Comparisons of Different Combinations of Hand and Mechanical Pruning

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Concerns Related to Hand Pruning

- **Cost- $1.50 to $3.00 per tree can be more than $ 600 per acre**
- **Availability of labor**
- **Growers moving away from traditional annual hand pruning**

Previous Mechanical Pruning Research High Density Hedgerow planting
9 X16’ 1981 planting

- Showed that stand alone mechanical pruning severe enough to give the fruit size and value per ton achieved by hand pruning resulted in reduced tonnage and total value per acre

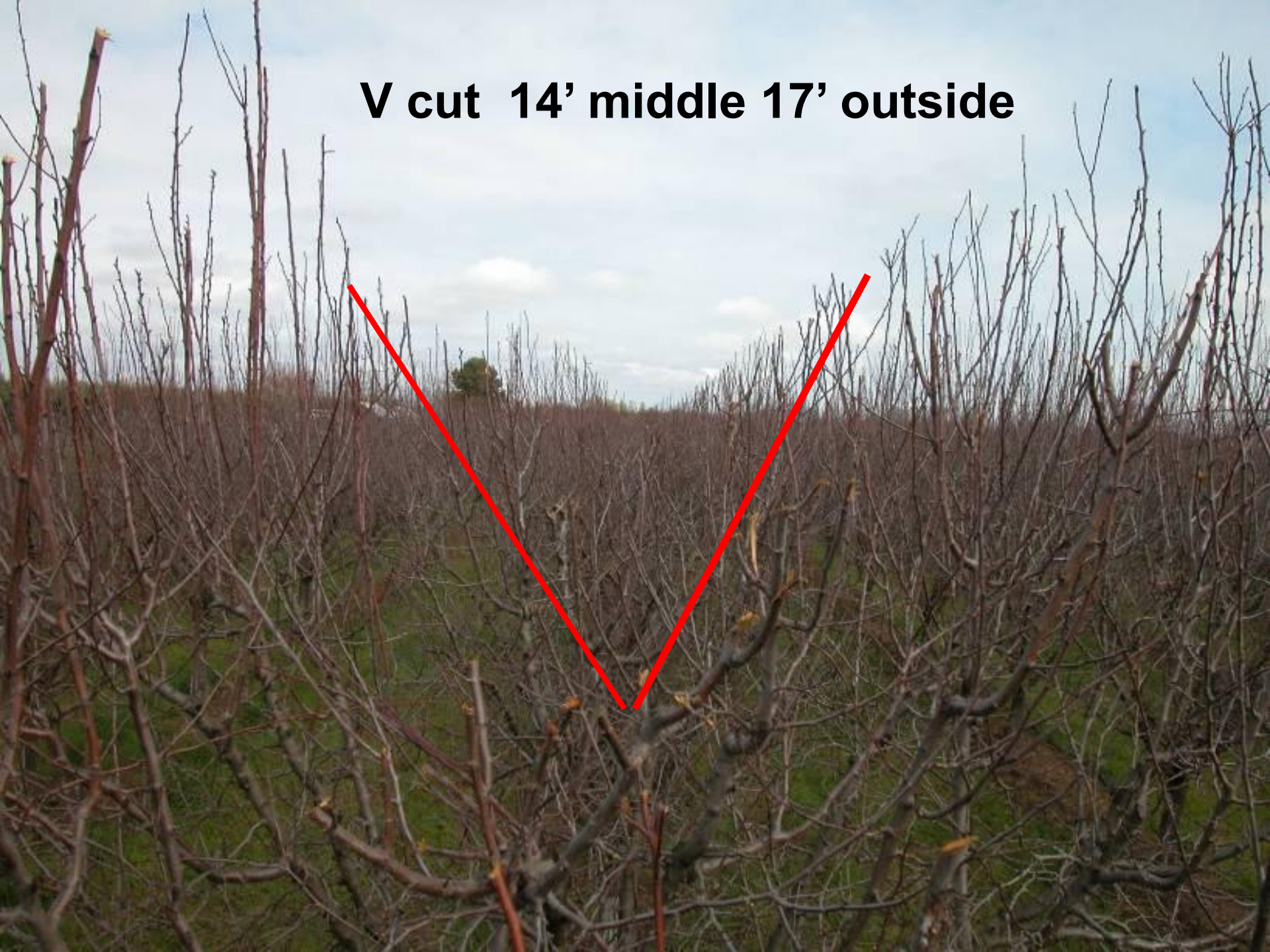
Mechanical Pruning Objectives

- Reduce pruning costs without sacrificing yield and quality that results in a reduced value greater than the savings
- Fruit set varies from year to year and so will the pruning results
- Select pruning strategies and then manage to the optimum
- Learn to use combinations of mechanical and hand pruning to maximize grower returns.


Eleven year
old vigorous,
N/S planting,
14 X 17, 183
T/ac.
16 t0 17 feet
high

Pneumatic hand pruning


Flat Top - 15 ft.


V cut 14’ middle 17’ outside

Mechanical Pruning Video Link


“Mohawk”


Summer V cut- 14’ at
bottom 17’ on outside

2006 Results

Treatment	Drying Ratio	Dry tons/ac	$/Ton	$/ac
Dor 3-4 cuts	3.08a	5.16	1,605a	6,325a
Dor top + pnuematic.	3.17a	5.08	1,598a	6,218ab
Dor top+light summer	3.06a	5.08	1,586a	6,207ab
Roof Top + chainsaw	3.01a	4.83	1,605a	5,827ab
V dor E only	3.09a	4.91	1,600a	5,777ab
Dor top + pnuematic	3.02a	4.43	1,594a	5,161bc
V dor	3.02a	4.17	1,589a	4,860bc
V dor + summer	3.14a	4.12	1,463a	4,456bc
Dor mohawk	3.07a	3.82	1,585a	4,416bc
Ladders &loppers	2.93a	3.06	1,588a	3,430c

Results and Discussion

- Fruit set was moderate (reduced by bacterial blast)
- Mechanical pruning reduced pruning costs and resulted in higher yields and grower returns (THIS YEAR)
- Results will vary from year to year
- Different levels of pruning will reduce the risk of poor set
- Manage pruning system according to fruit set


Dormant V cut regrowth

Summer V Cut 7-7-06, Regrowth

Timing of Mechanical Pruning
Bill Olson

Timings, Dormant Nov-Dec.), Summer (June) and Post Harvest (Sept)

. Of the three topping timings post harvest topping clearly resulted in the least amount of return shoot growth and should be preferred over June or dormant topping.

2007 Objectives

- Continue to compare mechanical and hand combinations
- Emphasize post harvest timing

Field Notes 2007

- All treatments pneumatically pruned from ground dormant
- All treatments were mechanically thinned 4/27 to 5/7 to approximately 6000 prunes/tree
- Treatments managed as needed
- Heavy clusters thinned with PVC 6/04/07
- 7/12/07 knocked heavy limbs in all treatments
- 7/19/07 mechanically cut small alley way, 1 to 3’
- 7/19/07 propped limbs as needed

Treatments 2007

- **1. Dormant- ground lopper**
- **2. Roof top 6/2**
- **3. Ladders and loppers**
- **4. V cut 6/2**
- **5. Roof Top, Post harvest**
- **6. Top, Post harvest**
- **7. V-cut, Post harvest**
- **8. V cut 6/2**
- **9. Mowhawk , 6/2**

2007 results

Treatment	DR	Ct/lb	D T/Ac	
Trt 5. Roof Top, post harvest, 9/17	3.13	67.41	8.18	A
Trt 7. V, post harvest	3.11	72.30	8.09	A
Trt 9. Mowhawk 6/2	3.12	70.35	7.98	AB
Trt 4. V cut 6/2	3.10	67.51	7.97	ABC
Trt 6. 3-4 cuts from ground 4/23	3.19	74.63	7.96	ABC
Trt 2. Roof Top, 6/2	3.28	72.14	7.67	ABCD
Trt 3. Ladder and loppers	3.25	69.34	6.97	BCD
Trt 8. V cut, 6/2	3.24	71.94	6.94	CD
Trt 1.Dormant lopper from ground	3.21	70.24	6.76	CD
	NS	NS		

2008 Field Notes

- Mechanical pruning done post harvest 2007
- Dormant pruning from the ground all treatments except ladders and loppers
  - Pole loppers 10-20 cuts
  - Long handled loppers 12-24 cuts
  - Cost $ 2.00/tree
- No mechanical summer pruning in 2008
- 5-6000 fruit per tree at reference date- no thinning
- Moderate yield 4.38 dry ton/ac ave.

2009 Field Notes

- Heavy fruit set, approximately 13,000 fruit per tree
- Thinned to approximately 7,000 to 8,000/tree
- Mechanically cut alley way in July

Pruning Trial Results 2009

Trt.	Mech Trt	Drying Ratio	$ / Acre	$ / Ton	Count / Lb	Dry Tons / Acre
1		3.03 a	9424 a	1309 ab	60 a	7.15 ab
2	S RT	3.21 bcd	8947 a	1232 bcd	64 bc	7.27 ab
3	**Std**	**3.24 cd**	**6827 b**	**1225 cd**	**63 abc**	**5.56 c**
4	SV	3.05 ab	8635 a	1280 abc	62 ab	6.72 ab
5		3.08 abc	8795 a	1191 d	65 bc	7.38 ab
6	PH T	3.21 bcd	8711 a	1189 d	66 c	7.27 ab
7	PH V	3.15 abcd	9188 a	1202 cd	64 abc	7.61 a
8	PH RT	3.28 d	8330 ab	1221 cd	67 c	6.84 ab
9	PH MH	3.03 a	8715 a	1358 a	62 ab	6.42 bc

Treatment and Yield Summary 2006-2009

Mechanical Pruning Treatments					Dry Yield/ac as % of Standard					$/ac
										% of Std
Trt.	2006	2007	2008	2009	2006	2007	2008	2009	Cum 06-09	Cum 06-09
1	D T				166 a	97 cd	80 c	129 ab	113 bc	117 a
2	D T	S RT		S RT	145 ab	110 abcd	112 b	131 ab	121 ab	122 a
3	**Std**	**Std**	**Std**	**Std**	**100 c**	**100 bcd**	**100 bc**	**100 ab**	**100 c**	**100 b**
4	D V	SV		S V	136 abc	114 abc	147 a	121 ab	127 a	129 a
5	D V		PH RT		160 ab	117 a	81 c	133 ab	121 ab	121 a
6	S V		PH T	PH T	166 a	114 abc	100 bc	131 ab	124 ab	122 a
7			PH V	PH V	169 a	116 a	109 bc	137 bc	129 a	127 a
8	D RT	SV		PH RT	158 ab	100 cd	113 b	123 ab	118 ab	118 a
9	D MH	S MH		S MH	125 bc	114 ab	115 b	116 c	116 ab	121 a

Results

- Ladder and lopper treatment had lowest yield and value
  - Smaller trees over pruned?
- Mechanical pruning in the summer did not reduce yield and value over all


Ladder and Lopper


No Mechanical
Pruning Since 2006


Summer V


Post Harvest V

Estimated Pruning Cost

- Ladders and loppers - $2.50/tree - $3.25 with overhead X 183 t/ac = $594/ac.
- Dormant Pneumatic - $1.25/tree with overhead = $229/ac.
- Light summer pruning from ground $.50/tree = 91.50/ac
- Mechanical Pruning 2 passes
  - Flat or roof top $30-40/ac.
  - V cut $40-50/ac.
- Pneumatic+ pneumatic = $229 +40 = $269

Conclusion

- Combinations of mechanical and hand pruning can be used in combination with other good management practices to achieve good production along with some reduction in pruning costs.