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Establishing New Southern Highbush Blueberry Plantings in Florida[1]

Douglas A. Phillips, Jeffrey G. Williamson, Gerardo H. Nunez, Philip F. Harmon, Peter J. Dittmar, and Diego F. Cabezas[2]

There are many steps to consider when establishing a new southern highbush blueberry field. The purpose of this publication is to assist Florida blueberry growers with critical management practices for establishing a new field. We assume that any irrigation wells, overhead irrigation, and farm equipment are already in place. Therefore, establishing those items is not addressed here.

Site Selection

Blueberry plantings should be located in areas with full, direct sun, ensuring enough distance from tree lines to avoid shade in the planted field at any part of the day. Avoid low-lying areas if possible because cold air tends to pool there, making freeze protection more difficult. Also, do not choose chronically wet areas for planting blueberries unless steps, such as grading or drain tile installation, are performed prior to planting and/or high beds are prepared to allow for sufficient drainage. Consider the prior use of the land because it can potentially alter physical and chemical soil properties. Furthermore, the soil can contain pesticide residues and soilborne pests and diseases.

Bed Preparation

Most Florida blueberry farms are located where soils have low organic matter and a pH that is not ideal for growing blueberries. In addition, these soils can sometimes be very sandy and ineffective at retaining water and nutrients. For this reason, most Florida blueberry growers prepare beds of either 100% milled pine bark or incorporate pine bark into raised beds of native soil in around a 50:50 ratio. Pine bark adds essential organic matter and helps create a root zone pH favorable to blueberry growth (ideally 4.5–5.5). See the Adjusting pH section for further information. Pine bark also retains water and fertilizer better than the native sandy soils, especially as it breaks down over time. Add supplementary pine bark to the beds every two to three years as the pine bark decomposes. A few growers have also used coconut coir (in containers or in the field) instead of pine bark.

If beds are constructed using soil and pine bark, take and test soil samples to determine pH, nutrient, and salinity levels. Adjust nutrients and pH as necessary prior to planting. Blueberry plants are very sensitive to high salt levels. In some areas close to the coast, saltwater intrusion or other related issues may have created high salinity conditions, which may not be ideal for planting blueberries. Electrical conductivity (salinity) should not exceed 2.0 dS/m in mature plants.

Blueberry roots tend to remain within the pine bark or amended bed area, so the beds should be wide enough to allow sufficient space for root growth. Researchers have consistently found roots only in the top 14 inches (35 cm) of soil. Also, blueberry beds should be tall enough to promote good drainage, especially in areas prone to waterlogging. Typical width and depth of Florida blueberry beds are 30–32 inches wide and 18–22 inches deep (machine harvesting may require different bed measurements, as discussed later in this section). Along with other management practices, this can help prevent conditions that are favorable for root rot diseases, including Phytophthora root rot. See Ask IFAS publication PP374, "Phytophthora Root Rot on Southern Highbush Blueberry in Florida," for more information. A preplant application of mefenoxam (Rimdomil and other products) may help minimize the risk of Phytophthora root rot, especially if the pathogen is known to be present in the planting area. In addition, if Ralstonia is known to be present, consider a preplant application of a phosphorus acid product.

In some parts of the Southeast, soil fumigation is used to prevent replant diseases associated with plant-parasitic nematodes. Published by the University of Georgia Extension, the annual Southeast Regional Blueberry Integrated Management Guide discusses the use of Telone II, Vapam, K-Pam HL, and Pic-Chlor 60 EC. These products are highly toxic and have specific label instructions and precautions that must be followed carefully to prevent injury to applicators and blueberry plants. Plant-parasitic nematodes are not currently thought to be a pest on southern highbush blueberry in Florida, so fumigation is not a common practice in Florida blueberry production at this time.

There are additional bed setup considerations if machine harvesting is anticipated. The bed height will likely vary depending on the type of harvesting equipment used. Beds should be no wider than the lower entrance of the harvesting equipment, and wide beds should taper off at the edges to allow adjustment of the catch plates. Having the bottom of the bed wider than the top allows the machine to get as low as possible to the crown of the plant, reducing fruit ground loss, facilitating narrow-crown training, and minimizing cane damage from catch plates. Beds made of native soil and pine bark (as opposed to beds made of 100% pine bark) may help keep plants from being loosened in the bed or uprooted when plants are shaken by the harvester. However, it will depend somewhat on the heaviness of the soil.

Rows should have a minimum of 10 feet between row middles for machine harvesting, with at least 30 feet at the end of rows for the harvesting equipment to turn around. For large plantings, periodic breaks in the rows are helpful for unloading fruit from harvesters for transportation to the packinghouse. Spacing between plants depends on the cultivar, but in general, 3 feet between plants is suggested for machine harvesting, which may be slightly wider than for fields designed solely for hand harvesting.

For more information, see Ask IFAS publication HS1481, "Preparing a Southern Highbush Blueberry Field for Machine Harvesting."

Weed Mat

Weed control is an important practice for Florida blueberry growers. One way to help with weed management is to install a weed mat or weed fabric on the growing beds (Figure 1). This can control weeds in the bed (except for the open area at the base of new plants) and can help manage insects that hatch and drop from the plant canopy to the ground to pupate. Disadvantages of the weed mat include difficulty in adding additional pine bark to beds over time and the inability to effectively use dry granular fertilizer.

Figure 1. Weed mat on a planted blueberry bed.
Credit: J. Williamson, UF/IFAS

Planting in Containers

Some Florida blueberry growers plant in containers or bags with soilless substrates rather than in beds of pine bark or amended soil (Figure 2). This may be done to more closely control nutrients and other matter in the root zone or to grow in areas where soil conditions will not permit successful growth. Pine bark or coconut coir is typically used as the substrate in container production. For more information, see Ask IFAS publication HS1476, "Introduction to Southern Highbush Blueberry Cultivation in Containers."

Figure 2. Blueberry planting in containers.
Credit: D. Phillips, UF/IFAS

Adjusting pH

The ideal pH range for growing blueberries is 4.5–5.5. Most Florida soils do not have a pH in this range. Also, the deep well water typically used for irrigation on blueberry farms, if untreated, tends to have a relatively high pH. There are a few ways to create and maintain a favorable pH in blueberry plantings. Measure soil pH prior to planting and, if too high, adjust it using elemental sulfur. Soil microorganisms oxidize the elemental sulfur, and this acidifies the soil. However, this process is not immediate; therefore, sulfur applications should be made ahead of planting. The use of pine bark in beds can help lower pH, as can ammonium sulfate fertilizer products, which lower root zone pH as they are taken up by the plants. Also, injecting sulfuric acid into high pH well water can lower the pH before using the water for irrigation.

Weed Management

Before planting, scout the field for the most problematic perennial weeds. Many weeds such as cogon grass, nutsedge, or Johnson grass should be treated with an application of glyphosate, which may need to be repeated. Other herbicides recommended for these species may have longer plant-back restrictions before planting or transplanting blueberry bushes.

If pine bark mulch does not come directly from the provider and then sits unused until needed, maintain a weed-free perimeter around the area to prevent weed seed from entering the mulch pile and spreading.

Plastic sleeves around new plants can reduce injury from burndown by postemergence herbicides. Use extreme caution when applying systemic herbicides, such as glyphosate and halosulfuron, which should be used only in dire situations with new plantings.

Selecting Cultivars

An important part of establishing a new blueberry planting is selecting the cultivars that will perform best in the applicable region. Some considerations on selecting cultivars include location, climate, and production system (deciduous or evergreen). Most farms in north-central Florida use cultivars selected for the deciduous system in which plants go dormant during the winter. Cultivars that perform best in the evergreen system (where plants do not go dormant) are used in both central and south-central Florida. Some central Florida growers use a combination of the evergreen and deciduous systems.

Most of the commercial blueberry plantings in Florida are southern highbush varieties from the UF/IFAS blueberry breeding program. Details of these cultivars, including the regions they are best adapted to, and other information are available in the UF/IFAS Blueberry Growers Guide app, the UF/IFAS blueberry breeding program webpage on varieties, and in Ask IFAS HS1245, "Southern Highbush Blueberry Cultivars From the University of Florida."

New plants from nurseries typically come in liner size, 1-quart containers, 1-gallon containers, or as bare-root plants. Nurseries propagate blueberry plants using either softwood cuttings or tissue culture. Growers should exercise caution when planting small liner-sized plants during hot, dry months.

Planting Practices

Blueberry plants have two periods of fast root growth: one in the early spring and one in the fall. It is advisable to plant during these periods to increase transplant success. Nursery plants in containers can sometimes have top growth that outpaces the growth of the root ball, resulting in a top-heavy plant. Many growers prune back the top 1/3 to 1/2 of each plant before planting to balance it with the root ball. Plants left in containers for too long can become rootbound, resulting in root girdling, which prevents proper root growth after planting and can result in plant death. It is advisable to break and separate the roots before planting to allow for good root growth within the bed. Plants with significant root girdling should not be planted.

A common planting issue is burying the crown too deep, causing the crown to retain excess moisture. This can result in rot, fungal growth, and infection. Moreover, plant roots that are set too deep may suffer from low available oxygen. The plant crown should be at or just above the top of the bed, so that it can dry out sufficiently after irrigation or rain events.

If the grower anticipates using machine harvesting, a common practice is to use plastic sleeves and fiberglass stakes to train the plant to have a narrow crown (Figure 3). The sleeves allow the catch plates of the mechanical harvester to close tightly around the base of the plant, reducing ground loss of harvested fruit. These plastic sleeves also protect the plants from herbicide damage.

Figure 3. Plastic sleeve and fiberglass stake to train young blueberry plants.
Credit: D. Phillips, UF/IFAS

Fertilization

Applying an appropriate amount of fertilizer during the first year of a new planting is essential. Too much fertilizer, applied either before or after planting, can result in fertilizer burn because salts limit the plant's ability to take up sufficient water. Young blueberry plants are susceptible to salinity stress. Therefore, it is advisable to introduce fertigation incrementally rather than fertilizing at a high rate immediately after planting. Fertilization with high doses of ammonium can cause burns in young plants, especially under cool or cold conditions. For fertigation through a drip line or microjet, apply frequent light amounts of fertilizer to young plants. For dry granular fertilizer, applying a slow-release or controlled-release formulation at a low or medium rate, depending on the plant size, is best to minimize the chance of plant burn. After planting, wait until a total of 1 inch of rain or irrigation water has settled the soil around the roots before applying dry granular fertilizers. One published recommendation is to apply around 1 teaspoon to 1 tablespoon of granular fertilizer per plant for two to four applications in the first year, depending on whether controlled-release fertilizer is used (see Bulletin 1291, a field report from the University of Georgia, "Fertilizing Highbush Blueberries in Pine Bark Beds"). Apply the fertilizer in a circle of around 12 inches in diameter (or 18 inches for 1-gallon-sized plants) from the base of the plant, avoiding a concentration of fertilizer near the crown.

New pine bark tends to tie up nitrogen, making some amount of nitrogen fertilizer unavailable for plant uptake. Consider adding some nitrogen to new bark at least three months prior to planting to help address this but be careful to avoid applying excess fertilizer that could result in fertilizer burn.

Irrigation

Keeping young blueberry plants sufficiently irrigated is very important, especially if they are planted during summer or early fall when temperatures are high and precipitation can be sporadic. Carefully monitor plants and beds for signs of drought stress, insufficient moisture in the root zone, and hydrophobic conditions. Also, keep the root zone moist but not saturated. With the limited root zone of young plants, one could apply more than enough water to the field, but not enough to where the roots are located. Moisture sensors can help monitor root zone moisture by detecting moisture levels at various depths within the root zone and providing signals as to when additional irrigation is needed. These sensors can be added at planting if placed close to the new plant and its root zone. Sensors added later should be placed within the expanded area of the root zone. On farms where beds are made of pine bark only, soil moisture sensors can end up in air pockets, which limit their accuracy.

First Year Expectations

Depending on when the new plants go in the ground, most of the first year will be about vegetative canopy growth, as the plant expands in size and begins to develop plant architecture. In the past, the recommendation was to remove flower buds and fruit during the first year of the plant's growth. However, field trials in research plots and reports from growers indicate that newer southern highbush cultivars from the UF/IFAS blueberry breeding program can produce a marketable crop within 12 months of planting. In these situations, growers may choose to allow the plant to fruit and obtain a harvest in the first year to begin recovering some of the initial planting costs.

Summary

The preceding discussion addresses a number of important steps and practices for establishing new plantings of southern highbush blueberries in Florida. Implementing these practices should help new plantings have a successful start.

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[2] Douglas A. Phillips, Extension specialist, blueberry Extension coordinator, Department of Horticultural Sciences, UF/IFAS Gulf Coast Research and Education Center, Wimauma, FL; Jeffrey G. Williamson, professor, UF/IFAS Department of Horticultural Sciences, Gainesville, FL; Gerardo H. Nunez, associate professor, berry crop physiology and nutrition, UF/IFAS Department of Horticultural Sciences, Gainesville, FL; Philip F. Harmon, professor and Extension plant pathologist, UF/IFAS Department of Plant Pathology, Gainesville, FL; Peter J. Dittmar, associate professor, UF/IFAS Department of Horticultural Sciences, Gainesville, FL; Diego F. Cabezas, assistant breeder, Department of Horticultural Sciences, UF/IFAS Blueberry Breeding Program, Gainesville, FL; UF/IFAS Extension, Gainesville, FL 32611.