

Blueberry Culture in Florida

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Blueberry classification

- Family – *Ericaceae*
- Genus – *Vaccinium*, very diverse with hundreds of species.
- Ornamentals in *Ericaceae* –
 - Rhododendrons and azaleas
 - Mountain laurel
 - Heather
 - Heath
 - Leatherleaf

Blueberry classification

- Fruiting species in Ericacea
 - Blueberry
 - Cranberry
 - Huckleberry – black, box, dwarf, tall.
 - Lignonberry – small cranberry like fruit in Northern Europe.
 - Bilberry – native shrub of northern Europe and Pacific Northwest.

Blueberry classification

- Important types of blueberry
 - Highbush – *Vaccinium corymbosum*
 - Rabbieye – *V. virgatum* (*V. ashei*)
 - Lowbush – *V. angustifolium* and *V. myrtiloides*
 - Southern highbush – *V. corymbosum* x *V. darrowi* x *V. virgatum*
 - Half-high highbush – *V. corymbosum* x *V. angustifolium*

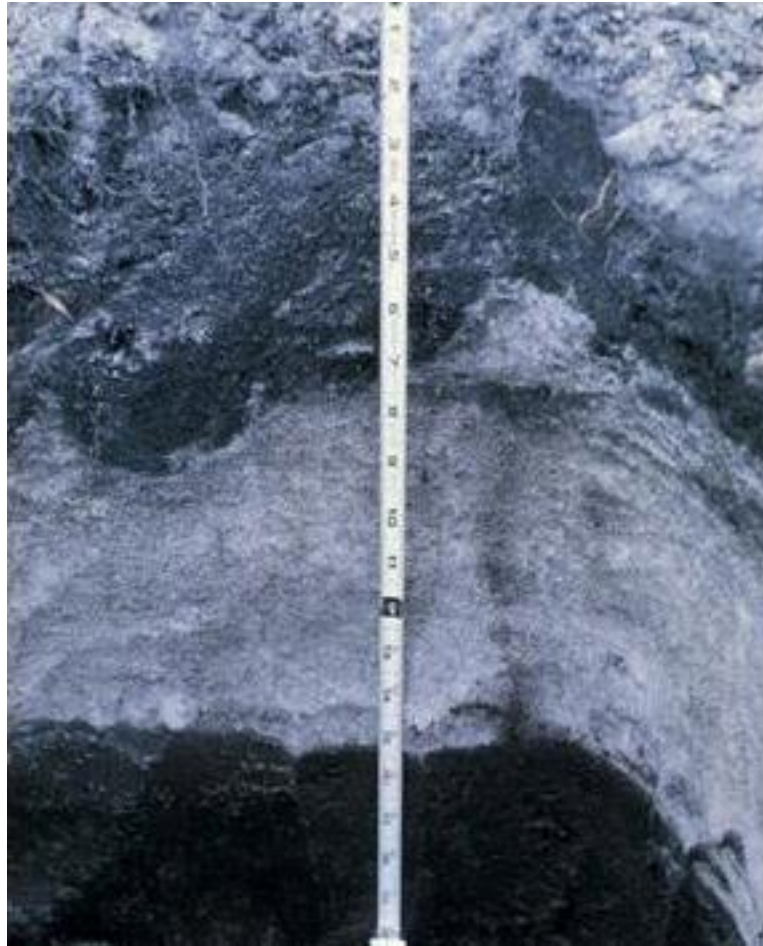
History and non-food uses

- Probably cultivated for many centuries by native American Indians.
- Domesticated in the early 1900's.
- Florida is one of the first locations for commercial cultivation.

General Requirements

- Acid soils – pH 4.5 to 5.5.
- Soil organic matter content
- Well-drained soils.
- Spodosols, or highly OM amended sandy soils.
- Frequent, light, fertilizations
- Frequent irrigations during dry periods.

Spodosol



Adaptation of mineral soils (sands) for blueberry production

- Ideal blueberry soils are coarse, acidic, and high in organic matter (OM).
- Few soils in Florida are naturally suited for blueberry production.
- Good blueberry soils in Florida tend to be in frost pockets, or are poorly drained (must be modified to provide good drainage).
- Sandy soils low in OM can be amended with pine bark or peat moss.

Florida sands can be modified to grow blueberries



New planting on amended sandy soil in Polk County, FL



Experience has shown that pine bark works well as a soil amendment.



Key characteristics of pine bark

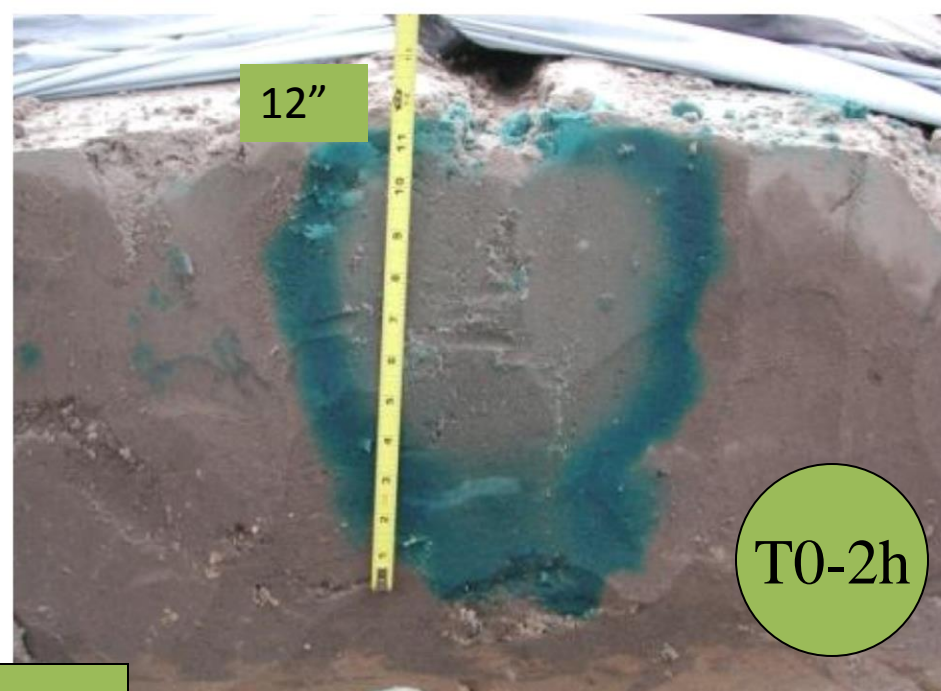
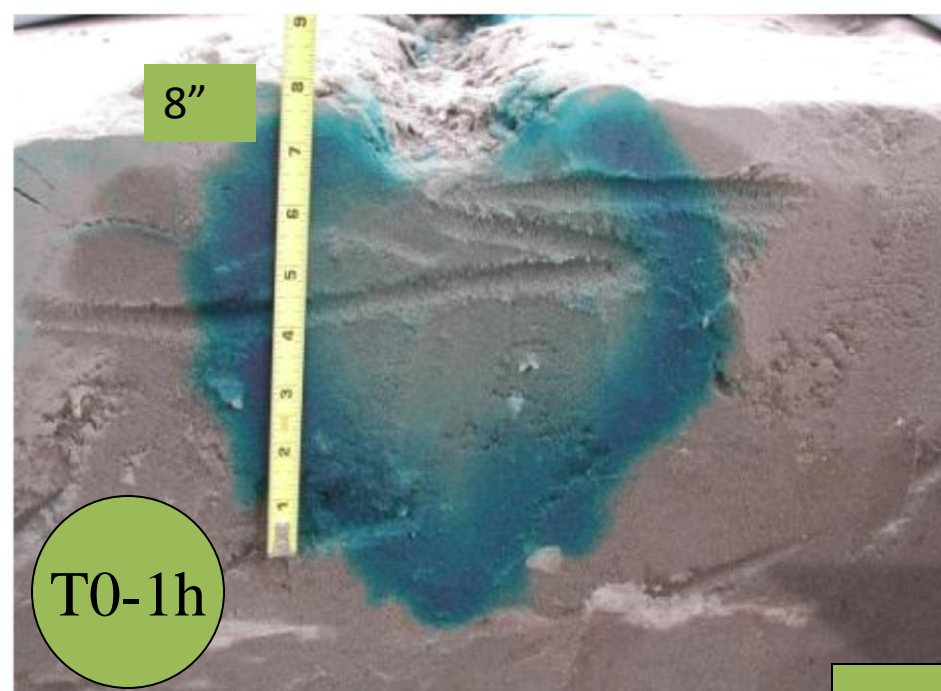
- Low pH
- Relatively low C/N ratio
- Well aerated
- Moderately low cation, and very low anion exchange capacities
- Moderate water holding capacity
- Properties largely depend on level of decomposition
- Can be expensive

Blueberry roots are shallow in pine bark culture

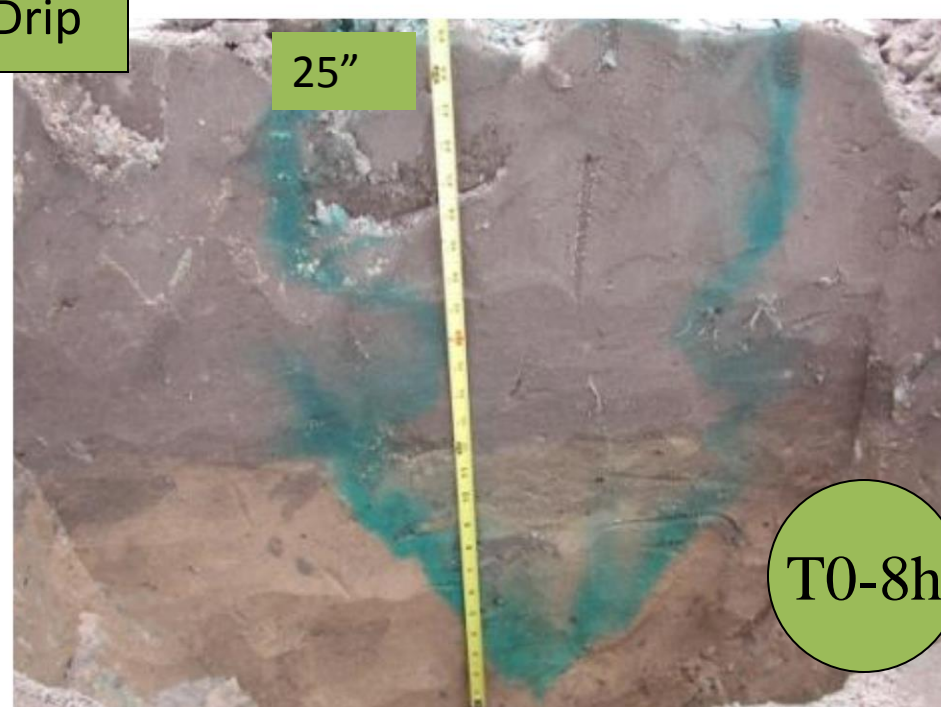
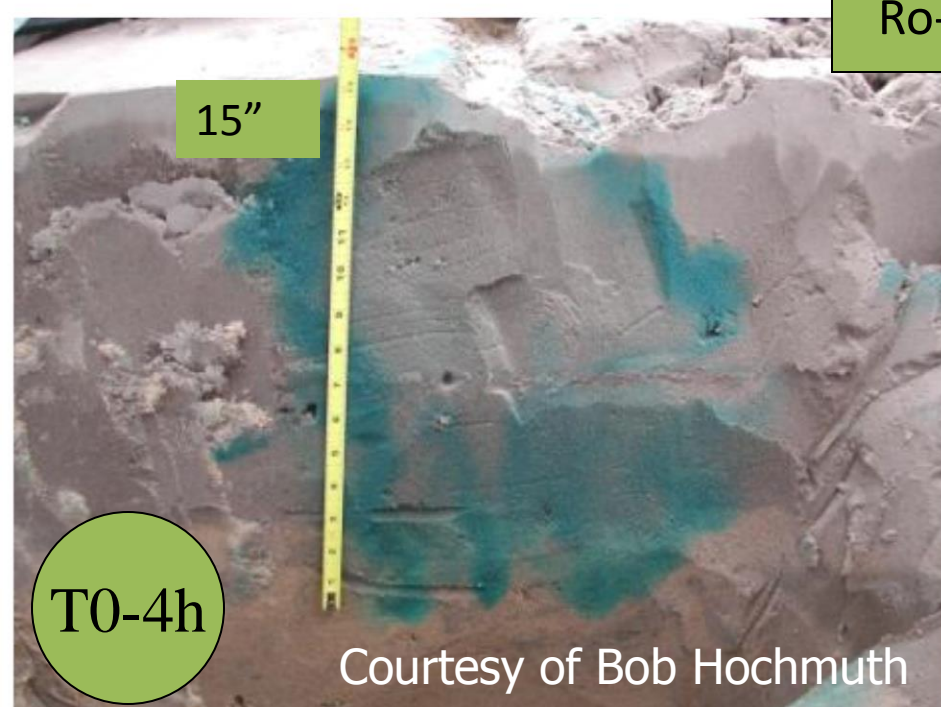




The majority of roots are located in the top 5 to 6 inches of soil profile.

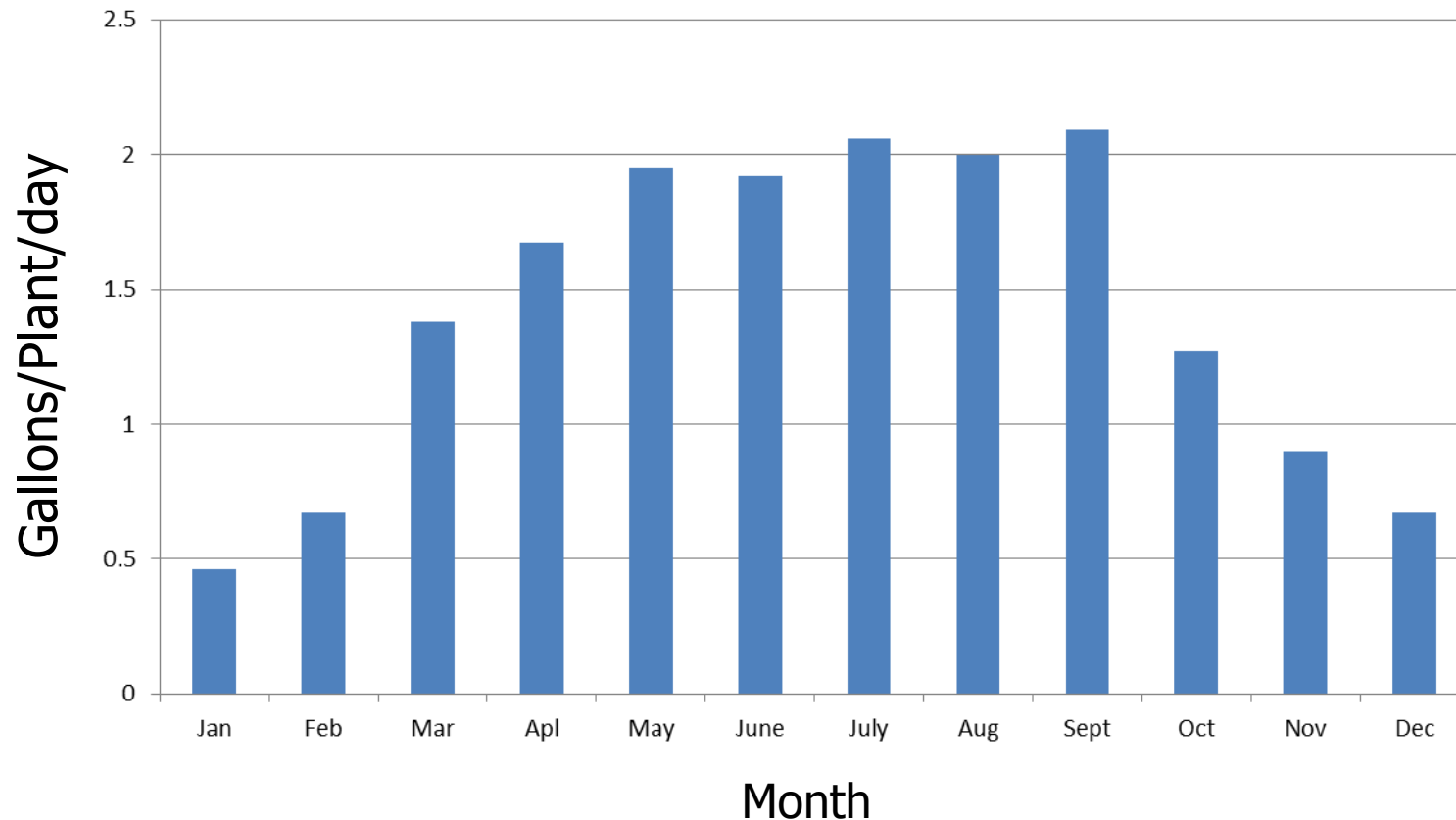


Ro-Drip



Courtesy of Bob Hochmuth

Daily plant water use of mature 'Emerald' blueberry plants by month averaged across years.



Monthly means of daily water use of mature 'Emerald' southern highbush blueberry plants averaged across treatments and years from April, 2010 to Sept. 2012.

Southern highbush blueberry

Irrigation

- Southern highbush blueberry plants are shallow-rooted and drought susceptible. 80+% of roots were in the top 7 inches of soil.
- Water demands increased rapidly in the spring (March) and peak water demands occurred during the late stages of fruit development and throughout the summer (May through September).
- Monthly averages for daily plant water use of mature 'Emerald' blueberry plants ranged from about ~ 0.5 gal/day (winter) to ~ 2.0 gal/day (mid to late summer).
- Frequent, light, irrigations are needed during the growing season.
- Bark, applied as either a bed or incorporated into the soil increases water holding capacity of sandy soils and reduces drought stress.

Fertilization

- Blueberries prefer frequent light applications of a balanced fertilizer with ammonium or urea as the N source (not nitrate).
- Often 12-4-8, or similar formulation.
- Controlled-release and slow-release fertilizers also work well. (i.e. sulfur-coated urea)
- Do not concentrate fertilizer near plant base.

'Sharpblue' SHB



NH_4 From Rebecca Darnell, Horticultural Sciences Dept., IFAS, UF NO_3

Rabbiteye fertilization

- Young plants with limited root systems benefit from frequent, light fertilizations.
- Do not apply fertilizer to the planting hole.
- First application is after rainfall or overhead irrigation has settled soil.
- Example - fertilize at budbreak, May, July, and early September.
- Rate = approx. 1 ounce of blended fertilizer per plant.
- Apply fertilizer to 24 inch diameter circle. Do not concentrate fertilizer at base of plant.
- Gradually increase fertilizer rates in following years as plant size increases.
- Mature plants respond well to 4 fertilizer applications per year (rate = approx. 5 ounce/plant).
- Use caution not to over-fertilize blueberry plants.

- For more detailed information on blueberry fertilization practices

<http://smallfruits.org/Blueberries/production/blueberryfert.pdf>

SHB fertilization

- Generally, SHB blueberries require more annual fertilizer than rabbiteye.
- However, SHB plants have very shallow root systems and are very salt-sensitive plants.
- Do not apply fertilizer to the planting hole.
- First application after planting is after rainfall or overhead irrigation has settled soil.
- SHB respond well to frequent, light fertilizer applications.
- More detailed information on SHB fertilizer practices.

<http://smallfruits.org/Blueberries/production/blueberryfert.pdf>

<http://extension.uga.edu/publications/detail.cfm?number=B1291>

Pruning for young plant establishment

- Blueberries are usually cut back to about 10 to 15 inches at planting to remove flower buds and adjust the root:shoot ratio.



Young Plant Establishment

- Fruit on young plants can inhibit leaf and shoot development and predispose plants to blueberry stem blight.
- Remove all flowers and/or fruit the first year!



Two types of pruning are done on mature blueberry plants in Florida

- Summer hedging and topping
- Dormant pruning
 - Cane renewal and detailed hand-pruning

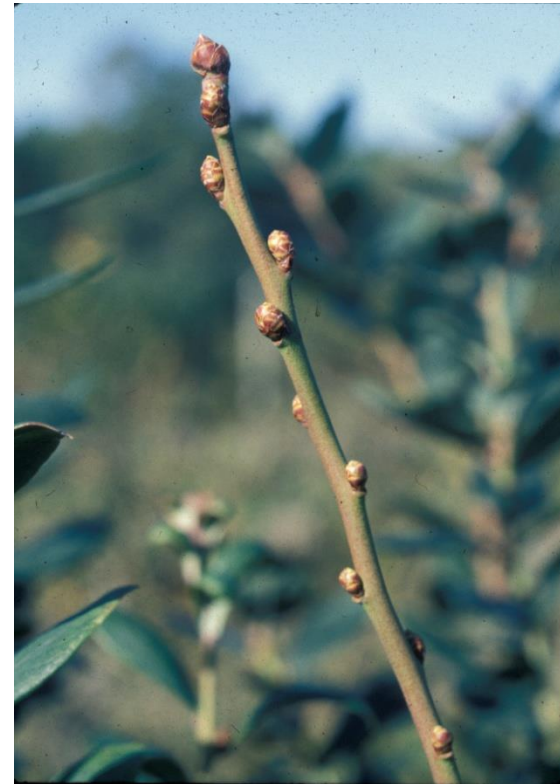
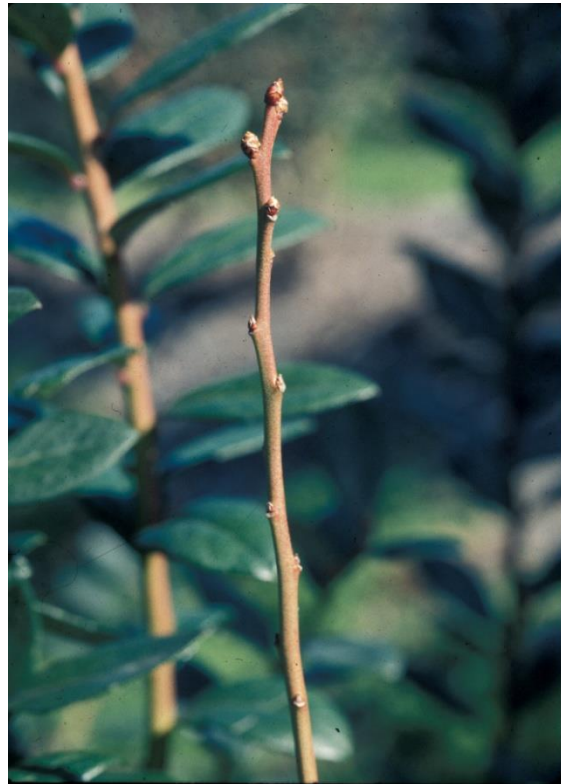
Typical appearance of non-pruned blueberry plant during fall



Typical appearance of pruned blueberry plant during fall



Flower bud development on Misty defoliated in September (left) and December (right)



Summer hedging and topping



Dormant pruning

Example of no selective cane renewal pruning



Numerous new canes resulting from cane renewal pruning



Cane renewal pruning to thin out canopy and stimulate new cane development

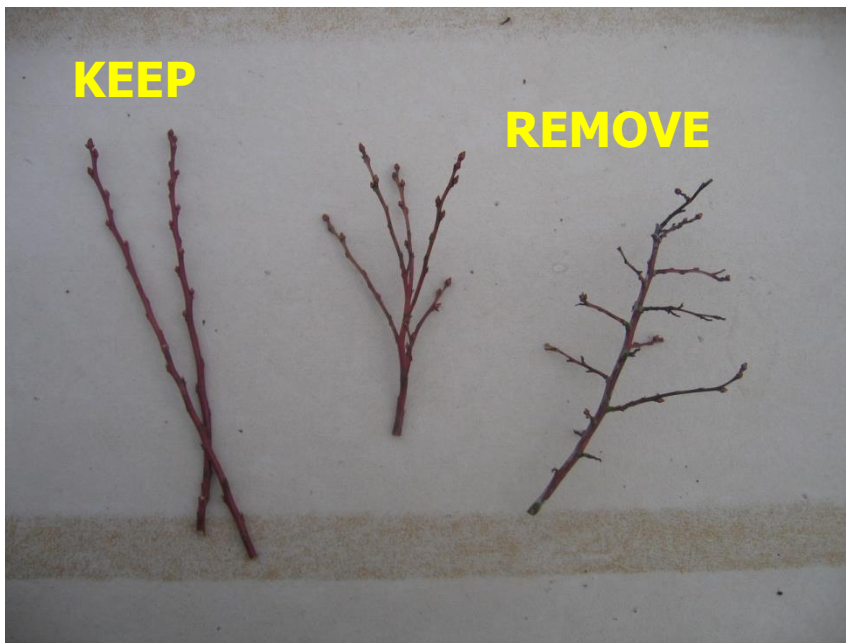


Cane renewal pruning



No pruning

During winter pruning remove thin, twiggy “matchstick” wood during routine winter pruning



Courtesy of Bill Cline, N.C. State University

Healthy vs “matchstick” fruiting wood



Courtesy of Bill Cline, N.C. State University

Selective hand pruning during the dormant season. Highbush blueberry, before (left) and after pruning to a narrow base



Courtesy of Bill Cline, N.C. State University

Blueberry Varieties

- Rabbiteye varieties in Florida
 - Early - Climax, Beckyblue, Alapaha, Vernon
 - Mid-season - Brightwell, Powderblue, Tifblue
- Southern highbush (SHB)
 - Numerous, discussed later.

Rabbiteye vs. Southern Highbush (SHB)

- Rabbiteyes have greater chilling requirements than SHB.
- Rabbiteyes bloom later and ripen later than SHB.
- Rabbiteyes are more vigorous, larger and will tolerate drought and poor soils better and are easier to grow than SHB.
- SHB ripen very early and have slightly better fruit quality.
- SHB bloom earlier and are more likely to be damaged by freezes.
- SHB are grown commercially more than rabbiteye in Florida – early markets = higher prices for berries and more profits for growers.

Blueberry Varieties

- Rabbiteye varieties are best suited in Ocala and points north into Georgia.
- Southern highbush varieties are best suited for Gainesville and points south to about Sebring.



Blueberry Pollination

- All blueberry varieties benefit from cross-pollination.
- Bumblebees are an excellent pollinator.
- Honey bees are commonly used in commercial fields.



BEEES

NO BEES



Poor crosspollination can result in poor fruit set, small, late-ripening fruit.

Southern highbush cultivars

- Early flowering (susceptible to late freezes)
- Early fruit ripening
- Susceptible to drought
- Requires soil OM
- Generally low chilling requirements

'Snowchaser' (USPP # 19,503)



- Low chill, early bloom (mid January in Gainesville)
- Very early ripening, ≈ 20 days before 'Star'
- Excellent flavor, medium sized fruit
- Susceptible to stem blight – field survival is marginal in FL

'Springhigh' (USPP # 16,404)



- Early bloom, ≈ 1.5 weeks before 'Star'
- Early ripening, ≈ 9 days before 'Star'
- Vigorous, upright growth habit, excellent field survival
- Darker berry color, lower firmness
- Harvest frequently or packing and postharvest problems

'Jewel' (USPP # 11,807)



- Low chill (Gainesville-south)
- Blooms 1 week before 'Star'
- Ripens with 'Star'
- Excellent fruit quality, but berries are tart until fully ripe
- High yield potential
- Often paired with 'Emerald'
- Very susceptible to leaf rust

'Emerald' (USPP # 12,165)



- Low chill requirement
- High yield potential
- Vigorous, spreading bush
- Large fruit size, good quality, tight clusters
- Blooms 1 week earlier than 'Star'
- Long harvest period
- Often planted with 'Jewel'

Windsor

Patented.

Blooms about 3
days after
Sharpblue.

Harvest, April 18 –
May 15.

Large fruit.

Fruit tend to have
wet scars. May not
store well.



'Farthing' (USPP # 19,341)



- Vigorous, compact growth habit, good survival
- Blooms later than 'Emerald'
- High yield potential, long picking season
- Very firm fruit, potential for mechanical harvest
- Color?
- Evergreen potential.
- Algal stem blotch has become a problem.

Rabbiteye cultivars

- Rabbiteyes have greater chilling requirements than most SHB.
- Rabbiteyes generally bloom later and ripen later than SHB.
- Rabbiteyes are more vigorous, larger plants, and will tolerate drought better than SHB.
- Cross-pollination very critical for rabbiteye.

'Climax' rabbiteye

- 400 – 450 chill units.
- Early for a rabbiteye (late May through mid-June).
- Reliable producer.
- more susceptible to freezes than mid to late season rabbiteyes.



'Brightwell' rabbiteye

- 350 – 400 chill units.
- Ripens early June through early July.
- Fruit are firm with good color, firmness and size.
- May over-crop some years.
- Plant is productive, vigorous and upright.



'Powderblue' rabbiteye

- 550 – 650 chill units.
- Late season variety.
- Excellent quality fruit with light blue color.
- Upright , productive vigorous plant.



'Alapaha' rabbityeye

- Released in 2001 (UGA)
- 450 -500 chill units.
- Flowers 7-10 days after Climax.
- Ripens with Climax.
- + Crop.
- Medium-sized fruit.
- Good post-harvest traits.



'Vernon' rabbiteye

- Released in 2004 by UGA.
- 450 chill units.
- Flowers after 'Climax' most years.
- Ripens early, several days ahead of 'Climax'
- Berries have excellent firmness and good size.
- Good postharvest char.
- Possible replacement for 'Climax'



Blueberry IPM



Thrips



Gall midge

Thrips damage to flowers and fruit

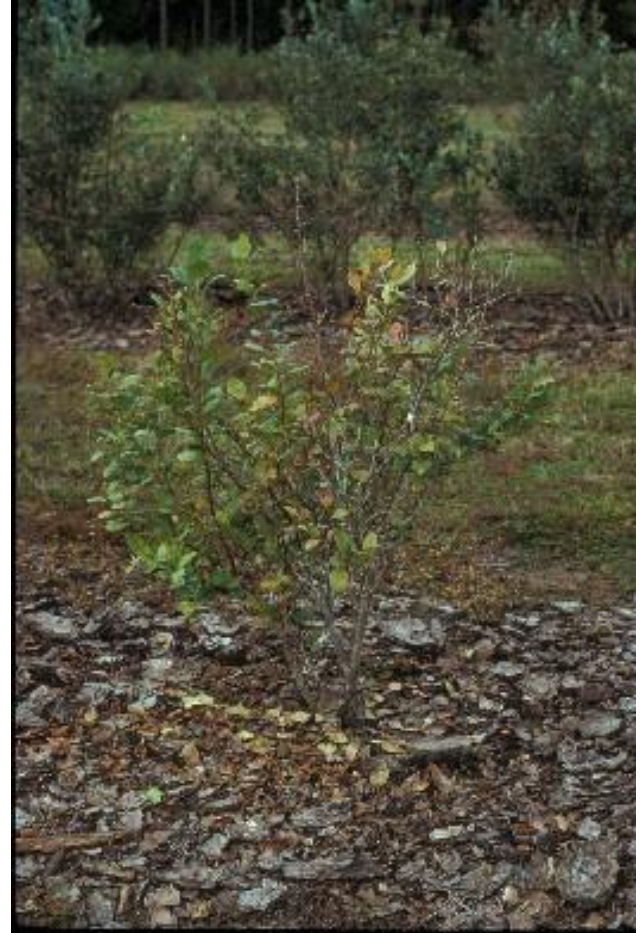


Blueberry gall midge damage – once thought to be freeze damage.



Blueberry Diseases

- Phytophthora root rot.
 - Soil drainage
 - Cultivar
 - Chemical control



Blueberry stem blight from over-fruiting

- Note heavy crop load with almost no leaves
 - Symptom of under chilling
 - Over fruiting stress will result in death from stem blight.
- Blueberry stem blight
 - Minimize plant stress
 - Cultivar selection
 - Cultural practices to reduce stress
 - Use Dormex to increase leafing
 - Winter prune to adjust crop load.



Phyllosticta leaf spot



Gloeosporium leaf spot aka anthracnose

Septoria leaf spot



Courtesy of Phil Harmon



Rust leaf spot

Courtesy of Phil Harman

Botrytis flower blight



Most common during wet, cool bloom periods, or following freeze damage to flowers.

algal stem canker

Cephaleuros virescens

More common in central and southwest Florida than in north Florida.



Major Considerations

- Acidic soil pH (4.5 – 5.5)
- Mulch and soil OM
- Soil drainage
- Irrigation and fertilization – light and frequent
- Cross pollination
- Protect from late frosts and freezes
- Protect from birds and other wildlife