Best Practices for Cane Management and Color Reversion Prevention in Prime-Ark®45

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PACIFIC BERRY
BREEDING

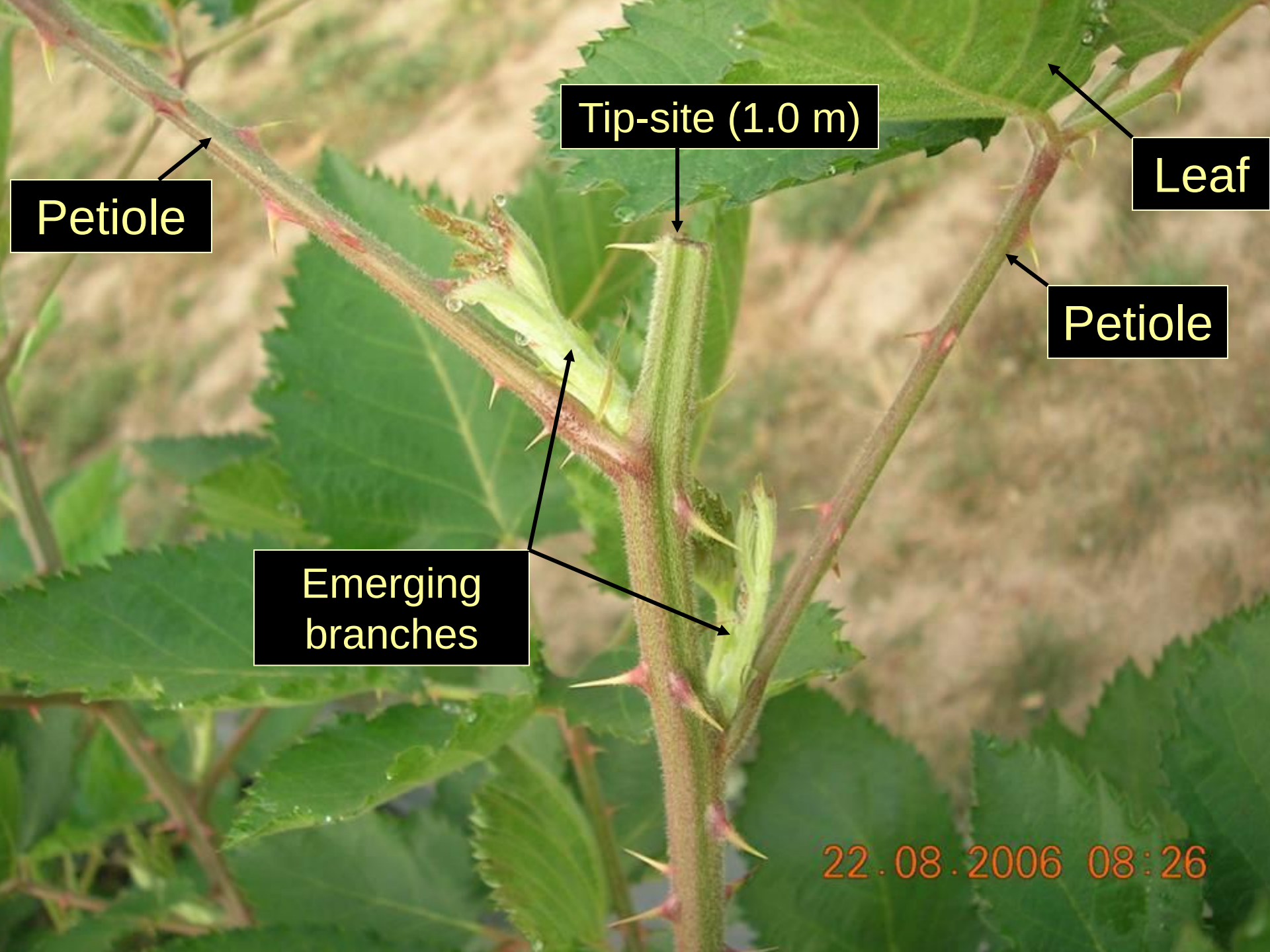
Outline

- Summary of Research
- Color Reversion and Postharvest Handling
- The CA Experience with Prime-Ark®45

Summary of Research

- Drake and Clark, 2003
- Thompson *et al,* 2007
- Strik *et al*, 2008
- Thompson *et al*, 2009
- Strik and Thompson, 2009
- Strik and Buller, 2012

- Canes MUST be tipped at least once!


Tip-site (1.0 m)
Leaf
Petiole
Petiole
Emerging branches
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Un-tipped primocane

Tipped primocane (1.0 m)

Un-tipped primocane

Tipped primocane (1.0 m)

Summary of Research

- Canes MUST be tipped at least once!
- Timing of tipping is critical

Tip 0.5 m (1.5 ft)

Tip 1.0 m (3.2 ft)

Tip 1.5 m (4.9 ft)

Remove flowers at bloom

Too late – DO NOT TIP!

Summary of Research

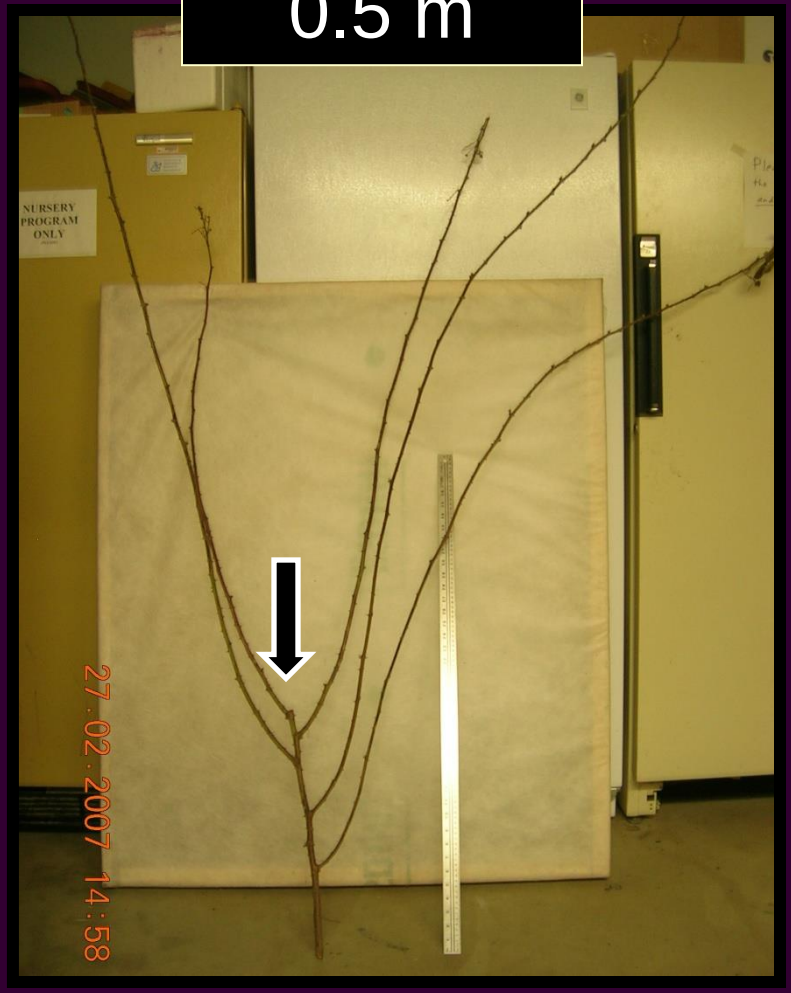
- Canes MUST be tipped at least once!
- Timing of tipping is critical
- Single-tip vs. Double-tip

Single-tip vs. Double-tip

- What's the difference?

Single-tip = Main cane tipped once

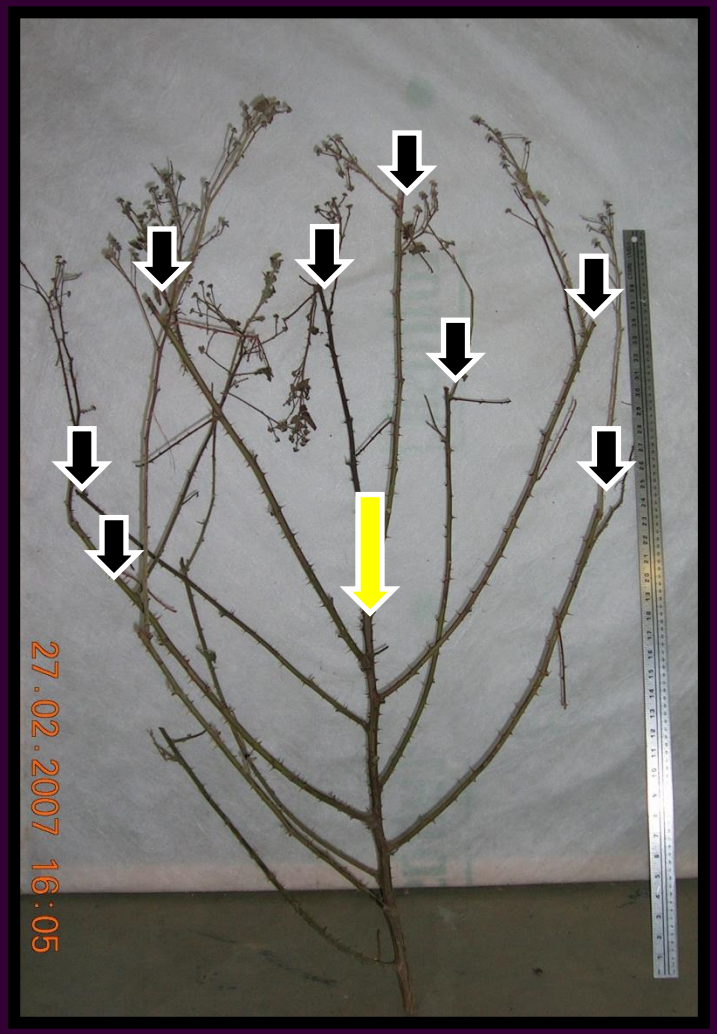
0.5 m



1 m

Double-tip = Main cane tipped once (0.5 m)

AND All branches tipped once (0.5 m)

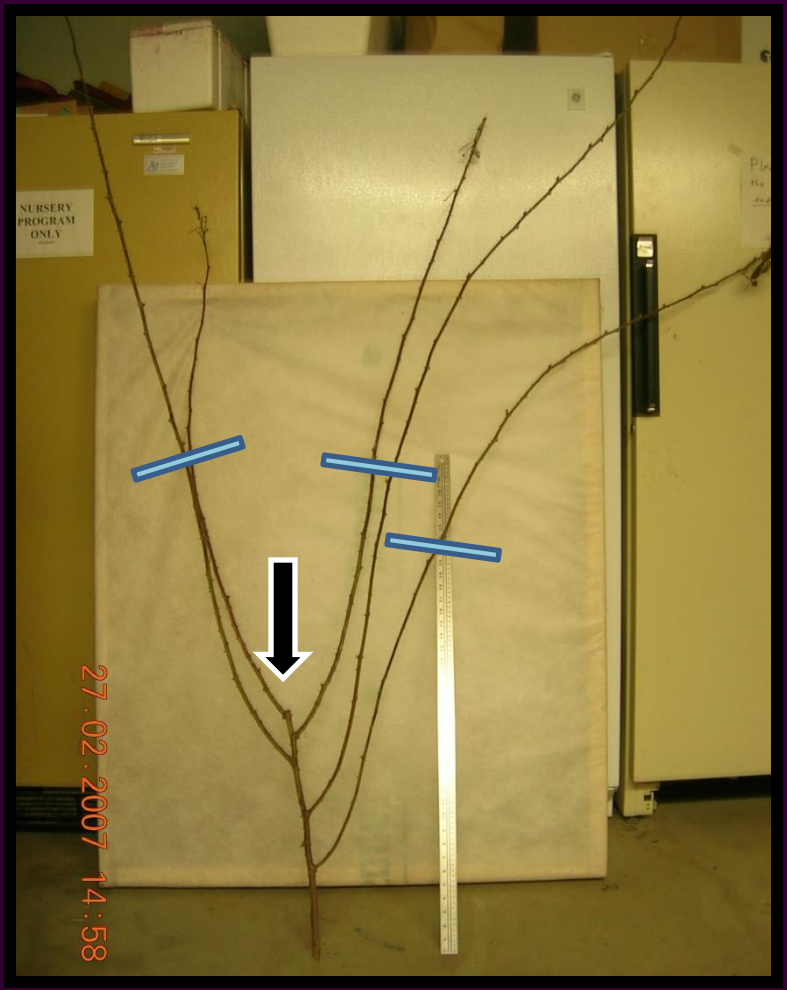


Single-tip vs. Double-tip

- What is recommended? Double-tip!
  - Labor intensive (canes grow in flushes)
  - Higher yield
  - More concentrated harvest

– Depends on your production goal

Main cane tipped at 0.5 m



Main cane tipped at 1 m


Double-tip = Main cane tipped once (0.5 m) AND
branches tipped once (0.5 m)

Summary of Research

- Canes MUST be tipped at least once!
- Timing of tipping is critical
- Single-tip vs. Double-tip
- Soft-tip vs. Hard-tip

Soft-tip vs. Hard-tip

- What's the difference?


SOFT-TIP
HARD-TIP
5-15 cm
(2-5 in)
25-40 cm
(10-15 in)

Soft-tip vs. Hard-tip

- What is recommended?
- TIPPING ! (At least once)
- If done by hand, soft-tipping is easier
- If done mechanically, hard-tipping is easier

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Color Reversion

- What is color reversion?

"A condition which manifests only after cold storage"

  - Also called red cell, red drupe, reddening
  - Individual drupelets turn from black to red
  - Up to 30-50% of a berry may turn red

Color Reversion

- What causes it?

- Stink bugs feeding on fruit? No.
- Changes in acidity after harvest? Not likely.
- Cell disruption, leaks pigment? Possibly.
- Heat, cold, rain damage? Yes!
- Handling? Yes, in some cases.
- Genetics? Yes, can influence color.

Color Reversion

- Why is it a problem?

- Blackberries are supposed to be **black**!!!
- Increased competition, increased complaints
- Re-packing is costly
- Consumer perception:
  - Red = sour fruit
  - Checkerboard-look = defective


Prime-Ark®45
After 7 days in cold storage (~34 °F)


Prime-Ark®45
After 7 days in cold storage (~34 °F)


Gardez les baies au réfrigérateur et
rincez-les avant de les utiliser.
Prime-Ark®45
7 days after cooling (~34 °F)

Color Reversion

- Different than:
- Heat damage
- Redberry mite damage
  - (*Acalitus essigi*)

Heat Damage

UV damage (sunburn)

Bronzing


Bronzing

Red Berry Mite

Unripe drupelets remain red and firm, found in patches.

Red Berry Mite

Color Reversion

- What else do we know?
- Warm berries suffer the most (> 72 °F)
- Chill / freeze injury seen most on:
  - Top layer of forced-air cooling
  - Loads near front of reefer trucks
- Nutrition imbalance
  - High N seems to promote reversion

Color Reversion

- Prevention

- More reversion seen at <35 °F
  - Protect top layer of fruit from forced air cooling
  - Check for cold and hot spots in reefers
- Use low-scoring varieties
  - Prime-Ark® 45, Prime-Ark® Traveler, Osage


Garder les baies au réfrigérateur et
rincez-les avant de les utiliser.
NATURIPEFARMS.COM
Prime-Ark® Traveler
After 7 days in cold storage (~34 °)


Prime-Ark® Traveler
After 7 days in cold storage (~34 °)

Color Reversion

- Prevention
- Less reversion at 41 – 50 °F
  - QC methods used in Mexico
  - Pre-cool for 2 hours @ 45 - 50 °F

Color Reversion

Berry temperature taken upon arrival in Mexico.

Rejected if over 72 °F

Fruit often pre-cooled at 45 – 50 °F

Color Reversion

Prevention

- Reduce temperature in canopy:
  - UV blocking plastic
  - Allow late-emerging canes to grow and shade fruit


Later season canes allowed to grow
Early season canes tipped

Outline

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The CA Experience

- Prime-Ark®45:

- Productive
- Large berries (10+ grams)
- Tolerant of many soil / water qualities


S. Maria
9/8/14 PA-45

The CA Experience

- Prime-Ark®45:

- Harvest on primocanes begins:
  - 8.5 – 9 months (Year 1, December planting)
  - 7.5 – 8 months (Year 2, after mow down)

The CA Experience

- Prime-Ark®45:
- Harvest on floricanes:
  - Late April (enclosed tunnels)
  - May (plastic on at bloom)
- Difficult to crop floricanes + primocanes

The CA Experience

- Prime-Ark®45:

- Pests:
  - Raspberry Crown Borer
  - Lygus (*Lygus lineolarus*)
  - Cucumber beetle


Lygus damage
(*Lygus lineolarus*)

The CA Experience

- Prime-Ark®45:
- Overall, a positive one:
  - High productivity and vigor
  - Excellent prices July – Oct.

A New Experience

- Prime-Ark® Traveler
- Thornless
- Similar productivity / berry size to Prime-Ark®45
  - Same cane management recommended
- Less reversion, but not zero

Thank You