ORCHARD SYSTEMS IN WASHINGTON STATE

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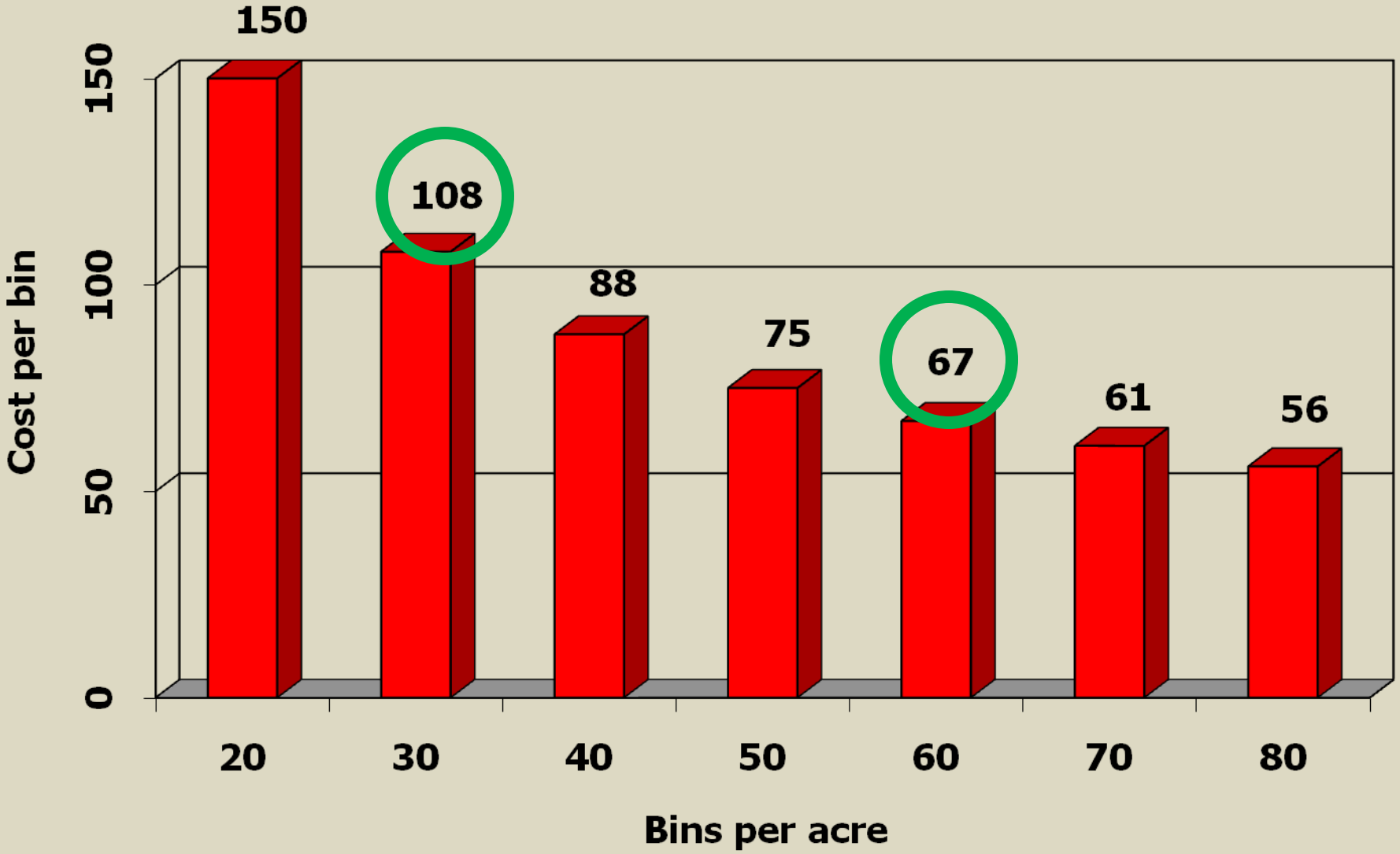
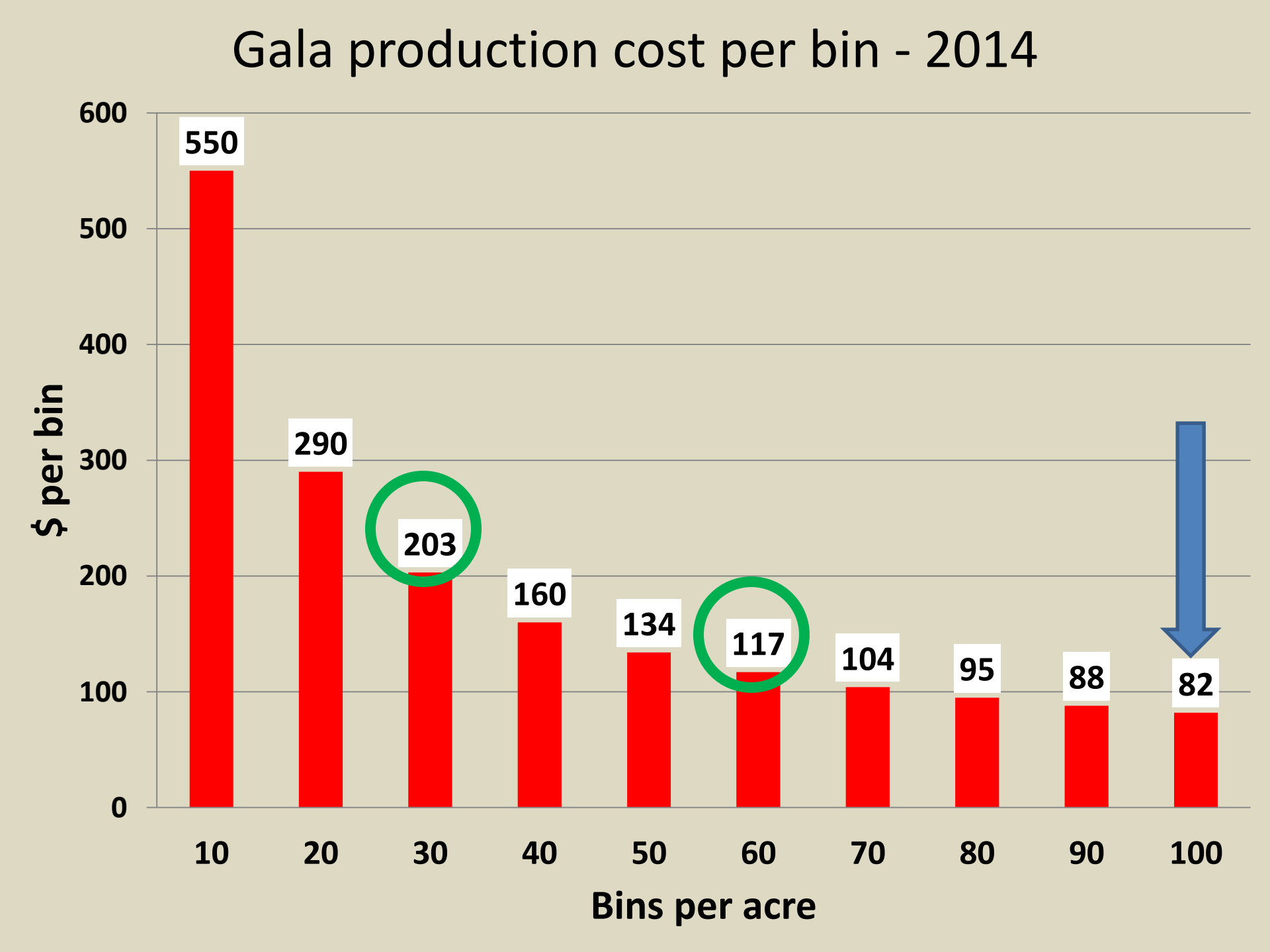
Goals

- Consistently deliver an excellent eating experience
- Positive ROI to return to the farm
  - Harvest sunshine
  - Stress management
  - Measure, manage, model
  - Precision cropload management
  - High early and sustained yields of high quality target fruit

Gala production cost per bin - 2005



From Clark Seavert, Oregon State University


Gala production cost per bin - 2014
600
500
400
300
200
100
0
$ per bin
550
290
203
160
134
117
104
95
88
82
10
20
30
40
50
60
70
80
90
100
Bins per acre

Point to Remember…

- **Focus on higher yields of increased quality by spending more, and labor becomes cheaper and more efficient per unit**
- **All post harvest expenses are reduced when number of packed boxes per acre increase**

(SNAP)
Simple, Narrow, Accessible and Productive Canopies

Random or organized /
narrow = accessible

Uniform Canopy/ Uniform Crop

High Early Yields

High Mature Yields

High Quality Fruit (Target)

Single, twin or triple stem

Canopy thickness: 20-90cm

Tree height: 2.7-3.5m

Row spacing: 3-3.5m

Tree spacing; .75-2.5m depending on system

4 dimensional	3 dimensional	2 dimensional
		
Complex system need high degree of skill (4^{th} D) Wide range of size quality	Simpler Improved quality Apply existing technology	Simplest Ability to be market specific New and existing technologies

Dale Goldy
Asst
General
Manager,
SAS

Orchard is laid out in advance of all other activity

Stemilt
World Famous Fruit

Dale Goldy
Asst
General
Manager,
SAS

Take the time to organize:

- Keep spacing equal
- Don't let trees move around
- Water

Dale Goldy
Asst
General
Manager,
SAS

Take the time to organize:

- Keep centrals straight

Goals of new plantings:

Quickly establish bearing surface: Two seasons

Start bearing 2nd or 3rd leaf

Sustain yields 80-150 bins/acre

With 1600-3000 packs / acre ‘target’ fruit

Harvesting Sunlight

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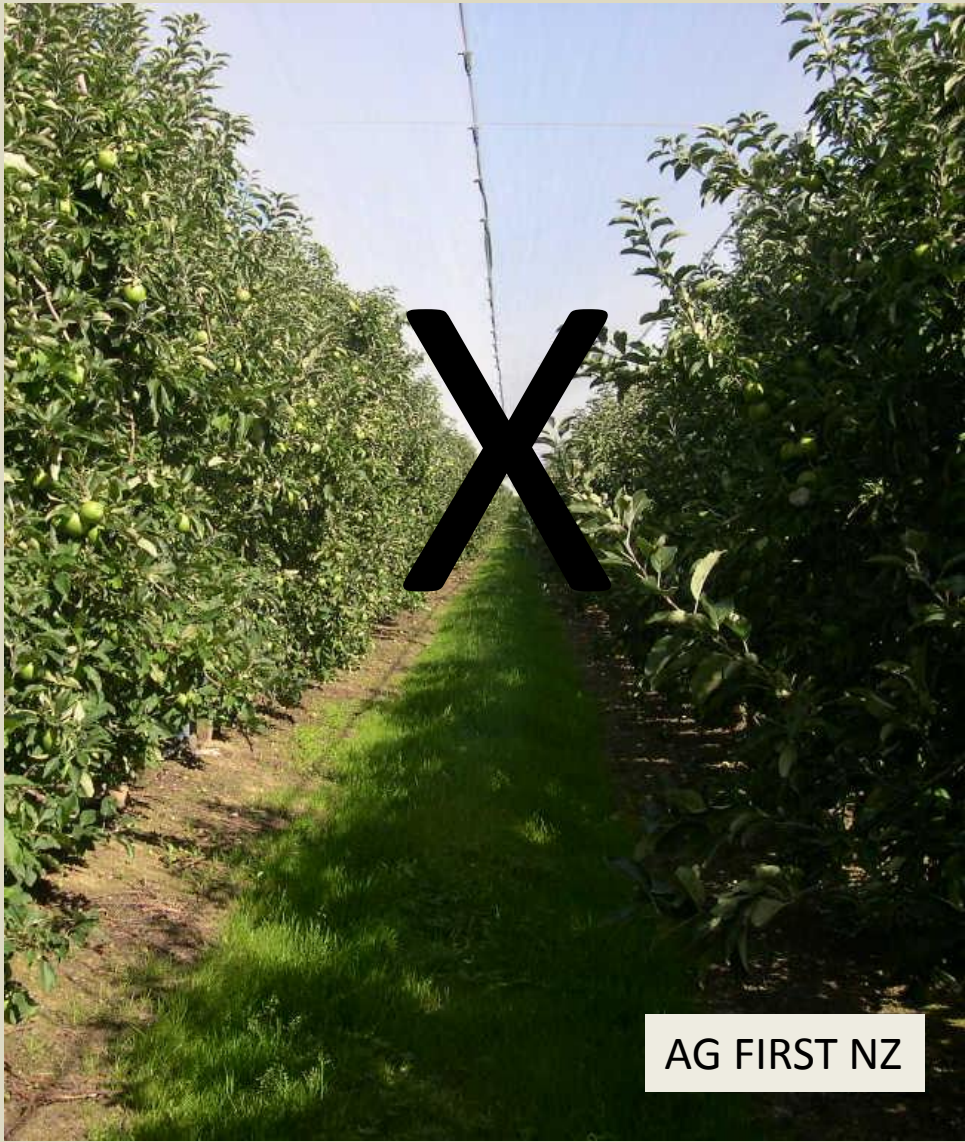
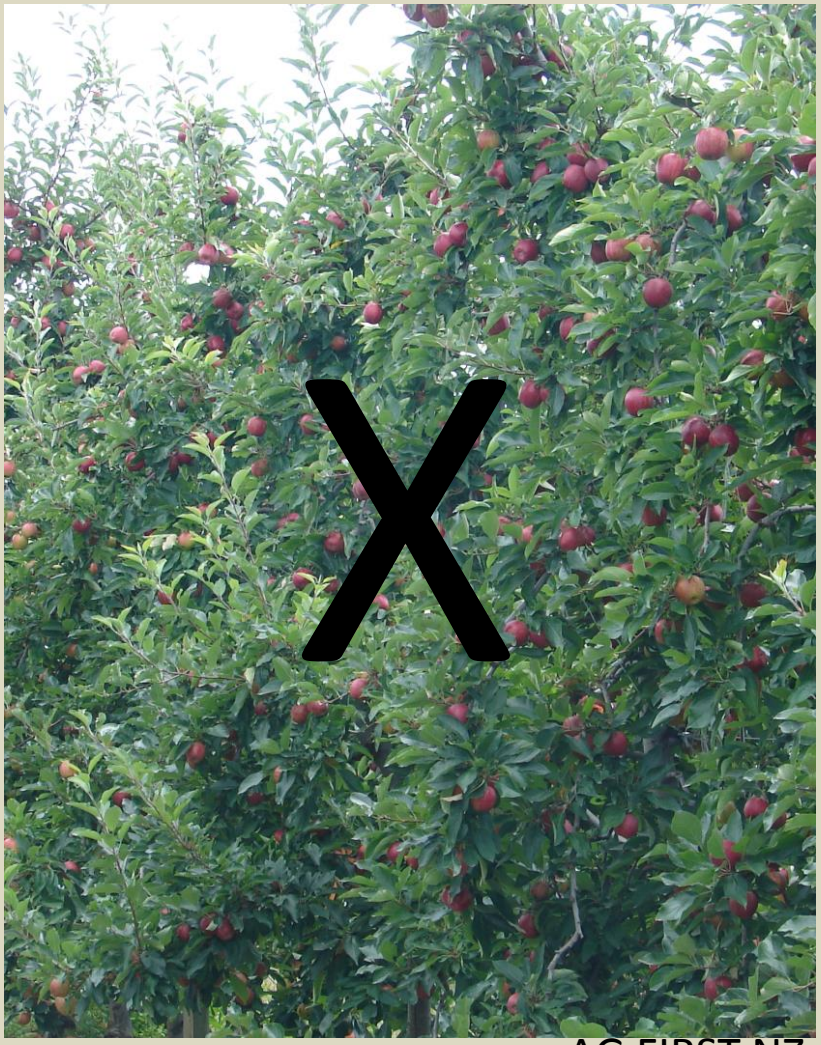
Harvesting Light – 50% rule



Harvesting Light – 50% rule



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Harvesting Light – 50% rule


V or Angle canopy creates more spatial distribution of leaders: better light management
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Focus on the Consumer

Upper Canopy

Lower Canopy

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Fruit position within the canopy

ce: Whiting, 2011


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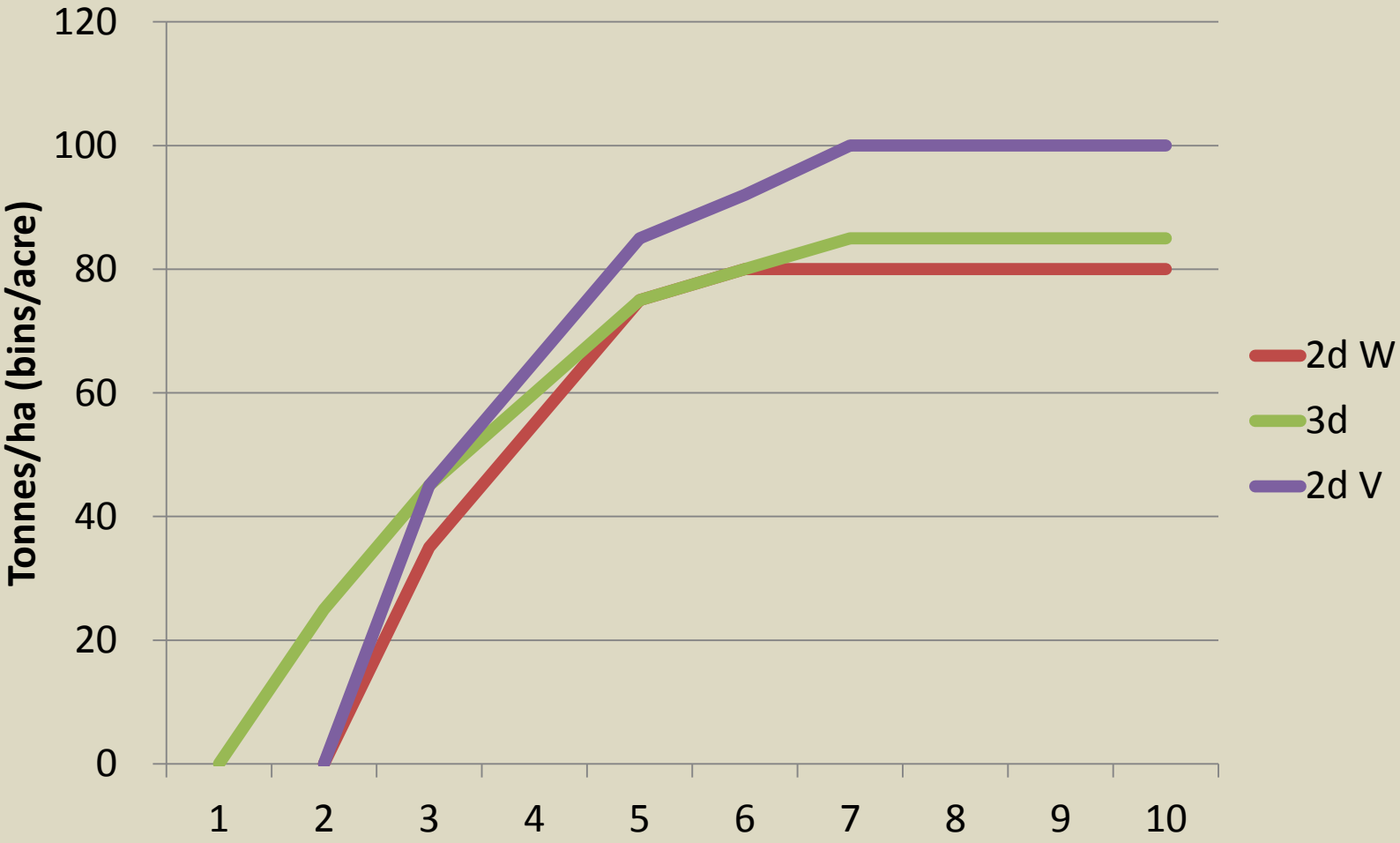
Systems - Yield



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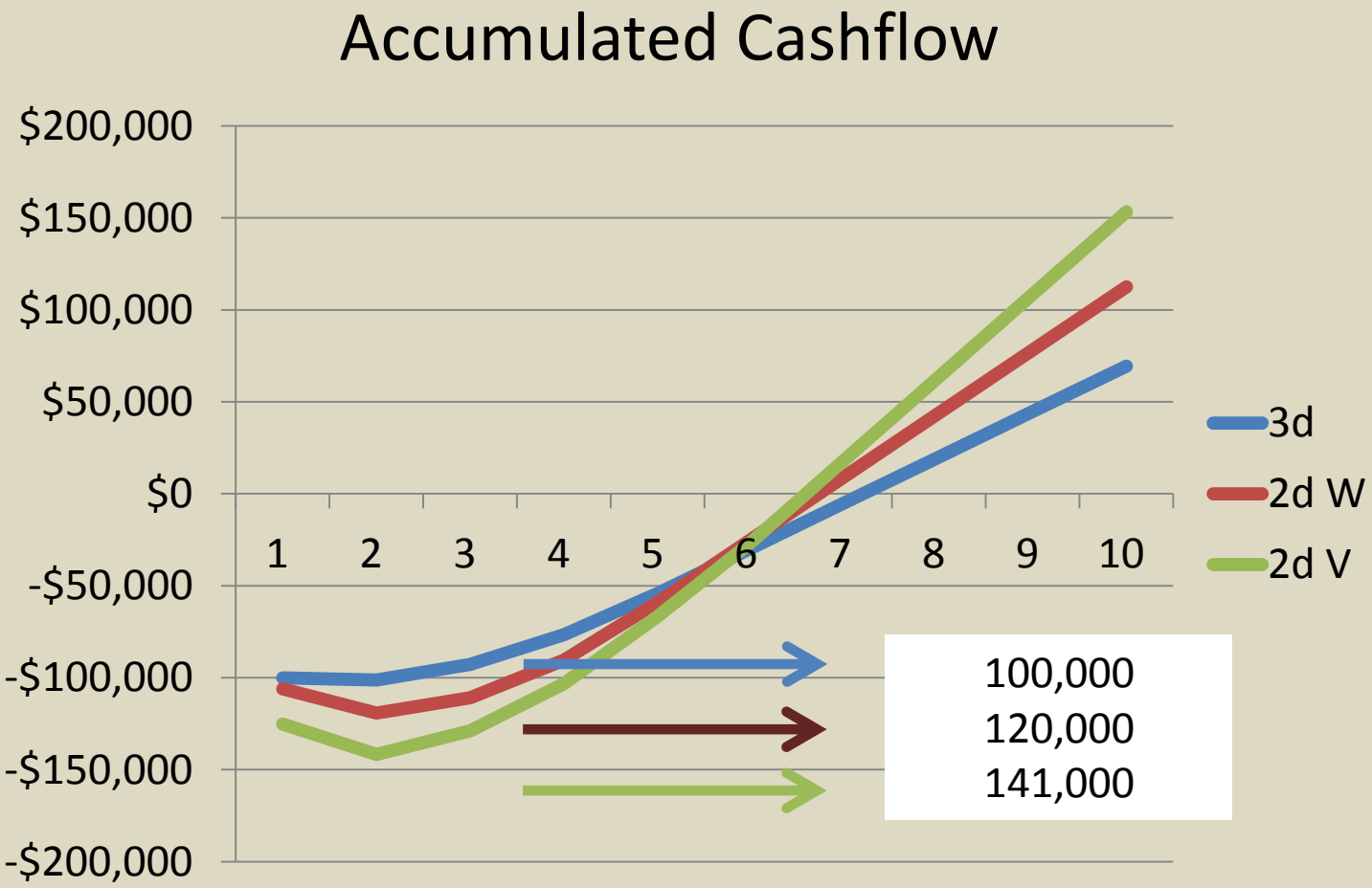
Investment Result: "Show me the Money!"



Investment Result: "Show me the Money!"

Internal rate of return and net present Value

	3D	2D W	2D V
IRR - 10 years	11%	14%	15%
IRR – 6 years	-8%	-6%	-5%
NPV @ 8% 10 yrs	$23,000	$55,000	$83,000

- Relative investment comparison
- Close to your opportunity cost of money

Labor

Management Changes

Dale Goldy
Asst
General
Manager,
SAS

Beginning of 2nd leaf

Row Spacing: 12 foot
Tree Spacing:

- Galas – 3 to 4 foot
- Honeycrisp 2.5 to 3 foot

Dale Goldy
Asst
General
Manager,
SAS

End of
2nd leaf

V trellis system

Spacing 1.5’x12’- 2’x12’

Height 11.5’- 12.5’

Two dimensional tree training system

Nursery tree style: sleeping eyes, bench grafts , plant in place.

Year 1 goals

Gala first year

growth height: 6.5’- 7’

Side limbs: 4-6 above 36”

Honey crisp first year

growth height 6.5’ – 7’

Side limbs: 2-4 on strong trees

Weak trees - none

Years 2-5 goals

Gala

growth height: 12’

Side limbs: 14-16

Cropping on year 3

Honey crisp

growth height 12’

Side limbs: strong trees 12-16

Weak trees - 10-14


Planting 2008

Caliper reduction from competitive limb

Pruning March 2009


New growth in 2009

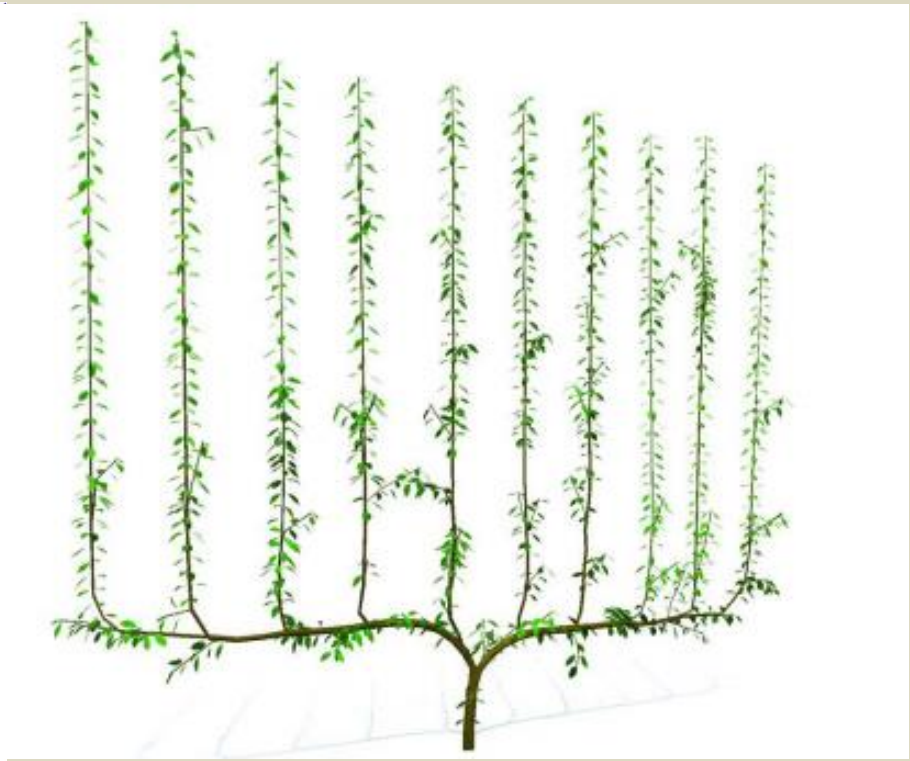
The perfect taper


08/24/2010

	Morning Mist Fuji 2008 Vertical Wall	Jazz 2009 Vertical Wall	Envy 2010 V trellis	Honeycrisp Grafts w/ all metal V trellis 2011
Trees cost /Acre	$4,982.73	$7,541.50	$7,405.96	$1,089.60
Growing Cost/Acre	$21,412.30	$10,166.91	$6,656.78	$7,000
Irrigation/Acre	$3,435.93	$1,402.01	$1,752.16	
Trellis/Acre	$3,660.33	$3,045.42	$5,657.81	$6,078
Site/Acre	$4,000	$4,000	$4,000	
Total Cost/Acre	$37,491.29	$26,155.84	$25,472.71	$14,167.60

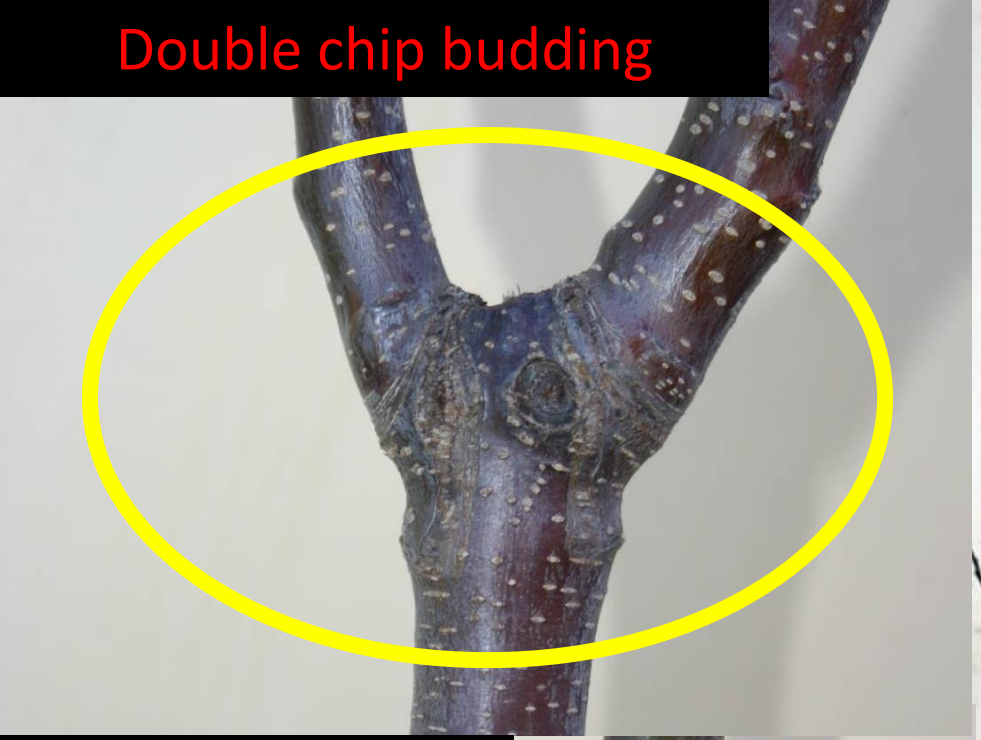
Systems compared

2.5m X 1.4m
2857 trees per ha
380 mm between wires
3.4m high
36 km fruiting wood



2m X 3m
1600 trees per ha
300mm between stems
3m high
39 km fruiting wood
V iteration 46km

Double chip budding



Bench graft

BIBAUM® TREES

Year of plantation 2005. Toshiro/M9 T337. Yield 2006

Bi-axe planting in Chelan, 2011

Bi-axe planting in Chelan, with 55 Bin/acre crop in 2013

Twin Stem at planting
Bi-Baum

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Twin Stem 2nd spring
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Twin Stem 3rd spring
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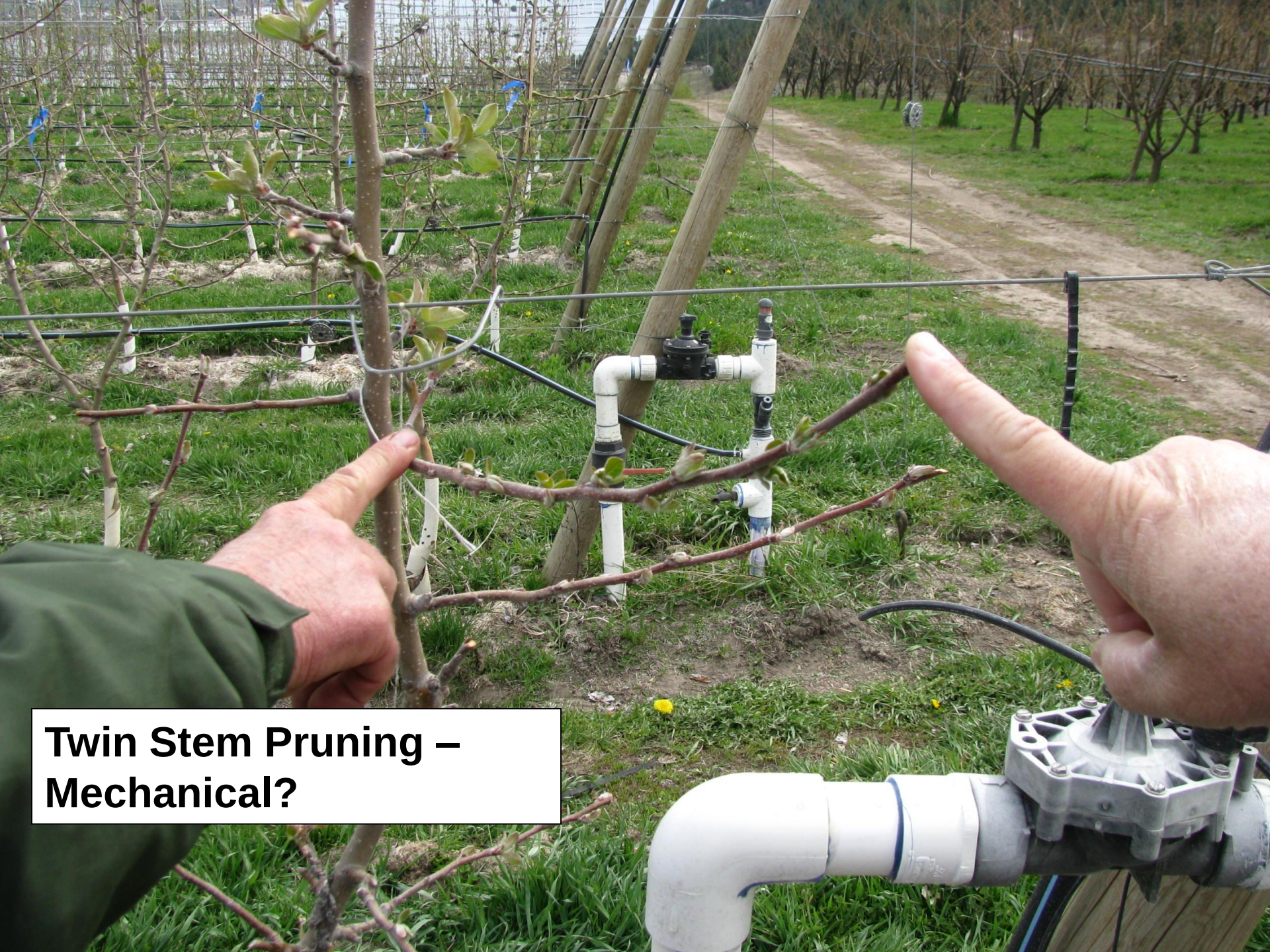
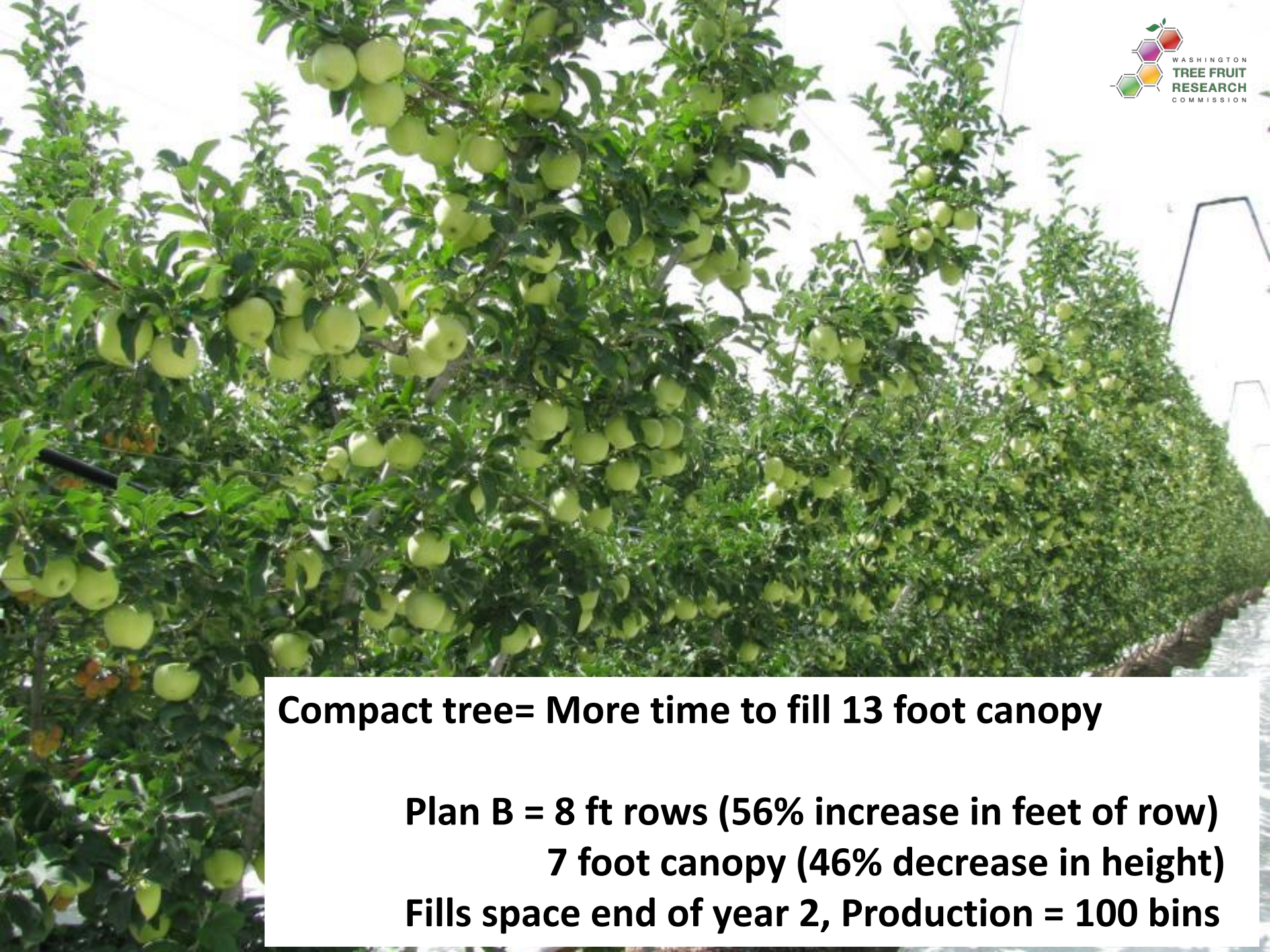
different overcolor in the bottom part of the tree – Year 4

Spindle

Bi-axis


Twin Stem Pruning –
Mechanical?



Compact tree= More time to fill 13 foot canopy

Plan B = 8 ft rows (56% increase in feet of row)
7 foot canopy (46% decrease in height)
Fills space end of year 2, Production = 100 bins


Short v height
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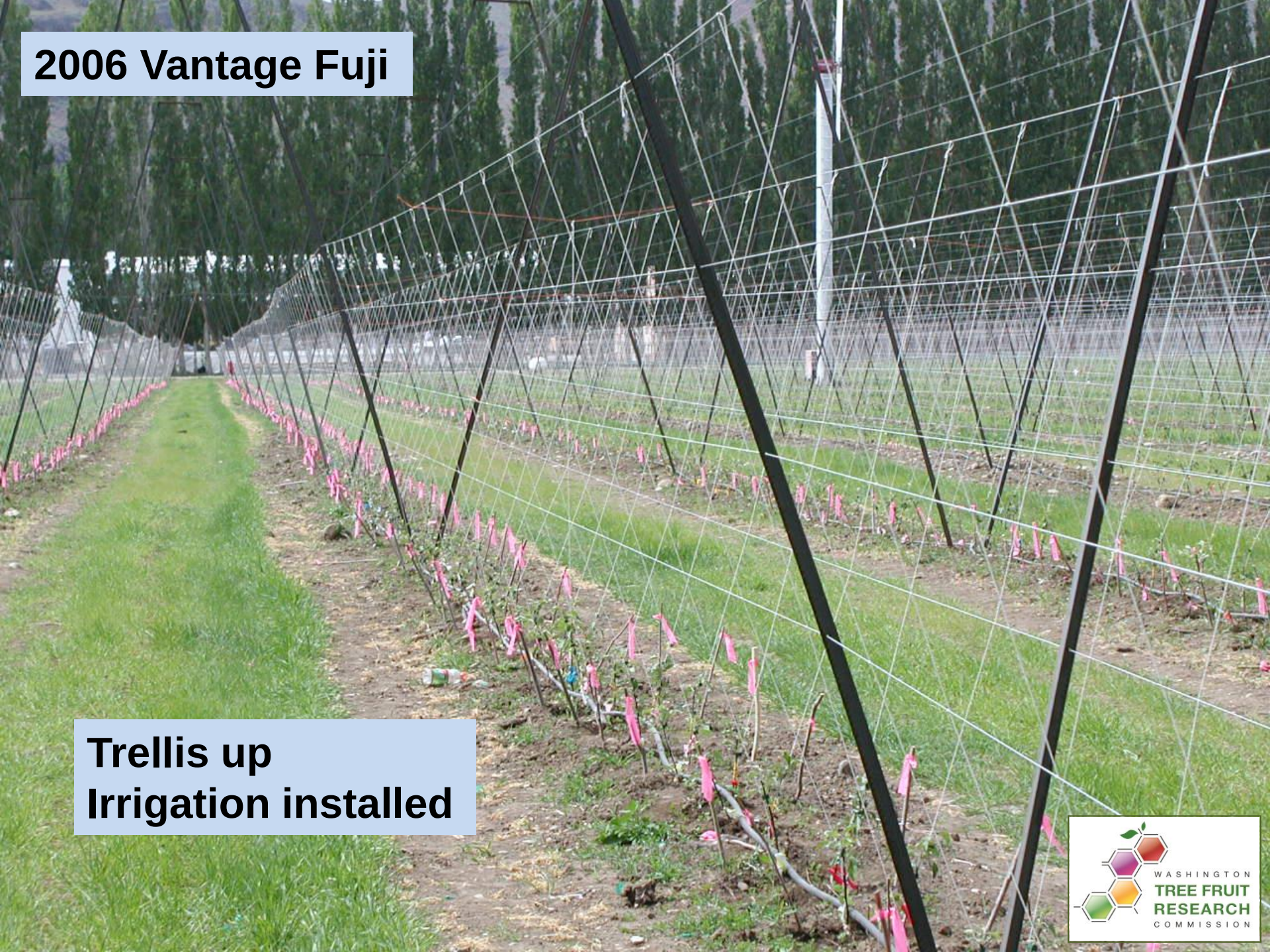
2006 Vantage Fuji
Trellis up
Irrigation installed
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July 1st Leaf

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July 1st Leaf

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August 2nd Leaf


August 2nd Leaf
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3rd Leaf crop
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3rd Leaf crop
WASHINGTON
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Spring 4th Leaf


Spring 4th Leaf
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Harvest 4th Leaf
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Trellis for crop and covers requires precision in construction. Retrofitting a crop trellis = $$$$

Auvil Fruit Company
Vantage, Washington

New Language

Old

- TPA / Trees per acre
- Tree row volume
- Bins per acre

New

- Sticks or leaders per acre
- Miles of canopy
- Packed boxes per acre

The Word

Ex.e.cu.tion

Getting the task done, getting it done right and getting it done on time