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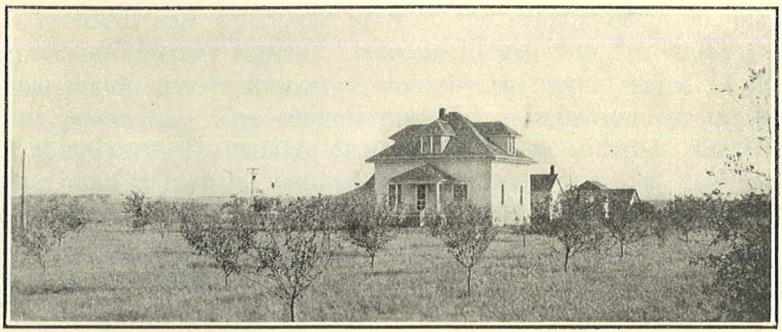
Establishing the Home Orchard



THE UNIVERSITY OF NEBRASKA
COLLEGE OF AGRICULTURE
EXTENSION SERVICE
LINCOLN

ESTABLISHING THE HOME ORCHARD

R. F. Howard and E. H. Hoppert

Is it worth while to grow fruit for home use? This question is constantly presenting itself to hundreds of farmers in Nebraska, as well as to persons living in towns and cities who have some space which could be devoted to fruit plants. Almost everyone is agreed that a home orchard is a desirable asset to the farm, provided it can be made to produce good fruit. The degree of success in growing fruit for the home depends first, upon a wise selection of varieties, and second, upon their subsequent care. The actual amount of time and expense necessary to give the home orchard proper care is not great.

Well-known methods of controlling most of the insects and diseases are now at our disposal. Certain varieties are known to be especially well adapted to our conditions of soil and climate. The person, therefore, who carefully plans and plants his orchard, and who later gives it the proper attention, may expect satisfactory returns. Success in growing fruits for the home should not be measured alone by the actual value of the fruit produced. The convenience and satisfaction of having an abundance of available fruit should be considered. On the other hand it may be assumed that an orchard which does not receive a reasonable amount of attention with regard to pruning, spraying and cultivation, will sooner or later be a disappointment to its owner.

The object of this bulletin is to offer definite suggestions for establishing and caring for the young orchard.

THE PLANTING PLAN

The home orchard should be large enough to meet the demands of the average family for the entire year. One acre or even less properly planned should provide not only sufficient fresh fruit but fruit for canning, drying and preserving as well. Farm orchards occupying two and three acres of land are not usually given the attention they deserve to make them productive. As a result of this the average 200-tree orchard does not produce the quality and quantity of fruit that a 25-tree orchard should produce.

LOCATION

In eastern Nebraska, the orchard should be located on relatively high ground in order to provide good air and soil drainage. Such a location permits the cold air, on frosty nights, to escape, thus reducing the injury caused by late spring frosts. Low, wet places should be avoided if possible. In certain parts of central and western Nebraska where the soil and moisture conditions make it difficult to grow trees, it is better to locate the orchard on low land.

WINDBREAKS

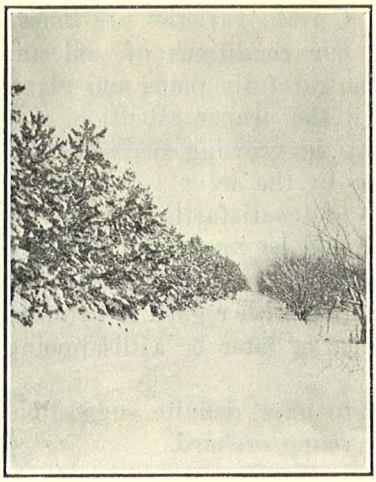


FIG. 1—An evergreen windbreak in proper relation to the orchard.

Windbreaks may be planted around the orchard to advantage. Where some species of pine can be grown with success, it is to be preferred to other trees. For this purpose the Scotch, Austrian and Bull Pine should be used in the eastern one-third of the state. The Jack and Bull Pine are the two best evergreens for windbreaks in central and western Nebraska. The Red Cedar should never be used because it is apt to transmit a fungous disease (cedar rust) to the apple trees. Other trees, such as Russian Olive and Russian Mulberry, may be used alone on the south side or with pines on the north and west exposures. The windbreak should not be near enough to the orchard to sap the ground occupied by the fruit trees, nor should it be near enough to cause excessive shading. Large trees, therefore, such as soft maple and cottonwood, should never be planted nearer than 60 to 80 feet to the orchard. Pine trees may be planted within 40 or 50 feet of the orchard. Unless the orchard is exposed in such a way as to

require protection, it is better to be without a windbreak than to have it too close to the fruit trees.

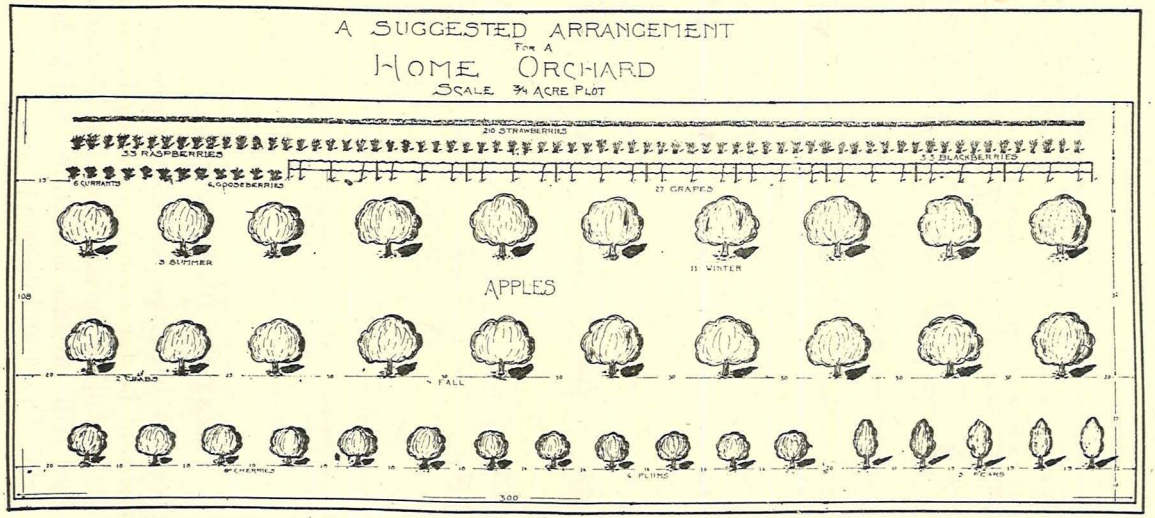


FIG. 2—A home orchard should contain a variety of fruits in proportion to the home needs. The productiveness of fruit plants and the ease with which they may be cared for depends largely on proper spacing and general arrangement. It is important to select fruits and varieties adapted to local conditions. In preparing the plan it is recommended that tables 1 and 2 and figure 4 be studied.

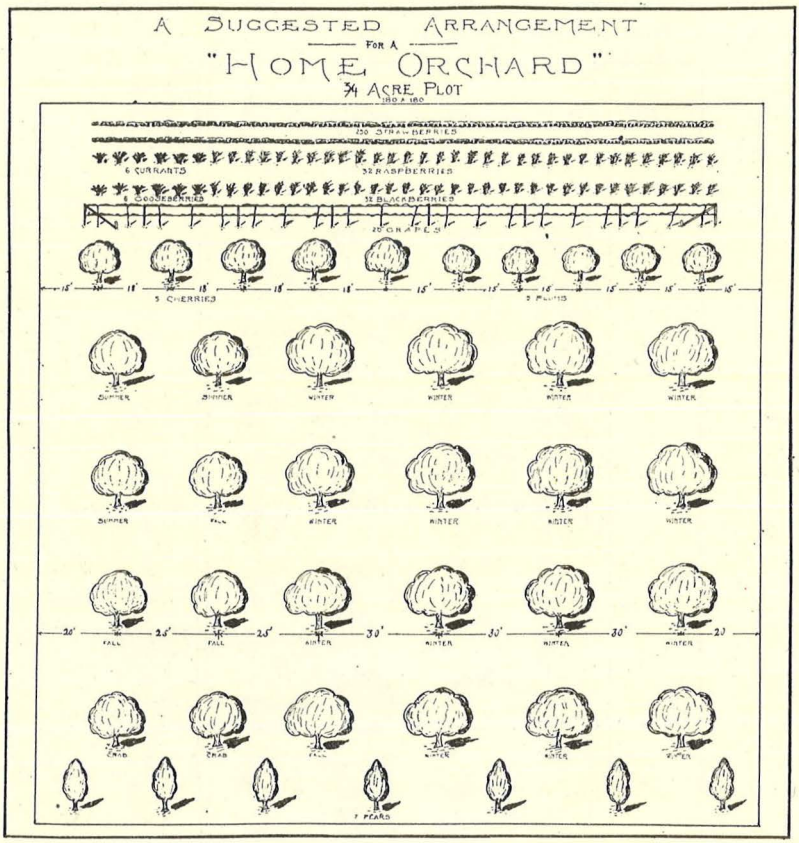


FIG. 3—A suggested arrangement for a planting plan where it is necessary to use a piece of ground that is approximately square.

PLANTING DISTANCES

Fruit trees should be given sufficient space to develop properly. They should be far enough apart to facilitate such orchard operations as cultivation and spraying. Trees planted too closely together will produce conditions which favor the development of certain insect and disease pests.

TABLE I. SUGGESTIONS FOR SPACING FRUIT TREES

Kind of Fruit	Distance Apart in the Row	Distance Between Rows
Apples	25-33 feet	30-35 feet
Cherries, pears	16-20 feet	18-22 feet
Plums	15-18 feet	18-20 feet
Grapes	6- 8 feet	8- 9 feet
Blackberries, raspberries	3- 4 feet	7- 8 feet
Currants, gooseberries	4- 5 feet	6- 7 feet
Strawberries	12-15 inches	3½- 4 feet

SELECTION OF VARIETIES

Local conditions with regard to soil, moisture, and climate should always be considered when selecting varieties for an orchard. Some kinds of fruit can be grown in all parts of Nebraska. However, lack of moisture and low temperature in mid-winter would limit the selection in certain sections of the state to certain varieties that are known to be very hardy and drouth-resistant. Such varieties may not, in all instances, be of superior quality. Where growing conditions are more favorable, the choice may be made primarily on the basis of quality.

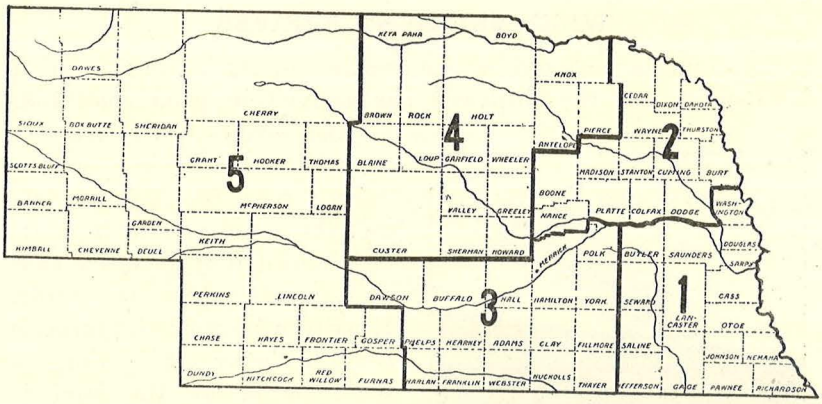


FIG. 4—The state is here divided into five sections in order to permit more specific recommendations regarding the selection and care of fruits for local conditions. In district 1, for example, the climate conditions are sufficiently favorable for tree growth that the selection of fruits may be made chiefly on the basis of quality, while the selection in district 5 should be made with some regard to hardiness and drouth resistance.

The varieties listed in Table II are regarded as standard sorts for Nebraska, tho it is realized that there are many other varieties which may be grown with varying degrees of success. An attempt has been made to designate the region in the state where they may be most appropriately planted. (See Table II.) The accompanying map (figure 4) shows the state divided into five fruit districts. It is realized, however, that the extent to which some of these varieties will succeed in a given locality will depend to a large degree upon the kind of cultural care they receive.

ORDERING THE PLANTS

Fruit trees are usually sold when they are either one or two years old. They are graded by the nurseryman for size and quality. Two-year-old trees have side branches formed and a somewhat larger root system than the younger trees. A good grade of tree is more important than the matter of whether or not it is one or two years old.

Tree and woody plants of all kinds do better in Nebraska when planted in early spring. The order should, therefore, be placed during the fall or winter months for spring delivery.

WHEN SHIPMENT ARRIVES

The package should be examined at the station to determine whether or not the shipment has arrived in good condition. If the plants are shriveled from excessive drying, or discolored from freezing or heating, the agent should be notified immediately in order that adjustments may be made. Usually a nursery shipment is received before it is time to plant or before the land is prepared. If the plants are to be held for a few days they should be stored under

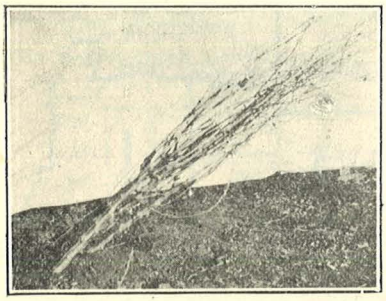


FIG. 5—When trees are received they should be unpacked and heeled-in until planting time.

conditions that will not injure them. It is good practice to unpack the plants immediately and either cover them in a cool cellar with damp dirt or sacks or heel them in out of doors, until it is time to plant. Many of the failures to get plants to live thru the first season may be attributed directly to the fact that they were allowed to become dry before planting time. If the cellar is used as a temporary storage place, the plants should be watered often enough to keep the roots moist. If upon unpacking the shipment it is deemed advisable to heel-in the plants out of doors, the following method may be used: Select a well-drained location. Dig a trench two feet deep and wide enough to freely admit the roots. Place the trees and plants in the trench in an inclined position. Cover the roots and one-half of the tops with a foot or more of moist dirt, as in figure 5. Trees and plants may be held in this way until they are to be transferred to the orchard.

TABLE II. SHOWING THE VARIETIES OF FRUITS SUITABLE FOR DIFFERENT PARTS OF THE STATE

Kind of Fruit	Variety	Districts Where They May Be Planted
Summer Apples	Oldenburg (Duchess)	1, 2, 3, 4, 5
	Yellow Transparent	1, 2, 3, 4, 5
	Chenango	1, 2, 3, 4
	Liveland	1, 2, 4
	Cole Quince	3
Autumn Apples	Wealthy	1, 2, 3, 4, 5
	Maiden Blush	1, 2, 3
	Fameuse (Snow)	1, 2, 3, 4
	Warfield	1, 2, 3
	Ramsdell	1, 2, 3
	Utter	2, 4, 5
Winter Apples	Jonathan	1, 2, 3
	Winesap	1, 2, 3, 5*
	Grimes	1, 2, 3
	York Imperial	1, 3
	Delicious	1, 2, 3, 4,*5*
	Rome Beauty	1
	Black Twig	1
	Willow Twig	1
	King David	1
	Genet	1, 2, 3, 4, 5

* For trial.

Kind of Fruit	Variety	Districts Where They May Be Planted
Winter Apples	Salome	2, 4, 5
	Iowa Blush	2, 4, 5
	Missouri Pippin	1, 2, 3
	Windsor	2
	Walbridge	4, 5
	N. W. Greening	4, 5
	McIntosh	2* 4* 5*
Crab Apples	Florence	1, 2, 3, 4, 5
	Hyslop	1, 2, 3, 4
	Whitney	1, 2, 3, 4, 5
Pears	Sheldon	1, 2, 3, 4, 5
	Flemish Beauty	1, 2, 3, 4, 5
	Duchess	1
	Kieffer	1, 2, 3, 4, 5
	Louise Bon	1, 2, 4
Plums	Burwood	1, 2, 3, 4,*5*
	Omaha	1, 2, 3, 4,*5*
	Wauneta	1, 2, 3, 4, 5
	Hanska	1, 2, 3, 4, 5
	Compass Cherry	2‖ 3‖ 4‖ 5‖
	Wyant	1, 2, 3, 4, 5
	Forest Garden	1, 2, 3, 4, 5
	Stoddard	1, 2, 5
	Lombard	1
	Imperial Gage	1
Cherries	Early Richmond	1, 2, 3, 4, 5
	Montmorency	1, 2, 3, 4, 5
	Eng. Morello	1, 2, 3, 4, 5
Peaches	Russell	1§
	Champion	1§
	Wright	1§
	Crosby	1§
Grapes	Concord	1, 2, 3, 4† 5†
	Moore Early	1 3, 4†
	Worden	1, 2, 3, 4†
	Brighton	1, 2, 3
	Niagara	1, 2, 3
	Beta	4† 5†
Blackberries	Snyder	1, 2, 3

Kind of Fruit	Variety	Districts Where They May Be Planted
Raspberries	Cumberland (Black)	1, 2, 3, 4
	Cardinal (Purple)	1, 2, 3
	Columbian (Purple)	4* 5*
	St. Regis (Red)	1‡ 2‡ 3‡ 4‡ 5‡
Gooseberries	Oregon Champion	1, 2, 3
	Houghton	1, 2, 3, 4, 5
	Downing	1, 2, 3, 4
Currants	Perfection	1, 2, 3, 4
	Cherry	1, 2, 3
	North Star	1, 2, 3, 4, 5
	White Grape	1, 2, 3
	Pomona	5
	Victoria	5
Strawberries	Senator Dunlap	1, 2, 3, 4, 5
	Warfield	1, 2, 3, 4
	Progressive	1¶ 2¶ 3¶ 4¶ 5¶

*For trial.
‖ Jam and jelly.
§ Limited plantings only.
† Protection.
‡ Fall bearing.
¶ Everbearing.

PREPARATION OF LAND

The land which is to receive the orchard should be rich enough to enable the plants to make a satisfactory growth. It should contain sufficient humus to hold moisture well and to prevent baking. New land or land that has had clover or alfalfa in the crop rotation makes a desirable place for the orchard. It is desirable to plant the orchard on land that has been given clean cultivation the previous season. Where the land is in sod it should be fall plowed. Old land that has been farmed to grain for several years can be converted into a desirable orchard site either by adding well-rotted barnyard manure in generous quantities or by growing and incorporating a green manure crop such as red clover into the soil.

PLANTING

A planting plan as shown in figures 2 and 3 enables one to simplify the planting operation by locating the position of each plant by means of a stake. The hole that is to receive the tree

or plant should be freshly dug and large enough to permit the roots to assume a normal spread-out position. When removing the plants from their heeled-in position, every precaution should be taken to prevent the roots from drying out. A large proportion of the trees often die the first year in the orchard. This is due no doubt to the fact that the roots have been exposed to the sun and wind during the planting operation. This loss may be prevented by keeping the roots wrapped in a wet gunny sack while the tree is being moved. Another method often employed to prevent the roots from drying out is to dip the roots in a barrel or pail of thin mud as soon as the trees are taken from the heeled-in place. A wet gunny sack should then be thrown over the roots until the tree is planted.

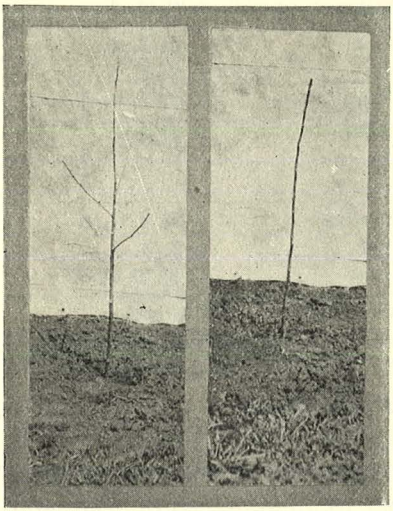


FIG. 6—The picture at the left shows a two-year-old apple tree pruned. The scaffold branches are on different sides of the trunk and distributed at different heights in order to prevent crotches. The picture at the right shows the method of pruning a one-year-old tree at the time it is set.

The important things to bear in mind when planting a tree are: (1) Some loose, moist, rich dirt should be in the bottom of the hole; (2) the tree should be set three or four inches deeper than it stood in the nursery; (3) the lowest permanent branch should be on the southwest side; (4) the dirt should be firmed at least twice during the planting process; and (5) the last two or three inches should be left unpacked as a mulch. The mistake is often made in planting trees and other plants of not getting the soil packed firmly about the roots or of even allowing air space under and about the roots. This may be prevented if one will use his hands early in the planting process and draw the dirt under the crown of the root system. One should then

shake the tree or plant gently up and down as more dirt is applied and firmed.

If the soil becomes dry enough to endanger the plant, water should be added. The application of water should be sufficient to moisten the roots. In applying the water one may create a basin around the tree which should be filled with dry dirt or a light litter mulch after the water has been absorbed. This prevents the surface from baking.

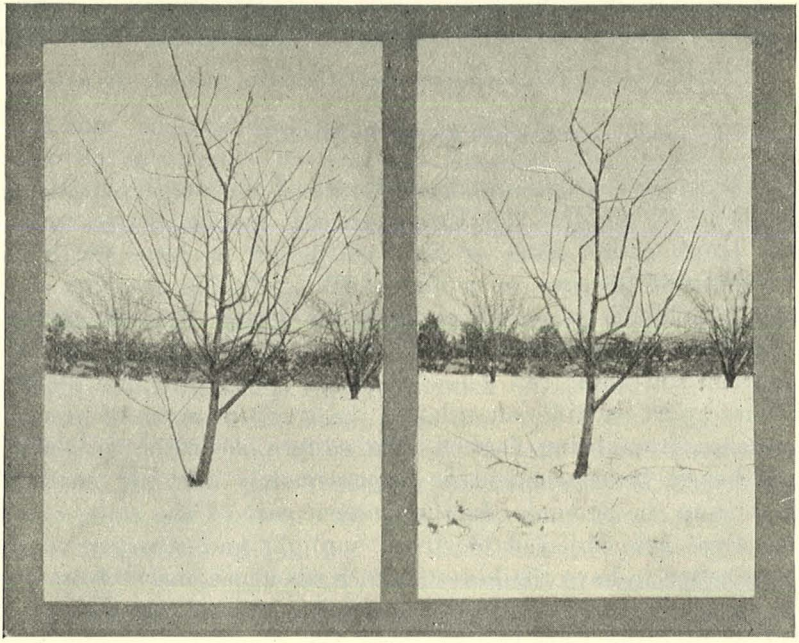


FIG. 7—Young fruit trees should be pruned moderately each spring before growth begins. This picture shows a five-year-old apple tree before and after pruning. The branches that were removed interfered with the proper development of the tree. The short twigs have been left on the permanent branches to induce the formation of fruit spurs.

PRUNING AND TRAINING

Young trees and plants should be pruned at the time they are set in the orchard. The pruning at this time should consist mainly in reducing the wood of the top and in cutting away any broken or bruised roots.

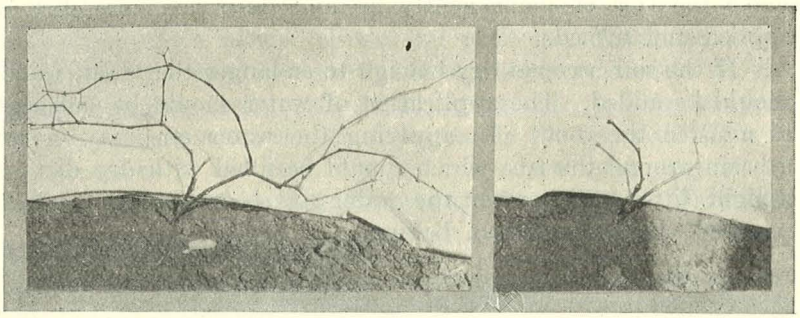


FIG. 8—The grapevine, after one season's growth, should be pruned in this manner.

APPLES AND PEARS

When giving this initial pruning the following things should be kept in mind: (1) Prune off all branches close up to the trunk except three or four which are to form the main branches of the tree, as in figure 6B. (2) The branches that are left should be cut off eight or ten inches from the trunk. (3) The lowest branch should be on the southwest side to prevent sun-scald. (4) These branches should be four or five inches apart on different sides of the trunk in order to prevent crotches from being formed. In eastern Nebraska generally, the lowest branch should be approximately one and one-half feet from the ground. In the western part of the state where the trees are subjected to strong sunlight and stronger winds it is better to have the lowest branch about six inches from the ground. If trees one year old are being planted, cut the trunk off at planting time two or three feet above the ground and follow the above suggestions one year later for heading the tree.

If the young tree is given a moderate pruning each year it will not be necessary to remove large branches when it reaches bearing age. For the first five or six years attention should be given to removing the crossed branches as well as other twigs that tend to grow where they will interfere with the principal branches. For the first two or three years, the leading branches should be headed in to about one-half the previous

season's growth to prevent them from becoming lanky. After this, heading in should be avoided if possible or at least reduced in amount. The trees will be induced to fruit at an earlier age and they will attain a larger size, if the pruning is reduced to a minimum the fourth, fifth, and sixth years. At this time it is also advisable to leave many of the young spurs that start from the large branches or to clip them back to a single bud to induce the formation of fruit spurs. In general, severe pruning induces vegetable growth and rank growth retards fruit bud formation.

CHERRIES AND PLUMS

Either one-year-old or two-year-old cherry trees may be used for planting. In Nebraska the sour cherries are almost exclusively grown. The most common varieties in this group are Early Richmond, Montmorency, and English Morello, tho the Dyehouse and Wragg may also be grown.

Cherries should not be pruned as severely as apples either at the time of setting or later. At planting time all broken or damaged branches should be cut off close up to the trunk. Four or five branches well distributed on the trunk should be left to form the main part of the top. All other limbs should be cut off. The central leader may be left since a cherry tree will of its own accord form a round head. If the lateral branches which are left are not more than one and one-half feet long they should not be cut back at planting time. Pruning, the second year, should consist in removing young branches that cross or interfere with the ones which were left the previous year. For the next few years the pruning should consist only in removing young branches when they are crowding or when they are in an unhealthy condition. It is not advisable to clip off the ends of the branches, because the strongest buds are near the tip ends. When it is necessary to prune a branch, remove it entirely by making the cut back to a larger branch or at the trunk.

Pruning the plum at the time it is set should consist in cutting off the central leader about two feet from the ground.

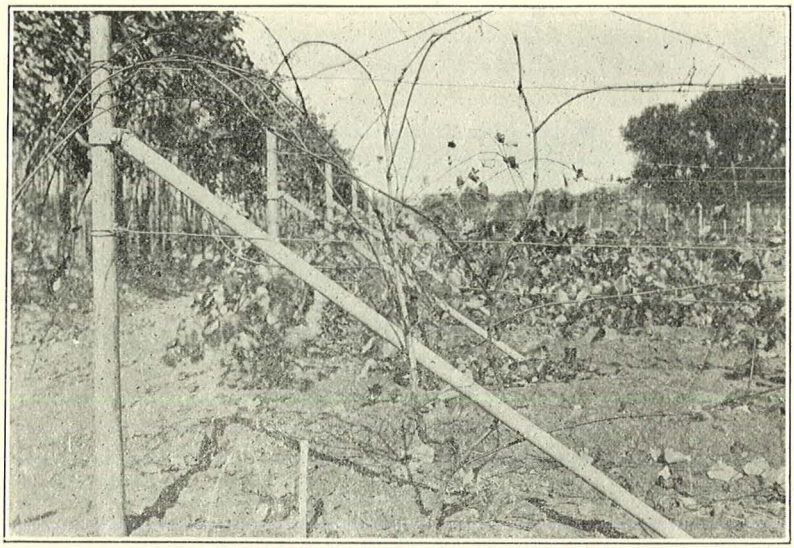
If the young tree is branched cut off all but four or five limbs and reduce these to a few inches in length. The pruning in later years should consist mainly in removing branches that interfere with others, and in heading—in the one-year-old wood on extra long lateral branches. Bearing plum trees do not need as much pruning as apple trees.

GRAPES

When the young grapevine is first set in early spring it should be pruned to one cane, leaving only two or three buds. A few weeks after growth starts all but the strongest shoot should be removed. It is well to provide a stake to which the vine may be tied either the first or second season. The pruning one year from the time the plant is set should include cutting off all the previous season's growth but two to four buds, depending upon the vigor of the plant. During the growing season following this pruning, shoots that tend to grow from near the ground should be pulled off, thus inducing the formation of a long upright trunk. Two trellis wires should be provided by this time and the trunk tied securely to both in upright position. The second spring after the plant is set the trunk should be cut off at the height of the top trellis wire. The summer following this the vine will produce some vigorous lateral canes, some of which may bear fruit. The third spring four lateral canes (figure 10A) of the previous season's growth should be left and tied to the trellis wires. These should be cut back to a length of two feet. All other growth coming from the trunk should be pruned off.

After the third year, pruning each season should be done with a view of leaving the proper amount of fruiting wood and maintaining the desired shape for the vine. This will involve cutting away from one-half to three-fourths of the growth that was made the previous season because four or five of last year's canes when left will furnish all the fruiting wood the vine should support. These fruiting canes should be cut back to a length of two and one-half to four feet depending upon the vigor of the vine. Each year after the pruning is

FIG. 9—After the grapevine has made its second season's growth it should be pruned and tied to the trellis wire.



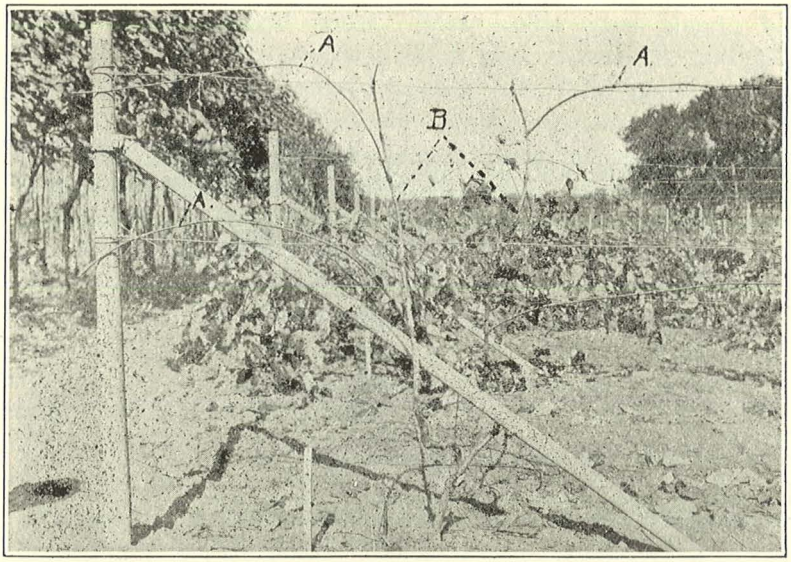


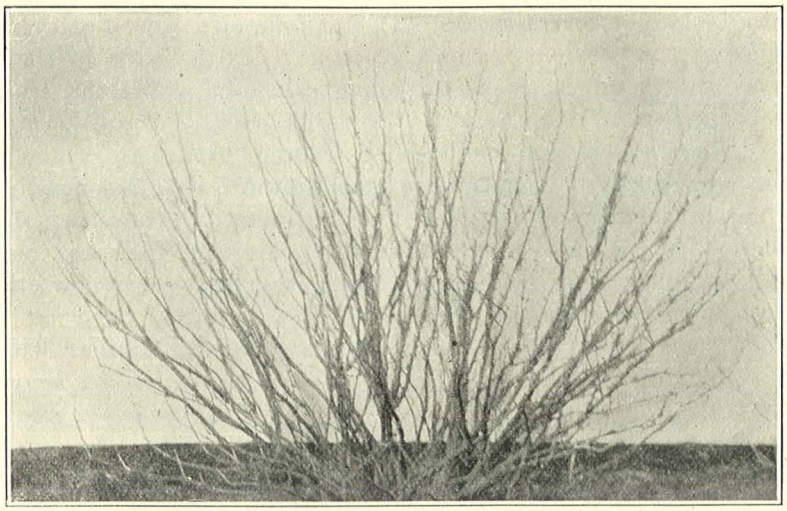
FIG. 10—A three-year-old grapevine before and after pruning. All the growth made the third season has been cut away except the four fruiting canes shown at (A). The following season's shoots will be produced from the buds on these canes, on which the fruit will be borne.

done the vine should consist of a trunk (figure 10B) (which may be two or several years old) and four or five well-matured canes of the previous season's growth. It is the buds on these canes that produce shoots or young canes on which the fruit is borne.

There are several methods of training grapes in commercial use. Some of them involve pruning the vine in a somewhat different manner from that described above. However, the method here described of pruning to a few long fruiting canes and training these to two or three trellis wires is simple and probably the most convenient for the small grower.

It will be an aid to the person who is not familiar with pruning grapes to remember that *the vine must have a heavy annual pruning in order to renew the fruit bearing wood.* In order to be sure that the proper kind of wood is left it is also well to remember that *grapes are borne on the small shoots of the present season which grew from canes of the previous season.* One should not allow the vine to accumulate an excessive amount of old wood. This may be prevented by occasionally selecting a fruiting cane which has been produced from old wood and cutting away everything above it. One may even allow a shoot which has been produced from near the ground to attain an age of two years with fruiting wood attached and then cut away the old trunk, thus renewing the whole top. This should only be done, however, when the vine becomes so old and woody that it is making an unsatisfactory growth or when some insect or mechanical injury to the trunk makes it necessary.

The pruning may be done any time after the leaves drop until the sap begins to flow in the spring. In eastern Nebraska where the vines are seldom injured by mid-winter temperatures it is advisable to give the severe pruning in early spring a few weeks before growth starts. In the central and western parts of the State where the soil moisture and temperature conditions are more adverse for growing grapes, it is well to prune in late fall, in order that the vine may be laid to the ground and covered with a few inches of dirt or other protective material.



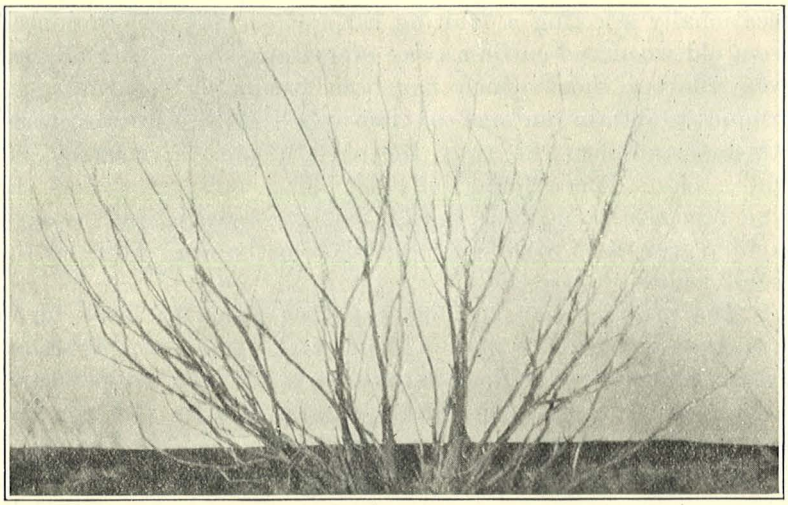


FIG. 11—Most of the fruit of currants and gooseberries is borne on one-year-old wood and from spurs on two and three-year-old wood. The pruning here consisted in removing the wood over three years old. This aids the plant in developing vigorous young shoots to replace the old wood.

CURRANTS AND GOOSEBERRIES

When the young plants are set the roots should be pruned back about one-half and the top reduced to four or five inches. From six to eight stems should be allowed to grow from the crown. These should be pinched off at a height of two or three feet to induce the formation of fruiting spurs. The only other pruning that is necessary, until the end of the fourth season, is to keep most of the young shoots cut off at the ground. During the fourth season six or eight young canes should be allowed to grow to replace the old ones. After the plant is past four years of age the pruning each year should consist in cutting away the oldest canes and leaving a few new ones. The best fruit is borne on one-year-old shoots and on spurs of two and three-year-old wood. Pruning may be done any time during the dormant season, tho it is considered best to do it in early spring.

BLACKBERRIES AND RASPBERRIES

The tops of cane fruits live only two years. The crowns and roots continue to live and produce new tops or canes each year. The fruit is borne on young shoots produced from last year's canes. The canes that have produced fruit should be cut out and burned as soon as the crop is harvested.

In pruning cane fruits the following should be borne in mind: First, four to six strong canes should be allowed to grow each year from the crown. Second, these young canes should be topped or pinched off when they are three feet high in order to induce lateral branches. Third, the old canes that have fruited should be cut off at the ground when the crop is picked. (This aids in controlling certain diseases and also enables the young plants to make a more vigorous growth.) Fourth, in early spring about the time growth begins the lateral branches should be pruned to twelve or eighteen inches. The St. Regis and the other red raspberries should not be topped or pinched off. The red varieties do not branch readily and the St. Regis bears its fruit in autumn on canes produced the same season.

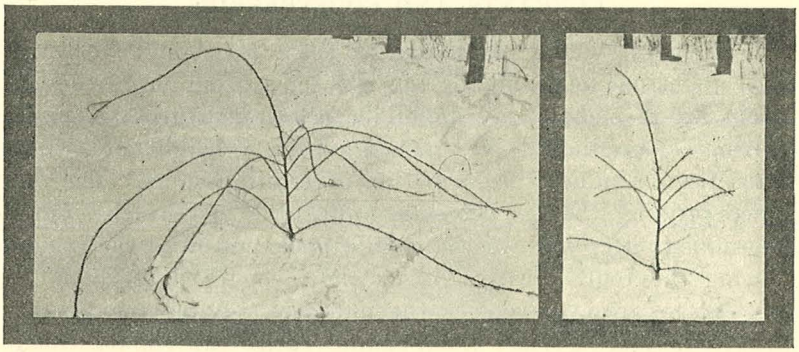


FIG. 12—Blackberries and raspberries that have made vigorous lateral growth should be pruned in early spring.

The tops of cane fruits are apt to be killed or severely injured in mid-winter by the dry, cold conditions that sometimes prevail in Nebraska. This type of injury may be prevented with little effort and expense. At the approach of severe winter weather, the canes should be laid down and covered with two to four inches of moist dirt. This is better than to cover them with other loose material.

STRAWBERRIES

When strawberries are grown in matted rows the plants should be set 15 to 18 inches apart in the row. The plants may be set either in early fall or early spring. Spring planting is preferable. The roots of the plants should usually be pruned at the time of setting and all of the leaves except the two inner ones pulled off. Only one-year-old plants should be used. They can be distinguished from older plants by their lighter colored roots. In setting the plants one should endeavor to spread the roots somewhat and firm the soil so that the crown is even with the surface of the ground. If the crown is beneath the surface it will not grow and if it protrudes much above the surface the plant will dry out and die. Newly set strawberries should be given intensive culture to induce them

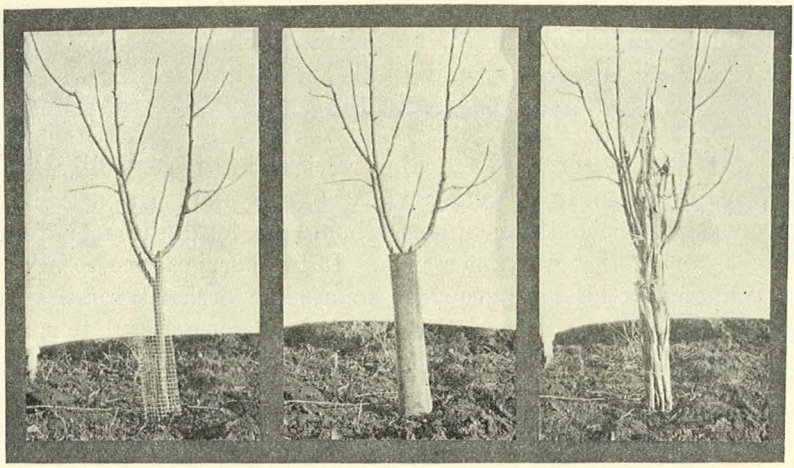


FIG. 13—Young fruit trees should be protected from rabbits. The methods here illustrated are recommended. Wire wrappers are more expensive but they need not be removed for several years. Cornstalks, paper wrappers and veneer protectors are effective but should be removed each spring, since they harbor injurious insects and mice.

to form runners and set new plants. The flower stems should be kept pinched off the first season.

A strawberry bed or matted row should be allowed to bear only two crops. It should then either be renewed so that young plants can be formed in abundance or transferred to another location. The renewing process should be done as soon as the fruit is all harvested and the soil is in a good moist condition. The object should be to destroy all the plants except one every 10 or 12 inches and to get the soil worked to a fine seed bed so a new matted row of young plants will be formed the same season. This may be done by plowing out all the row except a narrow strip on the edge to be thinned with a hoe or it may be done by hoeing out all but a few plants.

At the approach of winter, when the ground is frozen hard, a straw mulch four or five inches thick should be spread over the entire bed. This prevents the plants from being heaved out of the ground by the freezing and thawing processes of winter. One should be careful to avoid using anything as a

mulch that contains rye or weed seeds. Most of the mulch should be raked off in early spring, leaving just enough to prevent the berries from coming in contact with the dirt.

CULTURE

The home orchard should receive intensive cultivation especially when it is young to keep the plants in a thrifty growing condition. The plants should be hoed three or four times during the growing season. It is poor practice to allow a sod of any kind to grow, or to use the orchard for a calf or pig pasture. The orchard may be put to a useful purpose while it is young by using it for any of the vegetables or cultivated crops. As the trees and plants become older and occupy more of the land, this cropping should be gradually diminished. When the trees reach an age of five to seven years it is advisable under the most conditions to add something to the soil that will furnish humus and plant food. In the case of tree fruits this may be done by sowing red clover to be turned under in the fall of the second year. In the case of other fruits an application of well-rotted barnyard manure is advisable. This keeps the soil in good physical condition and causes the plants to make vigorous growth. Where winter injury is feared, cultivation should be discontinued in the late summer to allow the wood to become more mature.

Where irrigation water is used one should attempt to have the soil somewhat moist for winter to prevent root injury. This should be accomplished, however, by cultivation in August to conserve the moisture rather than to add heavy applications of water in late summer sufficient to induce second growth.

Pear trees are subject to a bacterial disease known as fire blight. One of the most effective means of controlling this disease is to check the wood growth of the tree. It is advisable, therefore, to plant the pear trees in the outside row of the orchard, and after they are four or five years old to allow sod to grow about them to check the growth.

(12-20—5M)
(6-22—10M).

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