

Mechanical pruning trial in 'Improved French' Prune

Rosecrance R.¹, Milliron L.², Niederholzer F.³

¹College of Agriculture, California State University, Chico, ²UC Cooperative Extension, Butte, Glenn, Tehama Counties, ³UC Cooperative Extension, Colusa, Sutter, Yuba Counties



Boxed Trees



Thinned Boxed Trees



Fig 1. Mechanically hedging trees

Introduction

The California prune industry relies on hand pruning to thin fruitwood, improve fruit size, reduce alternate bearing, and control tree size and shape. Hand pruning, however, is one of the most expensive field operations, accounting for over 25% of the total cultural costs to produce prunes (Fig 2). Increasing labor costs and decreasing labor availability will continue to affect adversely California's global competitiveness in the prune market.

Mechanical hedging (Fig. 1) can be an important tool in decreasing pruning costs, reducing alternate bearing, and helping to maintain trees in their allotted space. Growers are currently experimenting with mechanical pruning to limit tree size and encourage renewal growth at the canopy perimeter. A range of practices, including topping and/or side hedging (one or two directions) are beginning to be practiced. We are aware of no research that supports one mechanical pruning practice over another.

Hypothesis

A mechanical pruned tree will produce similar yields at significantly lower cost than hand pruned trees.

Fig 2. hand pruning costs as a percentage of prune productions costs.



Methods

Mechanically pruning is currently being evaluated in an 9-year-old orchard, oriented NE-SW, and spaced 15 x 18; 161 trees/acre (Fig. 3)

Treatments: 5 treatments (hand pruning, 5 sides of the canopy in Fall, 5 sides of the canopy in Spring, hedging both sides in Fall, hedging both sides in Spring)

- 12 trees per treatment for a total of 300 trees.
- hedging will aim to remove about 50 percent of the new growth
- randomized complete block of five replications.



Fig 3. boxed tree on May 24, 2019.

Results

- Mechanical topping and hedging did not significantly affect fruit size or yield (Table 1).
- Dry pruning weights were greatest in the hand pruning (dormant trees) and boxing in the fall treatments and lowest in the Spring hedge both sides treatment .

Table 1. Treatment yields, percent large fruit, canopy, trunk diameter, and pruning weights in 2019.

Treatment	Yields (Dry t/a)	Percent large fruit (screen A + B)	Trunk Diameter (inches)	Dry Pruning Weights (lbs)
Control	5.6	94	5.7	100 ab
Box in Spring	5.0	86	5.8	45.2 b
Box in Fall	5.2	89	5.7	179 a
Hedge both sides in Spring	4.4	89	5.7	29 c
Hedge both sides in Fall	5.1	89	5.7	57.6 a
P value	ns	ns	ns	0.0005



Fig 4. Plum spur.

Aim

The aim of this experiment is to evaluate different mechanical pruning treatments compared to a hand-pruned control. We hope to identify mechanical pruning practices that produce similar yields at substantially lower costs than hand-pruned trees. This information will be very important to keep California's global competitiveness in the prune market.

To evaluate mechanical pruning timing and severity on:

- Yield, fruit set, fruit size, and canopy growth,
- Spur survival and return bloom.

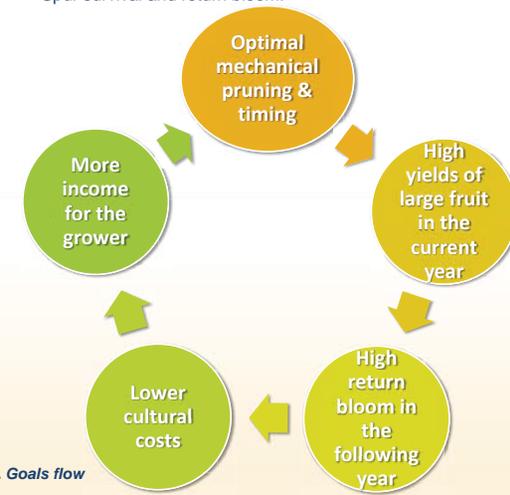


Fig 5. Goals flow chart.