

Blueberries

Blueberries, and their cousin the cranberry, are the only commercially produced fruit crops that are native to North America. Wild blueberries grow in all regions of the country except in the High Plains and the desert Southwest.

In the early 1900s, Elizabeth White of New Jersey and Fred Coville of the U.S. Department of Agriculture cooperated to develop the first hybrid blueberries. Many of their cultivars are still grown commercially today.

Blueberries often are incorrectly called huckleberries. Huckleberries belong to the genus *Gaylussacia*. Unlike blueberries, they have 10 comparatively large seeds in each berry, which crunch between your teeth when you eat them. Blueberries belong to the genus *Vaccinium*, and the 20 or more small seeds in each berry are not noticeable when eaten.

The wild lowbush blueberry, *Vaccinium angustifolium*, is a hardy shrub that usually grows no more than 15 inches tall. Many species of wild blueberry grow naturally throughout the United States. The cultivated blueberry industry is founded on cultivars developed by extensive breeding and selection from the northern highbush blueberry, *Vaccinium corymbosum*, and several related species.

Choosing Cultivars

Selecting appropriate cultivars for home plantings is not a simple matter. In the coldest areas of New York State, gardeners are limited to only the hardiest cultivars, such as Northblue, Northcountry, and Northland, which will survive winters in most areas of USDA Hardiness Zone 3. Patriot, Bluecrop, Jersey, and Blueray will overwinter in most areas of Zone 4. Gardeners in warmer areas can choose from these and less hardy cultivars, such as Herbert, Darrow, Spartan, and Bluejay.

Cultivars differ in the size, color, and flavor of their berries and when they ripen. Cultivars are self-fertile, but planting at least two different cultivars improves pollination and increases berry size. The following cultivars are listed by harvest period, from early- to late-ripening blueberries. (For an updated list of nurseries selling blueberry plants, see www.hort.cornell.edu/nursery.)

- **Earliblue**—hardy in Zones 5 to 7. Berries are large with light blue skin and have a soft flesh and mild flavor. The fruit does not shatter (drop easily) from the bush, and it is resistant to cracking. Plants are vigorous, productive, upright, and well shaped.

Keys for Success

Your soil **must** be acidic, with a pH of less than 5.0. Test the soil and start reducing its pH at least a year before planting. If the pH is more than 7.0, it may be too difficult to reduce pH. Consider growing something else instead.

Choose a sunny site and avoid frost pockets. Plants require at least a 140-day frost-free growing season.

Blueberry plants prefer a moist but well-drained soil but will tolerate a wide range of soils (as long as the pH is less than 5.0). Plants are sensitive to moisture stress, especially the first few years after transplanting.

Test your soil before you even think about which cultivar to grow. Its pH must be less than 5.0.

- **Duke**—hardy in Zones 5 to 7. This productive newer variety from New Jersey has large fruit with good flavor.
- **Blueray**—hardy in Zones 4b to 7. Berries ripen in early midseason and are crack resistant and very large with medium–light blue skin, firm flesh, and a strong flavor and aroma. The plants are upright, spreading, and consistently productive. It overproduces (produces too much fruit, weakening the plant) unless carefully pruned.
- **Patriot**—hardy in Zones 4 to 7. It is partially resistant to phytophthora root rot and has excellent-tasting fruit. The plants are vigorous, productive, open, upright, and smaller than other cultivars.
- **Berkeley**—hardy in Zones 4 to 8. Berries are very large and light blue and have a mild flavor and firm flesh. Berries ripen in midseason, store well, resist cracking, and do not shatter from the bush. The plants are vigorous, open, spreading, and easy to grow.
- **Bluecrop**—hardy in Zones 4b to 7. Berries are medium large and have a light blue skin, an excellent flavor, and firm flesh. Berries shatter somewhat from the bush, but they resist cracking. The plants are vigorous, consistently productive, spreading, and drought tolerant. This is the most popular variety in the world.
- **Herbert**—hardy in Zones 5 to 7. Berries ripen in late midseason, are very large and medium blue, and have tender flesh and a very good flavor. They resist cracking and do not shatter from the bush. The plants are consistently productive, vigorous, open, and spreading.
- **Darrow**—hardy in Zones 5 to 7. Another variety with exceptional flavor for the home gardener.
- **Jersey**—hardy in Zones 4 to 8. Berries are medium sized with medium-blue skin and firm flesh. They keep well, resist cracking, and have a good flavor. The plants are vigorous, productive, erect, and easy to prune.
- **Coville**—hardy in Zones 5 to 8. Berries are large and aromatic with medium-blue skin and a tart flavor. They do not shatter from the bush. The plants are productive and late ripening with vigorous, open, and spreading growth that is easily pruned.
- **Lateblue**—hardy in Zones 5 to 7. Berries are late ripening, firm, light blue, and highly flavored. The plants are productive and vigorous with erect growth. They ripen in a relatively short time, about seven days after Coville.
- **Elliot**—hardy in Zones 4 to 7. These productive plants bear berries that are firm, light blue, and medium sized with a good, mild flavor. They ripen very late in the season, around Labor Day.

Site Selection and Soil Preparation

For best results, blueberries need a frost-free growing season of at least 140 days. Cultivars differ greatly in their susceptibility to winter injury. The condition of the wood also determines whether cold temperatures will injure the plants. Very vigorous plants that continue to grow late in the season are injured more easily than plants growing normally.

Even when low winter temperatures kill the tops of the plants, the crown and roots are often protected by snow cover. The plants usually recover and put out new shoots that frequently bear fruit the following year. Where deep snows prevail, much of the bush is protected from extreme low temperatures, but heavy snows can break canes.

An early fall frost sometimes kills back late-growing shoots from the tip, but in most cases this injury can be pruned away. A late spring frost, however, can injure partly opened flowers, causing a partial to total crop loss on some early-flowering cultivars. Avoid these early cultivars if your site is prone to late spring frosts.

Blueberries grow best on a sunny site in sandy peat soil, but they also do well in heavy soils if they are well-drained, aerated, and high in organic matter and receive adequate moisture.

The most important requirement for growing blueberries is acidic soil. Few soils are naturally suitable for blueberry cultivation because the pH is above 5. If the pH of your soil is greater than 5 but less than 7, you can increase the acidity with applications of sulfur or acid peat.

Soil acidity increases very slowly after applying sulfur, so it is important to test the soil and adjust the acidity and nutrient levels as needed the season before planting. Because it will take at least two months of warm weather for the sulfur to lower the pH, don't wait until the fall before a spring planting to apply it. Also, incorporate organic matter such as compost or peat, particularly if the soil is very light and sandy. It is impractical to reduce the pH of alkaline soils (those with a pH greater than 7) low enough to grow blueberries.

Planting

Blueberries are difficult to propagate, and survival of rooted cuttings is poor. Purchase two- or three-year-old plants from a reliable nursery. Avoid one-year-old cuttings because they have a high mortality rate.

Planted properly, bare-root plants perform as well as container-grown plants and usually cost less to ship. If container-grown plants are pot-bound, prune the roots before planting.

Keys for Success

To control weeds early in the season, cultivate around the plants no more than 2 inches deep. After harvest, apply mulch to control weeds and conserve soil moisture.

Prune first-year growth so that just the two strongest canes remain. Keep one or two canes from each year until they are eight years old. Remove nine-year-old canes in early spring.

Harvest early or protect the fruit from birds.

As soon as possible after the plants arrive in early spring, plant them in soil that you prepared the previous season. Soak the roots in water for several hours before planting. Space the plants a minimum of 4 feet within rows and 10 feet between rows. Set plants 1 inch deeper than they were grown in the nursery, and prune them to half their original size. This will remove most of the flower buds, balancing the top growth with the still-small root system.

Remove any flowers that appear the first year to divert energy and nutrients to the vegetative growth. Keep plants well watered because blueberry plants are extremely sensitive to dry conditions, particularly during the first two years after transplanting.

Fertilization

Do not use fertilizer the year you set out the plants because the roots are easily damaged at this time. When plants flower during the spring of the second year after transplanting, apply 4 ounces of ammonium sulfate or 2 ounces of urea to each plant. Sprinkle the fertilizer in a ring around the bush, but don't work it into the soil because it might damage the shallow roots. Never fertilize after flowering as it may make the plants more prone to winter injury.

Increase the amount of ammonium sulfate you apply to each plant by 1 ounce each year (1/2 ounce for urea) until the sixth year. After that time, use 8 ounces of ammonium sulphate (4 ounces of urea) per application. Fertilizers containing chlorides or nitrates are not recommended because they can harm blueberry roots.

Sometimes plants need supplemental fertilization with magnesium sulfate and a balanced fertilizer. To find out, you can test the soil. (Contact your county's Cornell Cooperative Extension office for soil testing information; see www.cce.cornell.edu/local_offices.cfm.) For a more precise assessment, you have a leaf analysis done (cost: about \$30; for more information, contact the Cornell Nutrient and Elemental Analysis Laboratory; phone 607-255-1785, on the web at www.hort.cornell.edu/departments/facilities/icp).

Cultivation and Mulching

To avoid root damage, avoid cultivating within 2 feet of the plant, and never cultivate more than 2 inches deep. Cultivation after July increases susceptibility to winter injury.

To conserve moisture and control weeds, apply mulch in mid to late summer. Sawdust, wood chips, or chopped cornstalks make excellent mulch. Plant grass or another groundcover between rows.

Never cultivate blueberries more than 2 inches deep. Apply mulch to control weeds and conserve moisture.

Pruning

Proper pruning practices contribute significantly to consistent production, high yields, and good fruit quality and help ensure a long life for your planting.

The best time to prune is in the early spring when you can assess and remove winter injury. If you prune in the fall, wait until after the leaves fall off. Simply topping the canes to stimulate lateral growth is generally not recommended. To prune properly, it helps to understand more about how blueberries grow and produce fruit.

The largest blueberry canes do not produce the most fruit. Rather, canes that are $\frac{1}{2}$ to 1 inch in diameter at their bases are the most productive. In fact, canes greater than 1 inch in diameter allocate increasing amounts of energy to the leaves at the expense of the fruit. Removing these old large canes makes the bush behave like an efficient young plant, even though the underground portion is quite old (see Figure 24).

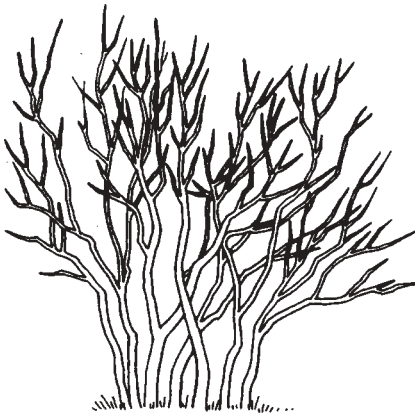


Figure 24. Unpruned blueberry bushes (left) become unproductive when older canes dominate. Properly pruned bushes each have about 12 to 16 canes, with one or two that are from one to eight years old.

The ideal blueberry plant should have at most 16 canes. The oldest one or two should be eight years old, and then there should be one or two left from each of the previous years. You can accomplish this by allowing only the two strongest new canes to grow each year from the time the bushes are planted until they are eight years old. By that time, the oldest two canes should be about 1 inch in diameter.

Early in the ninth year, prune out the two largest canes and all but the two largest one-year-old canes. If repeated annually, this practice minimizes uneven growth and production. The oldest canes are continually replaced with the same number of new canes, and the bushes remain the same size.

If you are pruning old neglected bushes, you can remove up to 20 percent of the basal area (the total diameter of all the main stems) of a bush without

adversely affecting the current year's yield. Although pruning this hard will reduce the number of berries, the increase in fruit size compensates for the reduced number.

Flowering and Fruiting

Blueberries will produce a small crop the third year after planting and will reach full production in about eight years if you follow the recommended pruning strategy. Most cultivars flower in May and the fruit ripens in July, August, or even as late as September, depending on the cultivar.

Blueberries can self-pollinate, but planting two different cultivars increases pollination, berry size, and total harvest. If you only pick two cultivars, don't make one of them a very early variety and one a very late variety. If you do, their bloom times may not overlap. A midseason variety such as Bluecrop is likely to overlap with the flowering of most any other variety.

Diseases and Pests

Fortunately for home gardeners, blueberries have fewer pest problems than other fruits. There are, however, some diseases and insects to watch for, which are described below. For more help identifying these and other problems with blueberries, see www.hort.cornell.edu/diagnostic.

Fusicoccum canker. Jersey, Earliblue, and Bluecrop are all very susceptible to this disease, which appears as small reddish spots on the canes, frequently at a leaf scar near the ground. As the canker enlarges, a bull's eye pattern develops. Plant parts above the canker suddenly wilt and die during warm dry weather, calling attention to the disease. Prune diseased canes as they appear. Fusicoccum canker is relatively uncommon except in colder regions. If this disease is a problem in your area, plant the resistant cultivar Rancocas. Coville, Berkeley, Blueray, Burlington, and Rubel are moderately susceptible.

Phomopsis canker. This disease causes new shoots to wilt and die back from the tips toward the crown. The pith and wood of infected mature canes become discolored, and the canes suddenly wilt and collapse in the summer. If single canes suddenly die while the rest of the plant remains healthy, suspect phomopsis canker. Usually, infected plants were previously injured or already in a weakened condition. Good preventive measures include maintaining your plants in a vigorous condition and taking all possible precautions to minimize winter injury and early frost damage. To reduce the spread of phomopsis canker, prune and burn diseased twigs and canes as they appear.

Mummyberry. This fungal disease causes young shoots and leaves to wilt, turn brown, and die. Infection is similar in appearance to frost damage. The tissue at the base of flower clusters appears water soaked or brown. As harvest approaches, berries that develop from infected blossoms become tan or cream-colored, shrivel into hard mummies, and shatter easily from the

Planting two different cultivars increases berry size and yield.

bushes. To limit the spread of the fungal spores, rake all old berries into the ground before budbreak in spring, or cover the planting with 2 inches of sawdust mulch. In most years, mummyberry is not common in the Northeast. Resistant varieties include Burlington, Collins, Jersey, Darrow, Rubel, Bluetta, and Dixi. Earliblue and Blueray are most susceptible.

Blueberry maggot. While this is potentially a very destructive pest, it has not been a serious problem in the Northeast except in some areas of New Jersey. Small white maggots attack the berries, one per fruit, and usually cause them to drop, decreasing the yield. When infested berries remain on the plant, the crop is unacceptable for consumption.

Stem galls. These oblong swellings develop on the tips of canes anytime during the season. The best control is to prune and destroy the galls before their insect inhabitants emerge as adults.

Harvest

If left on the bush after ripening, blueberries do not spoil for at least one week. Their flavor and sweetness continue to increase. Unfortunately, this makes the berries very attractive to birds. (See suggestions for bird damage control in the section “Before You Begin,” page 1.)

For the home gardener, covering plants with bird netting is a practical, though labor-intensive, option. Another option is to pick the berries while they are still slightly tart to avoid extensive losses to birds. Keeping the fruit at a cool temperature after picking maximizes storage life.