Critical Steps in Blackberry Plant Care for Optimum Growth, Yield and Berry Quality in Florida

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Outline

- Site selection and planting
- Weed management
- Pruning
- Nutrient management
- Research

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Site Selection, Preparation & Planting

- **Site**:
  - Site with good air circulation and drainage
  - Low lying areas should be avoided
  - Treat planting site with herbicide before planting
  - Raised beds 36-40 inch wide and 8-10 inch high
  - Plant to plant distance 3-5 feet while row to row distance 10-12 feet
- **Weed control**:
  - Polythene or fabric mulch would provide good weed control during early establishment
- **pH management**:
  - Ideal pH is 5.5-6.5
  - Use lime or elemental sulfur to increase or decrease pH
- **Planting time:**
  - Planting can be done any time Dec to Feb as bare rooted plants
- **Irrigation:**
  - Drip irrigation is preferred than overhead

Site Selection, Preparation & Planting

Bare rooted

Tissue cultured

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Weed Management

- Blackberry bed should be weed free
- Use pre-emergence herbicide at least 30 days before plating
- Plastic/fabric mulch suppress weed germination
- Once soil get settled again use PRE herbicide to prevent weed emergence on bare ground
- PRE herbicides suppress weed germination but do not have any effect once they emerged
- ½ to 1 inch irrigation is needed following Pre herbicide
- Once weeds emerged then use a combination of Post and Pre
- Since post herbicides are contact so plant tissues will be prevented from the chemical
- ***Weed management in blackberry is year-round task and timely application of herbicides/mulch will prevent from yield loss***
- ***Kill the weeds before their seed production***

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Weed Management

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Blackberry Growth Habit

Primocanes:

- 1st year shoot emerge in April,
- Dense green or light brown in color
- Don't break easily by hand

Floricanes:

- 2nd year shoot
- Dark brown in color
- Tend to break easily by hand
- Dieback after harvest

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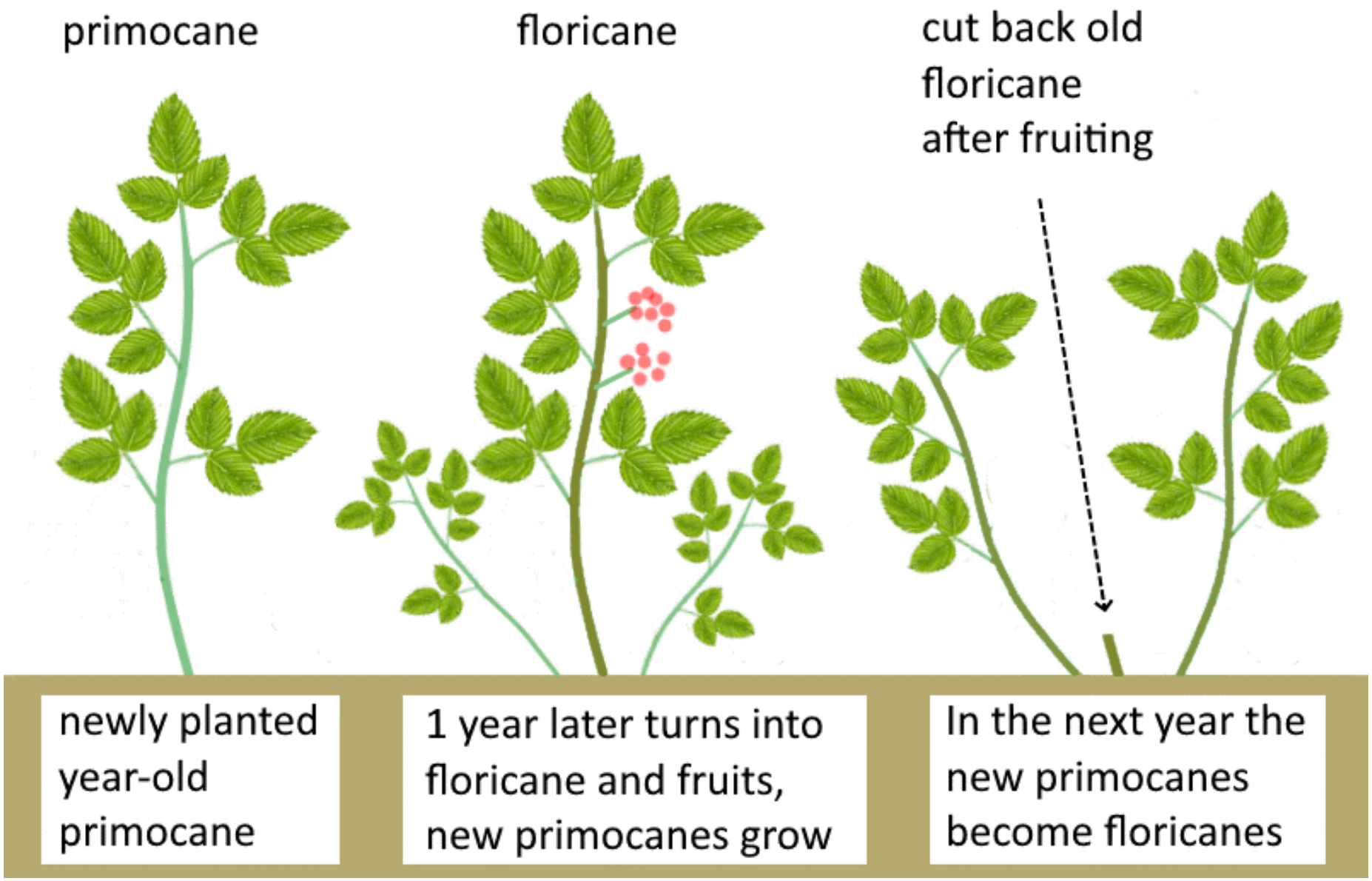
Pruning



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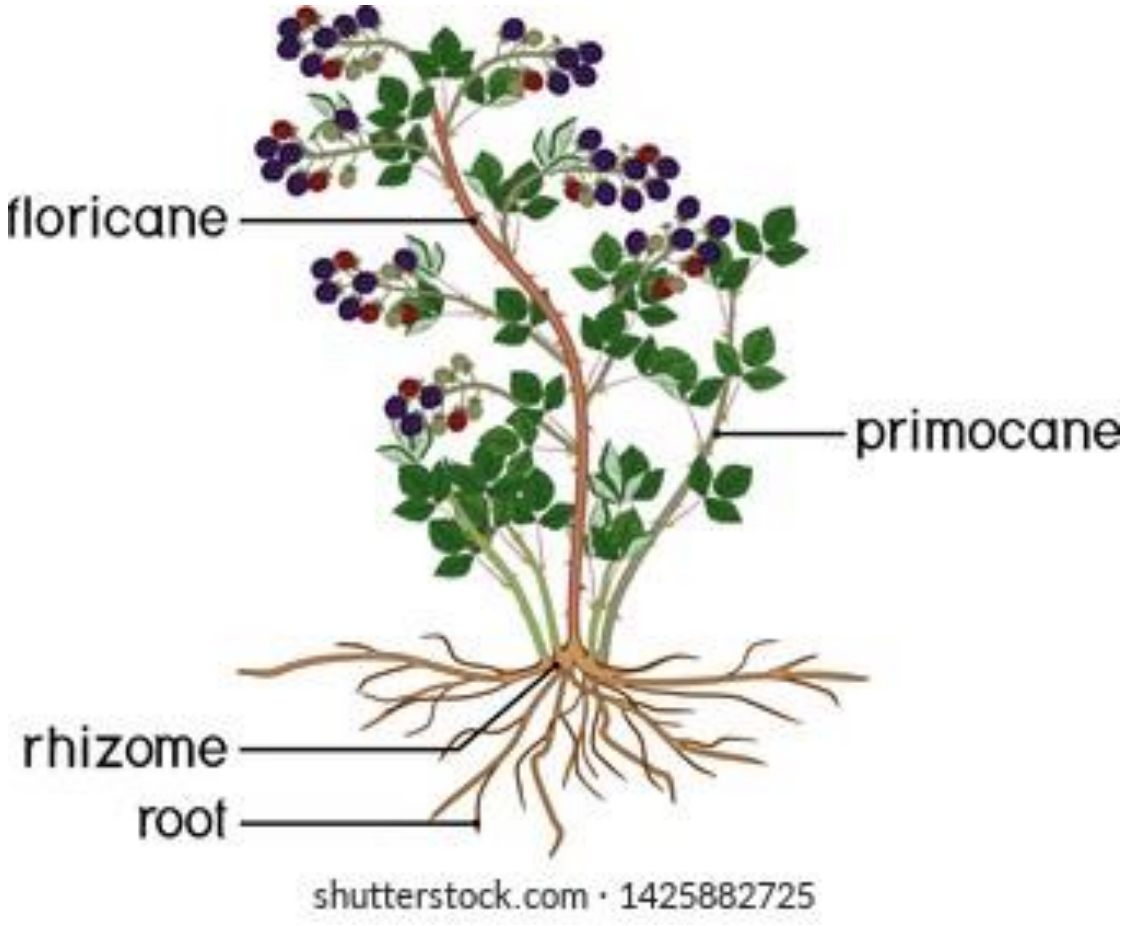
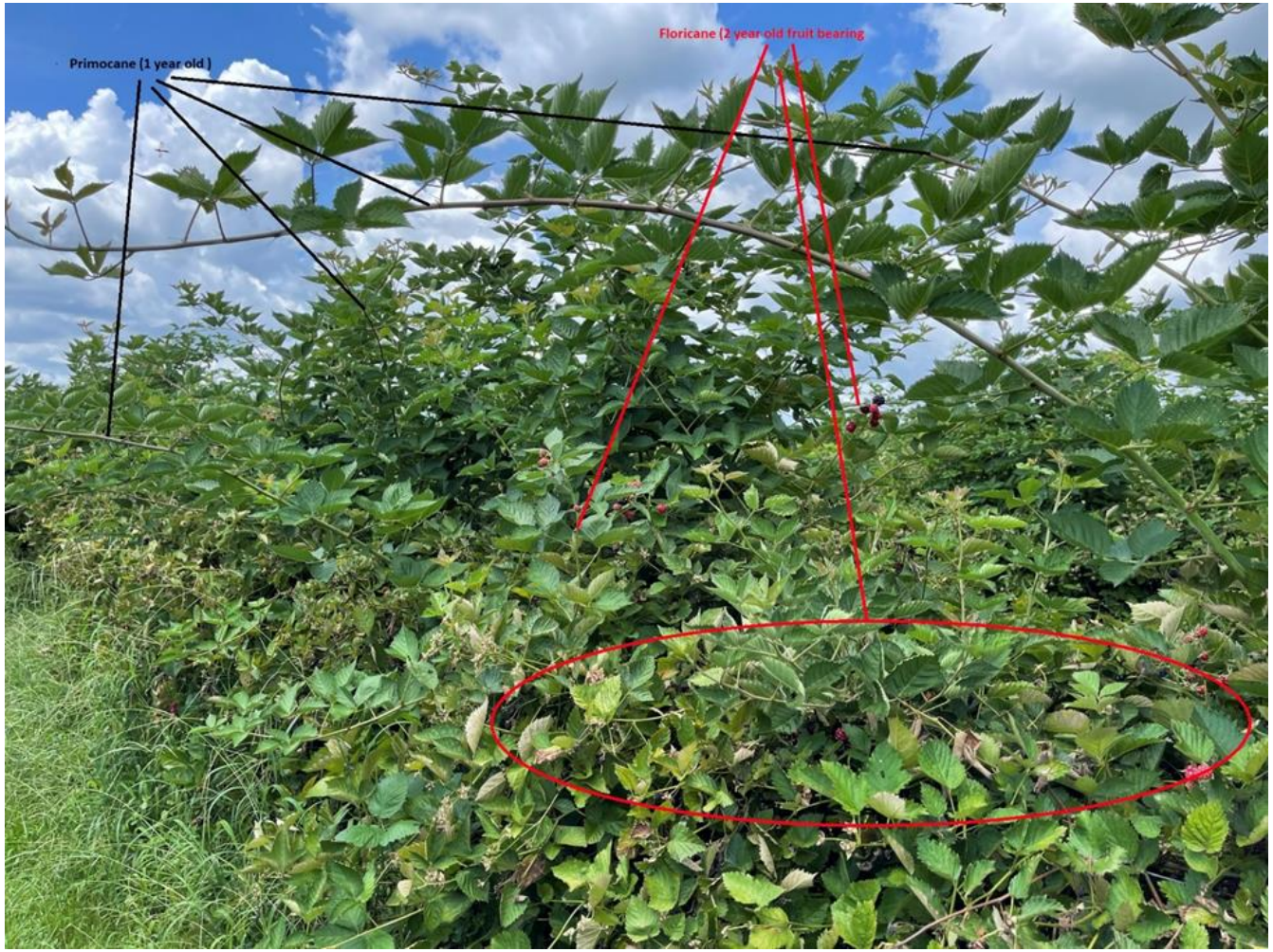
Primocanes vs Floricanes





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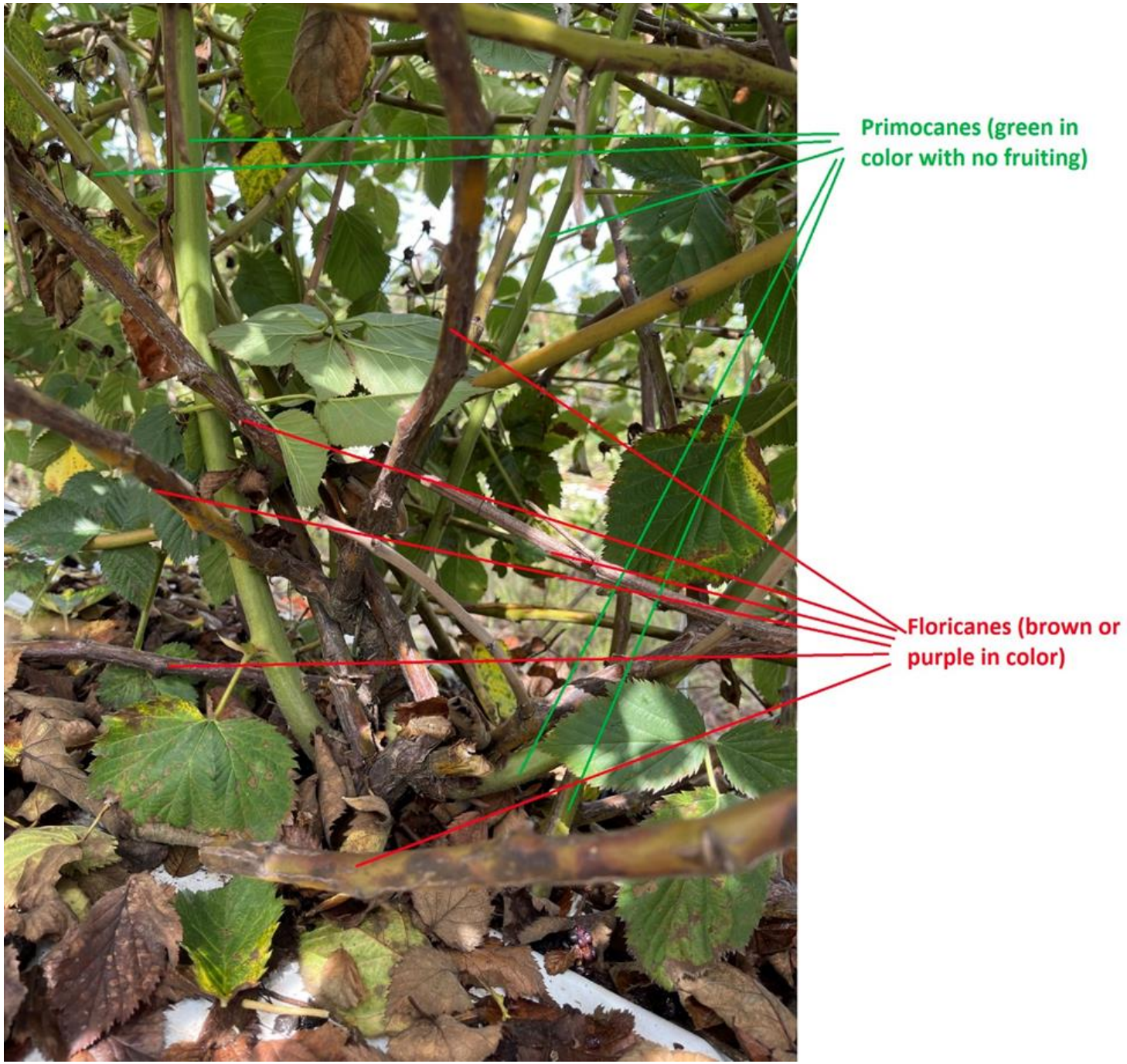
Primocanes vs Floricanes



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Why pruning in blackberry?

- For achieving optimal fruit size, yield, and quality
- Limiting disease and pest attacks and pressure.
- To remove dead, diseased, and dry canes (branches) within the plant canopy
- To increase plant's energy reserve

- https://www.youtube.com/watch?v=kIAuafrNH6Q&t=200s

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Why pruning in blackberry?

Before pruning

After pruning

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When to prune?

- Three pruning events i.e., early summer, late summer and winter pruning are recommended for Floricanes blackberry production in Florida.
- Always use well disinfected tools and keep doing disinfecting of cutting parts of pruners and loppers after pruning a certain number of plants or rows.
- Sterilization of pruning tools is very critical to prevent the spread of any disease. Use a 10% bleach solution or quaternary ammonium to disinfect cutting tools between each plant to avoid spreading disease.

Pruning Kit

Lopper

Pruner

Gloves

Tie tape

Early Summer Pruning/Tipping

- Tipping refers to removing the tip of the primocanes in early summer pruning.
- The main goal of tipping is to increase the number of laterals by simply removing tips of each primocane.
- Primocanes can be easily tipped by hand in early summer when they are tender but use a pruner when pruning them later in summer when they are stocky.
- Always cut/remove tip right above the leaf. All primocanes that are 4-5 feet in height are tipped so that laterals can easily be trained on the top wire of the trellis system.

Tipping

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Tipping

Late Summer Pruning/Tipping

- Primocane pruning can also be done after harvesting in early July along with floricanes pruning
- In other blackberry producing states like Oregon, Arkansas, North Carolina berries are harvested during July to August while harvest season might go to September in Oregon.
- In Florida floricanes pruning is recommended any time after harvesting for better growth and development of primocanes, which going to fruit next year.
- All floricanes are pruned to the earth leaving the 4-6 healthy uniform primocanes.
- If too many primocanes are left to fruit, it will make the canopy dense with shading issues, with less air and light penetration affecting the fruit quality.

Late Summer Pruning/Tipping

No floricane prunning after harvesting

Floricanes were prunned to the earth after harvesting

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Late Summer Pruning/Tipping

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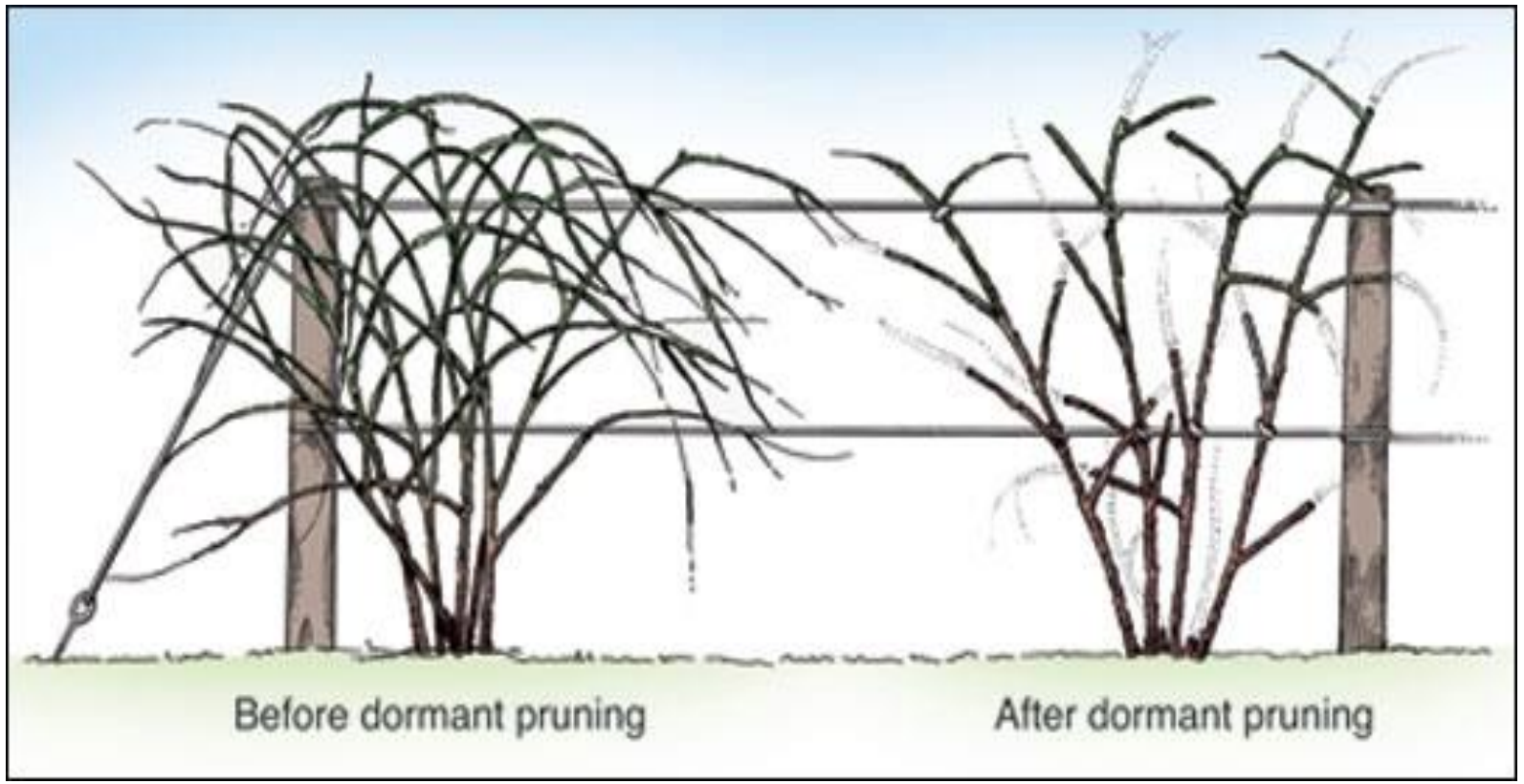
Winter Pruning

- Pruning all the dead, smaller, weak, and branches without laterals
- Branches growing in the wrong directions are removed
- Laterals branches produced after tipping are also pruned to 14–16-inch length
- Afterward, all the branches are tied up to wires on the trellis system
- Removing pruned branches is important because will serve as a source of disease and pest inoculation
- This is also a good time to inspect the trellis system and fix any wear.

Winter Pruning



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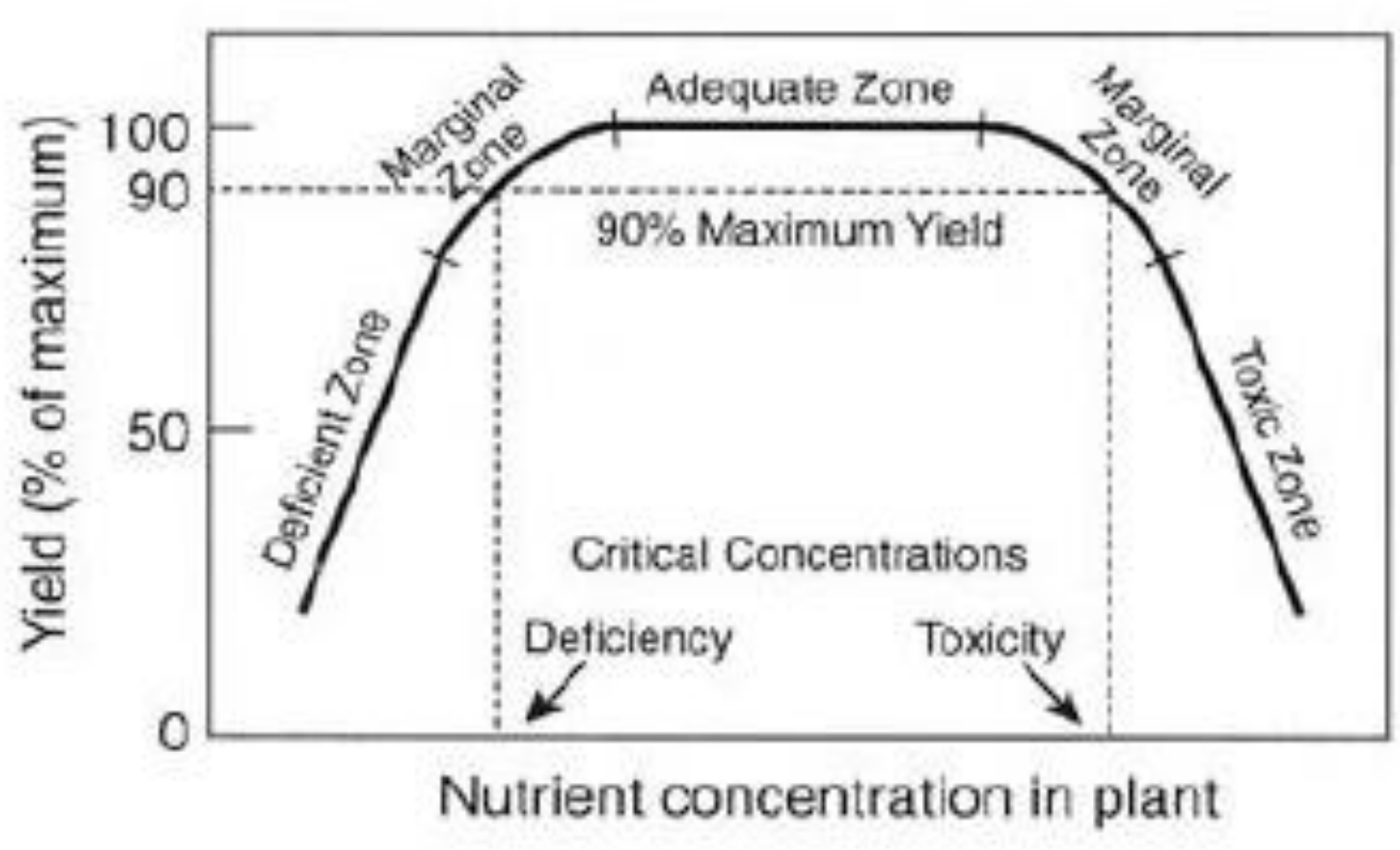
Nutrient Management: Key points

- Nutrients are required for sustainable growth and production
- Nutrients will never mitigate other production issues
- Don’t wait until you feel deficiency symptoms in plant
- Soil and tissue sampling to assess nutrient status
- Soil pH
- 5Rs concept:
  - Right fertilizer source
  - Right rate
  - Right time
  - Right place
  - Right moisture

Nutrient Concentration & Yield



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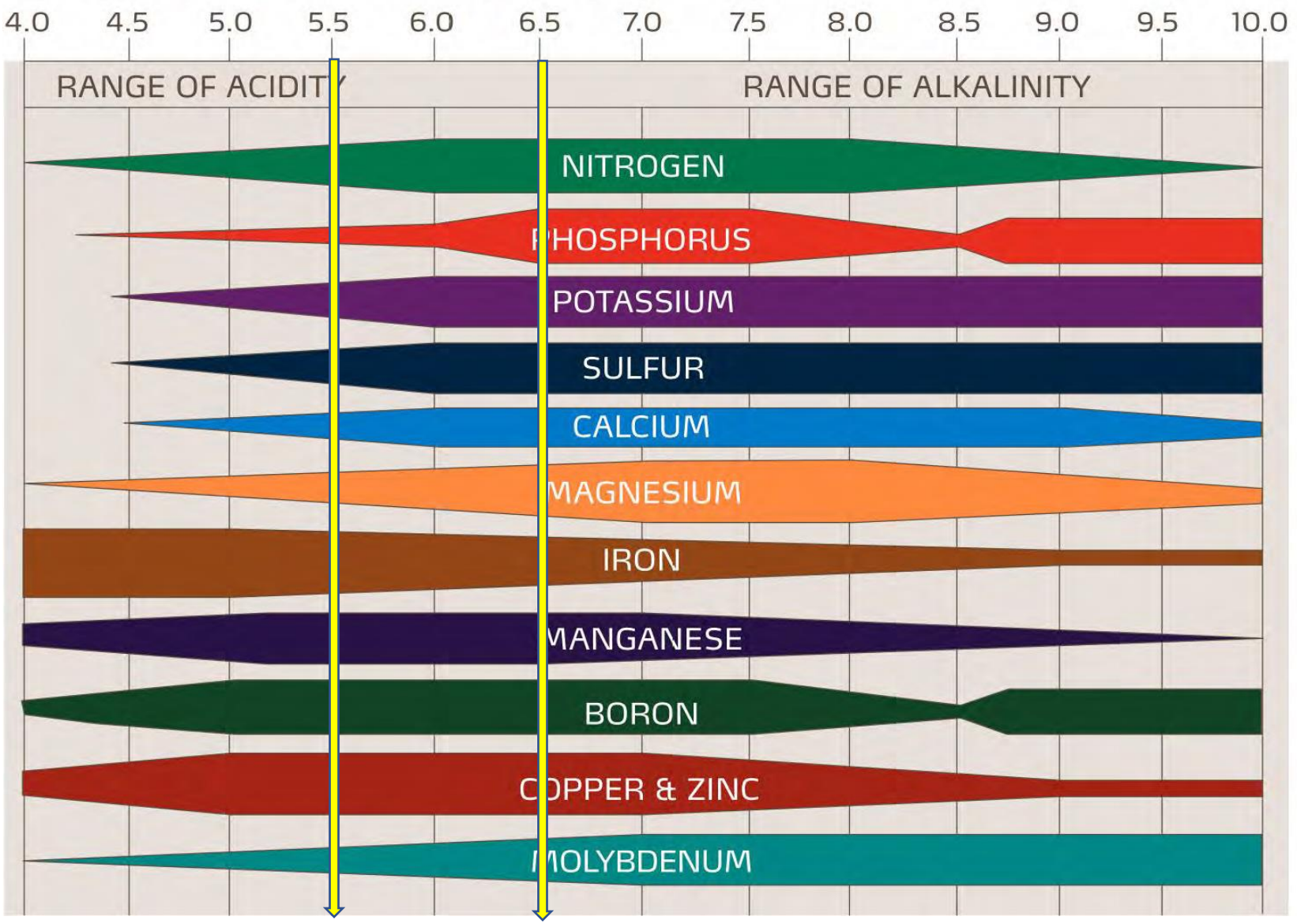
Role of Soil pH in Nutrient Uptake



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Pre-Plant Soil Testing

- Goal: to know weakness and strengthens of soil to adjust nutrients, pH and organic matter in soil
- Get representative samples from 6-8 inches
- Add nutrients and amendments according to the soil test results

Nutrient	Deficient at less than (ppm)
Phosphorus (P; Bray)	20 to 40
Phosphorus (Olsen)	10 to 20
Potassium (K)	150 to 350
Calcium (Ca)	1000
Magnesium (Mg)	120
Manganese (Mn)	20 to 60
Boron (B)	0.5 to 1.0

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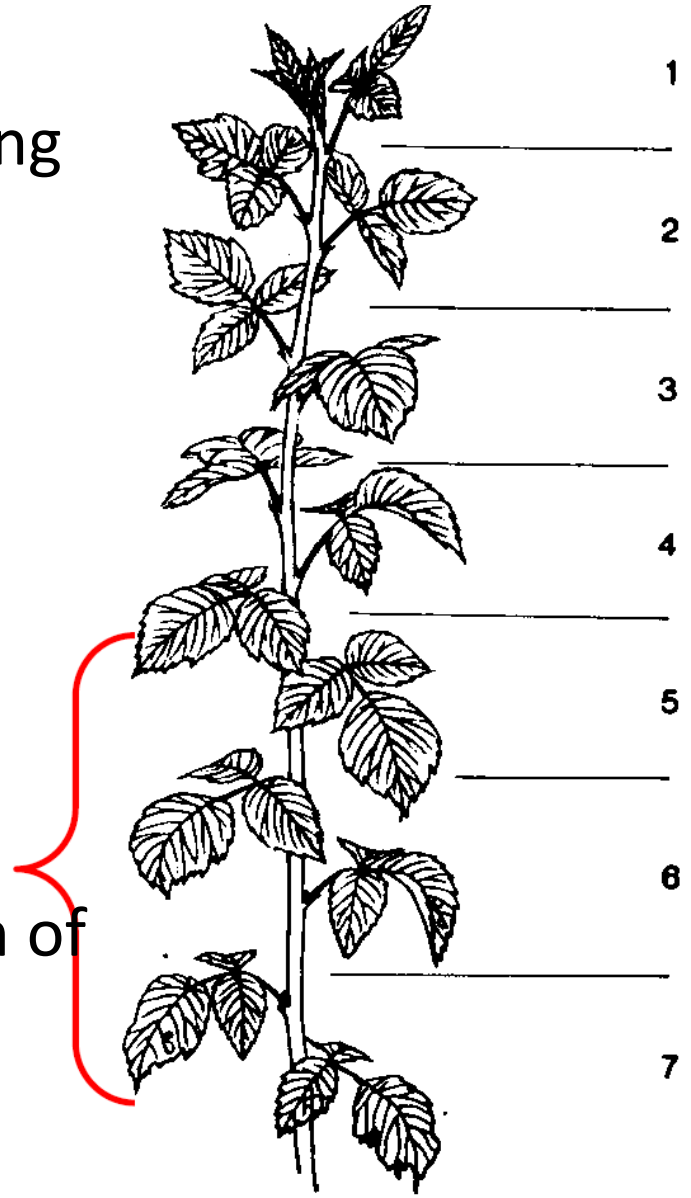
Plant Tissue Testing

- Predicting fertilizers needs of plants
- Diagnosing nutrient related problems
- Evaluating fertilizer program
- Effective in monitoring and adjusting fertilizer needs in annual crops
- Not useful in perennial crops – minimal short-term effect on yield

When to sample?

- Tissue concentration changes rapidly during early growing season in blackberry
- Concentration is mostly stable in late June to July
- Tissue sampling other than stable period is not recommend to check the nutrient status
- Do not mix cultivars in tissue sample
- Sample should have 50 newest fully expanded leaves 12 inches from the tip – one leaf /primocane
- Collect leaves with petioles
- Collect free of disease leaves
- Don’t wash them, put them in paper bag and send them of lab.
- Samples should reach the lab in less than 7 days

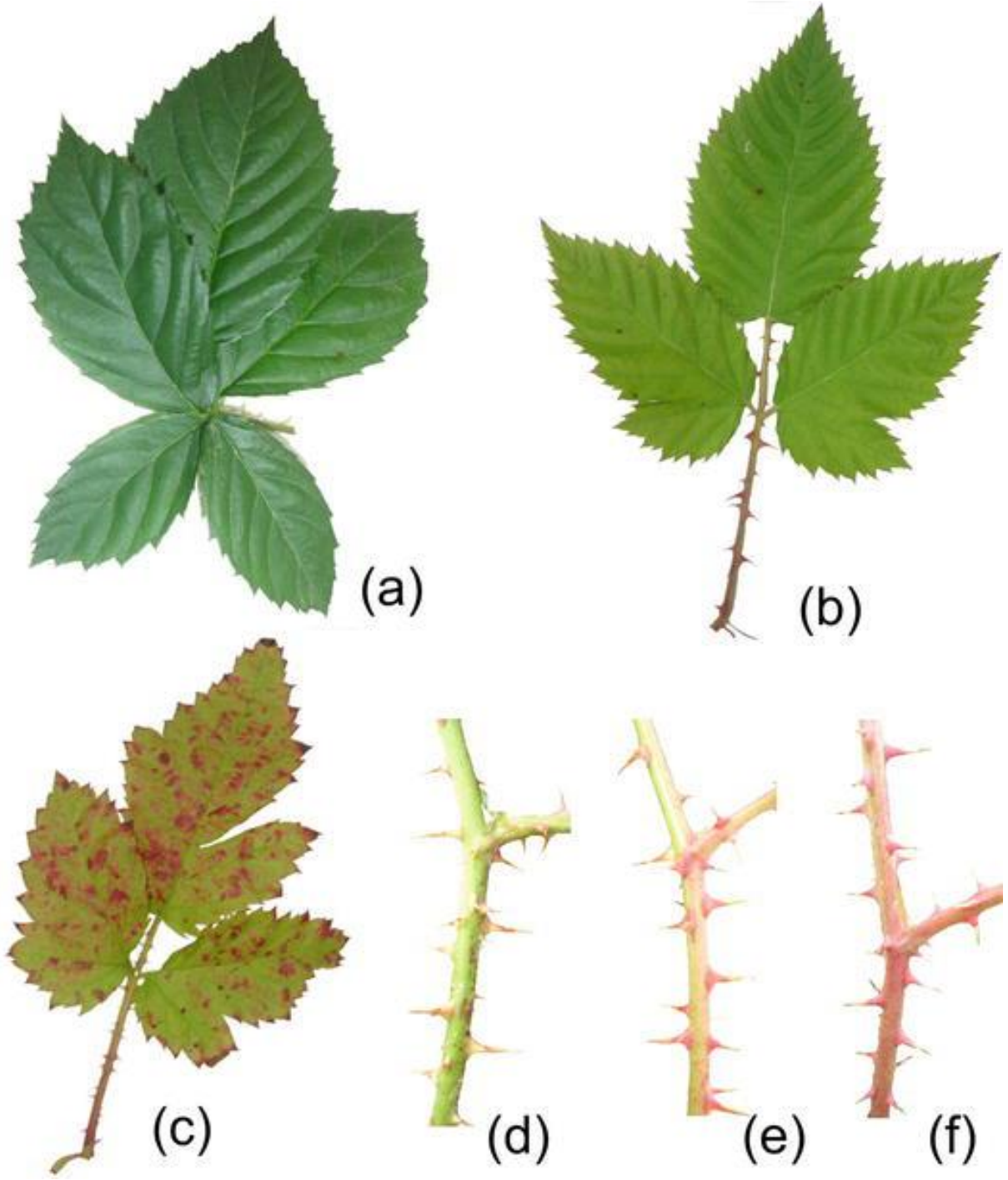


Hughes et al., 1979

Nitrogen

- Blackberry nitrogen requirement varies with yield, cane growth, plant age, soil type, irrigation, rainfall and cultivar
- Cane growth is the first indicator of N sufficiency
- Some cultivars are more vigorous than other so need less N
- Excessive N will promote vigorous vegetative growth resulting in thinner primocane with short internodes – reducing yield
- Excessive N in late winter or early spring may reduce the fruit firmness due extra accumulation in fruit
- Tissue sampling during stable period should be **2.3-3%**
- ¼ lb per plant in 1st year and afterword's 1/2lb/plant 10:10:10
- 40-50 lb per acre in 1st year and 50-70 lb/ac in year 2 and after is safe level
- N source: Urea, ammonium nitrate, calcium nitrate and ammonium sulphate

Nitrogen deficiency



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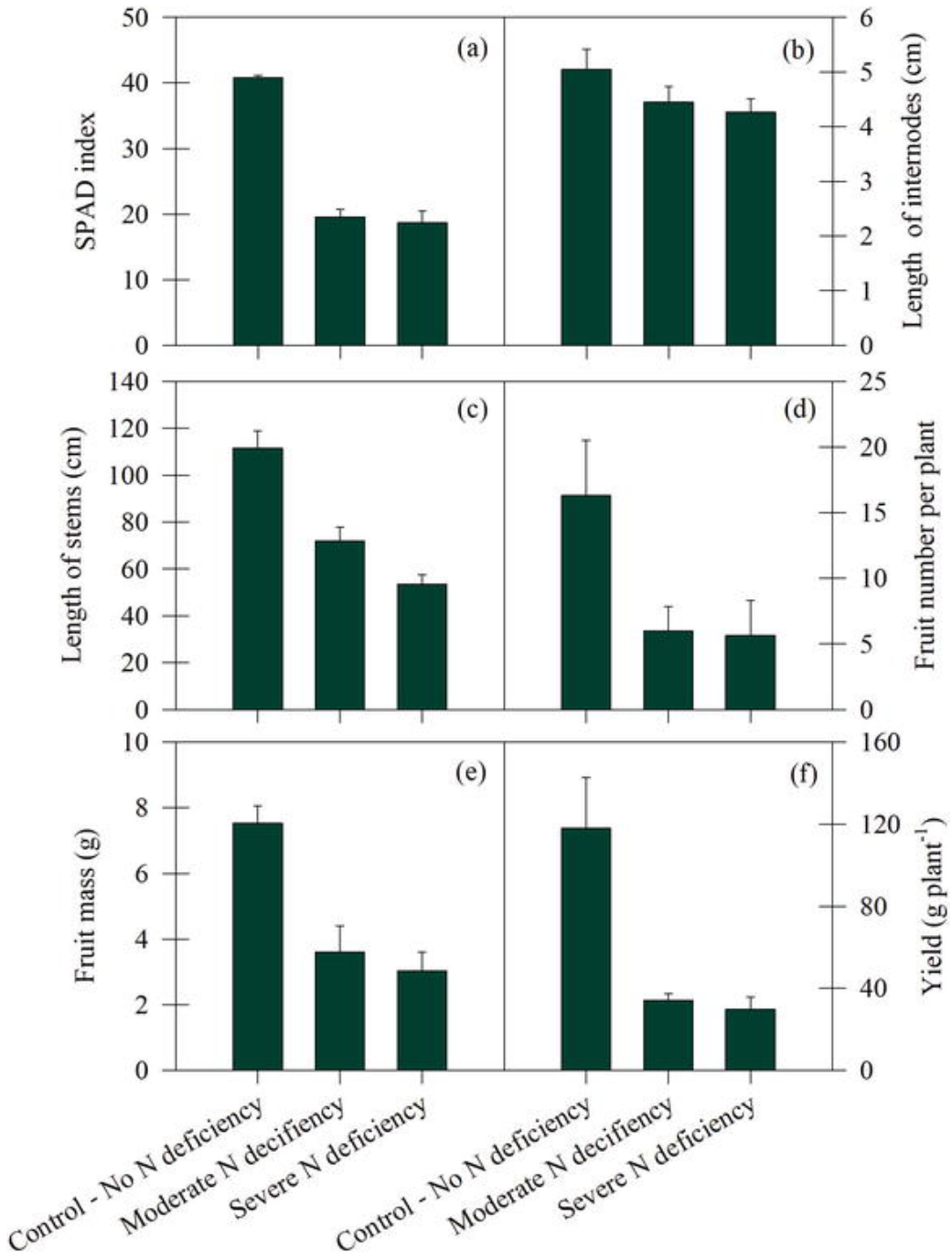
Pereira et al., 2018

Effect of N Deficiency on different characteristics



Pereira et al., 2018

Phosphorus (P)

- Mobile in plant, but immobile in soil
- Excess P will increase root to shoot ratio. No evidence that added P will increase growth/yield if leaf values sufficient
- Excess P may lead to micro-nutrient deficiencies
- Most commonly applied as granular in soil-grown; fertigated in substrate
- If tissue test shows **0.19-0.45%** then no need to add more P
- 25-30 lb/ac should be fine

Phosphorus

Umd extension, Mark Bolda

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Potassium (K)

- Mobile in plant, but somewhat immobile in soil
- Important for fruit firmness and good quality
- High rates of K can lead to “salt” injury
- Application of high rates or build up in soil may reduce uptake of other cations and yield
- Most commonly used sources are potassium chloride, potassium sulphate, potassium magnesium sulphate and potassium nitrate
- If tissue test shows **1.3-2.0%** then no need to add more K
- Equal to N, 40-50 lb/ac

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K Deficiency

Boron (B)

- Critical for bud break and fruit setting
- Promotes growth in growing tips of roots and shoots
- Promotes auxin activity
- Maintains balance between sugar and starch
- Translocation of sugars and carbohydrates
- Cell wall formation
- Transport of K to stomata for internal moisture regulation

Boron deficiency (B)

- Appears in young parts first
- Terminal buds die back
- Short internodal length
- Yellowing or yellow spotting along leaf margins
- New growth stubby and distorted
- Roots become short and stubby with few root hairs
- Flowering/fruiting is greatly reduced

Boron deficiency (B)

B Deficiency

Blueberry Tip Dieback
Due To B Deficiency

Gary Pavlis, Rutgers

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Boron Deficiency (B)

- Solubor or Borax
- Tissue test is preferred

If the soil test for B is (ppm):	If tissue B is (%):	Apply this amount of boron (lb/a):
<0.5	<25	2–2.5
0.5–1.5	26–30	1–2
>1.5	>30	0

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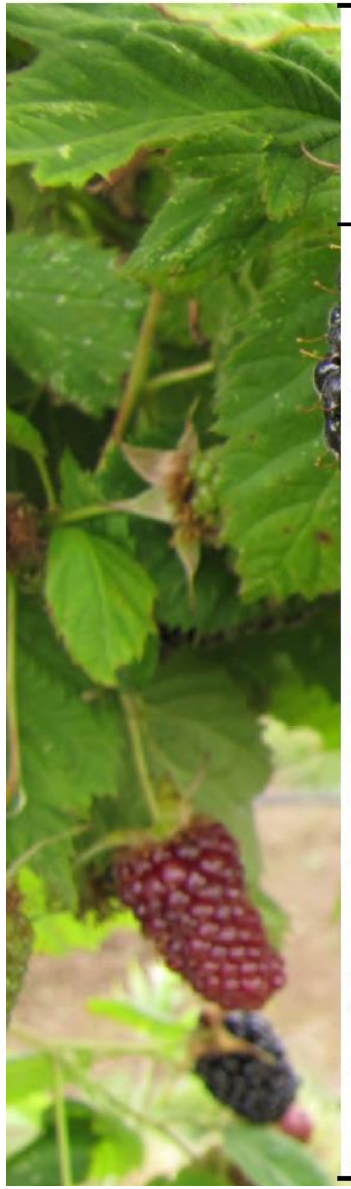
Tissue Sufficiency Levels for Blackberries



Nutrient	Current
Nitrogen (%)	2.3 to 3.0
Phosphorus (%)	0.19 to 0.45
Potassium (%)	1.3 to 2.0
Calcium (%)	0.6 to 2.0
Magnesium (%)	0.3 to 0.6
Sulfur (%)	0.1 to 0.2
Manganese (ppm)	50 to 300
Boron (ppm)	30 to 70
Iron (ppm)	60 to 250
Zinc (ppm)	15 to 50
Copper (ppm)	6 to 20
Aluminum (ppm)	na

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Fertilizer Application Methods

1. Surface feeding
- Broadcasting
- Top-dressing
- Side-dressing

2. Foliar feeding
- Spraying
- Drenching

3. Fertigating
- With sprinkler irrigation
- With center pivots
- With drip irrigation

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Shading to Improve Fruit Quality

- White drupelet
- Less sweet
- Less shelf life

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Mark Bolda

Shading to improve fruit quality: on-farm

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Take Home Message

- Summer and winter pruning is very important
- Do not let the weeds to grow
- pH (
- Fertigation for commercial production
- Use balanced fertilizer (10:10:10) with micros
- N (2.3-3%)
- K (1.3-2%)
- P (0.19-45%)
- Thornless floricane varieties are preferred

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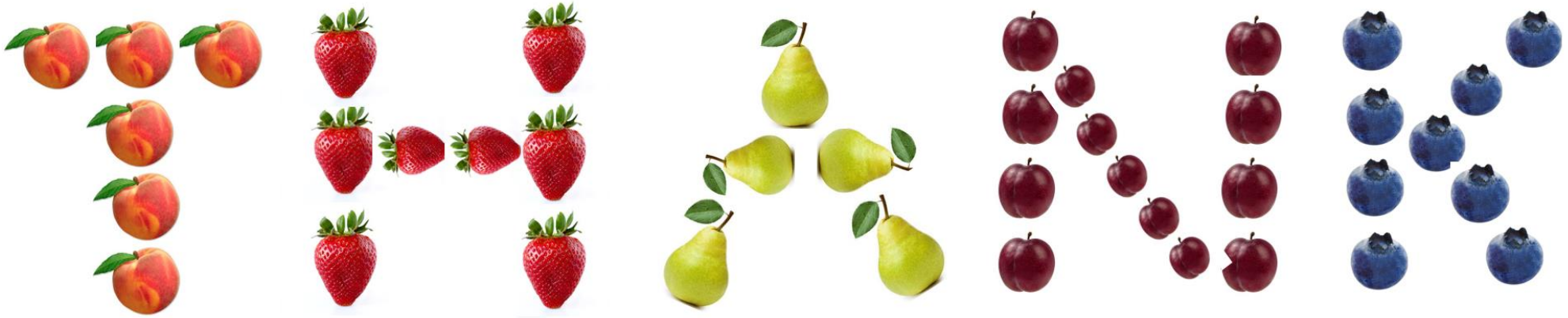

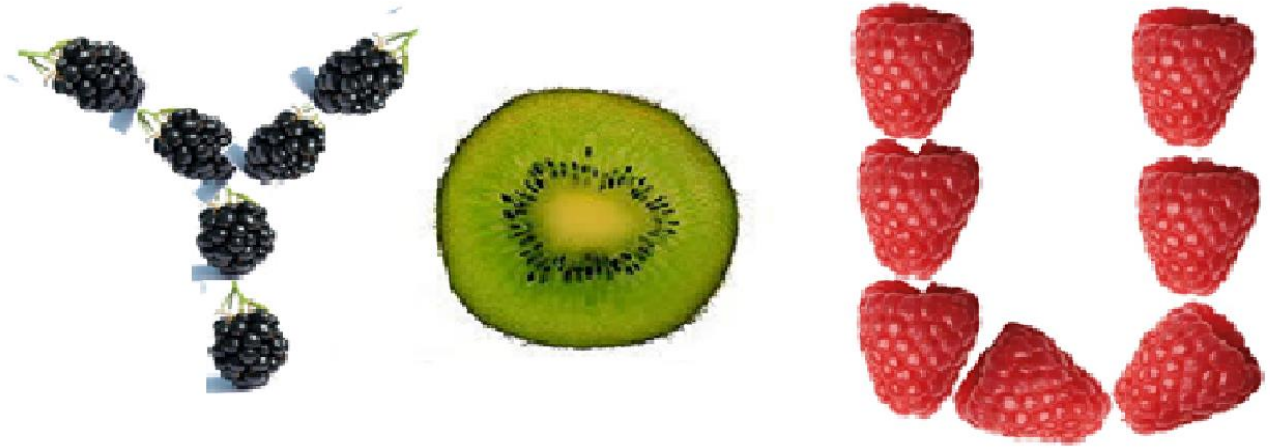

Questions

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