Blueberry Production for Local Sales and Small Pick-Your-Own Operators

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Blueberries are a native North American fruit, and North Carolina is one of the largest producers of highbush blueberries. Although commercial production is mostly limited to southeastern NC, blueberries can be grown anywhere in the state if the right blueberry species and proper soil modifications are used. Limiting factors include pH, water availability and cold-hardiness.

Soil pH - Blueberries require a lower pH than many other small fruit crops. Apply wettable sulfur (90% S) if pH is above 5.3 for rabbiteye blueberries or 5.0 for highbush blueberries. Use 1.0 pound (2.5 cups) per 100 square feet on sandy soils to lower pH by 1 unit (for instance, from 6.0 to 5.0). Apply 2.0 pounds per 100 square feet for the same amount of pH lowering on heavier soils containing silt, clay or more than 2% organic matter. Try to achieve a pH of around 4.8; too much reduction can be detrimental to bush growth. Apply sulfur at least 3 to 4 months before planting, and take another soil test before planting. If pH is still above the acceptable range, additional sulfur can be applied.

Organic Additions - If the soil contains less than 2% organic matter, the incorporation of peat moss or well-decayed pine sawdust or bark will improve plant survival and growth. Establish the rows on ridges to provide the required drainage. Apply 4 to 6 inches of the organic material over the row in a band 24 inches wide and incorporate thoroughly using a roto-tiller to a depth of 6 to 8 inches. Preparing the beds in the fall will allow planting earlier in the season (late Feb. to late March depending on the location). If the organic material is incorporated in the fall, any sulfur required to lower the pH can be added at the same time. Avoid opening a furrow, adding the organic material and planting directly in the pure organic material. Water and nutrient management is likely to be difficult in the pure organic material and plants are more likely to become weak and die.

Organic material, such as bark, wood chips, sawdust or pine straw as a 3- to 4-inch mulch on the surface after planting results in more uniform soil moisture, reduces soil temperature and generally promotes better bush growth and survival. Pine bark, chips or sawdust have a pH of 3.5 to 4.5 and are more desirable than the same mulches from hardwood with an associated pH above 5.0. However, hardwood mulches on the surface have been satisfactory. Avoid sticky hardwood sawdust that will "seal" the bed and prevent water infiltration.

Drainage - Provisions for drainage must precede planting. Soil maps or observing the soil profile may be helpful in predicting internal drainage. However, digging a "dry well" is the most effective way to assess internal soil drainage. Dig a hole(s) 6 to 8 inches deep and observe the water level following heavy rains. Water should not remain in the hole for more than 24 hrs; otherwise, select another site or plant on ridges high enough for the water level to reach 6 to 8 inches deep within 24 hrs.

Irrigation - In most seasons and on most soils, irrigation is absolutely essential the year of planting. A system using micro-sprinklers is recommended and is more efficient than point-source drippers. Even 2 drippers per plant often do not wet enough of the soil surface. At least 50% of the area under the drip line should be wetted. The irrigation must be designed for the higher output of micro-sprinklers (about 10 gal per hr) compared with 1 or 2 gal per hr for drippers. Align the micro-sprinklers to avoid saturated soil around the crown of the bushes. The use of automatic timers on drip or microsprinkler irrigation systems can result in shallow root systems and root rotting if systems apply water daily. Apply irrigation no more than once every two days to reduce the chances of root-rot infection. If the grower has no choice but to establish the planting on a site prone to problems with frost during the early spring (during bloom), then overhead sprinkler irrigation should be installed to provide frost protection and supplemental moisture.

What Species - Both the highbush (Vaccinium corymbosum) and the rabbiteye (V. ashei) types of blueberries can be grown in the Coastal Plain and Piedmont. However, only highbush will consistently survive and produce fruit following the minimum winter temperatures below 10o F that regularly occur in the mountains. The rabbiteye is more drought- and heat-resistant and will tolerate a wider range of soil types than the highbush. For these reasons, rabbiteye are easier to establish and grow successfully in the Piedmont and on the drier soils of the Coastal Plain than highbush. More recently, a group of cultivars referred to as southern highbush have been released. These cultivars are intermediate between highbush and rabbiteye in soil and climate adaptation.

Varieties - Highbush varieties begin ripening in mid-May in the southeastern Coastal Plain and in early July in the Mountains. Rabbiteye first ripen in mid-June in the southeastern Coastal Plain. More than one rabbiteye variety must be planted to provide the cross-pollination required for maximum yields. Following are varieties in order of ripening from early to late that have been grown successfully and are recommended for local sales and PYO operations:

Coastal Plain - Highbush: ‘O'Neal' (southern highbush), ‘Reveille', ‘Croatan', ‘Legacy', ‘Blue Ridge' (southern highbush), ‘Bluechip', ‘Sierra', ‘Jersey';

Coastal Plain and Piedmont - Rabbiteye: ‘Climax', ‘Premier', ‘Tifblue', ‘Powderblue', ‘Centurion'. Highbush: ‘Blue Ridge' (southern highbush) and ‘Legacy' (southern highbush) have also been grown successfully on Piedmont soils and are worthy of trial.

Mountains and Upper Piedmont - Highbush: ‘Duke', ‘Sunrise', ‘Blueray', ‘Toro' ‘Sierra', ‘Bluecrop', ‘Berkeley', ‘Nelson', and ‘Jersey.

Planting

a) Plants - Nursery plants that are 2 or 3 years old and 12 to 36 inches tall will transplant well. The roots must be kept moist at all times between digging and replanting.

b) Time - Late winter (Feb-Mar) as soon as the soil can be worked is best for bare-root plants; Fall (Nov-Dec) planting has been successful on sandy soil in the southeastern Coastal Plain with bare-root plants and in the other areas with potted plants.

c) Spacing - Highbush 4 to 5 ft in the row and 8 to 10 ft between rows and; rabbiteye 6 ft in the row and 10 to 12 ft.

d) Depth - Plant to the same depth as the plants were growing in the nursery if organic

mulch will be applied on the surface. Without mulch, plant 1 to 2 inches deeper to allow for soil settling. Firm the soil around the plant with your feet and water thoroughly.

e) Cut Back - Prune approximately 2/3 of the top growth on bare-root plants and 1/2 on potted plants leaving only 1 to 3 of the most vigorous upright shoots and remove any remaining flower buds (plump rounded buds).

Fertilization

a) Use Caution - Blueberries are easily damaged by excess fertilizer. Apply the recommended amount and allow 4 inches of rain or an equivalent amount of irrigation between applications.

b) First Year - Do not fertilize immediately after planting, wait until the first leaves have reached full size, then apply 1 Tbs of a special azalea fertilizer, 12-12-12 or 10-10-10 within a circle 1 ft from the plants. Repeat applications at approximately 6 week intervals depending upon rainfall or irrigation until mid-August in the Coastal Plain and mid-July in the Mountains. Use 1/2 Tbs of ammonium nitrate instead of the complete fertilizer for the second and subsequent applications if phosphorus was above 60 on the soil test.

c) Second Year - Double the first year's rates, but increase the circle around plants to 1-1/2 ft . Make the first application when new growth begins in spring.

d) Bearing Plants - When growth begins in the spring, apply 1 cup of complete fertilizer such as 10-10-10 within a circle 3 ft from the plant. If more vigorous growth is desired, sidedress with 1/4 cup of ammonium nitrate at 6 week intervals. For mature bushes, 6 to 12 inches of new growth is adequate, additional growth must be pruned away. This may result in a loss in production, but it is necessary to keep the plants from becoming excessively large. Determine sidedressing requirement based on the amount of shoot growth and bush color.

e) Lowering pH - If the soil pH is slightly high in an established planting based on a soil test; then sidedress with ammonium sulfate rather than ammonium nitrate. If the pH is 0.5 units or more above the acceptable range, apply wettable sulfur in a narrow band under the drip line of the bush at the rate of 0.1 pound per bush to lower pH 1 unit.

Weed Control

a) Mulched - If mulch is applied following planting and replaced at the rate of 1 inch per year, few weed problems should develop. Hand pull or hoe the occasional weed growth. If row middles are in sod, mow often to reduce invasion by runnering grasses and weed seeds into the mulched area.

b) Not Mulched - Avoid deep cultivation since blueberry roots are very near the surface. Hoe no more than about 1 inch deep. In addition, hoe often (once every 2 weeks) when weeds are germinating to reduce competition with bush growth and to prevent disturbing the roots that will occur when large weeds are removed.

c) Herbicides - Pre- and postemergent chemical herbicides are registered for use in controlling weeds in blueberry plantings. Please contact your local county extension agent for current recommendations.

Pruning

a) Highbush - If the plants are cut back severely as recommended following planting, little pruning will be required the second year except removing all flower buds and any weak, damaged or diseased growth. Use a similar pruning strategy the third year with the exception that several flower buds can be left on vigorous shoots. In the fourth year, the bush should be 4 to 5 ft tall and capable of handling a crop, but carefully thin flower buds to prevent overfruiting and severe permanent bending of young canes under the fruit weight. When bushes are mature, remove old canes that are weak, diseased or damaged; cut back tall, vigorous shoots to force branching at a lower level and to control bush height; and thin fruiting shoots to reduce the number of flower buds by about 50%. Prune during the dormant season. Late winter is most desirable, especially in the Mountains.

b) Rabbiteye - During the first 3 years, pruning is very similar to highbush; however, excessively tall and limber shoots will need cutting back to stimulate branching and strengthen the shoot. With mature bushes that are excessively vigorous in spite of low rates of fertilization, cutting back the excessively vigorous shoots in late July will help control bush height and increase yield. Winter pruning of mature bushes is also similar to the recommendation for highbush except detailed thinning of fruiting shoots on each cane is less critical, and more suckers (shoots developing a distance from the crown) will require removal.

Harvest

a) Yield - With good care, mature highbush and rabbiteye plants should produce more than 10 lbs each year. Rabbiteye cultivars can on occasion produce up to 25 lbs per plant.

b) Bird Protection - Birds love to harvest blueberries. They can consume the complete crop from a small planting. One inch by one inch mesh bird netting draped over the bushes or supported on a framework is the only practical control.

c) Frequency - Highbush blueberries will be of best quality when picked every 5 to 7 days depending upon temperature. Rabbiteye flavor improves if berries are picked less often; about every 10 days allows for maximum flavor with few soft overripe fruit.

Potential for Organic Production - Blueberries can often be grown successfully without insecticides and fungicides outside of the commercial production areas of southeastern North Carolina. Japanese beetles can occasionally cause damage to the fruit during ripening, but the foliage is quite resistant. Susceptible plants such as roses or grapes will usually be defoliated before injury is seen on blueberries. The low rates of fertilizer required make organic sources a viable alternative. Horse manure has proven to be a suitable source of nitrogen and rock phosphate provides adequate phosphorous. Weeds can be controlled with shallow cultivation or more desirably with mulch.

Sources of Plants - Blueberries are propagated vegetatively through the use of cuttings. Both hardwood (winter) and softwood (summer) cuttings can be rooted under mist without the use of rooting hormones. While this can be accomplished by the backyard hobbyist or by a local nursery, the best sources of uniform plants for establishing a new planting are nurseries that specialize in blueberry propagation. Some commercial sources will sell single plants, while others require minimum orders of 50 to 100 plants. A partial list of nurseries is included below.

Finch Blueberry Nursery
P. O. Box 669
Bailey, NC 27807
(252) 235-4664
(Rabbiteye, southern highbush, highbush)

Atlantic Blueberry Company
475 S. Chew Road
Hammonton, NJ 08037
(609) 561-8600
(Highbush for mtns)

A. G. Ammon Nursery
P. O. Box 488
Chatsworth, NJ 08019
(609) 726-1370
(Highbush for mountains)

Fall Creek Farm and Nursery, Inc.
39318 Jasper-Lowell Rd.
Lowell, OR 97452
(541) 937 2973
(Highbush, southern highbush)

Ed Darden
106 Yellow Cut Road
Rose Hill, NC 28458
(910) 289-2849
(Southern highbush, highbush rabbiteye)

N.C. Foundation Seed Production
P. O. Box 33245, Method Station
Raleigh, NC 27606
(919) 737-2821
(Recent NC releases)

Tower View Nursery
70912 CR 388
South Haven, MI 49090
(616) 637-1279
(Highbush for mountains)

For Further Reading

- Blueberry Culture, Rutgers University Press, New Brunswick, NJ
- Blueberry Diseases in Michigan, MSU Ag Facts Extension Bulletin No. E1731
- Blueberry freeze damage and protection measures. North Carolina Cooperative Extension Horticulture Information Leaflet 201-E
- Blueberry Science, Rutgers University Press, New Brunswick, NJ
- Blueberry Pest Management, NC Cooperative Extension Service AG-492
- Commercial Blueberry Production in Florida, University of Florida Pub. No. SP179
- Compendium of Blueberry and Cranberry Diseases. APS Press, St Paul, MN
- Diseases and Arthropod Pests of Blueberries. N. C. Agricultural Research Service Bulletin 468
- Highbush Blueberry Production Guide, NRAES-55, Ithaca, NY
- Small Fruit Pest Management and Culture, University of Georgia Cooperative Extension Service Bulletin No. 1022
- Suggestions for establishing a blueberry planting in Western North Carolina. North Carolina Cooperative Extension Horticulture Information Leaflet 201
- Principles of pruning the highbush blueberry. Pruning the Highbush Blueberry in Eastern North Carolina. NC Cooperative Extension, Horticulture Information Leaflet 201-B

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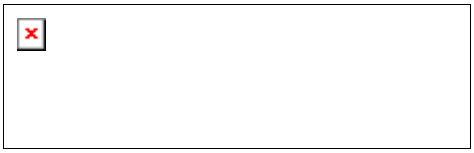
examine a current product label before applying any chemical. For assistance, contact an agent of the North Carolina Cooperative Extension Service in your county.



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