Harvista™ Trials Pennsylvania, 2015

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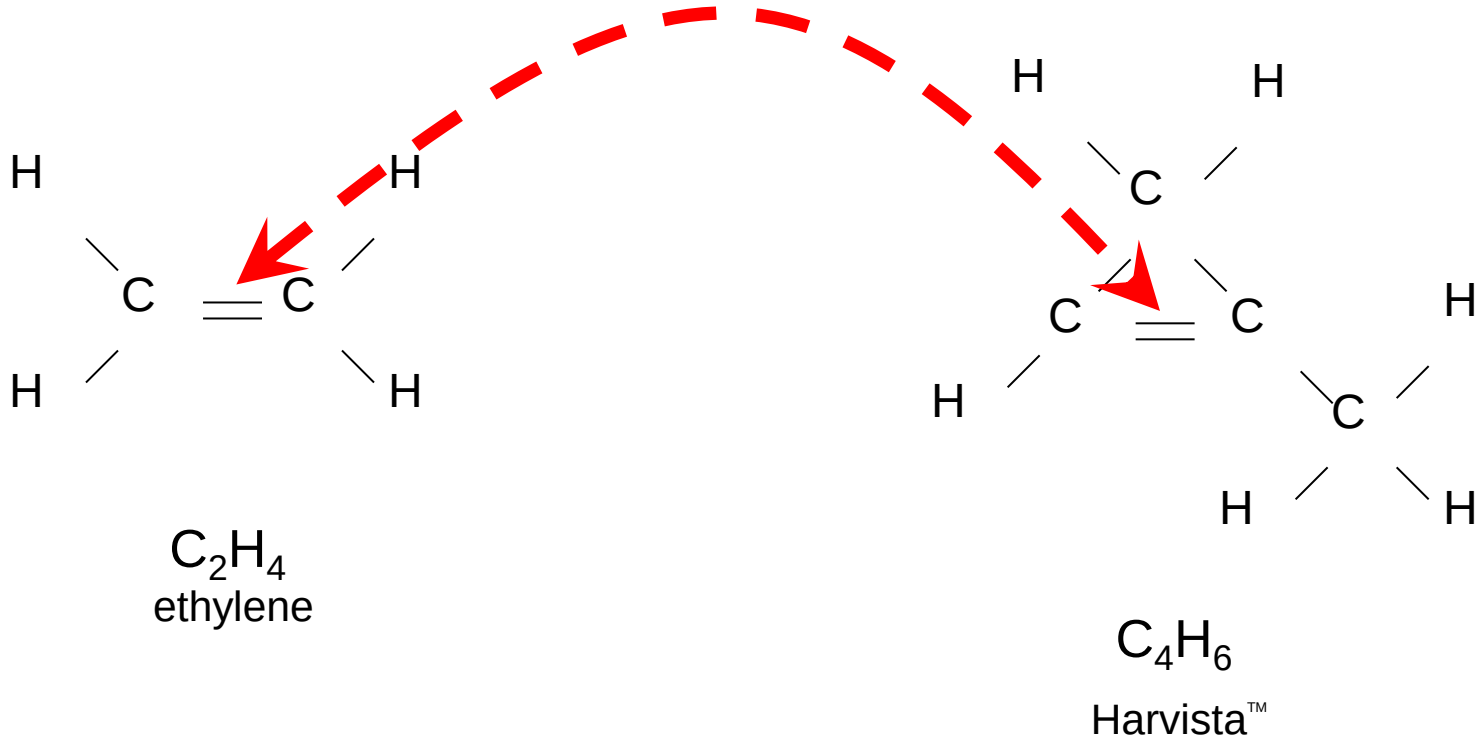
Harvista

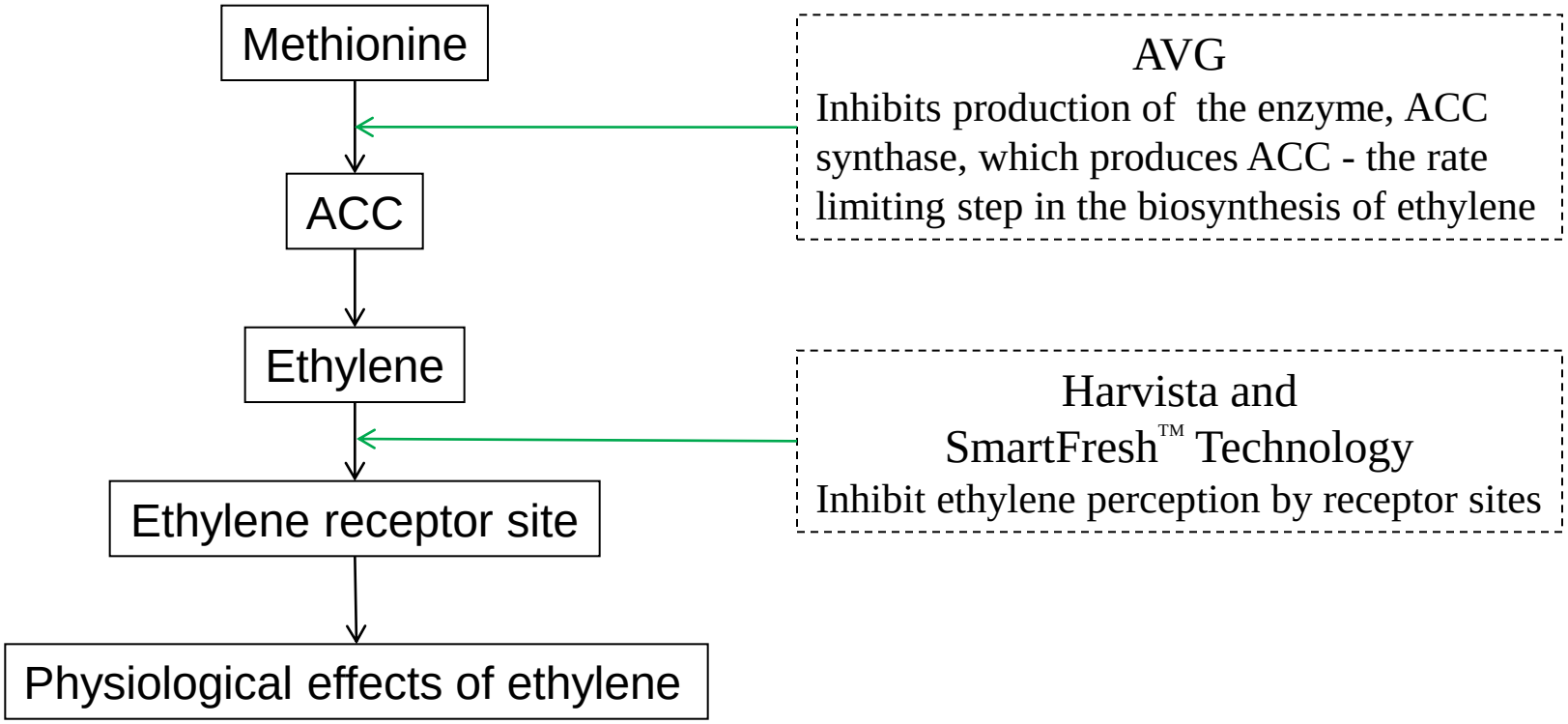
- What is Harvista?
- Why is Harvista important?
- How does this benefit you (the grower)?

How Does Harvista Work?



To an ethylene receptor, the Harvista molecule (1-MCP) is similar to ethylene, *but more attractive*.

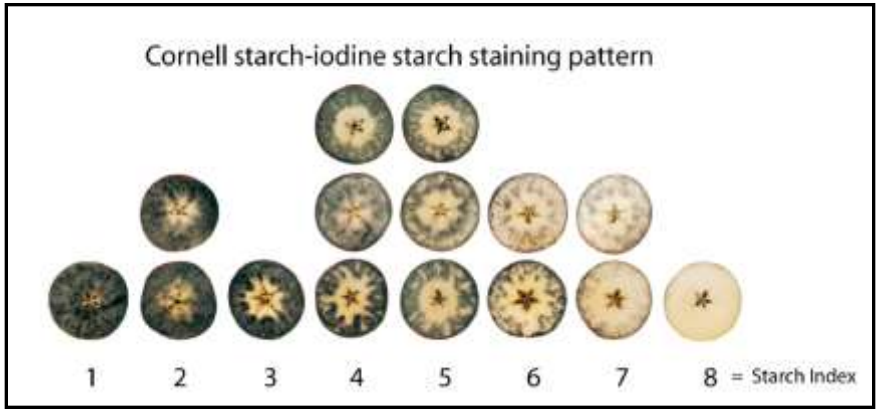
Ethylene Biosynthesis



"Real time" because mode of action allows application close to harvest

How is Harvista Applied

- Starch testing – iodine stains the starch

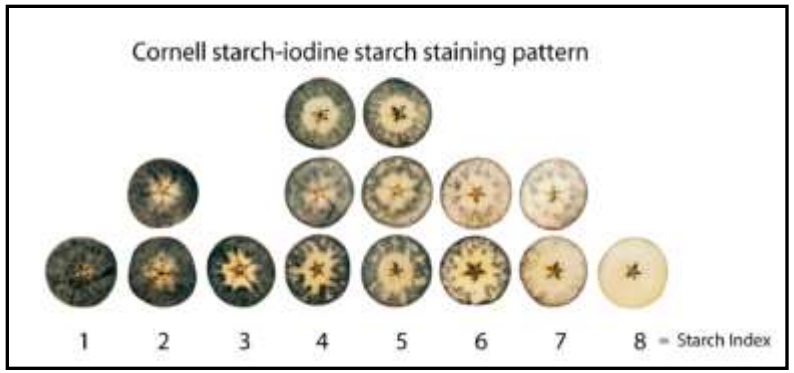


How is Harvista Applied

- Harvista Use Recommendation Guide

APPLE VARIETY	OPTIMUM AVERAGE STARCH INDEX AT APPLICATION*
Gingergold	1.0 - 2.0
Gala	1.5 - 3.5
McIntosh	3.0 - 4.0
Honeycrisp	5.0 - 6.0
Spartan	1.5 - 2.5
Macoun	2.0 - 3.5
Empire	2.5 - 3.5
Jonagold	5.5 - 7.0
Red Delicious	1.5 - 3.0
Golden Delicious	3.0 - 5.0
Idared	2.5 - 4.5
Fuji	2.5 - 4.5

* Starch Index scale of 1 to 8 (Generic Starch-Iodine Index for Apples, Cornell Cooperative Extension Info Bull 221).



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http://www.turbomist.com/150_series/S24P300SHD/181

How is Harvista Applied

Sprayer

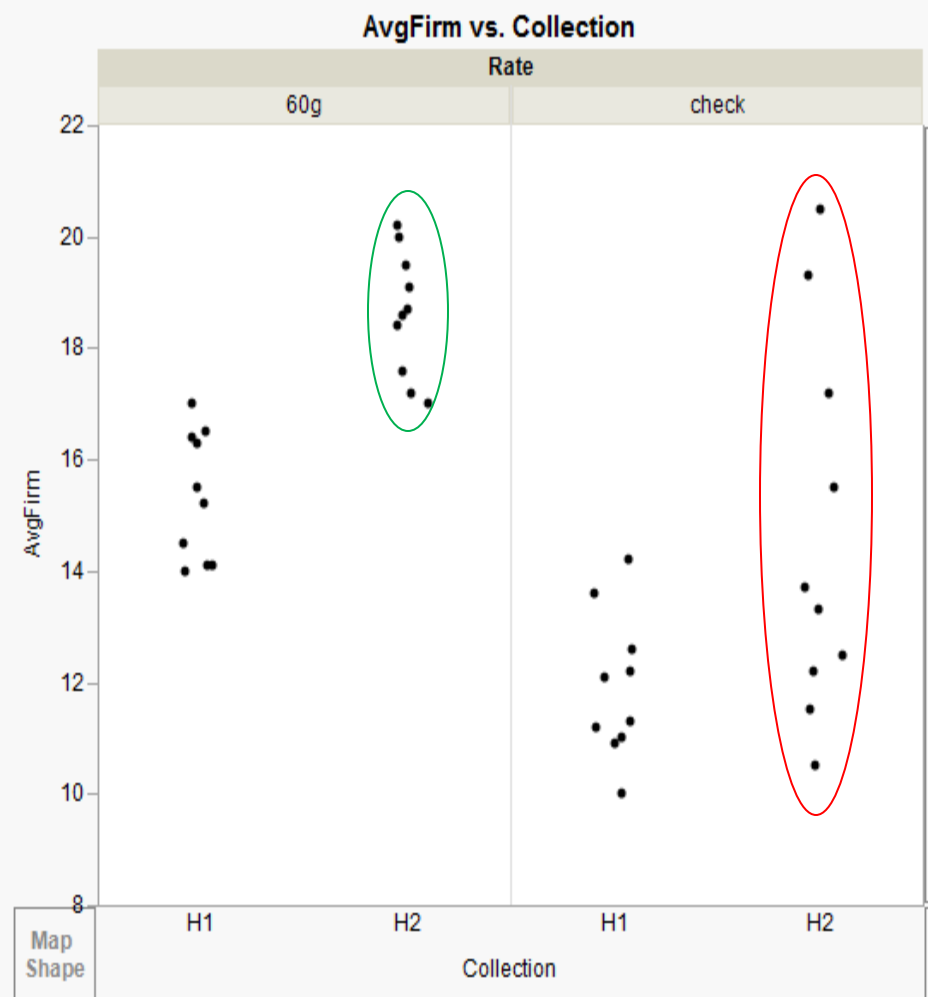
- Turbo-Mist sprayer built by Slimline Manufacturing, Penticton, BC, Canada
- Nozzles are interchangeable, 13 nozzle bodies on each boom (26 total), adjustable plenum
- 300 gal tank
- Injection system: concentrate tank saddled on the side and injection pump mounted at the rear
- Adjustable fan speed: Hi and Lo; neutral for calibration
- Calibration by weight of concentrate used per minute
  - Ground speed fixed by the tractor
  - Adjust line pressure
- How wide will it be? Narrow enough to travel trough 10 ft. row spacing in trellis plantings

Saddle Tank and Injector Pump

Why is Harvista Important?

- Production (“field”) quality benefits:
  - Fruit drop
  - Maintain firmness & brix
  - Greasiness control
  - Condensed maturity
  - Acid retention (Honeycrisp)
  - Reduced watercore (Fuji and others)
- Management benefits:
  - Labor management (and cost)
  - Harvest efficiency
  - Consistent storage response
  - Higher ROI (packout)

Why is Harvista Important?



Buckeye Gala

- Scatter plot of apple firmness
- Application date: 8/21/15
- Harvest 1 (H1): 9/3/15
- Harvest 2 (H2): 9/10/15
- Untreated apples become increasingly variable with harvest delays
  - > Advanced apples are susceptible to storage problems!
- Harvista maintains firmness and consistency!

Buckeye Gala – Starch Test

Harvista

Untreated Control

Why is Harvista Important?

- Buckeye Gala, sprayed with Harvista on 8/25/15; day of photo = 9/16

Harvista

AVG

Control

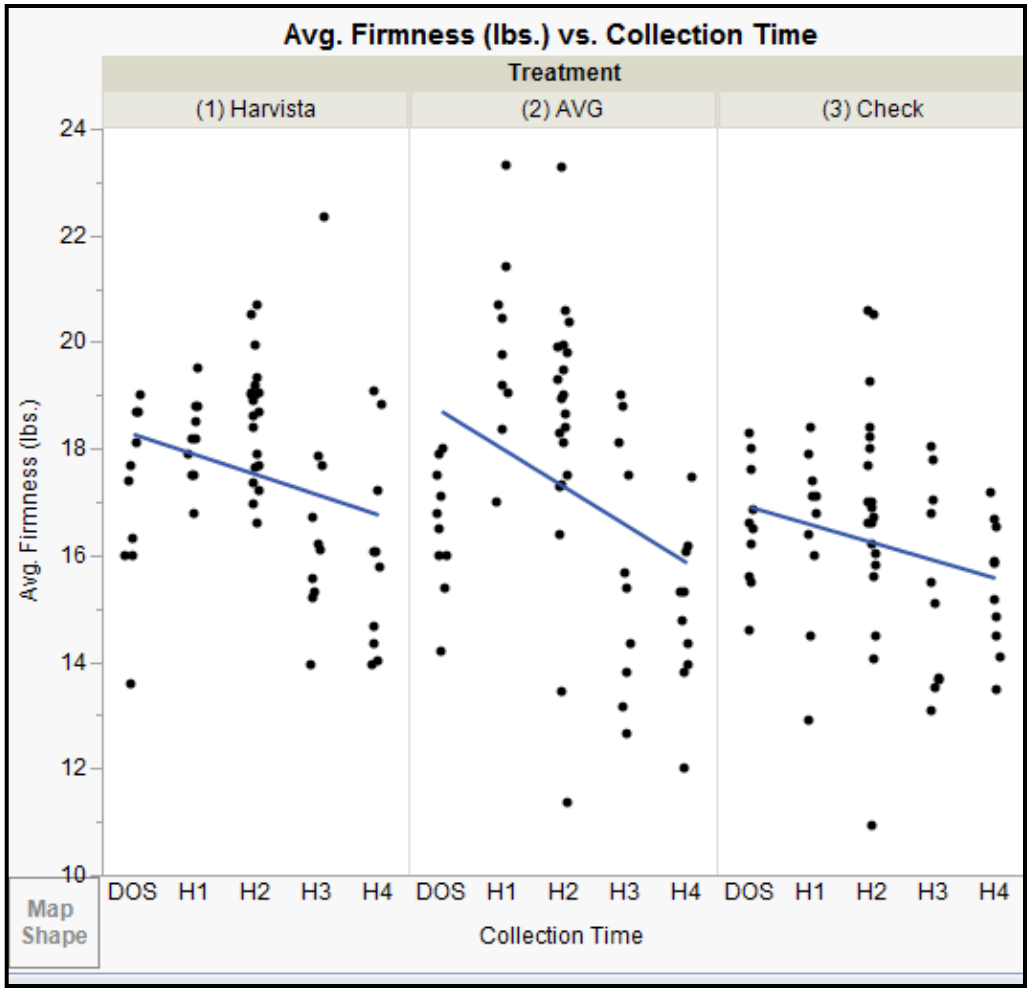
- Grower 1, Application date = 8/21, photo 13 days later

- Grower 2, Application date = 8/18, photo 17 days later

Harvista

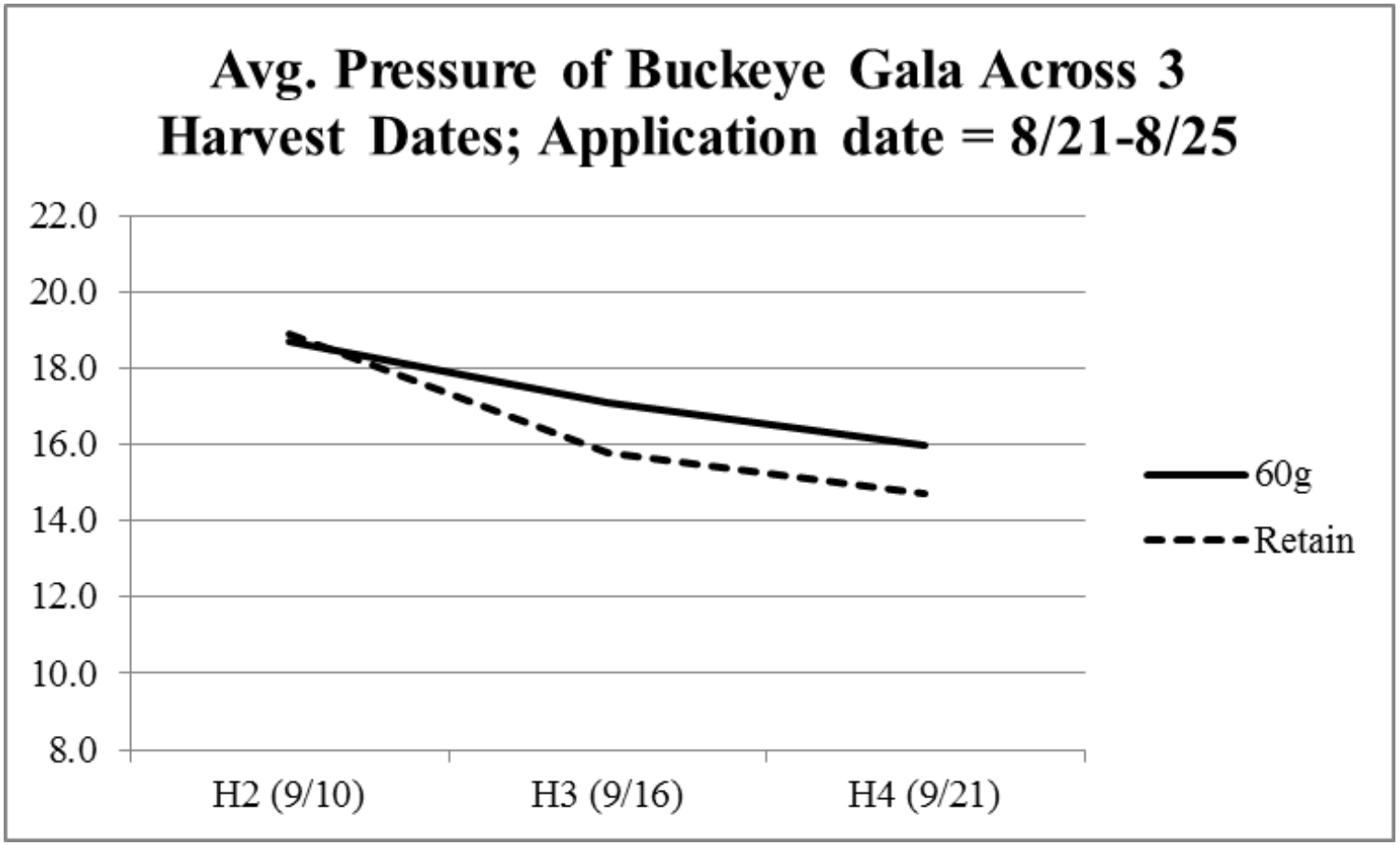
Check

Buckeye Gala Firmness



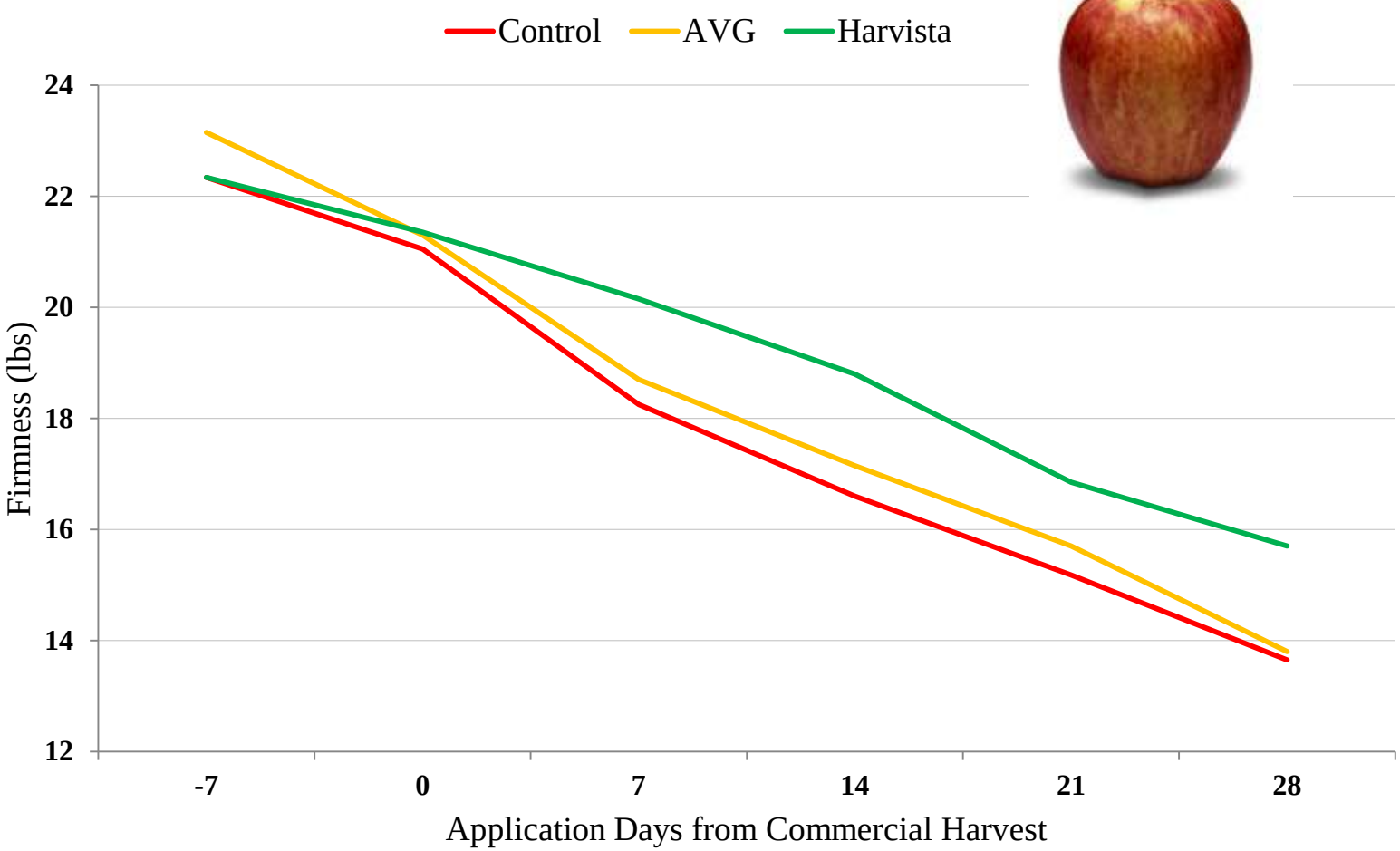
Harvista improved firmness and consistency

Adams County Gala



Why is Harvista Important?

Harvista – Gala Firmness Response



2015 Pennsylvania Honeycrisp

What was measured:

- 6 locations
- 3+ different collection dates, 3-7 days apart, starting with date of application
- 4 rates: 60g, 40g, check and NAA
- Measured: color (pictures), firmness, brix, starch, on 10 apples each collection date, each farm
- Also measured:
  - Rootstock (M 26 and M 9)
  - 2 timings:
    - Harvista applied before first spot-picking
    - Harvista applied after first spot-picking
  - Size of tree: short and tall (tree row volume adjustments)

Honeycrisp – color

Application date = 8/27; orchard photos are H1 (no 40g rate)

Sampling of apples on 8/25

60 g Harvista

Control

Honeycrisp – harvest management

Treated

- Application date: 8/27
- Picked once and delivered on 9/11
- Extra-fancy

- Untreated
- Top photos picked on 9/5
- Bottom photos picked on 9/7

Honeycrisp - color

40g

Check

- Harvista: 40g rate on short trees
- Application date = 8/27
- Photo of color on 9/10

Honeycrisp - color

Honeycrisp
- Application date = 9/8
- Harvest on 9/28

Grower remarks,
“Still crispy with flavor.”

Honeycrisp

Harvista applied 8/31. Photo on 9/28 across all treatments.

Honeycrisp - starch

Application date = 8/31; photo taken on 9/28

Why is Harvista important?

Honeycrisp – color on short vs. tall trees

Same 60g rate rate of Harvista was applied to both sets of trees. Application date was 9/3, these photos are H1 (9/10).

Short trees on left. Tall trees on right.

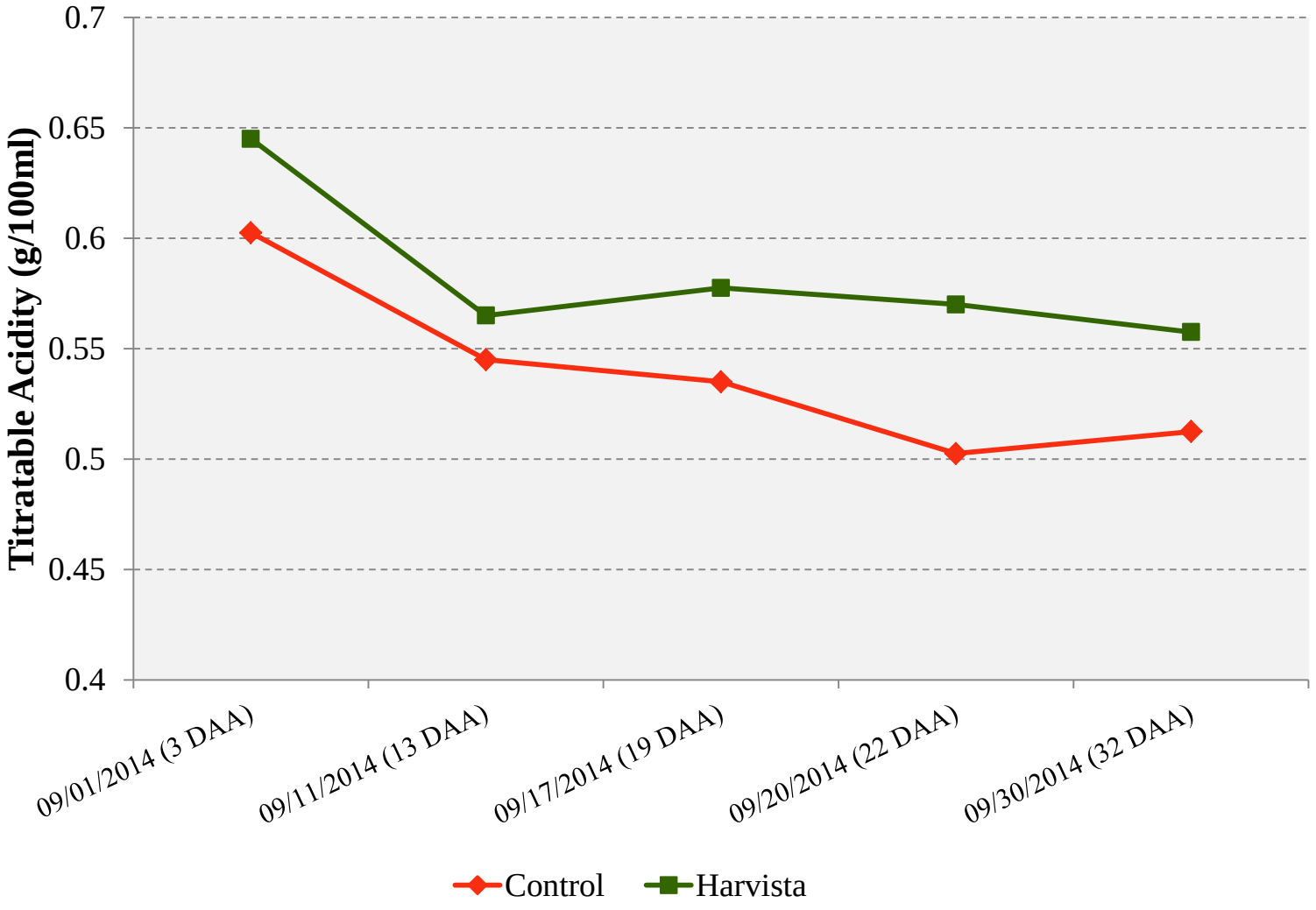
Why is Harvista Important?

- Does Harvista affect coloring of HC?
  - Yes it can!
- But, it doesn't have to…
  - Delay harvest date
  - Influence of strain, cultural practices, and weather
- What about Brix, acid, drop?

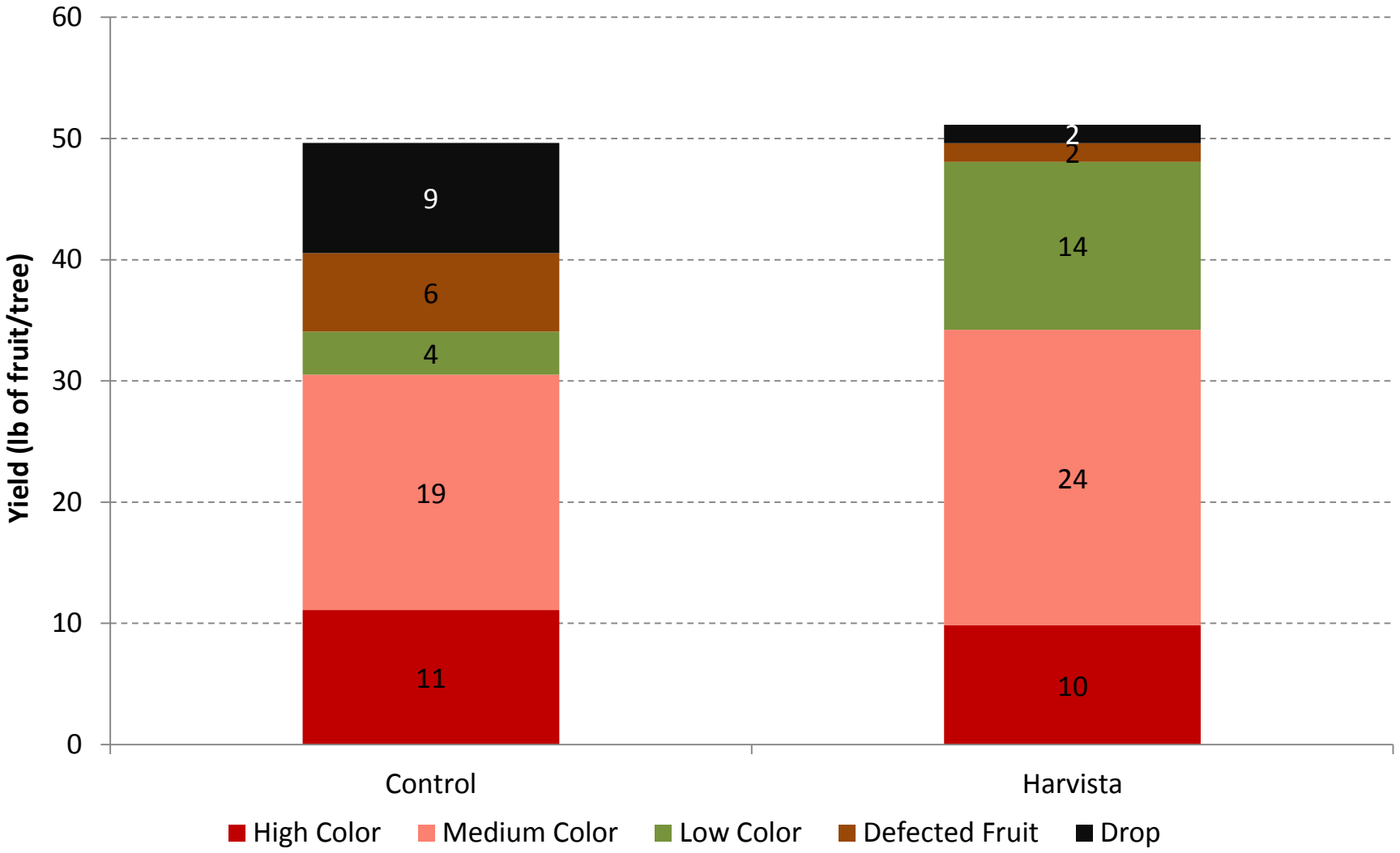
Why is Harvista Important?

- Honeycrisp results – Brix
- For both before spot-pick and after spot-pick, Brix was NS for rate x harvest date
- Across all farms:
  - Brix was significantly higher by 1.3% on M26's than M9

Harvista Effects on Honeycrisp Acidity



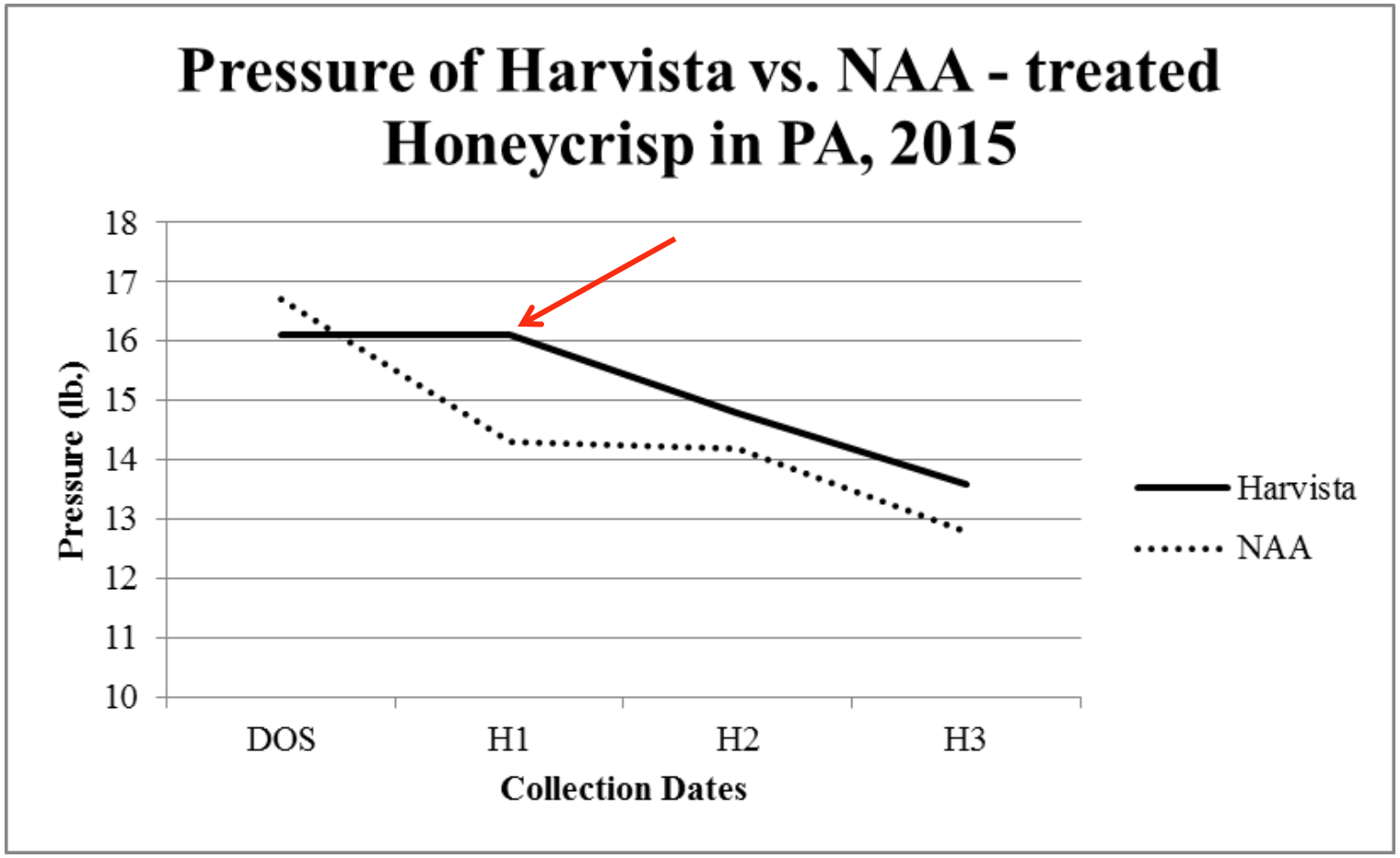
Honeycrisp – Yield per Category, all harvest dates combined



Harvista Drop Control

Photo taken after second pick.

Harvista – Drop Control without Sacrificing Firmness

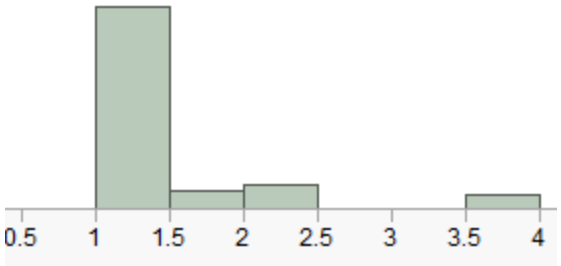


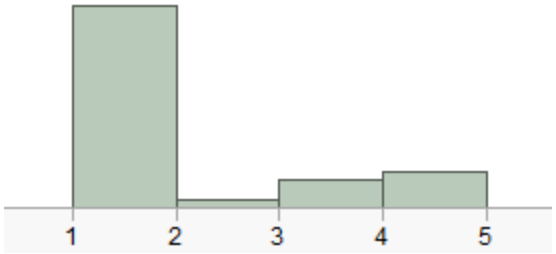
Stored Fuji

- Objective: determine effect of Harvista on Fuji watercore management
- Rated a total of 85 apples – 45 Harvista-treated; 40 check
- Sprayed on 9/25/15
- Picked on 10/15/15
- Rated on 12/23/15, storage time = 69 days

Fuji Watercore Management

- Results
- Check = 25% incidence of watercore
- Harvista = 20% incidence of watercore, but lower ratings
- To be continued…more ratings and in 2016, rate at harvest





Conclusions

- Local results are from ONE unusually warm harvest season
  - Follow up and additional testing is planned
- Gala:
  - > Slow starch hydrolysis
  - > Pressure is consistently higher!
  - > Control of greasiness is very apparent
  - > Manages stem crack when it's a "stem crack" year
  - > Color and flavor is maintained

Conclusions

- Honeycrisp:
  - M 26 rootstock had higher brix in test
  - > Coloring depends on grower cultural practices and weather
  - Application timing is very farm-dependent
  - No need to lower rates
    - Why? Results in less starch retention
    - Therefore, adjust application timing
    - 60g rate applied around first week in September
      - Expect Extra-fancy coloring after 3 - 4 weeks

- Fuji watercore mananagement, to be continued

Harvista maintains consistency!

How does this benefit you (the grower)?

- Integrated Apple Quality Management
  - Harvest management to fit the marketing plan
    - Labor management
  - Drop control
  - Improved firmness and consistency
  - Fewer pick dates
  - Pack-out value

How does this benefit you (the grower)?

- Recommendations are variety specific
  - > Adjusted timing according to:
    - Fruit maturity
    - Harvest and marketing plans
- Continued ***local*** research on:
  - > Fuji watercore
  - > Gala shoulder browning
  - > Honeycrisp soft scald, soggy breakdown, senescent browning

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