GROWING RASPBERRIES IN MONTANA

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Montana State University, Bozeman
Bulletin 1215 (Reprint) Nov. 1981

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SITE SELECTION

Raspberries may be grown successfully at an elevation as high as 7,000 feet. They do best in full sun on non-alkaline “fertile” loam soil. However, they may be grown in partial shade or under other environmental constraints. Natural protection against strong winter winds is provided by some valleys, but in other areas it is necessary to provide artificial protection during winter months (see topic on "Winter Protection").

A high, sloping site will reduce cold injury by allowing the cold air to drain into low areas. However, do not plant raspberries on the crest of a hill, due to the drying effect of wind. Winter-kill is often caused by wind desiccation instead of low temperature.

Raspberries grow well on a wide range of soil types. The character of the subsoil is more important than the type of surface soil. The subsoil should be deep and well-drained. The root system will be restricted if the subsoil is underlaid by a shallow hardpan or a high water table. Plants with restricted root systems may be damaged during drought periods because raspberries need an abundant supply of moisture at all times.

Raspberry roots and crowns are also extremely sensitive to excessive moisture in poorly drained soils. Flooding for 24 hours or longer may kill the roots by suffocation. Young plants may appear to grow well the first season on poorly drained soils, but injury symptoms will occur during the following seasons.

Well-drained loamy soils are usually most productive. The lighter textured sandy soils are easiest to cultivate but must be frequently watered and fertilized.

Select a site at least 300 feet from other bramble crops to minimize transfer of virus diseases. Additionally, eliminate any wild bramble plants found within several hundred feet of the planting. Tomatoes, potatoes, eggplants, peppers, and brambles are all susceptible to many common diseases. Do not plant raspberries after these crops.

If possible, set raspberries on sites that were planted to cultivated crops the previous year. When sod fields are used turn under the sod the season before planting.

PREPARING THE GROUND

Unfortunately, raspberries are poor competitors. After choosing the best soil and site, be sure to destroy all perennial weeds. Weeds may be destroyed with cultivation, herbicides, and/or plastic mulch (see "Weed Control" section). Before working small areas, cover the ground with a black plastic mulch and place soil, rocks or other weighty objects on the edges to hold it in place. A good time to lay the plastic film is in the fall or early spring (March). Leave it there for six to eight weeks to help control weeds before working the soil.

PLANTING

Obtain plants from a reputable nurseryman or from any other source, or patch that is free of virus disease. Keep the plants cool and moist until they are planted. They may be stored for several days in cold storage at 35°F.

Plant raspberries as soon as the ground can be worked early in the spring. It is better to delay planting than attempt to work wet soil.

Space hills approximately two feet apart, or if in partial shade, about three and one-half feet apart. Place plants in holes five to six inches deep and fill holes with soil and press firmly. Keep the soil moist. Generally, two complete growing seasons are required before the plants grow large enough to produce an appreciable amount of fruit.

PRUNING

Red raspberries need to be pruned annually. Two main reasons for pruning are to remove dead canes and to thin out the clumps. New canes grow annually and produce fruit the following year, then die. Dead canes should be cut at ground level and removed.

A healthy stand of raspberries will produce numerous new canes annually. They may become so dense that some canes are weak and produce little or no fruit. It is better to remove the weaker ones and leave six to ten large canes per hill. This should be done in July or August when the new crop of canes is young and tender.

Other pruning may be necessary to remove suckers which come up out and away from the hill or row. Generally, cultivation and mowing will keep suckers under control. If a natural planting is desired suckers, or side shoots, may be allowed to spread freely as in the wild. Do not mow, cut, cultivate or control the suckers if room is available for this type of planting. Dead tips of raspberry plants may be removed in the spring or early summer.

SUPPORT OF CANES

Unless the raspberries are the trailing varieties, the plants will stand erect. They will often bend over if they are grown in shaded or windy areas. Partial support is often necessary to keep plants upright. A tight wire, rope, nylon cord or any strong material on each side of the row will give good support. In some cases, it may be necessary to provide support between the hills. Tie a short piece of cord or wire across the row with both ends connected to two long strands for support.

FERTILIZER

Raspberries use large amounts of nitrogen, phosphorous and potash. They use lower amounts of calcium and sulfur and even lesser amounts of trace or minor elements such as

iron, zinc, magnesium, boron, manganese and copper.

It is wise to have your soil tested and to mix up a complete and well-balanced fertilizer. A general application of fertilizer containing equal amounts of the three primary foods of nitrogen, phosphorus and potassium is recommended when a soil test is not available. A mix containing approximately 20 percent of each primary element is usually available at commercial outlets. Weigh out about one pound for every 35 feet of linear row and spread it in a strip extending two feet past the row and two feet on each side. For a 35-foot row of plants this is an area 39' X 4' or 156 square feet.

Weigh out only about two-thirds of a pound for the 35-foot row if the fertilizer analysis is higher. Conversely, weigh out about one and one-fourth pounds for a 35-foot row if the nitrogen content is low.

Many fertilizer mixes contain enough sulfur with the three primary plant foods to satisfy plant needs. Most soils in Montana contain adequate calcium. Additionally, many fertilizer mixes contain adequate calcium.

IRRIGATION

Raspberries use more soil moisture than most fruit plants. Irrigated plants are more vigorous and yield fruit over a longer season than do unirrigated plants. Begin irrigating raspberries at the same time other garden crops are normally irrigated. Most cultivars require about one inch of water per week during the growing season. Extreme warm and windy conditions make greater amounts of water necessary. Light sandy soils need more frequent irrigation than heavier clay soils.

The fruiting period is a critical irrigation time. Apply 1 to 1 1/2 inches of water once a week if drought occurs during fruiting.

Do not overwater in late summer or fall. Excessive water application during this time may delay maturity of cane wood and result in a freezing injury that will become evident the next spring.

WINTER PROTECTION

There are two main ways in which raspberries become damaged or killed during winter months:

Winter drought

This drying process during subzero weather is common in Montana. Water the plants in late fall before the ground freezes (usually October or November) to reduce or avoid this damage. Provide protection against wind whenever possible.

Break of Dormancy

Whenever the temperature of the atmosphere reaches 41°F (5°C) for three or four days, raspberries break dormancy and become active. When a winter warm spell is followed by a sudden hard freeze it kills the active tissue. The top portion of the canes break dormancy first. This is why many canes with dead tops are evident in the spring. To avoid this, wrap the canes with burlap or similar material to reduce the intensity of winter sun and wind.

When possible, build a temporary fence to cast shade on the plants. Additionally, cover the ground around the plant with straw or other insulating material to reduce the intensity of the freezing period. Mulching reduces root injury which results in less root rot. Do not leave the mulch, shade or wrapping on too late in the spring. Usually these materials should be removed around the first of April or sooner in the lower elevations of the state to avoid injury.

DISEASE CONTROL*

Raspberry Rust

This fungus disease is easily detected. The undersurface of the leaves will be covered with a bright orange-colored mass of spores. The disease will stunt and weaken plants.

Upon first appearance of this rust, dig the plant out and burn it. Spray the remaining plants with a fungicide such as Maneb, Diathane, Captan, or dust them with sulfur or any other recommended fungicide on the market.

Do not eat fruit containing any of the fungicide. Read and follow the directions and precautions on the container label carefully.

Anthracnose

The symptoms of this fungus disease are circular, reddish-brown, sunken spots up to 1/4 inch across on young shoots. A slot-hole effect on the leaf develops late in the season. Individual droplets (seeds) or larger areas on fruit may remain reddish and hard as the fruit matures. The fruit may be deformed.

It is very important to have clean plants to control this disease. Remove and burn infected plants immediately and spray the remaining plants with a fungicide as for raspberry rust.

Spur Blight

This fungus disease usually occurs on shady sites and in patches where canes are very dense or numerous. It seldom exists on sunny locations where canes receive adequate sunlight. Symptoms include brown or chocolate-colored spots on canes at the base of the leaf petioles. Leaves usually drop off. The brown circular spot formed at the leaf scar

continues to enlarge until most of the cane turns brown.

It is essential to have raspberries in a sunny location and keep canes thinned out to control this disease. Spraying the plants with Bordeaux 4-4-50 will reduce the spread of this disease, but the thinning of the canes and admission of sunlight is the first control measure. Burn diseased canes.

Rhizoctonia

This is a fungus disease which injures roots. When washed, normal raspberry roots appear white or nearly so. Brown roots may be indicative of the disease. The outer portion or epidermis is dead if the roots appear brown. *Rhizoctonia* may be the casual organism causing this damage. It is very difficult to control. Because it tends to invade frost-injured roots it may be reduced by controlling the extent of winter freezing. This is done by applying a mulch over the crowns and soil surface within two feet of the plants.

Mosaic

The symptoms of this virus disease are large greenish blisters surrounded by yellowish tissue on the leaves. Leaves are smaller than normal and crinkly. These symptoms are obscured by hot weather. The best control is to use disease-free plants. Remove and burn diseased canes. Control leaf-feeding aphids because they may spread the disease.

*See USDA, Farmers Bulletin, 2208, Controlling Diseases of Raspberries.

WEED CONTROL

Weed control usually involves a combination of both mechanical and chemical means. Cultivate soon after setting out the plants. Do not cultivate deeper than three to four inches or the roots may be damaged. An annual cover crop may be seeded each year that will die in winter. However, cover crops may be a disadvantage if water is scarce.

Several herbicides are registered for use in raspberries. For established plantings, spray the rows with a herbicide before the weeds and new canes emerge in early spring. Do not use pre-emergence herbicides the year the planting is made.

- Dichlobenil (CASORON) may be used at two to four pounds of active ingredient per acre depending on the soil type. Read and follow the label carefully. Dichlobenil is effective against quackgrass and many annual weeds. Granular formulations are most effective on quackgrass. Do not exceed four pounds active ingredient per acre. Use lower rates on young plantings.
- Simazine (PRINCEP) may be used late fall or early spring before growth starts. Do not exceed four pounds of active ingredient per acre. Use two pounds or less on young plantings. Refer to the label for specific rates and application procedures. Simazine is effective against many annual weeds.

INSECT PROBLEMS

Pest	**Description and Damage**	**Controls**	**Interval between last application and harvest / Remarks**
Dryberry mite	Microscopic mites found on ripe berries, in cracks and crevices, and under bud scales. Causes "dryberry" disease of loganberry. Mites feeding at druplet bases, cores and stems inject a toxin which prevents proper druplet maturation. Affected berries turn red, then brown and dry.	Diazinon or Kelthane may give some relief during the growing season, or lime-sulfur applied as a dormant or delayed dormant spray in early spring while canes are still on the ground, but buds are closed. Repeat application when buds are developed.	It is doubtful whether it is worthwhile to control infestations that develop after Sept. 1.
Two-spotted spider mite	Mites overwinter as adults on weeds and debris at the base of most plants. Adults are tiny, about 1/50-inch-long, have eight legs, and are light tan or greenish in color with a dark spot on each side. Mite feeding reduces plant vigor and may cause leaves to turn brown and drop prematurely.	Systox Kelthane Meta Systox-R	Post-harvest only Two days Seven days – do not apply more than once per season. Be sure spray is applied to undersides of leaves.
Leaf rollers	Larvae overwinter in crevices, mostly on old canes. Larvae tan when small turning green as they mature. They web and feed on foliage and ripe fruit.	Guthion Sevin	14 days Seven days Apply material two weeks prior to bloom or examine plants in May to determine need for control. Removing dead leaves and trash following harvest will help reduce overwintering larvae and reduce the population the following spring.

Pest	Description and Damage	Controls	Interval between last application and harvest / Remarks
Raspberry crown borer	A serious pest of raspberries, the raspberry crown borer larvae feed in the larger roots, crowns, and at the base of canes, causing reduced fruit production and often death of the plant. Larvae are white and from ¼ to 1 inch long.	Diazinon – apply as a crown drench. Guthion – Best results obtained when applications are made in October or March. Treatments should be made for at least two successive years since older larvae will mature and moths will lay eggs even when first year larvae are controlled.	Do not apply any control when fruit is present. Removing and destroying old or injured canes close to the soil line can help reduce damage since borers enter old stubs and injured canes to pupate. This should be done prior to mid-august to prevent any of the adults from emerging.
Root weevils	Larvae (grubs) overwinter in the soil at depths of 2-4 inches. Grubs are white, legless, with tan heads. Adults are black or grey and feed on foliage. Grubs feed on roots and crowns of plants, causing stunted and poor yielding of plants.	Malathion – foliar spray Guthion – apply to soil in crown area; do not apply to foliage	One day Three days Note: apply Malathion sprays only in late evening to protect bees at bloom.
Thrips	Thrips are about 1/25-inch-long at maturity. They are common flower feeders and may infest ripe berries.	Diazinon or Methoxychlor in the pre-bloom period.	Seven days
Western raspberry fruitworm	Small brown beetles, the adults of which cause slits in leaves from their feeding. Adults also destroy developing buds. The larvae feed within the blossom and in developing fruit.	Diazinon before bloom Rotenone at bloom	Seven days One day. Apply rotenone when blossoms open and repeat one or two times at 10-day intervals. Do not use rotenone if Diazinon was used before bloom unless the beetles are observed.
Slugs	These slow-moving, slimy animals may climb canes and move into berries. Most likely to occur during cool, wet summer.	Metaldehyde (bait formulation)	One day. Scatter bait on soil surface around plants according to label instructions. Do not contaminate berries on foliage.

VARIETIES

Probably 75 percent of the raspberries in the United States are the red type. Red raspberries are more hardy than black or purple raspberries. There are only a few protected areas in Montana where black and purple raspberries do well.

Red Raspberries

'Latham': is one of the most popular and dependable mid-season raspberries. The canes are very vigorous, productive and cold-hardy. The large red berries darken as they mature. 'Latham' is a late-season variety with a fairly long harvest season. Ripens mid to late season. Berries are extra-large and are good quality for fresh use and/or freezing.

'Canby' is a moderately hardy, mid-season, vigorous producer. It is very productive but produces fewer canes per hill than most red varieties. Canes are nearly thornless, which makes picking easier. Berries are light red, high capped, firm and non-crumbling.

'Newburgh' is a light red berry of good quality and flavor. Plants are very productive and resistant to root rot. This variety is a relatively hardy mid-season producer. Berries are firm.

'Hilton' is a cross between the 'Newburgh' and 'Walfred' and is reported to be vigorous, productive and usually winter hardy. The canes are semi-erect. Berries are medium red and very large. They ripen mid-season. 'Hilton' is one of the largest of all red raspberries. Berries are difficult to pick, unless fully ripe.

'Gatineau' is a very early raspberry from Ottawa, Canada. May be two weeks earlier than 'Latham.' The berries are larger than many early red types. Heavy cropper with irrigation. Very cold-hardy.

'Madawaska' is another very early red berry. It is one of the hardiest varieties. The berries ripen about one to two weeks earlier than 'Latham.' 'Madawaska' is a prolific producer throughout the growing season.

'Boyne' is a mid-season berry that was developed in northern Minnesota. It is extra hardy and bears large fruit. It is a top commercial variety in some northern states. Fruit are borne on dwarf canes that are easy to pick. 'Boyne' is an excellent plant maker and may bear a week or ten days before 'Latham.' Berries are succulent with large dark red fruit. Heavy cropper.

'Killarney' is another fine Canadian variety that is similar to 'Madawaska.' It is a very hardy mid-season cropper. Berries are large and excellent quality.

Red Everbearing Raspberries

'Heritage' is an excellent fall-bearing red raspberry. It is very vigorous and suckers prolifically. Canes usually do not require support. The fall-crop berries are medium-sized and very firm unless produced under rainy conditions.

'September' is one of the best fall-fruiting varieties. Berries are medium size and bright red. The spring crop ripens early and is fair in quality. Good for jellies and pies.

'Fall Red' bears a small crop in early summer with a large crop in the fall. Berries are large and have excellent flavor. Good fresh, frozen or canned.

Black Raspberries

Blackhawk and Cumberland are two types that may be grown in the warmer areas of the State.