

## Blueberry Gardener's Guide <sup>1</sup>

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The purpose of this publication is to provide home gardeners with basic information on growing blueberries in Florida. Commercial growers and those interested in more detailed information on growing blueberries in Florida are encouraged to visit the UF/IFAS, Florida Cooperative Extension's publications Web site at <http://edis.ifas.ufl.edu>.

Florida's winter season is short and mild with intermittent periods of warm temperatures. Most deciduous fruit cultivars have too great a chilling requirement to grow well in Florida. That is, they require more exposure to cool temperatures during the winter than they are likely to experience in Florida. With insufficient chilling, plants do not flower and leaf out satisfactorily during the spring. Growth can be weak and erratic. However, low-chill cultivars of some deciduous fruits, including blueberry, have been developed by plant breeders at the University of Florida and elsewhere. These cultivars were developed specifically for regions with mild winter temperatures such as in north and central Florida.

Two types of blueberries grow well in Florida, rabbiteye (*Vaccinium ashei*) and southern highbush (interspecific hybrids of *V. darrowi*, *V. ashei* and *V. corymbosum*). However, only the low-chill cultivars

of each are adapted to Florida. Generally, rabbiteye blueberries grow well in areas of Florida that have winters as cold, or colder, than Ocala. The southern highbush cultivars that are commonly grown in Florida are well adapted to areas south of Ocala and north of Sebring, although they will grow reasonably well in Alachua County. The southern limits of southern highbush adaptation in Florida have not been fully determined.

### Site Requirements

Both rabbiteye and southern highbush thrive on acid soils which contain more organic matter than is usually found in Florida's soils. If mulched, rabbiteye blueberries will usually grow satisfactorily on soils with 1% organic matter, but they do better with 2-3% organic-matter soils. Southern highbush blueberries are not recommended for soils with less than 3% organic matter and usually require mulching for optimum growth. Organic matter can be added to soils by incorporating peat moss prior to planting. Also, pine bark mulch will eventually decompose and add to the soil organic matter. Where blueberry plants have been heavily mulched for several years, it is not uncommon to observe most of the fibrous roots growing in the decomposed litter above the natural soil.

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Blueberries require a soil pH of 4.0 to 5.5. At higher soil pH values, tissue levels of micro-elements such as iron and zinc become deficient. Deficiency symptoms develop on new growth and plants lose vigor. Soil can be acidified by thoroughly mixing a small amount of granulated sulfur into the soil several months before planting. Many fertilizers are acid-forming and will gradually lower the soil pH. A soil test is needed to determine the soil pH and whether or not acidification of the soil is necessary.

Blueberries require a well-drained soil profile of at least 18 inches in depth. Where water stands within 18 inches of the soil surface for prolonged periods during the rainy season, blueberries should be planted on raised beds. If blueberry roots are exposed to water-saturated soil for more than a few days damage from *Phytophthora* root rot may become severe. Generally, blueberries will grow well where azaleas, camellias and other "acid loving" plants are proven performers.

## Planting and Establishment

The best time to plant blueberries is from mid-December to mid-February. Either bare-root or container-grown plants can be used. Plants about 2 feet tall with well developed root systems that are not pot-bound are best. Keep the roots of bare-rooted plants moist but not wet prior to and during planting. The root balls of potted plants should be broken up slightly and the roots of bare-rooted plants should be spread out evenly in the planting hole. In most situations, dooryard blueberry plants benefit from the incorporation of 1/4 to 1/2 cubic foot of acid sphagnum peat moss into the planting hole. Dig the hole large enough to accommodate the roots and peat moss. The plants should be set at the same height as they grew in the nursery. If blueberries are planted on raised beds, flatten the bed in the vicinity of the plants and set the plant in a slight depression so that irrigation and rain water will not flow away from the plant.

Pine bark mulch aids in the establishment of young blueberry plants. A layer of pine bark 3 inches deep extending about 2 feet out from the plants in all directions, or a pine bark strip about 4 feet wide extending down the row will provide a good substrate

for surface feeder roots. Mulch also moderates soil temperatures, aids in weed control, provides protection from mechanical injury and adds organic matter to the soil. Weed control is extremely important for young plant establishment because blueberries are shallow-rooted plants that compete poorly with weeds for water and nutrients.

Blueberries should be pruned at the time of planting. If plants have a well-developed root system and irrigation is used, pruning should not be severe. Select the tallest, strongest cane and leave it unpruned. Remove the weak, "twiggy" growth at the base of the plant. If the plant has a large top compared with the root system, remove all the stems and canes except for the strong, dominant, cane and prune it back to half of its original height. During the first growing season, remove all flowers before fruit set occurs. This will prevent fruiting during the first year and promote strong vegetative growth and good plant establishment. This is especially important with some southern highbush cultivars that flower heavily as young plants.

Plant in a sunny area away from the roots of trees except pines, and at least 20 feet away from any building foundation.

A mature rabbiteye blueberry plant can reach 12-15 ft in height with canes sprouting over an area 8-10 feet in diameter. Southern highbush plants tend to be less vigorous and smaller than rabbiteyes. Plant size can be controlled to some degree by pruning. However, severe pruning will reduce yields the following spring. Allow at least a 7' x 7' area for rabbiteyes and a 4' x 4' area for southern highbush. Plants may be set 3 feet apart (southern highbush) or 5 feet apart (rabbiteye) for a hedgerow effect.

## Cultivars

Aside from site selection, choosing the proper blueberry cultivars may be the most important decision a dooryard blueberry grower can make. Most blueberry cultivars that are grown in Florida are self-unfruitful; they require cross pollination from another cultivar. Another requirement for good fruit set is that pollen vectors (usually bees) are present and working the flowers during bloom. With good pollination, berry yields of 2 to 5 pounds per plant

may be expected by the 3rd or 4th year. Some of the major blueberry cultivars commonly grown in Florida are described below.

**Southern highbush cultivars.** Southern highbush blueberries grown in peninsular Florida are the earliest blueberries to ripen in North America. These cultivars are generally considered more difficult to grow than rabbiteye types. Very early flowering makes southern highbush cultivars quite susceptible to late winter/early spring freezes and therefore not suited for extreme north, and northwest Florida. Moreover, southern highbush blueberries are less forgiving of soil requirements, and are generally more susceptible to some diseases such as *Phytophthora* root rot and stem blight than are rabbiteye blueberries. Nevertheless, if you want to grow blueberries in central or south Florida, southern highbush are preferred to rabbiteyes.

**'Emerald'** (Fig. 1) was released as a patented variety by the University of Florida in 1999, and is currently one of the more widely planted varieties in north-central Florida and appears to be adapted from Gainesville to Sebring. Emerald combines a vigorous, upright, bush with high yield potential, early ripening, and large, high-quality berries. Emerald flowers open uniformly, and it produces abundant leaves even after mild winters in Gainesville. Because the plant is highly vigorous when planted on suitable soils, Emerald is capable of carrying heavy crops. Emerald normally reaches full bloom in Gainesville about February 15, and overhead irrigation is needed to protect flowers and fruit from freezes in February and March. First harvest occurs a few days earlier for Emerald than for Sharpblue and Star in Gainesville. About 80% of the fruit of Emerald is normally ripe between April 15 and May 10 in Gainesville.

**'Gulf Coast'** 1987 USDA release, very early harvest season (same as Sharpblue), 200-300 chill hours, medium-sized fruit, pedicels tend to remain attached to fruit at picking, otherwise a very good cultivar.

**'Jewel'** (Fig. 2) is a patented release from the University of Florida breeding program with a moderately low chilling requirement, very early ripening, and high berry quality. Jewel appears to be



**Figure 1.** 'Emerald' blueberry.

adapted to the region of Florida from Gainesville to Sebring. In Gainesville, Jewel typically flowers about a week before Sharpblue and begins ripening about 10 days earlier than Sharpblue. The average date when harvest of Jewel begins in Gainesville is about April 12 and harvest is normally finished by May 10. Jewel produces a large number of flower buds but leafs well in the spring. Vigor is about equal to Sharpblue but Jewel is shorter and more spreading than Sharpblue. Berry quality is excellent but tends to be tart until fully ripe. Berry size is about equal to Sharpblue, but firmness and scar are much better than Sharpblue. Jewel may be considered for trial from Ocala north into SE Georgia. In central Florida, Jewel has looked good in some fields, producing large early berries but these plantings are still young. Jewel is moderately susceptible to *Phytophthora* root rot.

**'Millennia'** (Fig. 3) was released as a patented variety by the University of Florida breeding program in 2001. It is one of the more widely planted varieties



**Figure 2.** 'Jewel' blueberry.

in north-central Florida. Millennia has performed well in north-central and central Florida. Millennia is medium to high in vigor and has a spreading, rather than an upright, growth habit. It produces a heavy load of flower buds in the fall, and young plants should be winter pruned the first 2 years to prevent over-fruiting and to enhance early leafing. Older plants may require either Dormex application or winter pruning to increase leafing and/or reduce the flower load. The average date on which Millennia reaches 50% open flower is about Feb. 16 in Alachua County. In Alachua County, first commercial harvest on Millennia (10% of fruit ripe) averages about April 15, and the first half of the berries are normally ripe by April 28. The berry of Millennia is large to very large on well-leaved bushes that are not overloaded. Millennia berries are very firm, equal to Star. The picking scar is good to excellent. The flavor is good, although it can be somewhat bland on poorly-leaved or overloaded plants.



**Figure 3.** 'Millennia' blueberry.

**'Sharpblue'** 1976 UF release, the most commonly grown southern highbush cultivar, very early harvest (50% of fruit ripe by late April or early May in Gainesville), very early flowering, 150 chill hours, moderately productive, medium-sized fruit of high quality if handled carefully, susceptible to several fungal leaf spot diseases, although plantings containing only a few plants tend to escape serious leaf disease problems.

**'Star'** (Fig. 4) was released by the University of Florida as a patented variety in 1995. Star is slightly less vigorous than Sharpblue but its survival in the field is about equal to Sharpblue. Star holds its winter dormancy much better than Sharpblue and is less likely to bloom in January or early February. Star appears to be best adapted to north Florida and southeastern Georgia. Star has not performed well south of Ocala where it tends to produce few flowers and has weak growth. Average date on which Star reaches 50% bloom in Alachua County is February 23. The first half of the berries are normally ripe by April 26. Star leafs well in Gainesville and southeastern Georgia. Star has a very short bloom to ripe interval and has a relatively compressed harvest period of about 3 weeks as compared to about 6 weeks for Sharpblue. Berries are excellent in size, firmness, and scar.



**Figure 4.** 'Star' blueberry.

**'Windsor'** (Fig. 5) is vigorous, with stout stems and a semi-spreading growth habit. Windsor appears to be best adapted to north-central Florida but has been grown successfully as far south as Hardee County. The mean date of 50% open flower in Alachua County averages about February 21, about 3 days after Sharpblue and about 3 days before Star.

Windsor leafs out strongly as it begins to flower, and this strong leafing enables it to support a large crop. In Alachua County, the first commercial hand harvest on Windsor (10% of the crop ripe) averages about April 12, and 50% of the berries are normally ripe by April 24. Windsor berries are very large. Berries from the first half of the harvest average about 2.4 grams on young vigorous plants. The berries are about the same color as those of Sharpblue and Star. It has good firmness and excellent flavor. Although Windsor has a deep picking scar which complicates packing and reduces commercial post-harvest life but is generally not a problem for home gardeners.



Figure 5. 'Windsor' blueberry.

**Rabbiteye cultivars.** Rabbiteye cultivars, as a group, are easier to grow than southern highbush. They are more drought tolerant and less susceptible to *Phytophthora* root rot. They flower later in the spring making them less susceptible to late winter/early spring freezes. They require less organic matter and less mulching and are generally more vigorous. Rabbiteye fruit has a slightly tougher skin and slightly larger seed than southern highbush fruit. Their fruit usually stores better than southern highbush fruit. Rabbiteyes are self-unfruitful and require cross-pollination from another rabbiteye cultivar(s). The harvest season for rabbiteye blueberries extends from May to July, depending on the cultivar. Rabbiteyes are best adapted to areas of Florida north of Ocala.

'Beckyblue', 'Bonita' and 'Climax' are three early-season rabbiteye cultivars that are widely grown in Florida. These cultivars usually ripen in late May and early June in Gainesville. Early season rabbiteyes have not been as productive under Florida

conditions as the mid to late-season cultivars. However, they are useful in extending the rabbiteye harvest season. For best pollination, plant 'Climax' with either 'Beckyblue' or 'Bonita'. 'Austin' is a new early-season rabbiteye cultivar that appears to grow well where 'Climax' is adapted.

Most of the mid- to late-season rabbiteye cultivars are more productive than the early season rabbiteye discussed above, and home gardeners would do best to choose from this group. 'Brightwell', 'Powderblue', 'Tifblue' and 'Woodard' have performed very well in north Florida and in the panhandle. These cultivars bloom later than the early-season rabbiteyes and the flowers and young fruit are much less susceptible to late winter freezes. Other mid to late-season rabbiteyes that can be grown in Florida include 'Chaucer', and 'Bluegem'.

To increase cross-pollination and fruit set, mix two or more of the following cultivars from the appropriate group:

'Sharpblue'/'Misty'/'Flordablue'/'Avonblue';  
'Beckyblue'/'Climax'/'Bonita'; 'Tifblue'/'Climax'/'Powderblue'/'Woodard'/'Brightwell'.

## Fertilization

Blueberries respond best to frequent, light fertilization. They can be killed or damaged by over fertilization. It is best to begin on the lean side and gradually increase fertilizer rates as you gain experience with your soil type and the kinds of fertilizer you are using.

Do not put fertilizer in the planting hole. After planting, when the soil is well settled from irrigation or rainfall, give unmulched plants 1 ounce per plant of 12-4-8 with 2% magnesium (Mg). Use ammoniacal nitrogen or nitrogen from urea or organic sources, rather than from nitrate sources. Chlorine levels should be as low as possible, preferably below 2%. A special formulation called "blueberry special" is available in Florida and meets these requirements. Another possibility is "camellia-azalea" fertilizers. Many of these are suitable for blueberries and they are usually readily available in small quantities for home gardeners. Spread fertilizer evenly over a circle 2 feet in diameter with the plant in the center. Repeat this

procedure in April, June, August and October. If plants are mulched heavily, use 1.5 ounces per plant per application rather than one ounce. During the second year, use 2 ounces of 12-4-8 per plant per application and spread it evenly over a 3 foot diameter circle. In year three and later, use 3 ounces of fertilizer per plant per application spread evenly over a 4 foot diameter circle, or broadcast in a continuous band 3 to 4 feet wide, centered on the plant row. These are general guidelines and should be adjusted based on plant performance. Slightly more fertilizer may be required if plants are heavily mulched. However, more often than not, cultivated blueberries suffer more from over-fertilization than from lack of fertilization.

## Irrigation

Mature blueberry plants need about 40 inches of water annually. Most of this water is provided by rain. Water requirements for blueberry plants are low during the winter. Rainfall plus stored water in the soil should limit the need for irrigation during most years, on most soils, between December 1 and March 1. The most critical period for irrigation of blueberry plants in Florida is from early fruit set until the end of harvest. For most cultivars, this corresponds with a period of high water use by the plants and low rainfall. During March, mature blueberry plants will require about 0.6 inches of water per week (rainfall plus irrigation). As leaf canopies continue to develop, and air and soil temperatures continue to increase, 1.0 to 1.2 inches of water per week (rainfall plus irrigation) will be needed throughout the late spring and summer months. The frequency of irrigations depends on the weather, soil type, and type of blueberry (rabbiteye vs. southern highbush). Established rabbiteye blueberries as dooryard plants will require irrigation only during prolonged dry periods. They are at least as drought tolerant as evergreen azaleas. Southern highbush blueberries planted on very sandy soils may require two or three irrigations per week during dry periods. Most water from deep wells has a pH of over 7.0 and can increase the pH of sandy soils rapidly. If you suspect you have poor quality water, soil test annually to monitor changes in soil pH.

## Pruning

If blueberry plants are left unpruned, they eventually become dense, twiggy, and nonproductive. Pruning mature blueberry plants is largely a matter of cane removal or cane thinning. The objective of pruning mature bushes is to stimulate the proper balance of vegetative and reproductive growth, and limit plant size. Pruning stimulates the development of new canes which are more productive than older canes. A general rule is to remove about 1/4 to 1/5 of the oldest canes each year (usually one to three of the oldest canes). This will result in continuous cane renewal so that no cane is more than three or four years old. Pruning to reduce the number of flower buds may also be required on some southern highbush cultivars which set heavy crops such as 'Misty'. Flowers should always be removed from one and two-year-old plants by pruning or rubbing them off before fruit set occurs. Most pruning is usually done immediately after harvest during the early summer. Removal of some of the flowers buds to adjust the crop load is usually done during the late winter just before growth begins. Experience is the best guide for pruning blueberries.

## Pests and Diseases

Many insects, diseases, and vertebrate pests can attack blueberries in commercial fields. Some can cause serious reductions in growth, yield, or even plant death. However, most are sporadic in occurrence and normally cause little damage in small plantings. The most serious pests and diseases which have been observed on blueberries in Florida are discussed below.

*Phytophthora* root rot, caused by the fungus, *Phytophthora cinnamoni*, kills more blueberry plants in Florida than any other pest or disease. Root rot may result in sudden plant death, usually during the summer rainy season, or it may manifest itself as a slow progressive disease characterized by weak growth and early fall color development (yellow, orange or red foliage) before adjacent healthy plants. Infested plants are often poorly anchored in the soil and usually have very few healthy fibrous roots. *Phytophthora* root rot is favored by excess soil moisture and high soil temperatures. The best defense

against this disease is good soil drainage and avoiding excess irrigation. Chemical control is currently available and some cultivars are less susceptible to *Phytophthora* than others, but none are immune.

Botrytis flower blight (gray mold), caused by the fungus, *Botrytis cinerea*, can destroy large numbers of rabbiteye flowers when periods of rainy, cloudy weather occur during bloom. This disease can occur on southern highbush blueberries but is generally more severe on rabbiteye cultivars. Under conditions favorable for disease development, all parts of the flower are susceptible to infection. Flowers may even become infected before they open. Flowers and flower buds should be kept as dry as possible. Overhead irrigation should be avoided during bud swell and bloom. Protective fungicides are available for control of this disease.

Blueberry stem blight, caused by *Botryosphaeria dothidia*, has resulted in significant plant mortality of some southern highbush cultivars in Florida. The causal fungi are usually present in orchards and blueberry fields and causes a number of different diseases on various host plants. Rabbiteyes are usually not seriously affected by this disease but some southern highbush cultivars are extremely susceptible. 'Misty' appears to be more susceptible to infection and death by blueberry stem blight than most other southern highbush cultivars. 'Misty' tends to produce very heavy crops, even as young plants. Over-fruiting predisposes blueberry plants to stem blight. In recent years, many young 'Misty' plants which were fruited heavily have died from stem blight. There is no chemical control for blueberry stem blight. Pruning out infected wood and removing flower buds and fruit from young plants, pruning mature bushes to thin crop loads, and minimizing drought and other plant stresses appear to be the best methods of control.

Several insect pests damage blueberries in Florida, but as with diseases, chemical treatments are usually applied only where serious damage is being inflicted. Some insects that can occasionally cause serious damage include flea beetles, various scale insects, cranberry fruitworms, caterpillars, root weevils, and blueberry gall midge. Birds are the most serious vertebrate pest of blueberries, although the

severity of their damage varies greatly from year to year. Cedar wax wings, robins, and crows have all caused economic damage at some locations during some years. Small blueberry plantings in the dooryard provide both food and cover for many attractive songbirds. Although few blueberries may be harvested from dooryard plants that are not protected by nets, the bird life that the plants attract to the yard is welcomed by most homeowners.

## Conclusion

Blueberries can be grown successfully for the home garden in Florida. Either rabbiteye, southern highbush, or both may be used depending on geographic location, site characteristics, and anticipated harvest season. Generally, rabbiteyes are the best choice for areas north of Lake City and southern highbush are usually preferred for areas south of Ocala. Only the low-chill cultivars which have been specifically bred for mild climates are suitable for Florida. Proper site and cultivar selection are probably the two most critical decisions for the blueberry gardener. Plants located too close to hardwood trees produce few fruit, although blueberry plants and pine trees are surprisingly compatible. Rabbiteyes require cross-pollination and southern highbush benefit from cross-pollination. Cultivars of each type (rabbiteye with rabbiteye and southern highbush with southern highbush) should be mixed together and natural bee populations should be encouraged for good pollination and fruit set. Growing several cultivars will also lengthen the harvest season. Major yield reductions occur from spring freezes and birds. Phytophthora root rot is the major cause of plant mortality in Florida.