



# Blueberry Production and Pruning in North Carolina

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# Leading states for Cultivated Blueberries, 2009

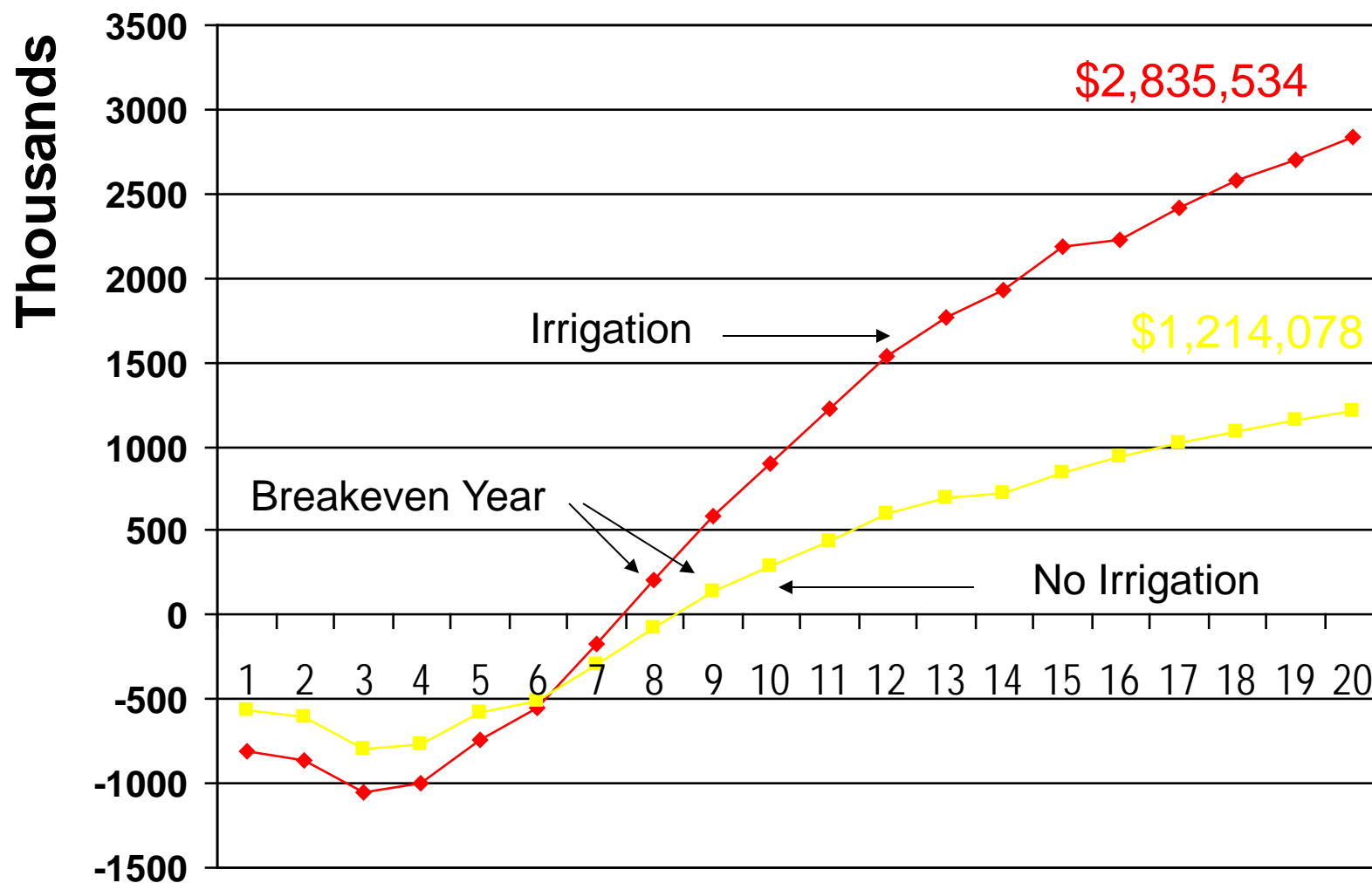
## Ranked by farm gate value (USDA/NASS)

STATE	ACRES	FRESH LBS	TOTAL LBS	% FRESH	\$/LB	TOTAL VALUE (\$)
Michigan	18,500	49,000,000	99,000,000	49%	1.03	101,850,000
Florida	3,200	13,500,000	13,500,000	100%	5.40	72,900,000
California	2,700	23,000,000	23,000,000	100%	2.93	67,390,000
New Jersey	7,700	45,000,000	53,000,000	85%	1.23	65,260,000
Georgia	10,500	23,000,000	43,000,000	53%	1.29	55,600,000
North Carolina	5,500	25,500,000	32,700,000	78%	1.57	51,330,000
Oregon	5,700	23,000,000	48,000,000	48%	.78	37,280,000
Washington	4,500	9,500,000	36,000,000	26%	.78	27,925,000
Other States	4,870	10,950,000	13,100,000	--	1.68	21,984,000
UNITED STATES	63,170	222,450,000	361,300,000	62%	1.39	501,519,000

2009 Maine wild (lowbush) blueberries, 88 million lbs, \$0.36 per lb, farm gate \$32,025,000

# Accumulated Cash Flows (Safley, Cline, Mainland, 2005)

100 acre budget for good blueberry soil, southeastern NC



**Spotted wing drosophila (SWD)** is a new invasive fruit fly that attacks blueberries and other fruit crops. This insect now occurs on most fruit-producing areas in the US, and is likely to affect both commercial and home plantings. For more information, see: <http://ncsmallfruitsipm.blogspot.com/2013/01/spotted-wing-drosophila-biology-and.html>



Figure 1. Male SWD.



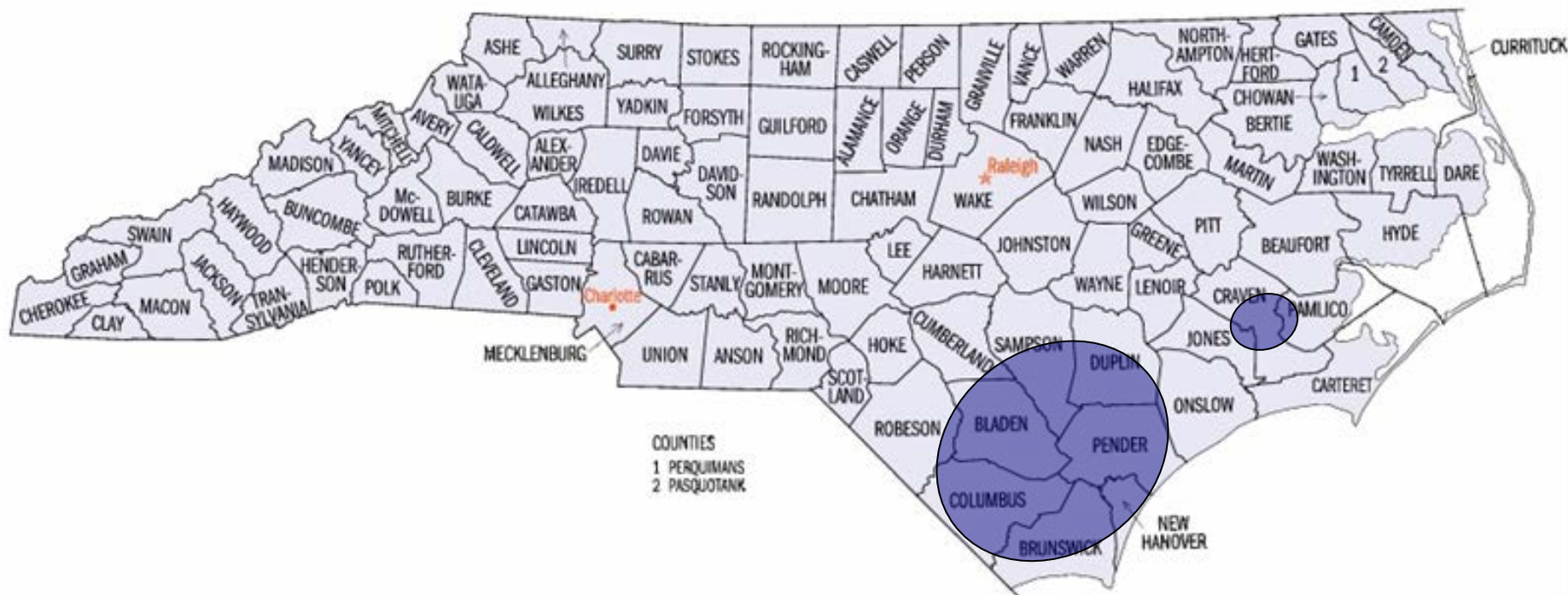
Figure 2. Female SWD.

[http://www.aphis.usda.gov/publications/plant\\_health/content/printable\\_version/Drosophila\\_Suzukii.pdf](http://www.aphis.usda.gov/publications/plant_health/content/printable_version/Drosophila_Suzukii.pdf)



## BLUEBERRIES IN NORTH CAROLINA

Home garden and pick-your-own plantings exist throughout the state, but our main commercial crop is harvested in southeastern NC (**blue area**) with an annual farm gate value of \$71M (2012). Limited to unique, low pH sand-based organic soils (Leon, Lynn Haven series), or organic muck soils (i.e., Carolina Bays).



**HIGHBUSH AND SOUTHERN Highbush BLUEBERRY** – These cultivars are the basis for fresh market “windows” in April (FL) May (GA) and from mid-May to late June (NC). Some machine harvest, but mostly picked by hand. Highbush also grown at higher elevations in mtns of GA, NC, SC, VA, TN, where suitable soils exist.





**RABBITEYE BLUEBERRY** – Later ripening than highbush or SHB. With mulch and irrigation, will grow on piedmont soils and in mtns to 2500 ft. 'Ira' (shown) ripens in July/August. These cultivars are the basis of most pick-your-own and home plantings in the southeast.



# 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 =





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.





# 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-P-K) 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).







Blueberries on volcanic soils in Chile. Raised beds, drip irrigation, mulch amendments, fertility and pH adjustments through the drip line.





# Early-ripening southern highbush in bark beds, south Georgia, 2009





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





Experimental  
planting with  
weed barrier  
fabric, drip  
irrigation, trained  
to a trellis wire  
system





# 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

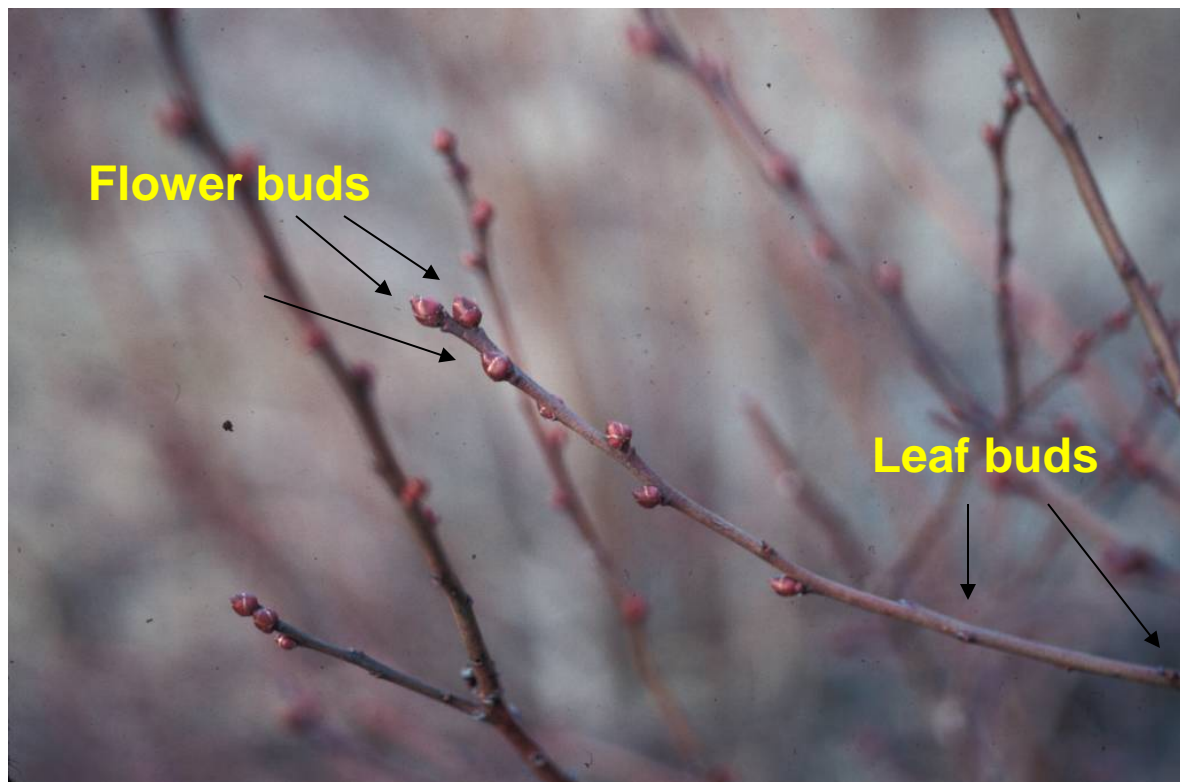
Blueberry flowers must be visited by a pollinating insect in order to form a berry. The Southeastern Blueberry Bee (shown) is a very effective wild, native pollinator.



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.

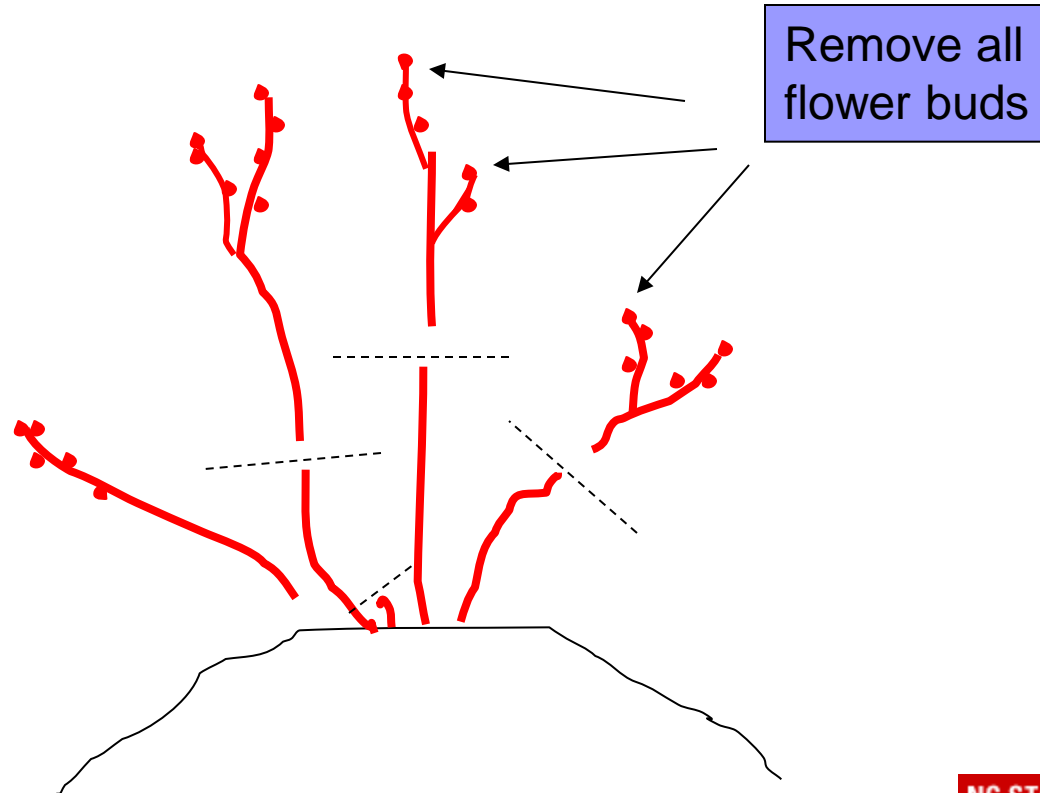


**FLOWER BUDS** that will produce the next crop are formed in late summer and early fall on the current season's growth. In winter, flower buds are easily visible on fruiting twigs, and can be counted to estimate crop potential for the coming year (expect 3-7 berries per bud).

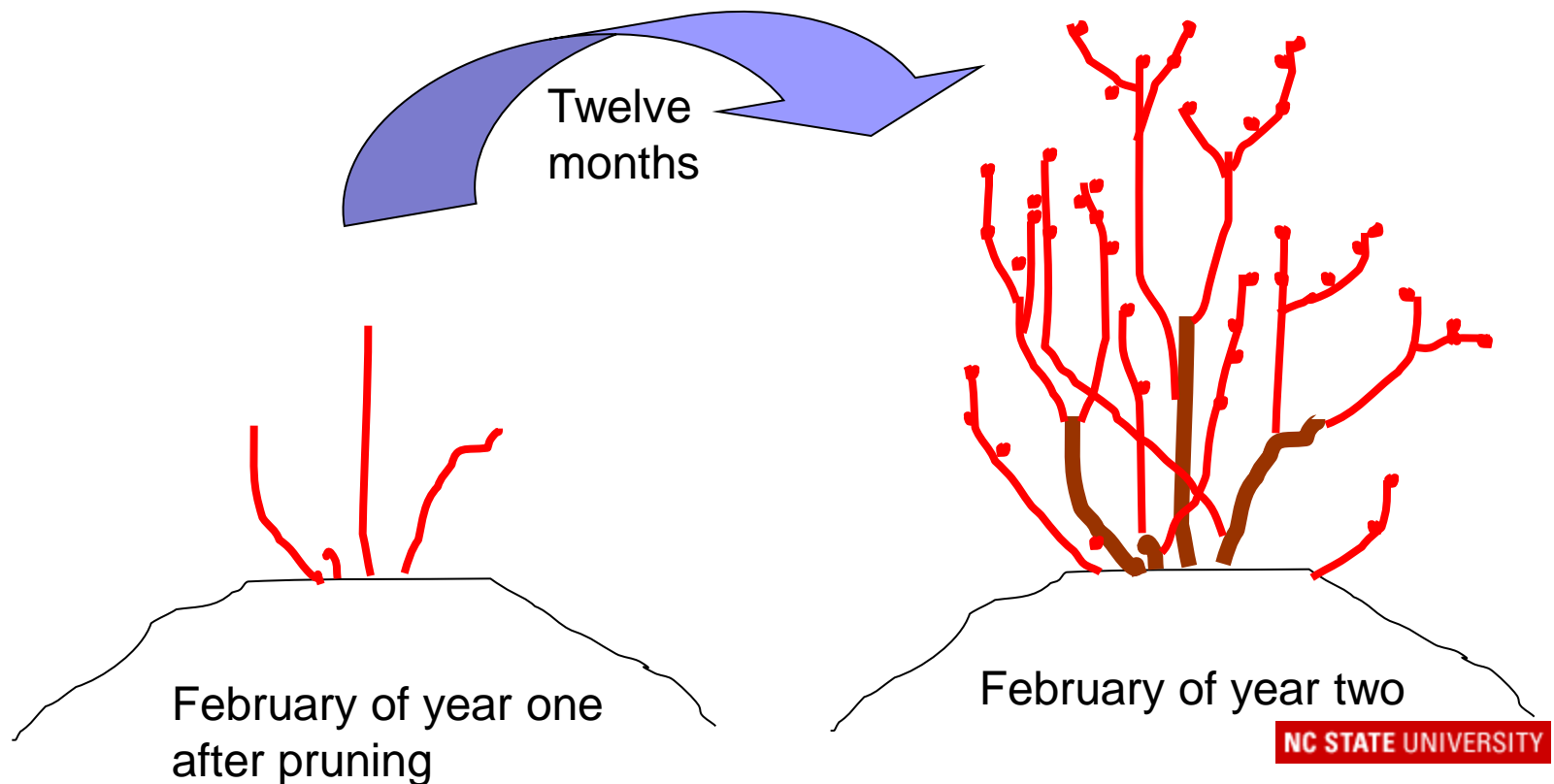




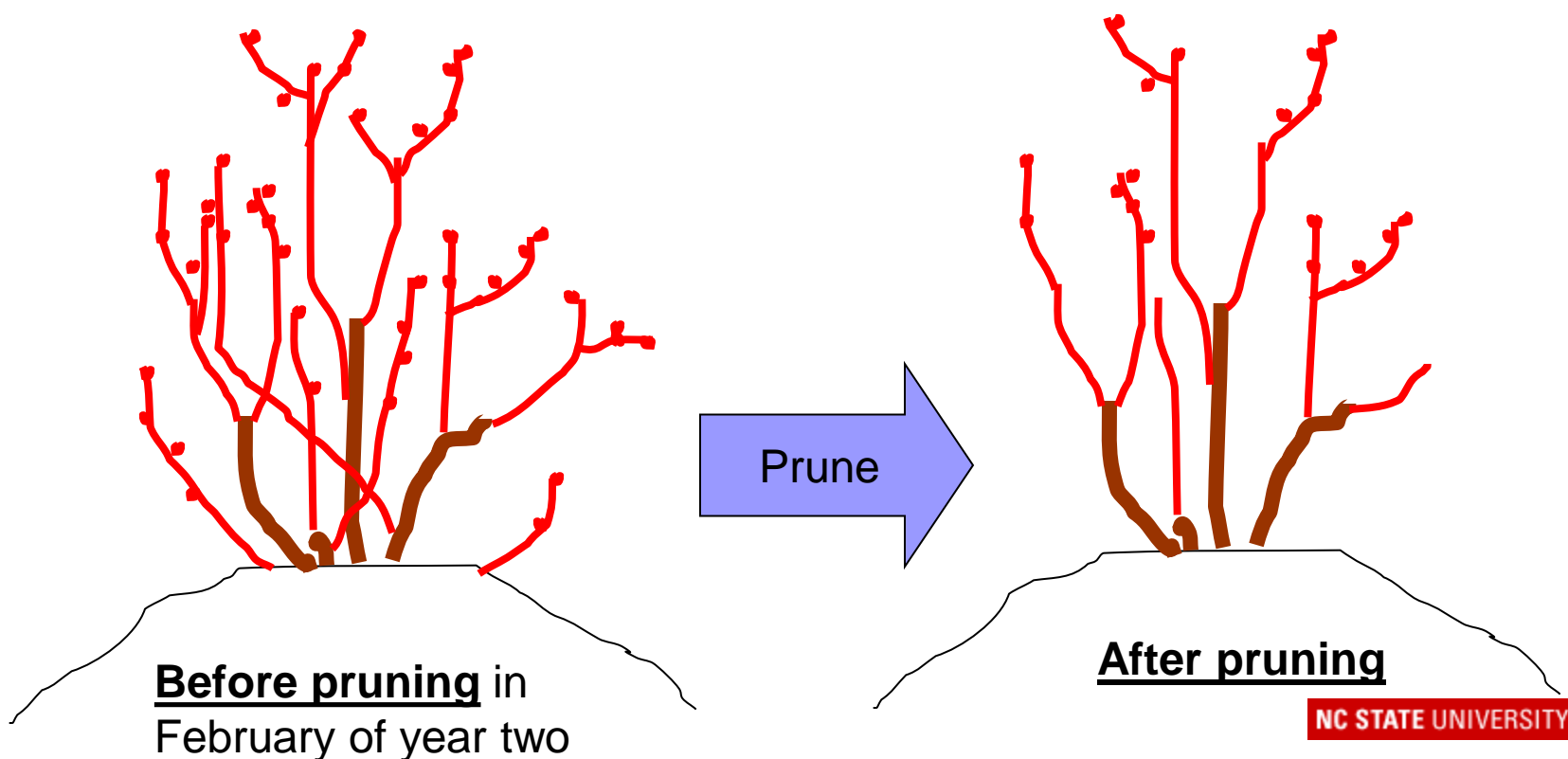
**Setting out new plants** -- Always prune or rub off all flower buds and cut back 1/2 to 2/3 of the height at the time of planting. For potted plants, gently separate and spread out the roots so that the root mass is no longer in the shape of a pot.



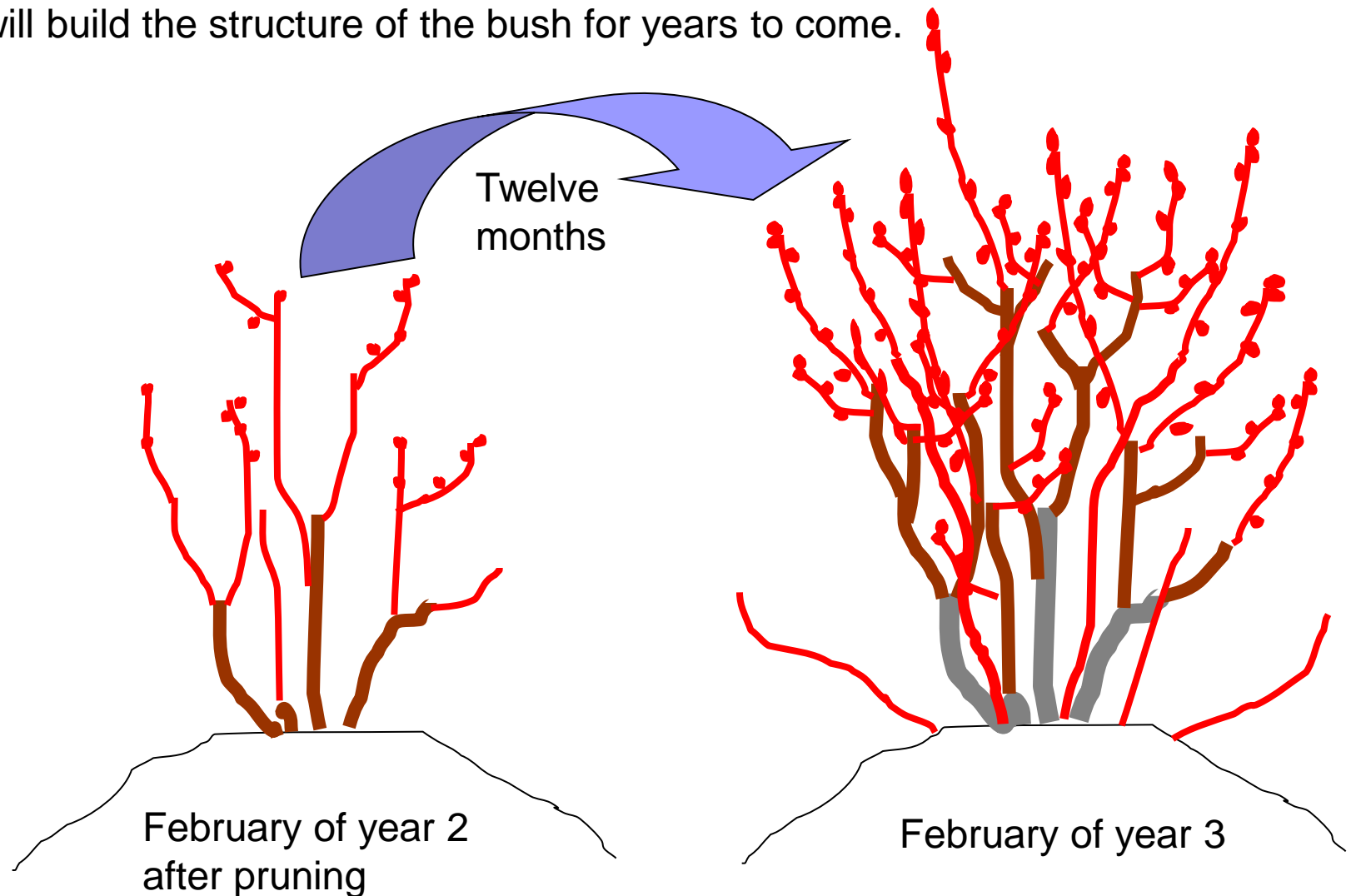
**In Year One** – the goal is to avoid fruit production entirely. With removal of all flower buds at the beginning of year one, the bush grows vegetatively, and by Fall of the first year has increased in size and produced more flower buds.



**Young bushes** -- In year two, remove low-lying or weak shoots and cross-overs, keeping the healthiest, large upright canes. Some flower buds may be allowed to produce fruit in year two if the bush grew vigorously in year one.

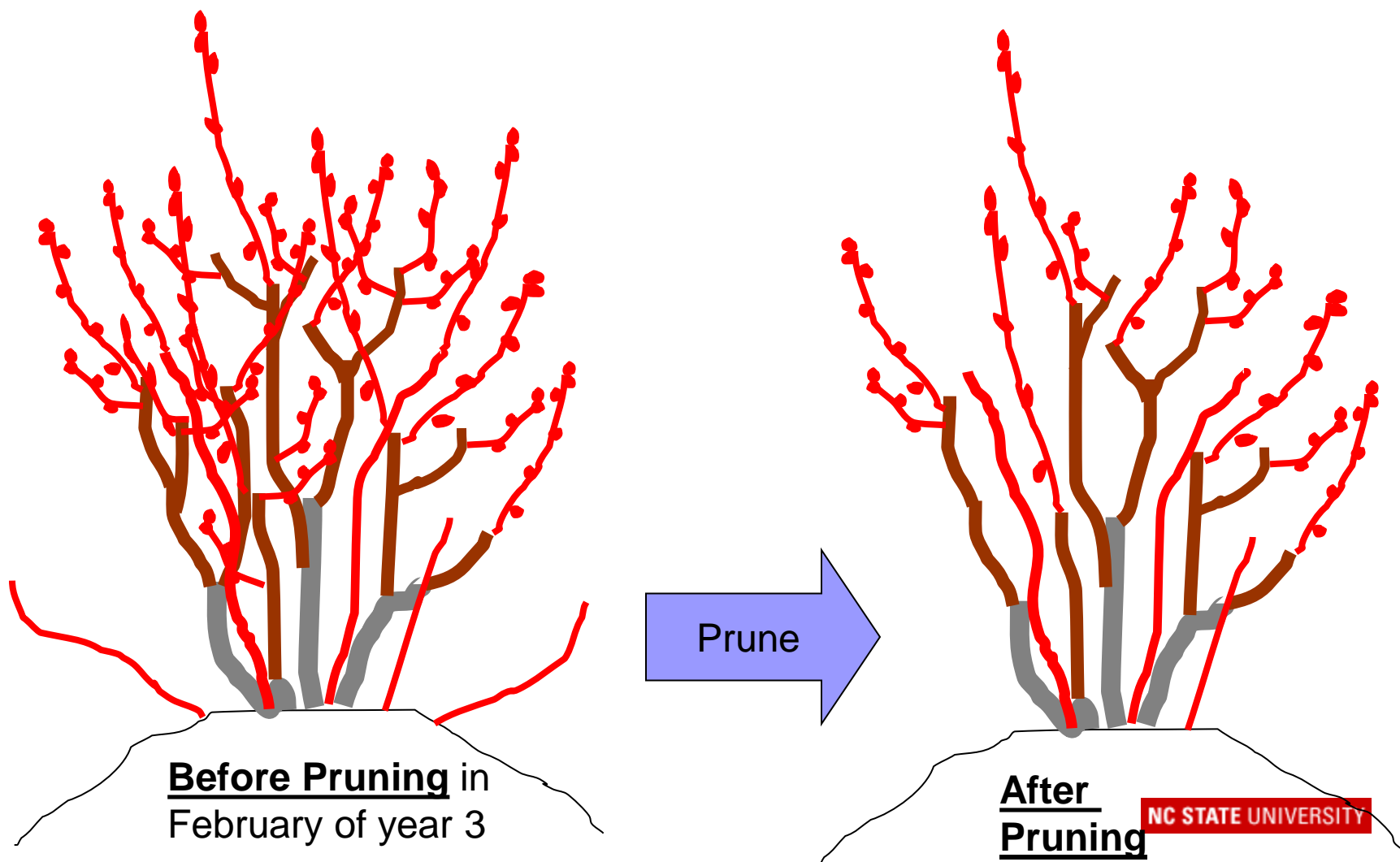


**First crop?** – the bush may be allowed to produce a few berries in year two, however the goal is still to promote vegetative growth that will build the structure of the bush for years to come.





**Year Three** – the bush is well established and capable of producing a significant crop. However, routine pruning should still remove 40 to 50% of the flower buds. Begin selecting new basal shoots that will replace older canes.

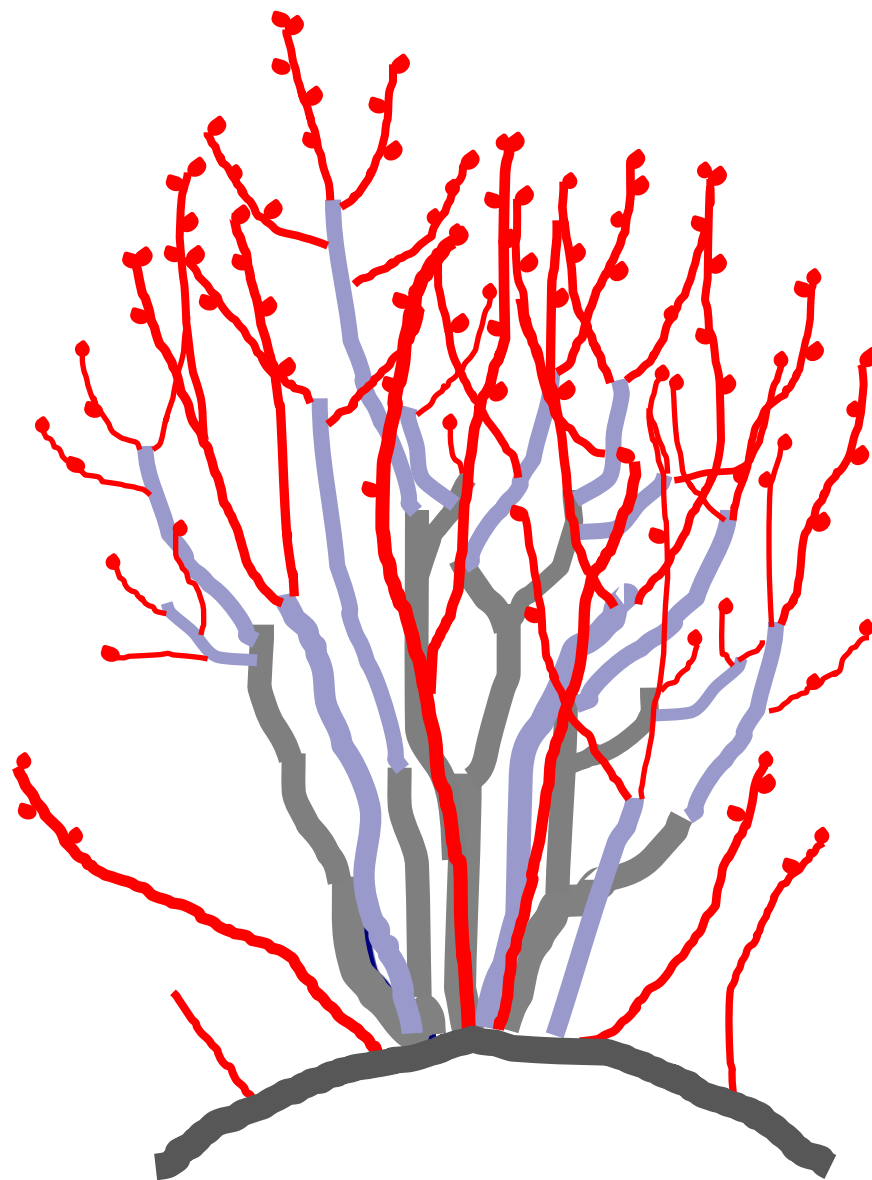


Neglected bushes may have old canes covered in lichens. Old bushes can be brought back into production by pruning to encourage new growth. Pruning a few selected canes every year is the best strategy.



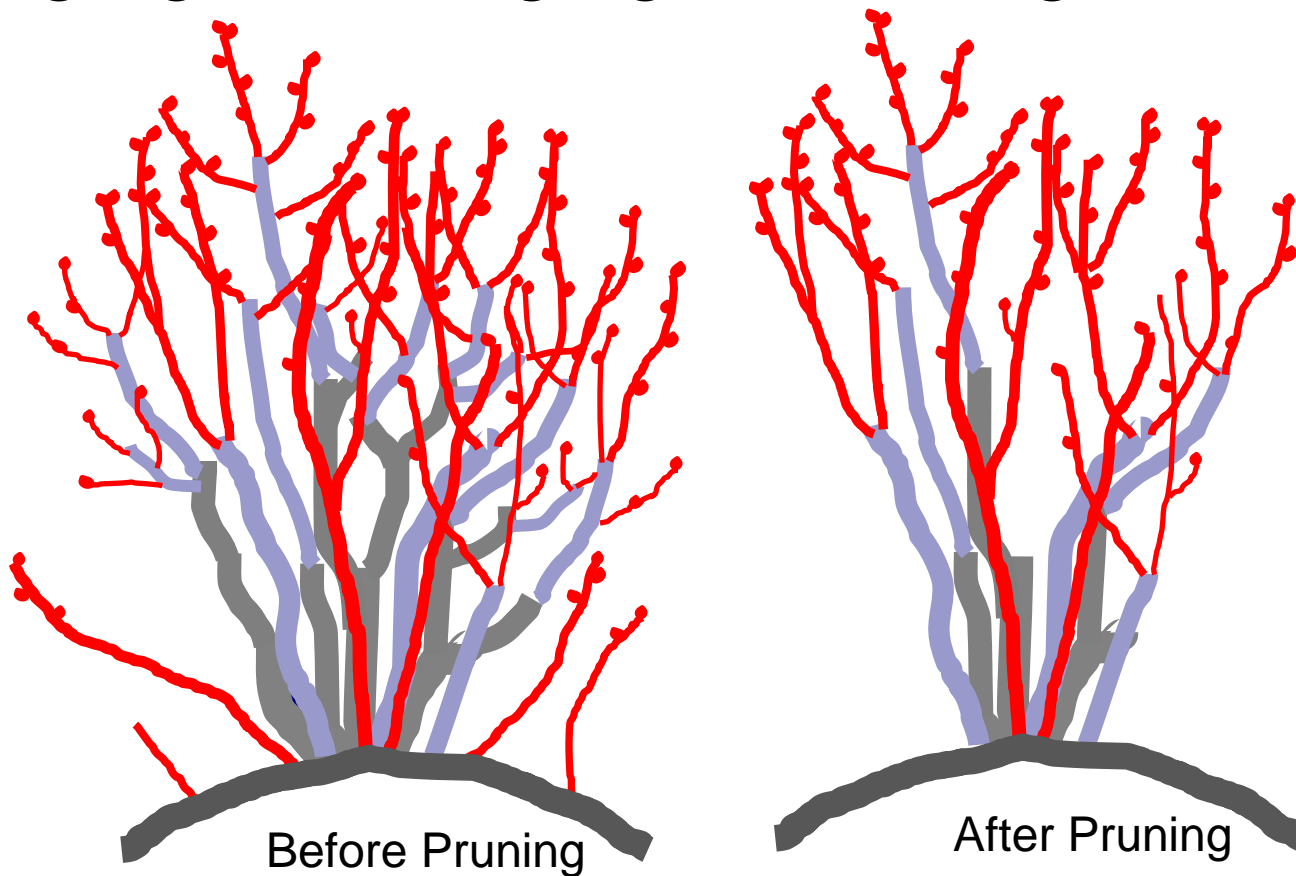
# Steps in pruning

- Define the crown
- Remove crossovers and low-angled canes
- Open the center
- Head back and thin





Both “before” and “after” have canes of varying ages emerging from the ground

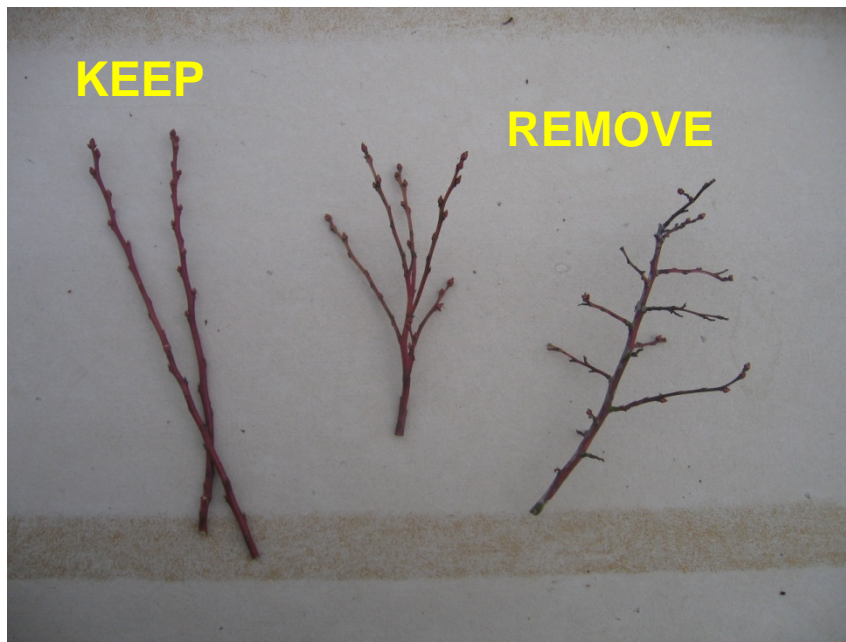








**Remove thin, twiggy “matchstick” wood during routine winter pruning AND selective summer cuts after harvest**



# Healthy vs “matchstick” fruiting wood





# 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.



Over-the-row mechanical harvesters are used mainly for processed (frozen) berries, but are increasingly used for fresh-market fruit as well.





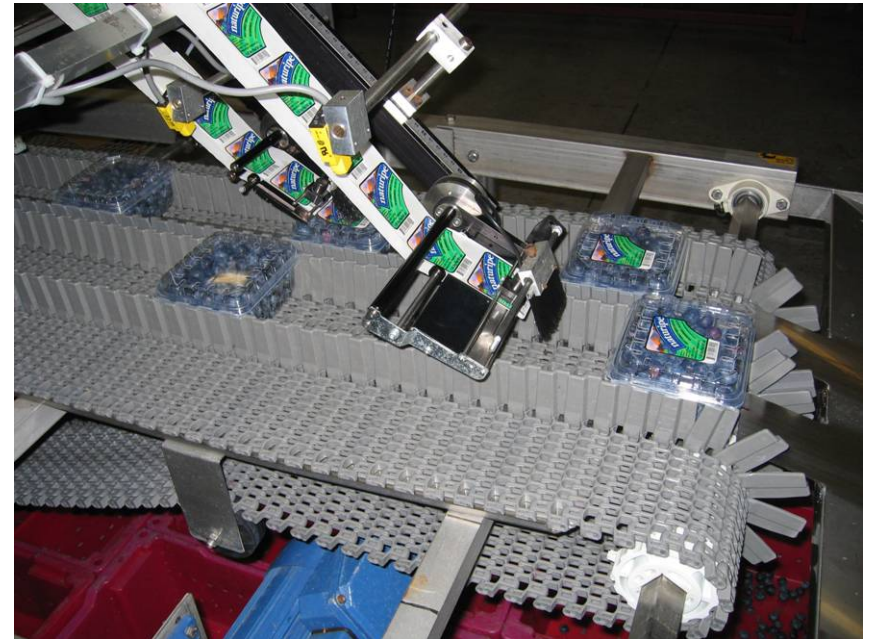


Immediately after harvest, berries are quickly cooled by using forced-air fan systems to pull cold air across shallow trays of fruit.





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





Paper-pulp or cardboard containers are often still used for local or farm market sales; however, nearly all commercial shippers and buyers require the use of clear plastic 'clamshell'-type containers.



# Rabbiteye Cultivars

- STANDARDS:  
Premier, Tifblue,  
Powderblue, Climax,  
Brightwell
- NEWER CVS  
Alapaha, Vernon,  
Ochlockonee,  
Columbus, Onslow,  
Ira (shown)



# Southern Highbush Cultivars

- STANDARDS:  
O'Neal, Star, Legacy (shown), Reveille, Bladen, Southern Belle, Southmoon
- NEWER CVS: Rebel, New Hanover, Camellia, Springhigh, Emerald, Jewel





# Highbush Cultivars (Mtns)

- STANDARD:  
Bluecrop, Berkeley,  
Jersey, Earliblue,  
Patriot, Elliott
- NEWER CVS: Duke  
(Shown), Aurora,  
Liberty, Draper,  
Echota, Toro



# For Further Information

- Contact Your County Cooperative Extension Service Office
- Michigan Blueberry Facts <http://www.blueberries.msu.edu/>
- Small fruit information for the southeastern US [www.smallfruits.org](http://www.smallfruits.org)
- NC Agricultural Chemicals Manual  
<http://ipm.ncsu.edu/agchem/agchem.html>  
<http://ipm.ncsu.edu/agchem/7-toc.pdf>
- NC Grower Information Portal  
<http://www.ncsu.edu/enterprises/blueberries/>
- NC Blueberry Journal <http://ncblueberryjournal.blogspot.com/>
- Small fruit insect pests <http://ncsmallfruitsipm.blogspot.com/>