



Blueberry Production for the Home Garden

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Blueberries can be an excellent choice for a home fruit crop. The fruit is usually abundant, attractive, and flavorful. The fruits can be used in cooking or eaten fresh. They can also be frozen, canned, preserved as jams, or dried for use as a substitute for raisins. The fruits provide many healthful dietary factors, including vitamins, minerals, and components that may help prevent certain diseases. Blueberry bushes vary in shapes and sizes. Leaf size and color, as well as bush shape, vary widely among varieties. These variations allow the home fruit growers to choose the varieties that fulfill their special needs.

Site Selection

Blueberries need a site in full sun. Excellent drainage is essential, hence, raised beds (6 to 15 inches high) are highly recommended in order to improve soil drainage, if needed. Although blueberries bloom later than most other berries (March-April), and frost is only an occasional problem, areas prone to frost should be avoided. A site on a slight, northward-facing slope helps prevent spring frost injury and gives some protection from drying southwest winds in summer.

Deep, well-drained sandy loam soils with added organic matter are ideal. A pH of 4.0 to 5.5 is necessary for optimum plant nutrition. However, sulfur may be added to lower the soil pH one unit, for example, from 6.0 to 5.0 (Table 1). For in-between numbers and soil types, estimate as needed, or consult your extension office for assistance.

Newly-cleared land may be planted. However, bermudagrass sod and woody weeds such as blackberries should be completely killed before the land is planted with blueberries as this will help with weed control. A large amount of irrigation water that contains little salt or lime must be available for a successful planting. It is helpful if the pH of the irrigation water is close to 5.0 as this prevents the pH of the soil from getting too high.

Soil Preparation

Have a soil test made six months to one year in advance. If sulfur is needed, it should be applied six months to one year before planting. Prepare the soil by tillage to give a weed-free

Table 1. Pounds of sulfur per 100 square feet to lower soil pH one unit.

Soil Texture	lbs/100 sq. ft.
Sand	1.0 to 1.5
Loam	2.0 to 3.0
Clay	3.0 to 4.0

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planting area. Also, planting a green manure crop, such as rye or wheat, the fall before planting blueberries, and tilling it under in the spring is recommended. Adequate fertilizer should be applied to the cover crop to get the maximum benefits of the cover crop.

Plant Selection

There are three basic types of blueberries that will grow in Oklahoma: highbush, rabbiteye, and southern highbush.

Highbush blueberries (*Vaccinium corymbosum*, *V. australe*) grow 5 to 23 feet tall and require 800 hours of chilling below 45° F. They ripen in May, and perform best in northern Oklahoma.

Rabbiteye blueberries (*V. ashei*) grow 5 to 19 feet tall and require 150 to 600 hours of chilling. They ripen in late May and early June. They grow best in central and southern Oklahoma and are more heat tolerant than highbush types. Rabbiteye blueberries are divided into pollination groups A, B, C, and D. In order to get the best fruit set and largest fruit, varieties that bloom at the same time should be planted together. Therefore, if a variety is pollination group B, it will be best to plant it near another variety that is also in group B.

Southern Highbush (*V. darrowi* crossed with *V. corymbosum* and others) are intermediate, between highbush and rabbiteye in most respects. Their genetic background is quite variable, therefore, the varieties may perform differently from each other. **Most** southern highbush are self-fertile, but two varieties should be planted in order to get better yields. Southern highbush ripens about three weeks earlier than rabbiteye, and should perform well across the state.

Choose varieties that will fruit when you want them to on your site (Table 2). Ripening dates may vary by as much as two weeks (earlier or later) depending on the weather. Berries will ripen 1-2 weeks later in northern Oklahoma than in southern Oklahoma. In order to get good pollination, purchase at least two varieties that bloom near the same time. Highbush blueberry varieties all bloom about the same time. Southern highbush may be greatly variable in bloom time, therefore, ask your nursery source which varieties will bloom near the same time. Purchase plants from a reputable nurs-

ery. When the plants arrive, check the plants for evidence of diseases and insects (use a magnifying glass). If the plants are infested or infected, return them to the nursery.

Propagation and Planting

Softwood cuttings taken from healthy, vigorous mother plants may be rooted in a shaded mist bed. Blueberries are somewhat difficult to propagate, but unpatented varieties could be propagated by a homeowner on a hobby basis.

Blueberries should be planted in the fall after growth has stopped, or in the spring before growth has resumed. February or early March is a good time for planting blueberries in most of the state. Space rabbiteye plants 6 by 12 feet, highbush 3 by 10 feet, and southern highbush 4 1/2 by 12 feet apart. Build raised beds at the 12 or 10 foot spacing. Allow rainfall to settle the beds, or use sprinklers.

Planting holes require extensive preparation. Each hole should be 18 to 24 inches across and the same depth. Add one-third cubic foot of peat moss to each hole, and mix it with the native soil. **Do not** add nitrogen fertilizer to the hole, however, phosphorus and potassium may be added and mixed thoroughly with the soil and peat. Let the hole stand for two weeks after this to allow the peat moss to become thoroughly damp, adding water as needed. If bare-root plants are used, one-third to one-fourth of the top growth should be removed at planting time. This balances the plant and helps prevent lodging from high winds. Keep root systems of bare-root plants covered with damp sawdust, hay, or peat moss while you are preparing to plant. Score the root balls of containerized or container-grown plants before planting them, in order to encourage the roots to grow outward. Plants should be set about one-half inch deeper than they were in the container. After replacing the peat and soil mixture into the hole, tamp it lightly to remove air spaces. Unless rain is likely, water the newly set plants. Cut back shoots on large plants to keep them from being blown over by high winds.

Nurturing

Blueberries are perennial shrubs. New canes shoot from buds on the old wood each year. Flower buds are formed the summer before they bloom, and overwinter on the old wood. Flower buds are round; and leaf buds are pointed.

In blueberries, the culture of the plant is determined by what the "leaf" of the plants are. Bushes which are growing for the first time after planting are in their first leaf. Blueberries in their second growing season after planting are in the second leaf, and so on. It is the leaf of the plants, and not the actual age, which matters. Blueberry plants may be anywhere from a few months to two years old when you purchase them. However, the actual time that the plants have taken to get established in an area is far more important for cultural considerations than the age of the plants. In other words, which leaf the plant is in, is more important than chronological age.

Mulching: Blueberries should be permanently mulched with 4 to 6 inches of organic material such as pine bark or sawdust. Replenish this each fall after the first killing frost. Mulch helps control weeds, conserves soil and moisture, helps prevent winter injury to the base of the plants, helps control unwanted suckers, and promotes growth of the blueberry root system (which will probably grow into the mulch).

Irrigation is necessary for good plant establishment and survival. A drip irrigation system is recommended. Fifty-five

to 110 gallons of water per 100 feet of row are required each week for blueberry establishment. This amount is equivalent to 1 1/2 to 3 inches of precipitation per week. These requirements may be even higher under windy conditions. If the root systems are allowed to dry out, the peat around the roots will not re-wet easily, therefore, the plants could die before water becomes available to them again.

Ninety-five gallons of water per 100 feet of row are required each day for mature, high-producing blueberry plants during the growing season. This amount is equivalent to 2.6 inches of precipitation per day. Mature plants receiving no rainfall will require 8 to 12 gallons of water per plant per day. The higher rate should be used on very sandy soils, and the lower rate on loamy soils. Keep in mind that these requirements will vary according to the weather. Rabbiteye blueberry bushes may be quite large and often ripen their fruit after the summer heat has arrived in Oklahoma. Under conditions of low humidity and dry winds, their water use may be considerably more than that mentioned above. If bushes are allowed to dry out between waterings, fruit often cracks and rots. In any case, water the blueberries whenever the soil under the mulch feels dry, before the plants start wilting.

Excess watering (even a few hours of waterlogging) will cause the roots of the blueberries and the whole bush, to die. The roots are extremely susceptible to root rot, therefore, good drainage is essential. The natural habitats of wild blueberries include half sand, half organic matter soils of coastal North Carolina, and the rocky steep slopes of Beaver's Bend State Park in southeastern Oklahoma. Both of these environments are high in organic matter, very well drained, and receive relatively high rainfall. Remember that cultivated blueberries will require more water than wild blueberries because you are attempting to produce a large crop of nutritious, water-filled fruit.

Water stress (too much or too little) reduces fruit size and yield. It may also reduce flower bud formation, and delay ripening. Leaves of flooded or drought-stressed plants become dark red with brownish margins, and often die.

Winter Protection

No winter protection is usually needed on blueberries. However, large rowcovers or similar materials may be used if spring frost threatens.

Harvesting

Blueberries should not be allowed to bear fruit until their third or fourth leaf. Although blueberries will flower in their second leaf, allowing them to bear fruit at this time is detrimental to the health of the plant, and often results in the plant becoming out of balance. Plants allowed to bear fruit too early may set many fruit, but grow few leaves to support them. If the fruit is not removed, the plants may die from stress.

Maturing blueberry fruit enlarge, develop a deeper blue-black color, and soften. When the berries appear ripe, a "taste test" is the best indicator of when to pick. Some varieties will retain the stems on the fruit, while others do not. If the stem does not come off with the fruit, the stem scar on the fruit may be dry or wet (torn open). Dry stem scars are less susceptible to infection by fruit rots after picking than wet stem scars.

Harvest fruit during the cooler part of the day and refrigerate the berries soon after harvest. These berries will usually remain in good condition for several days if they are handled properly.

Table 2. Blueberry varieties for Oklahoma. As “Berries per cup” increases, fruit size decreases. “Range” indicates the southern and northern limits of the variety, based on U.S.D.A. plant hardiness zones. Letters in parenthesis indicate pollination groups.

<i>Variety</i>	<i>Ornamental Value and Type of Bush</i>	<i>Berries per cup</i>	<i>Pounds per bush</i>	<i>Ripens</i>	<i>Range</i>
Highbush					
Berkeley	Good, spreading	70	5	middle	7a 5a
Blue Chip	Good, upright	65	15	middle	7b 6a
Bluecrop	Excellent, upright	65	15	middle	7a 4a
Bluejay	Good, upright	76	15	early	7b 4a
Blue Ray	Excellent, upright	60	15	middle	7a 4a
Bluetta	Good, low	71	15	early	7a 5a
Burlington	Exceptional, upright	75	7	late	7a 5a
Darrow	Good, slightly spreading	57	11	middle	7a 5b
Earliblue	Good, upright	75	8	early	7a 4b
Elliott	Very good, upright	75	15	late	7a 4a
Georgiagem	Good, upright	80	11	early	9a 7b
Meador	Good, slightly spreading	65	15	early	7a 4a
Patriot	Good, upright	49 - 60	15	early	7a 3b
Spartan	Good, upright	60	10	early	7a 5a
Southern Highbush					
Misty	Good, upright	65	12	early	10 6b
O’Neal	Good, spreading	50	7	early	9a 7b
Sharpblue	Very good, upright	77	12	early	10 7b
Sunshineblue	Very good, spreading	80	7	middle	10 6b
Rabbiteye					
Beckyblue (B)	Moderate, upright	72	10	early	9a 8b
Bonitablue (B)	Good, upright	70	10	early	9a 8b
Brightwell (C&D)	Moderate, spreading	77	11	middle	9a 7b
Climax (B&C)	Good, spreading	77	15	middle	9a 7b
Powderblue (D)	Very good, upright	77	11	late	9a 7b
Premier (C & D)	Good, upright	77	12	middle	9a 7b
Snowflake (C&D)	Moderate, upright	77	15	early	9a 7b
Tifblue (D)	Good, upright	77	16	middle	9a 7b
Woodard	Good, spreading	72	12	middle	9b 7a

Subsequent Care

Fertilizing: Ammonium nitrogen is better for blueberries than nitrate nitrogen. Urea, sulfur-coated urea, ammonium sulfate, and cottonseed meal are acceptable fertilizers. Any fertilizer sold for azaleas or rhododendrons should also work well. Apply nitrogen in small applications—once before bloom, once after fruit set, and once in the fall. If the plants will not be allowed to bear fruit due to their age, estimate the application timing. In the first year, only one application is required and should be applied in the fall after the first growing season. Due to the well-drained site and the large amounts of water applied, a slow-release nitrogen source is most desirable to

prevent excessive losses by leaching. Blueberries need much less nitrogen than other fruit crops, and excess nitrogen will kill them.

Apply fertilizers uniformly around the drip line of the plant and one foot outward, but never near the base of the plant. Fertilizer application stimulates plant growth, increases berry size, and boosts total production. Choose one of the fertilizers in Table 3, and apply the amount indicated. If you choose another fertilizer, you will need to calculate the proper amount to use.

Summer pruning for removal of broken and diseased branches is a good practice. It may also be necessary to prune the bushes for size control during the summer. If left unpruned, rabbiteye bushes may grow to a height of 25 feet

Table 3. Ounces of fertilizer per plant per application.

Year	Urea	NH ₄ NO ₃	S-coated Urea
1	0.5	1	0.7
2	0.5	1	0.7
3	0.4	1.5	1
4, etc.	1	2	1.2

From Patten, K. 1990. Plant nutrition and fertilization. In Texas Blueberry Handbook, Texas Agricultural Extension Service, p. 8-9.

or more. Pruning for size control may be done with pruners or a hedge clipper, and should be done soon after harvest. Cut the sides of the bushes back to narrow the rows to a convenient width. Also, cut the tops of the bushes back to about eye level. They will re-grow during the summer and fall, and may need to be pruned again later. Be careful about later pruning, because fruit buds will also be removed with the wood. Summer pruning for size control allows bushes to branch, which in turn increases the bearing area of the plant and may substantially increase yields.

Practice strict sanitation of pruning equipment by dipping it in a 10% chlorine bleach solution after each cut if disease is evident, and between plants if no disease is apparent. Remove pruned-off wood from the field. Do not prune if heavy dews or any rain is predicted because the dampness will help diseases to infect the plants.

Winter pruning involves removal of dead, diseased, deranged, and dying canes, thinning of healthy canes, and tipping of canes that are left. February is the best time for winter pruning. First, remove dead, diseased, and dying canes. Practice strict sanitation so that disease does not spread. Second, remove "deranged" canes that are growing where they will rub against other canes, canes growing the wrong way through the middle of the plant, and canes that stick out from the plant and make it too wide. Third, thin healthy canes to allow for air circulation and easy picking. Leave 6 to 10 main branches per plant. Try to keep the base of the plant narrow to make harvesting and weed control easier, but let the bearing part of the plant grow so that it is not shaded. In other words, do not prune the plants into a strict "V" shape. The plants should be narrow at the bottom, but wide in the middle and on top. Fourth, tip remaining canes at a convenient picking height if this has not been done earlier. Be sure to leave enough fat, round flower buds for production, and a few extras in case of frost.

Spring pruning may be needed to remove excess fruit in some (rare) years. Cut fruit clusters off with pruners to leave a crop that the plant can successfully ripen.

Pest control: It may be necessary to cover bushes with bird netting when harvest nears. Spraying for insect, disease, and weed control may also be necessary, but often is not needed. Relatively few pesticides are labelled for use on blueberries.

Insect pests include:

1. Plum curculio, a beetle with larvae which infest fruit.
2. Sharp-nosed leafhopper, which carries blueberry stunt disease.
3. Black army cutworm, a caterpillar which cuts petioles and fruit stalks.
4. Flea beetles, which can seriously damage foliage.
5. Bagworms, caterpillars which spin webs and feed inside.
6. Blueberry maggots, fly larvae which live inside the fruit.

Diseases of blueberries include:

1. Stem canker, which may girdle branches. It is controlled by pruning.
2. Root rots, controlled by good drainage.
3. Blueberry anthracnose, controlled by planting resistant varieties.
4. *Botrytis blight*, or gray mold, partially controlled by pruning and by removal of infected material from the patch.
5. Mummy berry, controlled by removing infected material from the blueberry patch.

Other Information Sources

Free publications

BAE-1511 Trickle irrigation for lawns, gardens, and small orchards
 BAE-1655 Lawn, garden and small plot irrigation
 PSS-2207 How to get a good soil sample
 PSS-2236 Knowing when to fertilize
 PSS-2750 Guide to effective weed control
 HLA-6005 Mulching garden soils
 HLA-6006 Commercial Fertilizer Use in Home Gardens
 HLA-6007 Improving garden soil fertility
 HLA-6222 Home Fruit Planting Guide
 HLA-6229 Pollination requirements for fruits and nuts
 HLA-6243 Weed control in small fruit crops
 HLA-6708 Mist propagation systems
 EPP-7450 Safe use of pesticides in the home and garden
 EPP-7612 Plant disease diagnostic services

Grower's Guide

Hartmann's Plantation, Inc. 1990. Northern & Southern Growers Guide. Grand Junction, Michigan.

Books

Baker, M.L., K. Patten, E.W. Neuendorff, and C.G. Lyons. (1990). Texas Blueberry Handbook: Production and Marketing. Texas Agricultural Extension Service, College Station, TX. About \$15.
 Galletta, G.J., and D.G. Himelrick, editors. (1990). Small fruit crop management. Prentice-Hall, Inc. New Jersey. About \$55.
 Whealy, K. (Ed.). (1989). Fruit, berry, and nut inventory. Seed Saver Publications, Decorah, Iowa. About \$18.

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