

Honeycrisp Production In Washington

Lessons Learned

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As it should be



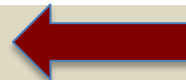
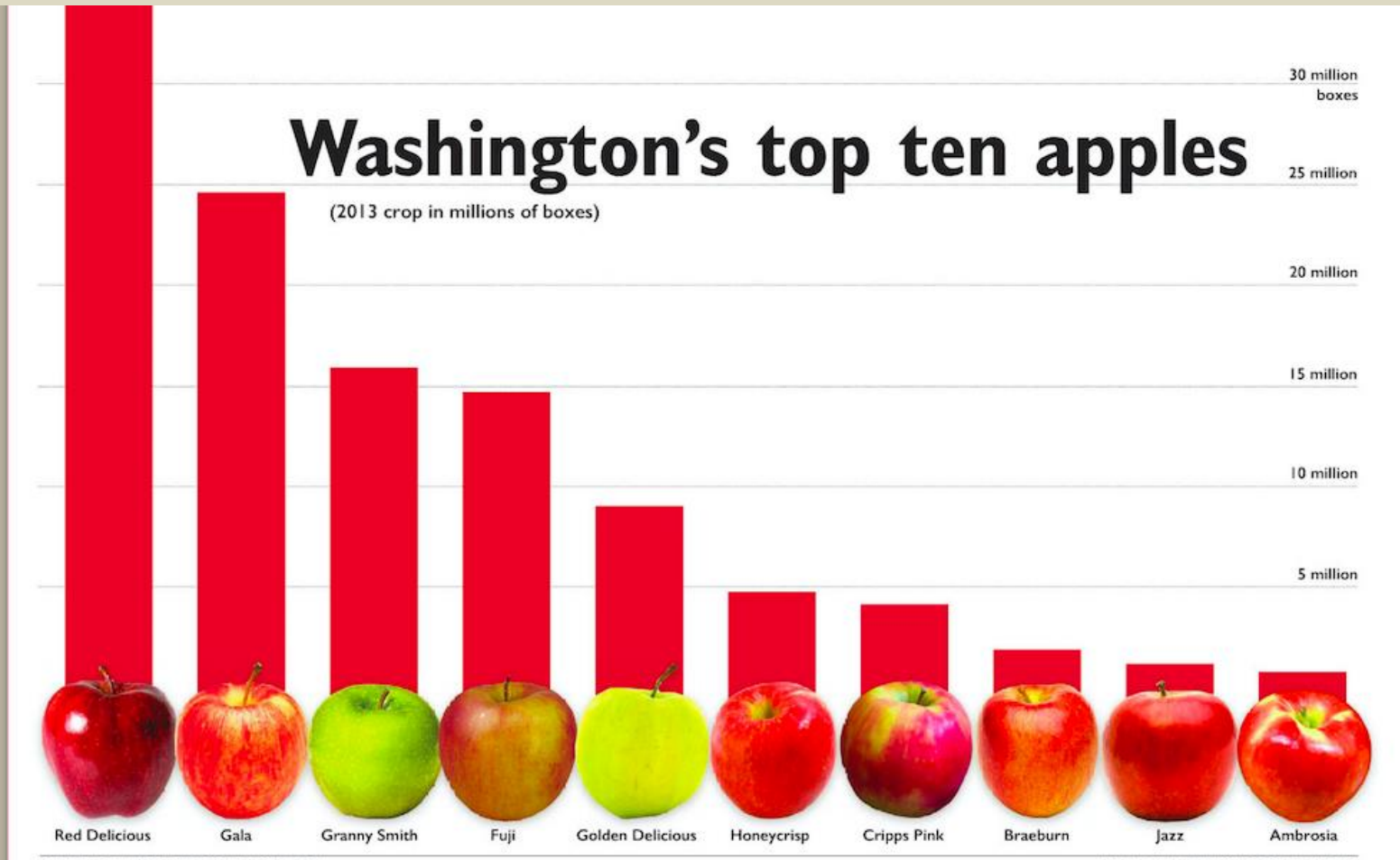
18th leaf Fuji



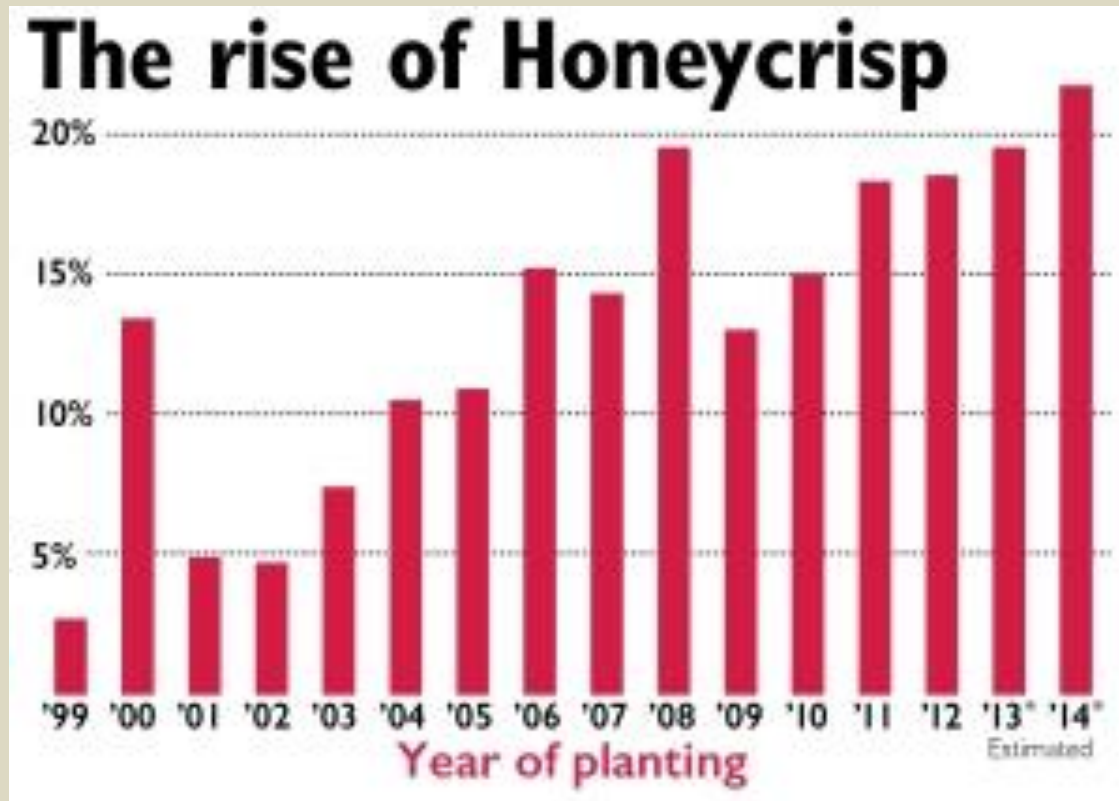
Maverick Orchard



Volume has tripled in last 5 years with 8.9M boxes in 2015



Nursery



Redder and Earlier

Royal Red

Firestorm

Cameron
Select

DAS 10
'Premier'



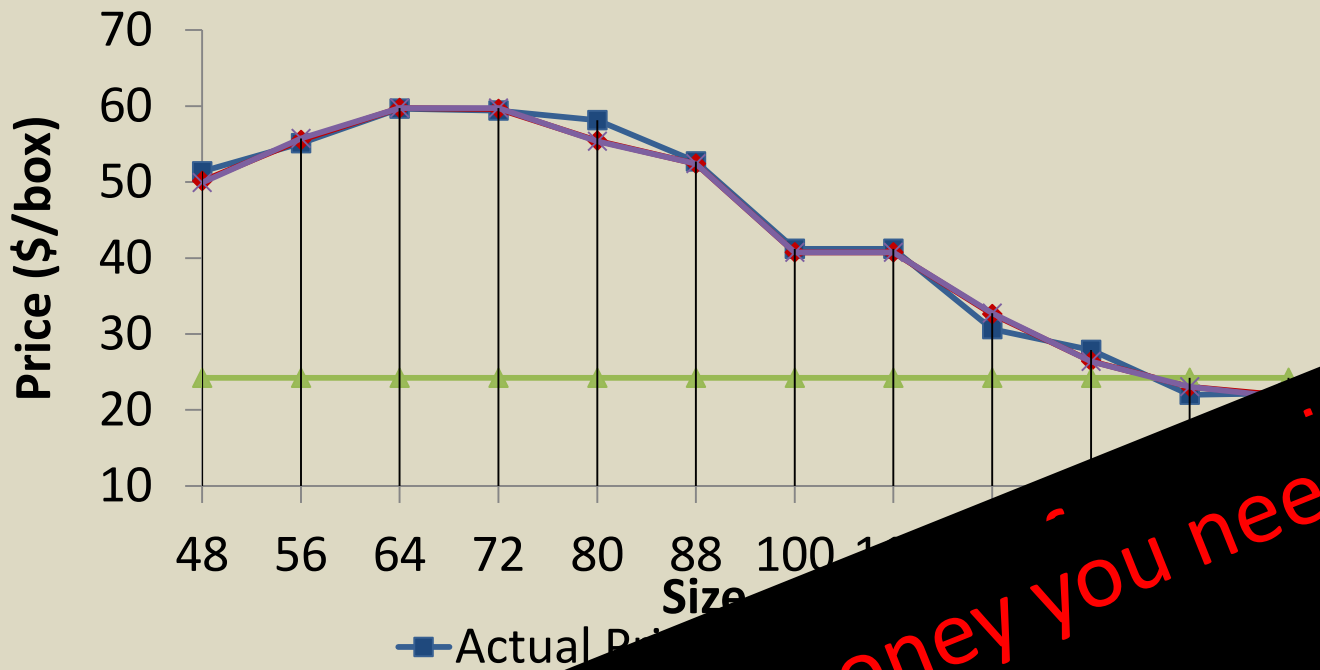
...Challenges...

- Bi-annual bearing
- Judging maturity
- Bruising
- Decay
- Sunburn
- Sensitive to low oxygen, high CO₂, low storage temps.
- Off flavor after longer storage
- Stem bowl and side splits
- Internal browning on the tree
- Birds love it
- Sequential picking needed
- Short stems
- Earwigs

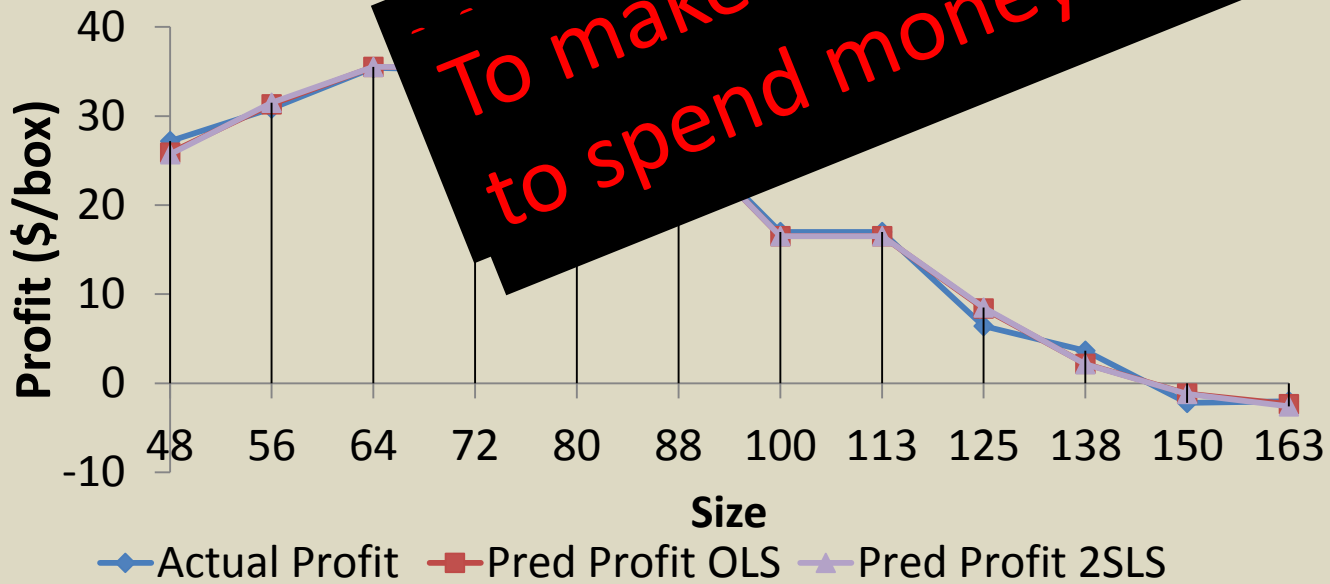
Until something better comes along



You too can lose money!

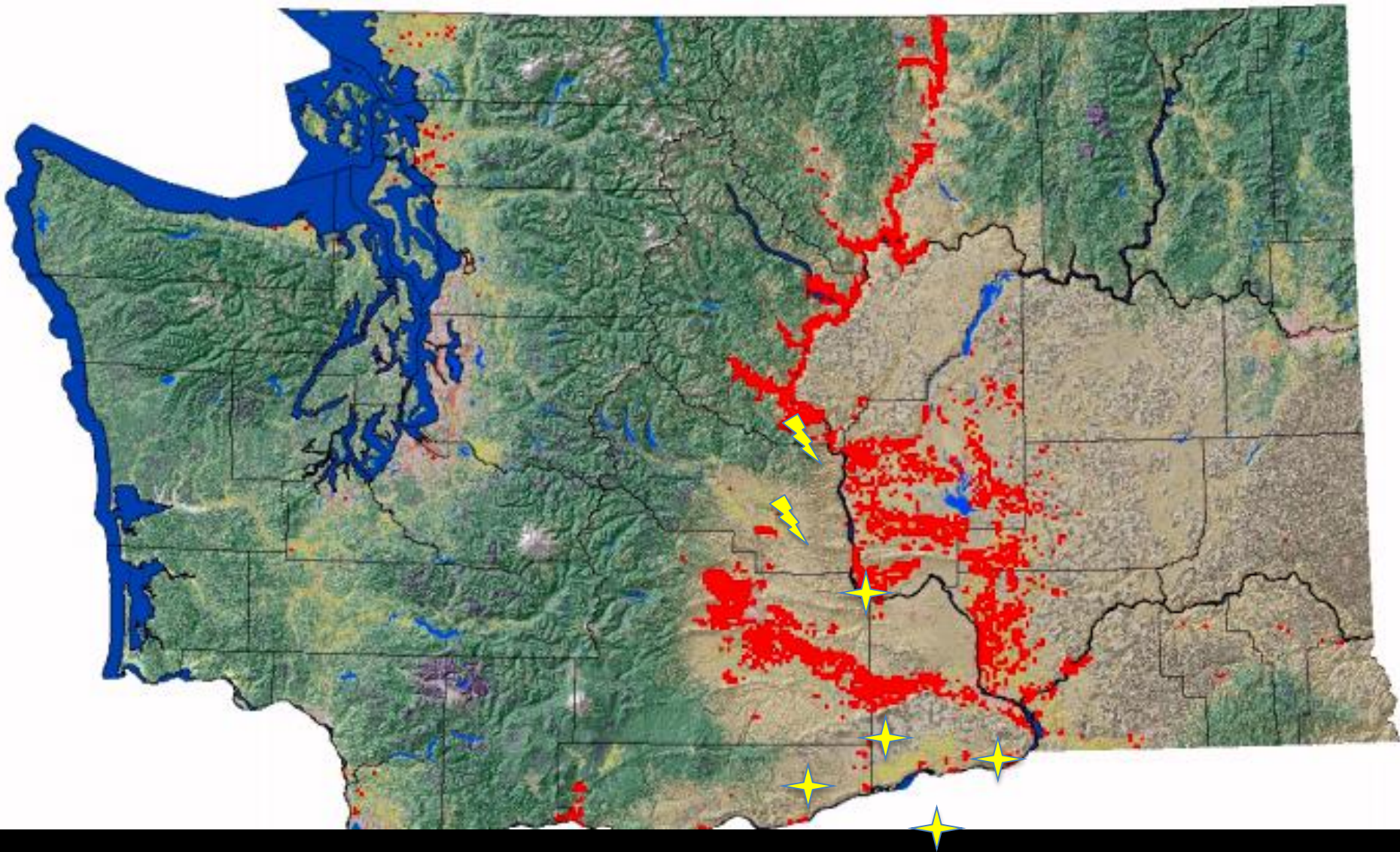


To make money you need to spend money



Bruce Allen
Mike Robinson
Richard Thomason







Sunburn/delayed sunburn

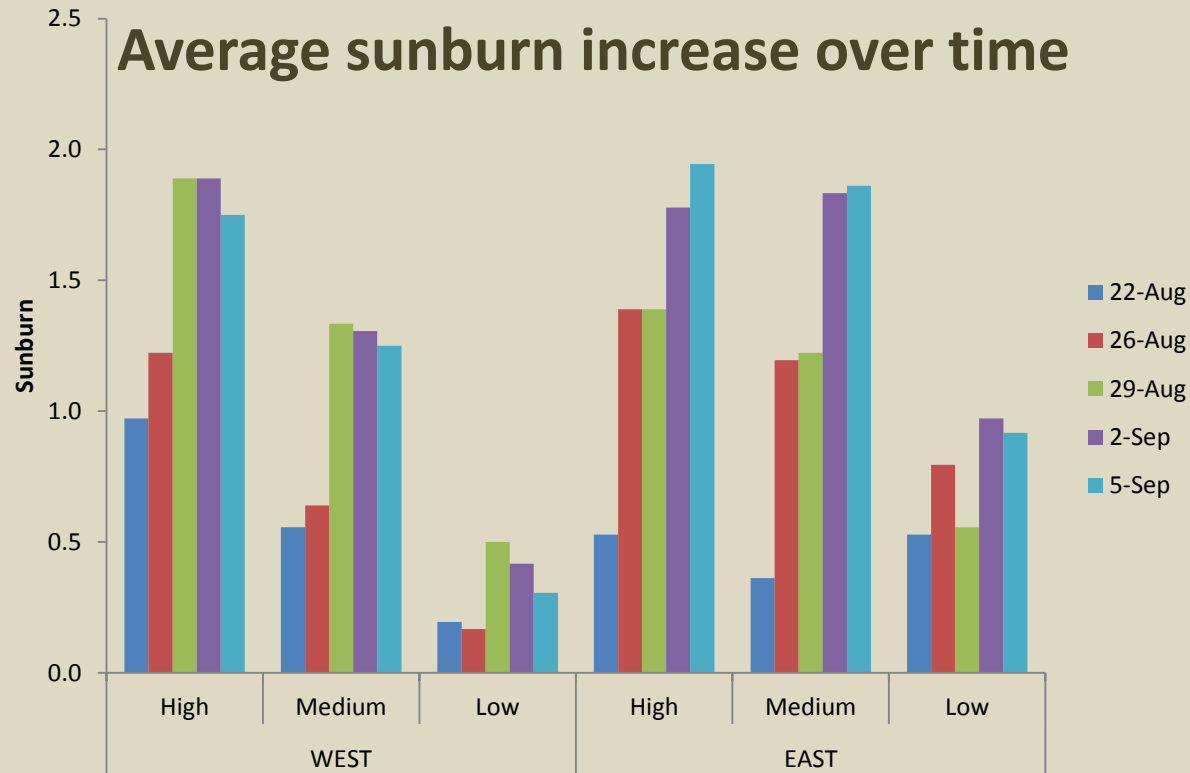


Red Color



Cropload

Average sunburn development (Scale 0-5)



Heat Stress and Sun Stress

Rotating applications of
Raynox and Surround
EC / misting
Shade cloth
Shade Cloth + EC



Effects on physiology of apple under photo-selective anti-hail nets

Dr's Lee Kalcsits, Stefano Musacchi, Desmond Layne
Washington State University



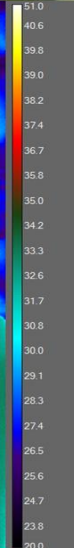
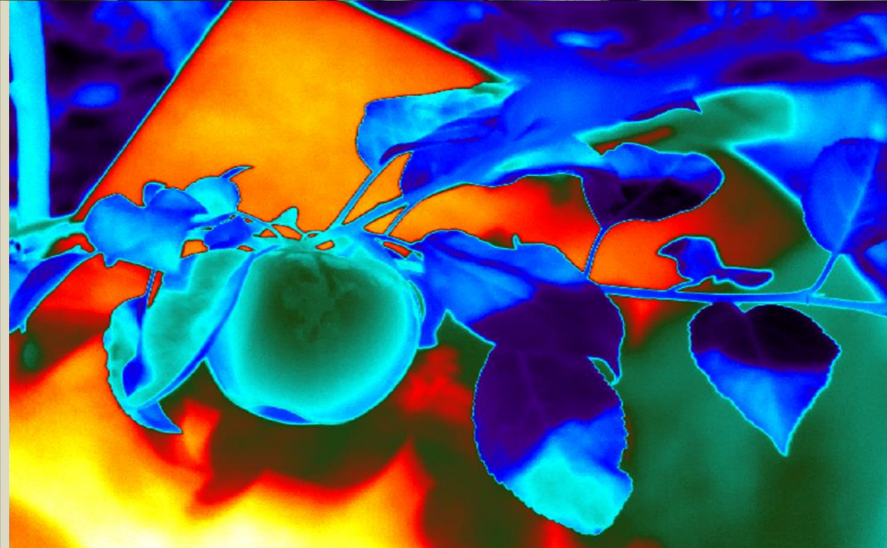
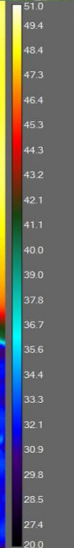
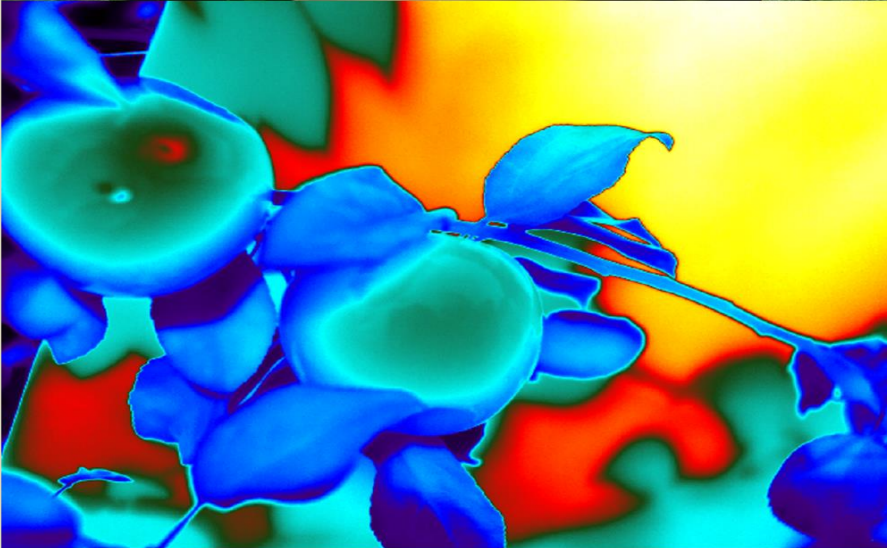
Photoselective Netting Colors





Blue, Pearl and Red netting compared to an uncovered control

	Mean Temperature (°F)	Relative Humidity	Light Intensity (umol m ⁻² s ⁻¹)	Wind Speed (feet s ⁻¹)
Control	76.75 a	0.387 a	1804 b	5.53 a
Blue	76.29 b	0.384 a	1404 a	3.45 b
Pearl	76.32 b	0.376 a	1459 a	3.63 b
Red	76.14 b	0.379 a	1355 a	3.33 b



Top left: A 'Honeycrisp' apple showing symptoms of severe sunburn outside of netting. Top right: A 'Honeycrisp' apple under netting showing no sunburn symptoms. Bottom left. High resolution thermal images of 'Honeycrisp' apple outside of netting. Bottom right: A thermal image of 'Honeycrisp' apple under photoselective netting.

Credit: Sindhuja Sankaran and Lav Khot

Wind?



Bird Management



- 4% sugar solution:
- 4lbs. Cane sugar / 100gal.
- Bird Shield

GS Long: Scaredancer

Light management

- Pre-harvest reflective foil
- Extenday products
 - Difficult on rolling slopes

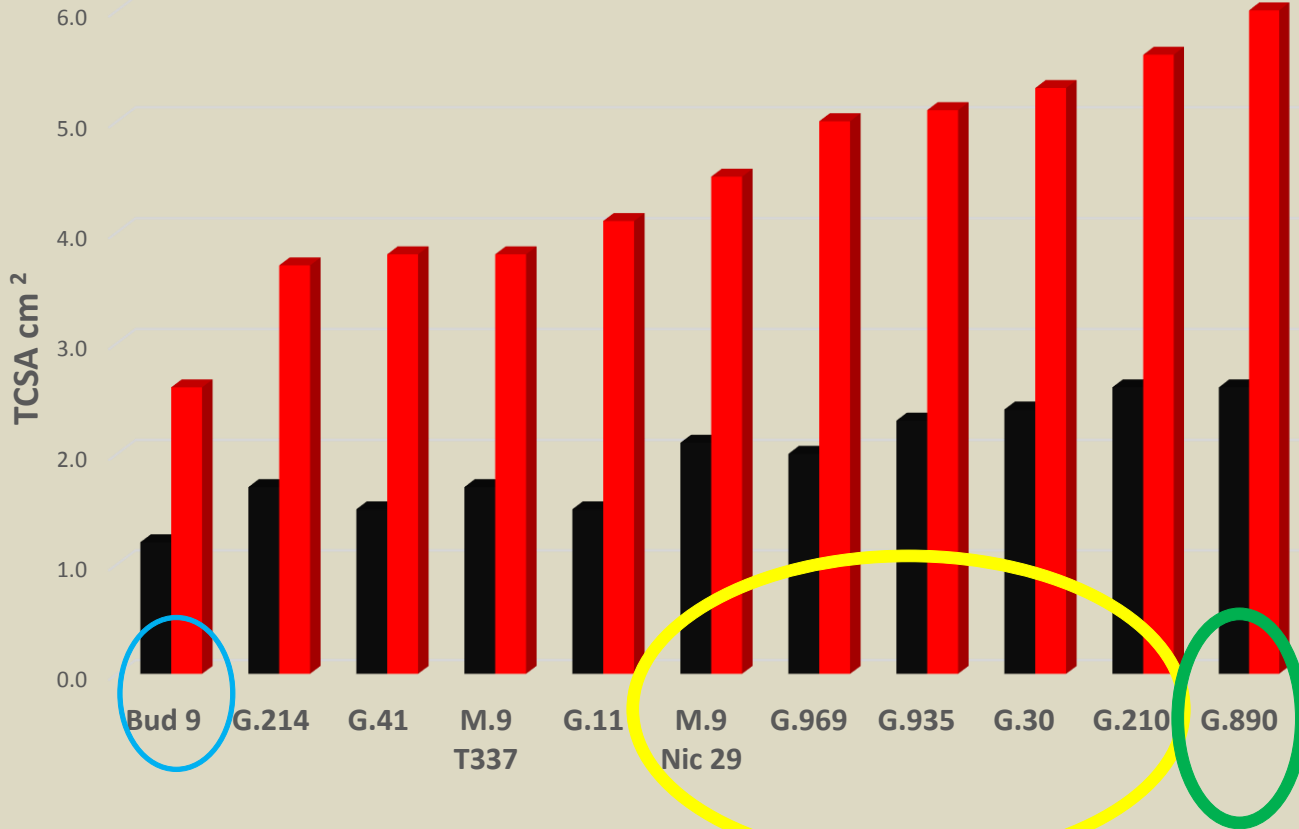


Roots

- Won't Bloom (M26 / M111)
- Won't Return (M9 types)
- Won't Grow (M9 types)
- Low Yields (Need more precocious)

2015 East Wenatchee Honeycrisp

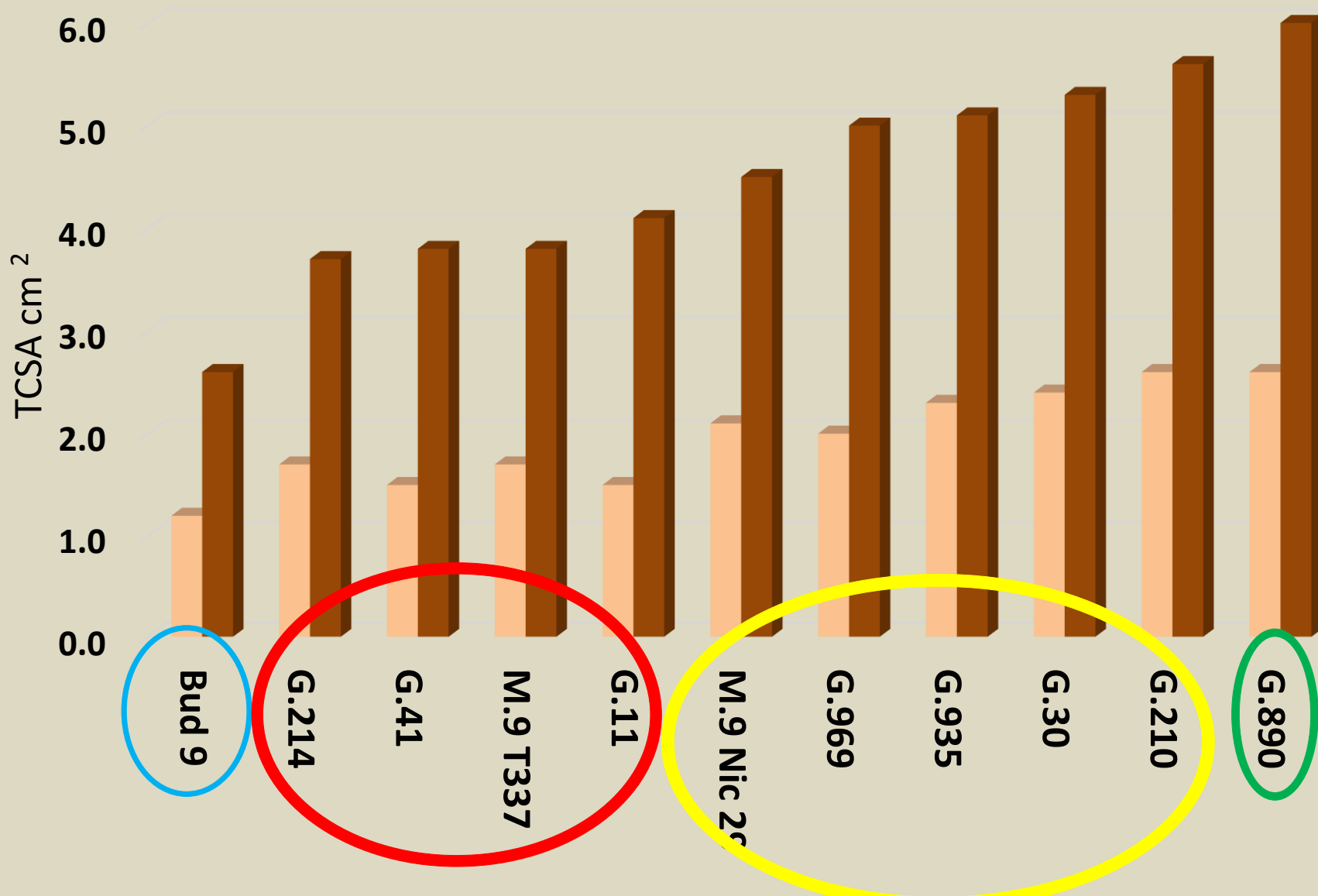
■ Spring 2015 ■ Fall 2015



Statistically, G.890 is biggest;
 G.210, G.30, G.935, G.969 and M.9 Nic 29 are similar;
 G.11, M.9 337, G.41 and G.214 are the same;
 Bud 9 smallest,

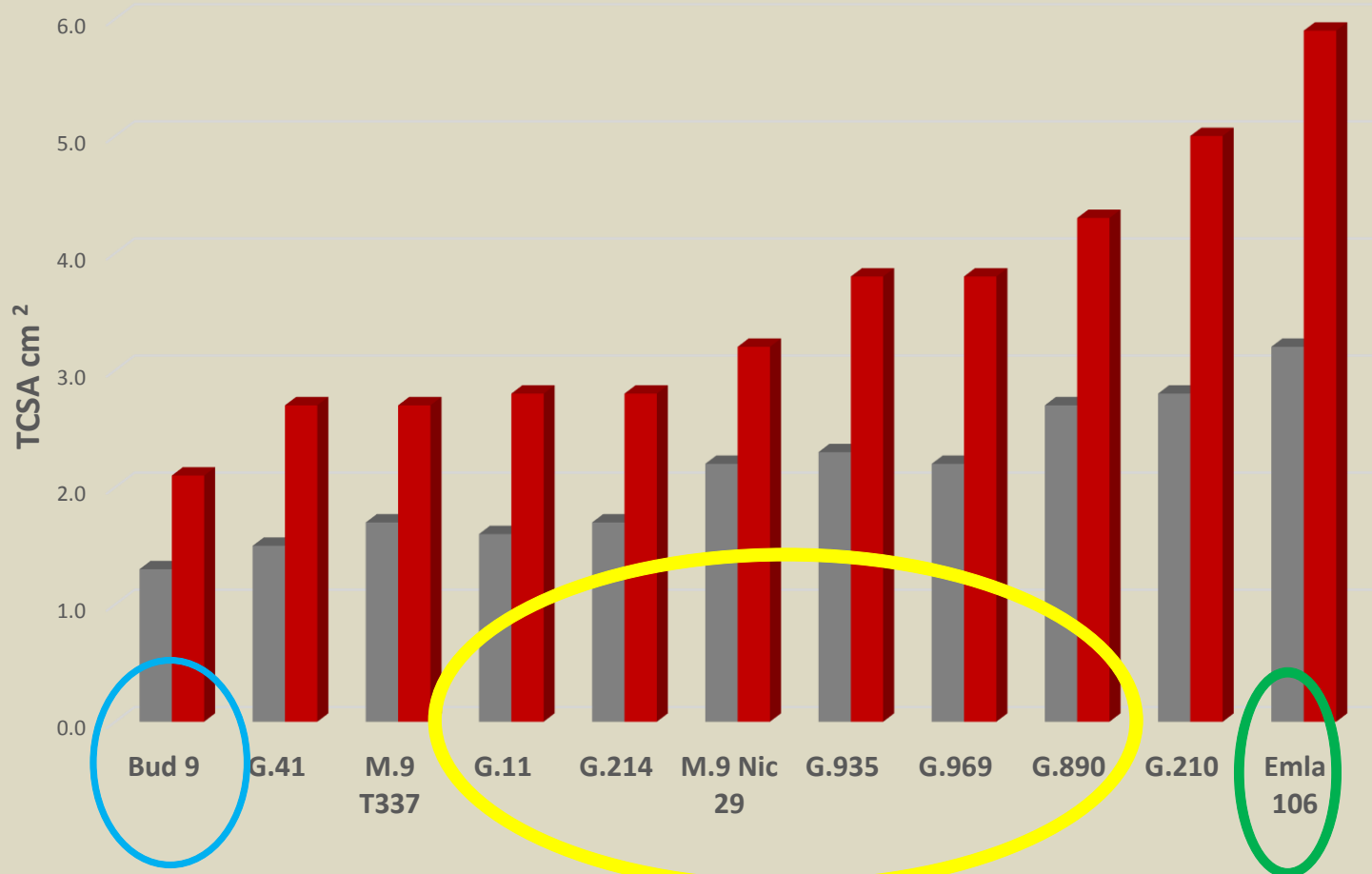
2015 East Wenatchee Honeycrisp

Spring 2015 Fall 2015



2015 Oroville Honeycrisp Replant

■ Spring 2015 ■ Fall 2015



Statistically, M.106 is biggest, G.210 is separate;
 G.890, G.969, G.935 are similar;
 M.9 Nic29, G.214, G.11, M.9 337 and G.41 are similar;
 Bud 9 smallest.

Current interest:

G.214, G.210, G.969 and G.890 for extra vigor

These rootstocks are VIGOROUS as non bearing trees

Crop density will calm them

Vigor/HEALTH will sustain very high yields better than M.9



2nd Year – Sleeping Eye Honeycrisp Planting



Systems

- We have on every system – responds well to 3D and 2D
- Vertical and V
- Most are successful
- Grower (and site) dependent

BMR: Royal City

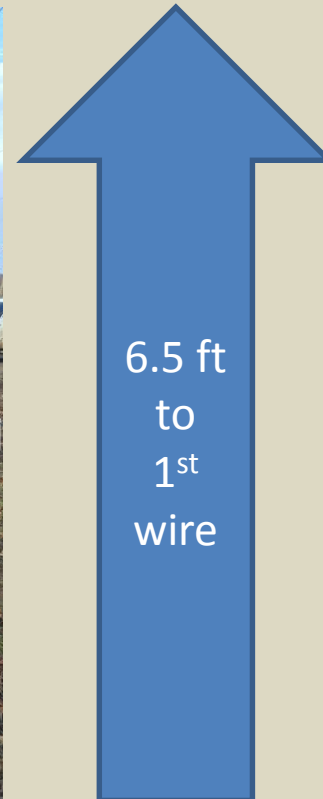


Fill the space / Grow the Tree

- More fruiting units per acre
- Stress
 - Nitrogen
 - Water
 - Weed free
 - Netting / cooling
 - Mildew control
 - Remove flowers

End of first leaf, 2.5' X 11'

Most trees to 7 feet. Top wire 11 feet



Aggressive fertigation
Weekly soil testing for salt and N
Weekly mildew and leaf feed spray



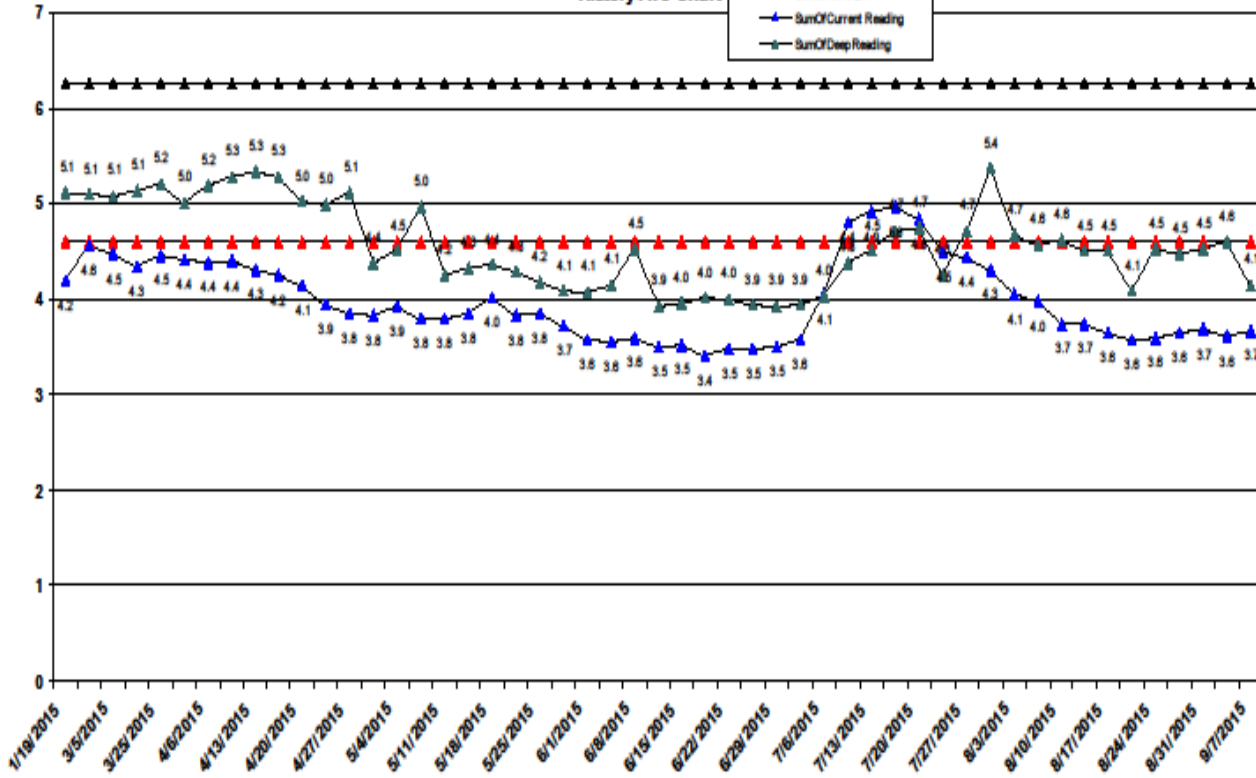
2015 crop

6

4

HistoryTwo Chart

- ▲ SunOfFull 2ft
- ▲ SunOfRefill 2ft
- ▲ SunOfCurrent Reading
- ▲ SunOfDeep Reading



Deep reading in grey

Shallow reading in blue

May

July

September

2015 season water use approx. 2 acre feet includes frost

Crop load management = Higher average production

8th leaf 3 year ave. 31 BPA



6th Leaf 3 year ave. 69 BPA



Crop load management = Consistent quality

50% 3rd grade no top grade 80% top grade



Crop load management = Consistent size

Size 27 \$30 a box



Size 80 \$70 a box



Mike Robinson

Large size equals more Bitterpit



Large size = reduced packouts

Honeycrisp return per bin					
Peak size	Ave packs / bin	Ave \$ box	Gross \$ bin	Packing cost per bin	Net per bin
36	10	\$30	\$300	\$200	\$100
80	16	\$70	\$1120	\$232	\$888

Packouts on lots heavy to very large sizes are always low.

Size 80 Packing costs from WSU fact sheet fso62e Galinato and Gallardo

Ave \$ / box are a SWAG estimate based on observed 2014 crop sales

Mike Robinson

Count buds, Count flowers, Count
fruits, Repeat.....



Mike Robinson

Get the look, look a lot



Mike Robinson

Honeycrisp thins like a Gala when young and Fuji when mature

Positives:

Low cost. No labor demand

Negatives:

Lack of precision, potential for over-thinning, under-thinning and unwanted singles



Cost

Honeycrisp production costs				
Yield	Growing cost	Hand bloom thinning cost	Harvest cost	Total Per acre
69 BPA	\$5,582	\$1,500	\$2,760	\$9,842
31 BPA	\$5,582	\$0	\$1,240	\$6,822
				\$3,020
<small>Growing costs from WSU fact sheet fso62e Galinato and Gallardo Assume 1452 TPA spindle</small>				

Net per acre, small vs. large size fruit

Peak size	Ave packs / bin	Ave \$ box	Gross \$ bin	Packing cost per bin	Net per bin	Bins	Per acre	Cost	Per Acre net
36	10	\$30	\$300	\$200	\$100	69	\$6,900	\$6,822	\$78
80	16	\$70	\$1120	\$232	\$888	69	\$61,272	\$9,842	\$51,430

Net per acre, low vs. high production

Peak size	Ave packs / bin	Ave \$ box	Gross \$ bin	Packing cost per bin	Net per bin	Bins	Per acre	Cost	Net
80	16	\$70	\$1120	\$232	\$888	31	\$27,528	\$6,822	\$20,706
80	16	\$70	\$1120	\$232	\$888	69	\$61,272	\$9,842	\$51,430

Earwigs

- Remove triples



Aug. 19, Chiawana

Doubles reduce size and increase yield



Honeycrisp in Columbia Basin of Washington

Mike Robinson

Preharvest sprays

- ReTain and Harvista
 - Widen harvest window
- Stop Drop (NAA)
 - Twice

Timing of harvest

Too early

Increased bitterpit

Less color

Smaller size

Lack of flavor

Too late

Reduced storage life

Skin greasiness

Bruising

Preharvest drop

Maturity determination



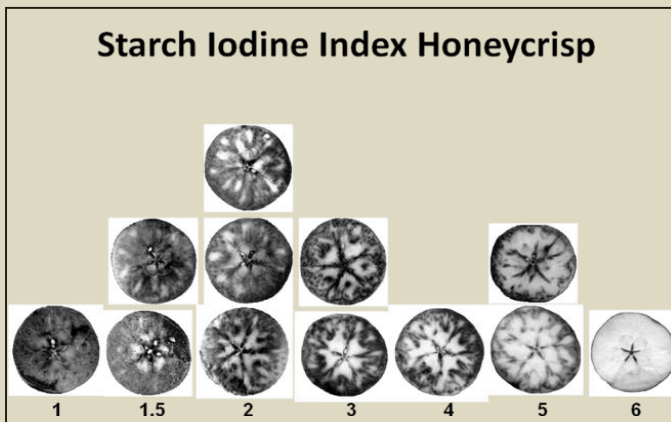
Color

Percent acid 0.6

Starch movement 60%

Firmness 14+

Soluble solids concentration 13



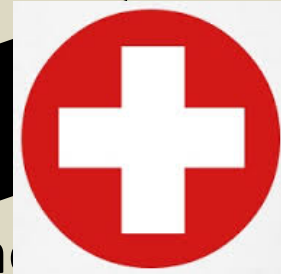
Maturity determination



FRUIT NEEDS TO TASTE GOOD!

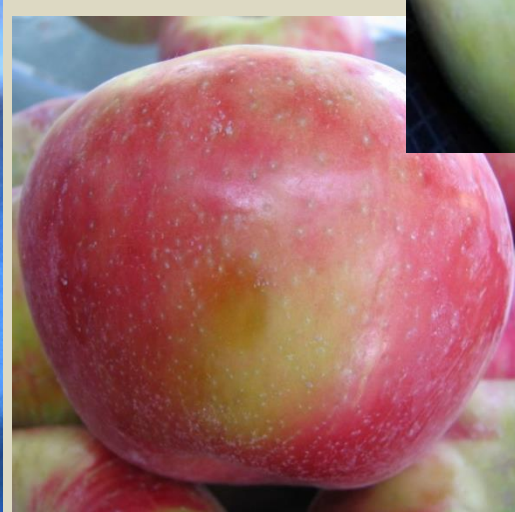
The Good the Bad and the Ugly

- Ugly = run now, Bad = run as soon as possible, Good = Run between Jan. and Feb.
- What factors decide when to run?
 - Age of Block
 - Fruit size
 - Index of fruit at harvest (mineral analysis)
 - Block History – has it gone long term before?
 - Fruit pressure
 - Malic acid content
 - Fruit starch content
 - Willingness of grower to take a chance
- Growers tag bins Green(good), yellow(bad) and Red(Ugly)



Storage is not a hospital

Bruising





Flavor Wake Up

Flavor Classification

