

## Raspberries

Of all the small fruits, raspberries are gaining the most popularity. The berries are versatile and can be used as fresh fruit, in preserves, or in pies and pastries. Newer plant varieties are productive and easy to grow.

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 are provided in some valleys, but in other areas it is necessary to provide artificial protection during winter months.

### Varieties

Red raspberries are the most commonly grown, but there are varieties of purple, black, or yellow berries that are adapted to Massachusetts. Purchase certified, virus-free plants from a reliable nursery. They cost more, but the benefits of having more vigorous, productive plants outweigh the extra cost. To help prevent problems with troublesome viruses, do not transplant either wild plants or cultivated plants from another site.

### Red Raspberries

**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.

**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.

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

**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.

**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.

**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.

**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.

**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. Fall bearing raspberries (plants that produce fruit on the current season's growth) are becoming more popular. Because they produce fruit on current growth, the gardener need not be so concerned about cane hardiness. The canes can be pruned to the ground in the fall, mulched, and left for the winter without additional protection. These fall bearing varieties, however, must be grown where there is a moderate to long growing season. Earlier fruiting varieties will no doubt be appearing on the market in the near future.

### Red Everbearing Raspberries

**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.

**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.

**Nordic** is a variety from Minnesota ripening mid-season, with medium sized fruit of good quality.

**Reveille** plants are vigorous and high yielding. Fruits ripen early and are medium to large with good flavor, but due to softness, do not keep long.

**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.

Trent has fruit that ripens early, is colored medium to dark red and may be crumbly or soft.

### **Black Raspberries**

**Blackhawk**

**Cumberland**

**Bristol**

**Jewel**

### **Purple Raspberries**

**Clyde**

**Brandywine**

### **Yellow Raspberries**

**Canby**

## **Site Selection**

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 because of the drying effect of wind. Winterkill 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.

## **Soil Preparation**

The best soil for raspberries is a deep, well-drained, medium loam that is rich in organic matter. Raspberries do best in soil that has a pH of 6.0 to 6.5. Organic matter such as peat moss, compost, or aged manure can be added to enrich less desirable soils. These materials also make the soil loose, allowing rain and roots to penetrate deeper.

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.

## **Lime and 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 2 feet past the row and 2 feet on each side. For a 35-foot row of plants this is an area 39 feet by 4 feet 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. Additionally, many fertilizer mixes contain adequate calcium.

**Before planting.** Where soil pH is too low, work in the required amount of lime before planting. In addition, aged manure at the rate of two to five bushels per 100 feet of row can be worked into the soil to increase available organic matter.

**After planting.** If necessary, two pounds of 10-10-10 fertilizer (or equivalent) per 100 feet of row can be applied after growth has started. Do not apply fertilizer after June 15. Late fall growth increases risks of winter injury.

**Following years.** Use 10 pounds of 10-10-10 fertilizer or equivalent per 100 feet of row in early spring.

## **Planting**

Sites for raspberries should be free of perennial weeds, have good air, drainage (preferably a hillside), and have adequate moisture. To avoid problems with verticillium wilt, do not plant raspberries where potatoes, tomatoes, peppers (solanaceous crops), or strawberries have been grown. Plant raspberries in full sunlight for maximum yields. Raspberries should be planted as early in spring as possible. Prune the canes to within six inches of the ground at planting time for best results. Soil should be thoroughly worked before planting. The most common planting system for red raspberries is the narrow hedge row in which individual plants are set 24 to 30 inches apart in the row, with rows six to ten feet apart. Black raspberries are often grown in hills 30 inches apart with seven to nine feet between rows. If planted in partial shade, the hills should be set 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.

Raspberry plantings should be cultivated thoroughly and frequently. If weeds and grasses get a start, they are difficult to control.

Obtain plants from a reputable nurseryman or from a 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 degrees 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.

## **Watering**

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 over-water 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.

## **Weed Control**

Proper site preparation will help control troublesome perennial weeds. After plants become established, shallow cultivation, hand weeding, or hoeing may be necessary to control weeds. Weeds should be kept out of the planting, especially the first year, to allow the raspberry plants full use of available nutrients and water. Once plants are fully established, weeds are not as troublesome within the rows.

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.

Mulches of straw, chips, sawdust or leaves placed around the canes in fall will reduce cane and root freeze injury. As mentioned under disease prevention, freeze injury can predispose the raspberry to diseases. Mulches can also provide a deterrent to weed invasion and if left throughout the growing season, help to retain soil moisture and reduce muddiness among the plants.

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 or Norosac) 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.
- Sethoxydim (Poast). Apply at up to three pounds actual ingredient per acre to actively growing grasses. Should be combined with a crop oil or other emulsifier. Products such as Ortho Grass-be-Gone contain the emulsifier. Do not use within 45 days of harvest.
- Oryzalin (Surflan). Apply in late fall or early spring to bare soil where vegetation has been removed. Irrigate with 1/2 inch water to activate chemical.
- Napropamide (Devrinol). Apply in late fall or early spring. Need 1 inch of irrigation or rainfall after application.

## Mulching

Mulching in the fall of the planting year will help keep down weed growth, increase moisture content of the soil, and help protect the plants against winter injury. Materials that can be used as mulch are straw, hay, and leaves. Add new mulch, as necessary, each year.

## Pruning

Raspberries need annual pruning, or "thinning out" to encourage new growth, fruit formation, and minimize disease problems. Summer-bearing varieties grow canes the first year, produce fruit the second year, and die after fruiting. Following are pruning guidelines for each variety:

- **Summer.** Remove old canes after harvest.
- **Early Spring.** Remove weak canes. Narrow and thin the rows to about one-foot widths. Shorten canes to heights of about 4 1/2 feet.
- **Ever-bearing.** These varieties set fruit during the summer and again in the fall. There are two "systems" for pruning this type of berry. One is to mow the canes within two inches of the ground after the fall harvest. Plants must then be mulched for protection during the winter. This system, however, eliminates the summer crop but allows a more consistent crop level in the fall. The second system is to remove the canes that bore fruit in the fall after the fall harvest and then follow the procedure for summer-bearing reds.
- **Black and Purple.** Remove the top two inches of canes in early June to encourage lateral branching. This process is called "topping" and should be practiced in addition to the steps for pruning early spring raspberries. Shorten side branches to six inches (black) or ten inches (purple). Leave only three to four canes per hill.

Pruning is one of the most important parts of raspberry culture and it is often neglected or improperly done. Proper pruning of raspberries makes fruit picking easier with the individual fruits growing larger. Also, the shortened canes are less likely to break under a load of fruit.

In the hedge row system, spring pruning should consist of thinning the canes to 6 inches apart of 8 to 10 canes per two feet of row. Keep in mind that row should be only 18 inches wide. The remaining canes should be tip pruned or headed back to 3 to 3 feet tall. This spring pruning should be done in early spring before any growth takes place.

In midsummer, after the raspberries have finished fruiting, all canes that bore fruit should be removed. These old canes will die the following winter since the canes of raspberries live only two years. The first year the canes grow from a shoot starting from the root. The second year these canes fruit and die. Canes that have fruited compete with the young canes for moisture and nutrients. They also harbor insects and diseases. Burn or bury all the refuse removed in 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 are 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.

## Supporting Brambles

Since fruit-bearing canes are top heavy, it is often a good idea to support fruiting canes. Usually, all that is necessary is a wire trellis which has two posts, one at either end of the planting. Each post should have a horizontal arm with wires running each side of the planting at a height of 40 inches.

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. 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.

## Pests

Birds often can be troublesome in raspberry plantings, and netting may be necessary.

Major insect pests include tarnished plant bugs, fruitworms, sap beetles, Japanese beetles, and cane borers.

## Harvesting

Raspberries should be picked when they develop deep color, lose their glossy color, and separate easily from the receptacle. Fruit is usually harvested every other day, or daily, at the peak of the ripening period. Raspberries have a short shelf-life and must be refrigerated as soon as they are picked.

Harvesting fruits as soon as they are ripe helps eliminate problems with Japanese beetles, sap beetles, and fruit rots.

## Other Problems

Problem: Leaves on my raspberries are yellowish, blotchy, twisted, and/or the fruit is small or crumbly.

Cause: The cause of any of the above symptoms is probably a virus. Infected plants should be removed and destroyed.

## Diseases

Brambles--red raspberries, black raspberries and blackberries--are susceptible to many diseases. Practicing the following management techniques helps prevent and control many bramble diseases:

1. Select disease resistant varieties and high quality (certified virus-free), healthy stock.
2. Plant at least 600 feet away from existing wild or cultivated brambles. Plant in fields not recently cultivated with tomatoes, potatoes, eggplants, peppers, or strawberries.
3. Keep plantings free from weeds and plant debris.
4. Control aphids and other insects to prevent spread of diseases.
5. Remove canes that have fruited after harvest, and destroy all diseased canes.
6. Thin out plantings to allow for increased air circulation.

## Disease Symptoms

**Anthracnose** is a fungus which damages canes and leaves and sometimes causes fruit rot. Anthracnose first appears on young shoots as purple, raised spots. Canes show light, grayish spots 1/8 inch in diameter. These spots enlarge, develop purple edges, and eventually girdle the cane. Leaves exhibit oval spots with light gray, sunken centers and purple margins. During severe infestations leaf edges tend to curl inward. Fruit may become 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.

**Raspberry mosaic** is an easily transmittable virus disease. Leaves develop a mottled appearance with large green blisters surrounded by yellow tissue. Eventually, leaves become deformed. Canes become stunted, and berries become dry, seedy, and crumbly. There are a number of other virus diseases which often affect brambles, causing similar symptoms. The best control is to use disease-free plants. Remove and burn diseased canes. Control leaf-feeding aphids because they may spread the disease.

**Rhizoctonia** is a fungus disease which injures roots. Normal raspberry roots, when washed, 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. Fruiting canes will wilt and die due to lack of feeder roots. It is very difficult to control but Metalaxyl (Ridomil) or fosetyl (Aliette) may provide 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.

Another fungus disease, **Spur Blight**, produces brown or purple spots around bud scars by the middle of July. These spots enlarge and encircle the cane. Buds shrivel and fail to develop. Leaves fall prematurely, and canes dry and crack. During the summer, spores are produced and spread the fungus to other plants. 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, lime-sulfur (Orthorix, Polysul) or captan (Orthocide) 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.

**Verticillium wilt** is a soil-borne fungus that infects plants through the roots and may persist in the soil many years. Symptoms appear about midsummer; lower leaves become infected, and the cane turns blue and dies.

**Orange rust** is a fungus that is often found on wild brambles. Infected shoots are thornless, spindly, and bear light green leaves. Leaves develop yellow spore bodies which turn black and later produces orange spores, causing the undersides of the leaves to turn bright orange. However, this disease is more visually spectacular than harmful. 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 (e.g. Orthocide) 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.

Remove and burn infected plants. Fruit rots are caused by various fungi and occur most frequently during hot, humid or rainy weather. Pick fruit frequently, and refrigerate harvested fruit immediately. Be sure plants are adequately thinned to allow for proper air circulation.

If the above diseases cannot be controlled with the cultural techniques mentioned, refer to the current pest control guide for chemical control measures.

### **Winter Protection**

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

- **Winter Drought** -- This drying process during sub-zero weather is common. 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 degrees F (5 degrees 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.