

# Blackberry Growing *in Oregon*

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# Blackberry Growing *in Oregon*

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**T**HE BLACKBERRY growing industry in Oregon is centered in the Willamette Valley counties of western Oregon. The area's normal climatic conditions, a mild autumn, a cool, dry summer, and sufficient spring moisture to develop the fruit, favors the production of these berries. Also, the mild but moist autumn weather helps cane growth and propagation by layering, and the dry summer permits harvesting with minimum loss from moldy or decaying berries.

When the first white settlers arrived in Oregon they found an abundance of the highly flavored trailing wild blackberry, *Rubus macropetalus*. Later the Evergreen variety was introduced to Oregon from Europe and spread quickly by natural means. So did the Himalaya, introduced after the Evergreen.

The vigorous growth of these introduced blackberries of European origin and the abundance of the native blackberry show that conditions in western Oregon are favorable for blackberry growing. Interest was stimulated by the introduction of the Logan early in the present century. The popularity of this berry reached its height about 1925, but since then has gradually declined, and other varieties are taking its place.

The term blackberry as used in this bulletin includes all types of trailing and upright berries, including the Loganberry, Youngberry, and Boysenberry. The trailing types are called dewberries in the Eastern States, but in Oregon the native trailing type of the West Coast and those from Europe are called blackberries. Those called blackberries, native to the Eastern States, are mostly upright in their habit of growth. They generally are not planted in Oregon although a few varieties are grown satisfactorily.

## Importance of the Industry

Blackberry growing in Oregon is done almost entirely in the Willamette Valley, where harvest labor is available and most of the processing plants are located. The berries can be grown successfully in the coastal region of the state, but because harvest labor is scarce and distance to markets is greater, the industry has not developed there as it has in the valley.

About 5,000 acres of blackberries are grown at present in Oregon, and about half this acreage is in Marion County. A thousand acres are in Clackamas County, and a considerable acreage in Multnomah County. Some acreage is in Polk, Yamhill, and Washington, and small plantings are in Douglas, Jackson, and Josephine Counties in southern Oregon.

## Economic Considerations

Costs of establishing a trailing berry planting include those for labor, for preparation of the land, cultivation of the planting, purchasing of plants, wire, and posts. The purchase of special equipment or implements also may be necessary. Because of the high investment, prospective producers should consider carefully all factors which effect the probable life of the planting and the yields that can be obtained. In addition, they should take in account available markets and market requirements before choosing their varieties.

### Markets

Large plantings should not be set until the grower is sure of a

definite market. If a new variety is being considered, market outlet is of special importance. The frozen pack today is the chief market outlet, and a large number of frozen pack processors now are located in the northern part of the Willamette Valley, where most of the blackberries are grown.

Some processors also can the berries or make them into jam, jellies, and flavors for the fountain trade or ice cream. With the increase in population in Oregon, the local fresh market, either in retail stores or on roadside stands, has possibilities for expansion. Varieties suitable for these purposes are now available.

## Place in the Farm Plan

A grower planning to set out blackberries must take into consideration his over-all farm organization. Many producers have combined blackberry growing with general farming. Some grow grain

or forage crops along with livestock or poultry. Such farmers have manure and crop wastes which can be used to advantage in blackberry plantings. Some also have irrigation equipment that can be used

for the berries. Such combinations can cut production costs, since more efficient use of all the farm facilities is possible.

Growers who produce only blackberries must give extra consideration to their production costs, as well as to choosing locations where high yields will be possible for a period of years. Plantings should be set out with a life expectancy of 15 to 20 years. Factors which seem most vital to successful operation are presented in this bulletin to guide those planning to put out new plantings.

### **Location**

Blackberries can be grown in many locations, but for the most profitable production, a high yielding site is most desirable. High soil fertility and ample moisture during the growing season help boost yields. Locations where strong prevailing winds rob the plants and soil quickly of moisture,

or spots where winter freezes and late spring frosts occur frequently should be avoided. Heavy soils which hold water for long periods are not the best for blackberries, but some varieties can stand such conditions better than others. Soils that are naturally fertile, easily worked, and of good moisture holding capacity are the most suitable.

Some varieties are affected by soil-borne diseases, so when such diseases are known to exist in an area only varieties which are resistant or tolerant to them should be grown. The light soils of the red hill areas generally are not as suitable for blackberry growing as the soils of the valley floor. However, some soils in the hill areas are fertile and have given good yields over a long period. Growers have succeeded occasionally in growing blackberries on poor soil by making special efforts to increase the fertility.

### **Preparation for Planting**

Most blackberry plantings are made on soils that are naturally fertile but have been cropped for so long they have become depleted of organic matter. Such soils have less ability to maintain fertility and moisture and are more difficult to work than soils high in organic matter. Growers planning to plant berries on such soil should make an effort to correct the situation before planting. Barnyard manure is the best source of organic matter for this type of soil, but because

manure is not always available, other materials, such as crop wastes, can be used.

Plowing cover crops in for a year or two prior to planting also may be profitable in the long run. These cover crops may be legumes, such as vetch or Austrian field peas, or others supplying large quantities of organic matter, such as rye or Sudan grass. It is advisable to add fertilizers to cover crops to increase their growth.

Whenever possible, use land that

has been in good sod for a few years. The grass could have been for seed or pasture. The best sod-forming grasses are Alta, Chewings, and red creeping fescues, and orchard grass.

The soil in which blackberries are to be planted should be prepared carefully, much the same as a seedbed for grain or vegetable crops. If land has been in sod, plow a whole year before planting

blackberries so the sod will have time to decompose completely. If erosion is not serious, fall plowing is best because early spring preparation can be made. At present there are many farm implements suitable for preparing the soil properly for planting. Do not work soil when too wet or dry, as this makes it much more difficult later to break the soil into fine particles.

## Propagation

Most blackberries grown in Oregon are of the trailing type, which naturally propagate themselves by the tips of the canes taking root. The cane tips usually are ready to root in the latter part of September or early October. Under normal weather conditions, these tips will root naturally if the soil is fairly moist and loose.

To make sure plants will be available, however, it is wise for the grower to make a small opening in the soil at the end of the cane about an inch or two deep, insert the tip of the cane downward at an angle of about 45 degrees, and cover it with an inch or two of soil. Growers interested in increasing the number of tip plants can do this by pinching off a few inches of the terminal of the cane in early

summer, when it is about 2 feet long. Just below the cut several side branches will form and grow into long canes with suitable tips for fall rooting.

Another method is to cover canes with soil at intervals as they lie on the ground. Plants produced this way are not as vigorous as those grown from the tips, but by using care in planting it is possible to get a greater number of plants.

Also, blackberries can be propagated by root cuttings. Roots about  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in diameter are taken up in early winter and cut into pieces 2 to 4 inches long, then placed either in the soil outside or in a greenhouse or coldframe. Some blackberries, particularly the eastern upright ones, can be propagated readily by this method.

## Planting Systems

Several factors must be considered in determining the best planting system. The amount of labor available to care for the planting,

the equipment to be used, the growth habit of the variety, and the expected yields are all important.

Various planting systems are used, and the grower should choose the best for his particular situation. Distance between rows is determined by the kind of equipment to be used. Rows should be far enough apart so the tractor or other equipment will not break or injure the canes. Distance between plants in the row is determined by the training system to be used and the growth habit of the variety.

Vigorous growing varieties, such as Evergreen, usually are planted 10 to 12 feet apart, or even more, in the row. Varieties which make shorter canes often are planted closer together, sometimes as close as 4 to 6 feet. Closer planting usually means greater yield per acre, but also means more labor in training the canes. A grower should be sure his increased yield in a close planting over-balances his extra labor costs. Close planting may not be practical for vigorous growing varieties such as Evergreen or Himalaya. Greater planting distances make it easier to use larger cultivating machines, cutting down on costly hand labor. Also, it makes for ease in training canes to wires.

When the stake system is used,

plants usually are set at equal distances in each direction, from 6 by 6 to 9 by 9 feet. In other systems the rows may be from 6 to 12 feet apart, distance determined by the equipment to be used. In the rows, in close planting systems, plants may be set 3 to 7 feet apart.

The average for most plantings of blackberries is 8 to 10 feet apart. Vigorous growing varieties, such as Evergreen, however, often are planted 10 to 16 feet apart in the row.

The following tabulation gives the number of plants required per acre at the distance in common use:

Distance between plants	Number of plants per acre
<i>Feet</i>	
3 by 8 .....	1,815
3 by 10 .....	1,452
4 by 8 .....	1,361
5 by 8 .....	1,089
5 by 10 .....	871
6 by 6 .....	1,210
6 by 8 .....	907
6 by 10 .....	726
8 by 8 .....	681
8 by 10 .....	544
9 by 9 .....	538
9 by 14 .....	346
10 by 10 .....	436
10 by 12 .....	363
10 by 16 .....	272

## Planting

Blackberries should be planted early in the spring, as soon as it is possible to get on the land. Tips can be dug early, packed, and held in cool or cold storage for considerable periods. When plants must be held for some time, or shipped, they should be dug early and the

soil shaken from the roots. New shoots should not be broken when packing and plants should not dry out. Packing material, such as moist moss, has been used in the past, but recently plastic bags, liners, or covers without packing material have been used successfully. When

plants are held for some time they should be put in cold storage of 32°F.

Growers who use their own plants or get them from neighbors should wait until the shoots begin to respond, then they should dig with soil remaining on the roots, and plant immediately. The soil should be kept moist at all times, and plants should not dry out.

A shovel or spade ordinarily is used in setting blackberry plants. If the plants do not have soil on the roots, it is customary to plunge the shovel downward into the soil about 7 or 8 inches, move it forward, and then place the roots just behind the shovel, with the tip at the ground line. The shovel is then withdrawn and the soil allowed to fall back into the cavity and pressed down tightly.

### Choice of Varieties

Success in growing blackberries depends much on the choice of varieties. Only a few were available in the past and only one or two of commercial importance. At present, however, there are several varieties from which to choose. Some have wide acceptance by processors and public, while others have only specific uses. Growers who depend on processors for their market should make sure the fruit they grow will be acceptable. If

they expect to sell to local markets they should find out which varieties can be handled easiest and which are most acceptable to consumers.

Present varieties of blackberries are adaptable to many soil types, but sometimes it is necessary to choose a certain variety because of the soil available. For instance, the only variety that will grow on heavy, poorly drained soil is Evergreen.

### Varieties Grown in Oregon

*Boysen (Nectar)*, California origin, is the most widely adapted variety in Oregon at present. It is fairly hardy and can be grown even in certain sections of eastern Oregon, although injury can be expected in colder winters. The plants are vigorous and productive. The fruit is dark red and begins to ripen later than that of Logan or Young, but the season does not last much longer. The berries are among the largest of the small fruits and are somewhat firmer than Logan.

The Boysen is highly desirable for local markets. It is used also in freezing and canning. The flavor is excellent, subacid to acid.

*Thornless* sports of Boysen have appeared occasionally as chimeras; that is, plants of mixed genetic makeup. These have been unreliable, unproductive, smaller in size than Boysen, resembling some other variety, particularly Young. Sometimes, however, thornless sports of Boysen have been desirable in every way.

*Brainerd* is a U. S. Department of Agriculture introduction, resulting from a cross of the Himalaya and an eastern upright blackberry. The cane growth is vigorous and hardy, and the fruit production is good. The foliage is subject to mildew. The berries ripen after the Boysen and the Logan, but before the Evergreen. The berries are large and fairly firm with good flavor, characteristic of the eastern blackberries, and they process well. Growers, however, have objected to the extreme vigor and thorniness of this variety.

*Cascade*, Oregon origin, is an introduction resulting from the cooperative breeding project of the U. S. Department of Agriculture and the Oregon Agricultural Experiment Station. *Cascade* originated from a cross of a native trailing blackberry variety, *Zielinski*, with the Logan. The plants are vigorous and highly productive. Though generally hardy in western Oregon, the *Cascade* is not hardy enough for eastern Oregon. The berries, dark red and slightly smaller than Logan, are somewhat soft and not suitable for fresh market purposes. The characteristic wild blackberry flavor is excellent. Except for its softness, the *Cascade* is well suited for canning and freezing and is especially adapted to the home garden. It ripens at the same time as the Logan.

*Chehalem*, Oregon origin, is an introduction resulting from a cooperative breeding project of the U. S. Department of Agriculture and

the Oregon Agricultural Experiment Station. *Chehalem* resulted from a cross of the native trailing blackberry *Santiam* and the Himalaya. The plants are vigorous, with long canes, and highly productive. The fruiting laterals are long, with many berries. The berries are rather small but bright black in color and of excellent flavor. The seeds are very small. The *Chehalem* is excellent for the frozen pack and for pie making. Its season is a few days later than that of the Boysen.

*Cory Thornless* (*Bowen*), California origin, is a thornless sport of the Mammoth blackberry, which is not grown to any extent in Oregon. The berries are quite large, long, black, and acid without characteristic flavor.

*Eldorado*, Ohio origin, is an erect blackberry well adapted to Oregon. It is productive, its berries are bright black, of medium size, and medium firm. It is recommended for home use or possibly local markets, where an eastern upright type is desired.

*Evergreen*, European origin, was introduced into Oregon early in the country's history and has become naturalized in the wild in western Oregon. Thickets of this variety have become a nuisance in many pastures, in woodlands, and along roadsides. The *Evergreen* is not hardy in eastern Oregon. Much of the production has been and still is from wild, uncultivated plants, but since the plant has been attacked by the red berry mite much

of the wild fruit has not ripened. Cultivated plantings, however, are being sprayed to control this pest. The fruit is firm and has fair flavor. Considerable quantities are canned and a small amount is shipped fresh to distant markets. Heavy yields can be obtained, especially when plants are irrigated. The Evergreen ripens in August and September. The thorny form is being replaced by Thornless Evergreen in cultivated plantings.

*Thornless Evergreen*, Oregon origin, is a sport of the Evergreen, discovered near Stayton in about 1926. Since that time it has replaced the thorny in cultivated plantings. Because of the lack of thorns it can be handled easily and with less expense than the thorny form. Thornless Evergreen now has a larger acreage than any other blackberry variety in Oregon.

*Himalaya*, (*Theodore Reimers*), European origin, is a vigorous European variety, which, after its introduction, became naturalized. Thickets have become even more of a nuisance than those of Evergreen. Although Himalaya is highly productive, there are few commercial plantings. The fruit is soft, of good acid flavor, and is used mostly for canning. The Himalaya season is between Boysen and that of Evergreen and slightly later than Brainerd.

*Kay* (*Kayberry*), Washington origin, plants are vigorous, highly productive, and similar to Mammoth plants. Berries are large, long, bright black in color. The

flavor is fair, apparently not good enough for commercial use.

*Logan*, California origin, plantings are vigorous and productive when well cared for. The berries are medium sized to large, dark red, medium firm to soft, and with a good subacid to acid flavor. Logan has been grown extensively in Oregon, but in recent years the Boysen largely has replaced it. Logan still is grown for juice and wine-making. The softness of the berry and its high acidity have been its chief drawbacks in the past. The Logan does have a desirable flavor, however. It begins to ripen June 15 to 25 and continues during most of July.

*Thornless Logan*, California origin, is a thornless form of the Logan and in all respects, except thornlessness, identical with Logan. Most plantings of Logan in Oregon now are Thornless. Yields apparently are equal to those of the thorny form.

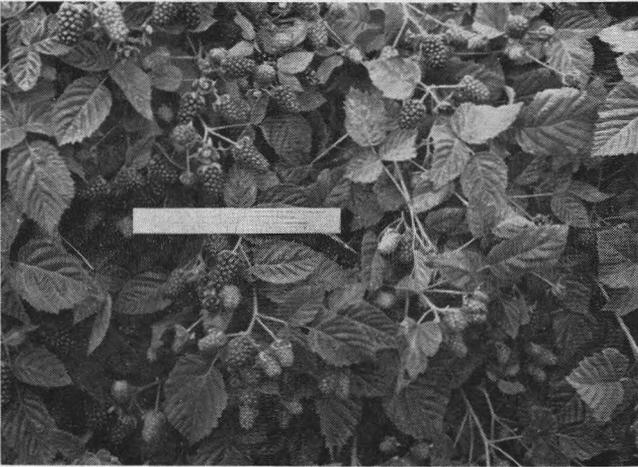
*Lucretia*, West Virginia origin, is the oldest, as well as the principal dewberry variety of Eastern States. Its growth and production are satisfactory in Oregon, but its berry qualities are not considered comparable with those of the Boysen. Few are grown in Oregon. Lucretia is hardy, however, and can be grown in parts of eastern Oregon, where others suffer winter damage. It ripens shortly before the Logan.

*Mammoth*, California origin, is a vigorous, productive variety which grows berries longer and



Logan has medium sized to large, dark red, medium firm to soft berries, used considerably for juice and wine making.

Chehalem has rather small but bright black, well flavored berries, excellent for frozen pack and for pie making.



Cascade has dark red berries, slightly smaller than Logan, is well suited for canning and freezing, and especially adapted to home gardens.

nearly as large as Boysen (Nectar). The berries are acid and do not have a desirable flavor. Few are grown in Oregon. The Mammoth season is about the same as the Logan. Cory is a thornless sport of Mammoth.

*Marion*, Oregon origin, is a recent introduction resulting from the cooperative breeding project of the U. S. Department of Agriculture and the Oregon Agricultural Experiment Station. Marion originated from a cross of Chehalem and Olallie. Plants are vigorous, producing few long canes of large diameter. Marion is very productive and has long, fruiting laterals. Its berries are medium to large, bright black, and excellent in flavor. Marion was introduced for trial for processing in the frozen pack, for canning, and for local markets.

*Nectar*, California origin, seems to be identical with Boysen.

*Olallie*, Oregon origin, is another recent introduction from the cooperative breeding work of the U. S. Department of Agriculture and the Oregon Agricultural Experiment Station. It is the result of a cross between the Black Logan and the Young. Plants are vigorous, but not hardy under Oregon conditions. Berries are bright black, medium sized, firm, excellent for local markets, but their flavor is not equal to those of other varieties grown in Oregon. The Olallie is well adapted to California conditions and has succeeded there.

*Pacific*, Oregon origin, is an introduction from the cooperative

breeding work of the U. S. Department of Agriculture and the Oregon Agricultural Experiment Station. Its origin is the same as that of the Cascade and in most respects the plants resemble Cascade. Under some conditions, however, Pacific seems less vigorous and productive than Cascade. The fruit is similar, but is slightly larger, firmer, and possibly more acid. It also has a characteristic flavor, suggestive of that of the native trailing blackberry. The season is the same as that of Cascade and Logan.

*Santiam* (Ideal Wild), Oregon origin, is in many respects similar to Cascade. Its parentage is unknown, but its growth characteristics are similar to those of known crosses between Logan and the native trailing blackberry. Its canes, somewhat smaller and more vine-like than those of most trailing berries, are similar to those of the native blackberry. The berry is smaller than Cascade or Pacific berry and rather soft. The flavor is excellent and characteristic of the native blackberry, but its yield is not equal to that of Cascade or Pacific, and the plant is highly susceptible to cane and leaf spot diseases. Santiam ripens slightly earlier than the Logan.

*Young*, Louisiana origin, was highly popular for a few years after its introduction to Oregon in 1926, but since the introduction of Boysen it has been losing favor. Generally, the Young is quite vigorous, but under some conditions yields have not been comparable

with its vigor. The berries are large, dark red, and have an excellent flavor, milder and less acid than that of Boysen. Much of the production has been canned and frozen. The Young season is the same as the Logan.

*Thornless Young*, California origin, is a thornless sport of Young. It is considered identical with Young in every other respect except that yields have been variable, usually less than those of the thorny form.

#### **Note on thornlessness**

The thornless varieties mentioned in this publication have originated as chimeras, or plants of mixed genetic makeup. In trailing berries, the outer tissue of the cane is thornless, while the center tissue of both canes and roots have

the characteristics of thorniness.

The perpetuation of these forms must be by rooting tips of the canes. Shoots from the roots always bear thorns. When cultivating thornless varieties roots should not be cut, since shoots are liable to grow from the cut or damaged roots and they will be thorny. Thornless canes of a thorny variety are rare, but they have been observed more often in the Young than in other varieties.

Yields of the Thornless Young and Cory (Thornless Mammoth) have been more variable than those of the thorny forms. Thornless Evergreen and Thornless Logan, however, appear equal in yields to those of the thorny forms. Hence, the common report that thornlessness is associated with low yields is not always true.

## **Care of the Plantation**

### **Weed control**

Cultivation in blackberry plantings is primarily for the purpose of controlling weeds, which compete with the berries for moisture and nutrients. Any cultivation done in blackberry plantings is entirely for weed control, and ordinarily only shallow cultivating is desirable. Deep cultivation cuts many roots, needed for best growth. In thornless types deep cultivation causes shoots to come up from cut roots and these shoots always are thorny and a nuisance.

Many growers now are using chemicals for weed control. A mixture of IPC, dinitro general, and

water has been used successfully many times for cleaning up a planting during winter. Where weed growth is luxuriant, diesel oil usually is added to the mixture. The spray is directed at the base of the plants so it does not contact the upper portions. Spraying late in the winter has caused injury to the succeeding crop of berries. Proper applications have reduced greatly the need for mechanical and hand cultivation in early spring.

Another practice followed by many growers is the application of monuron (Karmex W, CMU) or diuron (Karmex DW) at low rates in the spring and fall. This mater-

ial is effective on both grassy and broadleaf annual weeds and remains effective in the soil for long periods, preventing emergence of many weeds.

It is hoped herbicides will be found to control perennial weeds selectively in caneberry plantings. Since continual progress is being made in this field, growers are urged to contact their county agents for the latest recommendations and suggestions.

### **Use of cover crops**

Growers have raised cover crops of various kinds to maintain organic matter in the soil. Principal cover crops have been oats, rye, vetch, crimson clover, Austrian winter peas, or winter barley seeded in the fall. Fertilizers to increase cover crops have been disked in or plowed under in early spring. Early spring working in of the cover crop is especially important where irrigation is not available. It prevents the cover crop from competing with the blackberries for moisture and soil nutrients. Cover crop refuse on the surface of the soil ordinarily is not objectionable.

### **Irrigation**

In growing blackberries it is important to have a good supply of moisture in the soil from early summer until harvest. When rainfall is low during spring, irrigation has been of considerable advantage. Sprinkler systems are most commonly used in blackberry irrigation, although in a few locations land

can be leveled for the rill system. Injury to ripening berries, particularly of soft varieties, has been noted when sprinkler systems were used during harvest. There seems, however, to be little injury to the varieties with firm berries, such as the Thornless Evergreen, if irrigation is applied just after a picking has been made. Where permanent cover crops are grown it is essential that moisture be kept plentiful at all times. Irrigation after harvest seems of little advantage except in unusually dry seasons.

### **Fertilization**

Probably the best way to maintain soil fertility in blackberry plantings is by use of barnyard manure. Application of 10 to 30 tons per acre every year or every 2 or 3 years has been successful. Where organic materials, such as straw or other crop wastes are used, it may be necessary to add commercial fertilizers, particularly nitrogen, to help in their decomposition. Information on the effective use of commercial fertilizers is limited. It does appear, however, that in most plantings an application of nitrogen in early spring usually is advantageous. Application of fertilizers containing 50 to 60 pounds of actual nitrogen per acre is recommended, but it is possible that nitrogen applications will cause more winter injury when sudden early freezes occur. The application of phosphorus fertilizers may help when the soil is known to be deficient.

## Managing the Growing Canes

### Training the new canes

New canes of trailing blackberries appear early in the spring and grow upright for about 2 or 3 feet and then bend over and run along the surface of the soil. To keep the canes from being injured by pickers and cultivation implements, growers move them so they are underneath the trellis. These canes usually are held in place with small sticks made from lath, other wood material, or stiff wire bent into a U shape. In moving the canes growers should avoid making sharp angles that break the tissue and eventually cause the cane to break off when being trained to the trellis. This moving of the new canes must be done at intervals of 2 or 3 weeks during the early part of the growing season. Some growers train all the new canes in one direction to make it easier to handle them in the trellising operation. However, with this method there is danger of making sharp angles and causing cane breakage.

### Removal of fruiting canes

After harvest most growers cut old fruiting canes as low as possible without injury to new canes. If plantings are cultivated, the old canes usually are left in the space between the rows, chopped up, and worked into the soil. It is not harmful to leave the old canes in the rows, or even to delay cutting them until after spring training. Some growers believe leaving canes in the planting increases spread of

diseases, but apparently this is not so. Many growers now are using a rotovator or similar cultivating implements, which break up the old canes easily. Where permanent cover crops are used it is necessary to take the canes out of the field.

### Time of training

Although spring training is customary, some who have tried fall training have had success, providing there was no severe weather during winter. Another reason favoring fall training is because canes that lie on the ground during mild, rainy winters become succulent, and so are easily killed by light frost or are attacked by fungi. When the winter following fall training is mild, canes trained up have given much larger yields than those left down. Control of diseases by spraying in the fall is more effective when the canes are on the wires than when they are lying on the ground. Some varieties are more winter hardy than others and can be trained in the fall with little or no danger from winter injury.

Fall training, as soon as the fruiting canes can be removed following harvest, allows the canes on the wires to harden in the open air and sunlight better than on the ground. Training in the fall usually is more easy than in the spring, since canes are not quite so long and tangled. Most growers, however, do spring training, since they cannot depend upon the winter to be sufficiently mild.

## Methods of Training

Several systems are used in training trailing blackberries. The method used depends on the variety, the size, purpose of the planting, and other factors. The main systems are to stakes, to a 1- or 2-wire trellis, and to a horizontal trellis. These are described in this section.

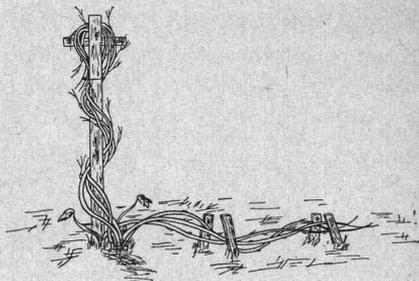
In training most varieties of trailing berries it should be understood that the central portion of the cane is the part that bears the most fruit. The terminal ends of the cane usually can be cut off without greatly reducing the yields. Size of the berries often is greatly increased when as much as half of the cane is cut off. The number of berries always is reduced, however, when any portion of the cane is cut off.

All trailing blackberries need some kind of support for the fruiting canes. These supports usually are trellises, but sometimes are stakes.

### Training to stakes

Stakes are used for various reasons, usually to allow cultivation in two directions. Sometimes stakes are desired when the planting is to be of short duration, and stakes often are preferred in home gardens. When the planting is to remain for many years stakes of cedar or redwood are preferred. Other woods should be treated with a wood preservative. Sometimes metal stakes are used.

Stakes should be 5 to 6 feet above



and 1½ to 2 feet, or even more, below the ground. They should be large enough to support the weight of the fruiting canes in wind, rain, and snow. Stakes of wood should be at least 2 inches in diameter. A crossarm 1 to 2 feet in length near the top of the stake often is used. Canes should be brought up either directly from the ground or spiraled around the stake and held in place with 2 or 3 ties of strong twine. Twine may not be necessary if the canes are looped over a crossarm and the ends twined into the canes below.

### Training to wire trellises

Wire trellises usually are the most satisfactory since they last longer and are less expensive than stakes. The end posts should be firmly anchored and 6 inches or more in diameter. Cedar is most satisfactory, although other woods treated with wood preservative are used occasionally.

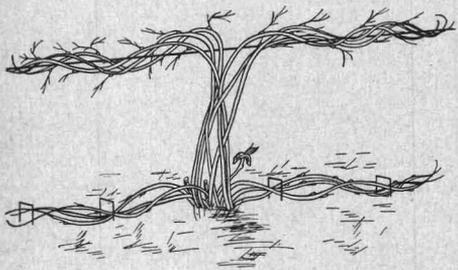
Between the end posts, other posts should be set about 12 to 20 feet apart, but can be at greater distances if 2 or 3 smaller stakes are placed in between the larger posts at distances of 10 to 12 feet apart.

Wires should be attached to the stakes in such a way that they can be tightened easily each year before the canes are put up. The number of wires depends on the growth habit of the variety. The most common trellis has 2 wires. A single strong wire is satisfactory under some conditions, and some growers prefer 2 to 4 horizontal wires. Where the fan system of training is used 3 to 5 wires are desirable.

Growers usually train canes to wires from February to April, since they do not always have other pressing work at this time, and extra labor may be available. Growers, however, should try to have all canes on the wires before leaf buds begin to expand, usually late in March. They should be careful in separating the canes of each plant to prevent breakage. Canes should be placed on the wire so sharp angles are avoided, and so the canes do not shift in the wind. To prevent shifting, some growers interlock the canes, and others tie them to the wires with binding twine.

#### **Training to single-wire trellis**

Many commercial growers prefer the single-wire trellis system of training. A heavy wire is strung



tightly on posts 16 to 20 feet apart. The wire is usually about 5 or  $5\frac{1}{2}$  feet above the ground. Canes are twisted along the wire in one or both directions from the plant. Ends of the canes may or may not be cut off. Canes of Boysen, Logan, and Young plants, when set from 8 to 12 feet apart in a row, need to be left 9 to 12 feet in length if trained in one direction.

One of the objections to this method is that many canes are wrapped around a single wire. Unless an extra heavy, tightly stretched wire is used, there is danger of its breaking. Breaking also may occur if canes are not properly tied to the wire. However, the high single-wire trellis gives more room for hoeing and training operations and all the berries are in one place for the pickers.

#### **Training to 2-wire vertical trellis**

The 2-wire vertical trellis is the most common in Oregon. Posts are set 16 to 24 feet apart along the row. Large posts can be set farther apart and smaller posts or stakes set every 10 to 12 feet between. The end posts are well anchored or braced. Two wires are stretched between posts, the upper wire  $4\frac{1}{2}$  to  $5\frac{1}{2}$  feet above ground and the lower wire about 2 feet below the upper one.

Various methods of attaching the wire to the posts are used. The wire sometimes is fastened with staples or nails, but these sometimes pull out under a heavy load of fruit. To prevent this the upper

wire can be stretched along the top of the posts, or wires can be passed through holes bored in the posts, or they can rest in notches cut in the side of the posts. Wires usually

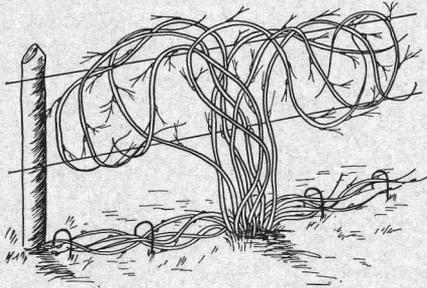
need restretching each year before the canes are trained. The method of attaching the wire to the end posts should be one that will allow this tightening.

## Training Systems

There are various ways of training canes to the 2-wire trellis. No definite names have been given these methods. Those given here seem most logical to the authors.

### Weave or wreath system

The weave or wreath system has been used extensively in Oregon until recent years. A few canes, usually 1 to 3, are taken together and passed from upper to lower wires and back again to form circles or wreaths. All the space

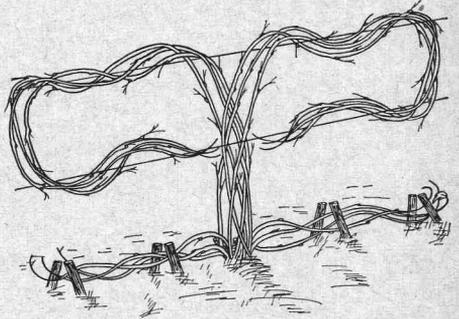


between the wires is utilized in this system. Sharp bends or curves causing damage to canes are avoided. More time is consumed in training with this method than with some of the others described.

### Loop system

The loop system is probably the most common at present. The canes from a single plant are divided into two parts and each taken separately

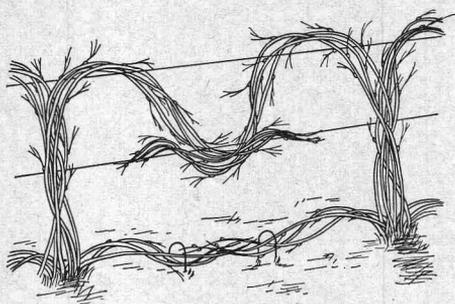
to the top wire. One or two twists are made around the wire and then the canes are brought down to the lower wire and turned back toward the plant with one or two twists.



The excess length of canes usually is cut off when it reaches the upright portion of the canes. The other half of the canes is looped on the other side of the plant in a similar manner, thus forming a double loop. Canes can be trained rather rapidly to this system, and plantings have a uniform and attractive appearance.

### Half loop or interlocking system

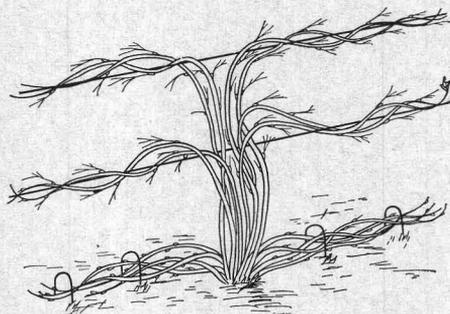
The half loop or interlocking system is similar to the loop system except that the canes are not turned back toward the plant. Instead they are brought down to the lower wire and interlocked with the canes of the next plant. The portion of the canes left at the



point of interlocking is cut off. Canes about 9 or 10 feet long are left in this system when plants are set about 8 feet apart.

#### Rope or 4-arm system

The rope or 4-arm system is made by dividing the canes into 4 parts and extending them along both wires. Usually the longer canes are taken to the top wires. Canes can be cut off and tied at the point of intersection with those of the next plant or interlocked with them. This method usually requires more time in training than the two-loop systems.

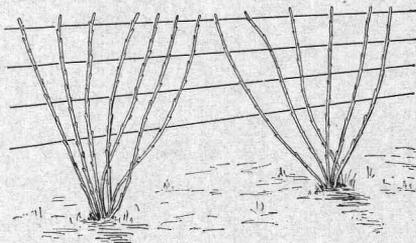


A variation of this method is practical in handling the Brainerd blackberry and other vigorous varieties having a similar habit of growth. This system consists of pinching or cutting off the ter-

minals of the new canes just after they reach the top wire. Strong lateral branches then will be produced below the point of cutting, similar to those of the black raspberries. These lateral branches can be trained along the upper and lower wires at the time of training. Some branches coming out at right angles to the row may have to be cut off, as these canes cannot be bent without breaking.

#### Fan system

The fan system has been used where blackberry plants can be planted close together and the canes allowed to grow long, so as



to get large yields. Plants are set in the row 3 or 4 feet apart. A trellis of 3 to 5 wires usually is necessary. Canes of plants set this close usually become entangled and are difficult to separate unless summer training is used. Therefore, the canes are trained up to the wires in the summer and cut off at the top wire. Usually only 2 or 3 canes are brought up at a time and tied to each wire. When canes are cut at the top wire in summer a number of branch canes are forced out. This system of training greatly increases the amount of good fruiting canes and very high

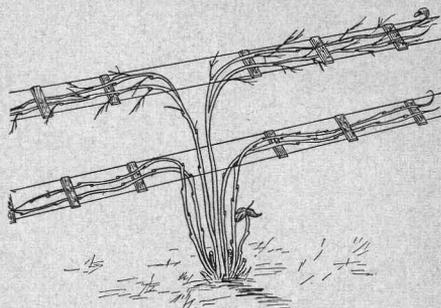
yields can be expected. Much more labor, however, is required than with other systems, and unless the increased yield offsets the great labor costs, this system is not practical.

#### **Two-wire horizontal trellis**

The vigorous varieties, such as Evergreen, Himalaya, and Mammoth, often are trained on 2 horizontal wires supported on cross-pieces nailed to the posts. These crosspieces are 1 to 2 feet in length. Other crosspieces of wire or wood are laid on the wires and the canes are placed on them. Placing the crosspieces both above and below the canes will hold them in place securely. In this system the wires are about 4 or 5 feet above ground.

#### **Four-wire horizontal trellis**

The 4-wire horizontal trellis consists of 2 pairs of horizontal wires,



the lower pair placed about 2 feet below the upper pair. The canes usually are placed on the upper wires and the new growth is trained along the lower wires. After harvest or the following spring, these new canes either can be taken to the upper wires or left to fruit on the lower wires. If left on the lower wires the new canes of the following year are trained to the upper wires where they remain until after they have fruited.

### **Effects of Growth Regulators**

In recent years research has shown that certain chemical compounds applied at the proper time and concentration to flowering plants increase size and yield of blackberries. Many growers now apply these materials as a standard practice because the cost is low and increased yields are possible.

Materials such as beta-naphthoxyacetic acid and para-chlorophenoxy-acetic acid have been used successfully and now are available from commercial sources. Equal parts of beta-naphthoxyacetic acid and para-chlorophenoxyacetic acid are formulated in ethyl alcohol

with a small amount of solubilizer or spreading agent. This stock solution or commercial preparation is used to make a spray solution consisting of 50 parts per million of each of the two chemicals. The material is applied first to the entire plant about 14 days after full bloom. A second application is made 10 days later. Sufficient spray to wet the foliage and flowers is required.

Additional information and current changes in method or procedure should be sought from county extension agents before using these materials.

## Harvesting

Most varieties of blackberries begin to ripen during the latter part of June, with the season continuing during most of July. Some varieties ripen in late July and August, and the Evergreen ripens during August and early September.

Equipment for pickers usually consists of a container, tied to the waist, and holding 2 boxes; or a carrier made with legs and set on the ground. Berries are picked and placed directly into the boxes or the carrier.

It is important to protect berries from the direct rays of the sun after they have been picked, so carriers should be taken to the packing shed as soon as they are filled. The amount of fruit picked by one person varies greatly. Picking is easier and faster when berries are large and stand out from the canes and leaves. Varieties such as the Boysen require about 4 or 5 pickers per acre throughout most of the season.

In large plantings requiring

many pickers the grower or some other responsible person should be in charge of the picking crew. All berries picked should be of desirable maturity. Over ripe, immature, decayed, and otherwise undesirable berries should not be put into the berry boxes. Varieties like Boysen usually are picked every 3 or 4 days. Longer intervals between picking are possible in the cooler weather that usually prevails when the Evergreen blackberries are ripening.

Packing sheds should be located conveniently so carriers need not be carried far and they should be arranged so all operations there can be done in the shade. In the packing shed berries are weighed and a record kept of the amount picked by each picker. The berry-boxes are transferred from the carriers to the crates. Ample space should be provided for the stacking of filled crates in the shade until they are loaded for market. Some responsible person should be in charge of packing shed operations.

## Insects and Diseases

Insect pests and diseases are not as troublesome to trailing berries in Oregon as they are to strawberries and raspberries. Certain insects and diseases are present, however, and the grower should take all the necessary measures for their control.

Information and control recommendations can be obtained from the Oregon Agricultural Experiment Station or Agricultural Extension Agent located in each county.

*To keep up with the rapid developments in  
chemical growth regulators and controls  
of weeds, insect pests, and diseases,  
see your local County Agent.*

