

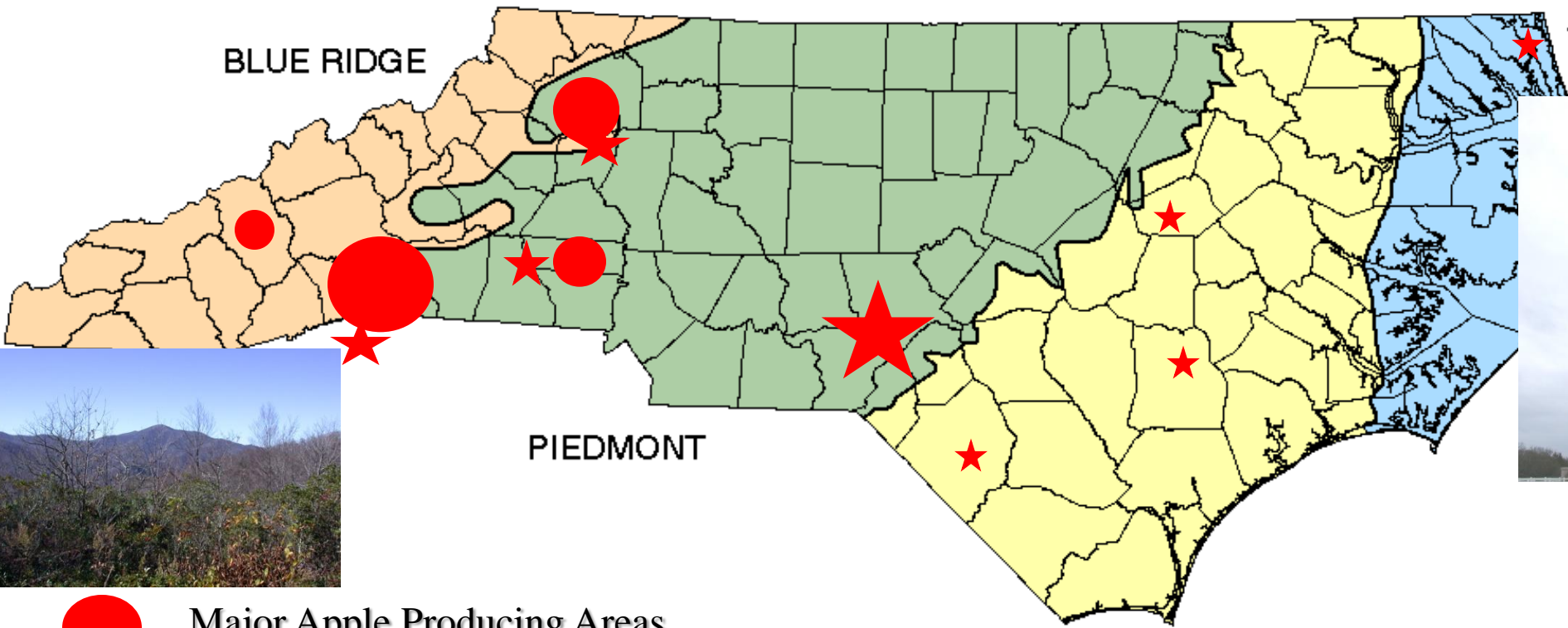
The North Carolina Apple Industry



Dr. Michael L. Parker
Department of Horticultural Science
North Carolina State University









BLUE RIDGE

TIDEWATER

PIEDMONT

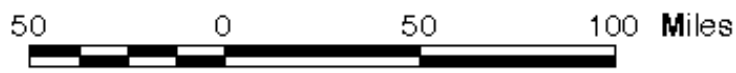
MIDDLE AND UPPER
COASTAL PLAIN



-  Major Apple Producing Areas
-  Major Peach Producing Areas

NORTH CAROLINA CENTER FOR
GEOGRAPHIC INFORMATION & ANALYSIS

August 1997



The North Carolina Apple Industry

- Approximately 8,000 acres, \$20 million farm gate value
- Marketed through retail, local and regional wholesale markets, and Farmer's Markets in addition to a significant processing industry
- Major Varieties:
 - ❖ Rome
 - ❖ Golden Delicious
 - ❖ Gala
 - ❖ Red Delicious
 - ❖ Fuji
 - ❖ Pink Lady
 - ❖ Granny Smith

The North Carolina Apple Industry (cont.)

- Average tree density is 136 trees/acre
- Most prominent rootstocks being planted:
 - ❖ M.7
 - ❖ M.26
 - ❖ M.9 size
 - ❖ MM.111 or 106





**BARBER
ORCHARD**

A PRIVATE RESIDENTIAL COMMUNITY





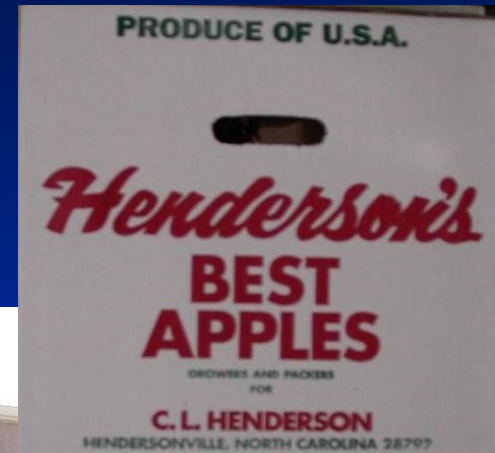




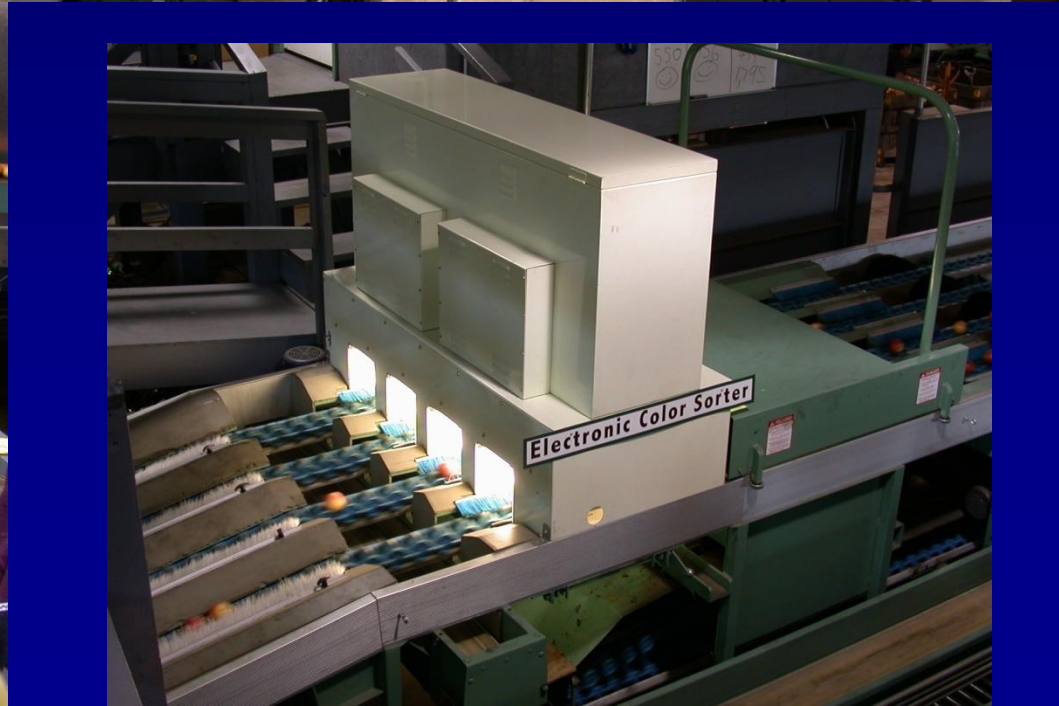




Allan Henderson, Grower, Packer, Broker and Processor of Fresh Slices











Things You Would Never Hear a Southerner Say

- Duct tape won't fix that.
- We don't keep firearms in this house.
- Honey, did you mail that donation to Greenpeace?
- We're vegetarians.
- Give me the small bag of pork rinds.
- Deer heads detract from the decor.
- I believe you cooked those green beans too long.



SmartFresh Facilities for Retail Apple Markets

Dr. Michael Parker
Department of Horticultural Science
North Carolina State University
Raleigh, North Carolina



What is SmartFresh™

- MCP – 1- methylcyclopropene
- Very close chemistry to ethylene
- Attaches to the sites where ethylene normally binds, making the fruit insensitive to ethylene

**1-MCP Research
Conducted in the late
1980's- early 1990's**



History of SmartFresh™

1993 – Patent filed by NCSU for MCP

1996 – Patent Issued

1999 – Floral registration approved

1999 – Rohm and Haas acquired patent rights to MCP

1999 – AgroFresh was formed to “develop and commercialize” MCP

2002 – SmartFresh™ approved for edible crops

What SmartFresh™ Does for Apples

- Helps maintain fruit flesh firmness
- Slows acidity decrease
- Eliminates scald
- Reduces greasiness



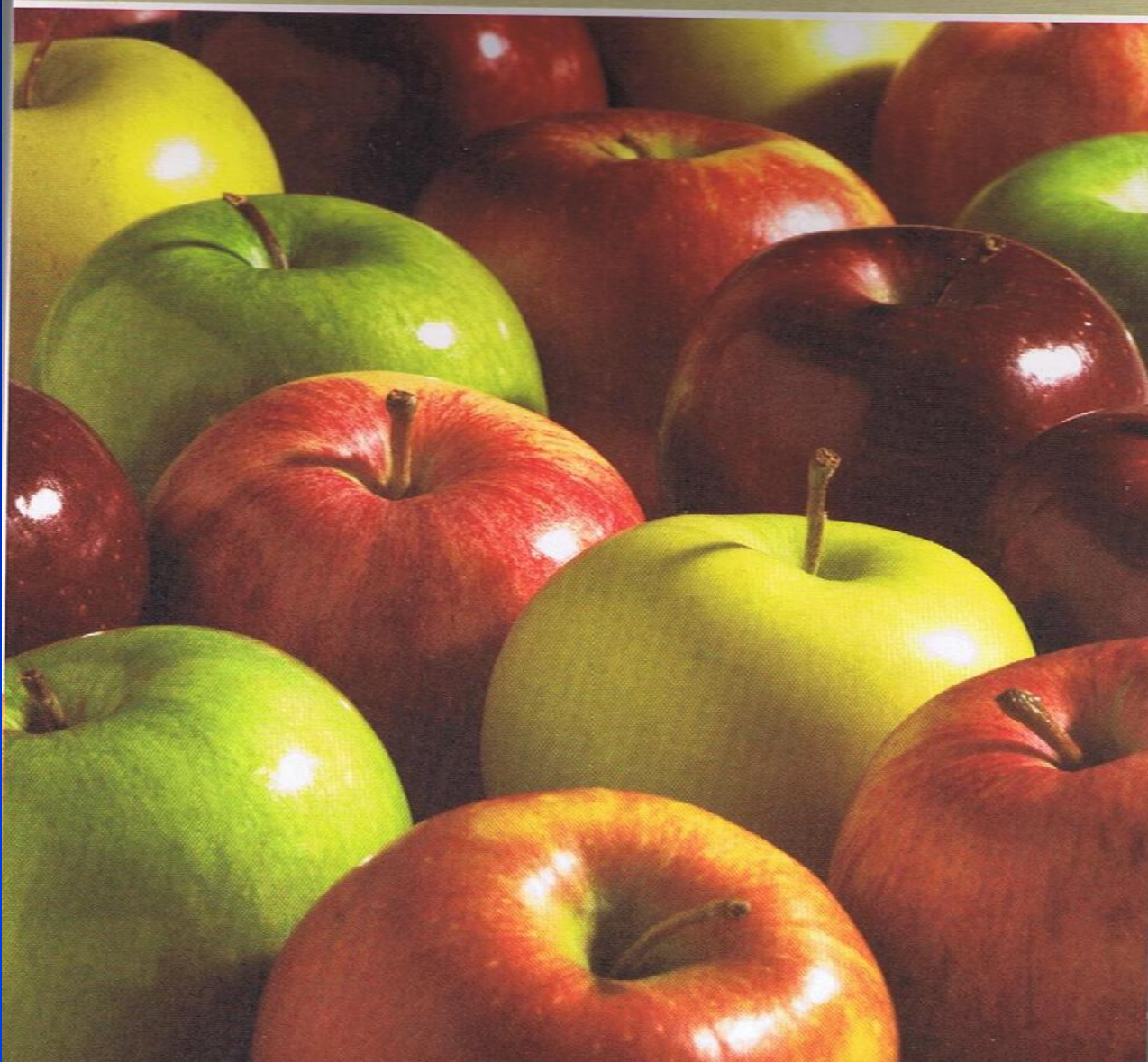
How are Apples Treated With SmartFresh™?

- Apples must be treated within 3-7 days of harvest
- Treatment period is 24 hours then apples returned to cold storage
- Room that apples are treated in must be airtight
- Treatment concentration is 1 ppm
 - ❖ 30 seconds in one year
 - ❖ 1 bad apple in 2,000 barrels (100 qt.- 2.5 bu)
 - ❖ 1 cent in \$10,000
- Leaves no detectable residue



SmartFreshSM Quality System

2009 APPLE USE RECOMMENDATIONS



GINGER GOLD

Starch Index
Scale 1-6 Scale 1-8
2.0 - 3.5 1.5 - 3.0

Target Mean Firmness (lbs.)
(Standard Deviation)
17.0 (1.45)

Maximum harvest to application interval (days)
5

Handling

SmartFreshSM technology application prior to the start of color change may delay green color loss.



See notes on "Apple Management Practices"

GALA

Starch Index
Scale 1-6 Scale 1-8
2.5 - 4.5 3.0 - 6.0

Target Mean Firmness (lbs.)
(Standard Deviation)
16.0 (1.45)

Maximum harvest to application interval (days)
7



ROME

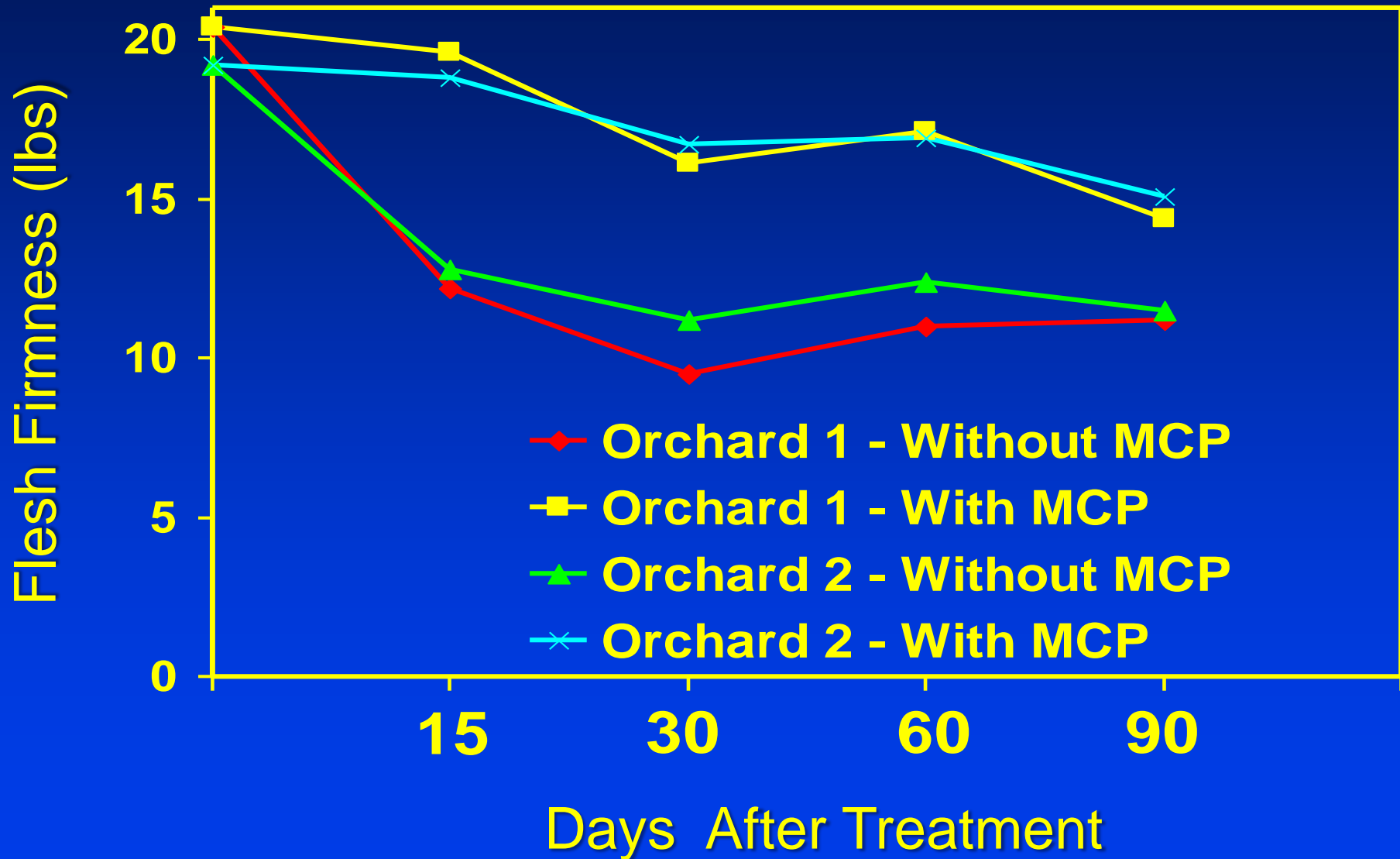
Starch Index
Scale 1-8
2.5 - 6.0

Target Mean Firmness (lbs.)
(Standard Deviation)
19.0 (1.7)

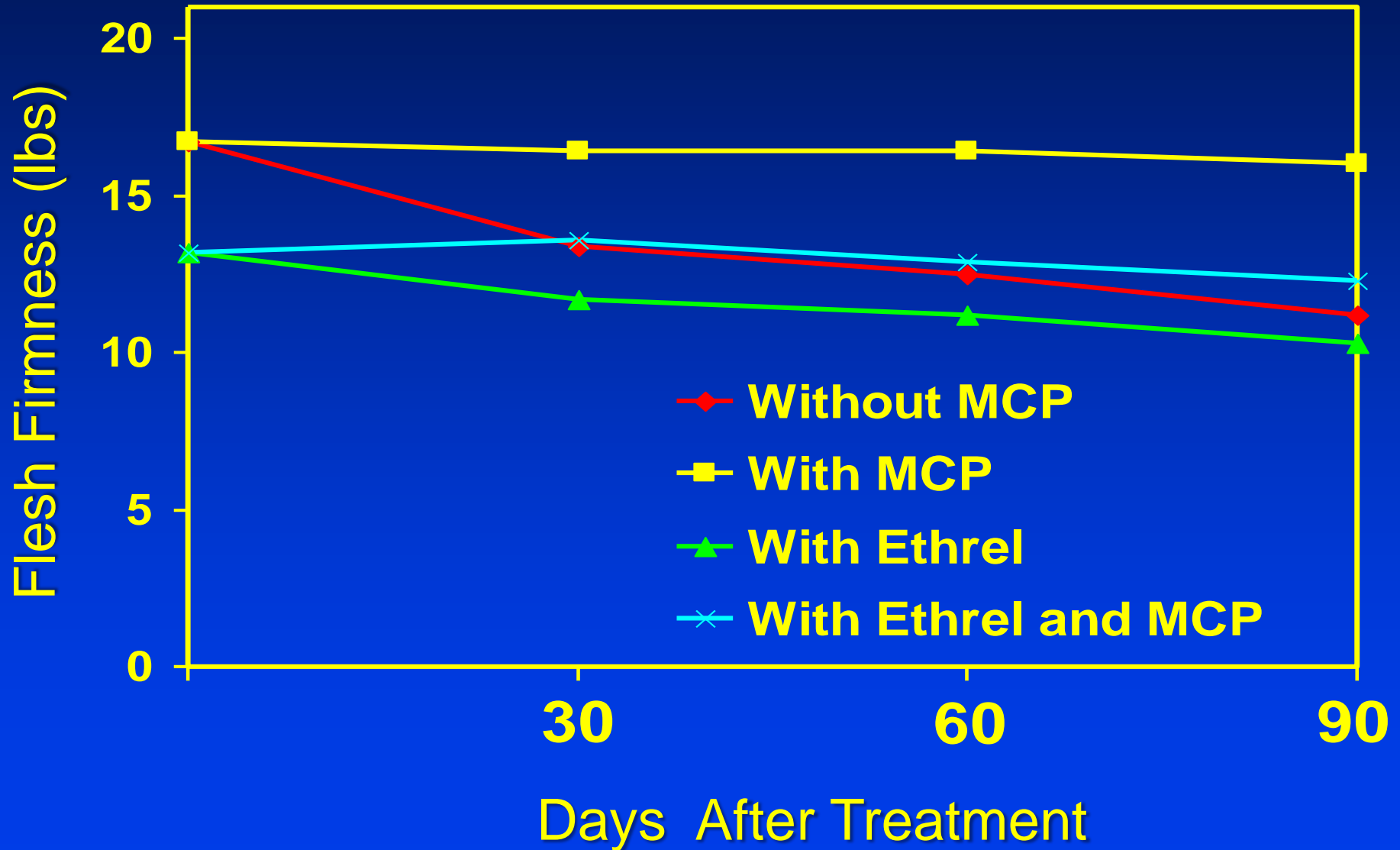
Maximum harvest to application interval (days)
7



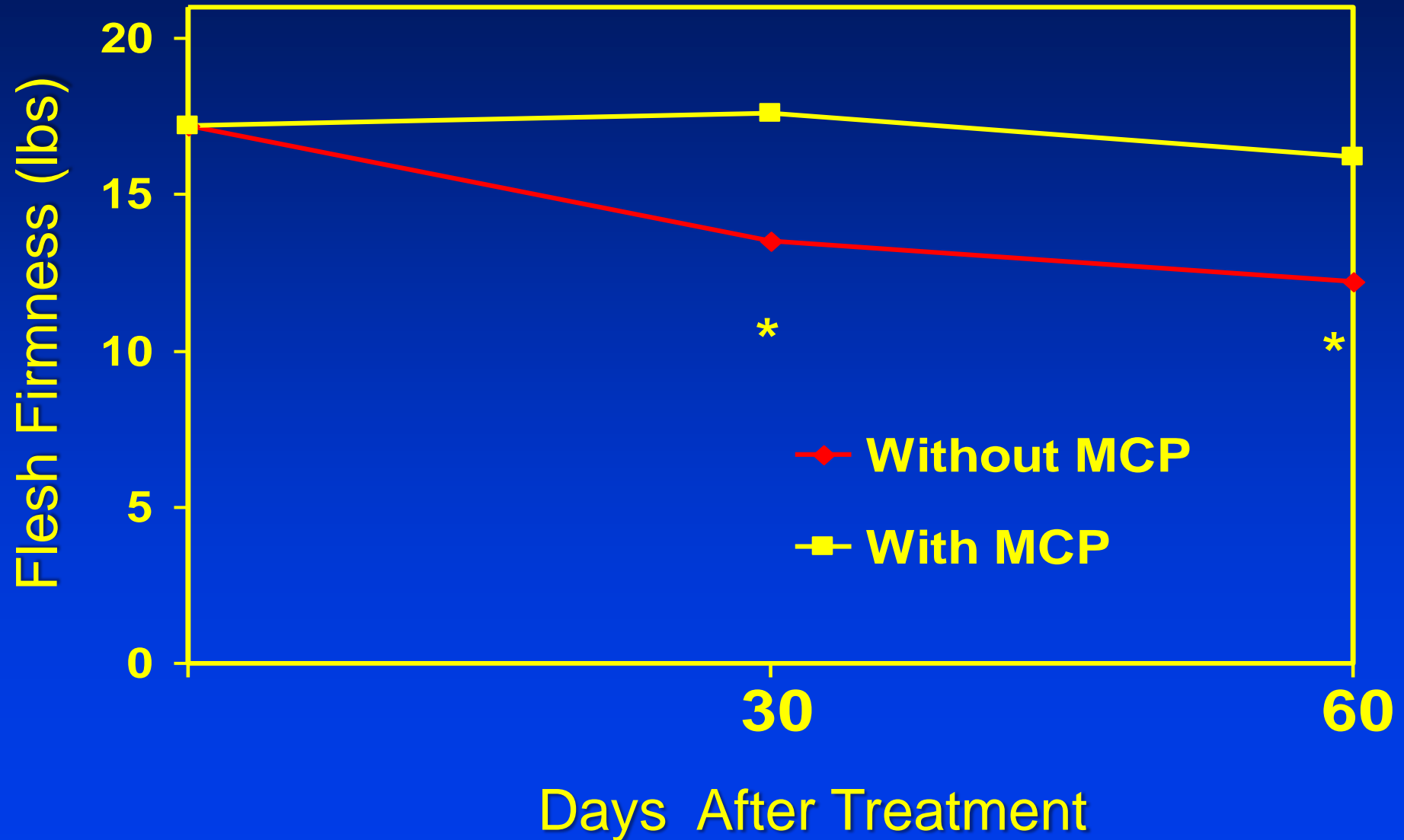
Gingergold



Red Delicious



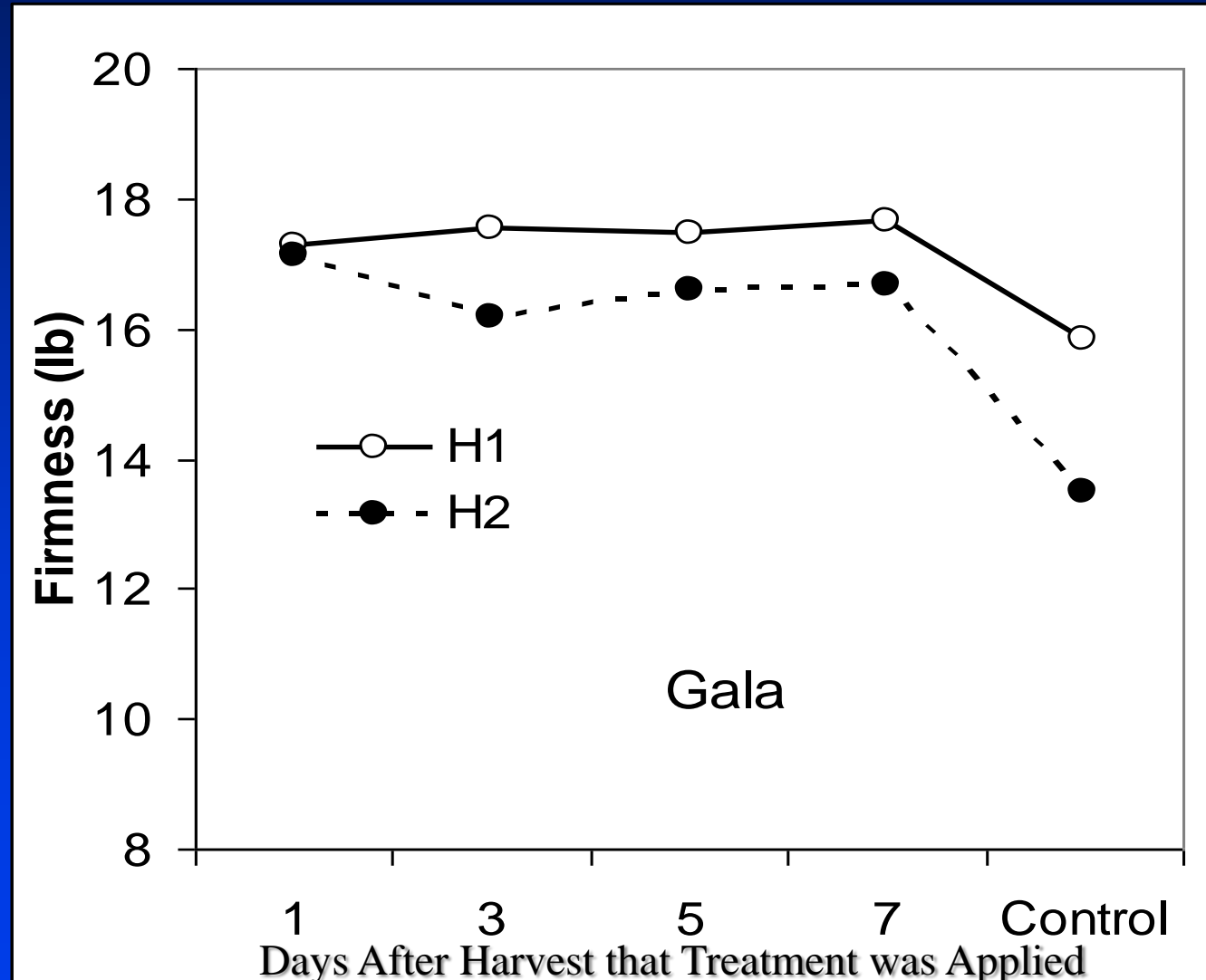
Romes



Harvest Maturity

	<u>H1</u>	<u>H2</u>
Flesh Firmness (lbs)	18.3	18.8
Starch Index (1-8)	3.9	4.6

40 days after
harvest with 7 days
at room
temperature



Harvest Maturity

Flesh Firmness (lbs)

Starch Index (1-8)

H1

H2

H3

15.8

14.6

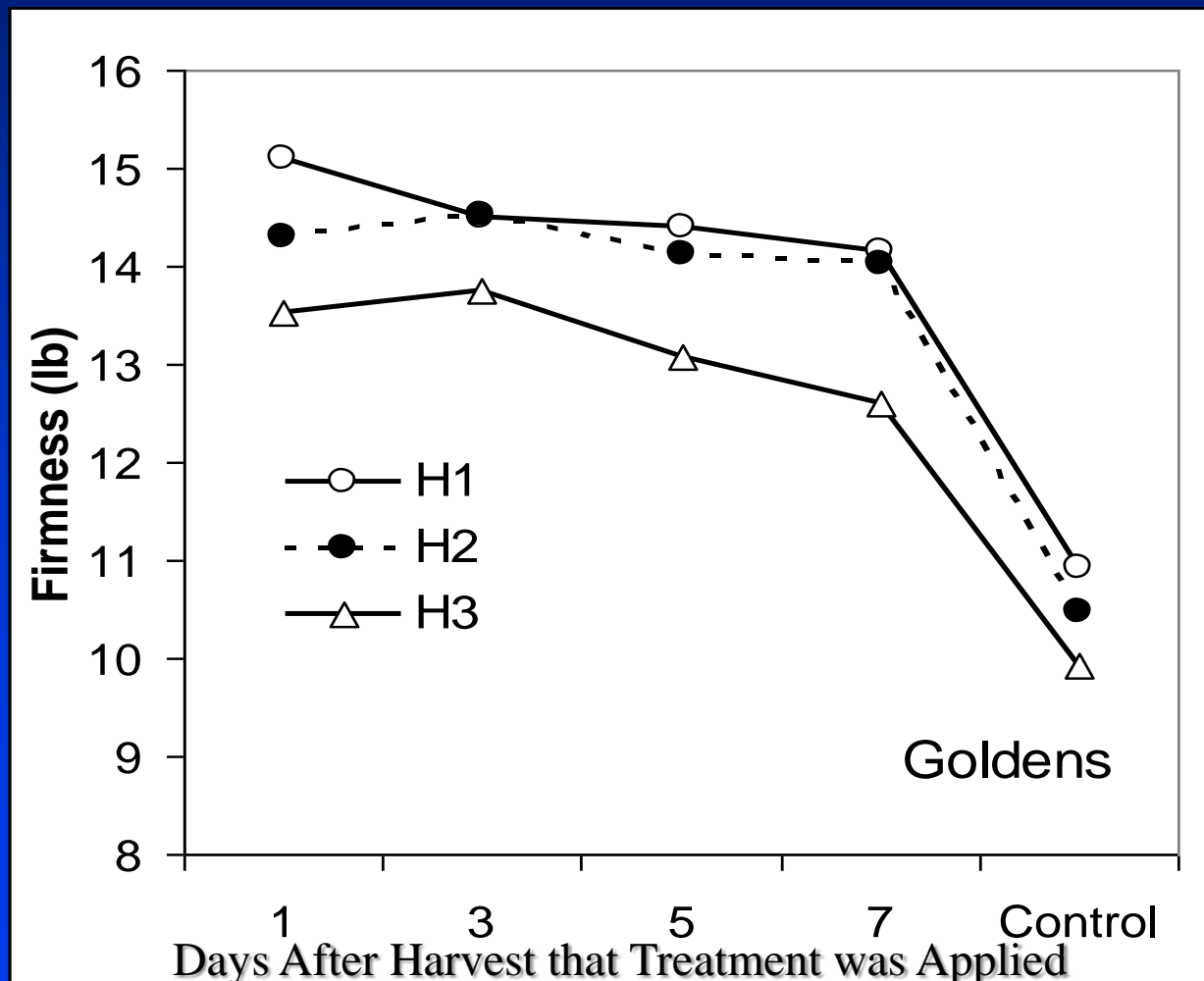
14.0

2.8

4.5

6.0

40 days after harvest
with 7 days at room
temperature



Harvest Maturity

Flesh Firmness (lbs)

H1

H2

20.0

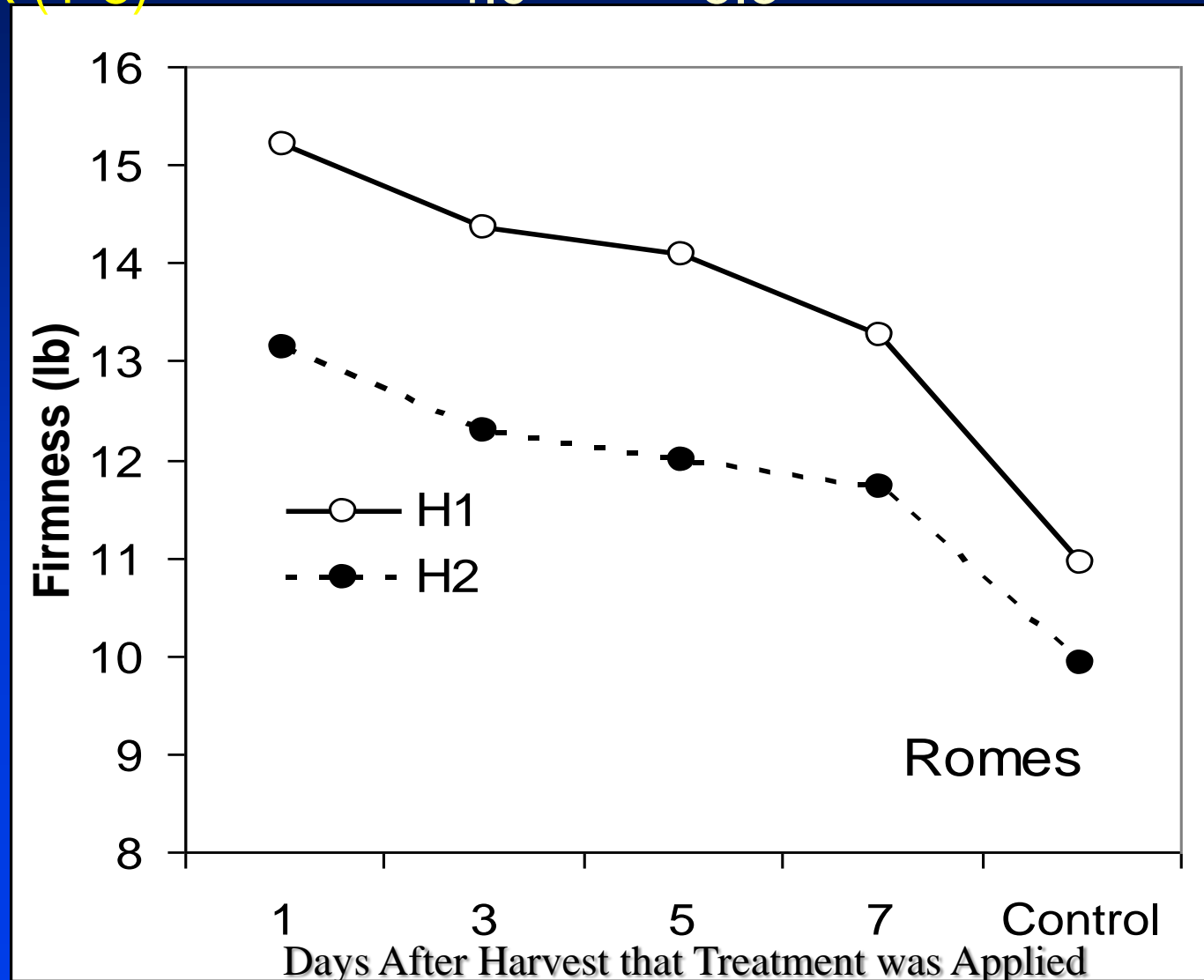
18.5

Starch Index (1-8)

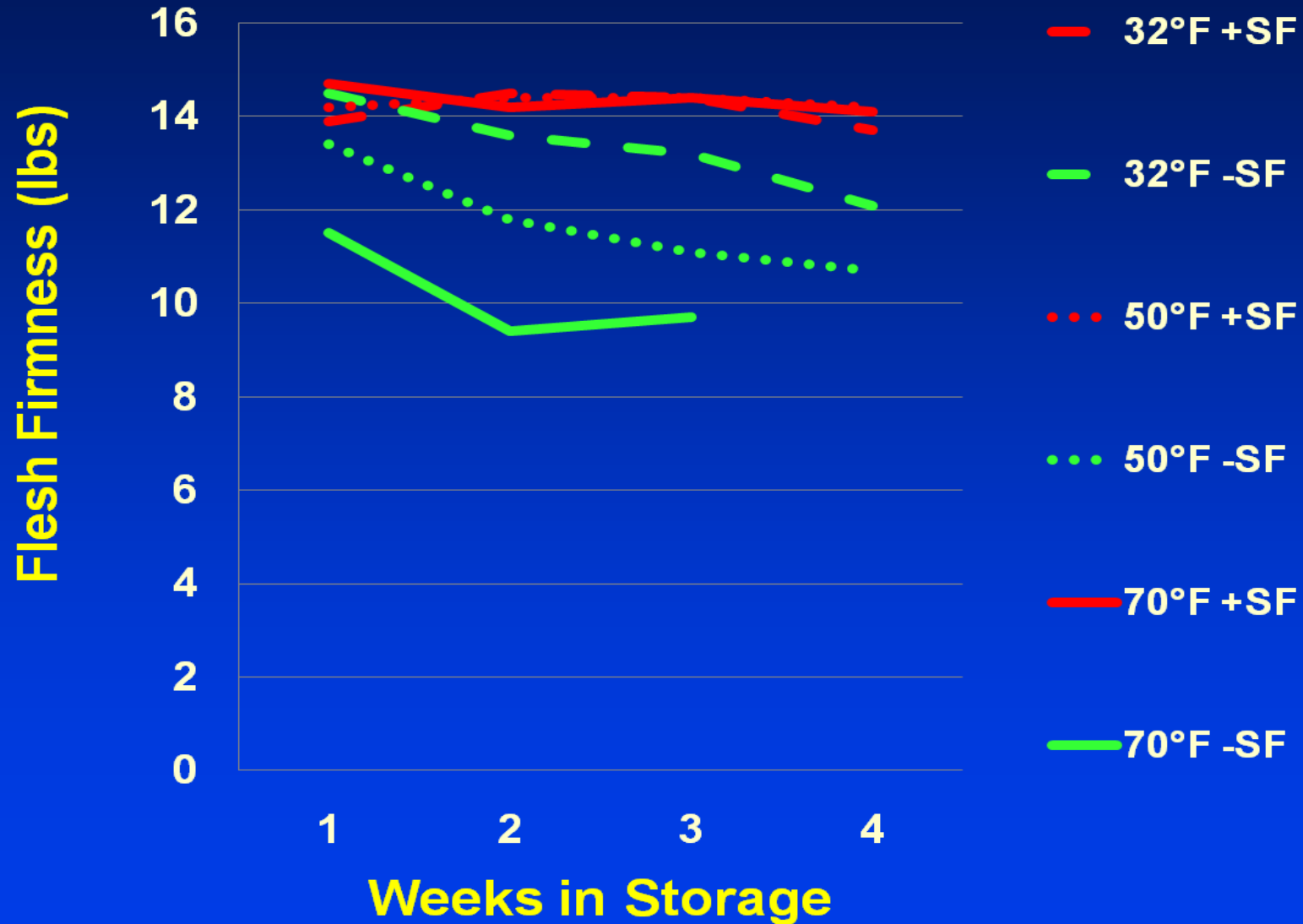
4.0

5.3

40 days after
harvest with 7
days at room
temperature



'Golden Delicious'









THERMO KING

SE-II di

10000













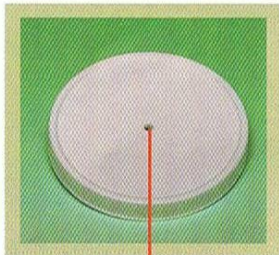
SmartFresh Quality System

1. Ensure that you have the correct number of SmartFresh SmartTabs for the treatment.
2. Fill the space or room where the application will be made with the fruits or vegetables to be treated.
3. Open the SmartFresh Activator Kit. Leave the container with the Activator Solution inside the foam block.

Remove the cap from the container.

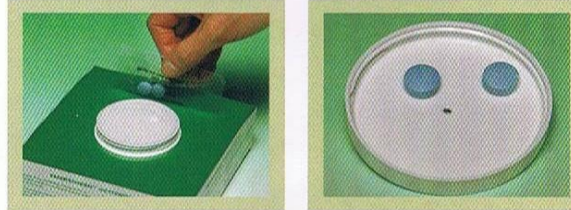


Confirm that the container has a small hole to allow SmartFresh technology to be released into the treatment space.



opening

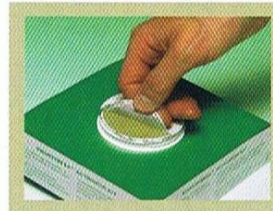
4. Always place the TWO BLUE ACTIVATOR TABLETS in the inverted container cap.



5. Add the correct number of SmartFresh SmartTabs into the inverted container cap (as per the label requirement).

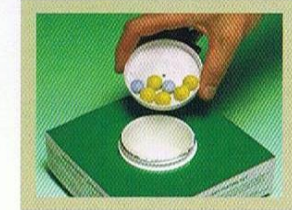


6. Peel open the foil seal on the Activator Solution container.



IMPORTANT: Before adding the tablets to the liquid, make sure you are ready to complete steps 7, 8 and 9 quickly, since the product will start to release in 5 minutes.

7. Place all the tablets into the container with the Activator Solution.



Place the cap back on the container.



8. Place the foam block with the container on a stable, level surface inside the container or room to be treated.



9. Close the treatment room doors tightly and ensure that they remain closed during the entire treatment period.

DO NOT OPEN THE DOORS BEFORE THE APPLICATION HAS FINISHED.

BEFORE YOU START:

- Confirm that the application room or space is ready for the SmartFresh technology application. Refer to the list of steps.
- Do you have the necessary components to make the treatment?

SmartFresh™ SmartTabs



SmartFresh™ Activator Kit

REMEMBER: Each kit can only activate a maximum of 10 SmartFresh SmartTabs.

Crop	Number of SmartFresh SmartTabs to use
Apple, Asian Pear, Avocado, Broccoli	One SmartFresh SmartTab per 120 cubic feet
Pear	One SmartFresh SmartTab per 200 cubic feet
Melon, Tomato, Kiwifruit, Persimmon, Plum, Apricot, Peach, Nectarine	One SmartFresh SmartTab per 240 cubic feet
Banana	One SmartFresh SmartTab per 380 cubic feet

Price of 10
SmartFresh
SmartTabs is \$320.
Will treat up to 25
bins of apples
(approx. \$0.72/bu)



MCP Top Back

MCP Middle Back



MCP Front Floor

NO MCP







PVC Pipe and a Pallet Cover

6 - 10 ft 1" pipe

8 - 3 way fittings

Cost: \$33.30 plus a pallet
cover

2010 SmartFresh Grower Trials

- Growers were provided a 2 bin sampling chamber and SmartFresh Tabs for 10 runs
- Worked with 3 growers
- Growers harvested fruit at their own determined harvest date
- Fruit samples were collected before and after treatment
- Fruit were stored at room temperature after treatment for 30 days before measuring maturity parameters











INTERNATIONAL HARVESTER

HAVOLINE

STOP



SINCLAIR H-C

TRUCKS ENTERING HIGHWAY

ONE WAY

CHESTNUT GAP RD.

OLIVER TRACTOR LARM MACHINERY

Royster Fertilizer

VOLUNTEER

Inductees: American - ArcAngel
Kerry - Anderson - Cline - Dale of Hendersonville
Carmichael - Edwards - Edward Jones
Henderson - Jones - Keith - Keith
Henderson - Keith - Keith
Henderson - Keith - Keith
The Kings - Keith - Keith
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NET 28,140 KGS
62,040 LBS
CU. CAP. 37.5 CU.M.
1,322 CU.FT.





2010 SmartFresh Grower Trials - Flesh Firmness

Cultivar	Untreated After 30 days (lbs)	Treated After 30 Days (lbs)	Treatment Difference (lbs)
Ginger Gold	9.9 b	17.5 a	7.6
Gala	8.4 b/9.1 b	12.3 a/15.2 a	3.9/6.1
HoneyCrisp	15.3	15.2	-
Jonagold	9.0 b	15.8 a	6.8
Red Delicious	7.4 b	13.4 a	6.0
Golden Delicious	11.5 b	16.1 b	6.6
Mutsu	9.7 b	15.2 a	5.5
Stayman	8.7 b	13.0 a	4.3
Rome	12.1 b	15.3 a	3.2













SmartFresh Conclusions

- SmartFresh can be an effective postharvest management tool
- SmartFresh will maintain apple firmness and flavor for a longer period of time.
- SmartFresh is strongly encouraged on some cultivars when:
 - ❖ Apples will be held for more than 30-40 days
 - ❖ Storage temperatures may be less than ideal
- Can improvise for a facility to treat apples
- Apples should be treated as soon after harvest as possible, and preferably within 3 days
- Effectiveness varies with variety, and in the SE possibly year to year variation on some varieties
- SmartFresh does not correct harvest errors or substitute for proper orchard management

