Blackberry Production

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Pick TN 2022

Diverse Types of Blackberries

- thorny or non-thorny
- erect, semi-erect or trailing
- early to late maturing
- Primocane or floricane-bearing
- plant vigor, fruit size, flavor, seediness, or firmness may also vary.

Blackberry growth characteristics

- Tend to be managed as individual plant units
  - do not sucker and spread freely.
- Pruned to maintain an optimum number—typically 4 to 6—canes per crown
  - further pruned one or more times to limit their height.
- Trained on a trellis to:
  - control the cane orientation,
  - allow adequate air circulation, light interception, and to enable spraying or other cultural practices as needed.

Blackberries

- Genus: Rubus
- Family: Rosaceae
- Botanically: not a berry, instead it is an aggregate fruit composed of small druplets

- Grow well with summer temperatures in mid 80's
  - Thorned & thornless varieties
  - Erect (thorned, primocane bearers)
    - Semi-erect varieties (thornless)
  - Most varieties are floricane bearers

Growth Habit: Floricane-bearing varieties

- Perennial plant that typically bear biennial stems from the perennial root system
- Growth Habit for **Floricane-bearing** varieties:
  - 1st year: New green stems **(primocanes)** grow from buds at the base (crown) of plants
  - 2nd year: **Floricanes** flower in spring, fruit in summer & die
    - New primocanes will be growing at the same time floricanes are fruiting

Blackberries

- Yrs to 1st crop: 1 after planting year (floricane-bearing)
- Yrs to full crop: 2 – 3
- Yield @ maturity: ~ 20 lbs./10 ft. of row
- 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

Growth Habit: Primocane-bearing varieties

- Bear fruit on current season's growth (upper 1/3 of cane)
  - Harvest begins in late summer & continues until frost
  - Fruiting area of cane dies
  - In hot climates, the late summer/fall crop may be limited

- Double cropping:
  - Carry over canes to the 2nd year (floricane year), prune off dead portion of canes
  - Fruiting will occur in early summer on the lower portion of the canes
  - Cane will die back to the crown
  - Growth of new primocanes will coincide with floricane fruiting

Primocane

Floricane

Floricane-fruiting Caneberry

- Primocane (1st) year
  - Cane grows
  - Fruit bud initiation begins
- Floricane (2nd) year
  - Bud break
  - Short shoot growth from buds
  - Bloom
  - Fruiting
  - Cane death

Floricane-fruiting Caneberries

Blackberry

- Kiowa (thorned)
- Natchez
- Ouachita
- Osage
- Triple Crown

Primocane-fruiting Caneberry

- Primocane year
  - Cane grows
  - Fruit bud initiation
  - Fruiting in upper 1/3 of primocane
  - Fruiting area dies
- Floricane year (double cropping)
  - Bloom & fruiting in lower portion of cane
  - Rest of cane dies
  - New primocanes will begin growing at same time as harvest

Erect, thornless varieties may resemble trailing types the 1st year

1st year

2nd year

Blackberry Disease Susceptibility

Variety	Rosette	Orange Rust	Anthracnose
Chickasaw	S	?	S
Choctaw	S	R	R(?)
Kiowa	S	R(?)	S
Shawnee	VS	R	R
Natchez	R	?	R(?)
Apache	R(?)	R(?)	R(?)
Navaho	R	VS	R(?)
Ouachita	R	R(?)	S
Prime Ark-45	S*	R	S

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

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

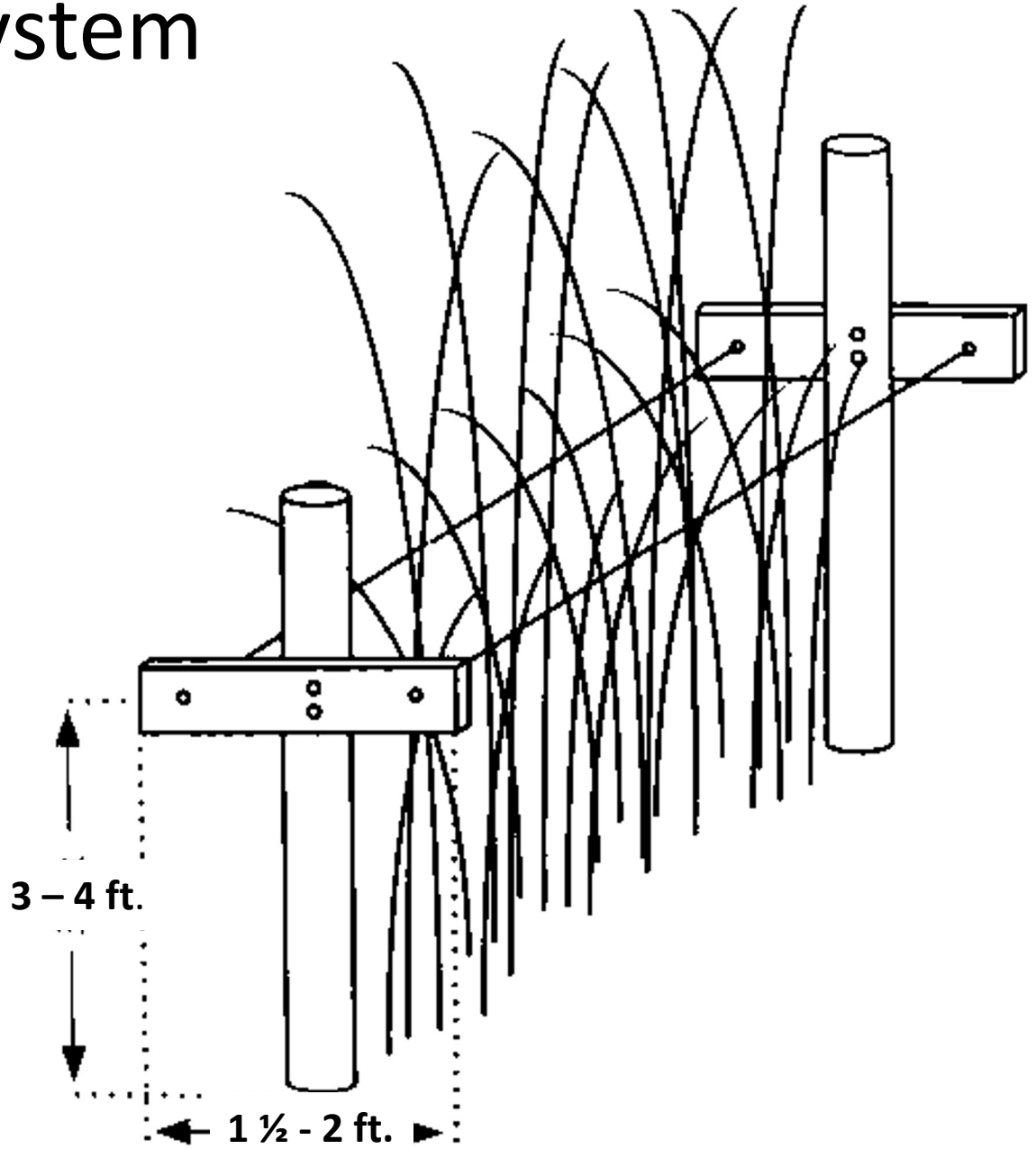
Trellising

- Maintain canopy within desired area
- Cane support, reduce breakage
- 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
- Winter protection potential (RCA trellis)

*for trailing & semi-erect cultivars, trellising is necessary to keep the fruit off the ground

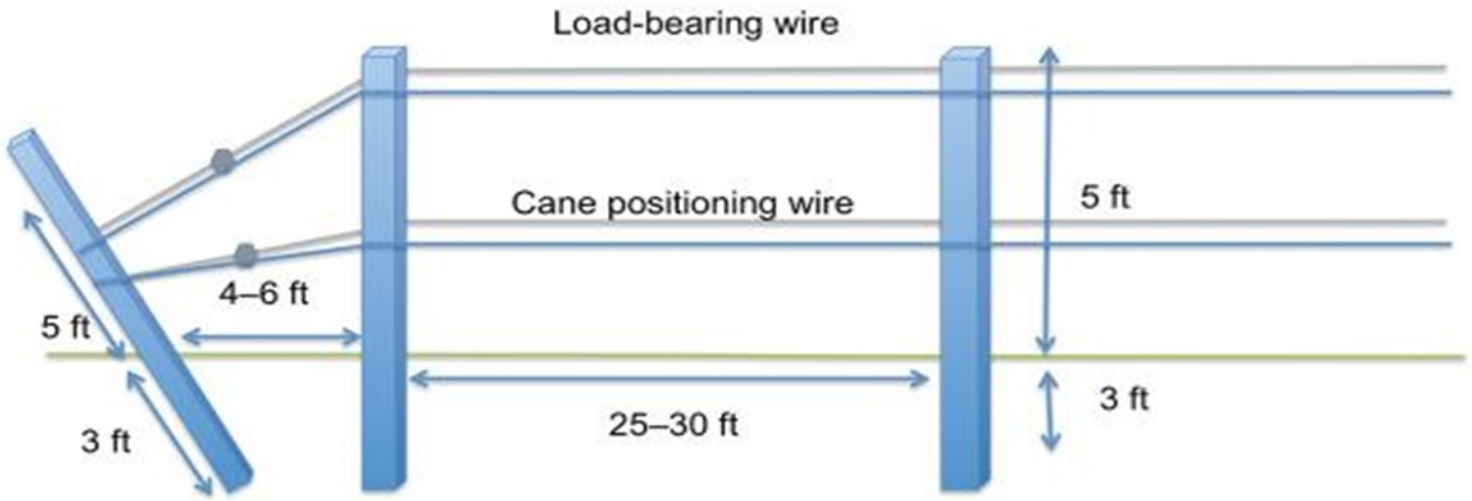
Supported Hedgerow System (I-Trellis)

- Pros:
  - Easy to build & maintain
  - Economical
- Cons:
  - Lower yields
  - Intermingled primocanes & floricanes increases disease pressure, makes harvest & pruning more difficult



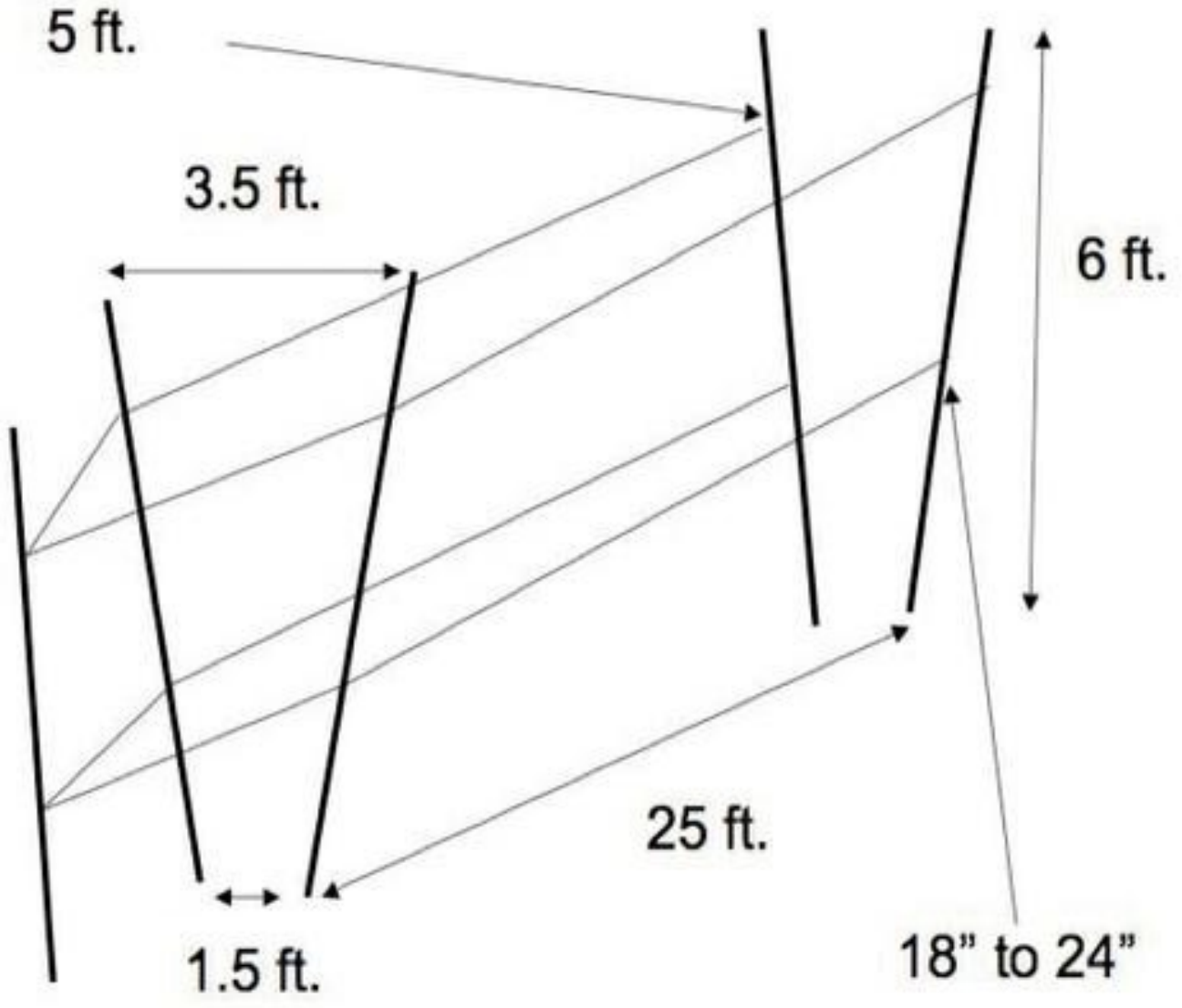
I-Trellis with End Post Configuration

- 6 to 8 ft. metal posts, cedar or pressure-treated posts
- set 20 to 25 ft. apart
- bury posts 24 in deep

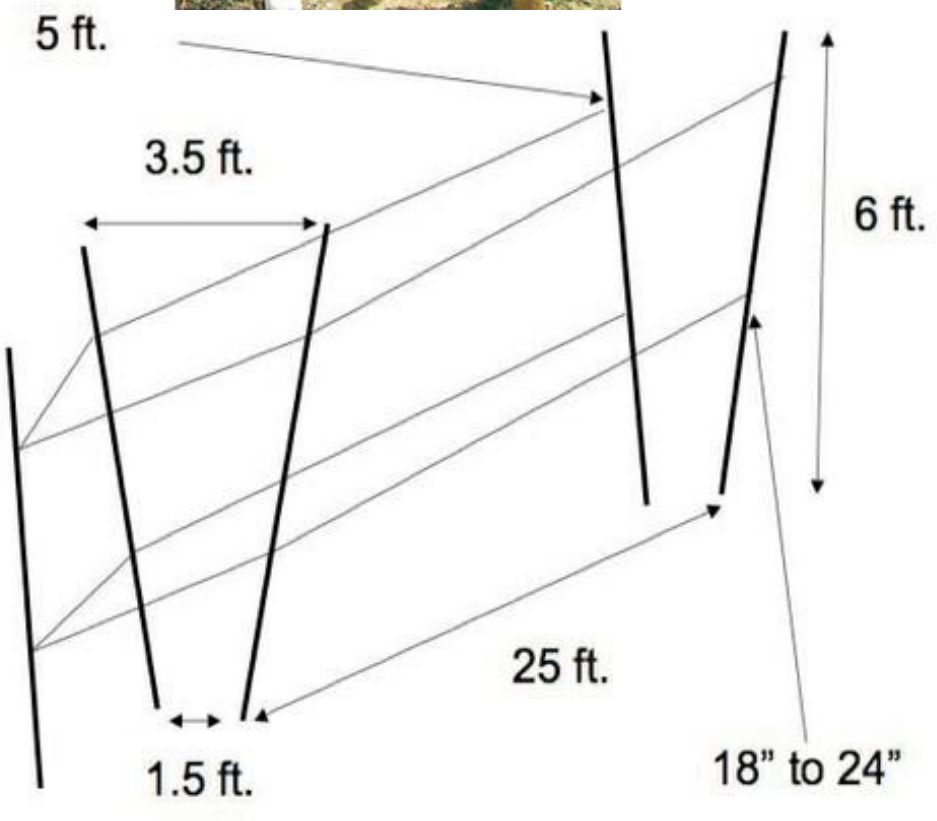


I-Trellis

V-trellis with metal posts



V-Trellis with Metal Posts



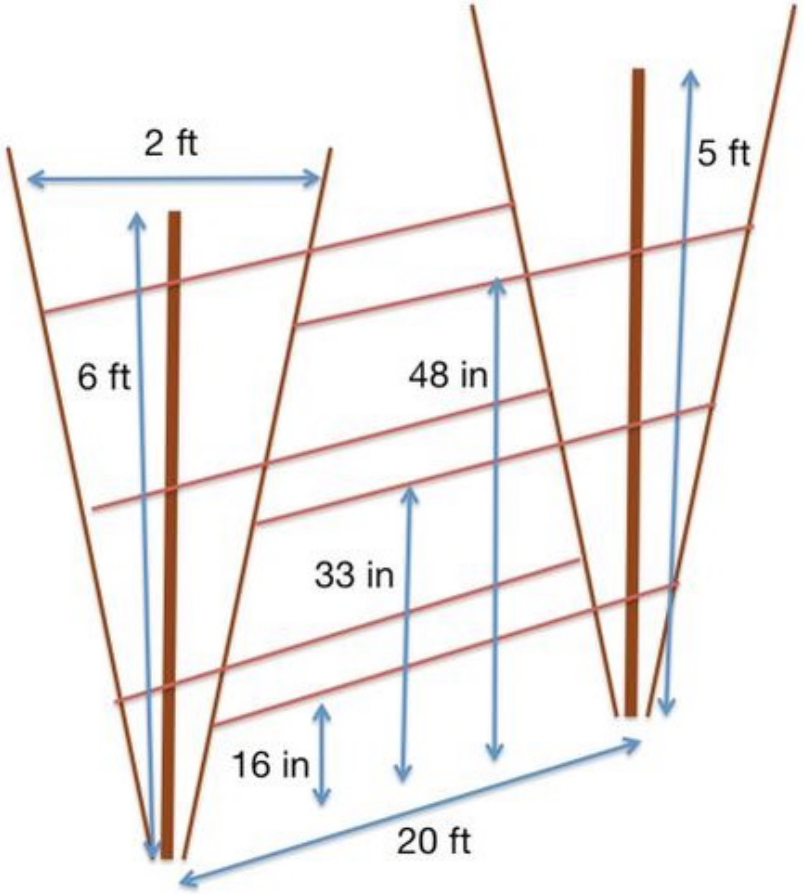
Uses steel posts set 20 to 30 degrees off vertical

- Pros:
  - Separation of floricanes & primocanes increases sun, air & spray penetration within canopy
  - Ease of harvest & pruning
  - Metal stakes allows moving wires up or down to accommodate plant vigor
- Cons:
  - More expensive to construct & maintain than I-trellis

California V-Trellis (with wooden posts)
Pre-Bloom

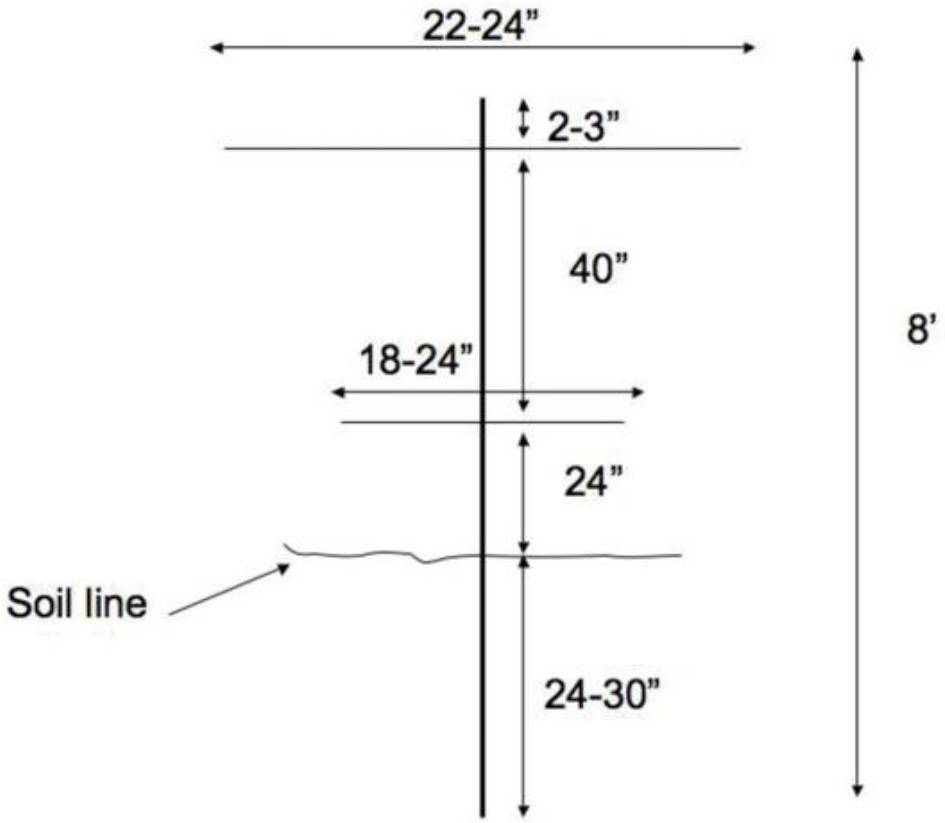
In winter, 1 X 1 inch moving post are tied nearly vertical so shoots containing blooms will develop on the outside of the floricanes

California V-Trellis (with wooden posts)
Post-Bloom



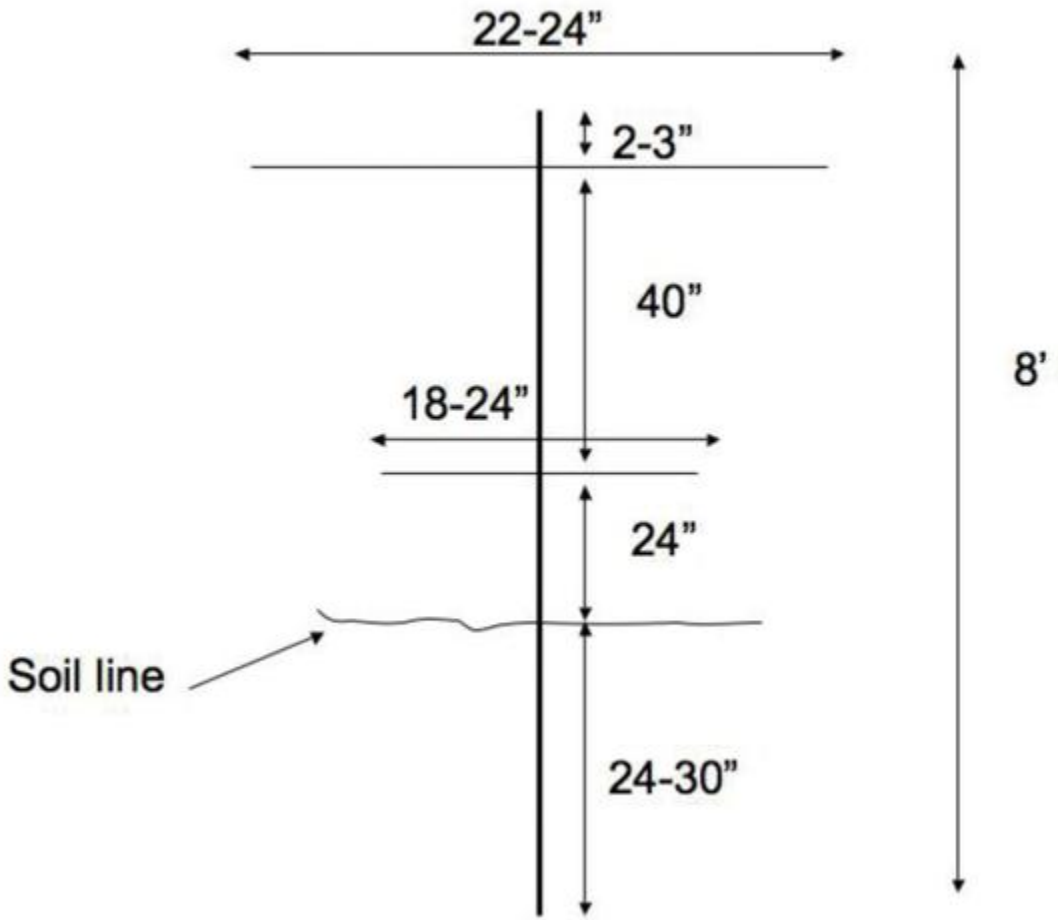
After bloom, moving posts are spread apart to allow light penetration & primocane growth. All fruit is on the outside of the trellis

T-Trellis with Wood



- 8 ft. pressure treated or cedar posts
  - Spaced 20 to 25 ft. apart
  - Set posts 24-30 in. deep
- 2 X 4 pressure treated cross-arms
  - Lower crossarm
    - 24 in. above ground
    - 18 – 24 in. long (centered on post)
  - Upper crossarm
    - 40 in. above lower crossarm
    - 22 – 24 in. long (centered on post)
- Pros:
  - Same benefits as V-trellis for disease control & accessibility
  - Can retrofit from an I-trellis easily
- Cons:
  - Wire height cannot be adjusted once crossarms in place

T-trellis

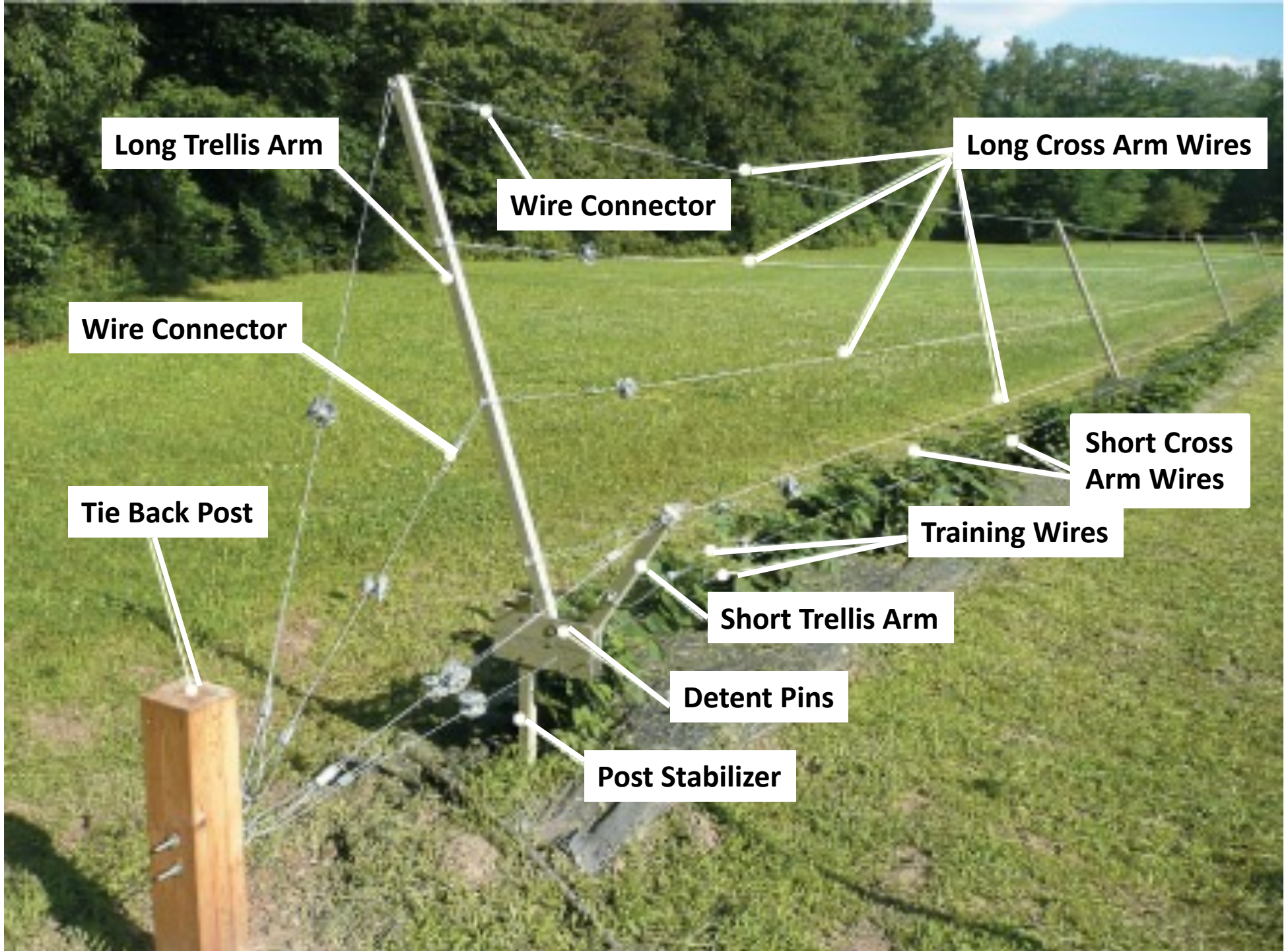


T-Trellis

Rotating Cross-Arm Trellis (Shift Trellis)

- Pros:
  - Easier harvest as all fruits are on one side of the canopy
  - Less sunscald since fruits develop out of direct sunlight
  - Canopy can be covered in winter to reduce cold injury
- Cons:
  - Most expensive to construct & maintain
  - Most difficult to learn
  - High labor inputs

Rotational Cross Arm Trellis



Nitrogen Applications for Blackberries

- 1st year –
  - (~ ½ cup 10-10-10) per plant
  - 30 to 60 days after planting
- 2nd year –
  - ½ to 1 cup 10-10-10 applied @ bloom

    or
  - Half at bloom PLUS half after floricane harvest
- 3rd & subsequent years
  - 1 to 1 ½ cup 10-10-10, single or split application

Timing of Nitrogen Applications

- Establishment year
  - Delay application until canes have emerged
- Maintenance
  - Single prebloom spring application

    OR
  - Split with 2nd application immediately after harvest

Postharvest Handling

- Perishable fruit
  - Optimum storage temperature: -0.5 to 0.0˚C
  - % relative humidity: 90 to 95
  - Ventilation rate: Very Low (5 cfm in 20’ container)
  - Storage time (days): 7 to 14
  - (source: Sydney Postharvest Laboratory & Food Science Australia
    CSIRO 2001 www.publish.csiro.au)

Blackberries – Site Preparation

- Soil test 1 – 8 in. & 8 – 12 in. depths
  - Lime & fertilize as suggested
- Incorporate organic matter in fall previous to planting if organic matter content of soil is low
- Prepare a vegetation-free strip

  4 to 6 ft. wide for rows
- Subsoil

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

Caneberry Production

Planting

- Good quality plants, check crown and root system
- Spacing depends on variety & growth habit (24 – 36”)
- Remove all grass sod at least 2ft. from plants
- Deep till (if needed)
- Dig a hole big enough for root system
- Apply complete fertilizer when finished
- Water in carefully

Field Layout

- North-south row orientation (if possible)
  - Less sunburn on fruit on south side
  - More uniform ripening
  - Increased yield?
- Planting across the slope
  - Easier to engineer irrigation system
  - More precision in spray applications
  - Contour plantings?

Irrigation and Water Requirements

- Drip irrigation works well
  - Double line of T-Tape
  - Hard line with in-line emitters
- Know your drip tape capacity
  - How many gallons/min, gallons/hr etc.
- Rule of Thumb: 2500-3000 gallons of water/acre/day during hot, dry periods
  - Soil types will effect rate/acre

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Between row spacing: 6 to 12 ft.

- Slope of land
- Equipment
- Type of trellis (crossarm or V vs. upright)
- Space rows at least 2-3 ft. wider than widest piece of equipment
- Type of blackberry being planted
- Desired height of canes
  - Between row spacing = 1½ times plant height on N-S rows
- Type of harvest – leave more room for PYO

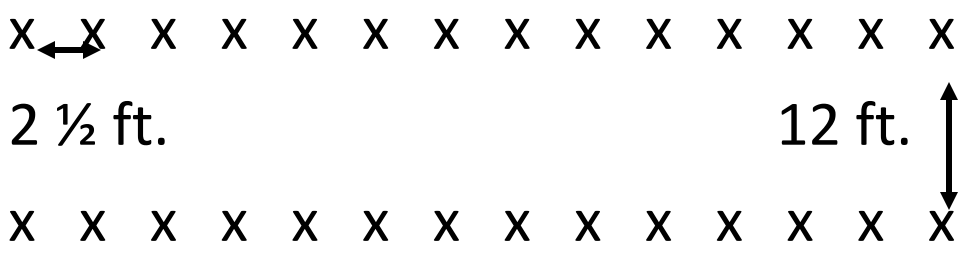
Inrow Spacing

- Varies depending on species, growth habit & training method
- Erect & semi-erect blackberries – 2 to 4 ft.
- Trailing varieties – 6 to 8 ft.

Plants / Acre?

$$\frac{43{,}560}{\text{inrow X between row spacing}} = \text{\# plants / acre}$$

Example: 2 ½ ft. inrow, 12 ft. between row spacing



$$\frac{43{,}560}{2.5 \text{ X } 12} = \frac{43{,}560}{30} = 1{,}452 \text{ plants / acre}$$

Preplant Care of Stock

- Purchase from reputable nurseries
  - Tissue culture
  - Virus indexed
- Inspect upon receipt
- Keep roots moist, cool (do not allow to freeze)
- Store under refrigeration or heel-in

Planting

- Time: late winter to early spring
- Inrow spacing:
  - Erect types – 2 to 4 ft. (set root cuttings at 2’)
  - Trailing & semitrailing – 6 to 8 ft.
    - Depends on variety
    - Trained to a hill system
- Planting depth – same as in nursery
  - Root cuttings – 4 to 5 in. deep on sandy soils, 2 to 3 in. deep on heavier soils

Planting Tissue Cultured Plants

- Plant tissue culture plants around June well after the last spring frost
- Take care to prevent plants from drying out or heating prior to planting
- Irrigate immediately after planting & everyday day thereafter for the next 2 weeks

Blackberry Fertilization

- P and K:
  - Apply based on soil test recommendations
- Ca and Mg:
  - Apply as dolomitic limestone if pH is low (<6.0)
  - Soil test every other year
  - Foliar analysis annually following harvest

Blackberry Fertilization - Nitrogen

New Plantings:

- 25 to 50 #/acre actual N
- 30 to 60 days after planting
- Placement
  - Around individual plants
  - Take care to avoid direct contact with plant

Floor Management

- **Eliminate perennial weeds prior to planting**
- **In-row weed control:**
  - **Mulch 1st year**
  - **Herbicide strip 3 – 5’ wide in succeeding years**
  - **Supplement with hand weeding, hoeing**
- **Between rows:**
  - **Non-competitive sod cover controlled by mowing or chemical suppression**

Timing of Nitrogen Applications – mature plantings

- Maintenance
  - Single prebloom spring application

    OR
  - Split with 2nd application immediately after harvest

Blackberries – When to Harvest?

- **Color is not a good indicator of harvest time**
- **Ease of separation of fruit from pedicel is best indication**

Blackberry Harvest

- **Pick every 2nd to 3rd day**
- **Do not pick when fruit is wet**
- **Protect harvested fruit from the sun**
  - **Fruit will turn red & taste bitter**
- **Cooling shortly after harvest extends shelf life**

Rosette (Double Blossom)

Orange Rust

Anthracnose in Brambles

Crown Gall

Raspberry Cane Borer

Oviposition damage to a rose stem by the raspberry cane borer.

Photo by Jim Baker, North Carolina State University, Bugwood.org

Raspberry Crown Borer

Spotted Wing Drosophila

Japanese Beetle

Blackberry Psyllid

Spur Blight, Cane Blight, Anthracnose

Spur blight on a raspberry stem caused a canker
Photo: Mary Ann Hansen, Virginia Polytechnic Institute and State University, Bugwood.org

- These three diseases can be routinely managed with good sanitation and one early-season lime sulfur treatment before new growth begins.