Growing Raspberries in Washington
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Most commercial raspberry production in Washington is west of the Cascade Mountains. However, some raspberries are grown commercially around Yakima, Walla Walla and Spokane.

Annual harvests average around 3,550 acres and 8,600 tons. The average yearly value is $3,098,000 for the state as a whole.

About 80 per cent of commercial production in Washington has gone into the freezing trade in recent years. Only 2 to 3 per cent have been canned. The remaining 17 or 18 per cent have been sold fresh.

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Soils and Sites

Raspberry plantings on deep, well-drained soils are the most productive, last the longest and give the best returns from investment and labor in the long run. A loam or sandy loam soil from 2 to 4 feet deep is ideal.

Good soil drainage is important. Raspberry plants grown in a tight clay soil or where there is a high water table are more subject to root killing and root rots than those on better soils. These plantings are also weak, unproductive and short lived. Some raspberry varieties such as Sumner and Newburgh are more tolerant to poor soil conditions than other varieties. But all do best on well-drained sites.

With ideal soil conditions and good care, plantings may remain productive for 10 years or more. On poorer sites, plantings may become unprofitable in less than five years.

Much of the labor for harvesting commercial raspberries must come from cities, towns or heavily populated rural areas. Locating commercial plantings close to a good labor supply will help reduce picking costs and help keep good quality since the berries can be harvested regularly and frequently.

Three-year-old raspberry plants. On the left, plants in well-drained soil grew and produced fruit normally. On the right, in poorly drained soil, new canes made little growth, leaves on the old canes yellowed and wilted, fruit was small.
Preparing Fields for Planting

A soil improvement program usually pays unless the area to be planted has been in sod, hay or other soil-improving crops. Heavy applications of barnyard manure or green manure crops, such as Abruzzi rye, grown during the winter before planting will increase organic matter in the soil. Hairy vetch is the best winter crop to use before planting in eastern Washington.

Ground that has been in sod should be cultivated or cropped one year in order to break down the sod and kill out the grass completely before planting to raspberries. The use of soil insecticides such as heptachlor, chlordane or aldrin before planting is important in western Washington. Details of rates and methods are available from your county agent.

Noxious weeds such as Canada thistle and quackgrass should be eliminated before planting raspberries. Raspberries should not be planted in ground that has had tomatoes or potatoes on it the previous year since the soil may be infected with Verticillium wilt. Black raspberries are more susceptible to Verticillium wilt than red varieties.

Soil for raspberries should be given the same careful preparation that you would give it for any other crop. If a high percentage of the plants are to survive and grow well, the soil must be well worked, firm and moist when the plants are set.

Selection of Plants

Get planting stock from young, vigorously growing fields that are free of disease. There is no certification program for raspberry plants in the state of Washington as there is for strawberry plants. It is a good idea to check the field from which you buy your plants. This should be done during the growing season the year before planting, if possible.

Hard plants from the previous season's growth make the best plants. They should have good strong canes, ¼ to ½ inch in diameter, and well-formed root systems. They should have been dug to leave on the feeder roots, rather than pulled. The sooner the plants are set after digging, the better. Don't let the roots become dry.

Soft plants that have come up in the spring ahead of planting time are sometimes used. Special care must be given them to avoid wilting or drying out. Transfer them directly, at the time they are dug, to the
A newly set raspberry planting. The plants were set in early spring.

field where they are to be planted. Set them in the ground at once. Take care not to break the succulent new stems.

If you get hard plants from the plant grower or nurseryman and can't plant them immediately, it is best to heel them in. Spread them out enough in the row so that soil moisture can get to all of the roots. Cover the roots well. Water them if necessary. Plants can be stored at near-freezing temperatures if they are protected from drying.

Spacings

Red raspberries are usually grown in hills 2½ to 3 feet apart in rows that are 7 to 9 feet apart. The most common spacing is 3 feet in the rows and 7 feet between rows. For many of the tractors, cultivators or sprayers now being used, 8 or even 9 feet between rows is necessary.

Number of Plants Needed

You can figure the number of plants per acre at any spacing by dividing 43,560 by the number of square feet needed per plant. Allow space for roadways, packing or loading platforms, ditches and room to turn at the ends of the rows. Here are the numbers of plants required per acre for some of the common spacings:

- 2½ feet x 7 feet, 2489 plants
- 2½ feet x 8 feet, 2178 plants
- 2½ feet x 9 feet, 1936 plants
- 3 feet x 7 feet, 2074 plants
- 3 feet x 8 feet, 1815 plants
- 3 feet x 9 feet, 1613 plants
Red Raspberry Varieties

Varieties of raspberries selected for planting should be productive; have long life and freedom from disease, be easily and rapidly picked and well-adapted to processing or fresh markets. In areas of cold winter temperatures, hardiness is also necessary.

The varieties listed below are important commercially or have qualities that make them promising as commercial varieties.

Washington
Berries of medium size, bright medium red, sweet. Excellent in color and flavor for fresh use and for processing, but lacking somewhat in firmness. Plants productive on good soil, hardy, susceptible to root rot and raspberry rust. Canes medium size, tall, fairly straight—some tendency to droop and to branch. Laterals long, fairly strong. Ripens with Puyallup and Sumner, three to five days later than Willamette and Canby.

Puyallup
Berries very large, medium red, sweet, fairly firm. Quality good for fresh use or processing. Plants productive on good soil, hardy. Susceptible to root rots and mildew. Canes medium to large, straight. Fruiting laterals medium length, strong. Ripens with Washington and Sumner, three to five days later than Willamette and Canby.

Willamette
Berries very large, dark red, tend to become purplish on standing, slightly acid, firm. Stands handling well. Fair in quality as a freezing berry, good when canned. Plants productive on good soil, hardy, susceptible to root rot. Canes medium to large, tall, straight. Laterals strong. Ripens with Canby, three to five days earlier than Washington, Puyallup and Sumner.

Canby
Berries large, light red, mildly acid, fairly firm. Fair quality as a processing berry. Plants productive on good soil, very susceptible to root rots. Very hardy. Canes large, tall, smooth, straight. Fruiting laterals strong. Ripens with Willamette, three to five days earlier than Washington, Puyallup and Sumner.
**Sumner**

Berries large, medium red, bright, sweet, firm. Good quality for freezing, excellent for canning. Plants productive. Very hardy. Some resistance to root rots, rust and mildew. Canes numerous, of medium height, straight, slender. Fruiting laterals slender, tend to bend when heavily loaded. Ripens with Washington and Puyallup, three to five days later than Willamette and Canby.

**Newburgh**

Berries fairly large, light red, fair quality and flavor. Plants productive. Very resistant to root rot. Very hardy. Ordinarily not grown where other commercial varieties of better quality are successful.

**Setting Plants in the Field**

Raspberry plants can be set in the field almost any time during the fall, winter or spring when the soil can be worked into good planting condition. Spring planting is most common. Planting should be done early enough for the plants to get a good start before the soil begins to dry out in early summer. February and March in western Washington, or March and April in eastern Washington, are best. Early planting lets the plants produce three to five strong canes for the following year's crop.

The field can be marked off with a hand- or tractor-drawn marker, or planted along a wire stretched over the row. Cross marking with straight, even rows both ways permits cultivating both ways until trellis wires are put up.

Plants may be set in a furrow plowed out along the row; or holes may be dug by hand; or holes may be made by pushing a shovel about 8 inches into the ground and pushing the handle back and forth to make a wedge-shaped hole. The last method suggested is quick and easy, but will not make holes big enough for large plants with strong root systems.

Set the plants so that when the soil is leveled they will be about an inch deeper than before they were dug. Spread the roots as much as possible. Be sure the soil is firmed down well around them. Irrigating the field or watering individual plants will pay dividends almost any time that the soil is dry enough to work well during the planting operation. Cut any long canes back to 6 or 8 inches.
Trellising

The trellis or wire support for red raspberry canes is usually three or four No. 12 galvanized wires. Set posts 25 to 30 feet apart in the row with anchors or braces for the end posts. They get most of the pull.

Treating the posts with a 5 per cent solution of pentachlorophenol will extend their life materially. To make the 5 per cent solution, mix a gallon of Penta (50 per cent by weight) with 10 gallons of kerosene or stove oil or diesel oil ($400) or other light oil. Stand the posts upright in a 50-gallon drum with enough of this solution to cover the part of the posts that will be in the ground. Since fir and cedar posts take up this solution slowly, they should be soaked as much as seven days. Information on other methods of treating posts can be obtained from your County Extension Agent. Use only well-seasoned posts.

The three-wire trellis has a single top wire about $4\frac{1}{2}$ feet from the ground. It is fastened directly to the side of the post. The fruiting canes are tied to the top wire as the pruning is done. The bottom pair of wires in the three-wire trellis may be fastened directly to the sides of the posts or to crossarms nailed to the post. They should be about 30 inches above the ground. Their chief purpose is to hold the new canes in the row.

With the four-wire trellis there are two top wires rather than one. These may be fastened directly to the post or to crossarms. The bottom wires may be held to the crossarms by notches cut near the ends of the arm or to the posts by strong nails bent into the shape of a hook. If the wire is fastened by notches or hooks, it can be unhooked and swung out over the new canes to pull them into the row when the wires are hooked again.

Pruning and Training

At the time red raspberry plants are set in the field the old canes should be cut back to 6 to 8 inches. Do not attempt to produce fruit the first season. The first growing season should produce 3 to 5 good strong canes per plant. These will produce berries the following year.

During the second growing season shoots will come up between plants in the row and between rows. Keeping the plants in hills makes weed control by tillage and hoeing easier. To do this cut out all of the new shoots, except those in the hills. Use hoes or cultivating equipment. Leave enough room in the hills to allow for 8 to 12 canes.
Mature raspberry canes after spring pruning and tying to four-wire trellis.

A—A hill after spring heading.
B and C—Hills with canes spread and tied. The canes in each hill are divided into two equal groups. The ties on the wire are spaced 18 inches apart or half the distance between the hills.

The canes that have produced fruit can be cut out any time from the end of harvest through late winter. Cutting them out soon after harvest makes spraying for disease or weed control easier. It also simplifies planting winter cover crops. Cut the canes as close to the ground as you can. When the old canes are cut out, new canes that are weak should be cut out, too. Tie the new canes that are kept to the top wire—either in one bunch for each hill, or with the canes from each hill split and the halves tied separately. Cutting the canes back or tipping them should be left until late winter or early spring after the danger of hard freezes has passed.

Canes are usually cut back to 4½ to 5½ feet. In areas where long fruiting laterals are produced, children who pick berries have difficulty reaching all of the berries if the canes are left 5½ feet long.

Sometimes canes will branch as the result of injury from insects, frost or other causes. Cut out branched canes since they are usually less pro-
Mature raspberry canes tied to a single top wire.
A—Weak canes cut out and strong canes tied.
B—Canes cut back or tipped.

productive than unbranched ones. Side branches can be cut off and the main cane tied up if it is good and strong.

The number of canes each plant or hill can support depends on soil fertility, moisture and planting distances. Research shows that all the good, strong canes each plant will produce should be left to bear fruit. This may mean 8, 10, or, with exceptionally good growing conditions, as many as 12 canes per hill.

Organic Matter

Use barnyard manure or poultry manure, if it is available, to keep up the soil organic matter and provide plant food in raspberry plantings. Annual applications of 8 to 12 tons of stable manure or 5 to 6 tons of poultry manure per acre should be made if manures are available. Manures are low in phosphorus so 500 pounds of ordinary (18 per cent) superphosphate or 200 pounds of treble superphosphate (48 per cent)
per acre should be applied annually in Western Washington to supplement the manure.

Winter cover crops are also a good way to keep up soil organic matter. In western Washington, plant winter rye in early September and work it down in the spring by mid-May. In eastern and central Washington plant spring oats or barley and hairy vetch in August and work them down in late May. If left longer the cover crop may take so much water that the raspberry plants will suffer. Even where irrigation is available avoid letting the rye get beyond the heading stage. If left longer it is coarser and more difficult to work into the soil. Heavy straw requires large quantities of nitrogen to break it down. If large quantities of strawy material are plowed under or mixed with the soil extra nitrogen should be applied. If the material is left on or near the surface there should be no need for extra nitrogen.

**Commercial Fertilizer**

Raspberry plants must be kept in good vigor if they are to produce good crops over a long period of years. Soil tests are the best guides to phosphorus and potash fertilizer needs. You can get shipping cartons and instructions for sending soil samples for testing to the State College from your county agent.

Western Washington soils may need all three major plant foods—nitrogen, phosphorus and potash. If a soil test is not made, and manures are not used, apply 800 pounds per acre of a 5-15-10 fertilizer, or its equivalent, each year as a general practice. This would provide 40 pounds of nitrogen, 120 pounds of phosphoric oxide (\(P_2O_5\)), and 80 pounds of potash (\(K_2O\)). The fertilizer should be applied when growth starts in the spring. Put it in a furrow or band 12 to 18 inches from the center of the row, and 2 to 4 inches deep. If equipment to put the fertilizer in the soil is not available, scatter the fertilizer on the soil surface near the row and work it into the soil with a cultivator or harrow.

South of the Lewis River and possibly in other areas in western Washington the lack of boron may cause cane dieback, or reduce plant vigor and yields. Soil analysis for boron is available through the College. You should make a special request if you want a boron test run on soil samples you send in. If you need boron, broadcast 20 pounds of agricultural
borax or its equivalent per acre in the winter or early spring. It may be necessary to apply boron each year where it is most severely lacking.

Eastern and central Washington soils are much less likely to be low in potash and somewhat less likely to be low in phosphorus. Here again soil tests are the best guide. The greatest need is usually for nitrogen. If a soil test is not made to determine phosphorus and potash needs, apply 80 pounds of nitrogen and 40 pounds of phosphoric oxide, in addition to the nitrogen from the vetch cover crop. This amount of fertilizer could come from one of the following combinations:

1. 100 pounds of ammoniated phosphate (11-48-0)
   200 pounds of ammonium nitrate (33 per cent nitrogen)
2. 200 pounds of ammoniated phosphate (16-20-0)
   250 pounds of sulfate of ammonia (21 per cent nitrogen)
3. 250 pounds ordinary (18 per cent) superphosphate, or 80 pounds of treble superphosphate (48 per cent) and
   250 pounds of ammonium nitrate (33 per cent nitrogen), or
   400 pounds of sulfate of ammonia (21 per cent nitrogen)

Cultivation

By the time the raspberry plants are three years old the roots will have grown out until they meet and intermingle between the rows. Raspberry plants are shallow rooted. Deep cultivation should be avoided. The deepest that cultivators should go is 3 inches; 2 inches would be much better. Rotary type cultivators, properly operated, are very good. Cultivation should be limited to controlling weeds and keeping down raspberry shoot growth between the rows.

Some hand hoeing is usually needed to keep down shoots between hills in the row and to control weeds. Two, three or even more hoeings may be necessary where chemical weed control is not used.

Chemical control of annual weeds in raspberries in western Washington has proven economical and effective. You can get information on materials, rates, and timing from your county agent.

Irrigation

Irrigation is a necessity in most parts of eastern Washington if good yields of raspberries are to be produced. In western Washington, irrigation will increase yields of raspberries materially most years.
No one general rule can be made to go by in determining the irrigation needs of raspberries. Soils vary in their water holding capacity. A medium-textured soil may hold about 2 inches of usable water per foot of soil depth. Light sandy soils may hold less than an inch. Heavy soil may hold up to 3 inches of usable water per foot of soil depth. This means light, shallow soils must be irrigated with smaller amounts of water, and more often, because the water is depleted more quickly. Highest yields are produced if moisture in the root-zone is not allowed to become less than half what the soil will hold. The soil should not be allowed to become powder dry between irrigations.

In western Washington, 2 acre inches of water or more are needed each month through the summer. This includes both rainfall and irrigation.

In eastern Washington, 2 to 5 inches per month are needed in the spring, 7 to 10 inches per month in the summer, and 2 to 4 inches per month in the fall. Watering should be tapered off after harvest to harden up the canes. A final irrigation in the fall may be needed to protect the plants from becoming too dry during the winter if rainfall is short.

Heaviest moisture needs are just before and during harvest. At this time the growth of new canes and rapid development of the berries draws heavily on water in the soil. Good berry size depends to a considerable extent on enough soil moisture. Because raspberries are shallow rooted, examine the soil often to be sure that it keeps moist during the growing period and particularly during harvest.

Insects and Diseases

Raspberries are subject to the attack of several insects and diseases. Your county agent has the most up-to-date information on their control.

Black Raspberries

Black raspberries, or blackcaps as they are frequently called, are grown much less widely than red raspberries. They are sold for processing, for fresh use, and for coloring in dyes. Yields of black raspberries are usually less than those of red raspberries. Price differentials between the two berries are not great enough to offset yield differences some years.
Cultural practices and soil, fertilizer and moisture requirements are much the same for black raspberries as for red raspberries. There are, however, some distinct differences in the way the two crops are grown.

**Propagation**

New black raspberry plants are produced when the tips of the canes come in contact with the ground and take root. Rooting takes place in the late summer and fall. In the mild winters of western Washington some root development takes place during the winter. Only well-rooted plants should be used for planting. Usually the rooted tips are cut from the canes when the plants are dug in the spring, leaving a 6 to 8 inch handle. The handles should be cut off when the plants are set in the field and the plant's location marked with a stake. Set the new plants so that the crown is about an inch below the surface.

**Training**

Black raspberries are sometimes trained on trellises, but the most common practice is to pinch the tip from the new shoots in the summer when they reach knee height—about 18 inches. This causes the canes

![Mature black raspberry plants before and after pruning. The new shoots were headed during the growing season by pinching out the tips.
A—Before pruning. The old fruited-out canes and some of the weaker ones have been removed. Note the length of the laterals resulting from the heading.
B—After pruning. The weak canes, those less than 1/3 inch in diameter at 1 foot above the ground, were removed. The laterals were cut five to eight buds long. The stronger the cane, the lighter the pruning.](image-url)
to branch. During the dormant season cut out the weak canes and cut the branches on the strong canes back to 6 to 10 inches, depending on plant vigor. The old canes that have fruited can be cut out either at the end of the harvest or during the winter.

Weed Control

The branching of black raspberries makes cultivation and hoeing difficult during the late summer and fall. The use of chemicals, applied after pruning in the dormant season, will do a good job on annual weeds in western Washington. Further information is available from your county agent.

Black Raspberry Varieties

Munger is the principal variety grown. No other varieties have been found that are superior in yield, fruit quality and plant characteristics.
Growing Raspberries
in Washington

• Start with good soil. Drainage and organic matter are important. Soil tests are the best guides to fertilizer needs.

• Careful soil preparation will cut down plant loss and bring the planting into good production faster.

• Select the best plants you can get. Handle them carefully. Protect them from drying out.

• Allow room between rows for cultivators, sprayers or dusters you will use.

• Shallow cultivation only often enough to control weeds is cheapest and best.

• Irrigation will increase yields. Greatest need for soil moisture is just before and during harvest.

• Ask your county agents for the latest information on:
  Insect control.
  Disease control.
  Chemical weed control.

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