

Growing Blueberries in Central Washington
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Scientific Name: *Vaccinium corymbosum*
Northern highbush blueberry
Plant Family: Ericaceae

Cultivars growing well in NCW
Blueray Berkley
Bluecrop Elliott
Jersey

Planting

- **Soil Preparation**
In the year before planting, eliminate all noxious weeds, increase soil organic matter by compost application, peat moss, and test the soil. Amend the soil according to test recommendations. The effects of sulfur (to lower the soil pH) require time, so these materials should be added in the fall before planting. Do not plant blueberry plants in high-pH soils without amending the soil first! Because sulfur does not move readily through the soil, surface sulfur applications after the plants are in place are ineffective in lowering the pH, and the plants will not thrive.
- **Soil characteristics**
The best soils for blueberries are moist, porous, and acid. The soil pH should be between 4.5 and 5.0. A lower pH can result in manganese or aluminum toxicity, while a higher pH results in the unavailability of certain nutrients, most notably iron.
- **Best Planting Method**
Most blueberry bushes are set out during the dormant season from March to April in eastern Washington as either 2-year-old bareroot stock, or as 3-year and older container stock. While the smaller stock is less expensive, do not allow it to bear fruit for 2 years to assure strong plant development. More expensive container stock often bears fruit the year it is planted. In a landscape setting, allow at least 4 to 5 feet between the plants and 5 to 6 feet between the rows, since plants become quite large at maturity. Dig a hole large enough to spread out the roots carefully. Planting them 3 feet apart allows branches to intertwine and protect developing fruit from birds.

Cultivation Requirements

- **Exposure**
Grow blueberries in full sun for optimum fruit production and quality. They will perform adequately, however, in a location that receives partial sun, although yield will be less. In areas of high summer temperatures, partial shade prevents soil moisture loss and keeps fruit from shriveling. A thick mulch application maintains soil moisture.
- **Pollination**
Blueberries are self-fertile, but plant at least two different cultivars near one another to ensure optimum fruit set and size. Most plantings will produce satisfactory crops when only one variety is included, but pollen from other varieties generally will result in increased yields, larger fruits, and earlier ripening. A planting design in which a row of one variety is alternated with a row of another variety will encourage cross-pollination.

- **Temperature Tolerance**

Blueberries generally will tolerate temperatures to -20°F, although varieties vary somewhat. Most require 750 hours of chilling below 45°F.

- **Water**

Because the blueberry plant is very sensitive to fluctuating soil moisture, mulch and irrigation are essential for a healthy planting and consistent yields. Plants should be kept well watered, especially during hot spells in the summer. Hardwood bark mulch (such as that used for landscaping) and rotted sawdust are good mulches. Mulch should be applied to a depth of 4 inches and replenished whenever necessary.

- **Fertilizer**

Incorporate sulfur, at the rate of 1 to 1.5 pounds per 100 square feet into the top 8 inches of the soil profile 12 months before planting. During the life of the plant, make yearly spring applications of ammonium sulfate fertilizer to lower the soil pH. If the soil is properly prepared prior to planting, only nitrogen fertilizer is required on a routine annual basis. Do not fertilize in the first year since the root system is very susceptible to root burning at this stage.

In subsequent years, always fertilize with ammonium sulfate in March or April. To each plant, apply 4 ounces of ammonium sulfate in year two, 5 ounces in year three, 6 ounces in year four, 7 ounces in year five, and 8 ounces in year six and subsequent years. Retest the soil every 5 years or so to make sure that the soil pH is in the correct range. If nutrient deficiency symptoms (e.g., light-green or red leaves in the summer, poor growth, poor yield) appear, it is likely that the soil pH is no longer in the optimum range of 4.5 to 5.0.

- **Pruning**

The philosophy behind blueberry pruning is to constantly renew the older, decreasingly productive canes by cutting them out and forcing new canes. The plant is continually replacing old canes with new canes, while the majority of the canes are in a productive, intermediate stage. Pruning is best accomplished toward the end of the dormant season, usually sometime in March.

To prune, first remove small, spindly branches and canes that lie on the ground. When thinning canes, try to maximize light conditions inside the plant by removing the centermost canes, which block the sunlight. Once the plant is mature (6 years old), it should be producing three to five new shoots per year. If it is not, check your fertilizer program. The production of new shoots is somewhat variety dependent, and some may not respond as well as others. Every year, select the best two to three new canes to retain. After 5 years, begin removing the oldest (5 years or older) canes while retaining the three best new canes. This will result in a plant that has two to three canes each of new, 1-, 2-, 3-, and 4-year-old canes, or 10 to 15 canes. As with any biological system, this is an optimal range--many plants will deviate from this ideal.

After removing the canes, thin those that remain. To do this, remove weak lateral branches and dense bushy twigs. Thin out the center of erect varieties while removing the low-spreading growth of more spreading varieties. Long canes with many flower buds also should be headed back to remove some of the crop.

Harvest

- **Time**

Harvest fruit approximately 4 or 5 days after the first berries turn blue so fruit size and sugar levels are the greatest. From then on, continue harvesting at 3- to 5-day intervals since all the berries in a cluster do not ripen at the same time. Harvest when entire berry is blue for best flavor.

Blueberries, like other fruits, should be picked in the morning after the dew has evaporated. If picked in the afternoon, the berries are more likely to be warm, which makes them more susceptible to postharvest breakdown.

- **Technique**
Use your thumb to gently roll berries from the fruiting cluster into the palm of your hand, then transfer them to a picking container.
- **Storage**
Fresh berries have a 2-week shelf life if they are kept in a refrigerator. To freeze blueberries, simply rinse them in water, then place in freezer in a single layer on a tray. When frozen, transfer to freezer containers.

Pest Problems – Insect and Disease

Organisms	Management Options
Aphids	Blueberries have relatively few insect pests. Aphids can reduce plant vigor and leave a buildup of sticky honeydew on the leaves and fruit. Ladybird beetles are effective against aphids in commercial settings. On small plots of land, however, they are not as effective because they disperse before feeding on very many aphids.
Mummyberry	<p>Mummyberry is the most serious fungal disease of highbush blueberries. It leaves affected fruit hard, white, and inedible. During a prolonged wet spring, this disease can be quite common. In late March, mummified fruit on the ground from the previous summer sprout minute, brown, mushroom-like cups that release fungal spores. The spores infect new flower clusters and leave them blackened and withered. Spores produced on these blighted tissues infect new opening flower blossoms, which subsequently produce infected fruit. Infected berries appear normal until the onset of ripening. They then turn a tan to salmon color. Mature fruit turn white, drop to the ground, and restart the cycle. Control mummyberry by raking the soil or mulch layer beneath the plants in early March as leaf buds swell. Raking destroys spore cups. Pick off and remove infected berries from the patch before harvest. Pick up and throw away infected berries that fall to the ground. A fungicide that can be sprayed on developing blossoms to protect them from the fungal spores is available to home gardeners. An integrated program of spring raking, blighted shoot removal, mummy removal, and use of protective fungal sprays will contribute significantly to mummyberry control.</p> <p><i>From Penn State website:</i> <u>Mummy berry</u> is the most serious and widespread disease of highbush, lowbush, and rabbiteye blueberries. It is most serious in the north following moist, spring weather conditions. Crop losses can be severe, depending on environmental conditions and variety susceptibility. Blueberry varieties differ in their susceptibility to this disease.</p> <p><u>Symptoms and Disease Cycle</u> Mummy berry is caused by the fungus <i>Monilinia vaccinii-corymbosi</i>. Spores within berries infected by this pathogen can remain viable in or on the soil for several years. In the spring, tips of the newly infected leaves, buds, stems, and flower clusters suddenly will wilt, turn brown, and eventually become covered with a powdery mass of spores produced by the fungus. Spores from these blighted shoots are carried to open flowers along with the pollen. The fungus colonizes the developing fruit by growing into and colonizing the ovaries. When nearly mature, infected berries become dry, shrivel, and drop early. These shriveled berries, on which the fungus will overwinter, are called "mummies." In the spring, cup-shaped fruiting bodies are produced on the mummies and can be found on the soil surface. These fruiting "cups" release spores that infect new plants. Mummy berry usually is more severe in low-lying areas of the field.</p> <p><u>Disease Management</u> Clean cultivation aids in the control of this disease. Remove and dispose of</p>

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	fallen leaves and old berries either by burying or burning. Cover old berries with at least 2 inches of soil by disking between rows or adding 2 inches of new mulch. Before berries blossom, thoroughly cultivate between rows and under plants after each hard rain. An application of urea fertilizer or a shallow cultivation of the ground between rows and beneath infected bushes before bud break kills the exposed mushroom-like apothecia (mummy cups). The Bluetta, Collins, Coville, and Darrow varieties may have some resistance. Susceptible varieties include Berkeley, Bluecrop, Bluejay, Earliblue, Jersey, and Weymouth. If using fungicides, apply at bud break and follow up at 10- to 14-day intervals through bloom. This will control the disease effectively. Once the flowers have been pollinated, no further infection can take place.
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Environmental Problems

Problem	Management Options
Inadequate water Leaf tips browning	The blueberry plant is a perennial, consisting of a shallow root system and woody canes that originate from the crown of the plant. The root system is very fibrous but devoid of root hairs. (Root hairs in most plants function by increasing the surface area of the root for water and nutrient uptake.) This characteristic makes the blueberry plant very sensitive to changing soil water conditions. Thick mulch (4-6") of straw or wood chips helps.
Yellowing of leaves Failure to thrive	Plants often become yellow and stunted due to iron deficiency where the soil pH is greater than 6.0. Add sulfate of ammonia fertilizer or aluminum sulfate to lower pH.
Failure to thrive	<p>The most common cause is inadequate moisture or lack of nitrogen. Increase thickness of mulch to increase the water available to the roots or increase frequency or duration of irrigation if water supplied is inadequate.</p> <p>Healthy plants should produce at least 6-12" of new growth each year. Either increase quantity of nitrogen applied in the spring, reduce plant canopy by selective pruning, or a combination of both until adequate growth is observed.</p>

Other useful blueberry resources:

Cornell University Berry Diagnostic Tool (for diagnosis and identification of problems):

<http://www.fruit.cornell.edu/berrytool/blueberry/BBparts.htm>

Penn State University Extension: <http://extension.psu.edu/gardening/fphg/blueberries>

Michigan State University: http://blueberries.msu.edu/growing_blueberries

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