Basics of Blueberry Crop Physiology

Dr. Amanda McWhirt
Horticulture Production - Extension Specialist

Blueberries are Native to the United States

Blueberries Types

Northern High-Bush
- *Vaccinium corymbosum*
- Adapted to cooler day-time temperatures
- Hardy to -20°F
- Northern
- 3-4’ tall
- Varieties:
  - Bluecrop
  - Blueray

Southern High-Bush
- *Vaccinium × rabbiteye*
- Better adapted to cooler and wetter conditions
- Central region
- Injury at 0°F or just below
- Varieties:
  - Norman
  - Ouachita
  - Kabluey

Rabbiteye
- *Vaccinium virgatum*
- Adapted to hotter temps and dryer conditions
- Central region
- Injury at 0°F
- Southern region
- Tall plants, >6’
- Varieties:
  - Tifton
  - Premier
  - Brightwell
  - Peshastin

A little History, the First cultivated varieties

- **Highbush**
  - 1911, Elizabeth White (New Jersey) was determined to create an industry for cultivated blueberries. She worked with botanist Frederick Coville (USDA) to identify wild plants, make crosses and select new varieties.
  - 1916, the first commercial crop of blueberries in Whitesbog, N.J.

- **Rabbiteye**
  - 1925, Wild types taken from Florida and planted by the University of Georgia.
  - Drs. Brightwell, Darrow, Scott, Galleta, Moore, and Draper worked together on blueberry breeding. Joint UGA, NCSU and USDA.
  - 1955, first cultivar of good commercial quality released: Tifton

Blueberries in their native habitat

- **Highbush Blueberry**
  - *Vaccinium corymbosum L.*
  - Native to “moist or wet peat of moderate to high acidity – in and around marshes, swamps, lakes and flood-prone areas”
  - USDA Plant Factsheet

- **Rabbiteye Blueberry**
  - *Vaccinium × rabbiteye*
  - Native to “moist or wet peat of moderate to high acidity – in and around marshes, swamps, lakes and flood-prone areas”
  - USDA Plant Factsheet
Plant Biology

Flower buds produced on last season's growth.

- Endomycorrhizae
  - Root lack root hairs
  - Limits ability to absorb water

Chilling hour requirements

- Chilling Hours Accumulation
  - Temperatures below 45°F

  - Blueberry requirements
    - Highbush: 650-2,000 hours
    - Southern highbush: 800-900 hours
    - Rabbiteye: 250-600 hours

  - Map only indicates estimates, yearly variation is to be expected

Dormant canes

Pruning

- Winter injury -20°F (depends on the type)

Dormant canes

Bud and Flower Development

- Flower buds break and open over a 3-4 week period

Assessing Cold Injury to Blueberry Flowers

Temperature at which damage may occur:

- Flower buds break and open over a 3-4 week period

Bud and Flower Development

- Flower buds break and open over a 3-4 week period

Assessing Cold Injury to Blueberry Flowers

Temperature at which damage may occur:

- Flower buds break and open over a 3-4 week period

Bud and Flower Development

- Flower buds break and open over a 3-4 week period

Assessing Cold Injury to Blueberry Flowers

Temperature at which damage may occur:

- Flower buds break and open over a 3-4 week period

Bud and Flower Development

- Flower buds break and open over a 3-4 week period

Assessing Cold Injury to Blueberry Flowers

Temperature at which damage may occur:
Blueberry Pollination

Plant more than one variety?
Typically, Yes

- Highbush blueberry is generally self-fertile, but cross-pollination increases fruit set and quality.
  - Other species vary in self-compatibility.
  - Rabbiteye tend to be incompatible
- Bumble bees are preferred over honeybees
- Flowers may be open and receptive over 5-8 days
  - Type and variety dependent

Fruit development

From petal fall to ripe fruit is: approximately 50-100 days

Harvest

- Generally come into production in year 3-4 and hit full production around year 5-8
  - A single variety will bear its crop spread over 3-4 weeks
  - Yield 3-10 lbs./plant
- Nationwide average yields are 6,700 pounds per acre (USDA)

Post-harvest, Fruit Bud set

- Flower buds start to be initiated 60-90 days after harvest
  - 61-75°F is ideal for initiation
  - Initiation occurs from the tip, down the laterals
  - The end bud will have the highest number of flowers/cluster
  - Thin, “twiggy” growth will produce low numbers of flowers per cluster
Plants enter dormancy

- Foliage turns red, to dark green
- Flower bud initiation may continue
- Leaves may stay on the plant well into spring

Plant Lifespan

- 40 years or more?
- Trend to re-plant earlier – 10-20 years

Blueberry through the seasons

Thanks and stay in touch!

AMANDA MCWHIRT
AMCWHIRT@UAEX.EDU

Links and Sources

- https://web.extension.illinois.edu/mms/downloads/68755.pdf
- https://extension.oregonstate.edu/produce-forage/berries-grapes/blueberry-plant-physiology
- https://www.blueberrycouncil.org/about-blueberries/history-of-blueberries/
- https://www.canr.msu.edu/blueberries/growing_blueberries/growth-stages
- https://site.caes.uga.edu/blueberry/2014/02/blueberry-flower-bud-stages/
- https://extension.oregonstate.edu/produce-forage/berries-grapes/blueberry-plant-physiology