Current best Honeycrisp Management Practices in Washington State

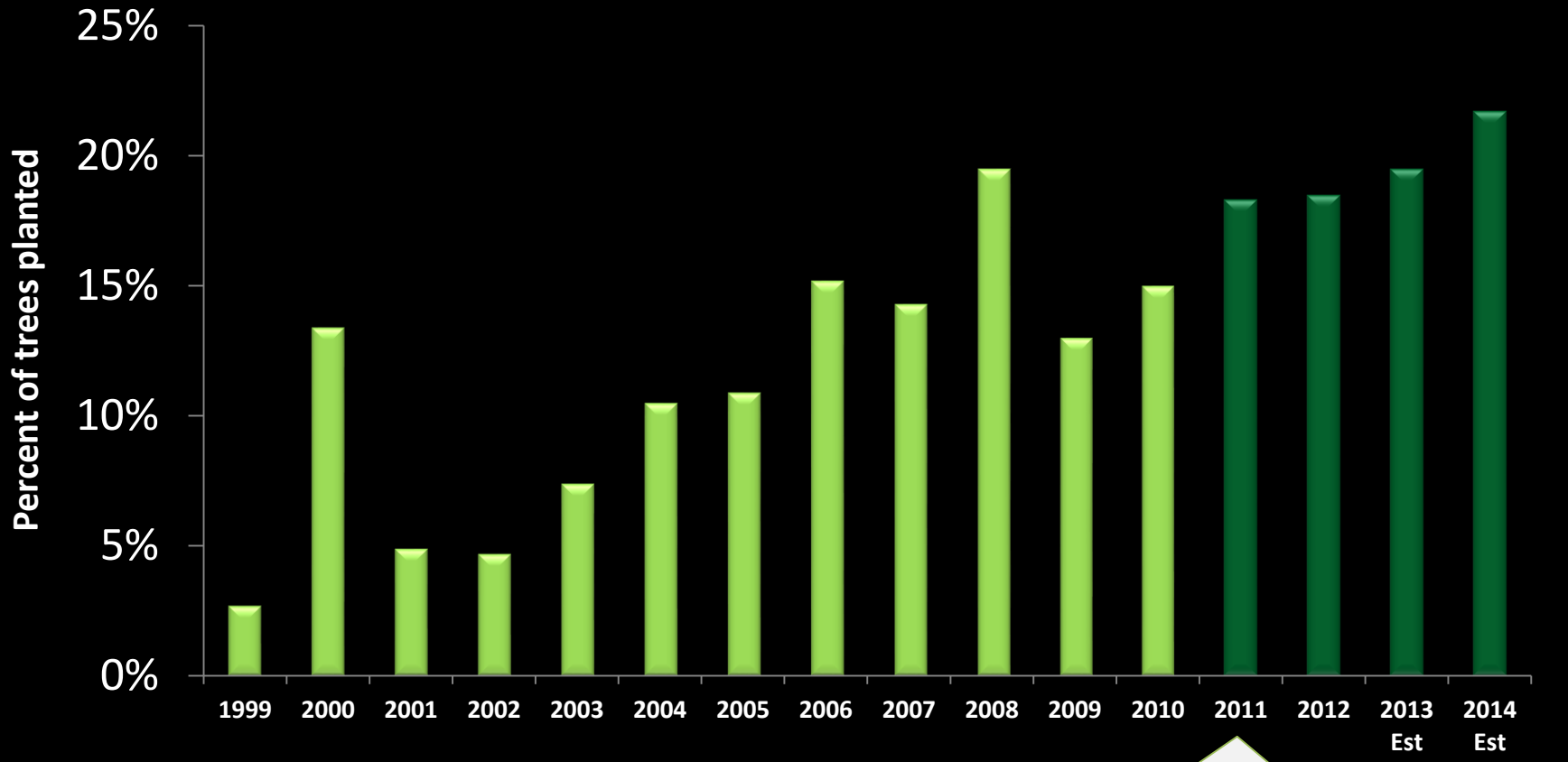
Dr. Ines Hanrahan, Project Manager, WTFRC

The Plan

1. Current situation
2. Horticultural management
3. Maturity assessment
4. Storage considerations
5. Outlook/Trends

CURRENT SITUATION

Washington State Honeycrisp apple planting trends



Since 2011 Honeycrisp is second most planted variety, after Gala.

Source: Tree Top Survey; USDA

Strains etc.

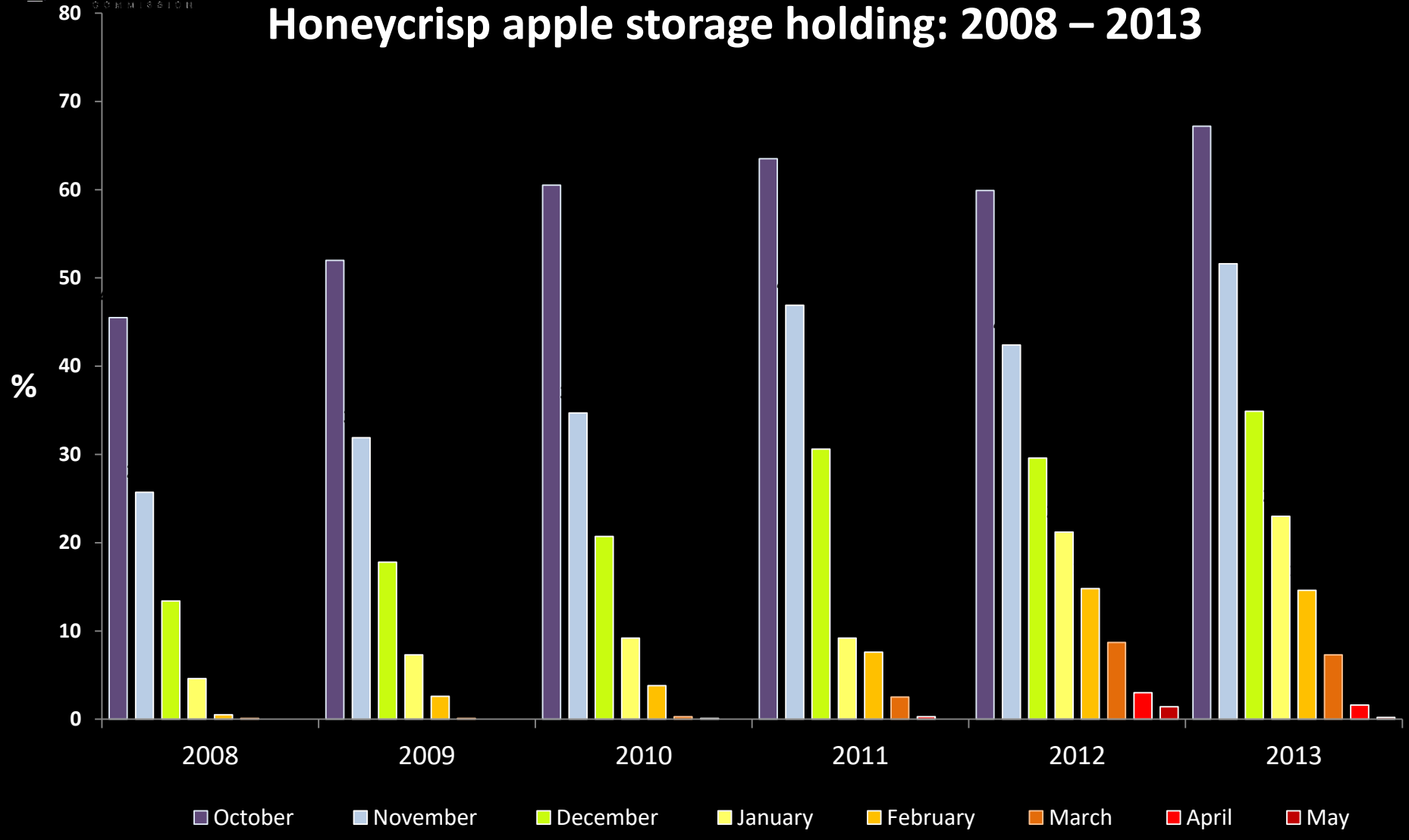
Royal Red	Firestorm	Cameron Select	DAS 10 'Premier'
		No strain Red selection	

Premier HC grown in WA 2016; early maturing strain found in PA

Honeycrisp: job security for postharvest physiologists



Honeycrisp apple storage holding: 2008 – 2013



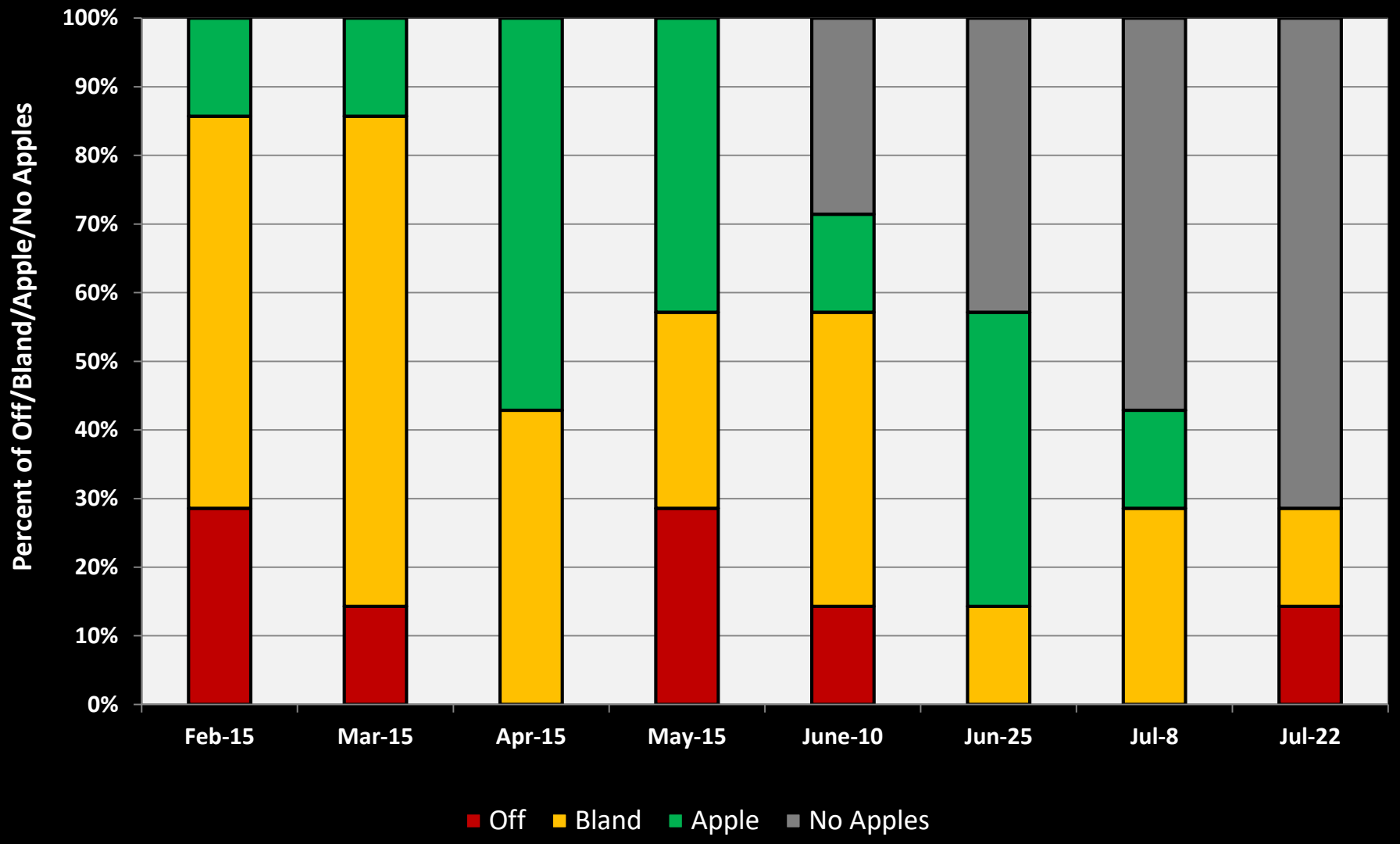
Source: WA Growers Clearinghouse

July 8, 2015: Wrays

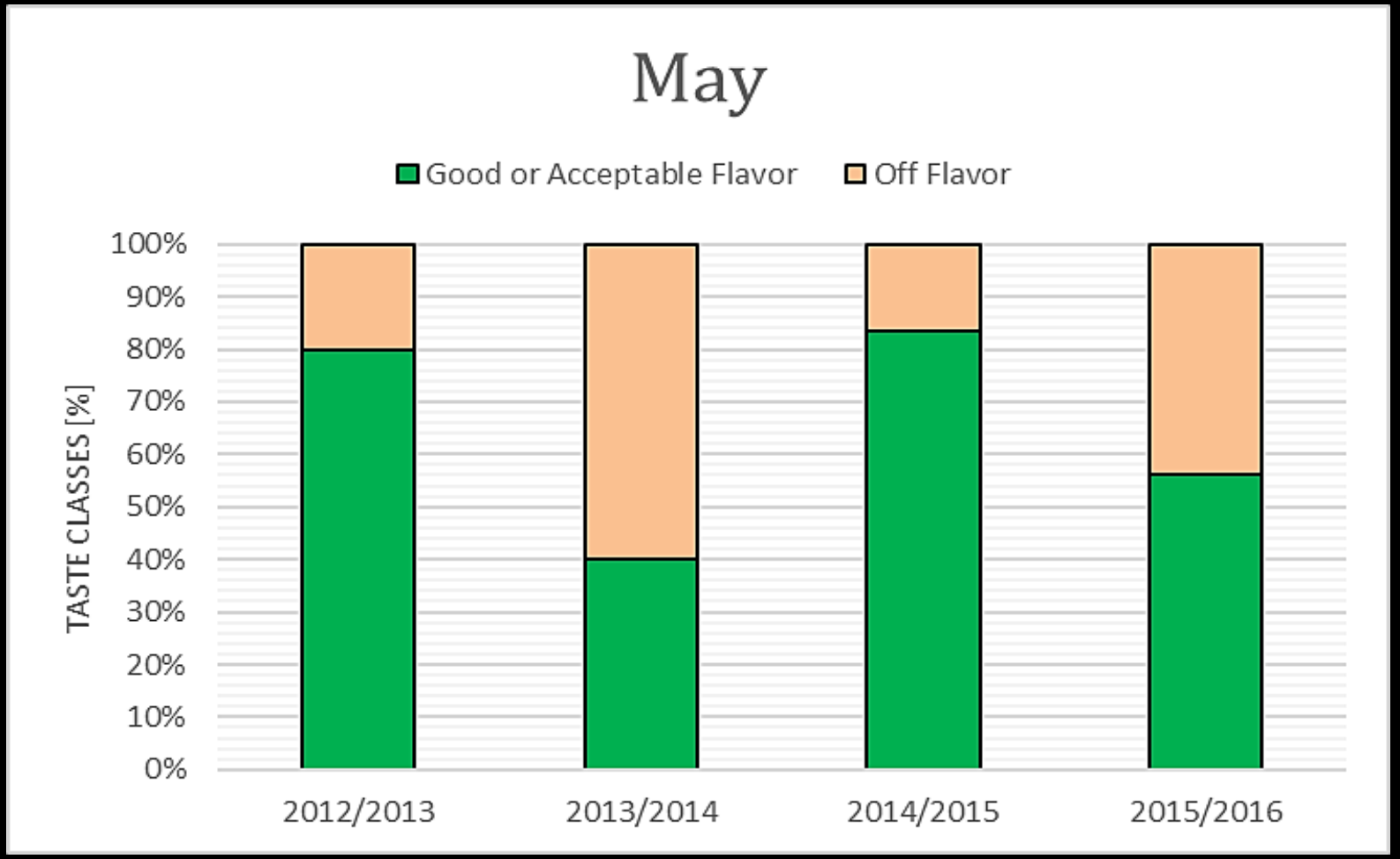
- Price: $2.99/lb
- Quality: Bruises, limb rub, stem punctures, inconsistent color
- Source: from Chile
- Size: Large

Flavor rating: 2
3 tasters

2015


Percent of Off/Bland/Apple/No Apples
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Feb-15
Mar-15
Apr-15
May-15
June-10
Jun-25
Jul-8
Jul-22
Off
Bland
Apple
No Apples

Honeycrisp Taste in Yakima Supermarkets



Taste of fruit (8 stores total) for Honeycrisp purchased in Yakima area supermarkets between May 2012 - 2016.

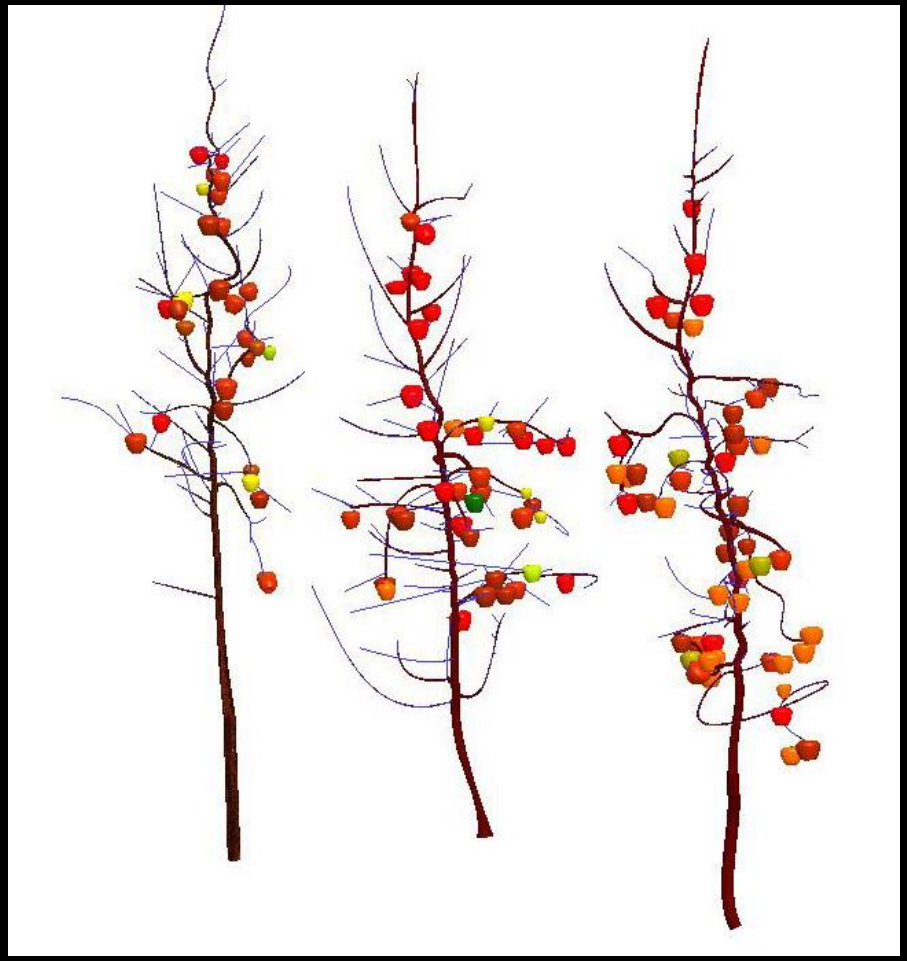
RosBREED: Breeding better Pomefruit
www.rosbreed.org

What drives repeat purchases?

- $0.12/lb more for a one-unit increase in SSC percentage
  - 13.7 is an optimum range
  - $1,362 loss per acre for each unit decease
  - Most likely achieved with 7 frt./cm^2 TCSA
- Optimum size range is 64-72
  - Loss of $5,332/acre if 5% shift to smaller fruit (48-88 vs. 100-163)

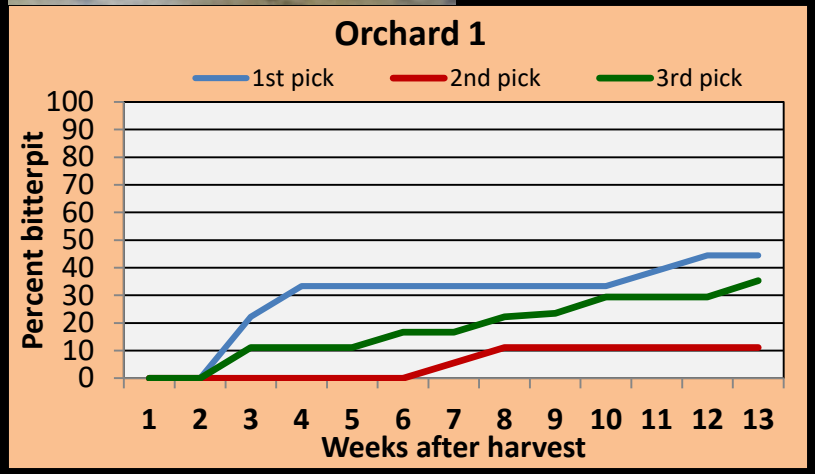
HORTICULTURAL MANAGEMENT

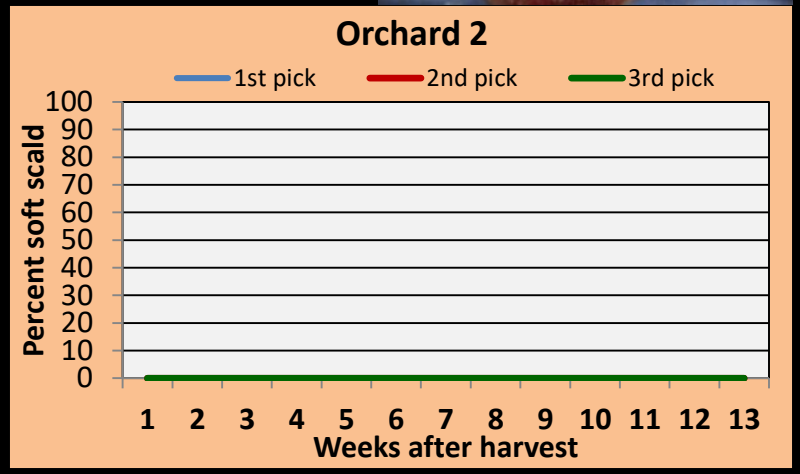
Fruit position within the canopy



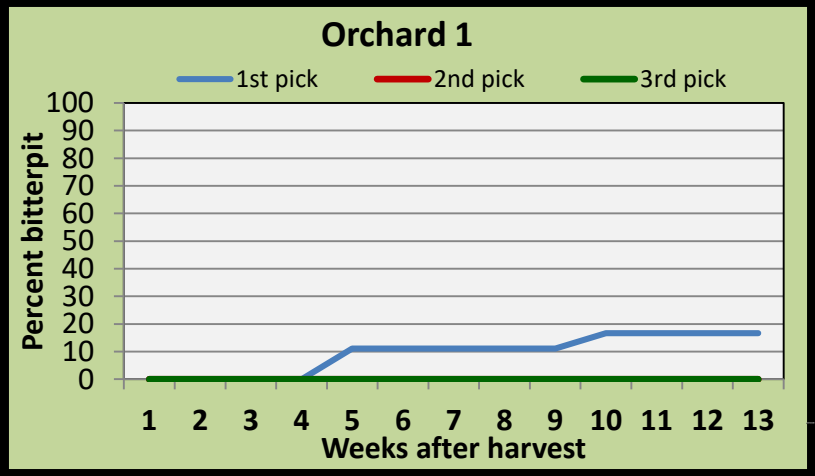
Source: Whiting, 2011

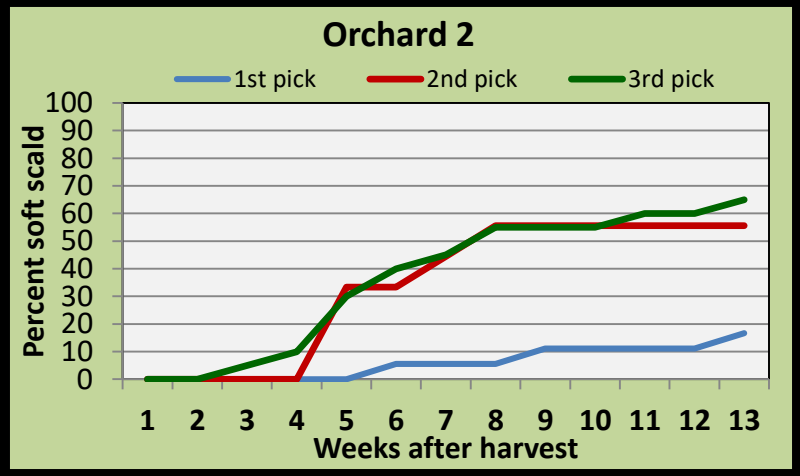
50F/36F storage





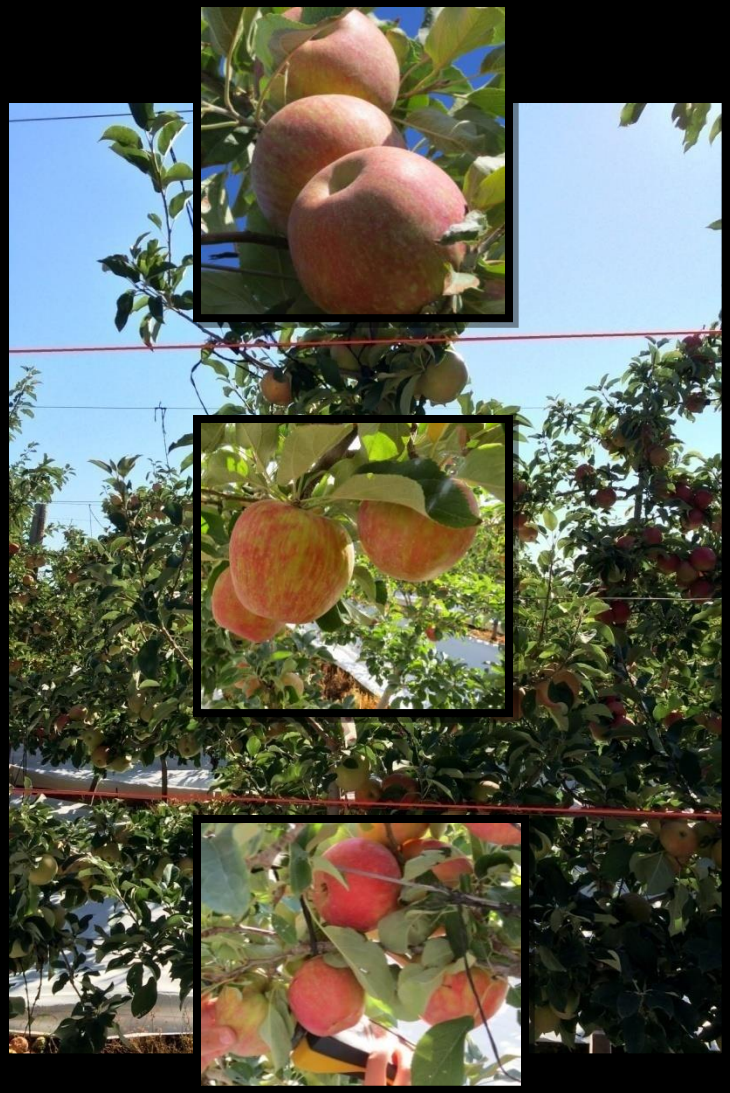
33F storage





WASHINGTON TREE FRUIT RESEARCH COMMISSION

Fruit position and harvest sequence



Orchard environment: light

2015

Fruit appearance in storage

3rd pick

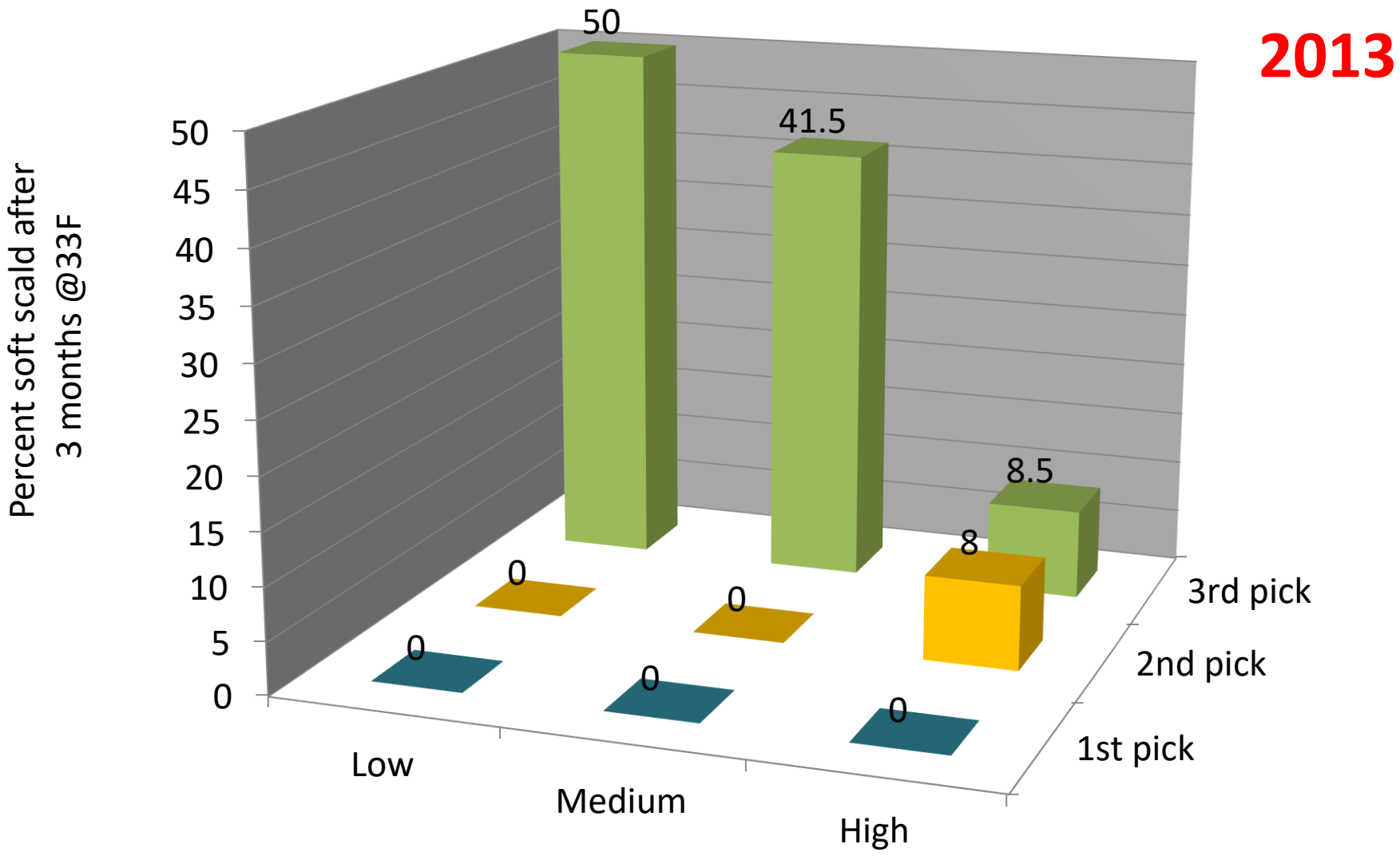
Week 4

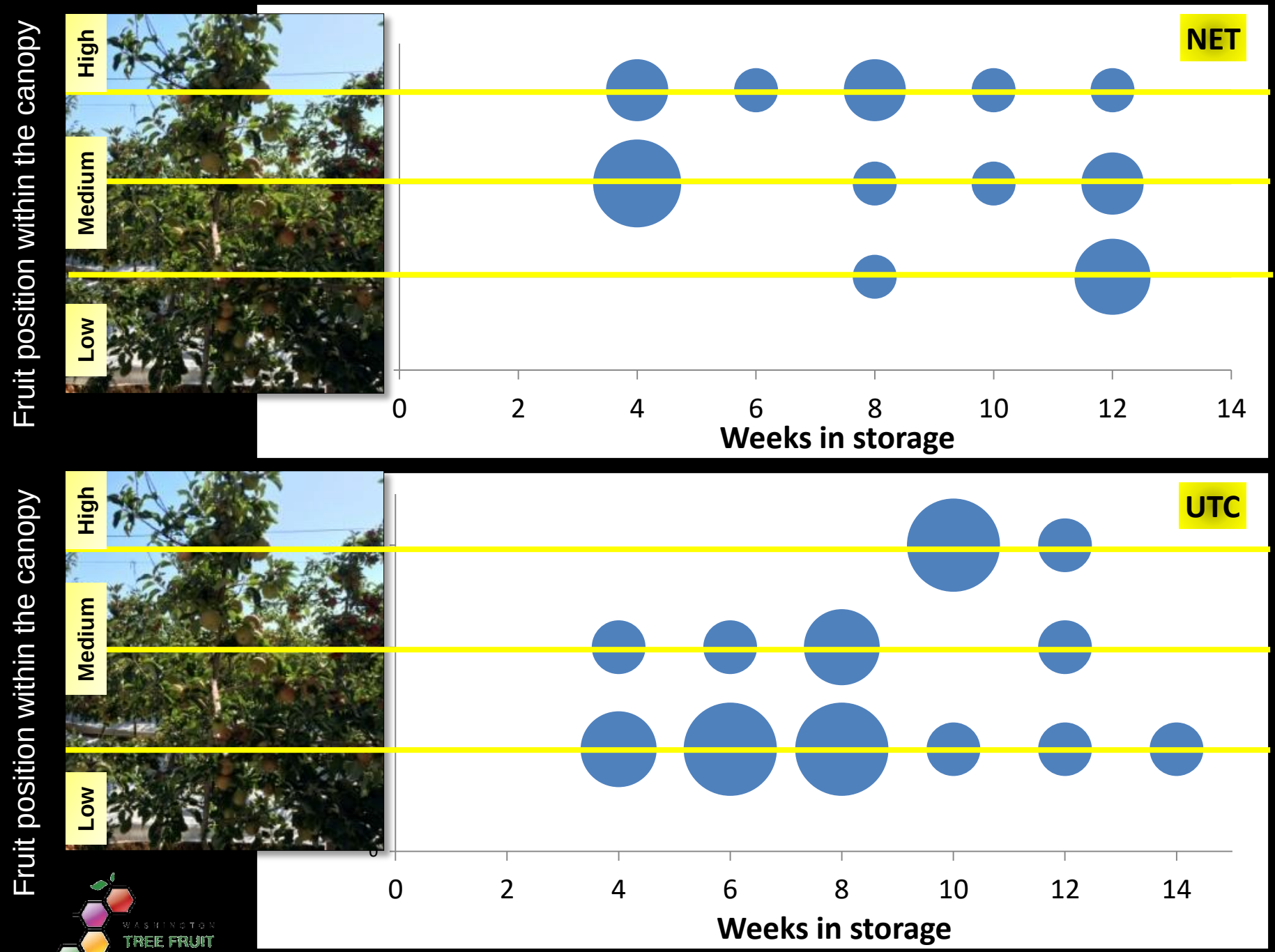
Week 6

Week 14

TREE FRUIT RESEARCH

Fruit position and harvest sequence



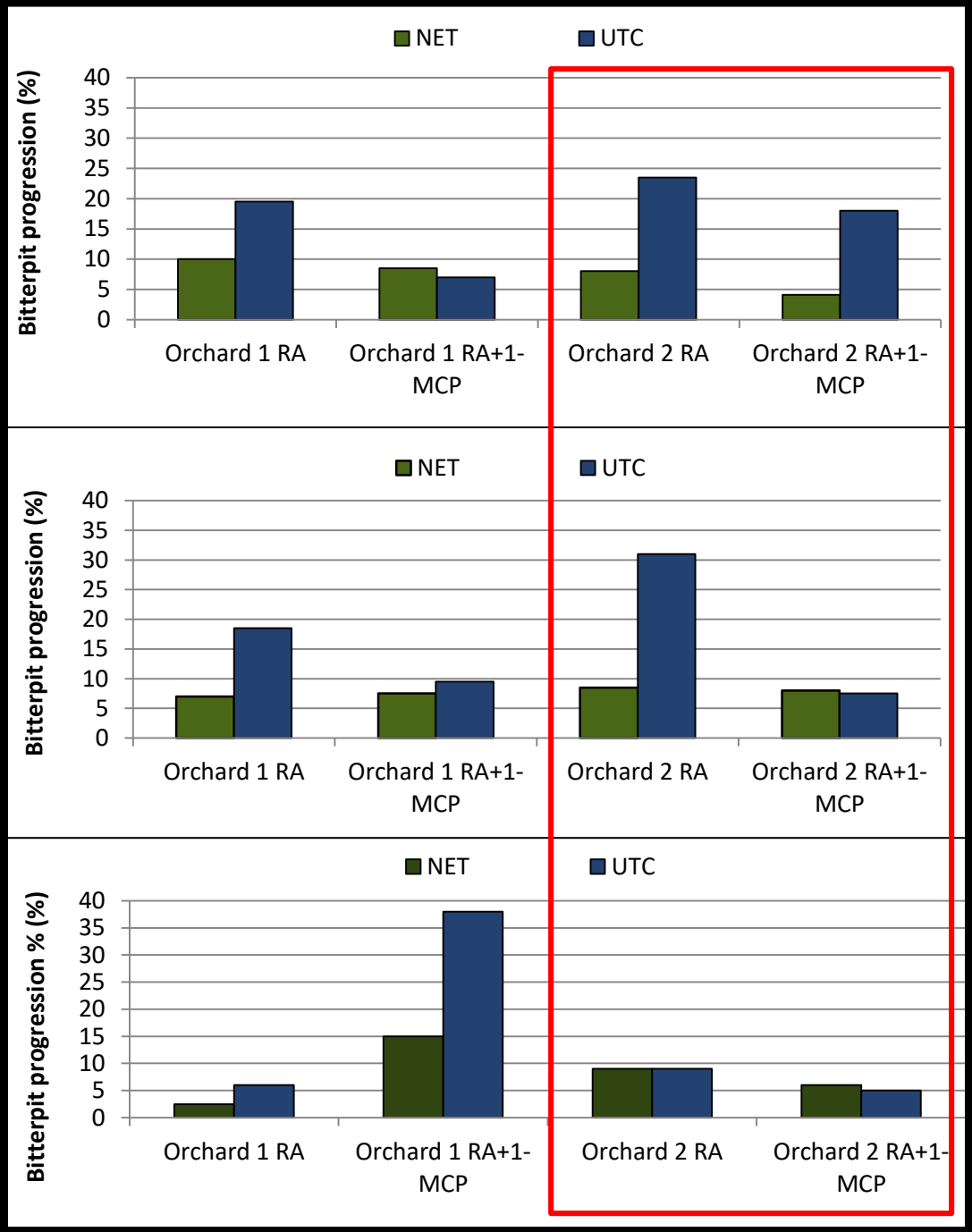


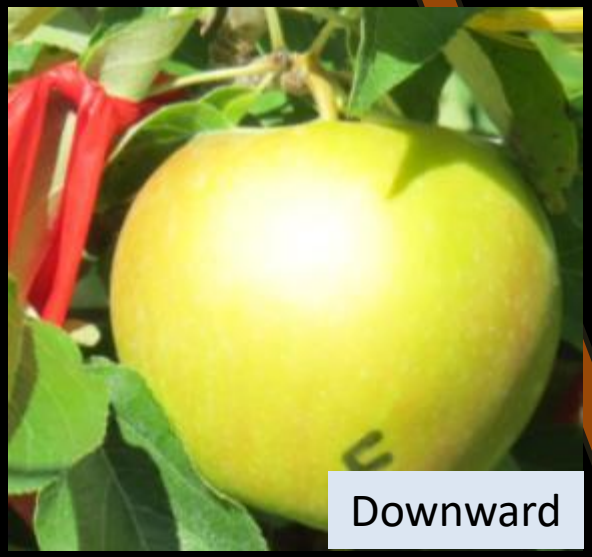
WASHINGTON TREE FRUIT RESEARCH COMMISSION

1st pick

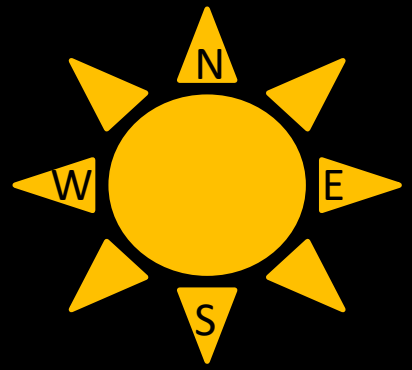
2nd pick

3rd pick





Downward



Angle

Apple on east facing side (Control)
Max. measured temperatures:

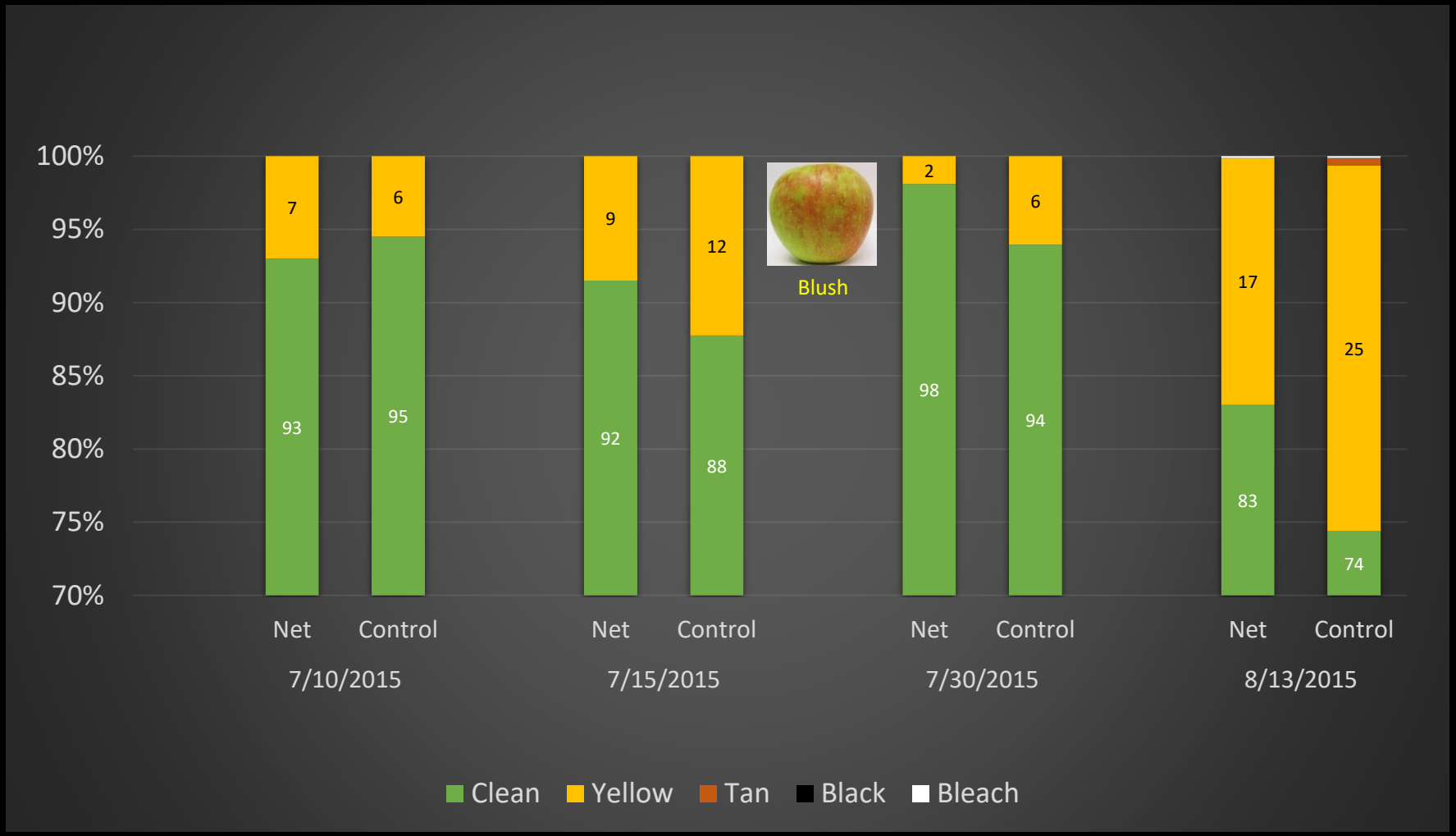
70° F Day: 99° F (at 3 pm)

90° F Day: 112° F (at 1 pm)

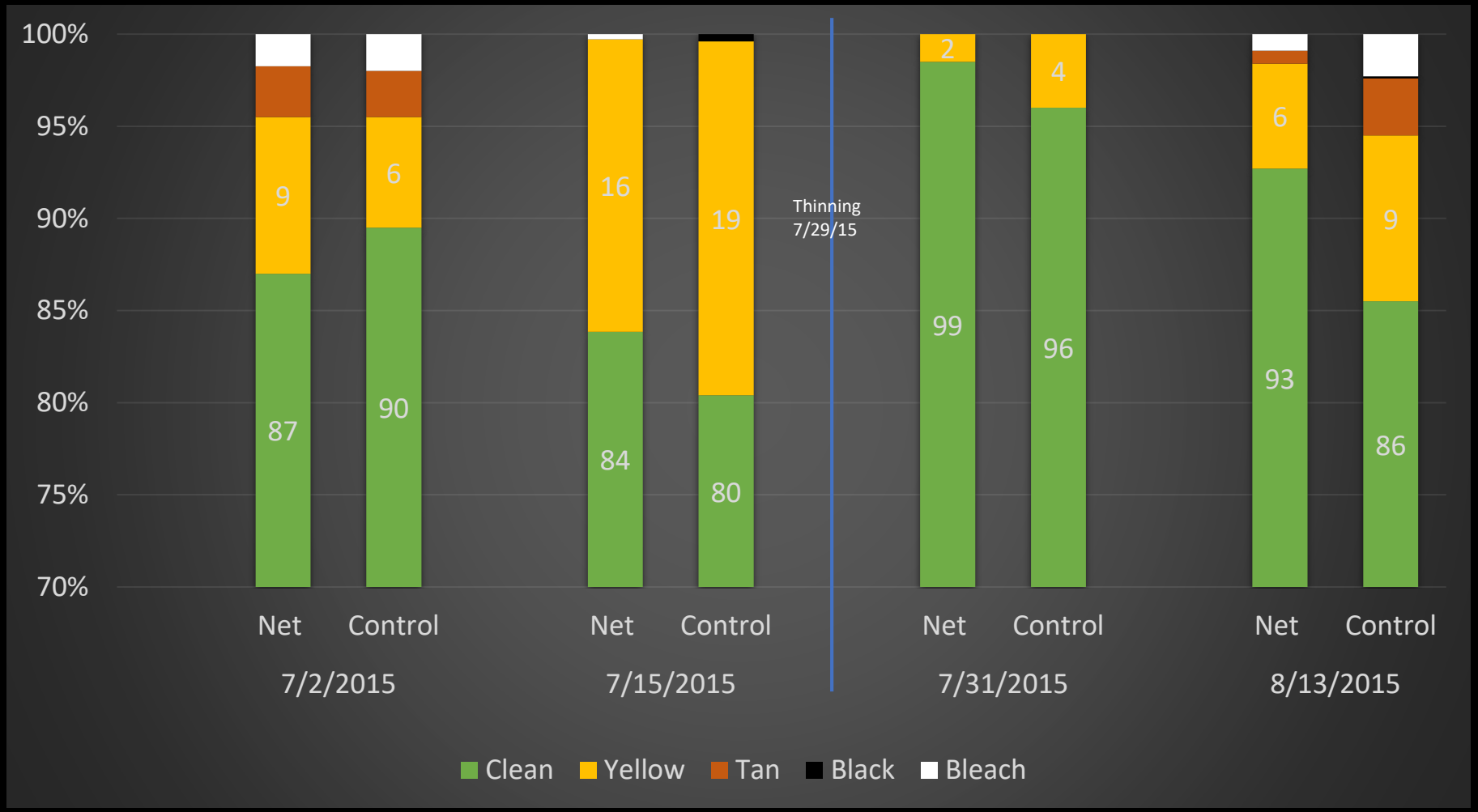
95° F Day: 111° F (at 11 am)

Example
hot apple

Sunburn Development Orchard A



Sunburn Development Orchard B



Sunburn

	3-4 weeks	Harvest	6 Months CA Storage
CLEAN	 0%	 6%	 0%
SUNBURNED	 100%	 44%	 38% 22%

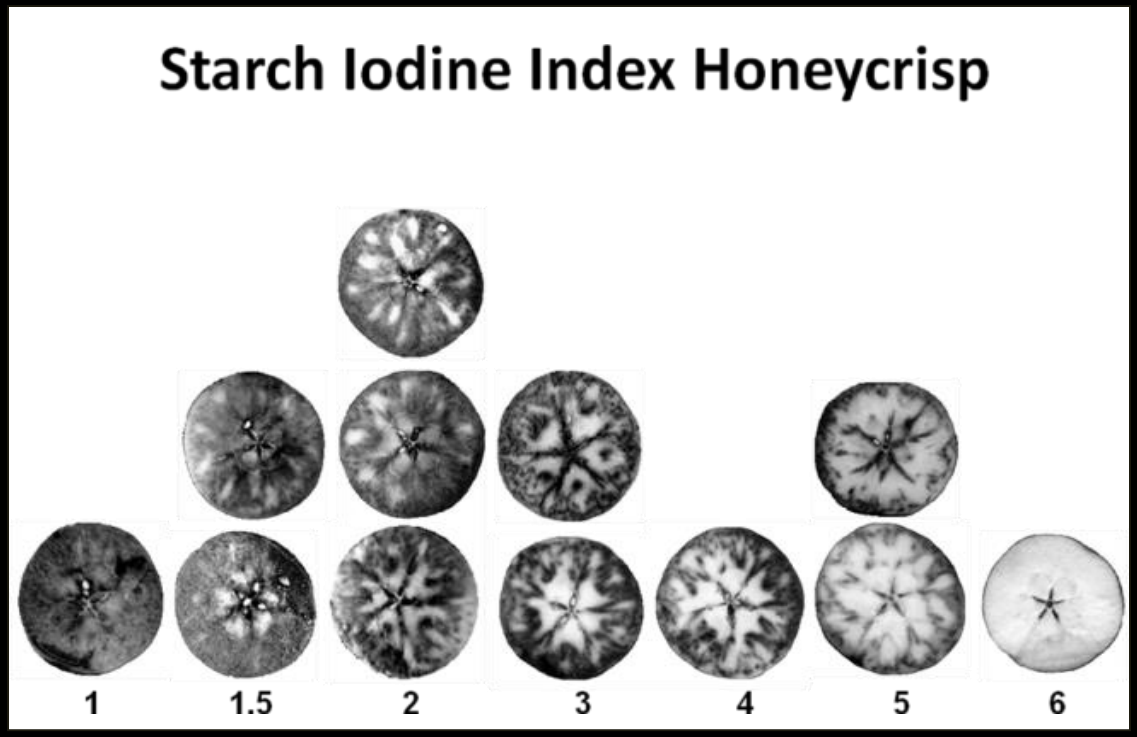
MATURITY ASSESSMENT

Harvest management

Optimize pack out

Potential new tools

Starch chart



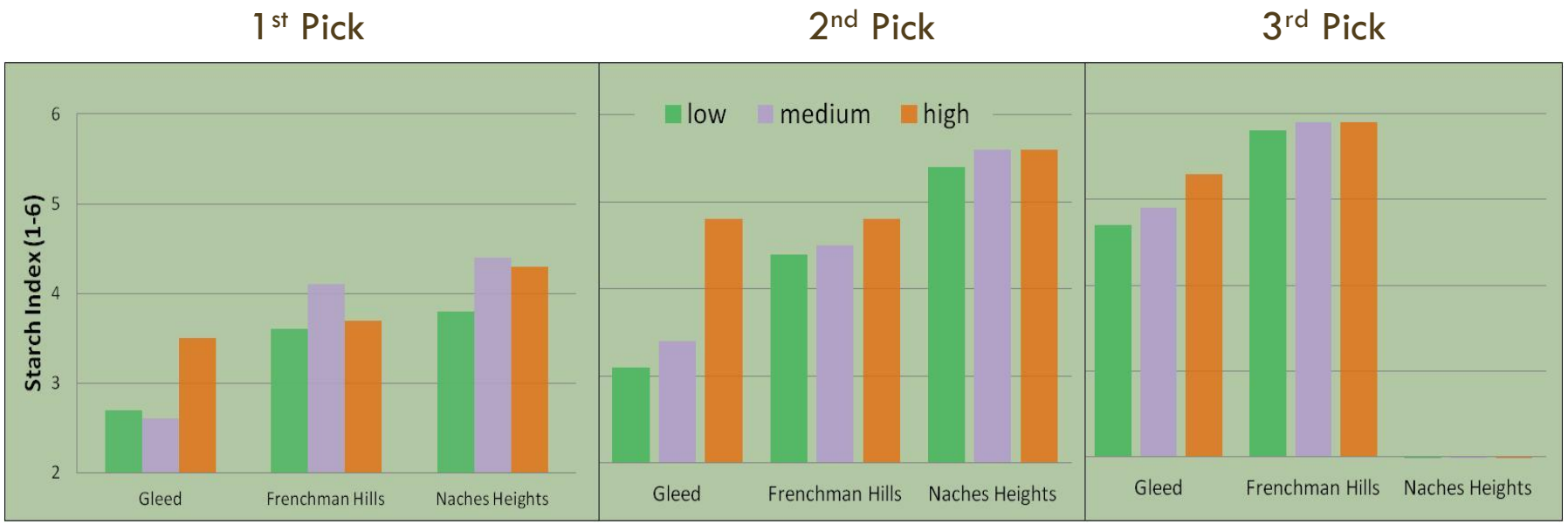
Source: WTFRC
www.treefruitresearch.com

Crop Load: Example Honeycrisp

Honeycrisp is the best apple to demonstrate the consequences of over cropping.

Medium **High** **Low**

Cropload



Cropload: Low = 2-3 frt./TCSA; medium = 5-6 frt./TCSA ; high = 8-9 frt./TCSA

WTFRC, 2010

Ways to measure Maturity

- Organoleptic methods

Tasting in WTFRC laboratory in Wenatchee

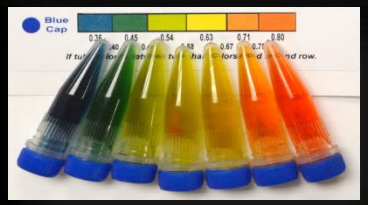
Bruce Allen, Chiawana Orchards, 2013

Cropload effects and softscald

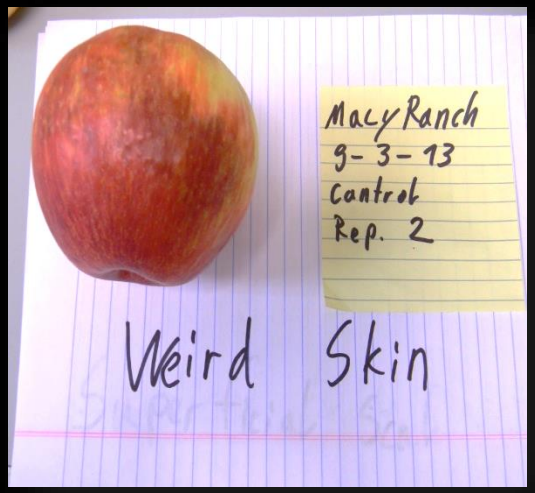
		Harvest 1		Harvest 2		Harvest 3	
Cropload	**Storage**	**4**	**8**	**4**	**8**	**4**	**8**
Low	RA	6	0	6	11	6	50
	CA	6	0	0	0	0	43
	MCP/CA	0	0	6	0	31	31
	MCP/RA	0	0	11	0	19	na
Medium	RA	0	0	0	6	56	56
	CA	0	6	6	6	29	53
	MCP/CA	0	0	0	20	31	47
	MCP/RA	0	0	6	0	56	67
High	RA	0	na	0	0	50	44
	CA	0	0	0	0	72	61
	MCP/CA	na	na	0	na	72	50
	MCP/RA	na	na	0	0	76	50

Softscald development after 4 and 8 months of storage. Gleed, WA (2010).

Titratable acidity



Single tube test

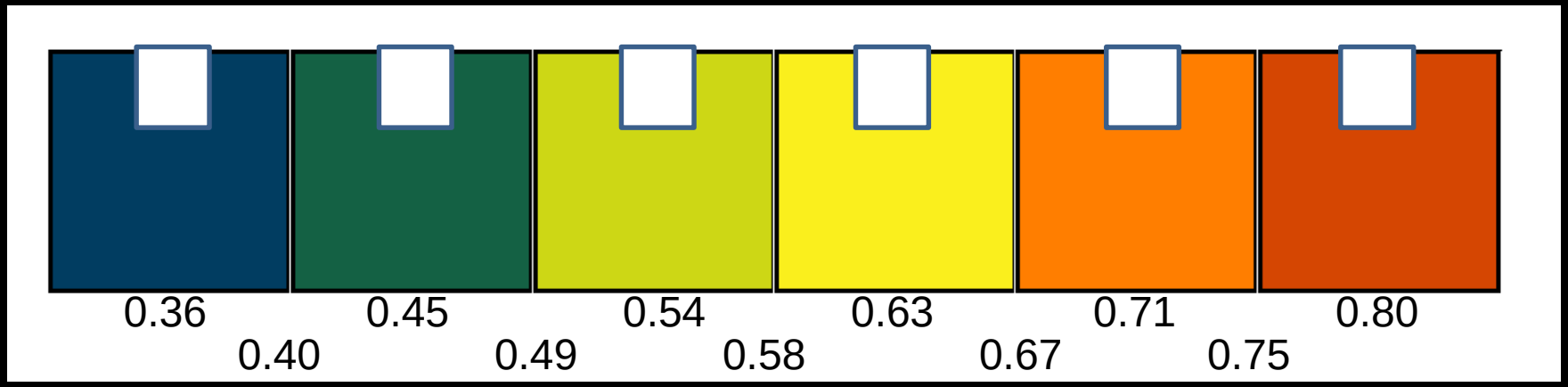


Single sample titratable test

Multi sample titratable test

www.resultsnowtests.biz

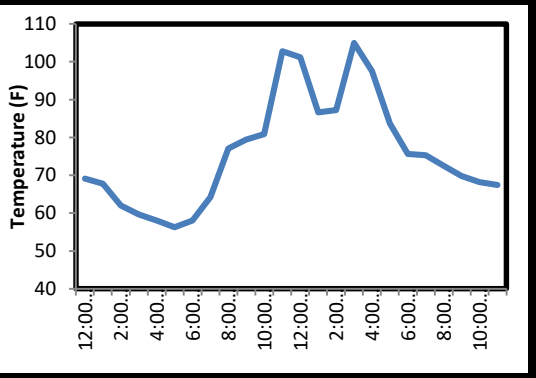
If tube color is between two charts colors, read second row



Titratable Acidity

http://www.goodfruit.com/new-tools-to-determine-fruit-quality-parameters/

DA meter in the orchard environment



Dry Matter Content

Side Product ☺

STORAGE CONSIDERATIONS

WASHINGTON CA PROTOCOL

Current research

Disorder management

Flavor retention

‘Honeycrisp’ long-term CA

- Breaking ground color
- Starch 4.5-5.0 (1-6)
- ≥ 0.5% TA
- 7 days at 50 ^{o}F
- SmartFresh
- 37-39 ^{o}F final storage temperature
- O_2 2-3%
- CO_2 0.5-1%

Source: Mattheis and Hanrahan, 2013

June 3, 2015

- CA stored
- 1-MCP
- Penbotec
- Cull <20%
  - 0.5% decay
  - Bitterpit 15% or less
  - No softscald
- Size 80-125

Low colored fruit

‘Honeycrisp’ long-term CA

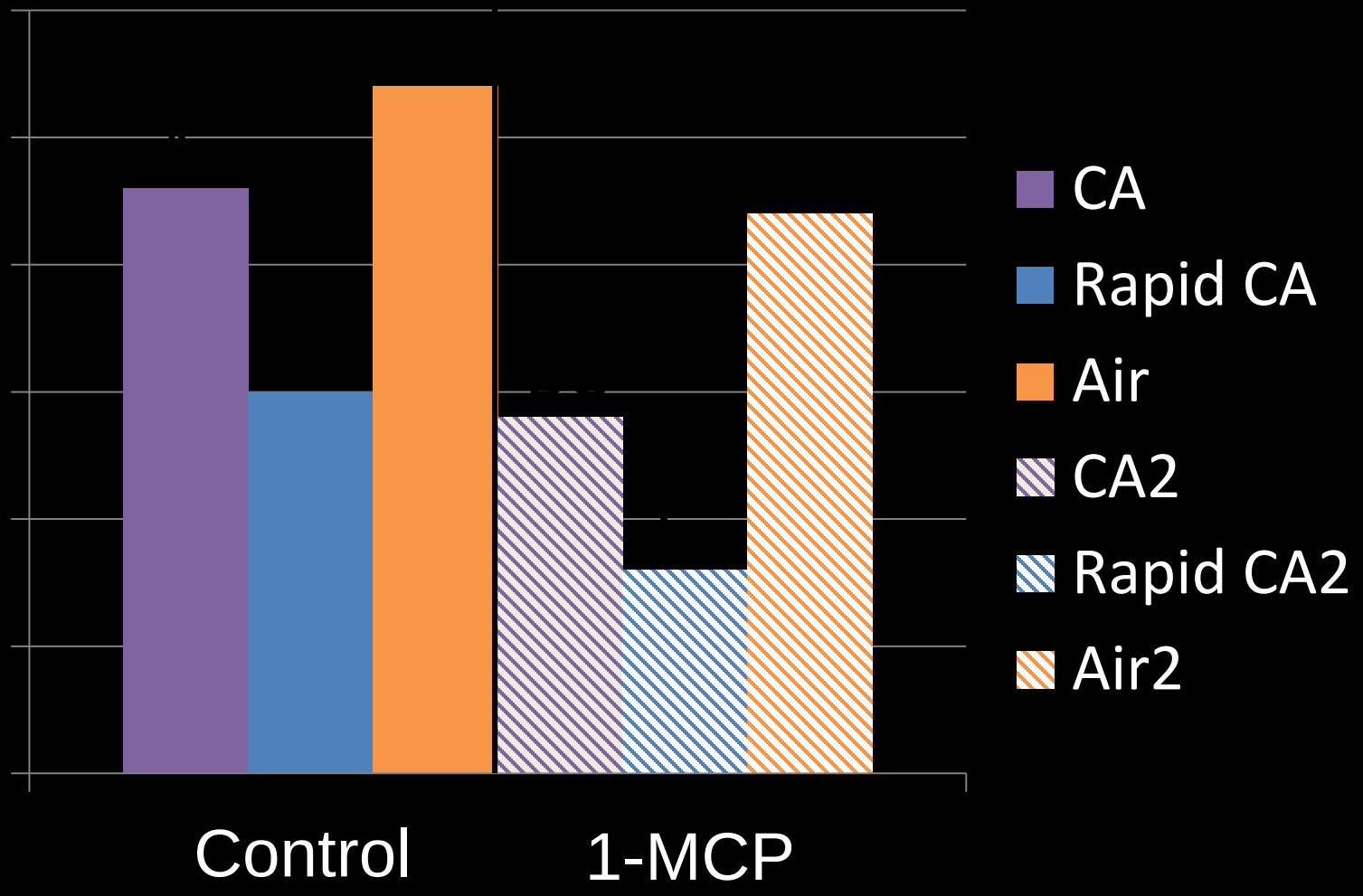
- Breaking ground color
- Starch 4.5-5.0 (1-6)
- ≥ 0.5% TA
- **7 days at 50 °F**
- SmartFresh
- 37-39 °F final storage temp.
- O_2 2-3%
- CO_2 0.5-1%

Humidity
Shorter time
High CO_2
Faster CA

Source: Mattheis and Hanrahan, 2013

Significant Findings

- CA during conditioning and 1-MCP reduce bitter pit incidence



OUTLOOK

Trends in Washington

Photo: TJ Mullinex

Acknowledgements

- James Mattheis
- David Rudell, Rachel Leisso
- Manoella Mendoza, Kyle Tynan
- Janie Countryman
- Suzanne Niemann, Nadia Valverdi, Jacqui Gordon, Lauren Brandt

- Grower collaborators
- WTFRC team
- WTFRC student interns

Thank you!

Ines Hanrahan

www.treefruitresearch.com

hanrahan@treefruitresearch.com

509-669 0267