

Impact of pruning and shoot thinning mechanization on growth, yield and fruit composition of 'Chardonel'

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• This project explores the effects of **mechanical pruning** and **mechanical shoot thinning**, given their great potential for improving the economics of grape production. The success of mechanization often hinges on the variety being harvested, in this study, the authors focused on 'Chardonel' (a cross between Chardonnay and the French hybrid Seyval). This summary reports the results for the 2008 trial, which the researchers intended to prolong until 2010.

• Researchers compared *growth*, *yield*, and *fruit composition* of the following treatments:

- *Hand pruning + Hand thinning*
- *Hand pruning + Mechanical thinning*
- *Mechanical pruning + Hand thinning*
- *Mechanical pruning + Mechanical thinning*

In addition, they studied the impact on fruit composition of 3 types of shoots:

- *Count shoots (shoots on count buds)*
- *Non-count shoots*
- *Lateral shoots*

• In case you were wondering how shoot thinning can be mechanized, the researchers used a tractor-towed trailer mounted with paired shoot thinning "heads", each consisting of three 1"-wide x 15"-long urethane paddles. The implement was operated at a ratio of 150 orbital travel:1 forward travel, with a ground speed of one mile per hour. The target shoot density was 6 shoots per linear foot of canopy.

• Results.

		<i>Highest in:</i>	<i>Lowest in:</i>
GROWTH	Shoot density	Not affected	
	Shoot damage (unintended hedging)	Mech. pruned + Mech. thinned	
YIELD	Total yield	Hand pruned + Hand thinned	
	Yield from count shoots	Hand pruned + Hand thinned	
	Yield from non-count shoots	Not affected	
	Yield from lateral shoots	Mech. pruned + Mech. thinned (6 times more)	
	# Clusters /vine	Not affected	
	Cluster weight	Not affected	
	# Berries /cluster	Not affected	
	Berry weight	Crop from count shoots	

Cont.

		<i>Highest in:</i>	<i>Lowest in:</i>
FRUIT COMPOSITION	Soluble solids	Mech. pruned + Mech. thinned	
	Soluble solids by shoot type		Crop from lateral shoots
	TA by shoot type	Crop from lateral shoots	
	pH by shoot type	Crop from count shoots	
	Main nutrients (P, K, Mg) by shoot type	Crop from count shoots	

Even though the authors succeeded in obtaining similar shoot densities for both treatments (hand and mechanical), the actual shoot density was higher than the 6 shoots per linear foot intended (8.4 and 9 shoots/meter for hand and mechanical thinning, respectively). At that point, shoots were too long to consider re-thinning.

• **Conclusions.**

- Mechanical thinning (and to a lesser extent mechanical pruning) had an unintended “mowing” or “hedging” effect on the shoots, which raised the amount of lateral shoots and the proportion of second-crop yield from 1% to 4%;
- “Count crop” is more mature than “non-count crop” or “lateral crop”, which can be an important source of non-uniformity if the proportion of lateral fruit is high;
- Mechanical pruning coupled with mechanical thinning decreased total yield, and the resulting fruit had higher soluble solids.

In summary, the treatments consisting of **mechanization of both pruning and thinning produced less yield, which was most advanced in maturity, but also the most heterogenous** (had a higher percentage of clusters with lower maturity).

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