



Growing Blueberries in North Carolina

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TYPES OF BLUEBERRIES – There are dozens of wild species, including thirteen native to North Carolina! Only a few are harvested commercially:

- Lowbush – Maine and Canada
- Half-high – Minnesota
- Highbush –Northern states
- Southern Highbush – Hybrid for warm climates
- Rabbiteye – Native to the southeastern US. Easiest to grow

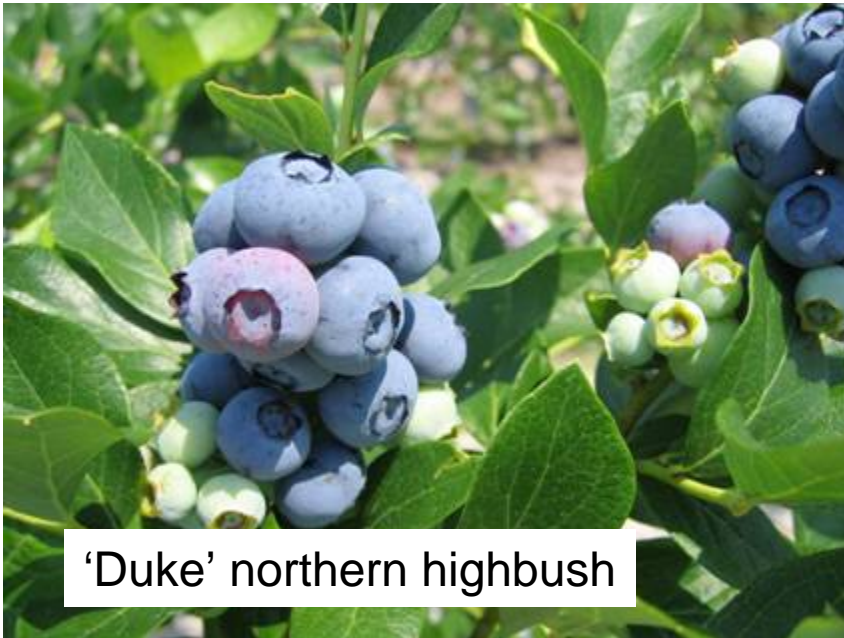


Wild deerberry in New Hanover Co.

Lowbush blueberry-- Native stands that occur mostly in Maine & Canada. This type is not grown in NC.



HIGHBUSH AND SOUTHERN HIGHBUSH BLUEBERRY – Rarely grown in home gardens, these cultivars are grown commercially in Bladen and surrounding counties for the traditional NC fresh market “window” from mid-May to late June. In Western NC, northern highbush cultivars are the only option at elevations above 2500 ft (<10°F).



'Duke' northern highbush



'Legacy' southern highbush

RABBITEYE BLUEBERRY – This is the blueberry species commonly grown by home gardeners. Late ripening and more vigorous than highbush. With mulch and irrigation, will grow on piedmont soils and in mtns to around 2500 ft (no higher, to avoid winter temps <10 °F). 'Ira' (shown) ripens in July/August.



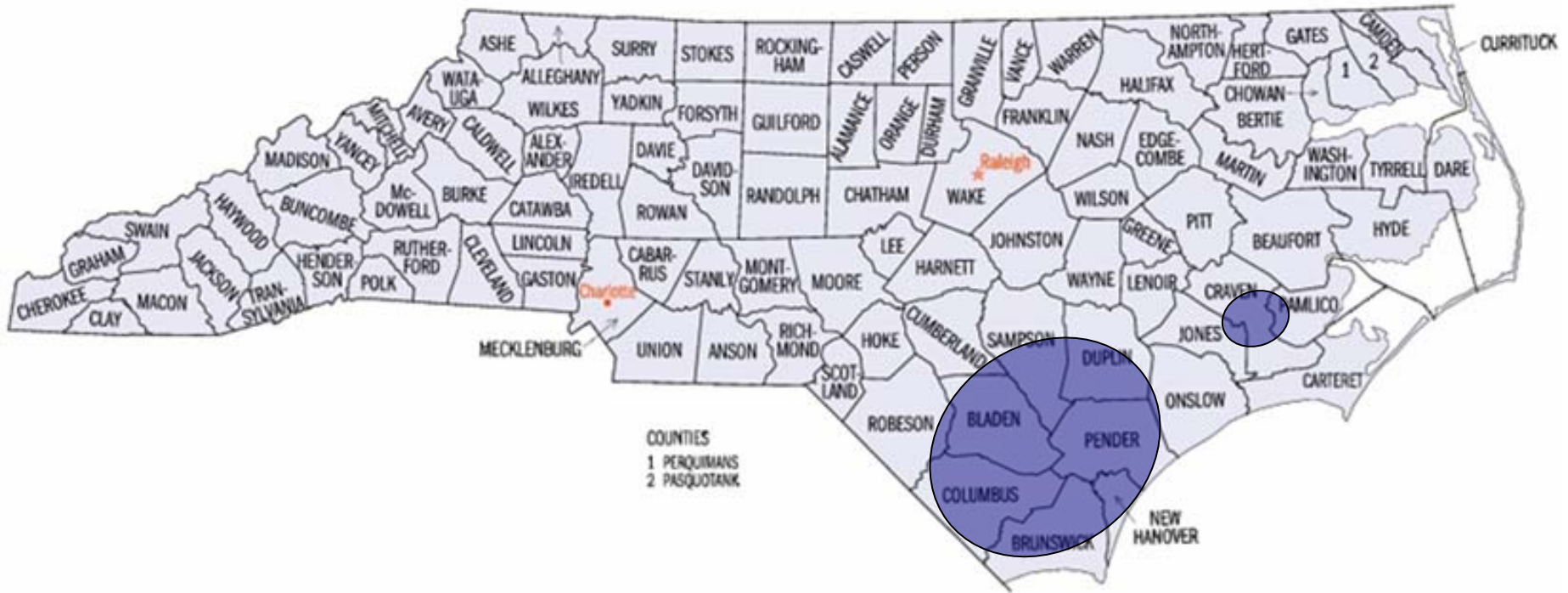
Blueberry harvest timing by cultivar and type in southeastern NC (selected cultivars)

Cultivar	May			June				July				August			
O'Neal			■	■	■	■									
Reveille				■	■	■	■								
Duke				■	■	■									
Legacy					■	■	■	■							
Premier							■	■	■	■					
Columbus									■	■	■	■			
Tifblue, Ira										■	■	■	■		
Powderblue											■	■	■	■	■

Highbush/Southern HB = 

Rabbiteye = 

Home garden and pick-your-own plantings exist throughout the state, but our main commercial area is SE NC (**blue area**) with annual farm gate value of \$48.7M (2006). Limited to unique, low pH sand-based organic soils (Leon, Lynn Haven series), or organic muck soils (i.e., Carolina Bays).



The best native NC blueberry soils are organic sands (>3% organic matter) with a water table within 12–24" of the surface; fields are bedded to improve root aeration.



WHAT MAKES A GOOD BLUEBERRY SITE? –



Ashe County, WNC



Bladen County, SENC

Good drainage, low pH, organic matter and water

■ LOW pH

- Highbush blueberry -- 4.0 to 5.0
- Rabbiteye blueberry – 4.5 to 5.3

■ Drainage

- Surface drainage (bedding, ditching)
- Internal drainage (mulch or bark amendments)

■ Water

- Overhead (allows frost protection)
- Drip or micro-sprinkler (conserves water)
- Natural source such as a spring or a perched water table

■ Organic matter (natural or added)

- Highbush blueberry -- 2-3% or greater
- Rabbiteye blueberry – < 2%

Raised beds are commonly used, along with drip irrigation, mulch and soil acidification (S).



Bark mulch added to increase organic matter, lower pH and improve drainage (note raised beds)





Basic steps to establishing a new blueberry planting:

1. Select a well drained site in full sun with an open, porous soil – avoid clay soils.
2. Acidify the soil as needed for a pH of 4.0 to 5.0.
3. Have your soil tested, and adjust fertility levels (N PK) according to NCDA soil test results.
4. Purchase the correct species and cultivar(s) for your soil type and location.
5. If needed, add acidifying organic matter (peat moss, pine bark, or aged sawdust) to the soil.
6. Mix and mound the amended soil to form raised beds or raised rows before planting.

Basics of establishment (continued):

7. Plant dormant bushes in raised beds or rows, usually in late winter (Feb - Mar).
8. Prune at planting to keep only 3-4 upright shoots, and to reduce height by one-half to two-thirds.
9. At planting, remove all flower buds to prevent fruit production in the first year.
10. Provide water - irrigation is essential for establishment and survival.
11. Maintain a weed and grass free zone around each plant.
12. Apply a 3-4 inch layer of surface mulch (pine bark, pine needles, wood chips, or woven plastic mulch).

Culture and Management

■ Pollination

- An insect must visit each flower or a berry will not form
- For cross-pollination, plant more than one cultivar

■ Pruning

- Annual task, usually in dormant season
- Removal of old or weak canes; shaping & thinning

■ Irrigation

- Drought relief (drip, micro-sprinklers, overhead)
- Freeze protection (overhead only)

■ Fertilizer/Organic matter

- Fertilizer use is based on soil testing
- Must maintain low pH for the life of the planting
- Pine bark, aged sawdust, wood chips if organic matter is low

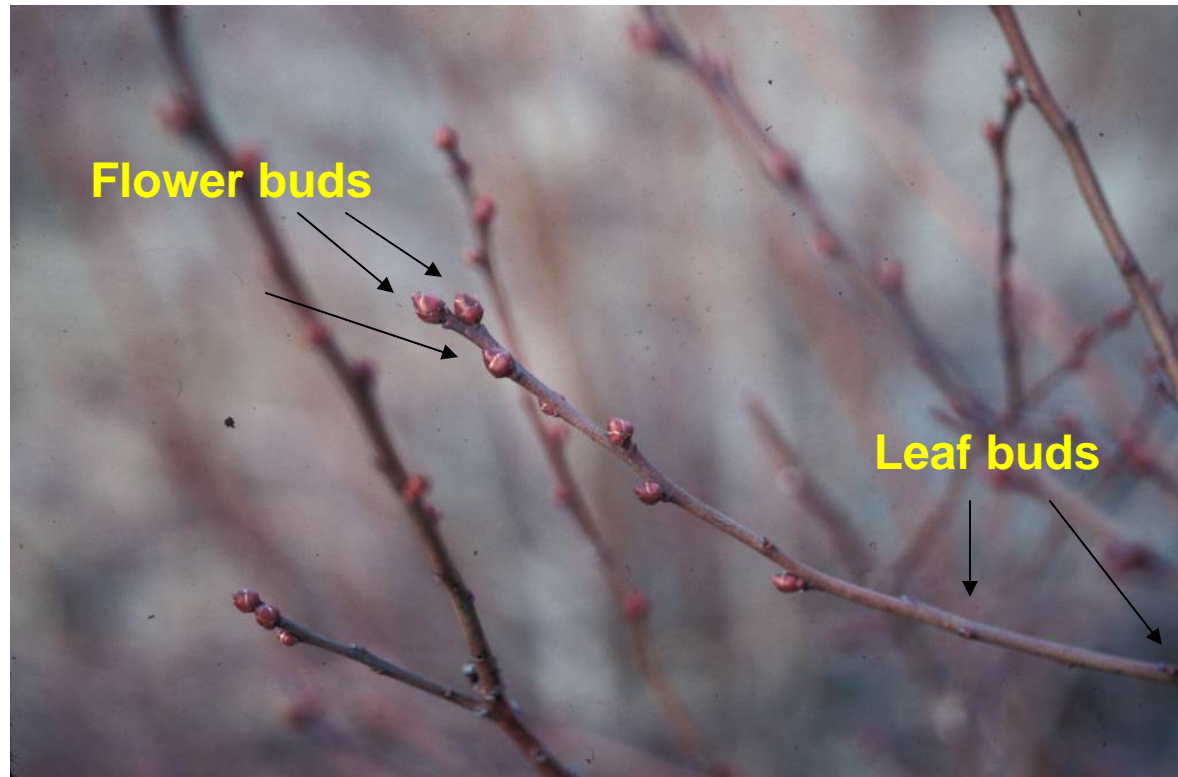
Blueberry flowers must be visited by a pollinating insect in order to form a berry. The Southeastern Blueberry Bee (shown) is a very effective wild, native pollinator.



A well maintained blueberry field has a reddish appearance in winter, due to the large quantity of one year old growth - young, healthy fruit bearing wood.



Flower buds that will produce the next crop are formed in late summer and early fall on the current season's growth. In winter, flower buds are easily visible on fruiting twigs, and can be counted to estimate crop potential for the coming year (expect 3-7 berries per bud).



PRUNING YOUNG BUSHES

- Always prune off flower buds at planting
- Balance top (shoot) with bottom (root) – usually take off 1/2 to 2/3 of the top at planting
- In year two, select 3-4 large canes, prune heavily, but may leave some flower buds if bush grew vigorously in year one

PRUNING MATURE BUSHES

- Remove low shoots and outlying canes
- Remove crossovers and old weak canes
- Make 1-3 large, shaping cuts to open the center of the bush
- Head back any overly vigorous shoots
- Thin shoots to reduce flower buds if needed

RENEWAL PRUNING

- For bushes over 10 yrs old
- Make severe cuts that reduce bush height and remove most large canes
- Blueberries CAN be cut down with a chainsaw or bush-hog and allowed to re-grow, but this eliminates the crop that year and reduces crop for 2-3 years

Neglected bushes may have old canes covered in lichens. Old bushes can be brought back into production by pruning to encourage new growth. Pruning a few selected canes every year is the best strategy.



This grower used a rigid plastic tubing for irrigation and inserted a drip emitter near each plant.



Fertilizer and pH needs

- Sulfur can be used to lower pH (1 lb/100 sq ft on sandy soils to lower 1 pH unit).
- Blueberries do not need much fertilizer (50-60 lb N/Acre/Yr) apply according to soil test results.
- For young bushes, apply SMALL amounts every 4-6 wks, rather than all at once.
- Lime is generally NOT used.

Pests

- **Diseases** – Mostly fungal pathogens causing death of stems and twigs, fruit rots, leaf spots.
- **Insects** – Include fruit worms, plum curculio, blueberry maggotfly, Japanese beetle.
- **Weeds** – Initially annuals and grasses, followed by woody perennials.
- **Vertebrates** – Birds can eat lots of fruit in small plantings; Voles may girdle stems.

Propagation and Nursery Stock

Propagation

- Hardwood cuttings under mist (Dormant wood, collected in winter and stuck in rooting beds in April)
- Softwood cuttings under mist (Leafy summer cuttings)
- Tissue culture (from commercial nursery sources)
- Basal shoot transplants (“suckers” from existing bushes)

Nursery Stock

- Bare root (liners or 2 3 yr old plants)
- Potted plants (large pots or plug trays)

Long, one year old hardwood 'whips' (shown) are collected in winter and cut into 5" to 6" sticks. The thin terminal portion of each shoot (with flower buds) is not used.



Hardwood cuttings collected in winter are bagged and packed in moist sawdust, then cold stored until beds are ready to be stuck in April. Drainage is critical: Beds are built atop 18" of sand, and are filled with pine bark.



Hardwood cuttings (mid May) produce leaves before they produce roots, and must be misted at regular intervals until roots form and a second flush of growth occurs.



By late July, hardwood cuttings have rooted and produced a second flush of growth. Overhead misting is gradually reduced as roots develop.



Softwood cuttings stuck in August under intermittent mist (5 10sec every 5 min) usually root in 6 8weeks. The rooting medium must be well drained, or cuttings will quickly rot.



Harvest Timing and Handling

- Highbush and southern highbush blueberries – pick every 5-7 days or less
- Rabbiteye blueberries – pick every 10 days to allow fruit to fully ripen
- Pick all ripe fruit on the bush!
- Do not handle fruit when wet (rain, dew)
- Once harvested, shelf life is extended with forced-air cooling

Hand harvesting is the largest annual expense. Small, shallow buckets must be used to avoid crushing berries. The industry standard is a one-gallon bucket. Pickers tie the bucket to their belt to leave both hands free for harvesting fruit.



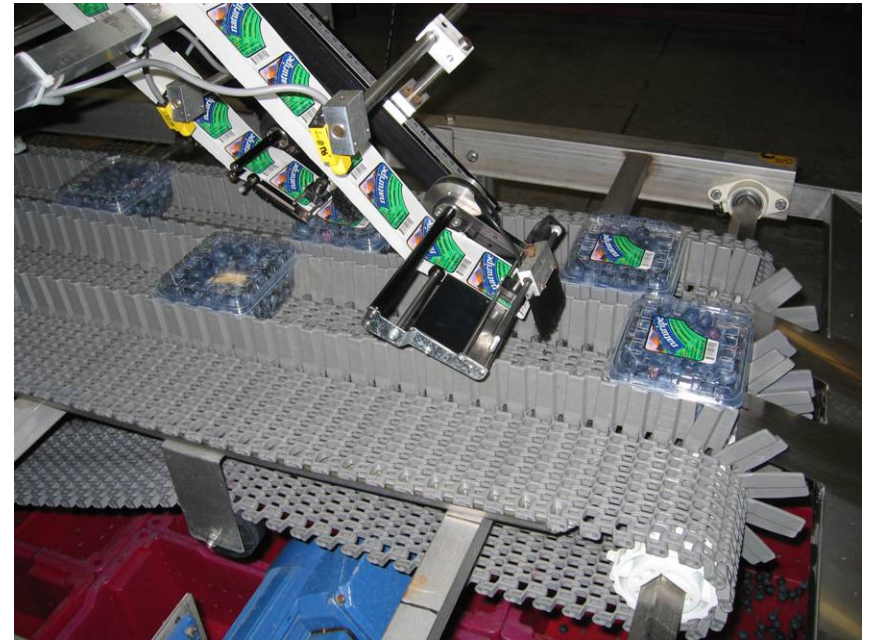
BEI Model H harvester is an affordable harvest aid for small farms; power unit (shown) has been discontinued, but the catcher frames are still available.



Paper-pulp or cardboard containers are often still used for local or farm market sales; however, nearly all commercial shippers require the use of clear plastic 'clamshell'-type containers. Often this requires specialized equipment to fill and close the containers.



Commercial growers use automated packing lines for dry-sorting and packaging fresh blueberries in plastic clamshell containers



Some suggested cultivars for NC (listed from early to late ripening)

- HIGHBUSH for WNC (>2,500 ft or <10°F) – Duke, Draper*, Bluecrop, Echota, Blueray, Berkeley, Jersey, Patriot, Liberty*, Elliot, Aurora*
- RABBITEYE statewide (Most sites <2500 ft, winter temp >10°F) – Robeson*, Climax, Premier, Columbus*, Ira, Tifblue, Powderblue, Onslow
- HIGHBUSH AND SOUTHERN Highbush for the coastal plain and sandy, upland piedmont sites with mulch and irrigation -- O'Neal, Star, Duke, New Hanover*, Legacy

*New cultivars – trial basis only

For Further Information

- Contact Your County Cooperative Extension Service Office
- Horticulture Information Leaflets
www.ces.ncsu.edu/depts/hort/hil/
- Small fruit information for the southeastern US www.smallfruits.org
- NCDA&CS Marketing Division – NC Farm Fresh
<http://www.ncfarmfresh.com>
- Blueberries: Organic Production. National Sustainable Agriculture Information Service – <http://attra.ncat.org/attra-pub/PDF/blueberry.pdf>