

Brambles

Brambles—raspberries and blackberries—are perhaps the most diverse group of cultivated fruits in the world. Hundreds of species grow throughout northern temperate regions. Because brambles grew wild and abundantly across North America, they have been cultivated only relatively recently.

The demand for processed raspberries increased in the early 1900s. In response, New York growers planted more than 10,000 acres. But a viral disease decimated the industry. The development of methods to control this disease has fueled a resurgence in raspberry cultivation in the Northeast.

Choosing Cultivars

You can tell the difference between raspberries and blackberries when you pick the fruit. When you pick a blackberry, the white core (receptacle) comes off with the fruit. When you pick a raspberry, the core remains attached to the plant, leaving a hollow center in the fruit.

Blackberries can be either thorny or thornless. Raspberries can be red, black, purple, or yellow. Some red and yellow raspberries are called fall-bearing (or sometimes everbearing). They produce fruit in the fall on primocanes (first-year canes) and in the summer on floricanes (second-year canes).

Blackberries and red raspberries produce many suckers and spread laterally. Black raspberries and purple raspberries generally stay confined to the area of the original planting hole.

There are many bramble cultivars for home gardening (see Table 4). For an updated list of nurseries, see www.hort.cornell.edu/nursery. Choose cultivars that can withstand the winter temperatures in your area. Also consider productivity, use, season of ripening, and fruit quality when making your selections. If your location is prone to early fall frosts, fall-bearing cultivars may not be a good choice.

In general, raspberries produce crops reliably only in USDA Hardiness Zone 5 and warmer regions up to Zone 7. The plants will survive in colder regions. But in most winters the aboveground canes (which produce the flowers and fruit) will be damaged, reducing that year's crop sometimes to zero.

The intimidating thorns on blackberries discourage most people from growing them. Thornless blackberry cultivars may seem like a good alternative, but they have limitations as well. They are susceptible to rodent damage, are only marginally hardy in most of the Northeast, and need to be planted in protected areas.

Keys for Success

Choose a sunny site with well-drained soil. Brambles need lots of moisture, but they will not tolerate soggy soil.

Do not plant brambles in a site where strawberries or plants in the tomato family (including potatoes, peppers, and eggplants) have been grown.

Prepare the soil at least a year before planting, particularly if pH and nutrient levels need to be adjusted. Get weeds under control before planting.

Trellis the plants for easier management and harvesting and to keep the fruit from coming in contact with the ground and rotting.

Be prepared for annual or even twice-a-year pruning. With most types of brambles, you'll need to thin the plants to get a good harvest of high-quality fruit.

Table 4. Bramble cultivars that consistently perform well in the Northeast

<i>Cultivar</i>	<i>Season</i>	<i>Attributes</i>				<i>Quality</i>
		<i>Hardiness</i>	<i>Fruit Productivity</i>	<i>Fruit Size</i>	<i>Fruit Firmness</i>	
Summer-bearing reds						
Prelude	1	3	1	1	2	2
Reveille	1	3	3	1	1	3
Killarney	1	3	2	2	2	2
Canby*	2	2	3	3	3	3
Festival*	2	3	3	2	2	1
Titan	4	2	3	3	2	1
Encore	5	3	2	3	3	2
Summer-bearing yellow						
Amber	4	1	1	2	1	3
Summer-bearing blacks						
Allen	2	2	3	3	3	2
Bristol	2	1	2	2	3	3
Alleghany	2	2	1	2	3	1
Jewel	2	2	2	2	3	2
Huron	3	2	1	2	3	1
Summer-bearing purples						
Brandywine	4	3	2	2	2	1
Royalty	4	2	3	3	2	3
Fall-bearing reds						
Heritage	7	3	3	2	3	3
Autumn Bliss ⁶	3	2	2	2	2	
Fall-bearing yellows						
Kiwigold	7	3	2	2	1	3
Fallgold	7	3	1	2	2	3
Goldie	7	3	2	2	1	3

* Nearly thornless

Note: Season: 1 (early) to 7 (late fall), Attributes: 1 (poor) to 3 (good)

The thornless cultivars Black Satin and Thornfree are damaged around -5 to -10 degrees F (meaning they may sustain damage in the colder areas of USDA Hardiness Zone 6 and colder). Triple Crown, Chester, and Hull suffer cold injury at temperatures of -10 to -15 degrees F (meaning they may sustain damage in Zone 5 and colder). But because they are high yielding, you still can expect a blackberry crop even if they sustain some winter damage. In many cases, fluctuating spring temperatures cause more damage than midwinter low temperatures.

Propagation

It is against the law to propagate patented bramble varieties. It also is not wise to propagate brambles from older plantings because they are likely to be infected with viral diseases.

Nurseries traditionally propagate red and yellow raspberries by removing suckers from the underground stems of virus-free plants. The suckers are harvested during the dormant season and referred to as one-year-old plants in nursery catalogs. Often the suckers are transplanted in the nursery and grown for an additional year. Then they are sold the following year and referred to as transplants. Despite the extra year in the nursery, there is no real difference in performance between one- and two-year-old plants when establishing a planting.

Black raspberries and blackberries are propagated in late August by tip layering. Tips of the current season's canes are buried 2 to 4 inches deep in the soil. The tips develop roots and form new plants before dormancy the same year. They are cut from the original plant before digging with about 6 inches of the old cane left attached to the rooted tip.

Tissue culture is rapidly becoming the preferred technique for raspberry propagation. Plants are cloned from tissues of virus-free stock in sterile surroundings. They are uniform and vigorous when planted in the field. The main drawback of tissue-cultured plants is their initial sensitivity to herbicides and frost. You must take care not to plant them before the last frost in the spring, and you should delay herbicide applications until plantings are well established.

Site and Soil Preparation

Brambles grow best on a sunny site in sandy loam soil with a pH between 5.5 and 6.5. While they tolerate a broad range of soil types, the soil must be well drained. Phytophthora root rot is a common cause of death in sites where there is excessive water, either on the soil surface or below. Excessive water also can be troublesome during the winter when alternate freezing and thawing can heave plants from the soil.

For these reasons, do not plant brambles on sites where water accumulates after rainfall. If this is not possible, plant them on raised beds at least 10 inches tall. Select a site somewhat higher than nearby land. This improves drainage and reduces the danger of cold injury and late spring frosts.

Adequate moisture during the growing season is essential for good cane growth and fruit production, particularly during drought, so be sure to locate plantings near a water source for irrigation.

Begin soil preparation at least a year before planting, especially if the pH needs to be adjusted.

Wild brambles are the principal source of diseases, so choose a site as far as possible from woodlots and old fields where wild brambles grow. If possible, destroy any brambles growing nearby. A previously cultivated site is best, but only if crops susceptible to verticillium wilt have not been grown

Brambles tolerate a wide range of soils but not poor drainage.

there before. These include brambles, strawberries, tomatoes, potatoes, peppers, and eggplants. If you choose a new site, till the sod under and plant a cover crop one year before planting.

Planting

Set plants 1 inch deeper than they were grown in the nursery and at least 30 inches apart in rows 9 to 10 feet apart. Plant rooted canes in early spring and tissue culture plantlets after the danger of frost has passed.

Remove any old dead canes that are attached to the new living plant because they can be a source of disease. Do not fertilize at planting or for several weeks after planting. Water liberally because brambles have shallow root systems.

Care

Brambles are easily injured by too much fertilizer. Apply no more than 5 pounds of 10-10-10 per 100 linear feet of row the first year and no more than 10 pounds per 100 feet in subsequent years. Apply fertilizer only in the early spring before flowering. Sprinkle it evenly in about a 3-foot-wide band over the row. Leave fertilizer on the soil surface because working it in could damage the plants' shallow root systems. Avoid using fertilizers that contain chlorides. For best results, test the soil every two to three years and follow recommendations based on the soil test.

Plants will likely need irrigation between bloom and harvest. Water them early in the day, after they have dried from the morning dew. Plants that remain wet during warm nights are more susceptible to disease.

Better yet, install a drip or trickle irrigation system to avoid wetting foliage. Drip tubes, tricklers, or emitters drip water continuously or intermittently into the root zone around the plant so that the plant receives as much water as it can use but no more. With this system, spaces between the rows remain firm and dry, and the root zone remains moist at all times; very little water is lost from evaporation or wind drift. But you must monitor your system carefully to make sure that the soil stays evenly moist and is not saturated.

Commercial growers usually cultivate the area between rows from early spring to mid-July to control weeds and eliminate suckers. For home plantings, keep about a 3-foot-wide strip cultivated around the plants, and mow the alleyways between the strips. To avoid injuring roots, cultivate no deeper than 2 inches near the plants. Unlike some other fruit crops, with brambles it is not a good idea to mulch the row area. Mulch can retain too much moisture and cause root disease problems.

Brambles are shallow rooted and will probably need watering between bloom and harvest.

Cane Management

To get good-quality fruit, you need to prune plantings annually. Some types of brambles require thinning to keep the plants from getting too crowded and producing poor-quality fruit. With others, you can mow off the canes annually to keep them under control. Proper pruning and cane management can reduce the incidence of disease and improve growth, yield, and fruit size, quality, and sweetness.

Different types of brambles require different kinds of management:

Primocane-fruiting raspberries (fall-bearing raspberries) produce fruit at the top of first-year canes (primocanes) in late summer or early fall and on the lower portion of those same canes in early summer of the second year. If the growing season cooperates, you can expect fruit from primocane raspberries in the fall of the year of planting.

Most growers sacrifice the early-summer crop by pruning or mowing down canes between fall harvest and bud break in early spring. Cut the primocanes as close to the ground as possible to force new buds to break below the soil surface. New primocanes from these buds will grow and fruit in late summer or early fall. This produces a smaller but higher-quality late summer crop.

If you plan to harvest your raspberries only in the fall, you want to maximize the number of canes, so thinning isn't needed. To harvest an early summer crop as well, manage the canes like floricane-fruiting brambles (see below), and remove the portion of the cane that's fruited after harvest in the fall.

Floricane-fruiting raspberries and blackberries produce fruit from buds on second-year canes (floricanes). Unlike primocane types, the canes must remain intact throughout the winter and until after harvest during the second year. After they bear fruit, the floricanes die. You can expect your first crop the year after planting and full production in the summer of the third year.

While the floricanes are flowering and fruiting during their second year, new primocanes also are growing. Some of these will replace the floricanes next season. But these new primocanes compete with the floricanes for sun and water, and they can interfere with spraying and harvesting. Proper pruning and trellising reduces this competition.

The traditional way to manage floricane-fruiting plants is to permit primocanes to grow through their first season and fruit the following year and then cut them off at ground level after harvest when they are dead. The key is to prune and thin the canes in early spring of their second season. In general, you remove any spent floricanes left from the previous season as well as any diseased or winter-damaged wood. Then thin out the canes to about three or four per foot. Finally, head back the remaining canes to a convenient height for picking—about 4 to 5 feet—but by no more than

Good-quality fruit requires annual pruning.

25 percent. (See “Pruning”, page 72, for more details about pruning different types of brambles.)

Another way to reduce plant interference and competition is to mow half of the planting alternately each year during the dormant season. During the spring after mowing, primocanes emerge and grow without interference from fruiting canes. The following year, the floricanes flower and fruit, and then you mow them to the ground once again. This system requires less labor because thinning and pruning are not necessary. It also reduces spray material costs. But because of the high cane density, you can expect poorer quality fruit, smaller berries, and lower yields.

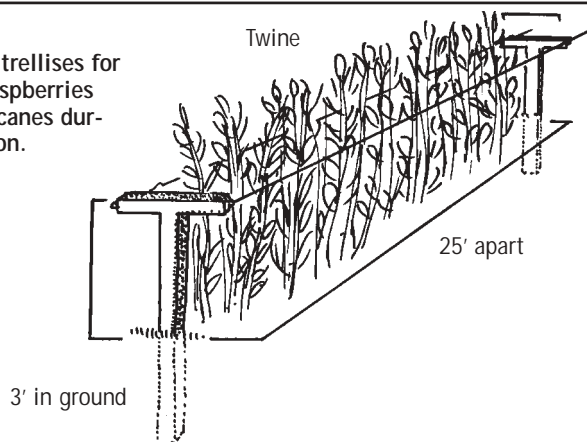
A third alternative is to select four or five primocanes per linear foot of row in June that you will carry through to fruiting the following year and remove the rest. Cut the primocanes that you don’t want when they are about 8 inches tall. They are much easier to prune out while they are still small and succulent instead of large and thorny. This method also increases the fruit size and yield of the current season’s crop. The disadvantage is that if any of these canes become diseased or damaged, you don’t have others to choose from to replace them.

Trellising

It’s a good idea to trellis plants to keep them from drooping over to the ground when they are heavy with fruit. Trellising makes harvesting fruit easier and keeps berries from rotting when they come in contact with the ground.

With primocane-fruiting raspberries, some growers use a temporary trellis during the fall harvest season. One system that works well consists of T-shaped wooden or metal posts approximately 7 feet tall with 3-foot-long cross-arms (see Figure 20).

Figure 20. Temporary trellises for primocane-fruiting raspberries make it easy to mow canes during the dormant season.



Prune primocanes while they are small and succulent, not big and thorny.

Dig post holes no more than about 25 to 30 feet apart in the center of each row. Make the holes slightly wider than the base of the post and 3 feet deep so that the trellis is about 4 feet tall when assembled. Line the holes with a 3-foot section of plastic pipe.

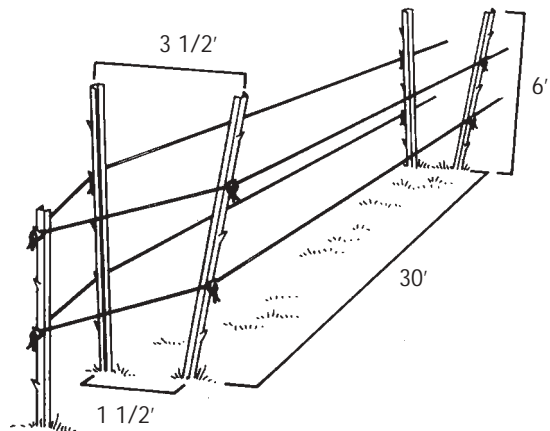
As harvest approaches, insert the posts into the holes. Run baling twine (tied to screw eyes in the ends of the cross-arms) along either side of the row. Twine is cheap and biodegradable yet strong enough to support the canes. After harvest, cut the twine and remove and store the posts for next season. Because the plastic pipes are buried, they do not interfere with cane-cutting operations.

Trellising floricanefruiting raspberry and blackberry plants helps reduce interference from primocanes and improves production. Without trellising, fruiting canes must be cut short in the dormant season to prevent the canes from breaking or tipping over. Because most of the fruit buds are on the top half of the cane, pruning low can significantly reduce yields.

Use a V-shaped trellis to reduce primocane interference and increase yields by separating the fruiting floricanes from the vegetative primocanes (see Figure 21). Set pairs of opposing posts about 1 1/2 feet apart every 30 feet. Angle the posts away from each other so they are about 20 to 30 degrees from perpendicular to form the V. The posts should stand about 6 feet tall. Run two wires (twine works well for short runs) between the posts and secure them to the anchor posts at the ends of the rows. The top wire should be about 4 feet from the ground, and the second wire—about 2 feet high—provides additional support. These can be adjusted depending on the size and vigor of the plants or how much winter damage they suffer.

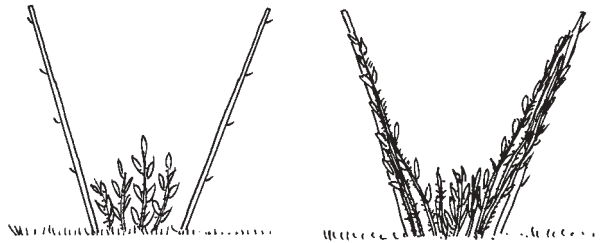
Trellising reduces competition and increases yield and quality.

Figure 21. A V-trellis system for floricanefruiting raspberries reduces competition between primocanes and floricanes.



After thinning in early spring, tie the floricanes to the top wires. Allow the primocanes to grow in the middle of the V where they won't interfere or compete with the floricanes for light. Spraying, harvesting, and pruning are easier because trellising pulls the floricanes to the outside where they are accessible. The presence of primocanes in the middle forces lateral growth by the floricanes outward. Studies of several raspberry cultivars showed higher yields using V-trellises, primarily because the practice increases the amount of light reaching the canopy (see Figure 22).

Figure 22. With a V-trellis, primocanes grow in the center of the V the first year (left). During their second season (when they become fruit-bearing floricanes), tie them to the trellis to keep them from shading the new primocanes (right). This system also makes the berries easier to harvest.



You can build a similar system using T-shaped posts by adding a second cross arm to support the lower wire. The disadvantage of the T-posts is that they aren't as flexible when it comes to adjusting the height of the wires to accommodate annual variation in cane height.

Select trellis posts and anchors from readily available materials. You can make them from wood, steel fence posts, rebar, or similar materials. Monofilament plastic wire, now the material of choice for trellis systems, is as strong as wire but much lighter and easier to handle. Inexpensive devices are available to hold the monofilament taut at the anchoring post and to rejoin lines that have accidentally been cut. Consult nursery and commercial grower catalogs for more information on trellising materials. When designing a trellis and choosing materials, keep in mind the potential 15-year life of the planting. Strong anchor posts are essential for a good trellis.

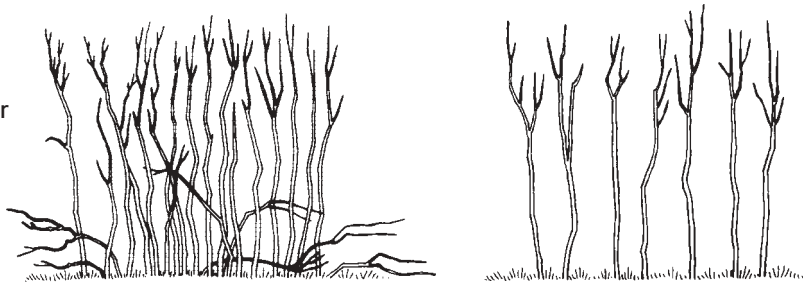
Pruning

Different types of brambles require specific pruning methods.

Red raspberries. Around mid-March, thin canes leaving three or four per linear foot of row (see Figure 23). Prune off winter-damaged tips. Cut top canes no more than 1 foot beyond the top wire of the trellis but below the point of any winter injury. (Lower the trellis wire if damaged canes require hard pruning.) Tie canes loosely to the trellis wire to prevent wind damage.

Black raspberries. In the summer when the primocanes reach about 2 feet tall, cut back their tips at least 4 inches to encourage lateral growth. By the end of the season, primocanes will be branched with long laterals. These

Figure 23. Red raspberries require thinning to three or four canes per foot for high-quality fruit.



should be supported by trellis wires in the winter to prevent breakage from snow. In early spring, remove any winter-damaged wood and shorten the laterals to about 1 foot long to increase berry size. Thin canes to about two or three per linear foot of row.

Purple raspberries. Purple raspberries are hybrids of red and black raspberries and can be managed like either. However, when managed like red raspberries, they grow very tall and don't yield as well. A better alternative might be to pinch primocanes when they are about 3 to 4 feet tall in June. This produces a stockier plant, more laterals, and better yields, but there is some increased risk of disease, especially if weather is hot and wet following pinching. In early spring, remove any winter-damaged wood and shorten the laterals to about 1 foot long to increase berry size. Thin canes to about two or three per linear foot of row.

Thorny blackberries. Prune twice, similar to pruning black raspberries. Tip primocanes when they are about 3 to 4 feet tall in the summer to stiffen the canes and encourage lateral branching. In early spring, shorten the lateral branches to between 12 and 16 inches, and thin canes to two per linear foot of row. Alternate-year mowing helps avoid the difficult task of pruning (see "Cane Management," page 69).

Thornless blackberries. In early spring, shorten fruiting canes to the top trellis wire, or weave them around the wire. Shorten laterals to about 18 inches. Low-growing laterals are less likely to suffer winter injury. For good production, maintain six to eight canes per clump.

Diseases and Pests

Your best first line of defense against diseases and pests is to choose disease-resistant cultivars and to keep your plants healthy. Choose your site and prepare the soil carefully, paying special attention to good drainage. Make sure plants get adequate water, but avoid saturating the soil. Remove wild brambles, which can harbor diseases that can spread to your planting.

For more help identifying disease, pest, and other problems with raspberries, see www.hort.cornell.edu/diagnostic.

Choose disease-resistant cultivars and plant them in a well-drained site.

Mosaic virus. Aphids and leafhoppers infect and spread this disease through bramble plantings. Leaves become mottled with yellowish or light green blotches on a dark background. They also are smaller than normal and frequently deformed or cupped. The virus stunts infected plants, which produce dry fruit of poor quality.

Royalty, a purple raspberry cultivar, is immune to the aphid that transmits this virus. Black raspberries are very susceptible. Red raspberries can carry the virus without showing any symptoms, so do not plant black raspberries near red raspberries unless you are certain the red raspberries are virus-free.

To reduce the incidence of mosaic virus, plant only virus-indexed stock. Plantings located far away from wild brambles are less likely to become infected. Remove infected plants, because once infected, they cannot be cured.

Ringspot virus. This virus is transmitted by nematodes (tiny soil-dwelling, wormlike creatures) and causes berries to crumble when picked. Plants cannot be cured once they are infected. Plant only virus-indexed stock, and do not replant into a site where crumbly berry plants have been recently removed.

Phytophthora root rot. This disease causes plants to wilt or collapse during the heat of summer. It stunts leaves, which show poor color before wilting. Digging up plants will reveal that many of the roots are dead or chocolate-brown in color. This root-rotting disease is associated with wet sites. To avoid it, plant only in well-drained soils or on ridges or raised beds. Black raspberries are generally the least susceptible. Red raspberries vary in their susceptibility.

Verticillium wilt. This disease can be found in soil where strawberries or tomatoes, potatoes, peppers, eggplants, or other crops in the tomato family have been grown. It causes leaf wilting and yellowing from the bottom up and may appear on only a few canes of each plant. Verticillium wilt is most severe on black raspberries. Grow a cover crop of a grass species for a couple of years before planting raspberries if the site was once used to grow any of the susceptible crops listed above.

Spur blight, cane blight, and anthracnose. These diseases infect canes and weaken plants. Spur blight is identified by chocolate-brown or purple cankers around individual buds. Buds within the discolored areas fail to grow, or laterals from those buds collapse before fruiting. Cane blight cankers grow around the entire cane below wilting branches. Symptoms of anthracnose include small purple spots on young canes in the spring. The spots become sunken and turn gray with a purple border. This disease is most severe on black and purple raspberries.

To control these cane diseases, prune out and burn diseased canes before new canes emerge in the spring. Also, remove the fruiting canes after they have fruited, usually sometime in August. Fall-bearing raspberries that are mowed annually are not infected by these diseases.

Botrytis fruit rot. This fungus develops during cool rainy weather as a gray mold over the fruit. Practices that improve air circulation reduce its incidence. Fungicides are most effective when applied during bloom.

Orange rust. This disease affects black raspberries and blackberries, turning the undersides of new leaves orange in the spring. Plants produce new canes that are weak, spindly, and thornless. The disease is systemic in the plants, returning every year.

Raspberry cane borers. Adults of this insect pest appear in June. The first symptoms are wilting tips on new canes and laterals. Closer examination reveals two rows of punctures 1/2 inch apart encircling or girdling the stem. These marks are made by the female borer before she deposits her eggs between them. Larvae hatch from the eggs and burrow toward the base of the cane. They spend their second year in the roots and crown.

To avoid this insect, do not plant near wild brambles. When infestations occur, cut off the wilted tips below the girdle and crush the old stubs of canes in early spring.

Raspberry fruitworms. Early cultivars of red raspberries are most likely to be attacked by this pest. Larvae are usually first noticed at picking either inside the berry or on the receptacle. Infected fruit is usually unfit for consumption. The adults can severely injure leaves by eating holes in them.

Spider mites. These tiny pests are most prevalent during hot, dry weather. They are found on the undersides of leaves, preferring older, less succulent ones. Injury appears as bronzing on the leaf surface. Excessive fertilization can lead to high mite levels.

Blackberry leafminers. These insects feed on foliage, weakening the plant and causing poorly developed fruits. Larvae hatch from eggs laid in the leaf tissue and excavate large blotched “mines” between the leaf surfaces. Two generations occur each year—the first in late May and the second in late August.

Raspberry sawflies. Look for these small pale green larvae feeding first on the outer edges or undersides of the leaves and then chewing holes in the leaves. In heavy infestations, all leaf surfaces except the vein are destroyed.

Japanese beetles. These familiar insects chew leaves randomly in midseason. They prefer particular cultivars. Plantings near grub-infested turf are particularly susceptible.

Harvest

Raspberries do not keep well on the plant and must be harvested every two or three days. Expect a small crop the first year after planting. Fall-bearing raspberries may produce a small crop in the fall of the planting year. Production usually peaks about the third year after planting and slowly declines after that. Many growers replant after about 10 years.

Bramble berries are very fragile. The reason they are usually sold in shallow, half-pint containers is that in deeper containers the weight of the berries on the top crushes the berries on the bottom. The rule of thumb is never to pile bramble berries more than four high. Unless you are planning to make jam or jelly from your crop, do not harvest berries into containers more than 1 or 2 inches deep.

To store raspberries for later use, proper postharvest care is critical. Select only berries in good condition and immediately cool them as close as possible to 33 degrees F without freezing.