Organic Caneberry Production:
site selection
cultivars
floor management
fertilization

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Site selection is the most important of the thousands of decisions a grower will have to make over the life of a planting.

Virtually every aspect of production and marketing will, at least in part, be affected by the choice of site.
Chilling Requirements - Blackberry

- Kiowa 200 hours
- Choctaw 300 (?)
- Natchez 400 – 500
  - Replacement for Arapaho
- Ouachita 400 – 500 (?)
- Chickasaw 500 – 700
- Navaho 800 – 900
- Apache 800 – 900 (?)
- Chester 900
- Triple Crown (?)
- Hull 900(?)
Site Selection

• Accessibility
• Full sun
• Elevation
• Direction of slope
• Soils
• Water, quantity & quality
• Previous cropping history
• Wildlife damage potential
Elevation

- Elevation
  - Air circulation & water drainage
    - reduced pest pressures
  - Passive frost protection
  - (in windy areas, tops of hills may result in plant damage & dessication)
Direction of Slope

• South-facing:
  – Greater potential for winter injury & frost damage
  – Soils tend to be thinner, lower in organic matter, droughty

• North-facing:
  – Canes break dormancy later in spring
  – Harvest delayed

• East-facing:
  – Morning sun dries off plant earlier in the day, thus reducing disease pressure
Blackberries - Soils

- Soil pH – 6.0 to 6.5 is ideal
  - Will tolerate pH of 4.5 to 7.5
- Deep, sandy loams
  - Minimum rooting depth 24 to 30 inches
  - May range from sandy to heavy clay loam
- Moderate fertility
- High organic matter content
- Friable
- Good water supplying capacity, but well-drained
Previous Cropping History

• Avoid sites where:
  – tomatoes, potatoes, eggplants, or strawberries have been grown within 4 to 5 years (Verticillium wilt potential)
  – persistent herbicides have been used within recent years
  – other brambles (wild or domesticated) are growing within 600 feet
  – areas with a history of *Phytophthora* root rot or crown gall
Site Preparation

• Floor management
  – Elimination of perennial (noxious) weeds
  – Establish desired floor cover
• Adjust soil pH & fertility based on soil test recommendations
• Increase organic matter levels in soil
• Eliminate “wet spots” in field
  – Consider constructing raised beds
  – Tile drainage
• Remove barriers to air drainage from site
• Eliminate host plants in the vicinity of fields
Cultivar Selection

- Chilling requirement
- Pest resistance
- Reputable Nurseries
  - Virus-free
  - Nematode-free
### Biennial Growth Cycle of Floricane-Fruiting Blackberry Varieties

<table>
<thead>
<tr>
<th>Primocane Year</th>
<th>Floricane Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>Bloom</td>
</tr>
<tr>
<td>Summer</td>
<td>Fruiting</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cane Growth</td>
<td>Lateral</td>
</tr>
<tr>
<td>Cane Death</td>
<td></td>
</tr>
</tbody>
</table>

**Summary:**
- **Primocane Year**: Spring growth, Summer death.
- **Floricane Year**: Summer lateral branching, Fall bloom, Winter fruited, Spring pruning and removal of old canes.
Blackberries

- Yrs to 1st crop: 1 after planting year (floricane-bearing)
- Yrs to full crop: 2 – 3
- Yield @ maturity: ~ 6,000 to 8,000 lbs/acre
- Expected productive lifespan: 7 – 9 yrs.
- Major pests: viruses, double blossom on thorned var., orange rust on thornless var., anthracnose, gray mold, Japanese beetles, birds
# Blackberry Disease Susceptibility

<table>
<thead>
<tr>
<th>Variety</th>
<th>Rosette</th>
<th>Orange Rust</th>
<th>Anthracnose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chickasaw</td>
<td>S</td>
<td>?</td>
<td>S</td>
</tr>
<tr>
<td>Choctaw</td>
<td>S</td>
<td>R</td>
<td>R(?)</td>
</tr>
<tr>
<td>Kiowa</td>
<td>S</td>
<td>R(?)</td>
<td>S</td>
</tr>
<tr>
<td>Shawnee</td>
<td>VS</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Natchez</td>
<td>R</td>
<td>?</td>
<td>R(?)</td>
</tr>
<tr>
<td>Apache</td>
<td>R(?)</td>
<td>R(?)</td>
<td>R(?)</td>
</tr>
<tr>
<td>Navaho</td>
<td>R</td>
<td>VS</td>
<td>R(?)</td>
</tr>
<tr>
<td>Ouachita</td>
<td>R</td>
<td>R(?)</td>
<td>S</td>
</tr>
<tr>
<td>Prime Ark-45</td>
<td>S*</td>
<td>R</td>
<td>S</td>
</tr>
</tbody>
</table>

R = resistant  
R(?) = none observed  
S = susceptible  
VS = very susceptible

* = Not an issue with primocane bearers grown for fall crop only
Blackberry Diseases

Crown Gall

Phytophthora Root Rot

Verticillium Wilt
Blackberry Diseases

Orange Rust

Anthracnose

Rosette (Double Blossom)
Borers in Caneberries

Red-Necked Cane Borer

Crown Borer

Raspberry Cane Borer
Gray Mold

- Prune & thin canes
- Maintain narrow rows
- Avoid excess nitrogen
- Control weeds
- Harvest often & regularly
  - Don’t put > 3 layers of fruit in container
- Postharvest
  - Handle fruit gently
  - Use proper storage conditions
Raspberries

• Red –
  – Do best in areas having relatively cool summers & moderate winters

• Black –
  – Less tolerant of cold winter temperatures than Reds, more subject to diseases, lower yielding

• Purple –
  – Hybrid of red & black, posses many characteristics of black raspberries

• Yellow –
  – Similar to reds
# Red Raspberry Cultivars - TN

## Summer Bearers

**Higher Elevations:**
- Latham, Titan

**Other Areas:**
- Dorman Red, Titan, Latham, Southland

## Primocane Bearers

**Higher Elevations:**
- Heritage, Caroline, Nantahala

**Other Areas:**
- Autumn Bliss, Heritage, Southland
Raspberry Cultivars - TN

Yellow

- Fall Gold –
  - everbearing, hardy
- KiwiGold –
  - everbearing

Purple

Royalty –
  immune to raspberry aphids (transmit mosaic virus)

Brandywine –
  very winter hardy

Estate (?) –
  hardy, ripens 3 – 5 days after Brandywine
Black Raspberry Cultivars - TN

• Black Hawk –
  – Hardy, resistant to anthracnose
• Jewel –
  – Resistant to anthracnose, hardy
• Cumberland (Blackcap) –
  – Large fruit, hardy
Floor Management

- Clean cultivation
  - Shallow cultivation to avoid damage to root systems
  - Establishment of winter cover crop in row middles
    - Rye or annual ryegrass

- Sodded row middles*
  - Reduced erosion potential
  - Support for equipment
  - Use non-aggressive sods
  - Legumes can be a source of nitrogen BUT can harbor stinkbugs, tarnished plant bugs
Mulching

+ Conserves moisture
+ Moderates temperatures in root zone
+ Decreases weed pressure
+ Increases yields

- Harbor voles
- Increase problems of Phytophthora root rot (especially on heavy soils, irrigated sites)
Types of Mulches

- Straw
- Landscape fabrics
  - High initial cost
  - May last several years
  - Will become less permeable to water over time
Weed Management

• Pre-plant weed control
• Suppression by use of cover crops
• Cultivation (grape hoe, Weed badger, Green Hoe)
  – Must be shallow to avoid root damage
• Hand weeding & hoeing
• Weeder geese
  – Control grasses & young broadleaf weeds
  – May eat ripe fruit, newly emerging primocanes
The need for a trellis depends on the type of caneberry & the desired training system

**Trellis not needed**

- Erect variety
  - plus
- a low primocane topping height

**Trellis needed**

- Trailing & semi-erect varieties
- High primocane topping height
- Red & yellow raspberries
Trellising

- Cane support
- Increased sunlight exposure, air movement, spray penetration throughout the canopy
- Easier management
  - Cleaner picking results in reduced attraction to picnic, sap, June and Japanese beetles

*for trailing & semi-erect cultivars, trellising is necessary to keep the fruit off the ground
2-Wire Vertical Trellis
2 Wire Trellis for Semi-Erect Blackberries
Trellising Red Raspberries
Narrow
Single “T”
&
Double “T”
Trellises
Single Crossarm Trellis

Floricanes

Primocanes

Floricanes
Trellis for 1-sided or 2-sided system

- 2 ft.
- 2 ½ - 3 ½ ft
- 3 to 4 ft.
- 25 to 30 ft.
- Ground level
Double “T” or “V” Trellis

Post 4’ high
Lower T @ 18” ht, 18” wide
Upper T @ 48” ht, 24 to 36” wide

- Floricanes secured to wires on each side
- Primocanes allowed to grow in center
Pruning Operations Throughout the Biennial Life Cycle of Erect & Semi-Erect Blackberries

- Remove canes with borers as symptoms appear
- Top primocanes at desired height (summer)
- Cut back laterals in late winter to early spring
- Remove laterals on lower part of cane
- Reduce # of canes / linear ft. of row
- Limit row width
- Remove weak canes
- Remove floricanes after harvest
Pruning Floricane-Fruiting Caneberries

- Summer
- Winter
Floricane Removal

• Reduce insect & disease pressure
  – Remove immediately after harvest
    • Burning
    • Shredding and soil incorporation

• Increase light, air & spray penetration throughout the canopy
Tipping Primocanes - Black/Purple Raspberries
Primocane Topping,
Heading Laterals
Pruning Red Raspberries - Floricane fruiting, annual system

Involves:

• Remove floricanes
  – Immediately after harvest for organic production

Late Winter:

• Remove weak and broken canes
• Thin remaining canes to 3 – 4 /ft²
• Top remaining canes @ 4 – 5 ft. aboveground (remove at least 6 – 8”
Pruning Red & Yellow Raspberries

18 – 24 in.
Primocane Crop Only

Allow Primocanes to grow. Maintain row width 12 – 18 in.

Primocane Harvest

Mow planting to ground in late winter.
Pruning Primocane-fruiting Brambles Involves:

• Mowing off planting close to the ground in late winter

• (To delay harvest until late summer, mow again when new cane growth is about 1 ft. high)
Topping Primocanes During the Growing Season:

- Increases the erect nature of canes
- Promotes the development of lateral branches for increased yields
- Blackberries – top when primocanes are 6+ inches taller than topping height
  - Top at 42” for non-supported canes, 65” for supported canes
- Black & purple raspberries – top when primocanes are 4+ inches taller than topping height
  - Black raspberry – top at 28 to 30 inches
  - Purple raspberry – top at 36 to 42 inches
Removal of Weak, Broken and Excess Canes:

• Erect Blackberries – leave 6 strong floricanes / linear ft. of row
• Semi-erect blackberries – leave 4 to 8 strong floricanes / crown
• Red raspberries – thin to about 4 canes/ ft²
• Black & purple raspberries – leave 5 to 6 strong floricanes / hill
Heading Laterals in Late Winter

• Blackberries –
  – Prune to 12 – 18” in length depending on strength of lateral
  – Remove laterals within 12 – 18” from ground

• Black & purple raspberries –
  – Cut large laterals back to 10 to 14” length
  – Remove or cut weaker laterals back to 4 – 10” in length
  – Remove laterals within 12’ of ground
Semi-Erect Blackberries
Dormant Pruning
Alternate Year Cropping

Rotation -

• 1\textsuperscript{st} year:
  – Crop \(\frac{1}{2}\) of the field, mow off canes in winter

• 2\textsuperscript{nd} year
  – Crop the 2\textsuperscript{nd} half of the field, grow primocanes on the 1\textsuperscript{st} half

• Repeat sequence in following years
Alternate Year Cropping

- Increased primocane growth
- Heavier yields in floricane rows
- Easier management
- Reduced pruning costs
- Alternate row cropping increases air movement through planting
Components of a Good Fertility Program

• Soil Testing - pre & postplant
• Tissue Testing
• Records
  – Crop history (yield & quality)
  – Growth the previous year
  – Weather factors
Uses of Foliar Analysis

- Diagnostic tool
  - Sample “normal” vs “affected” plants of same age, variety & rootstock
- Routine monitoring of nutrient status
  - Head off impending deficiency, toxicity or imbalance
    - Economic losses are generally suffered before visible symptoms of nutritional problems appear
Foliar Analysis

• Collect leaves from primocanes immediately following floricane harvest
  – Select leaves midway on primocane
    • (Max. of 2 leaves/primocane)
  • Collect a total of 50 to 100 leaves over planting
    – Sample each variety separately
    – Sample problem areas separately
    – Pull sample just before applying a spray
    – Restrict a sample to not over 10 acres
Preplant Soil Preparation

• Begin in the year prior to planting
  – Adjust soil pH to 6.0 to 6.5
  – Avoid high levels of phosphorus
    • May increase problems with zinc deficiency
      – (poultry litter may be high in phosphates)
    • Avoid pre- or post-plant use of potassium chloride
      – Brambles are sensitive to chlorine salts
Fertilizing Blackberries

- Lime, P & K based on preplant soil testing
- Nitrogen
  - Establishment year – total of 25 to 50 # actual N/acre
    - 1\textsuperscript{st} application ~ 1 month after planting
    - 2\textsuperscript{nd} application – early July
  - 2\textsuperscript{nd} year – 35 to 65#/A actual N total
    - Split application with ½ @ bloom, 2\textsuperscript{nd} after harvest
  - 3\textsuperscript{rd} year + - 60 to 80# actual N total
    - Split application with ½ @ bloom, remainder after harvest
- For organic production, apply compost prior to bud break
Nitrogen Applications for Blackberries

• 1\textsuperscript{st} year –
  – 25 to 50 lb/acre of actual N
  – 30 to 60 days after planting

• 2\textsuperscript{nd} year –
  – 35 to 65 lb actual N/acre
  – Apply as a single or a split application

• 3\textsuperscript{rd} & subsequent years
  – 60 to 80 lb N/acre, single or split application

• Collect leaf samples for foliar analysis from primocanes immediately after harvest
Fertilizing Established Raspberries

- Total of 50 to 80 lbs. N per year
  - ½ in March
  - ½ in May
- Apply over a 3 ft. wide band on each side of row
- Collect leaves for foliar analysis from promocananes shortly after harvest
Timing of Nitrogen Applications

• Establishment year
  – Delay application until canes have emerged

• Maintenance
  – Single prebloom spring application
    OR
  – Split with 2\textsuperscript{nd} application immediately after harvest
Organic Nitrogen Sources

- Manures
- Compost
- Animal byproducts
- Vegetable or seed meals
Nitrogen Availability

• Manures and compost
  – 50% available during year of application
  – 90% available in application year with fresh poultry manure
  – Balance available during subsequent years
    (be sure to figure it in annual applications)
Manure as Fertilizer

• Fertilizer value usually highly variable
• Unbalanced in regards to N, P, K
• Specific application rates will be impossible to recommend
• Typical application rates:
  – Most manures – 1 to 4 tons/acre
  – Poultry manures – 1 to 2 tons/acre
Timing of Manure Applications

- 120 days pre-harvest in crops where fruit may be in contact with the soil or soil can be splashed onto the fruit from rainfall or irrigation
- 90 days preharvest where fruit is elevated or shielded from soil contact
- Properly composted manures can be applied at higher rates & at times closer to harvest
Other Organic Fertilizers

- Cottonseed Meal: 7-2-2 (NPK)
- Blood Meal: 12-1.3-0.7 (NPK)
Harvest & Storage

- Harvest frequently
- Harvest directly into marketing container
- Cool quickly following harvest
- Store @ 31 - 32°F & 90 – 95% relative humidity
- Process or freeze fruit not sold within 1 – 2 days