



Blueberry Production

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A look at High Bush Blueberry
Production at the Robinson Experiment
Station and the Laurel Fork Reclaimed
Surface Mine Demonstration Site.



Blueberries are one of the few crops native to North America.

- They are increasing in popularity and can be grown in selected sites in Kentucky.
- Kentucky has a limited blueberry acreage but there is an excellent potential for local and regional sales. Example “You Pick”, and Farmers Markets.



Northern High Bush Blueberry

(*Vaccinium corymbosum* L.)

- These do best in most parts of the state, adapting well to our climate.



Site Selection

You need a site with

1. Good air drainage.

Usually found at higher elevations that will facilitate the movement of heavier air away from the plant on cold spring nights.

2. Good internal soil drainage.

Find a site where the soil does not compact easily. Mulching the plants can help maintain high organic matter.

Soil pH

4.5 – 5.2

- Most soils can be amended with finely ground sulfur or aluminum sulfate to adjust the pH level.
- If available soil calcium is below 2500 pounds per acre the site can usually be effectively acidified.
- Soil samples from potential sites should be submitted through your county Extension office.

Amending soil to Reduce pH

To lower pH one full pH unit (e.g. from 5.5 to 4.5) incorporate either finely ground sulfur or aluminum sulfate. Sulfur is usually the least expensive. Use the water pH value rather than the buffer pH value to determine how much sulfur or aluminum sulfate to use.

Soil Texture	Sulfur lb/100 sq ft. ¹	Aluminum Sulfate lb/100 sq ft. ¹
Light, Sandy	.75	4.5
Medium, Sandy Loam	1.5	9.0
Heavy, Clay Loam	2.25	13.5

¹ Since the soil's buffering capacity affects the degree to which a soil is acidified , apply the recommended amount well before planting. Then recheck the pH 60 – 90 days later.

Blueberry Cultivar Selection

- Cultivars differ as to when they ripen, so proper cultivar selection will give a continuous supply of fresh berries throughout the fruiting season.
- Research indicates that spring frost hardiness is based on cultivar floral development stages.
- Earlier maturing cultivars bloom earlier than late maturing cultivars and are consequently more prone to frost injury
- Blueberries can withstand 28° F in full bloom.

Blueberry Cultivar Selection

- As a rule blueberries will ripen 60 – 80 days after bloom.
- Each cultivar will usually supply fruit for a 2 – 3 week period.
- Desirable fruit characteristics include: ability to hold ripe fruit on the plant and a berry with a fruit scar.
- Purchase bare rooted or potted transplants that are 2 years old. Purchase from reputable nurseries that practice virus testing. Blueberry viruses can destroy a planting if they are brought in.

Cultivars for Kentucky (In order of ripening)

Plant more than one cultivar for best pollination and group cultivars by ripening date to make harvesting easier.

- | | |
|------------|---------------|
| 1. Duke | 9. Berkeley |
| 2. Spartan | 10. Nelson |
| 3. Patriot | 11. Jersey |
| 4. Sierra | 12. Bluegold |
| 5. Bluejay | 13. Brigitta |
| 6. Blueray | 14. Ozarkblue |
| 7. Toro | 15. Darrow |
| | 16. Elliott |

Desirable Fruit Characteristics

- Large Size
- Light Blue
- Firm Fruit
- Resistance to Cracking
- Long Shelf Life
- Nice Aroma and Flavor
- Dry Fruit Scar

Planting

- Plant blueberries in early spring or late fall after frost in a north to south row when possible so sunlight is more uniformly distributed.
- Subsoil each row and prepare a raised bed (6-8 inches) prior to planting.
- Plant rows far enough apart so tractors or trucks can be driven between rows for mulching. Recommended planting distances are 9 – 14 feet between rows and 4 – 8 feet within rows. Using these recommendations will allow the plants to eventually form a hedge row.
- Make planting holes several inches larger than the root system.

Planting

- Blueberries grow best on soils having a higher organic matter content than offered in most Kentucky soils. You can compensate for this by mixing one gallon of wet peat moss with the soil in the bottom of the hole prior to planting. One 6 cu ft bale of peat is enough for 45 plants.
- The blueberry bush should be planted at the same depth it was grown in the nursery with broken or injured roots cut off at time of planting.
- Water plants thoroughly to settle the soil around the root system.
- ***WARNING*** Do not substitute sawdust, hay, or compost for peat moss because as they decompose, your plants may become stunted or killed!

Fertilization

- Adjust soil fertility based on a soil test before planting.
- Side dress at bloom and six weeks later with 0.1 lb of ammonium sulfate per plant each time. This also helps maintain an acid pH. In subsequent years, use the same timing and increase the amount of fertilizer each year by 0.1 lb until you are applying 0.3 lb of ammonium sulfate per bush per application.
- Kentucky research indicates that when nitrogen is applied as sulfur coated urea, blueberry plants yield more than when ammonium sulfate is the nitrogen source. Sulfur coated urea is more expensive and not as acidic as ammonium sulfate so if you use it check and adjust the soil pH more often. Add additional phosphorus and potassium if the soil test indicates a need.

Fertilization

- Be careful to apply fertilizer completely around each bush since little lateral transport of nutrients occurs from one side to the other. Thus fertilizer applied to one side of the bush will only fertilize that side.
- If you use wood chips or sawdust for mulching, plants may need additional nitrogen at a rate of 0.1 lb of ammonium sulfate per plant for the first few years.

Pollination

- The blueberry flower shape makes pollination by honeybees difficult; however the bumblebee with its longer tongue tends to be a more effective pollinator. They fly in colder, windier weather than honeybees, but their pollination fluctuates too much from year to year to be dependable. Therefore, growers must rely on honeybees and have twice as many hives per acre than for other fruit crops. EX. 2 hives per acre.
- Blueberry fruit normally contain up to 65 seeds. Some studies have indicated that fruit with more seeds tend to be larger; therefore reduced pollination may cause fewer and smaller fruit. In addition, cross pollination with a different cultivar generally increases fruit size.
- Producing a good crop of blueberries generally requires that 80% of the blossoms be pollinated.
- *For proper pollination, no cultivar should be separated by more than 2 rows from a cultivar with a similar bloom or fruit maturity period.*

Honeybees for Pollination

- Blueberries are not a good source of pollen so honeybees prefer to work dandelions. Since bees continue working the flower source that they begin working on, move the bees into the field after blueberry blossoms have begun opening, but before 25% open bloom.
- If bees are moved after 25% open bloom, reduced set will result because pistils will only remain receptive for 5 to 8 days.
- A rule of thumb developed in Michigan indicates that when temperatures are around 70 to 80°F, pollination will be adequate if you see 4 – 8 bees per bush

Mulching

Apply Organic Matter After Planting

- Mulch should be applied 4 – 6 inches deep and reapplied when it rots to a depth of 3 inches.
 - Remulching will be necessary every year or two.
 - Blueberry roots grow at the mulch/soil interface and if the mulch decomposes too much and is not replaced the roots will be exposed.
 - Mulch is commonly applied in a 3–4-foot wide band down the row.
 - Producing plants are generally mulched after harvest to avoid removing blossoms and fruit during the mulching operation.
 - Mulch increases organic matter, conserves moisture, protects shallow roots from heat and helps in weed control.
- Pine Needles
 - Ground Corn Cobs
 - Straw
 - Woodchips
 - Sawdust

Irrigation

- Blueberry roots do not have root hairs and will consequently absorb moisture very inefficiently.
- Keep soil damp but not wet.
- Mature Blueberries require 1 – 2 inches of rainfall every 10 days during the growing season.
- Insufficient moisture will reduce fruit bud formation for next year's crop.

Trickle Irrigation

- Highly effective for growing blueberries.
- Allows water to seep down into the soil avoiding massive runoff.
- Be sure to monitor soil moisture with a tensiometer or other device to avoid over watering.



Pumping Water

- In order to irrigate a pump is used to transfer water from the blueberry plants.



Filtering

- Some type of filtering system must be utilized in order to keep sand and other particles from clogging up the emitters.



Pruning

- Regular pruning is necessary to establish plants and to develop vigorous plants that produce consistent crops of large early berries.
- Pruning may be done from February to bud break.

Pruning

- Remove any diseased or injured wood.
- Remove some of the old less vigorous canes at ground level or cut these back to young shoots so that the bush never has canes that are over 5 – 6 years old.
- Weak, brushy, or twiggy wood should also be removed.

Pruning

- Up to 20% of the wood in a bush can be removed without decreasing yields.
- The number of berries will be decreased, but the size of the berry will increase.
- Most growers do not let bushes get taller than 6 feet.

Problems Encountered.

- Insects
 1. Japanese beetles are a problem in eastern and central Kentucky.
 2. At this time a preventive spray program is not recommended in Kentucky.

Problems Encountered

1. Birds

*Robins

*Starlings

*Grackles

*Quail

*Brown Thrush

These are a serious pest particularly in small plantings.

- Bird control is subject to state and federal laws.
- Visual repellents like plastic hawks and snakes with large eyes have been effective.
- Audio alarms that use recorded bird distress calls help reduce bird problems.
- Netting to prevent bird depredation is highly recommended

Problems Encountered

- Mice

Watch for mice activity in the mulch around plants in fall and winter.

Use poison baits for control.

- Rabbits

Rabbits eat fruit buds and one-year-old wood. If rabbits are a problem use Thiram or other rabbit repellent sprays.

Harvesting

- Fruit does not ripen evenly throughout the growing season, so it should be picked at least once a week.
- Immature fruit have a reddish tinge while ripe fruit are a uniform blue but require 1 – 2 days to develop full flavor.
- Most commercial operations consider it necessary to pick fields once a week.

Mechanical Harvesting

- Uses a hand-held vibrator with adjustable speed to shake the limbs so that the berries fall out into canvas catch frames.



Handling for Market

- The easiest, most effective means of retaining blueberry quality following harvest is to use refrigeration.
- Low temperatures slow ripening and substantially reduce decay
- Blueberries keep best at 32° F and 85% relative humidity.
- Freshly harvested Blueberries will keep for 2 weeks at 32° F but only for 2 days at 70° F.

Blueberry Budget

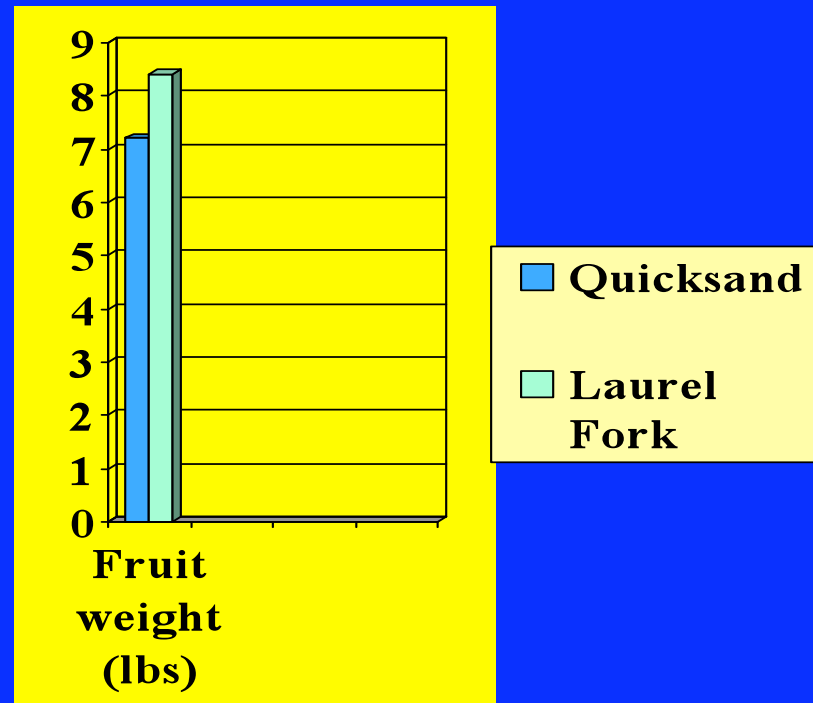
	Quantity	Unit	\$/Unit	Total
VARIABLE COSTS				
Establishment				
Plants	605	plants	2.55	1542.75
Fertilizer/sulfur	1	acre	60	60
Herbicides	1	acre	112.32	112.32
Mulch	1	acre	250	250
Machine Hire	1	acre	285	285
Establishment labor	100	hr.	6	600
Drip irrigation	1	acre	1500	1500
Total Production Costs				\$4350.07

Blueberries on Reclaimed Surface Mines (Laurel Fork)

- Laurel Fork has a low pH which blueberries like.
- Air flows better at high elevations, reducing the probability of disease.
- With irrigation and additional organic matter blueberries will produce well on these sites.

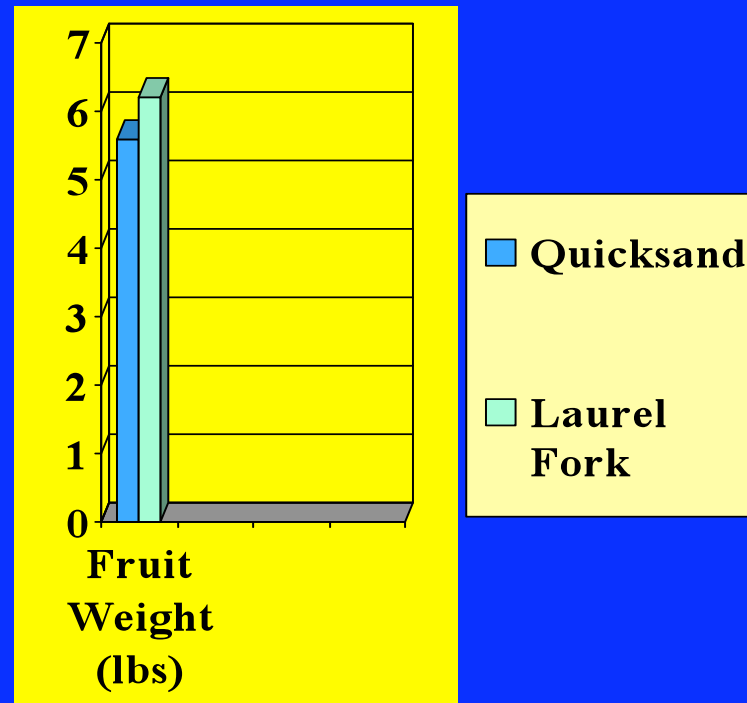
Brigitta

- Large berries
- Perfect appearance
- Late harvesting berry



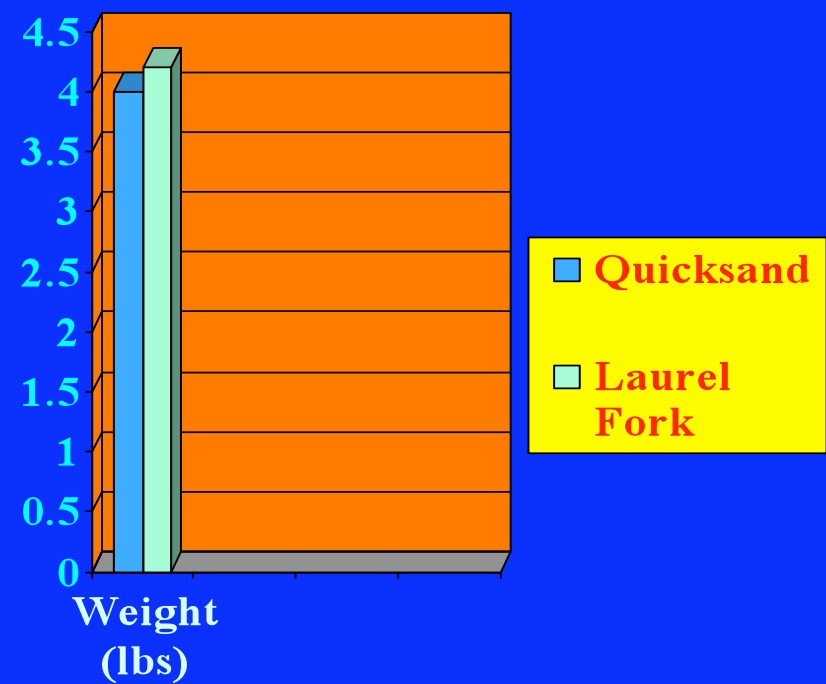
Bluegold

- Large to medium berry
- Excellent appearance
- Mid to late harvesting berry



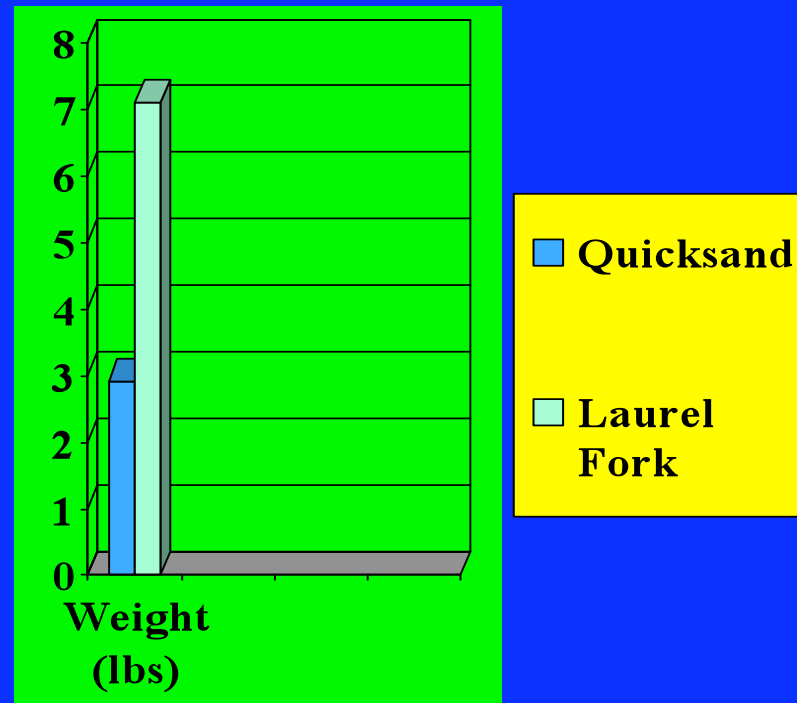
Blueray

- Very large berry
- Nice appearance
- Mid to late ripening berry



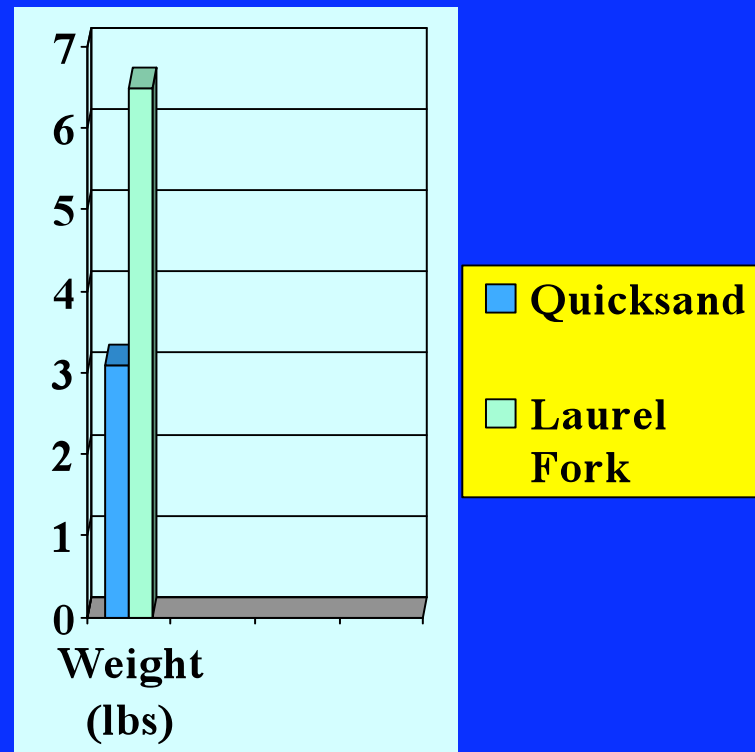
Patriot

- Large to medium size berry
- Nice appearance
- Late maturing berry



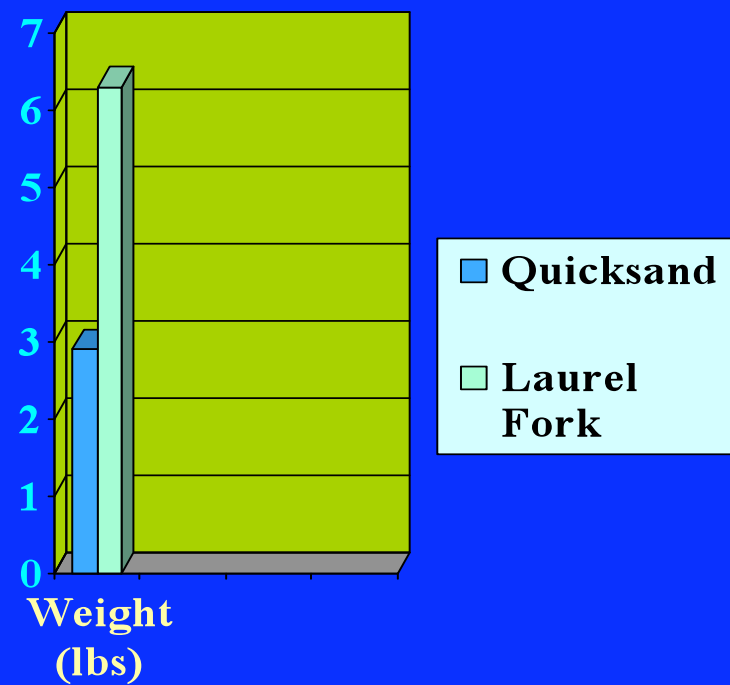
Bluecrop

- Large berry
- Very nice appearance
- Mid to late ripening berry



Toro

- Very large berry
- Very nice appearance
- Late ripening berry



The End



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