



Cherry Innovations[®]

Cherry Road Show 2017

By R.J. Nissen & Matt Whiting

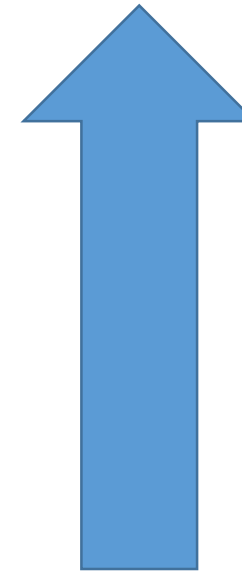
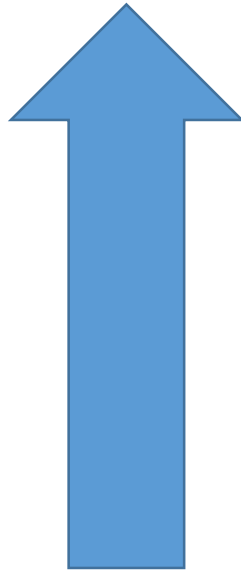




Future Cherry Orchards



Key Production Trends ?



Yield

Quality

Costs



To remain competitive the cherry industry must improve efficiency



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Future cherry orchards

- Economically Profitable
- Environmentally sustainable
- Right cultivars
- Planted in the right location
- Grown with the right management/cultural practices
- Targeted at specific markets
- Stable yields & balanced production
- Produce high quality fruit, marketability & storability
- Efficient and effective production & marketing systems



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Is this the orchard of the future?





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Is this the orchard of the future?





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Is this the orchard of the future?



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Is this the orchard of the future?



TIA is a joint venture of the University of Tasmania and the Tasmanian Government



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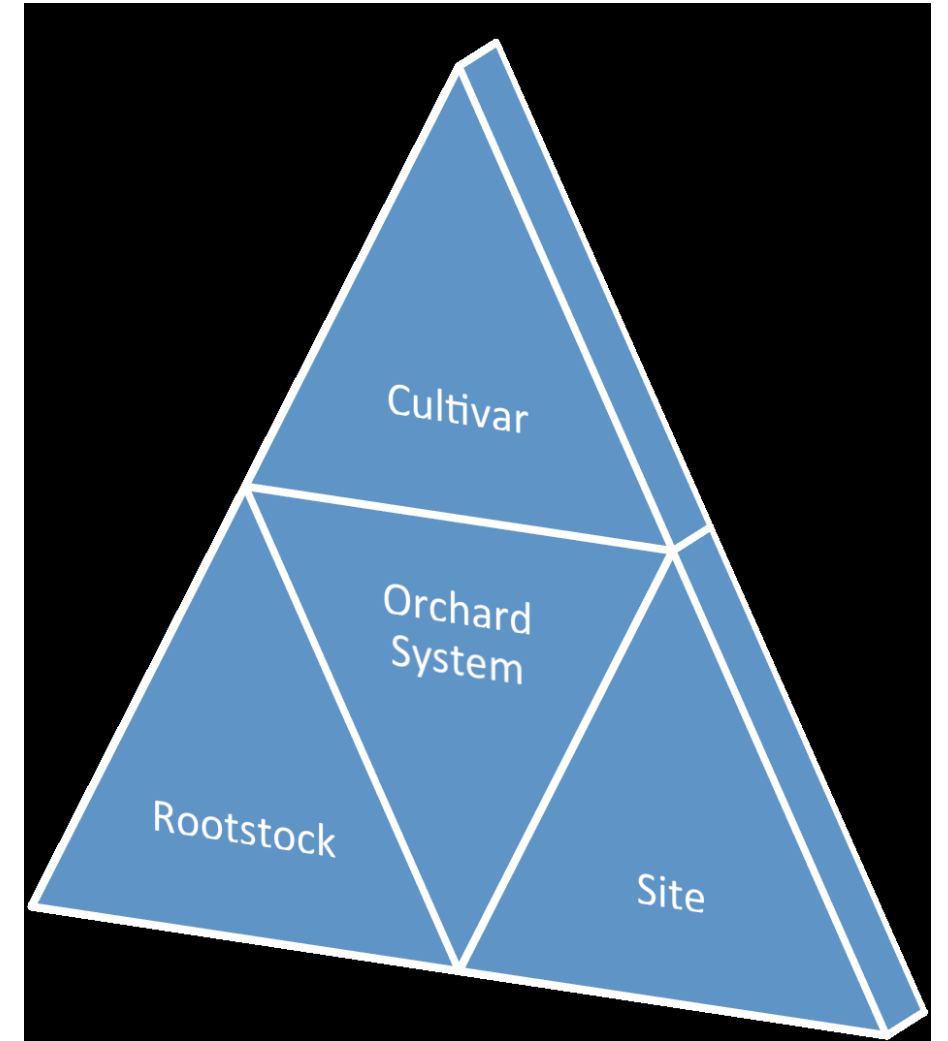
Key components of future cherry orchards



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- Profitable & sustainable
- Precious & constantly productive
- Simple to manage
- Pruning & training - simple, efficient productive canopies

Ability to utilise automation & mechanisation (drive costs down)



Output vs. Input



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Production Systems ?

Where do you
want to be?

Output

High



Low

Low

Input

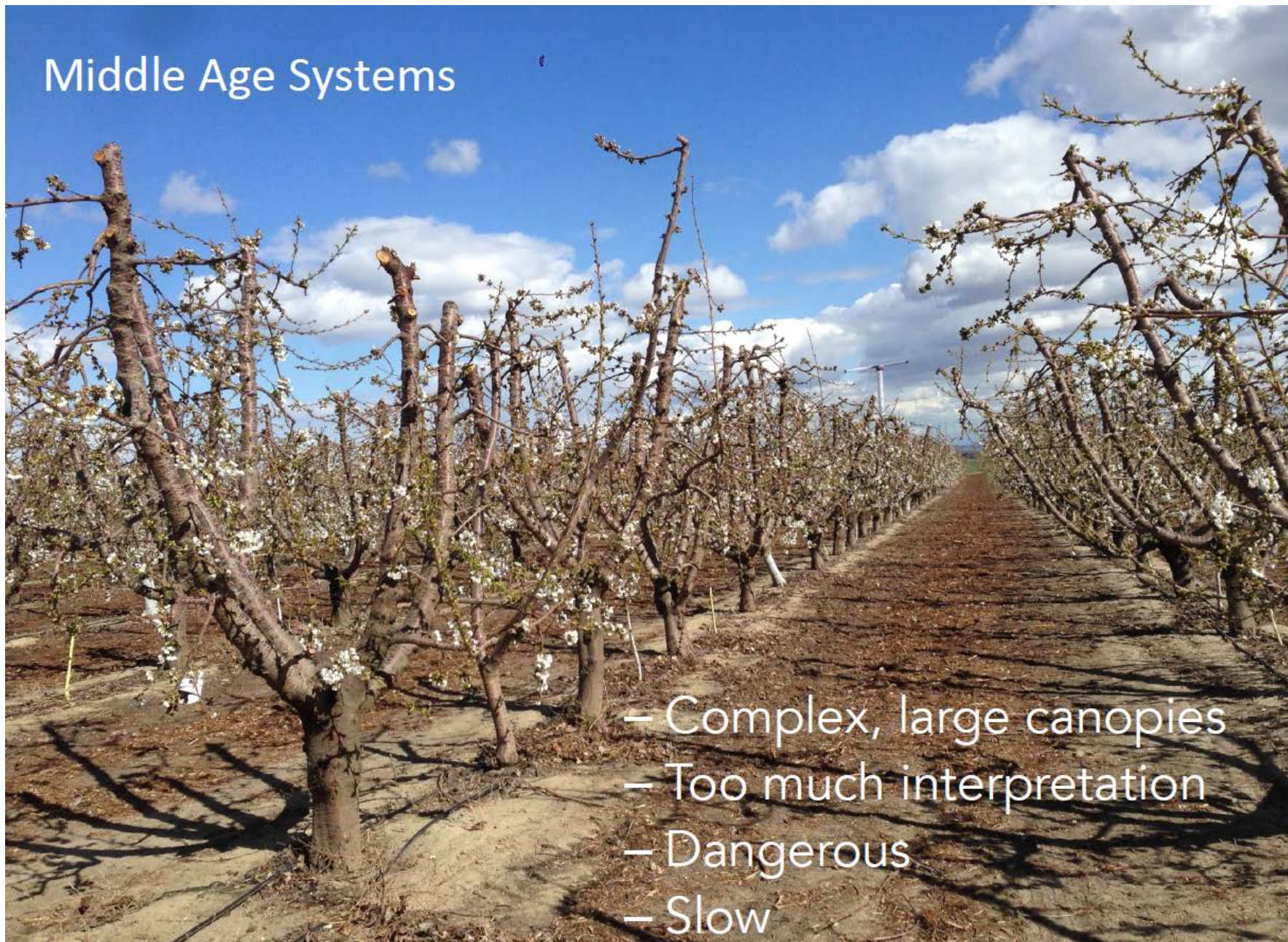
High



Large canopies are too complex:

- Slow to operate – control fruiting wood, nutrition etc.,
- Difficult to manage – pruning & training, harvesting, costs of pests & disease control
- Dangerous and costly

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Is this what we
want ?

What
production
systems can
deliver this
result?



Is the future cherry orchard this?



- 2 dimensional fruiting walls
- Simple to manage
- Easy to manipulate through management practices
- Reduced management costs

- Increased set up costs 

Is the future cherry orchard this?



- Compact, fruiting wall
- Repeated processes
- Efficient
- Suitable for mechanization/automation



Vertical UFO system (USA)

Key critical factor: PAR interception of vertical and angled fruiting walls

Y-Trellised UFO system (USA)





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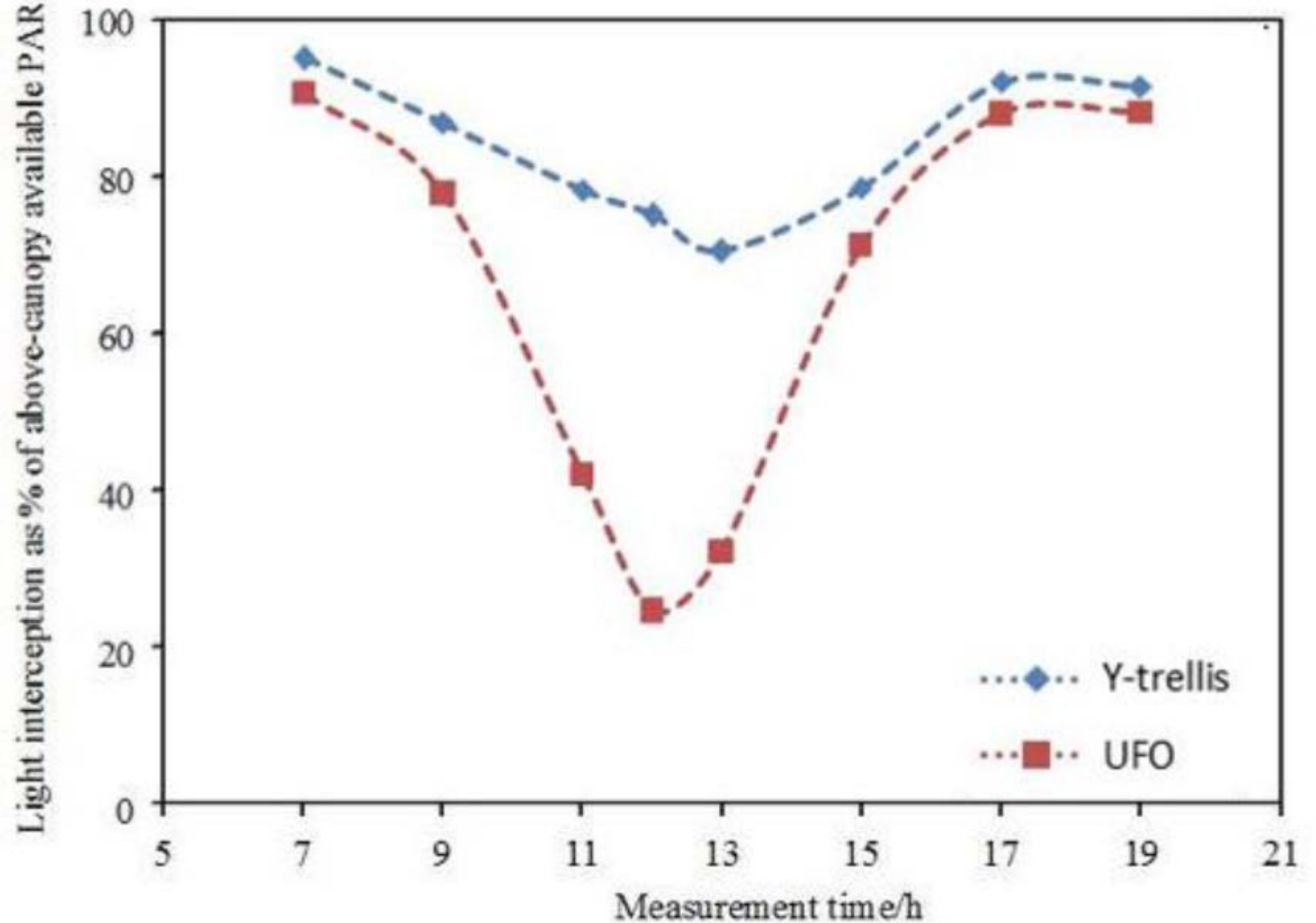
PAR interception: vertical vs. angled fruiting walls

Diurnal trend

Yield potential on angled canopies is greater than planar canopies

5 year old 'Santina/Giselar 12 35 tonnes / ha (Y-trellis UFO)

Benefits of fruiting walls:



Harvest efficiency

- Test in sweet cherries and apples
- Training systems have a substantial effect on harvesting efficiency and costs

USA

	Cultivar	Training System	Mean Harvest Rate (kg/min)
Sweet Cherries	Bing/'Mazzard'	Traditional open center	0.47 ± 0.12
	Chelan/'Mazzard'	steep leader (4-5 upright leaders)	0.53 ± 0.13 (+13%)
	Tieton/'Gi5'	Central leader	0.64 ± 0.19 (+36%)
	Sweetheart/'Mazzard'	KGB	0.72 ± 0.17 (+53%)
	Cowiche	UFO	0.81 ± 0.18 (+72%)
Apple	Fuji (Apple)	moderate density (7 x 13) central leader	3.58
	Braeburn (Apple)	high density tall spindle	5.61 (+60%)

Is the future cherry orchard this?

Other crops, what is happening?



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- Capture 70% of available light



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Mechanisation



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What are the effects of these new systems?

Double row V trellis system

Tree spacing

1.5 m between trees
staggered double row

Row spacing 4 metres
between rows

Trees 2286 trees/ha



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Economics

Australia

Single row non- trellis system

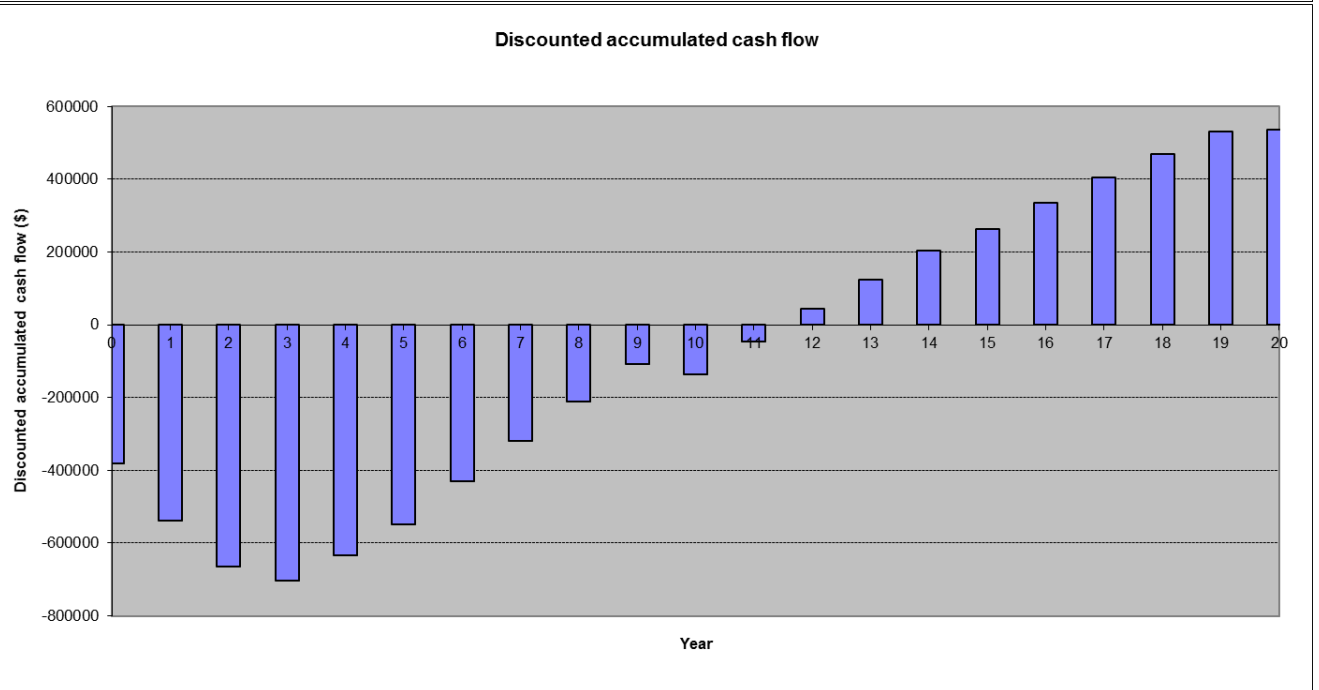
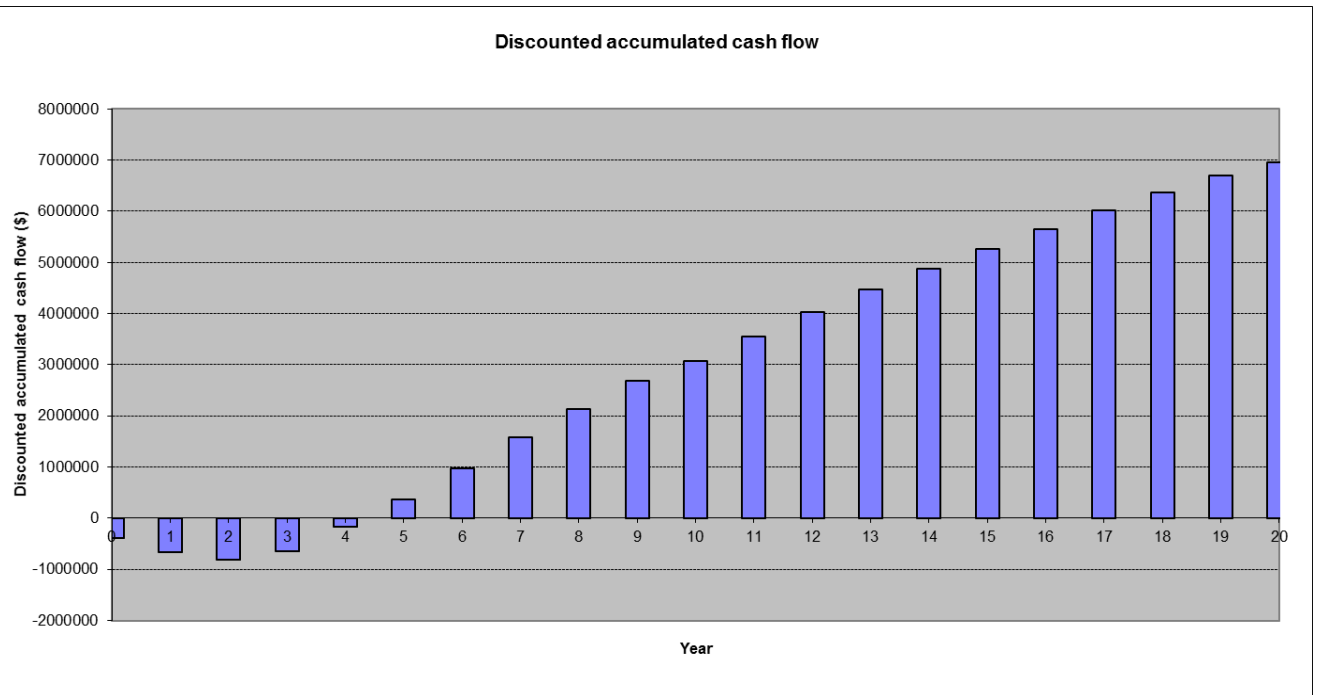
Tree spacing

3 m between trees

Row spacing

4 m between rows

Trees 833 trees/ha





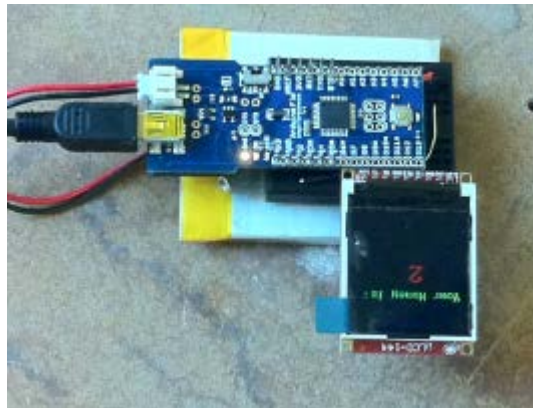
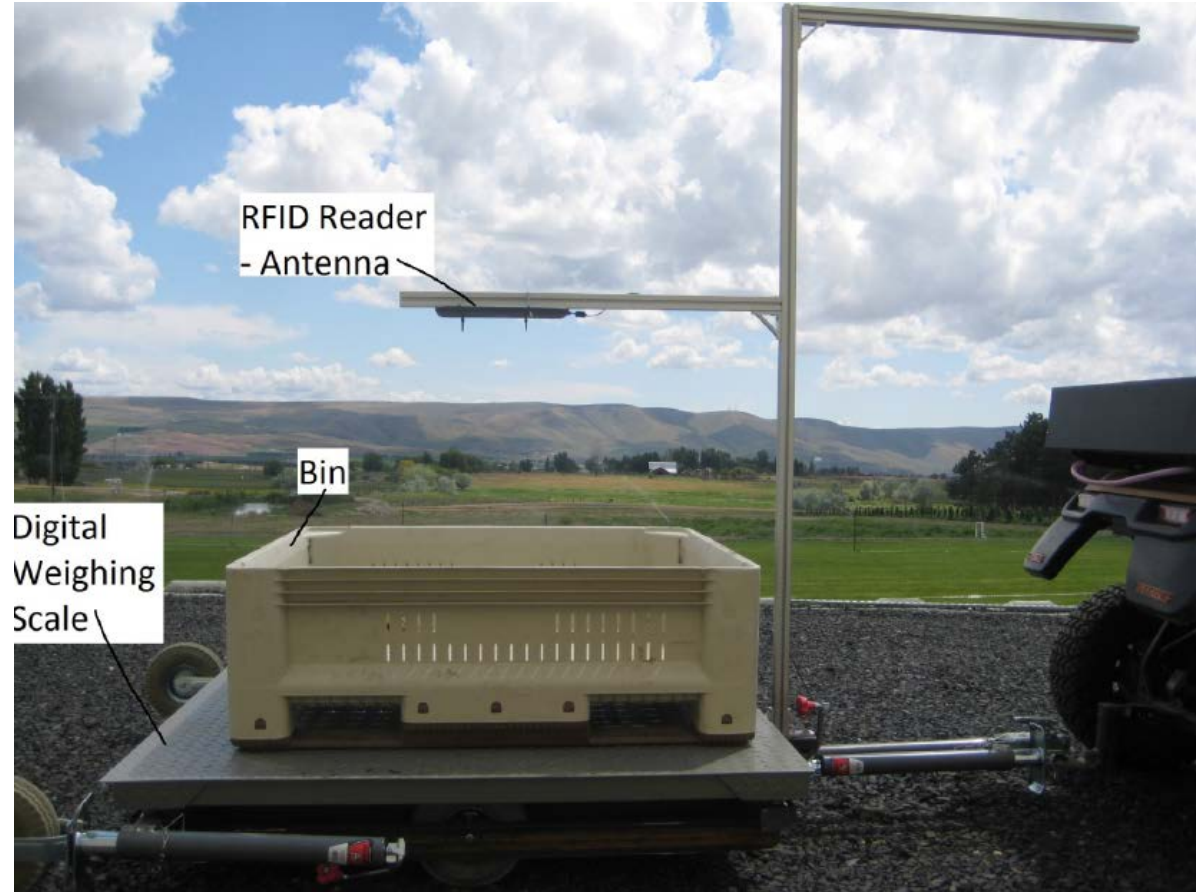
Labour efficiency



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Precision Horticulture

Labour monitoring systems





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Mechanical harvest

- Taking short- and long-term look using total systems approach
 - Mechanical assist (shake-and-catch)
 - Fully mechanical harvest



Key components

- Improve labour efficiency & safety
- Mechanisation or assisted mechanisation



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- 3-4 fold improvement in harvest efficiency with shake-and-catch system
- Worked with 10 growers in 2013/2014 to test/demonstrate the system
- Sold stem-free and stem-on cherries (same price, package, orchard)



Key components

- Are stem free cherries accepted by domestic and export markets?



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Key components

- New packaging and marketing by Chelan Fresh



USA

Cherries!
Fresh & Delicious

Cherries Out Pits In

15 cups per box.
Box of fruit per cup
Approximately 8 lbs. of fruit

Box dimensions:
16" wide x 24" length x 6.75" high

5 Tie x 13 High, 65 cases to a pallet

Pallet weight is 1035 lbs

Dual compartment lid holds discarded pits

Cup O' Cherries
SWEET CHERRIES

READY TO EAT
HEALTHY
NO MESS

Distributed by Chelan Fresh Marketing
Phone: 509-682-4252

Cherries!
Fresh & Delicious

Cherries Out Pits In

READY TO EAT
HEALTHY
NO MESS

Cup O' Cherries
SWEET CHERRIES

Distributed by Chelan Fresh Marketing

Key component

- Improve labour efficiency & safety
 - Mechanisation or assisted mechanisation
-
- Limb tying
 - Thinning
 - Pruning
 - Harvesting
-
- Work at night

USA



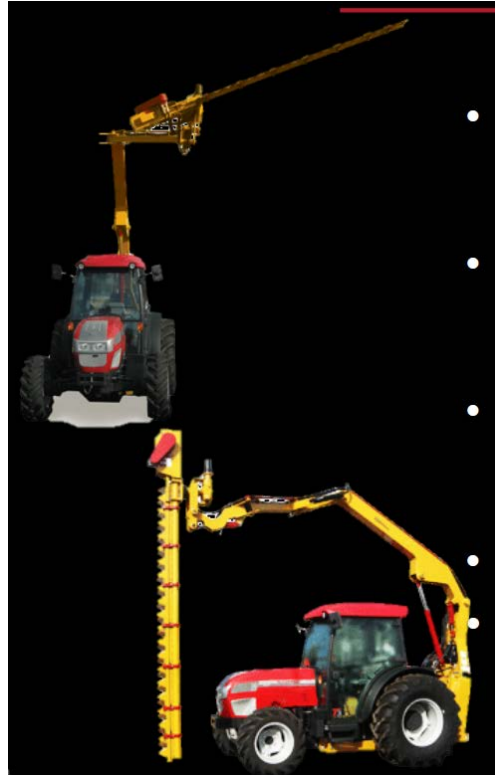
Key component

Determine best management practices for pruning sweet cherry and apple mechanically, by understanding equipment and orchard requirements.



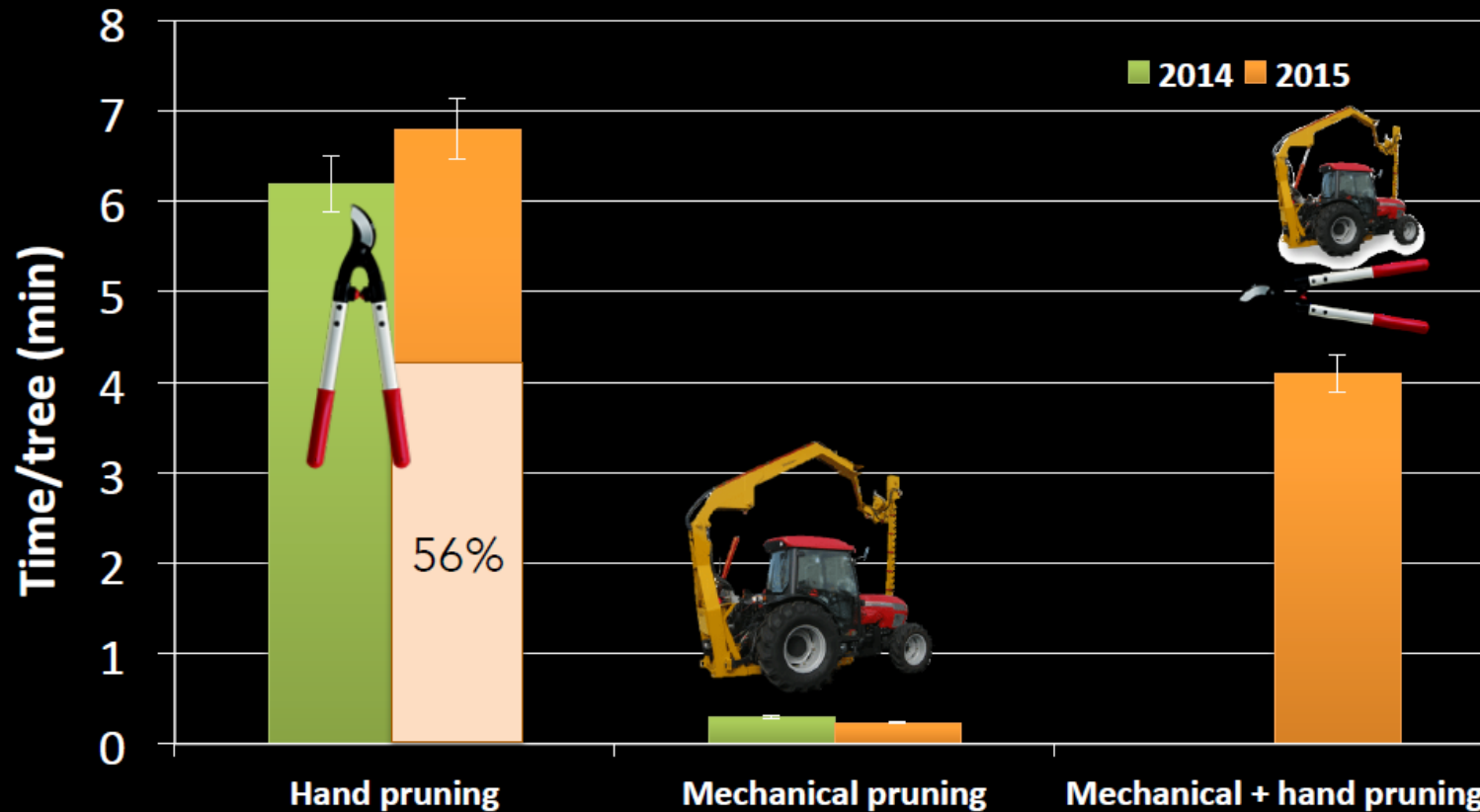
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Results: Time



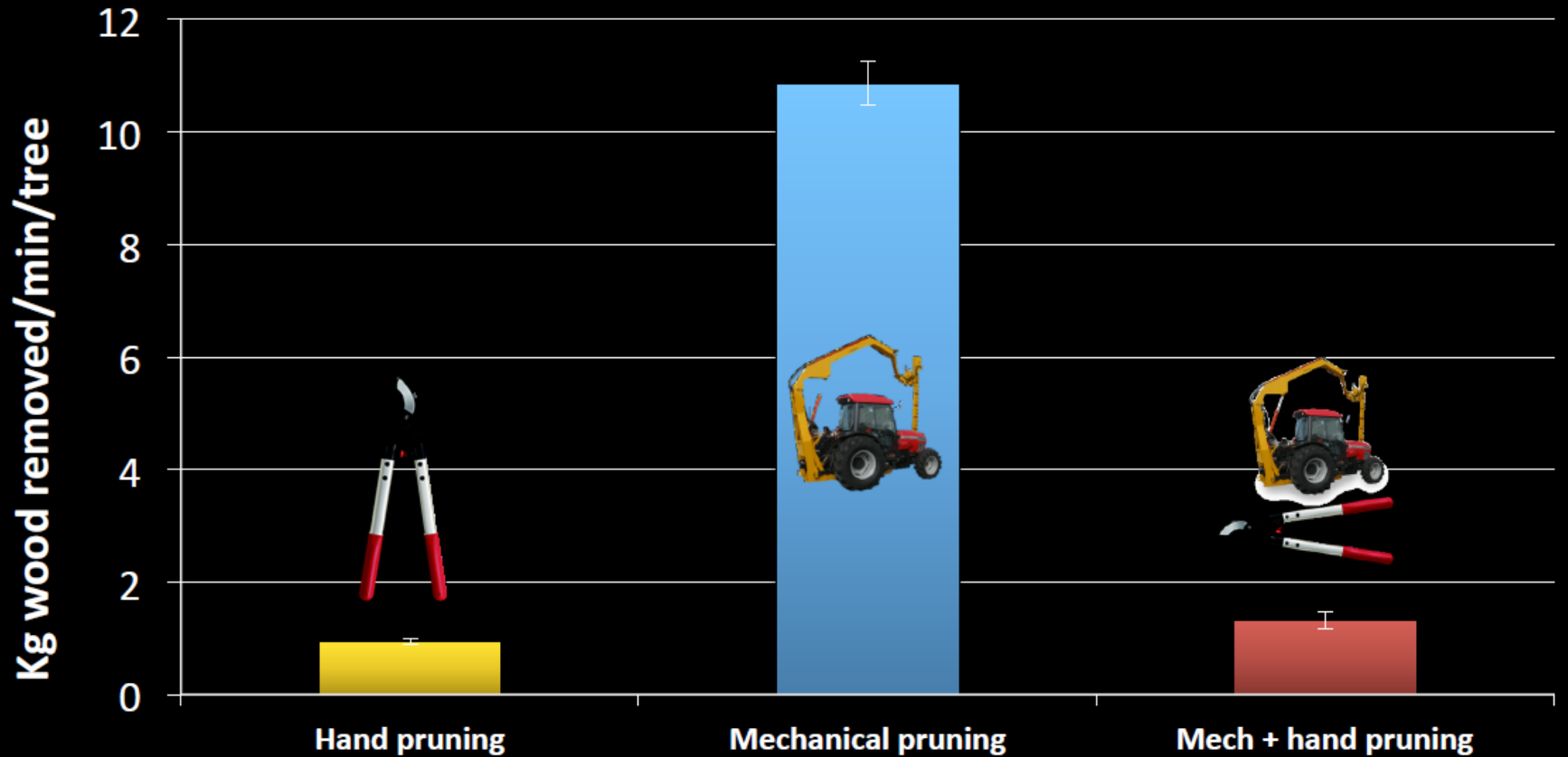
Mech pruning 23 and 29 times faster than hand pruning (hedging and topping) in 2014 and 2015

Combination of manual and mech. pruning was twice as fast as hand pruning (ca. 2.0 km/h)



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Results: Efficiency 2015



Mech + hand pruning was 66% more efficient than hand pruning alone

Mech pruning was 11 times more efficient than hand pruning



Australia

- Palmette training systems (close planted) 1.75 m x 4 m (1428 trees/ha)
- Use of growth bio-regulators (split applications of 2 ml/tree 4ml/tree total)
- Mechanical pruning in spring & post-harvest topping & hand pruning in winter
- Peach cultivar - TropicBeauty 30% reduction in pruning costs
 - \$2.39/tree or \$2987/ha
- Nectarine cultivar – Sunwright 31% reduction in pruning costs
 - \$2.54/tree or \$3175/ha



Pruning and Training Costs



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ASSUMPTIONS:

- 1 acre of UFO 'Tieton'/'Gisela5'
- Full canopy
- 1350 trees/ha

1 person

8 hours work/day

\$12/h

UFO pruning rules

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<u>Estimated pruning costs</u>	
	\$741
	\$168
	\$590



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Trial:

'Rainer'/'Giselar[®] 5'

Treatments

- Control (unpruned)
- Hand-pruned
- 20 days before harvest
- 10 days before harvest

Results:

- Mech-assist pruning was 7 times faster than hand
- Slight improvement (+12%) in colour with both timings
- Slight reduction (-9%) in soluble solids at 20 dbh
- Return bloom, regrowth TBD





Future Cherry Orchards



What is the future cherry orchard?

Totally new production systems in the foreseeable future (decision aid systems for growers)

- New orchard design
- New trellising systems
- New tree architecture
- New cultivars
- New rootstocks
- New canopy management systems (pruning & training)
- New plant bio-regulators (excessive vegetative growth = poor fruit quality & fruiting capacity)
- New nutritional and irrigation systems (mechanisation of delivery, control & monitoring)
- **Mechanisation or mechanical assistance** of labour intensive tasks (pruning & training, harvesting, post-harvest handling) – use of precision horticulture systems & electronics

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Benefits: Reduction in the production system costs

Enhanced fruit quality; yield stability & predictability; profitability & sustainability



Future Cherry Orchards

What is the future cherry orchard?

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Thankyou Ladies and Gentleman