Future Directions of Peach Tree Training Systems

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Production System Goals:

High marketable yields

LABOR EFFICIENCY

Compatible with automation/ mechanization

Open Vase Versus V

Characteristic	Open Vase	V shaped canopy
Tree density / A	100 – 172	242 – 544
Estab. ($)	Low	Moderate
Need for irrigation	Beneficial	Essential
Canopy height	7ft. – 10ft.	12ft. – 14ft.
Pedestrian?	Yes	No
Crop potential pruning	Feasible	Precise
Mech compatibility	Low	High
Years to full production	8 -9	5-6
Yield (bushels per acre)	350 – 450	550 - 670
Average fruit size	3.5”	3.25”
Average red color	50%	70%
Relative income	“100%”	116-154% of std

V Peach Systems
Tall, Medium Tree Density

Tall tree + labor intensive crop

Concern with fruit size

Renewal pruning not as successful as apple

Missing: Dwarf rootstock
- Spacing also helps dwarf

2014 Quad V Peach Trial

Spacing: 5, 7.5, or 10 ft within-row

16 ft between rows

Coralstar on 5 rootstocks

- Bailey
- Empyrean II (Penta)
- Krymsk 86 (K86)
- KV10123 (KV123)
- Guardian

Tatura trellis with 8 gauge plastic wire

After 5 Growing Seasons

Tree Size Effects 2018

Rootstock	Size (% largest)	
K86	100	a
Guardian	91	ab
Penta	87	abc
KV123	78	bc
Bailey	68	c

In-row Spacing	Size (% of largest)	
10 ft.	100	a
7.5 ft.	71	b
5 ft.	57	c

Preliminary: Tree Size

K86 > Guardian > Penta > KV123 > Bailey

- Bailey and Penta switched places in 2018

Of rootstocks in trial, Bailey has the most tree size control

Tree spacing exerts a similar or greater amount of tree size control as do selected rootstocks

- 5’ Vs 10’: 43% smaller
- 7.5’ Vs 10’: 29% smaller

Yield 2016 - 2018

In-row spac'g (ft.)	Trees	Scaffolds	2016	2017	2018	Cum.
	-- # per acre --		-- bushels / acre --			
5	545	2178	196 a	539 a	108	843 a
7.5	363	1452	134 b	408 b	110	653 b
10	272	1088	107 b	345 c	92	544 c

Rootstock	2016	2017	2018	Cum.
	----- bu / acre -----			
Bailey	222 a	444 a	96 b	762 a
Guardian	198 ab	418 ab	81 b	697 a
KV123	167 b	438 ab	71 b	676 a
K86	90 c	493 a	157 a	741 a
Penta	53 c	359 b	112 b	524 b

Fruit Size Effects 2016-2018

Rootstock	Avg fruit diameter (in.)	
Bailey	2.90	a
Guardian	2.87	a
KV123	2.85	ab
K86	2.80	bc
Penta	2.76	c

In-row Spacing	Avg fruit diameter (in.)	
10 ft.	2.93	a
7.5 ft.	2.84	b
5 ft.	2.73	c

Preliminary: Yield & Fruit Size

Closer spacing increases

- Bearing surface and early yield per acre
- Yield of 5 ft spacing is 148% > that of 10 ft.
- Yield of 7.5 ft. spacing is 120% > that of 10 ft.

Bailey is most precocious, while Penta has least early yield

Bailey and Guardian had largest fruit

Penta had smallest despite low yields

Smaller fruit with closer spacing

- 7% smaller : 148% more

The Story Continues!

Will 5 ft spacing eventually become crowded?

Fruit size is 7% smaller in 5 ft spacing than 10 ft

Trellis helps with management

Black plastic wire works, but too easy to cut / stretchy

Hail in May reduced yield in 2018

- Trees looked sick for 2 weeks, then grew with vigor

UC-Davis Orchard of the Future

Coming Attractions:
Controller size-controlling rootstocks

UC Davis Harrow Blood x Okinawa cross

Small semi-dwarf 70%

High cumulative yield

- Similar yield to trees on standard rootstocks

Yield efficiency (1st)

Precocious

Survival = 100%

Controller On-Farm Trial 2020

Flamin Fury PF Lucky 13

- Yellow flesh freestone
- Redhaven season
- Bac spot resistant

Four rootstocks:

Controller 6, 7 and 8, + Krymsk 86

30 trees of each

10 farms

Controller On-Farm Trial 2020

Containerized trees

- pick up at Adams County Nursery in Aspers, PA

Spacing: 10-12 ft in-row
16- 18 ft between rows

Trained as freestanding quad V or open vase.

Interested? Contact your PSU Extension Fruit Team member

This is the intensive Meadow Orchard system developed by Amnon Erez in Israel.

Long Term?
Time to reinvent the intensive meadow system?

2 perpendicular scaffolds @ 2-2.5’ in-row

Alternating complete removal of scaffolds every other year

Canopy never older than 2 years = pedestrian

Mechanized pruning & thinning are feasible

- Dormant and summer pruning

Takes advantage of peach growth/bearing habit & vigor

Intensive Peach System 2018:

Feasibility of intensive, mechanized system for increasing yields and minimizing labor costs of peach production

Biological limitations of intensive peach systems in the Mid-Atlantic

Starfire / Lovell peach trees

Between-row spacing will be constant at 12 ft.

In-row: at 2, 3, 4, or 5 ft.

Highly Mechanized

Thinning by Darwin blossom thinner

Summer pruned with a hedger

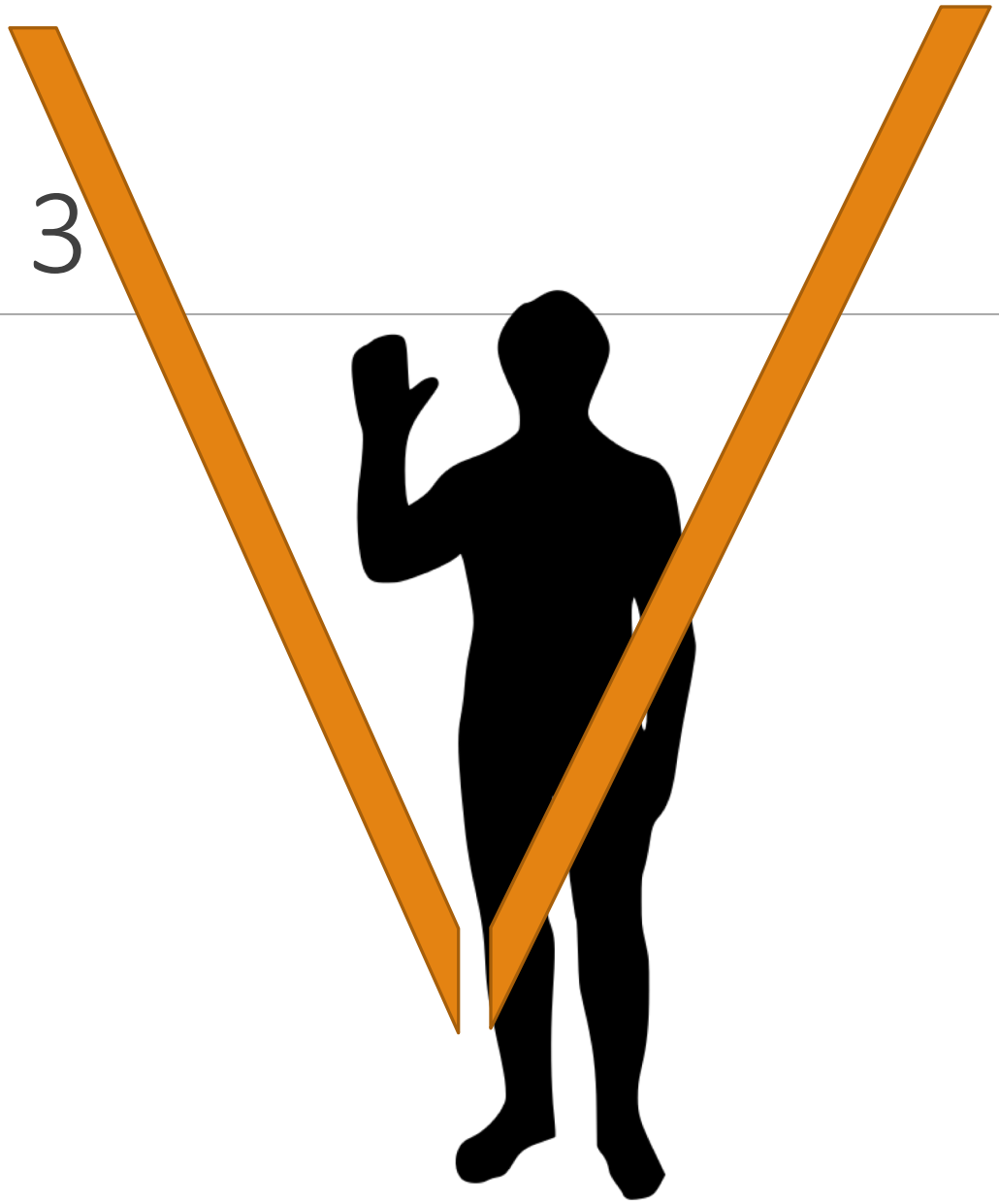
Dormant pruned with one cut to remove scaffold - mechanized

Harvest will be by hand, pending development of a mechanical harvester.

Year 1

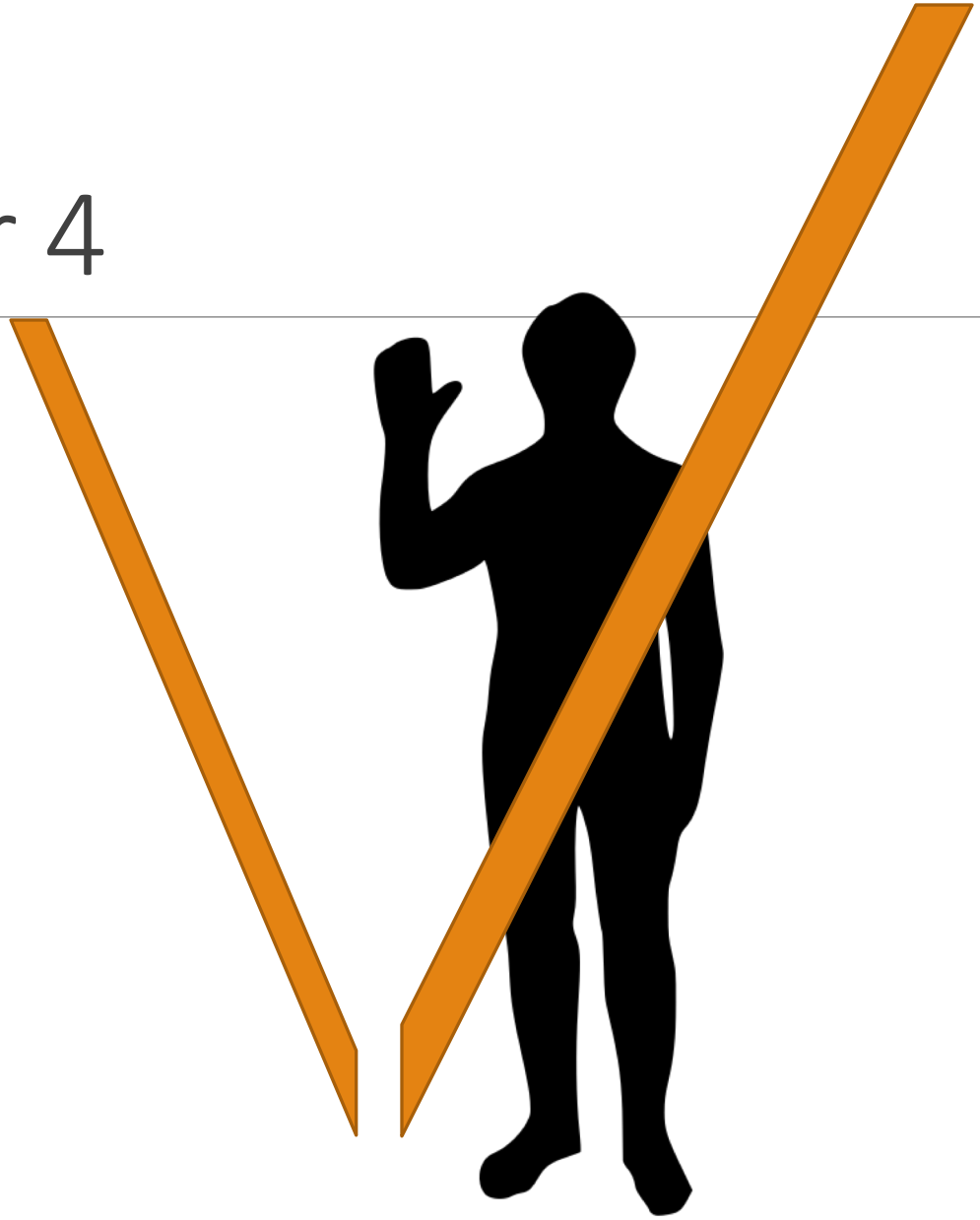
Year 2

Year 3

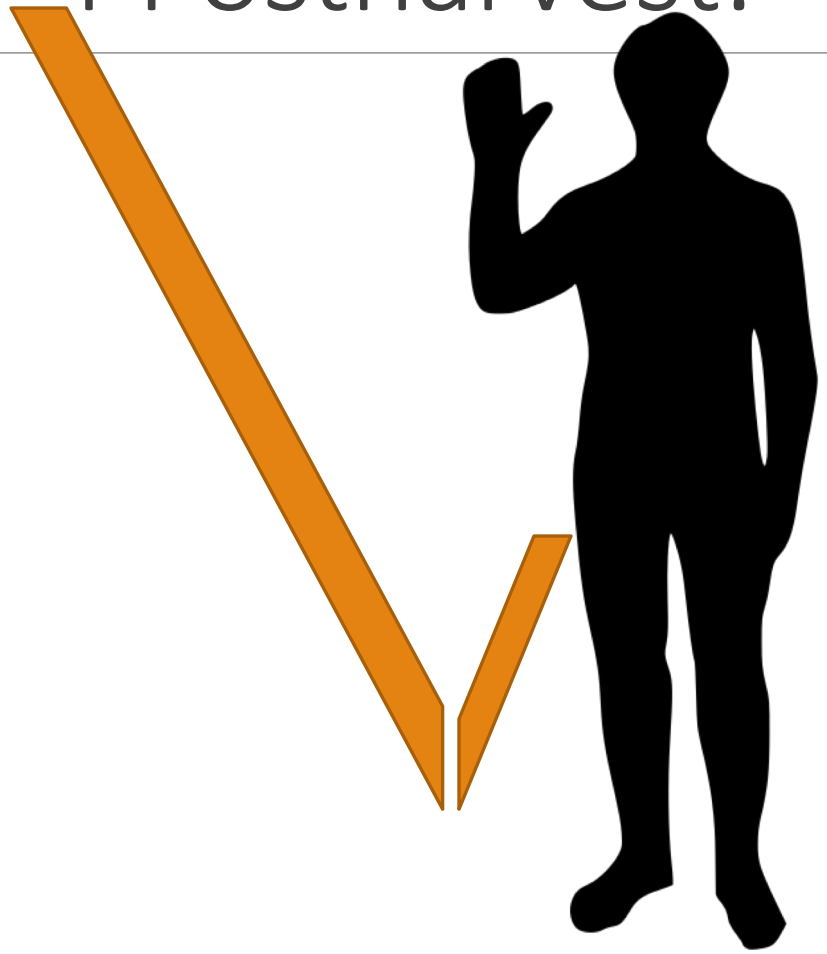


Year 3 Postharvest:

Year 4



Year 4 Postharvest:



2018 Pedestrian V

Better Wire Option - 1

Ag-Liner FruitLine

- High density plastic
- 5 mm diameter
- UV protected
- Cut-resistant
- Less stretchy than black 8mm plastic
- $$

  Agliner.com

Better Wire Option - 2

Kencote Horse Fence

12.5 gauge coated wire

7.5mm diameter

UV protected

$$$$

Kencove.com

Potential benefits of intensive system

Pedestrian orchard

No problems renewing fruiting laterals in lower canopy

- Continuous renewal of vigorous young fruiting laterals
- Using vigor to produce large fruit

Pruning, thinning highly mechanized

Narrow tree wall canopy compatible with future advances in mechanized harvest and automation.

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