from 100 to 170 man-hours per acre. The greater number of trees per acre in the West means more time required for pruning and spraying.

Most western orchards are on irrigated land. Considerably more labor is needed to supply water to them than in the East, where rainfall is usually abundant and irrigation is seldom practiced.

Estimated yields ranged from a low of 33 bushels per acre in Iowa to a high of 419 bushels in California. Yields in the irrigated regions of the West were nearly double those in the nonirrigated Eastern States. In the Western States, some progress has been made in mechanizing the handling of apples at harvesttime. The firmer varieties produced in that region enable growers to use larger boxes and to handle the apples with new, large machinery, which as yet is not well adapted to some of the softer fleshed varieties grown in the East.

The hilly topography of eastern orchards restricts the size and type of mechanical handling equipment that can be operated safely. Operators of western orchards that are located on level or gently rolling land for more efficient irrigation find much of the new equipment well adapted to their conditions and needs.

Labor requirements for nonbearing apple acreages in the irrigated regions of the Mountain and Pacific States are about double those of the rest of the country. Irrigation labor requirements and greater tree numbers per acre--about half again as many trees--account mainly for this increase in numbers of man-hours needed per acre. With adequate water assured, growers tend to plant trees closer together than do growers in unirrigated areas.

APRICOTS

Apricots are grown commercially in three Western States--Utah, Washington, and California. The bulk of the acreage is in California. Man-hours spent per bearing acre of apricots averaged 226 in 1954, of which 127, or 56 percent, were needed for preharvest work (table 2). Apricot culture is similar to the culture of peaches, except that thinning the fruit does not increase the size of the remaining fruit. Therefore, selective pruning of apricots is necessary to thin the fruit buds, the only practicable way of increasing the size of the fruit. Estimated yields ranged from 5,958 pounds per acre in Washington to 11,865 pounds in Utah; they averaged 6,835 pounds. Harvest labor requirements in Washington were low, as growers in that State did little or no farm grading and packing of the low-yielding 1954 crop.

The average annual labor requirements on nonbearing acreages of apricots were about the same for the three States. They averaged 57 man-hours per acre and ranged from 56 in Utah to 61 in Washington. The greatest difference was in the time spent in establishing an orchard. For this, 75 man-hours per acre were used in Utah and California, as compared with 85 in Washington.

AVOCADOS

Production of avocados is restricted to California and Florida, where the climate is favorable for this semitropical fruit.

In 1954, labor requirements per bearing acre were lower for avocados than for any other noncitrus crop. A total of 87 man-hours was used per acre; 45 of these were for preharvest labor (table 3). In Florida 35 man-hours were used for preharvest work, as compared with 49 in California. The difference was due primarily to irrigation labor in California. Preharvest culture of this crop varies with growers. Some clean cultivate; others maintain a year-round sod cover. Preharvest labor was approximately 10 man-hours less per year in groves on permanent sod than in those that were tilled.

As a result of smaller yields, harvest labor requirements were lower in California than in Florida. Differences in yield between the two States are largely a result of different varieties grown. The crop is picked by hand, with approximately 0.40 man-hour required to pick, load, and haul 100 pounds to storage. Between 40 and 50 percent of this crop is graded and packed on the farm.

Differences in labor used per nonbearing acre are attributed largely to two factors--trees per acre and irrigation. In Florida 70 trees were planted per acre, as compared with 96 in California. Yearly maintenance labor per acre averaged 45 man-hours in Florida and 60 in irrigated California groves. Pruning and shaping the trees required more labor than other jobs.

CHERRIES, SOUR

Sour cherries are grown commercially in 11 States in the northern part of the country. Control of insects and disease is so difficult in the warmer parts of the United States that commercial production has shifted to these northern States, where the cool climate reduces infestations of insects and incidence of disease and where extreme

changes in temperature are moderated by large bodies of water. In the East, sour cherries are produced near the shores of the Great Lakes. In the West, the fruit is grown primarily in areas swept by breezes moderated by the Pacific Ocean. Per acre yields ranged from 2,040 pounds in Ohio to 6,530 pounds in Utah, and averaged 3,271 pounds per acre for the 11 States. Labor requirements for bearing orchards ranged from 127 man-hours per acre in Ohio to 264 in Utah, and averaged 156 hours for the United States as a whole (table 4).

Preharvest labor needs usually ranged from 32 to 42 man-hours per acre in the East, while the labor required for irrigation and the greater numbers of trees per acre in the Mountain and Pacific regions increased the number of man-hours required to 49 and 64 per acre, respectively. Most harvest labor requirements are to pick the crop and haul it to a processing plant, as only 6 percent of the 1954 crop was graded and packed on the farm.

The nonbearing acreage of sour cherries had an average labor requirement of 39 man-hours per acre in 1954. In New York only 30 man-hours per acre were used, while in the irrigated orchards of Colorado, which had more trees per acre, 50 man-hours were used.

CHERRIES, SWEET

The culture of sweet cherries is about the same as that of sour cherries. Sweet cherries are grown commercially in most of the States in which sour cherries are grown. The climatic factors that are advantageous to sour cherries are equally advantageous to sweet cherries.

By regions, preharvest labor requirements per acre were slightly lower for sweet than for sour cherries, but the average for the 11 States is a third greater for sweet cherries because a higher proportion of the acreage is in the irrigated regions of the West (table 5). Size of tree accounts for the reduced preharvest work on sweet cherries. An acre will support only 60 large sweet cherry trees, as compared with 90 of the smaller sour cherry trees. Harvest labor for the two types differed greatly. The sweet varieties required 203 and the sour varieties 121 man-hours per acre. Two factors--yield per acre and market requirements--are responsible for this difference. Sweet cherries had an average yield of 4,915 pounds per acre, or more than half again as much as sour cherries. The increased physical output increased labor requirements for the crop. However, market requirements for the crop had an even greater influence on harvest labor.

Sweet cherries are customarily harvested for fresh market with the stems attached. Care must be taken not to detach the stem or bruise the fruit. To this end, some growers use clippers instead of pinching off the fruit by hand. To obtain uniform quality of this perishable crop, several pickings must be made at the proper stage of maturity.

Sour cherry trees are usually stripped in one picking by grasping the fruit and pulling it free from the stems. Less caution is needed and physical output per hour is increased by about 20 percent.

In 1954, an average of 47 man-hours of labor was used per acre of nonbearing sweet cherries. The range in hours was from 26 in New York to 61 in Washington. Labor needs for maintenance were decidedly lower in the irrigated orchards of the East.

CRANBERRIES

Commercial production of cranberries is reported in 5 States, but Massachusetts produces more than 50 percent of the annual crop. The other States are New Jersey, Wisconsin, Washington, and Oregon. In 1954, cranberries required 264 man-hours per acre to produce a yield of 44 barrels (table 6).

Preharvest work averaged 193 man-hours per bearing acre. Most preharvest work is performed by hand. Maintaining dikes and check dams to control erosion by wave action and rainfall is a continuous and laborious job. The tunneling of muskrats presents a similar problem. Bogs must be sanded to provide media for new root growth, which helps to control weeds and to prevent the vines from tearing out when berries are raked in the fall. Flooding of the bogs takes considerable labor also. The water is applied by either pump or gravity, but close supervision is needed if the correct depth of water is to be attained at the proper time to kill insects and diseases and to prevent injury from frost. Too much water for too long a period will harm the plants. Weeding and spraying is done mainly by hand.

The harvesting of cranberries required an average of 71 man-hours per acre and ranged from 44 in New Jersey to 100 in Wisconsin. Low yields in New Jersey accounted for the low harvest-labor requirements there. In Wisconsin, some cranberries

are still picked by hand. This requires a great deal more labor than is needed in the other States, where hand rakes or scoops are used. Mechanical picking has been tried in several areas in an attempt to reduce the number of man-hours, but the various machines developed have not proved to be successful.

To establish and bring a new cranberry bog into production requires an average of 748 man-hours per acre. It takes more than 500 man-hours per acre to scalp the sod, level the bog, build dikes, sand, plant the cuttings, and weed the stand. Maintaining the new bogs takes 82 man-hours per acre annually to weed, prune, fertilize, spray, and flood.

DATES

Dates are produced commercially only in California. This crop requires hot, dry, still air with no rainfall during the flowering and fruiting period, and irrigation to provide the necessary moisture for growth. In 1954, preharvest work required 140 man-hours per acre (table 7). More labor is needed for irrigation than for any other preharvest job. It is followed closely by pruning, pollinizing, thinning, tying bunches, and bagging fruit. Harvest work averaged 145 man-hours per acre, of which 131 were used in picking, loading, and hauling to storage or processor an average yield of 6,553 pounds of dates. Picking dates is slow work; about 2.0 man-hours per hundred pounds are needed to select properly ripened dates from strands having fruit in all stages of maturity.

The nonbearing acreage of dates required an average of 70 man-hours per acre in 1954. Establishment of a date garden takes 85 man-hours to prepare the ground, plant and wrap the shoots, cultivate, and irrigate. After establishment, 65 man-hours per acre yearly are necessary to maintain the trees to bearing age.

FIGS

In 1954, figs were produced commercially only in California. Labor requirements per bearing acre of figs averaged 112 man-hours (table 8). Preharvest labor used 36 and all harvest labor 76 man-hours per acre. Preharvest labor varies with the variety of figs grown. Adriatics require only about three-fourths as much preharvest work as the other three main varieties. Calimyrnas require the largest number of man-hours because of the additional work of caprifying (pollinating) the crop. Of the 76 man-hours used in harvesting, 44 were used in picking, loading, and hauling the figs to storage, drying shed, or processor. An average of 35 man-hours per acre was needed for the 90 percent of the crop that was cut, dried, graded, and packed on the farm. A small part of the Kadota crop was sold for fresh use and processing.

With an average original planting of 54 trees per acre, 65 man-hours were required to establish an acre of figs. This varies with varieties, as tree numbers range from 25 to 75 per acre. Maintenance for the 5 nonbearing years averaged 23 man-hours per year. In 1954, 30 man-hours were required per nonbearing acre of figs.

GRAPES

The average production of 9,525 pounds of grapes per acre in 1954 required 106 man-hours--55 for preharvest and 51 for harvest (table 9). Labor requirements for grapes varies according to the type of grape grown. Three major types of grapes are produced in the United States: The European type, which is grown in the Mountain and Pacific regions; the native American or Fox type, which is grown in the Northeast and along the Great Lakes; and the Muscadine type, which is grown in the Southeast. Preharvest labor needs for European and Fox grapes are similar; they range from 50 to 70 man-hours per acre. Somewhat less preharvest labor is needed for Muscadines. Their shallow root systems restrict cultivation and the fewer, but larger, vines per acre reduce the time needed for pruning.

Harvest labor requirements also vary by the type grown. Muscadines grow in clusters of from 4 to 10 berries each and yields are usually low. As the clusters shatter badly, pickers must exercise care in harvesting to avoid excessive loss. In 1954, growers in the Southeast used approximately 4.0 man-hours of labor to harvest 100 pounds of grapes. The other two types produce larger bunches of tightly clinging berries; they are harvested with only a fraction of the labor. Growers in the Northeast and the Pacific States used 1.0 and 0.5 man-hours of harvest labor, respectively, per 100 pounds of grapes.

The intended market outlet also affects the amount of harvest labor needed. Grapes harvested for raisins or juice are harvested more rapidly than those destined for fresh market.

Nonbearing grapes used 66 man-hours per acre in 1954. The number of vines planted per acre largely determined the number of man-hours used in establishing a vineyard. In the South, where Muscadines are grown, establishing 215 vines per acre took between 90 and 100 man-hours. In New York, where American-type grapes are grown, 155 man-hours were needed to establish 630 vines per acre. California growers used only 97 man-hours of labor to plant an average of 490 European-type vines per acre. Large vineyards and considerable labor-saving equipment enabled California growers to bring new vineyards into bearing with an average of only 59 man-hours of labor per acre per year.

NECTARINES

Genetically, nectarines and peaches are so similar that nectarine seeds often develop into peach trees and peach seeds into nectarine trees. California is the only State that reported commercial production of nectarines. Man-hour requirements are essentially the same for nectarines as for peaches. With 108 nectarine trees per bearing acre, 150 man-hours were required to perform the preharvest work in 1954 (table 10).

Harvest labor requirements amounted to 91 man-hours per acre yielding 6.71 tons of nectarines. When done on the farm, grading and packing require almost as much labor as picking, loading, and hauling to a packing shed or storage. Nectarines are highly susceptible to bruising; they must be handled with great care if they are to stand up during shipment.

The nonbearing acreage of nectarines required an average of 62 man-hours per acre in 1954. In new plantings, tree numbers are decreased to 84 per acre and require 75 man-hours for establishment. Annual maintenance for 3 years averaged 57 man-hours per acre, or 5 more than for peaches.

OLIVES

Olives are produced commercially in California on hot, dry slopes where water is supplied by irrigation. The hot, dry climate is essential for controlling black scale, the olive's most destructive insect pest. Planting on the slopes is also desirable for protection against frost. Preharvest labor requirements are affected by these two factors, as irrigation is more difficult and time-consuming on slopes, and spraying is necessary for further control of black scale. These two cultural operations accounted for 60 percent of the 50 man-hours per acre used for preharvest work in 1954 (table 11). Harvest labor requirements per bearing acre amounted to 107 man-hours, which were used in picking, loading, and hauling 1.78 tons of olives to a processing plant.

New groves of olives are now planted with 75 trees per acre. Establishment requires 23 man-hours and yearly maintenance averages 21 man-hours per acre. In 1954, an average of 21 man-hours was used per acre of nonbearing olive trees

PEACHES

Peaches, which are one of the most widely grown noncitrus fruits, are produced commercially in 36 States. In 1954, bearing peach trees yielded an average of 181 bushels of fruit per acre and required 158 man-hours of labor (table 12). Preharvest labor averaged 50 man-hours per acre. Normally, thinning requires more labor than any other preharvest job. In the high-yielding irrigated orchards of the Western States, thinning required nearly 60 percent of all preharvest labor. In 1954, the peach crop was poor in several States--notably Oklahoma and Texas-- and little time was needed for harvesting. In Delaware, an average of 121 man-hours per acre was used to harvest a 276-bushel crop. In California, where the yield was higher, significantly fewer man-hours were required as less time was needed per bushel to pick peaches to go to processors. Only 10 percent of the crop was graded and packed on the farm.

To establish a new peach orchard of 91 trees, an average of 61 man-hours per acre was needed. A yearly average of 40 man-hours per year for 3 years was used to maintain the trees to bearing age. The annual average of 45 man-hours needed to establish and maintain a nonbearing acre of peaches ranged from 34 to 45 man-hours in the nonirrigated regions and from 53 to 71 man-hours in the irrigated regions of the West.

PEARS

In 1954, pears required an average of 164 man-hours per bearing acre in the 30 States reporting commercial production. Of the total man-hours per acre, 89 were

for preharvest work. Preharvest labor requirements, like numbers of trees per acre, were greatest in the irrigated areas of the West and lowest in the nonirrigated South. In Indiana, however, preharvest work required only 20 man-hours per acre as compared with 32 to 36 in neighboring States, and the high of 120 per acre in Washington (table 13). Fireblight on many pear trees in Indiana has caused growers to abandon orchards or to reduce preharvest labor materially on trees of questionable value.

Harvest labor requirements vary with yield and percentage of the crop farm graded and packed. Labor used in harvesting pears ranged from 4 man-hours per acre yielding 4 bushels in Oklahoma to 104 man-hours per acre in Colorado and California where yields were 284 and 429 bushels, respectively. In Colorado, 80 percent of the grading and packing of the crop was done on the farm. In California, only 35 percent of the crop was prepared for market by farm crews. In Washington, where only 5 percent of the crop was graded and packed on the farm, 78 man-hours per acre were used to harvest 306 bushels--an average of about a quarter of an hour per bushel.

The number of trees planted per acre in new pear orchards ranged from 42 in North Carolina to 110 in Idaho. Labor required to establish orchards varied nearly as much, with 34 man-hours per acre required in North Carolina and 87 in Idaho. An average of about 30 man-hours per acre was needed in the eastern half of the country to maintain new plantings after the first year. Approximately twice this amount was required in the Mountain and Pacific regions, where trees are more closely spaced on irrigated land. In 1954, an average of 63 man-hours was used to establish an acre of pear orchard.

PERSIMMONS

In 1954, a bearing acre of persimmons required 205 man-hours to grow and harvest 3.87 tons in California, the only State with commercial orchards (table 14). Preharvest work took 85 man-hours; irrigation and pruning were the greatest labor-consuming jobs. Harvest labor requirements averaged 120 man-hours per acre. Picking, loading, and hauling the crop to storage, packing shed, or processor required 89 man-hours. When the crop was farm graded and packed, 62 man-hours were required. As persimmons intended for fresh market use must be harvested when the flesh is softening, care must be taken to prevent bruising so that the crop will withstand shipment.

New plantings require very little labor. Only 30 man-hours were used to establish an acre in 1954, and the yearly maintenance to bearing age averaged only 10 man-hours per year. An average of 12 man-hours of labor was expended on an acre of nonbearing trees in 1954. Most of it was used in irrigation of the trees.

PINEAPPLES

Because of climate, production of pineapples in the United States is limited to the southern tip of Florida. The acreage is not extensive, but the labor requirements of 306 man-hours per acre are among the highest for all fruits and nuts (table 15). Preharvest work of fertilizing and hand-cultivating took 63 man-hours per acre. In 1954, labor used to harvest an acre with a yield of 405 field crates amounted to 243 man-hours. Harvesting is mainly by hand labor, as the acreage grown is too small to justify the purchase of harvesting machinery. Labor used in picking and hauling the crop to the farm packing shed amounted to 203 man-hours. The remaining 40 man-hours were used in farm grading, packing, and delivering the crop to market.

Establishing a new planting of pineapples required 145 man-hours to prepare the ground, set the plants, and care for them during the first year. In the second year, fertilizing, hand-weeding, and cultivating consumed 50 man-hours per acre. Thus, an average of 98 man-hours a year for 2 years is required to bring an acre of pineapples into production.

PLUMS

California and Michigan are the only States in which plums are grown commercially. In California, 10 more man-hours of preharvest labor were needed per acre than in Michigan, as California orchards had more trees per acre and were irrigated (table 16). Harvest labor requirements differed considerably in the two States, although the total number of man-hours used was about the same. To harvest 5,494 pounds per acre in Michigan in 1954, 63 man-hours were needed to pick, load, and haul the crop to packing shed, storage, or processor, and 37 man-

hours per acre were necessary to grade and pack the part of the crop handled by farmers. In California, where the yield was about 1,000 pounds more per acre, 45 man-hours were used in picking, loading and hauling the crop, or 18 hours less than in Michigan. But with twice as much of the crop farm graded and packed, total requirements for harvest labor were higher in California.

Establishing an acre of plum trees required 35 man-hours in California and 55 man-hours in Michigan. Both States planted 80 trees per acre, but the use of much labor-saving equipment in California materially reduced the number of man-hours needed there. Another factor in the reduction of man-hours in California is the dry climate. Insects and diseases that attack plums are less prevalent and more easily controlled in California than in the more humid production areas of Michigan. The annual average labor used in establishing and maintaining an acre of plums to bearing age was 39 man-hours in Michigan and 32 in California.

POMEGRANATES

Both acreage and production of pomegranates are small and concentrated in California. Labor used in 1954, however, amounted to 306 man-hours per acre (table 17). Preharvest work took only 40 man-hours per acre, and the harvest work involved in handling 5.26 tons took the remaining 266 man-hours. Field work--picking, loading, and hauling the crop to storage or processor--used more than 80 percent of all labor used per acre.

In 1954, 40 man-hours were spent per acre of nonbearing trees. Establishment required 60 man-hours and annual maintenance for the 4 years until the trees produced averaged 35 man-hours per acre.

PRUNES

Prunes are grown commercially in Idaho, Washington, Oregon, and California. In these four States, man-hour requirements are similar, as cultural practices followed are about the same (table 18). In Oregon, however, where orchards are small and on hilly land, growers are less able to utilize labor-saving machinery; therefore, preharvest labor requirements are higher.

More preharvest labor is required for prunes than for plums, as two additional operations--propping and dragging--must be performed for prunes. The heavier yields of prunes necessitate the propping of tree limbs. As the prunes are not harvested until after they have dropped, the land must be rolled or dragged smooth to facilitate harvesting.

Harvest labor requirements vary with yields and with methods used. In Washington, where more hand labor is used to knock, pick, load, and haul than in the other States, 80 man-hours per acre were required to pick a crop just slightly larger than that in Oregon, where only 45 man-hours per acre were used. But as no prunes were graded or packed on farms in Washington in 1954, the 80 man-hours per acre represented all harvest labor requirements.

Of the four States in which prunes are grown, fewest man-hours were needed to bring a new acre into production in California. Growers there used only 190 man-hours in 6 years, or an annual average of 32. This is in contrast to the other States, where 48 to 50 man-hours per year were required. Larger units and modern planting machinery tend to reduce the amount of labor needed.

Citrus Fruits

In 1954, production of citrus fruits was almost half of the total production of all fruits and nuts. This segment of the fruit industry has expanded, while noncitrus production has held about steady over the years. Technological advances, particularly those made in the processing of citrus products, have made uniformly high-quality citrus products available to consumers the year round, and consumption has increased.

In 1954, an average of 117 man-hours was spent per bearing acre of citrus crops. The larger fruits--oranges and grapefruit--required considerably less labor per acre than did the smaller lemons and limes (fig. 3). Citrus fruits took 17 fewer man-hours per acre than the average of all noncitrus fruits. One reason for this is that citrus fruits, except for limes, are not graded and packed on the farm. The large percentage of the citrus crop that is processed also contributes to low needs. Nearly 51 percent of the 1954 citrus crop was sold for processing, which takes less labor. Workers are not required to be as careful as in harvesting fruit for the fresh market. Widespread use of machinery throughout the citrus industry has further reduced labor needs. Per acre yields reported in the tables are for the 1953-54 crop-year.

ORANGES, NAVEL

Commercial production of navel oranges is reported in California and Arizona. This type of orange favors locations having hot, fairly dry summers. California growers, who produced most of the 1954 crop, used 50 man-hours per acre for preharvest work and 82 man-hours for harvesting a yield of 200 field boxes (table 19). Arizona used 5 fewer man-hours in preharvest labor, but with an average yield of 287 field boxes 106 man-hours were needed to harvest an acre. Major labor-consuming jobs in the production of navel oranges are irrigating, protecting from frost, pruning, and picking and hauling.

Labor spent on nonbearing acreage was greater in Arizona than in California. As trees are spaced closer together, more labor was needed to establish an acre in Arizona than in California; and with more time spent on irrigating, annual maintenance labor was 9 man-hours greater in that State than in California. The annual average labor used in establishing and maintaining a nonbearing acre in California was 47 man-hours as compared with 58 in Arizona.

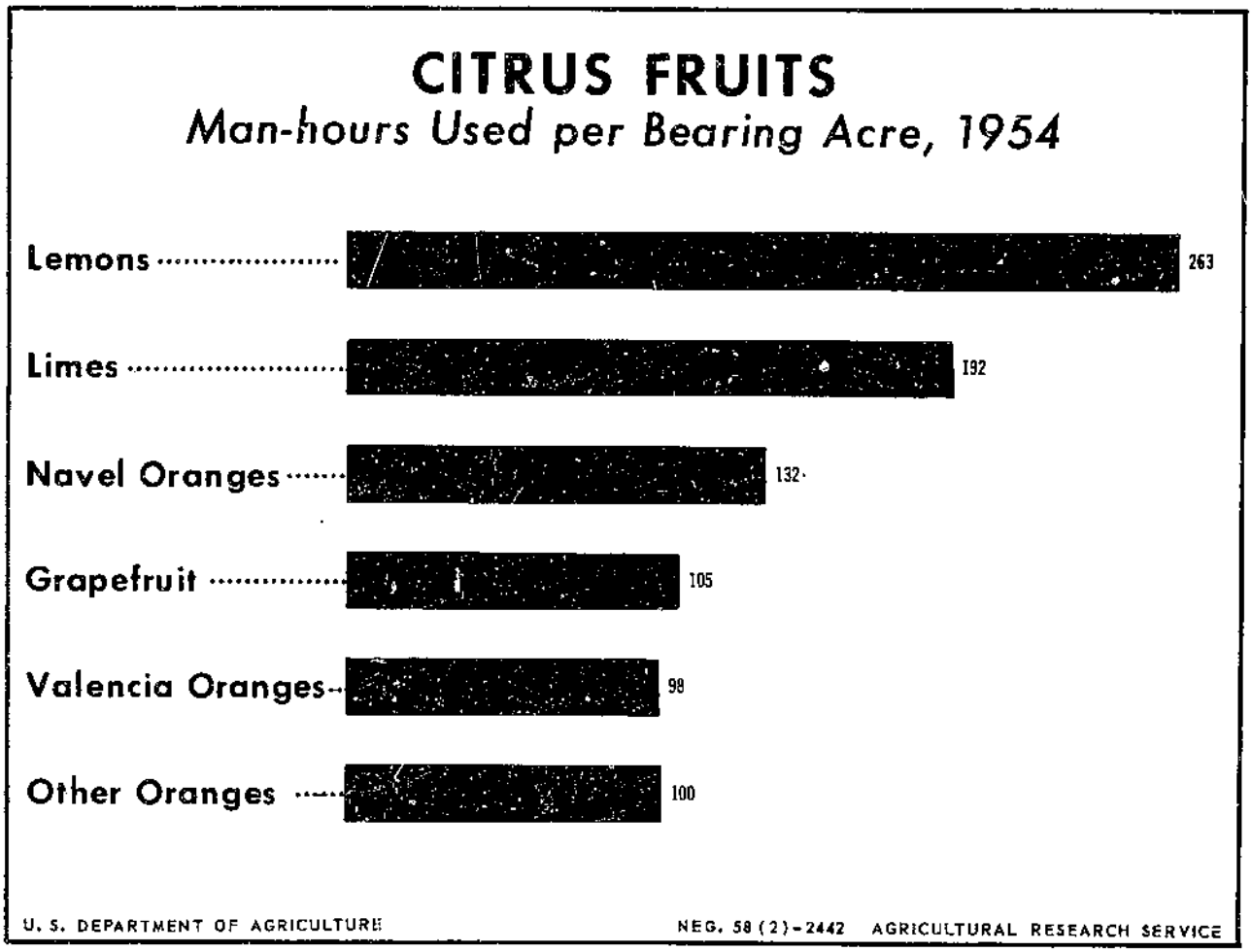

Figure 3.

ORANGES, VALENCIA

In contrast to navel oranges, valencias prefer a humid climate. They are produced in Florida and Texas, and in the more humid areas of Arizona and California. In 1954, an average of 98 man-hours was required to grow and harvest an acre of valencia oranges, or 34 man-hours less than for navels (table 20). Preharvest labor requirements averaged 42 man-hours per acre and ranged from 35 man-hours in Florida to 50 in California.

The harvest labor requirements of 56

man-hours per acre were lower than those for navel oranges, yet the yield for valencias was higher. It averaged 210 field boxes containing 86 pounds each, as compared with the navel yield of 202 field boxes averaging 77 pounds. Lower requirements for harvest labor reflect the influence of processing part of the valencia crop in Florida. In 1954, about two-thirds of the Florida crop, or nearly 55 percent of the total United States crop, was processed. In Texas, where the citrus industry has been hit by 2 killing frosts since 1949, an average of 20 man-hours per acre was used to harvest the very low yield of 34 field boxes.

The number of man-hours spent per nonbearing acre of valencia oranges ranged from 31 in Florida to 50 in Texas and Arizona and averaged 34. In Texas, where 100 trees were planted per acre, 75 man-hours were required to establish an acre, whereas the average for all States was 41 man-hours per acre. Yearly maintenance needs ranged from 30 man-hours per acre in Florida to 48 in Arizona and averaged 32 for the 4 States.

ORANGES, OTHER

Other oranges, which include tangerines, mandarins, and satsumas, are reported in Florida, Louisiana, Texas, and Arizona. In California, production of other oranges is included with the State's production of navel oranges.

Labor used per bearing acre of other oranges averaged 100 man-hours in 1954 (table 21). With a yield of 262 field boxes per acre, labor used for other oranges was considerably less per unit produced than labor used for navel or valencia oranges. The tree population of other oranges averaged only 66 per acre, whereas navel and valencia stands averaged 93 and 75 trees per acre, respectively. Preharvest work varied with tree numbers, as other oranges used only 35 man-hours per acre. Harvest labor requirements for other oranges averaged 65 man-hours per acre to harvest 262 field boxes. As the major part of the other orange crop was processed, this crop took less labor per unit harvested than navels or valencias.

GRAPEFRUIT

Grapefruit is produced commercially only in the 4 major citrus States--Florida, Texas, Arizona, and California. An average of 105 man-hours per acre of bearing trees was used to produce the 1953-54 crop in these States (table 22). Preharvest labor ranged from 35 to 48 man-hours per acre and averaged 36, with States having fewer trees per acre using less preharvest labor. Harvest labor needs varied greatly, as did yields. Texas groves, which were recovering from severe frost damage, produced an average of only 86 field boxes per acre and only 26 man-hours of harvest labor were used per acre. In Florida and Arizona, which had yields of 381 and 483 field boxes, respectively, 76 and 72 man-hours per acre, or about the same man-hours per ton, were used.

Newly established grapefruit groves averaged 75 trees per acre and ranged from 70 in Florida to 90 in Arizona. Labor needed to establish a grove ranged from 37 man-hours per acre in Florida to 65 in Texas and averaged 51 for the 4 States. Annual maintenance averaged 38 man-hours per acre; requirements were highest in Arizona, where 51 man-hours per year were needed for maintenance.

LEMONS

Production of lemons in 1954 required more labor per acre than any other citrus fruit. Man-hours used per acre totaled 263 (table 23). Lemons are grown commercially on irrigated land in California. Preharvest labor averaged 70 man-hours per acre, of which more than half was for pruning and irrigating. With a yield of 297 field boxes, harvesting took 193 man-hours per acre. The unevenness of maturity and ripening of the fruit necessitated many selective pickings. This and the small size of the fruit are responsible for the large number of man-hours needed in harvesting.

New plantings of lemons averaged 120 trees per acre and required an annual average of 67 man-hours for establishment and maintenance. In the year of planting, 88 man-hours were used per acre. In the remaining 5 years before production, 63 man-hours were used annually. Irrigation, pruning, and protection from frost used most of the maintenance labor.

LIMES

Florida is the only State in which limes are produced commercially. Production is centered on the Keys and the lower mainland, where the climate is hot and humid. In 1954, an acre of limes produced an

average of 9,432 pounds and required 192 man-hours of labor (table 24). Mature groves had an average of 100 trees per acre and required 80 man-hours of pre-harvest work. Harvesting of limes is similar to that of lemons in that the trees carry at the same time fruit in all stages from blossom to maturity. Repeated selective pickings are required to harvest the crop.

An average of 75 man-hours per acre was used to pick, load, and haul 9,432 pounds of limes from the trees to storage or packing sheds. When grading and packing was done on the farm, 75 additional man-hours per acre were used. With 50 percent of the crop graded and packed by commercial packing plants, an average of 112 man-hours per acre was used for all harvest work.

Nonbearing groves averaging 108 trees per acre required an average annual labor input of 36 man-hours per year from planting to bearing age. The labor required to establish a grove averaged 54 man-hours, while an average of 30 man-hours per acre was needed annually for maintenance.

Tree Nuts

The culture of the various tree nuts ranges from the intensive cultivation of almonds and walnuts, in which land preparation, irrigation, spraying, and pruning are common operations, to the extensive culture of wild pecans, where the only labor used is for harvesting the crop. In 1954, the average amount of labor used per acre of nuts ranged from 17 man-hours for wild pecans to 71 for almonds and averaged 40 man-hours for the 5 types of edible nuts reported (fig. 4). Compared

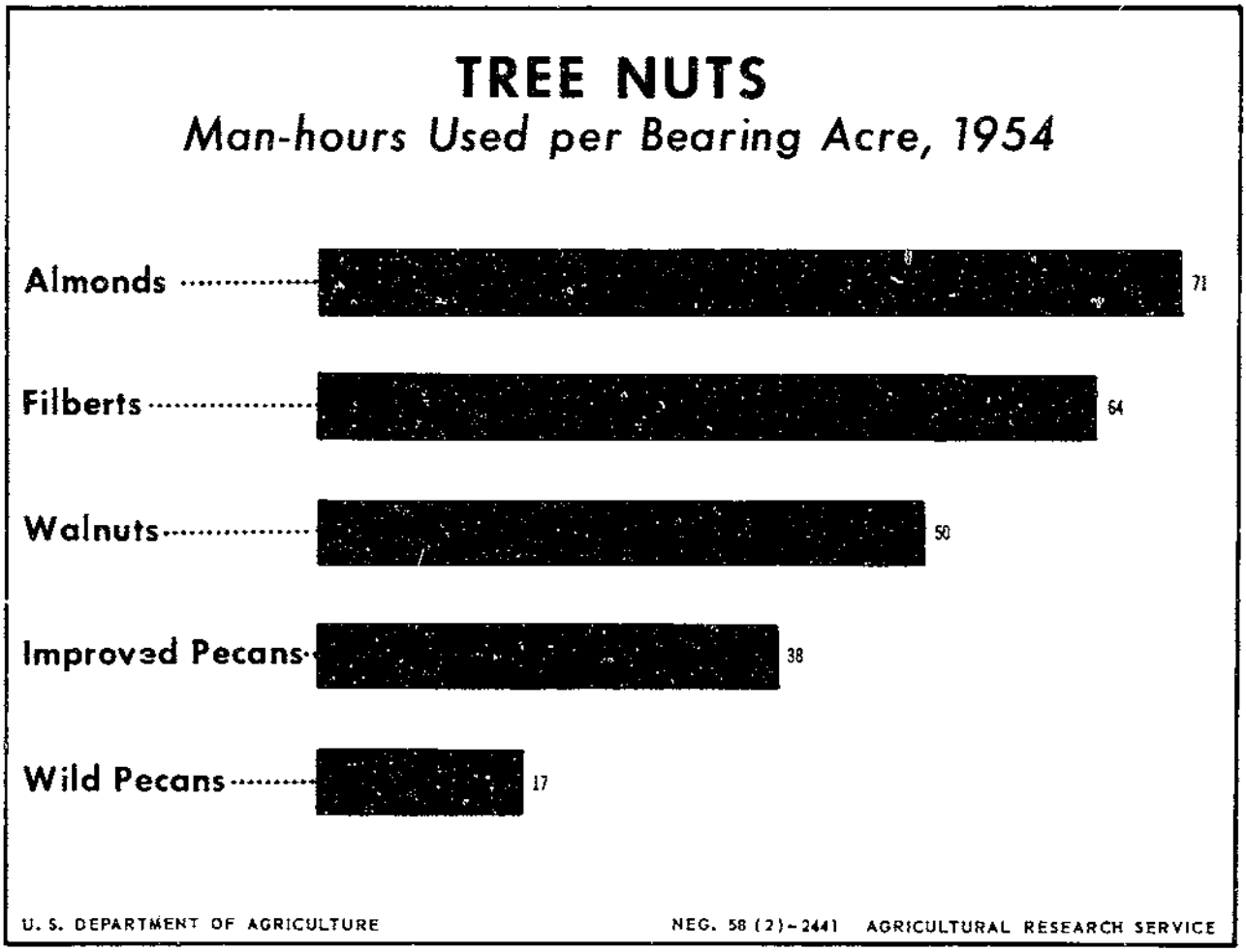

Figure 4.

with citrus and noncitrus fruits, nut crops use very little labor. The average of 40 man-hours per acre for tree nuts is less than 40 percent of the average for all fruits and nuts. These smaller labor requirements reflect the more extensive type of cultivation used and the lower yields of the nut crops.

ALMONDS

Almonds are grown in several States, but commercial production is reported only in California. In 1954, a total of 71 man-hours was used to produce 933 pounds per acre (table 25). Preharvest labor per acre averaged 34 man-hours, of which pruning and brush removal required 10 man-hours, irrigating 10, fertilizing and spraying 6 and cultivating the rest. Harvesting required 37 man-hours per acre in 1954; 34 were used to knock, pick, load, and haul the crop to storage or packing sheds, and 3 man-hours were used to farm-grade and pack the crop. In 1954, 8 to 10 percent of the almond crop was harvested mechanically. In groves in which mechanical harvesters were used, an average of 40 percent fewer man-hours was needed for harvest.

New plantings of almonds averaged 60 trees per acre and required an annual labor input of 27 man-hours per acre. Establishment used 30 man-hours, while maintenance to production required an average of 26 man-hours per year. Irrigation used about half the maintenance labor required.

FILBERTS

The filbert industry in the United States is very small. Annual average production is less than 5 percent of all edible tree nuts. Filberts are produced commercially in two States--Oregon and Washington. Oregon grows more than 90 percent of the crop. In 1954, 64 man-hours per acre were needed to produce and harvest 765 pounds of nuts (table 26). Preharvest labor averaged 30 man-hours per acre, with land preparation, pruning, and sucker control amounting to two-thirds of the total. Harvest labor needs depend on yield and method of harvest. In 1954, with 80 percent of the acreage harvested by hand, 34 man-hours of labor were necessary. Smaller yields in Washington account for the difference in harvest labor requirements for the two States.

Nonbearing acreage required an average of 29 man-hours per acre in 1954. Establishing an acre with a stand of 100 trees required 51 hours, half of which was for the actual planting of the trees. Annual maintenance from the second year to production averaged 24 man-hours per acre.

PECANS, IMPROVED

Improved pecans were developed by grafting scions from outstanding specimens of wild trees. The more promising grafted trees were given varietal names. These varieties are still undergoing improvement. Commercial plantings of improved pecans are located in 11 Southern States from North Carolina to New Mexico. In 1954, labor requirements ranged from 26 man-hours per acre in Texas to 81 man-hours per acre in New Mexico (table 27).

Preharvest labor averaged 20 man-hours per acre and ranged from 16 in Oklahoma and Texas to 30 in the irrigated groves of New Mexico. The average amount of labor used in harvesting an acre yielding 71 pounds was 18 man-hours, 16 of which were needed to pick, load, and haul the crop. Farm grading, packing, and marketing required 3 man-hours per acre for more than 70 percent of the 1954 crop that was prepared for market by farmers or their crews. Harvest labor requirements varied according to yield; they ranged from a low of 10 man-hours per acre in Texas to a high of 51 man-hours in New Mexico. Harvesting of pecans has been primarily a hand operation, as many groves are too small to permit economical use of mechanical harvesters. The large irrigated groves in New Mexico, however, use mechanical harvesters to advantage.

A total of 132 man-hours of labor are required per acre of improved pecans to establish and maintain the planting to bearing age. The average labor expended in 1954 amounted to 15 man-hours per acre; it ranged from 10 man-hours in Mississippi to 22 in Louisiana.

PECANS, WILD

Naturally seeded wild pecan trees are of commercial importance in 10 Southern States. In recent years, production from these trees has amounted to about half of all pecans produced. As wild pecan trees are not uniformly situated according to prescribed planting distances as are improved pecans, acreage, yield, and man-

hours per acre cannot be determined without making certain assumptions. It is assumed here that (1) number of trees per acre is the same as for improved pecans, and (2) no preharvest work is performed.

In 1954, an average of 17 man-hours was used per acre of wild pecan trees (table 28). Man-hours used ranged, according to yields, from 14 in Oklahoma to 24 in Georgia and South Carolina. Yields ranged from 35 pounds per acre in Oklahoma to 123 in South Carolina; they averaged 50 pounds. Picking, loading, and hauling the crop required an average of 16 man-hours per acre, and 2 man-hours were needed to prepare the crop for market when this was done on the farm.

WALNUTS

Walnuts are grown commercially in California and Oregon. Their production is more highly mechanized than that of any other nut crop. In 1954, a total of 50 man-hours was used to cultivate and harvest an acre of walnuts yielding 1,145 pounds (table 29). Preharvest labor averaged 19 and harvest work 31 man-hours per acre. Harvesting the walnut crop has become a highly mechanized operation in many groves; in others, it is largely a hand operation. Harvesting includes such jobs as knocking or shaking, raking, picking up nuts, loading, hauling, hulling, drying, grading, packing, and marketing. In 1954, machines were used to shake the nuts from the trees on 40 percent and to pick up the crop on 15 percent of the acreage. The bulk of the 1954 crop was delivered to cooperatives or commercial packing sheds for grading, packing, and marketing.

Nonbearing walnut groves had an average of 27 trees per acre. Labor used per acre in 1954 averaged 17 man-hours. Establishment took 25 man-hours; yearly maintenance until the trees reached productivity averaged 16 man-hours.

GUIDE TO TABLES

TABLE 1.--Apples: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Bushels*
Maine	40	40	34	17	47	87	75	85
New Hampshire	40	40	45	31	67	107	70	154
Vermont	40	40	61	45	95	135	75	227
Massachusetts	35	40	42	26	60	100	70	132
Rhode Island	35	40	37	14	44	84	50	92
Connecticut	35	40	48	25	60	100	50	167
New York	35	35	59	32	62	97	10	219
New Jersey	40	40	56	31	79	119	75	208
Pennsylvania	35	40	44	26	54	94	40	150
Delaware	40	40	74	45	108	148	75	299
Maryland	40	35	54	28	75	110	75	187
Northeast	36	38	52	29	62	100	36	184
Ohio	35	35	36	14	47	82	80	90
Indiana	35	40	33	15	42	82	60	103
Illinois	40	40	36	17	43	83	40	110
Iowa	40	40	16	5	18	58	40	33
Missouri	40	45	33	11	41	86	75	74
Corn Belt	37	38	34	14	43	81	66	91
Michigan	40	60	39	24	51	111	50	122
Wisconsin	60	40	34	16	42	82	50	106
Minnesota	60	40	36	14	43	83	50	90
Lake States	43	57	38	23	50	107	50	119
Nebraska	40	45	20	6	21	66	10	40
Kansas	40	45	25	8	28	73	40	50
Northern Plains	40	45	23	7	26	71	31	47
Virginia	40	35	58	43	77	112	45	215
West Virginia	35	35	56	38	73	108	45	192
North Carolina	35	40	36	14	40	80	30	71
Kentucky	40	40	26	9	30	70	50	56
Tennessee	45	40	23	8	27	67	50	52
Appalachian	38	37	48	31	62	99	43	159
Arkansas	45	45	32	10	39	84	70	70
Delta States	45	45	32	10	39	84	70	70
Montana	65	100	33	12	38	138	40	83
Idaho	50	100	68	54	111	211	80	270
Colorado	60	120	68	54	111	231	80	270
New Mexico	55	140	44	28	65	205	75	139
Utah	65	120	48	25	58	178	40	166
Mountain	57	120	56	40	86	206	70	206
Washington	45	135	93	58	96	231	5	387
Oregon	55	150	68	38	70	220	5	250
California	62	170	100	63	119	289	30	419
Pacific	51	146	92	57	100	245	12	382
United States	40	58	52	31	64	122	41	185

See footnotes on page 19.

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TABLE 1.--Apples: Labor used per acre, by States and regions, 1954[1]--Continued

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Maine	44	36	5	32	196	33
New Hampshire	44	36	5	30	186	31
Vermont	44	36	5	32	196	33
Massachusetts	38	34	6	31	220	31
Rhode Island	38	34	5	31	189	32
Connecticut	38	34	5	31	189	32
New York	44	33	6	30	213	30
New Jersey	42	33	5	30	183	30
Pennsylvania	38	34	5	32	194	32
Delaware	42	35	5	30	185	31
Maryland	42	35	5	30	185	31
Northeast	41	34	5	31	189	32
Ohio	38	33	5	32	193	32
Indiana	38	33	5	32	193	32
Illinois	43	35	5	30	185	31
Iowa	43	35	5	30	185	31
Missouri	42	35	5	30	185	31
Corn Belt	40	34	5	31	189	32
Michigan	44	36	7	32	260	32
Wisconsin	66	40	7	30	250	31
Minnesota	66	40	7	30	250	31
Lake States	50	37	7	32	261	32
Nebraska	43	36	5	28	176	29
Kansas	43	36	5	28	176	29
Northern Plains	43	36	5	28	176	29
Virginia	42	36	6	29	210	30
West Virginia	38	36	7	26	218	27
North Carolina	38	36	5	28	176	29
Kentucky	42	38	5	28	178	30
Tennessee	47	38	5	28	178	30
Appalachian	41	36	6	28	204	29
Arkansas	47	38	5	30	188	31
Delta States	47	38	5	30	188	31
Montana	71	75	4	60	315	63
Idaho	55	65	4	60	305	61
Colorado	66	70	4	60	310	62
New Mexico	48	65	6	60	425	61
Utah	71	65	5	45	290	48
Mountain	58	66	5	58	356	60
Washington	60	80	6	60	440	63
Oregon	60	75	7	67	544	68
California	68	70	6	60	490	70
Pacific	61	79	6	62	451	64
United States	46	44	6	36	260	37

See footnotes on page 19.

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Footnotes for Table 1.

[1] Number of man-hours required to pick, load, and haul a bushel of apples to storage or processor range from 0.20 to 0.50 hour, depending on many factors, the most important of which is yield per acre. The range in hours per bushel with different yields is as follows:

Yield per acre (bushels)	Hours per bushel
Less than 50	0.50 +
50 - 99	.40 - 0.50
100 - 199	.30 - .40
200 - 299	.25 - .30
300 and over	.20 - .25

Apples that are farm graded, packed, and hauled to market usually require an additional 0.10 to 0.25 hour of labor per bushel. In States where prepackaging is done at farm levels the upper range would be applicable; in States where a minimum of grading is done and bulk containers are used the lower range would be more appropriate.

[2] Yield per acre for each State except California was derived by dividing the 1954 production reported in the census by the bearing acreage. The bearing acreage was developed by dividing the census number of bearing trees by the author's estimate of trees per acre. California yield per acre is the 1954 yield reported in California Fruit and Nut Crops, 1909-1955--Acreage, Production, and Utilization Value; U. S. Agr. Market Serv. Spec. Pub. 261, 103 pp., illus., 1956; (Calif. Dept. Agr. cooperating).

TABLE 2.--Apricots: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
Utah	95	95	107	46	142	237	77	11,865
Mountain	95	95	107	46	142	237	77	11,865
Washington	90	105	54	---	54	159	0	5,958
California	78	130	50	74	102	232	70	6,764
Pacific	79	128	50	74	98	226	64	6,701
United States	79	127	52	73	99	226	65	6,835

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Utah	96	75	3	50	225	56
Mountain	96	75	3	50	225	56
Washington	90	85	4	55	305	61
California	83	75	4	52	283	57
Pacific	84	76	4	52	284	58
United States	85	76	4	52	284	57

[1] Labor used to pick, load, and haul apricots to storage or a processor ranges from 0.70 to 0.90 hour per hundredweight, depending on the yield. An additional 0.35 to 0.45 hour per cwt. is required to grade and pack the fresh crop on the farm and haul it to market. Labor to cut, dry, and pack apricots for the dried market requires about 0.80 hour per cwt. on a fresh-weight basis. One pound of dried apricots equals 5 1/2 pounds of fresh fruit.

[2] See footnote 2, table 1.

TABLE 3.--Avocados: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
Florida	70	35	44	13	50	85	50	3,260
Southeast	70	35	44	13	50	85	50	3,260
California	79	49	34	11	38	87	40	2,832
Pacific	79	49	34	11	38	87	40	2,832
United States	76	45	37	12	42	87	43	2,952

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Florida	70	65	5	45	290	48
Southeast	70	65	5	45	290	48
California	96	85	5	60	385	64
Pacific	96	85	5	60	385	64
United States	92	82	5	58	371	62

[1] With avocado yields of 2,500 to 4,000 pounds per acre, approximately 0.40 hour of labor per cwt. is required to pick, load, and haul the crop to storage or processing sheds. Farm crews spend an additional 0.15 to 0.20 hour per cwt. grading, packing, and hauling avocados to market.

[2] See footnote 2, table 1.

TABLE 4.--Cherries, sour: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
New York	85	30	144	33	146	176	6	4,536
Pennsylvania	80	40	117	23	120	160	12	2,937
Northeast	83	34	134	27	136	170	8	3,926
Ohio[3]	80	42	82	16	85	127	20	2,040
Corn Belt	80	42	82	16	85	127	20	2,040
Michigan	90	30	112	24	113	143	4	3,031
Wisconsin	100	40	98	20	99	139	6	2,457
Lake States	92	32	109	23	110	142	4	2,902
Montana	100	45	117	13	118	163	10	2,595
Idaho	100	45	196	30	201	246	15	5,953
Colorado	115	48	131	15	133	181	15	2,919
Utah	110	53	209	33	211	264	5	6,530
Mountain	109	49	164	20	166	215	11	4,494
Washington	90	70	162	---	162	232	0	3,607
Oregon	85	60	188	---	188	248	0	4,691
Pacific	87	64	177	---	177	241	0	4,215
United States	90	35	120	24	121	156	6	3,271

See footnotes at end of table.

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TABLE 4.--Cherries, sour: Labor used per acre, by States and regions, 1954[2]--Continued

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
New York	97	63	4	22	151	30
Pennsylvania	88	40	4	35	180	36
Northeast	93	54	4	27	162	32
Ohio[3]	80	52	4	35	192	38
Corn Belt	80	52	4	35	192	38
Michigan	100	65	5	35	240	40
Wisconsin	110	68	5	38	258	43
Lake States	101	65	5	35	240	40
Montana	110	81	5	40	281	47
Idaho	110	81	5	40	281	47
Colorado	118	87	5	43	302	50
Utah	115	75	5	45	300	50
Mountain	116	81	5	43	296	50
Washington	96	65	6	40	305	44
Oregon	90	65	6	40	305	44
Pacific	92	65	6	40	305	44
United States	100	62	5	34	232	39

[1] With the bulk of the sour cherry crop going directly to processing plants, harvest labor is used primarily to pick, load, and haul the crop to processor. Labor used per cwt. with different yields is as follows:

Yield per acre (cwt.)	Hours per cwt.
Under 10	6.0 +
10 - 19	5.0 - 6.0
20 - 39	3.7 - 5.0
40 - 59	3.3 - 3.7
60 - 79	3.1 - 3.3
80 and over	3.0

Farm crews expended additional labor to grade, pack, and haul to market the 5 percent of the 1954 crop that was sold fresh. This amounted to 0.50 hour in the West to 0.80 hour in the East per cwt. of sour cherries packed for fresh sales.

[2] See footnote 2, table 1.

[3] Number of trees and production is for all cherries reported by the census. Division into sweet and sour cherries estimated from proportions in adjacent States and from AMS data.

TABLE 5.--Cherries, sweet: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
New York	90	22	223	72	234	256	15	5,576
Pennsylvania	55	40	120	26	124	164	15	2,001
Northeast	75	29	180	53	188	217	15	4,093
Ohio[3]	65	40	119	22	130	170	50	1,704
Corn Belt	65	40	119	22	130	170	50	1,704
Michigan	70	30	157	45	164	194	15	3,482
Lake States	70	30	157	45	164	194	15	3,482
Montana	90	45	268	72	304	349	50	7,241
Idaho	65	43	231	58	260	303	50	5,787
Colorado	100	47	319	89	364	411	50	8,856
Utah	85	45	217	54	244	289	50	5,432
Mountain	81	45	236	60	266	311	50	6,053
Washington	45	80	217	---	217	297	0	6,025
Oregon	60	60	183	46	188	248	10	4,568
California[4]	65	50	203	51	213	263	20	5,087
Pacific	58	62	200	49	206	268	11	5,165
United States	63	53	195	51	203	256	16	4,915

See footnotes at end of table.

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TABLE 5. --Cherries, sweet: Labor used per acre, by States and regions, 1954[1]--Continued

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
New York	97	63	4	17	131	26
Pennsylvania	61	40	4	35	180	36
Northeast	80	52	4	25	152	31
Ohio[3]	70	46	4	35	186	37
Corn Belt	70	46	4	35	186	37
Michigan	76	49	5	35	224	37
Lake States	76	49	5	35	224	37
Montana	99	84	5	40	280	47
Idaho	73	69	5	38	259	43
Colorado	105	88	5	42	298	50
Utah	89	65	5	40	265	44
Mountain	89	72	5	40	272	45
Washington	55	70	6	60	430	61
Oregon	65	62	6	55	392	56
California[4]	68	64	6	45	334	48
Pacific	64	65	6	51	371	53
United States	71	61	5	44	281	47

[1] Labor requirements are somewhat higher for harvesting sweet cherries than for harvesting sour cherries. As the fancy sweet cherry trade demands bruise-free fruit with stems attached, pickers must exercise more caution in harvesting and handling sweet cherries than they do in harvesting sour cherries. Consequently, more labor is used per unit of output. Labor used to pick, load, and haul sweet cherries to storage or processor for different yields is as follows:

Yield per acre (cwt.)	Hours per cwt.
Under 10	7.0
10 - 19	6.0 - 7.0
20 - 39	4.5 - 6.0
40 - 59	4.0 - 4.5
60 - 79	3.7 - 4.0
80 and over	3.6

Labor used to farm grade, pack, and haul the crop to market ranges from 1.0 hour per cwt. in the West to 1.3 hours in the East.

[2] See footnote 2, table 1.

[3] Number of trees and production reported by the census are for all cherries. Division into sweet and sour cherries estimated from proportions in adjacent States and from AMS data.

[4] Includes some sour cherry production.

TABLE 6.--Cranberries: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre 1954[2]
	Pre-harvest	To pick, load, and haul	To farm grade, pack, and market	All	Total		
	Hours	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*100 lb. barrels*
Massachusetts	200	70	44	74	274	10	44
New Jersey	180	43	24	44	224	5	24
Northeast	194	61	38	65	259	8	38
Wisconsin	190	87	67	100	290	20	67
Lake States	190	87	67	100	290	20	67
Washington	200	72	---	72	272	0	72
Oregon	200	79	61	82	282	5	61
Pacific	200	75	61	76	276	2	68
United States	193	66	44	71	264	10	44

NONBEARING ACREAGE

State and region	Man-hours used per acre				
	To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Hours	*Years*	*Hours per year*	*Hours*	*Hours*
Massachusetts	500	3	80	740	185
New Jersey	510	3	90	780	195
Northeast	502	3	82	750	188
Wisconsin	500	3	80	740	185
Lake States	500	3	80	740	185
Washington	510	3	90	780	195
Oregon	510	3	90	780	195
Pacific	510	3	90	780	195
United States	502	3	82	748	187

[1] Few cranberries were hand picked in 1954. The common practice is to hand scoop the main crop, then flood the bogs and rake off the remaining berries floating on the surface. Labor used to pick, load, and haul a barrel of cranberries to storage or processor for different yields is as follows:

Yield per acre (bbls.)	Hours per bbl.
Under 30	1.8 - 2.0
30 - 39	1.7 - 1.8
40 - 49	1.6 - 1.7
50 - 59	1.5 - 1.6
60 - 69	1.3 - 1.5
70 and over	1.0 - 1.3

If a grower screens and cleans his berries before he delivers them to a processor, an additional 0.60 to 1.0 hour of labor per barrel is used. Farm grading, packing, and hauling to market usually requires 1.0 hour of labor per barrel.

[2] See footnote 2, table 1.

TABLE 7.--Dates: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
California	47	140	131	70	145	285	20	6,553
Pacific	47	140	131	70	145	285	20	6,553
United States	47	140	131	70	145	285	20	6,553

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
California	48	85	3	65	280	70
Pacific	48	85	3	65	280	70
United States	48	85	3	65	280	70

[1] Dates ordinarily require about 2.0 hours per cwt. to pick, load, and haul to storage or processor. Additional labor used for farm grading, packing, and hauling to market varies from farm to farm. In general, farmers do little grading and fancy packaging of dates and the labor requirements average only 1.0 hour per cwt. for these operations.
[2] See footnote 2, table 1.

TABLE 8.--Figs: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds (Fresh)*
California	54	36	44	35	76	112	90	6,979
Pacific	54	36	44	35	76	112	90	6,979
United States	54	36	44	35	76	112	90	6,979

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
California	54	65	5	23	180	30
Pacific	54	65	5	23	180	30
United States	54	65	5	23	180	30

[1] Depending on yield per acre, figs generally require from 0.50-0.75 hour per cwt. to pick, load, and haul to storage or processor, and 0.50 hour per fresh ton to farm dry, pack, and haul to market.
[2] See footnote 2, table 1.

TABLE 9. --Grapes: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Vines per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
New York	615	55	53	13	54	109	5	5,334
New Jersey	475	50	46	11	51	101	45	4,559
Pennsylvania	550	52	45	11	46	98	5	4,462
Northeast	598	54	51	12	52	106	6	5,124
Ohio	500	48	47	12	49	97	15	4,671
Indiana	500	48	39	8	41	89	20	3,238
Illinois	500	48	34	7	37	85	45	2,854
Iowa	500	48	32	7	35	83	45	2,703
Missouri	500	48	26	5	28	76	50	1,853
Corn Belt	500	48	42	8	44	92	24	3,920
Michigan	400	52	48	10	49	101	8	3,979
Lake States	400	52	48	10	49	101	8	3,979
Kansas	535	50	28	2	29	79	45	2,360
Northern Plains	535	50	28	2	29	79	45	2,360
Virginia	400	42	40	8	44	86	50	3,322
West Virginia	500	48	49	12	50	98	10	4,885
North Carolina	190	40	67	5	68	108	20	1,668
Appalachian	247	41	61	6	63	104	24	2,183
South Carolina	200	40	66	---	66	106	0	1,640
Georgia	200	40	45	---	45	85	0	990
Southeast	200	40	55	---	55	95	0	1,291
Arkansas	500	60	25	4	25	85	10	1,758
Delta States	500	60	25	4	25	85	10	1,758
Arizona	400	70	36	4	38	108	50	5,567
Mountain	400	70	36	4	38	108	50	5,567
Washington	590	60	48	---	48	108	0	7,084
Oregon	500	58	13	1	13	71	15	1,842
California	480	55	49	7	52	107	40	10,446
Pacific	482	55	49	7	52	107	39	10,386
United States	469	55	49	7	51	106	34	9,525

See footnotes at end of table.

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TABLE 9.--Grapes: Labor used per acre, by States and regions, 1954[1]--Continued

NONBEARING ACREAGE

State and region	Vines per acre	Man-hours used per acre				
		To establish vineyard	To maintain vineyard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
New York	630	155	2	58	271	90
New Jersey	490	145	2	53	251	84
Pennsylvania	570	150	2	55	260	87
Northeast	613	154	2	57	268	89
Ohio	510	140	2	53	246	82
Indiana	510	140	2	53	246	82
Illinois	510	140	2	53	246	82
Iowa	510	140	2	53	246	82
Missouri	510	140	2	53	246	82
Corn Belt	510	140	2	53	246	82
Michigan	500	135	3	48	279	70
Lake States	500	135	3	48	279	70
Kansas	550	115	2	50	215	72
Northern Plains	550	115	2	50	215	72
Virginia	415	135	2	46	227	76
West Virginia	510	140	2	53	246	82
North Carolina	225	90	3	40	210	52
Appalachian	280	101	3	42	227	57
South Carolina	215	95	3	42	221	55
Georgia	215	95	3	42	221	55
Southeast	215	95	3	42	221	55
Arkansas	510	120	2	52	224	75
Delta States	510	120	2	52	224	75
Arizona	415	110	2	45	200	67
Mountain	415	110	2	45	200	67
Washington	600	110	2	44	198	66
Oregon	510	106	2	42	190	63
California	490	97	2	40	177	59
Pacific	494	97	2	40	177	59
United States	507	111	2	44	199	66

[1] The number of man-hours required to pick, load, and haul a cwt. of grapes to storage, packing shed, or processing plant depends on many factors. Two important ones are yield per acre and type of grape. Labor requirements for picking, loading, and hauling to storage or processor are as follows, with higher labor requirements in the South reflecting the influence of the muscadine type of grapes:

Yield per acre (pounds)	Hours per cwt.				
	East	South	West		
	All	All	Raisin	Table	Wine
Under 1,000	1.8	4.5	---	---	---
1,000-1,999	1.4	4.0	0.65	0.72	0.60
2,000-3,999	1.2	3.5	.60	.70	.50
4,000-5,999	1.0	---	.60	.68	.40
6,000-7,999	.9	---	.55	.65	.30
8,000-9,999	.7	---	.50	.62	---
10,000-11,999	---	---	.45	.60	---
12,000-13,999	---	---	.40	.55	---
14,000 and over	---	---	.35	.50	---

Farm grading and packing labor ranges from a high of 0.25 hour per cwt. in the East and South to a low of 0.07 hour per cwt. in the West.

[2] See footnote 2, table 1.

TABLE 10.--Nectarines: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Tons*
California	108	150	84	70	91	241	10	6.71
Pacific	108	150	84	70	91	241	10	6.71
United States	108	150	84	70	91	241	10	6.71

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
California	84	75	3	57	246	62
Pacific	84	75	3	57	246	62
United States	84	75	3	57	246	62

[1] Nectarines have harvest labor requirements similar to those of peaches. To pick, load, and haul a ton of nectarines to storage or processor requires from 10 to 14 hours, depending on yield per acre. Farm grading, packing, and hauling to market requires an additional 10.5 hours per ton.

[2] See footnote 2, table 1.

TABLE 11.--Olives: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Tons*
California	58	50	107	---	107	157	0	1.78
Pacific	58	50	107	---	107	157	0	1.78
United States	58	50	107	---	107	157	0	1.78

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
California	75	23	6	21	149	21
Pacific	75	23	6	21	149	21
United States	75	23	6	21	149	21

[1] Olives usually require about 60 hours per ton to harvest and haul to a processor. Separate farm grading requirements were not established as more than 99 percent of the 1954 crop was delivered to processors.
[2] See footnote 2, table 1.

TABLE 12. --Peaches: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Bushels*
New Hampshire	80	60	29	9	38	98	100	44
Massachusetts	85	62	49	20	63	125	70	98
Rhode Island	100	65	67	30	82	147	50	149
Connecticut	85	60	57	25	77	137	80	127
New York	90	57	55	18	71	128	90	123
New Jersey	90	75	70	30	91	166	70	201
Pennsylvania	90	75	70	26	88	163	70	176
Delaware	90	65	83	55	121	186	70	276
Maryland	90	65	76	38	103	168	70	190
Northeast	90	70	66	25	85	155	75	168
Ohio	90	60	58	26	79	139	80	128
Indiana	80	55	65	29	91	146	90	145
Illinois	85	60	70	35	98	158	80	175
Missouri	75	52	36	14	47	99	80	72
Corn Belt	83	57	56	25	76	133	81	126
Michigan	90	60	56	19	66	126	55	124
Lake States	90	60	56	19	66	126	55	124
Kansas	70	50	31	12	36	86	40	62
Northern Plains	70	50	31	12	36	86	40	62
Virginia	90	60	53	23	69	129	70	152
West Virginia	80	55	61	35	85	140	70	173
North Carolina	85	60	48	19	61	121	70	92
Kentucky	85	58	46	19	59	117	70	91
Tennessee	90	60	32	13	45	105	100	63
Appalachian	86	59	50	22	66	125	73	121
South Carolina	95	70	50	17	58	128	50	111
Georgia	95	70	46	14	53	123	50	92
Florida	100	70	23	7	26	96	40	44
Alabama	85	90	41	16	53	143	75	82
Southeast	94	72	47	16	56	128	53	100
Mississippi	60	65	18	6	22	87	70	28
Arkansas	85	90	26	8	32	122	75	42
Louisiana	80	80	12	4	15	95	70	19
Delta States	80	85	24	7	29	114	74	38
Oklahoma	50	65	6	1	7	72	70	5
Texas	60	65	8	2	9	74	50	9
Southern Plains	57	65	7	2	8	73	56	8
Idaho	85	72	59	30	74	146	50	148
Colorado	115	140	80	40	100	240	50	265
New Mexico	80	65	58	29	72	137	50	144
Utah	105	75	51	25	61	136	40	134
Mountain	105	107	68	34	84	191	47	203
Washington	90	145	55	--	55	200	0	137
Oregon	85	150	22	7	23	173	20	34
California	90	150	82	61	88	238	10	407
Pacific	90	149	77	56	82	231	9	364
United States	88	92	56	21	66	158	49	181

See footnotes on page 34.

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TABLE 12. --Peaches: Labor used per acre, by States and regions, 1954[1]--Continued

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
New Hampshire	90	59	4	45	219	44
Massachusetts	93	60	3	35	165	41
Rhode Island	110	71	3	35	176	44
Connecticut	92	60	3	34	162	40
New York	97	63	3	34	165	41
New Jersey	94	61	3	28	145	36
Pennsylvania	97	63	3	23	132	33
Delaware	94	61	3	26	139	35
Maryland	94	61	3	28	145	36
Northeast	96	62	3	27	143	36
Ohio	90	59	3	30	149	37
Indiana	90	56	3	31	149	37
Illinois	90	59	4	31	183	37
Missouri	81	53	3	32	149	37
Corn Belt	88	57	3	31	150	37
Michigan	97	63	3	30	153	38
Lake States	97	63	3	30	153	38
Kansas	76	50	4	30	170	34
Northern Plains	76	50	4	30	170	34
Virginia	92	60	3	32	156	39
West Virginia	84	60	3	25	135	34
North Carolina	90	61	3	40	181	45
Kentucky	88	57	3	38	171	43
Tennessee	94	50	3	35	155	39
Appalachian	90	59	3	36	167	42
South Carolina	99	65	3	40	185	46
Georgia	99	65	3	42	191	48
Florida	105	54	2	40	134	45
Alabama	88	40	2	30	100	33
Southeast	98	62	3	40	182	45
Mississippi	62	40	3	34	142	36
Arkansas	90	55	3	36	163	41
Louisiana	83	55	3	36	163	41
Delta States	80	50	3	35	155	39
Oklahoma	55	35	3	30	125	31
Texas	66	53	3	33	152	38
Southern Plains	62	47	3	32	143	36
Idaho	93	80	3	62	266	66
Colorado	120	100	3	75	325	81
New Mexico	83	75	3	57	246	62
Utah	110	75	3	50	225	56
Mountain	109	89	3	66	287	71
Washington	90	85	3	55	250	62
Oregon	90	80	3	60	260	65
California	90	60	3	50	210	52
Pacific	90	62	3	51	215	53
United States	91	61	3	40	181	45

See footnotes on page 34.

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Footnotes for Table 12.

[1] The number of man-hours required to pick, load, and haul a bushel of peaches to storage or processor varies according to yield and other factors. For the East and South, labor requirements are somewhat higher than for the West where irrigated acres yield consistently larger crops. The range in hours per bushel with different yields is as follows:

Yield per acre (bushels)	Man-hours per bushel	
	East and South	West
Less than 100	0.50 - 0.65	0.50 - 0.65
100 - 199	.40 - .50	.35 - .50
200 - 299	.30 - .40	.30 - .35
300 - 399	.25 - .30	.25 - .30
400 and over		.20 - .25

Peaches usually require an additional 0.15 - 0.20 hour of labor per bushel to farm grade, pack, and haul to market.
[2] See footnote 2, table 1.

TABLE 13. --Pears: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Bushels*
Massachusetts	60	32	16	5	18	50	50	27
Connecticut	60	32	39	13	45	77	50	71
New York	75	35	36	8	42	77	70	65
Pennsylvania	70	34	36	10	43	77	70	81
Northeast	72	34	35	9	41	75	68	67
Ohio	65	36	29	3	33	69	50	52
Indiana	65	20	36	15	40	60	30	81
Illinois	60	34	23	7	27	61	50	38
Missouri	55	32	28	9	32	64	50	51
Corn Belt	61	33	27	9	31	64	49	49
Michigan	85	35	41	11	44	79	30	91
Lake States	85	35	41	11	44	79	30	91
Kansas	50	30	23	7	24	54	10	38
Northern Plains	50	30	23	7	24	54	10	38
Virginia	45	30	47	19	57	87	50	105
West Virginia	40	28	47	19	57	85	50	104
North Carolina	40	28	38	13	39	67	10	70
Kentucky	50	32	37	15	40	72	20	83
Tennessee	55	34	41	16	44	78	20	90
Appalachian	46	30	42	18	47	77	29	90
South Carolina	45	30	26	8	27	57	10	44
Georgia	50	32	34	11	37	69	30	61
Florida	45	30	38	12	39	69	10	69
Alabama	45	30	34	11	37	67	30	61
Southeast	47	31	33	11	36	67	24	60
Mississippi	45	30	29	10	32	62	30	53
Arkansas	45	30	13	4	14	44	30	21
Louisiana	40	28	19	6	20	48	10	32
Delta States	44	30	19	6	21	51	26	33

See footnotes on page 36.

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TABLE 13. --Pears: Labor used per acre, by States and regions, 1954[1]--Continued

BEARING ACREAGE--Continued

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Bushels*
Oklahoma	50	30	4	1	4	34	10	4
Texas	50	30	8	2	8	38	20	13
Southern Plains	50	30	7	2	7	37	17	10
Idaho	100	110	58	39	89	199	80	215
Colorado	100	110	77	34	104	214	80	284
Utah	100	100	56	25	76	176	80	207
Mountain	100	105	63	30	87	192	80	232
Washington	70	120	76	37	78	198	5	306
Oregon	75	115	65	29	68	183	10	239
California	90	105	86	51	104	209	35	429
Pacific	82	111	79	48	90	201	22	359
United States	78	89	66	32	75	164	28	276

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Massachusetts	65	46	5	30	196	33
Connecticut	65	46	5	30	196	33
New York	81	57	5	32	217	36
Pennsylvania	74	52	5	31	207	34
Northeast	76	54	5	31	209	35
Ohio	69	48	5	34	218	36
Indiana	69	48	5	34	218	36
Illinois	64	45	5	33	210	35
Missouri	58	41	5	30	191	32
Corn Belt	65	46	5	33	211	35
Michigan	86	48	5	39	243	40
Lake States	86	48	5	39	243	40
Kansas	55	42	5	30	192	32
Northern Plains	55	42	5	30	192	32
Virginia	47	34	5	30	184	31
West Virginia	46	34	5	30	184	31
North Carolina	42	34	5	29	179	30
Kentucky	52	36	5	30	186	31
Tennessee	58	41	5	30	191	32
Appalachian	50	36	5	30	186	31
South Carolina	47	34	5	30	184	31
Georgia	52	36	5	30	186	31
Florida	47	34	5	30	184	31
Alabama	47	34	5	30	184	31
Southeast	49	35	5	30	185	31

See footnotes on page 36.

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TABLE 13.--Pears: Labor used per acre, by States and regions, 1954[1]--Continued

NONBEARING ACREAGE--Continued

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Mississippi	47	34	5	30	184	31
Louisiana	47	34	5	30	184	31
Arkansas	42	34	5	30	184	31
Delta States	46	34	5	30	184	31
Oklahoma	58	41	5	32	201	34
Texas	58	41	5	32	201	34
Southern Plains	58	41	5	32	201	34
Idaho	110	87	5	65	412	69
Colorado	104	83	5	65	408	68
Utah	104	70	5	45	295	49
Mountain	105	78	5	56	358	60
Washington	90	80	5	60	380	63
Oregon	78	65	5	65	390	65
California	92	74	5	65	399	66
Pacific	88	74	5	63	389	64
United States	81	63	5	52	323	53

[1] The numbers of man-hours expended to pick, load, and haul a bushel of pears to storage or processor ordinarily range from 0.20 to 1.0 hour. Yield per acre is the main variable factor. With the low yields of the East and South, harvest labor requirements are high as indicated by the ranges below:

Yield per acre (bushels)	Man-hours per bushel	
	East and South	West
Under 50	0.60 - 1.0	--
50 - 139	.35 - .60	--
140 - 199	.30 - .35	0.30 - 0.35
200 - 299	.25 - .30	.27 - .30
300 - 399	--	.25 - .27
400 and over	--	.20 - .25

Pears that are farm graded, packed, and hauled to market usually require an additional 0.10 - 0.25 hour per bushel, depending on the extent of grading and the efficiency of the packing operation.

[2] See footnote 2, table 1.

TABLE 14.--Persimmons: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Tons.*
California[3]	92	85	89	62	120	205	50	3.87
Pacific	92	85	89	62	120	205	50	3.87
United States	92	85	89	62	120	205	50	3.87

See footnotes on page 37.

TABLE 14.--Persimmons: Labor used per acre, by States and regions, 1954[1]--Continued

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
California[3]	221	30	9	10	120	12
Pacific	221	30	9	10	120	12
United States	221	30	9	10	120	12

[1] Harvest labor requirements range from 20 to 25 man-hours per ton to pick, load, and haul to storage or processor, and about 16 hours per ton to farm grade, pack, and haul to market.
[2] See footnote 2, table 1.
[3] Trees per acre estimated from Special Publication 261, California Fruit and Nut Crop, 1956.

TABLE 15.--Pineapples: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Plants per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Crates*[3]
Florida	10,000	63	203	40	243	306	100	405
Southeast	10,000	63	203	40	243	306	100	405
United States	10,00	63	203	40	243	306	100	405

NONBEARING ACREAGE

State and region	Plants per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Florida	10,000	145	1	50	195	98
Southeast	10,000	145	1	50	195	98
United States	10,000	145	1	50	195	98

[1] Harvest labor requirements for pineapples range from 0.50 to 0.75 man-hour per crate to pick, load, and haul to storage or processor, and 0.10 hour per crate to trim, grade, pack, and haul from farm to market.
[2] See footnote 2, table 1.
[3] 70 pounds net.

TABLE 16.--Plums: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
Michigan	76	40	63	37	78	118	40	5,494
Lake States	76	40	63	37	78	118	40	5,494
California	90	50	45	43	79	129	80	6,476
Pacific	90	50	45	43	79	129	80	6,476
United States	88	49	47	43	79	128	75	6,357

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age[3]	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Michigan	80	55	4	35	195	39
Lake States	80	55	4	35	195	39
California	80	35	5	31	190	32
Pacific	80	35	5	31	190	32
United States	80	40	5	32	200	33

[1] The numbers of man-hours required to pick, load, and haul a cwt. of plums to storage or processor generally range from 0.70 to 0.90. The influence of yield on man-hour requirements per unit is as follows:

Yield per acre (cwt.)	Man-hours per cwt.
Under 40	0.90
40 - 59	.80
60 and over	.70

For that part of the crop that is farm graded, packed, and hauled to market an additional 0.65 hour is required to conduct these operations.

[2] See footnote 2, table 1.

[3] U. S. average greater than figure for either State because of rounding years required to maintain trees to production.

TABLE 17.--Pomegranates: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Tons*
California	97	40	247	27	266	306	70	5.26
Pacific	97	40	247	27	266	306	70	5.26
United States	97	40	247	27	266	306	70	5.26

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
California	152	60	4	35	200	40
Pacific	152	60	4	35	200	40
United States	152	60	4	35	200	40

[1] Harvest labor requirements range from 40 to 50 hours to pick, load, and haul a ton of pomegranates to storage or processor, with an additional 5 to 7 hours per ton to grade, pack, and haul to market that part of the crop that is prepared on the farm for the fresh market.

[2] See footnote 2, table 1.

TABLE 18.--Prunes: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds (fresh)*
Idaho	92	50	72	27	96	146	90	9,002
Mountain	92	50	72	27	96	146	90	9,002
Washington	90	50	80	---	80	130	0	5,683
Oregon	95	60	45	10	55	113	80	5,199
California	85	51	66	9	71	122	60	9,492
Pacific	86	52	64	9	70	122	60	8,811
United States	87	52	64	10	70	122	61	8,816

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Idaho	102	61	5	46	291	48
Mountain	102	61	5	46	291	48
Washington	90	75	5	45	300	50
Oregon	102	61	5	46	291	48
California	80	35	5	31	190	32
Pacific	85	40	5	34	210	35
United States	85	41	5	35	216	36

[1] Prunes require slightly more labor to harvest than do fresh plums. The number of man-hours required to knock, pick, load, and haul to storage, drying shed, or processor varies with yield per acre as shown below:

Yield per acre (pounds)	Man-hours per cwt.
Less than 5,000	0.90
5,000 - 6,999	.86
7,000 - 8,999	.83
9,000 and over	.80

That part of the crop sun-dried on the farm will require an additional 0.10 hour per cwt. (fresh basis), while the part sold to the fresh fruit trade will require approximately 0.30 hour per cwt. to farm grade, pack, and haul to market.

[2] See footnote 2, table 1.

TABLE 19.--Oranges, Navel: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Field boxes*[3]
Arizona	115	45	106	---	106	151	0	287
Mountain	115	45	106	---	106	151	0	287
California[4]	93	50	82	---	82	132	0	200
Pacific	93	50	82	---	82	132	0	200
United States	93	50	82	---	82	132	0	202

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Arizona	117	71	5	56	351	58
Mountain	117	71	5	56	351	58
California[4]	80	55	5	45	280	47
Pacific	80	55	5	45	280	47
United States	82	56	5	46	288	48

[1] The number of man-hours required to pick, load, and haul a field box of oranges to storage or processor is determined by many factors. Two of the more important of these are type of orange and yield per acre. Navel and other oranges require slightly less harvest labor per box than do valencias. The ranges in hours per box for different yields are as follows, with the lower limit for navel and other oranges and the upper limit for valencias.

Yield per acre (field boxes)	Man-hours per box
Under 200	0.30 - .35
200 - 249	.27 - .30
250 - 299	.23 - .25
300 and over	.18 - .20

Labor requirements for farm grading and packing of oranges were not estimated, as most of the crop is graded and packed off the farm by nonfarm workers.

[2] See footnote 2, table 1.

[3] 77 pounds.

[4] California, "other" oranges included with navel.

TABLE 20.--Oranges, Valencia: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Field boxes*[3]
Florida	65	35	66	---	66	101	0	264
Southeast	65	35	66	---	66	101	0	264
Texas	95	40	20	---	20	60	0	34
Southern Plains	95	40	20	---	20	60	0	34
Arizona	90	41	60	---	60	101	0	248
Mountain	90	41	60	---	60	101	0	248
California	86	50	45	---	45	95	0	150
Pacific	86	50	45	---	45	95	0	150
United States	75	42	56	---	56	98	0	[4] 210

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Florida	70	37	4	30	157	31
Southeast	70	37	4	30	157	31
Texas	100	75	5	45	300	50
Southern Plains	100	75	5	45	300	50
Arizona	90	57	5	48	297	50
Mountain	90	57	5	48	297	50
California	80	55	5	45	280	47
Pacific	80	55	5	45	280	47
United States	73	41	4	32	169	34

[1] See footnote 1, table 19.
[2] See footnote 2, table 1.
[3] 90 pounds in Florida and Texas, 77 pounds in Arizona and California.
[4] 86 pounds.

TABLE 21.--Oranges, Other: Labor used per acre, by States and regions, 1954[1 2]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[3]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Field boxes*[4]
Florida	65	35	67	---	67	102	0	269
Southeast	65	35	67	---	67	102	0	269
Louisiana	85	38	21	---	21	59	0	60
Delta States	85	38	21	---	21	59	0	60
Texas	95	40	35	---	35	75	0	99
Southern Plains	95	40	35	---	35	75	0	99
Arizona	90	41	63	---	63	104	0	272
Mountain	90	41	63	---	63	104	0	272
California[5]	---	---	---	---	---	---	---	---
Pacific	---	---	---	---	---	---	---	---
United States	66	35	65	---	65	100	0	[6] 262

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Florida	70	37	4	30	157	31
Southeast	70	37	4	30	157	31
Louisiana	90	40	5	30	190	32
Delta States	90	40	5	30	190	32
Texas	100	75	5	45	300	50
Southern Plains	100	75	5	45	300	50
Arizona	90	57	5	48	297	50
Mountain	90	57	5	48	297	50
United States	74	40	4	32	168	33

[1] Includes tangerines, mandarins, and satsumas.
[2] See footnote 1, table 19.
[3] See footnote 2, table 1.
[4] 90 pounds each for Florida, Louisiana, and Texas, 77 pounds for Arizona.
[5] California, "other" oranges included with navel oranges, table 19.
[6] 90 pounds.

TABLE 22.--Grapefruit: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Field boxes*[3]
Florida	65	35	76	---	76	111	0	381
Southeast	65	35	76	---	76	111	0	381
Texas	70	35	26	---	26	61	0	86
Southern plains	70	35	26	---	26	61	0	86
Arizona	90	42	72	---	72	114	0	483
Mountain	90	42	72	---	72	114	0	483
California	85	48	55	---	55	103	0	274
Pacific	85	48	55	---	55	103	0	274
United States	68	36	69	---	69	105	0	[4] 346

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Florida	70	37	4	30	157	31
Southeast	70	37	4	30	157	31
Texas	80	65	4	45	245	49
Southern Plains	80	65	4	45	245	49
Arizona	90	59	5	51	314	52
Mountain	90	59	5	51	314	52
California	80	55	5	45	280	47
Pacific	80	55	5	45	280	47
United States	75	51	4	38	203	40

[1] Grapefruit usually require from 0.15 to 0.30 man-hour of labor per field box to pick, load, and haul to storage or processor. The grapefruit crop is usually graded and packed by nonfarm workers. Therefore, farm labor requirements were not developed for these operations.

[2] See footnote 2, table 1.

[3] Florida and Texas field boxes average 80 pounds, Arizona and California boxes average 65 pounds.

[4] 78 pounds.

TABLE 23.--Lemons: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Field boxes*[3]
California	99	70	193	---	193	263	0	297
Pacific	99	70	193	---	193	263	0	297
United States	99	70	193	---	193	263	0	297

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
California	120	88	5	63	403	67
Pacific	120	88	5	63	403	67
United States	120	88	5	63	403	67

[1] The numbers of man-hours required to pick, load, and haul a field box of lemons to storage or processor usually range from 0.55 to 0.75 hour, depending on yield per acre and size of fruit. The ranges in hours per box for different yields are as follows:

Yield per acre (field boxes)	Man-hours per box
Under 200	0.75
200 - 299	.65 - .75
300 - 399	.60 - .65
400 and over	.55 - .60

As lemons are usually graded and packed in commercial packing sheds, no farm labor requirements were developed for these operations.

[2] See footnote 2, table 1.

[3] 79 pounds.

TABLE 24.--Limes: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
Florida	100	80	75	75	112	192	50	9,432
Southeast	100	80	75	75	112	192	50	9,432
United States	100	80	75	75	112	192	50	9,432

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Florida	180	54	3	30	144	36
Southeast	180	54	3	30	144	36
United States	108	54	3	30	144	36

[1] It usually takes from 15 to 18 hours to pick, load, and haul a ton of limes to storage or processor. Another 15 to 18 hours per ton is required to farm grade, pack, and haul the limes to market.
[2] See footnote 2, table 1.

TABLE 25.--Almonds: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
California	62	34	34	3	37	71	90	933
Pacific	62	34	34	3	37	71	90	933
United States	62	34	34	3	37	71	90	933

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
California	60	30	5	26	160	27
Pacific	60	30	5	26	160	27
United States	60	30	5	26	160	27

[1] The amount of labor used in harvesting almonds depends on yield per acre. The numbers of man-hours per cwt. to pick (knock), load, and haul to storage or processor range from 2.7 to 5.0 as indicated with the yields below:

Yield per acre (pounds)	Man-hours per cwt.
Under 500	5.0
500 - 899	3.5
900 - 1,199	3.0
1,200 and over	2.7

An additional 0.30 hour per cwt. is necessary to farm grade, pack, and haul to market.

[2] See footnote 2, table 1.

TABLE 26.--Filberts: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
Washington	85	30	23	8	25	55	20	545
Oregon	83	30	33	10	35	65	20	788
Pacific	83	30	32	10	34	64	20	765
United States	83	30	32	10	34	64	20	765

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Washington	100	51	4	24	147	29
Oregon	100	51	4	24	147	29
Pacific	100	51	4	24	147	29
United States	100	51	4	24	147	29

[1] Labor used to pick, load, and haul a cwt. of filberts to storage or processor depends on the method of harvesting and the yield. The quantity picked by hand is approximately 20 pounds per hour, while machine harvesting will average about 100 pounds per hour. The following ranges in man-hours for different yields per acre was developed with 80 percent of the acreage hand picked and the remaining 20 percent machine harvested.

Yield per acre (pounds)	Man-hour per cwt.
Under 500	6.0
500 - 799	5.0
800 - 1,099	4.6
1,100 and over	4.4

An additional 0.70 hour per cwt. of filberts is required to farm dry, grade, pack, and haul to market.

[2] See footnote 2, table 1.

TABLE 27.--Pecans, Improved: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
North Carolina[3]	14	20	19	1	19	39	30	85
Appalachian	14	20	19	1	19	39	30	85
South Carolina	17	20	18	1	19	39	90	126
Georgia	17	21	15	3	18	39	90	52
Florida	15	26	15	1	16	42	80	53
Alabama	14	18	16	1	17	35	80	57
Southeast	16	21	15	2	17	38	87	56
Mississippi	14	22	16	2	17	39	60	71
Arkansas	12	22	18	2	18	40	20	90
Louisiana	10	24	20	3	22	46	60	140
Delta States	12	23	18	2	19	42	55	100
Oklahoma	15	16	16	1	17	33	90	67
Texas	15	16	10	1	10	26	20	32
Southern Plains	15	16	11	1	11	27	32	48
New Mexico	20	30	41	10	51	81	100	507
Mountain	20	30	41	10	51	81	100	507
United States	15	20	16	3	18	38	72	71

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
North Carolina[3]	15	17	8	12	113	13
Appalachian	15	17	8	12	113	13
South Carolina	18	17	8	12	113	13
Georgia	18	17	8	11	105	12
Florida	16	20	8	12	116	13
Alabama	15	20	8	15	140	16
Southeast	17	18	8	12	114	13
Mississippi	15	19	8	9	91	10
Arkansas	13	22	8	15	142	16
Louisiana	11	26	8	21	194	22
Delta States	13	22	8	15	142	16
Oklahoma	16	20	8	15	140	16
Texas	16	20	8	18	164	18
Southern Plains	16	20	8	17	156	18

See footnotes at end of table.

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TABLE 27.--Pecans, Improved: Labor used per acre, by States and regions, 1954[1]--Continued

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
New Mexico	24	30	6	20	150	21
Mountain	24	30	6	20	150	21
United States	16	20	8	14	132	15

[1] The number of man-hours required to pick, load, and haul a cwt. of pecans to storage or processor depends primarily on two factors-yield per acre and whether the pecans are improved or wild. The ranges in hours per cwt. for different yields are shown below for both improved and wild pecans:

Yield per acre (pounds)	Man-hours per cwt.	
	Improved	Wild
Under 100	18.0	20.0
100 - 199	12.0	14.0
200 - 299	11.0	13.0
300 - 499	10.0	11.0
500 and over	8.0	9.0

When farmers grade and pack their crop on the farm and haul it to market they incur an additional 0.20 man-hour per cwt. for improved and 0.30 man-hour for wild pecans.

[2] See footnote 2, table 1.

[3] Improved and wild pecans were combined for North Carolina in 1954 by the census. Estimates of numbers of trees and production were made on the basis of the 1950 census when these varieties were reported separately. In 1950, 91.7 percent of the bearing trees were of improved varieties producing 90.7 percent of the crop. Of the nonbearing trees, 90.8 percent were improved varieties.

TABLE 28.--Pecans, Wild: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE[2]

State and region	Trees per acre	Man-hours used per acre[3]					Percentage of crop farm graded and packed	Yield per acre, 1954[4]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
North Carolina[5]	14	0	21	2	21	21	20	89
Appalachian	14	0	21	2	21	21	20	89
South Carolina	17	0	22	2	24	24	80	123
Georgia	17	0	21	4	24	24	80	80
Florida	15	0	21	2	22	22	70	70
Alabama	14	0	18	2	20	20	80	61
Southeast	16	0	20	3	22	22	78	73
Mississippi	14	0	20	2	22	22	80	75
Arkansas	12	0	19	3	21	21	60	82
Louisiana	10	0	17	2	19	19	80	48
Delta States	11	0	18	2	20	20	78	58
Oklahoma	15	0	13	1	14	14	90	35
Texas	15	0	16	2	16	16	15	53
Southern Plains	15	0	15	1	15	15	45	46
United States	15	0	16	2	17	17	51	50

[1] To derive man-hours and yields on an acreage basis, trees per acre are assumed to be the same as for improved pecans.

[2] Labor requirements were developed for bearing acreage only, as wild pecans are established by nature and have no establishment and maintenance labor.

[3] See footnote 1, table 27.

[4] See footnote 2, table 1.

[5] See footnote 3, table 27.

TABLE 29.--Walnuts: Labor used per acre, by States and regions, 1954[1]

BEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre					Percentage of crop farm graded and packed	Yield per acre, 1954[2]
		Pre-harvest	Harvest			Total		
			To pick, load, and haul	To farm grade, pack, and market	All			
	Number	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Percent*	*Pounds*
Oregon	22	16	25	3	25	41	10	892
California	22	19	32	4	32	51	10	1,183
Pacific	22	19	31	4	31	50	10	1,145
United States	22	19	31	4	31	50	10	1,145

NONBEARING ACREAGE

State and region	Trees per acre	Man-hours used per acre				
		To establish orchard	To maintain orchard		Total to bearing age	Annual average
	Number	*Hours*	*Years*	*Hours per year*	*Hours*	*Hours*
Oregon	27	34	9	14	160	16
California	27	25	8	16	153	17
Pacific	27	25	8	16	153	17
United States	27	25	8	16	153	17

[1] The number of man-hours needed per acre to pick, load, and haul a cwt. of walnuts to storage or processor depends primarily on such factors as yield per acre, mechanization of harvest, and the number of operations performed by farmworkers.

Numbers of man-hours for different yields per acre to pick, load, and haul to storage or processor with present levels of mechanization are as follows:

Yield per acre (pounds)	Man-hours per cwt.
Under 400	6.0
400 - 599	4.5
600 - 799	3.2
800 - 999	2.8
1,000 and over	2.7

Farm grading and packing, and hauling to market add an additional 0.30 hour per cwt. of walnuts.

[2] See footnote 2, table 1.

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