Use of a String Blossom Thinner in Canning Peaches: Year One

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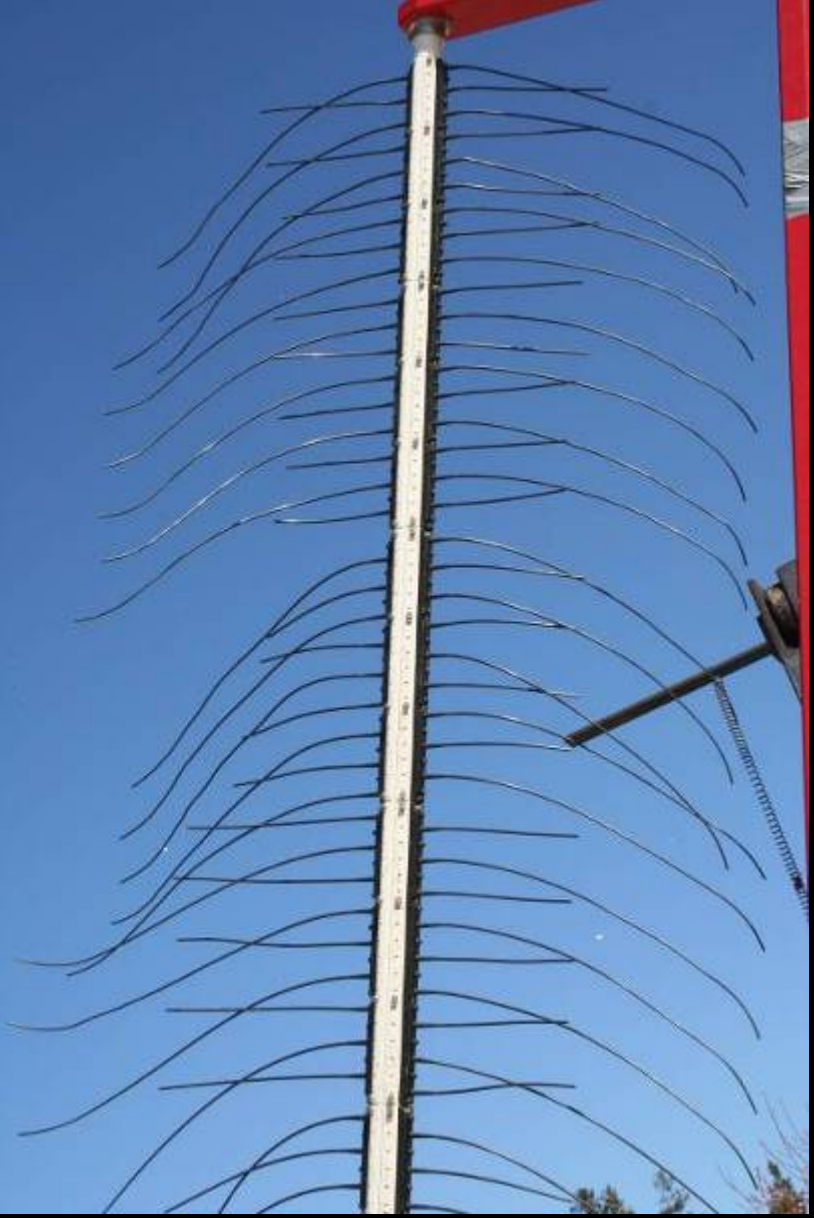
- Hand thinning can cost $1200 per acre or more in extra early varieties

- Ladder falls are very common workers' comp claim

Darwin String Thinner

- Developed in Germany for blossom thinning apples
- Penn State CE tried it in peaches with some success
- Multi-state research project funded by the Specialty Crops Research Initiative & the CA Canning Peach Association



Molded plastic cords can be removed or cut for different thinning effects

video

Preliminary Trials in 2009

- Nine “demonstration” trials in Stanislaus County
- Two in Merced County
  - Single row or four row “picking units”

- Two fully replicated, intensive field trials
  - Six replications of 10 ten trees each

Participating Stanislaus County Growers

- Norman Kline
  - Loadel (replicated and demo trials)
- Derk & Paul Van Konynenburg
  - Tuolumne (replicated & demo trials)
  - Loadel
  - Carson
  - Ross
- Sid & Scott Long
  - Reigel
- John and Chris Miller
  - Bowen
- Kevin Voss
  - Loadel
  - Stanislaus

Replicated Trials

Hangers were tagged to count flowers before and after blossom thinning and again after fruit set

Crews were timed to determine the time required to hand thin in blossom-thinned and unthinned trees

Fruit were collected at hand thinning time to determine number of fruit thinned and measure fruit size

B-VK Tuolumnes

- Perpendicular “V”
- 6’ x 18’
- ~ 10 years old
- “Renewal pruned”
- Thinned tops & both sides with string thinner
- Tractor speed: 1.5 MPH
- Spindle speed: 200 RPM
- Bloom stage: late petal fall

B-VK Tuolumnes

B-VK Tuolumnes

Bloom stage of B-VK Tuolumnes when thinned

Effect of Darwin String Thinner on Hand Thinning Costs

B-VK Tuolumnes. April 30, 2009.

Thinning Time (hours / acre)		Thinning Cost ($ / acre)*		Reduction in thinning costs $$
Check	Darwin	Check	Darwin	
118.5	92.0			

Effect of Darwin String Thinner on Hand Thinning Costs

B-VK Tuolumnes. April 30, 2009.

Thinning Time (hours / acre)		Thinning Cost ($ / acre)*		Reduction in thinning costs $$
Check	Darwin	Check	Darwin	
118.5	92.0	$1328	$1031	

*Hand thinning costs based on $11.20 per hour ($8.00 + 40%)

Effect of Darwin String Thinner on Hand Thinning Costs

B-VK Tuolumnes. April 30, 2009.

Thinning Time (hours / acre)		Thinning Cost ($ / acre)*		Reduction in thinning costs $$
Check	Darwin	Check	Darwin	
118.5	92.0	$1328	$1031	$297

*Hand thinning costs based on $11.20 per hour ($8.00 + 40%)

Harvest Evaluations

- Fruit Size
- Yield

Harvest Evaluations

- Determine fruit size, percent #1, #2, undersize, total yield

B-VK Tuolumne Harvest Data

July, 2009

	Tons per Acre			
	No. 1	No. 2	Smalls	Total salable*
Check	24.3	1.2 (5.1%)	0.3 (1.3%)	25.5

*Total salable = number 1 fruit + ≤ 5% number 2 fruit

B-VK Tuolumne Harvest Data

July, 2009

	Tons per Acre			
	No. 1	No. 2	Smalls	Total salable*
Check	24.3	1.2 (5.1%)	0.3 (1.3%)	25.5
Darwin	28.0	0.7 (2.4%)	0.1 (0.4%)	28.7

*Total salable = number 1 fruit + ≤ 5% number 2 fruit

Preharvest Fruit Counts
B-VK Tuolumnes

Average number of fruit per tree	
Darwin	Check
360	359

*Target ~ 275 – 300 fruit / tree

Counted 24 trees in each treatment

Effect of Darwin String Thinner on Yield & Gross Income

	Yield (tons per acre)		Gross Income ($ / acre)*		Difference in Gross $$
	Check	Darwin	Check	Darwin	
Tuolumne	25.7	28.7	$8173	$9127	+$954

*Based on price of $318 / ton for Tuolumnes

Kline Loadels

- Perpendicular “V”
- 6.5’ x 18’
- 9 years old
- “Renewal pruned”
- Thinned tops & both sides with string thinner
- Tractor speed: 1.5 MPH
- Spindle speed: 200 RPM
- Bloom stage: 50-60% bloom

Norman Kline Loadels

Bloom stage of Kline Loadels when thinned

Effect of Darwin String Thinner on Hand Thinning Costs

Kline Loadels. April 27, 2009

Thinning Time (hours / acre)				
Check	Darwin			
126.2	91.7			

Effect of Darwin String Thinner on Hand Thinning Costs

Kline Loadels. April 27, 2009

Thinning Time (hours / acre)		Thinning Cost ($ / acre)*		
Check	Darwin	Check	Darwin	
126.2	91.7	$1413	$1027	

*Hand thinning costs based on $11.20 per hour ($8.00 + 40%)

Effect of Darwin String Thinner on Hand Thinning Costs

Kline Loadels. April 27, 2009

Thinning Time (hours / acre)		Thinning Cost ($ / acre)*		Reduction in thinning costs $$
Check	Darwin	Check	Darwin	
126.2	91.7	$1413	$1027	$386

*Hand thinning costs based on $11.20 per hour ($8.00 + 40%)

Preharvest Fruit Counts
Kline Loadels

Average number of fruit per tree	
Darwin	Check
534	508

*Target ~ 300 fruit / tree

Kline Loadel Harvest Data

July, 2009

	Tons per Acre			
	No. 1	No. 2	Smalls	Total salable*
Check	12.2	3.9 (19.6%)	3.8 (19.1%)	14.1 tons

*Total salable = number 1 fruit + 10% number 2 fruit

Kline Loadel Harvest Data

July, 2009

	Tons per Acre			
	No. 1	No. 2	Smalls	Total salable*
Check	12.2	3.9 (19.6%)	3.8 (19.1%)	14.1 tons
Darwin	14.9	2.8 (13.6%)	2.9 (14.1%)	16.9 tons

*Total salable = number 1 fruit + 10% number 2 fruit

Effect of Darwin String Thinner on Yield & Gross Income

	Yield (tons per acre)		Gross Income ($ / acre)*		Difference in Gross $$
	Check	Darwin	Check	Darwin	
Loadel	14.1	16.9	$5020	$6016	+$996

*Based on price of $356 per ton for Loadels

Summary of Replicated Trials:
Effect of Darwin String Thinner on Net Income

	Decrease in thinning costs	Increase in Gross Income (higher yield)	Total Increase in Net Income per acre
Tuolumne	$297	$954	+$1251
Loadel	$386	$997	+$1383

Demonstration Trials

Summary of Darwin Demo Plots

Effect of Mechanical Bloom Thinning on Cost of Follow Up Hand Thinning*

	Darwin	Check	Difference
B-VK Tuolumne top & sides	$871	$1175	- $304
B-VK Loadel sides only	$1231	$1351	- $120
B-VK Carson sides only	$1197	$1092	+ $105
B-VK Ross top & sides	$708	$934	- $226
Kline Loadel top & sides	$794	$1035	- $241
Kline Loadel sides only	$1390	$1035	+ $355
Long Reigel top & sides	$404	$545	- $141
Voss Loadel (tops only)	$902	$992	- $90
Voss Loadel (sides only)	$1241	$992	+ $249
Voss Stanislaus top & sides	$436	$512	- $76

*Hand thinning costs based on $11.20 per hour ($8.00 + 40%)

Effect of Mechanical Blossom Thinning on Fruit Size at Hand Thinning Time (mm)

	Darwin	Check	Difference
Kline Loadel	22.5	22.0	+ 0.5
Long Reigel	38.6	35.8	+ 2.8
VK Carson	31.1	30.8	+ 0.3
VK Ross	32.4	31.2	+ 1.2
VK Tuolumne	27.5	24.8	+ 2.7
Voss Loadel	27.2	24.3	+ 2.9
Average			+ 1.7

Summary of Darwin Demo Plots

Effect of Mechanical Bloom Thinning on Yield (tons/acre)

	Darwin	Check	Difference
B-VK Tuolumne top & sides	30.1	24.1	+ 6.0
B-VK Loadel sides only	20.9	20.7	+ 0.2
B-VK Carson sides only	22.8	21.2	+ 1.6
B-VK Ross top & sides	28.1	28.8	- 0.7
Kline Loadel top & sides	21.0	21.4	- 0.4
Kline Loadel sides only	19.7	21.4	- 1.7
Long Reigel top & sides	29.4	30.8	- 1.4
Voss Loadel (tops only)	24.8	23.9	+ 0.9
Voss Loadel (sides only)	25.9	23.9	+ 2.0
Average yield increase			+ 0.7

Things learned in 2009

Variable fruit size in unthinned trees

Blossom thinned peaches are larger with fewer “dummies” but imperfectly spaced

Larger fruit size is maintained through harvest on bloom-time thinned trees, resulting in larger potential yields

Tree training & pruning make a difference in how successful string thinner will be

Some orchards will be difficult to use the string thinner unless pruned differently

Next Steps

- Verify results with more trials in 2010
- Test different times of bloom thinning (pink bud, 50-100% bloom, petal fall)
- Test bloom thinning on tops and sides vs. sides only
- Incorporate pruning / tree training?

Questions?

Comments??