

FRUIT WOOD REJUVINATION BY REDUCING TREE HEIGHT AND SHOOT REMOVAL ♦ Year 2 Progress Report

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ABSTRACT

A 9 year old block of *Prunus persica* cv. Doctor Davis was used to evaluate reducing tree height and removal of vertical shoot growth in the upper portion of the tree in an attempt to stimulate fruit wood development in the lower portion. The trees were 3.5m tall and were spaced 4.3m X 5.5m and were growing on a deep, sandy soil under drip irrigation in the North San Joaquin Valley. The foliage in the upper portion of the trees was moderately dense. The first treatment consisted of lowering the trees 30-46cm in the dormant season to an outward branch. The second treatment was to pull out or prune off any upward growth in the top of the trees in early summer. The control was dormant pruning only with mechanical topping at 3.5m. There was a positive response to both treatments as expressed by new fruit wood > 0.5cm diameter developed in the lower portion of the trees. The controls continued to loose fruit wood while the modified trees began to slowly recover fruit wood in the lower portion of the tree. Yield components will be measured in year 3.

INTRODUCTION

Prunus persica cv. Doctor Davis is prone to loosing productivity over time due to the loss of fruit wood in the lower portion of the tree. The presumed cause is insufficient light intensity. While most *P. persica* cultivars are sensitive to insufficient light Doctor Davis is considered locally to be very sensitive. The objective of this study was to demonstrate two possible methods of stimulating new fruit wood growth in the lower portion of the canopy.

MATERIALS AND METHODS

The site was 9-10 year old block of Doctor Davis – a late cling peach variety on Nemaguard rootstock growing in Delhi Sand in the northern San Joaquin Valley Tree spacing was 4.3M (14 ft) and row spacing was 5.5M (18ft). The trees were trained to a traditional open center system and were being maintained at about 3.5M (11'5") tall. The trees were progressively losing all fruit wood below about 2.7M (9 ft) from the ground. This is presumably due to insufficient light intensity in the lower 2/3 of the tree. Examination of the dead shoots and hangars did not show bacterial canker or any other diseases that could account for the loss of fruit wood This project was to address this problem which was resulting in production declining over time.

The treatments consisted of three management strategies in addition to the practices already employed by the farmer:

1. Standard dormant pruning + no summer pruning
2. Standard dormant pruning + summer pruning in early summer to remove all upright vigorous growth in top of tree.
3. Lower height of tree 30-46cm (12-18 in) using a pole-mounted chainsaw for three years and then allow to return to previous height.

Six replications of each treatment arranged in a randomized complete block design. All trees were commercially dormant pruned by hand during early February 99. The trees in treatment 3 were lowered with the chainsaws on 24 February 99. The summer pruning done by breaking out the offending shoots 31 May 99.

July 15, the grower had a commercial pruning crew made heading cuts on the most vigorous upright shoots in the centers of the trees in all treatments, in an attempt to induce branching. The block was harvested 16 August and on 6 September, the entire block was mechanically topped – this resulted in the removal of about 25cm (10 in) of shoot growth on the standard trees and lesser amounts on treatments 2 and 3, returning the trees temporarily to about 3.5M (11.5 ft) tall.

RESULTS AND DISCUSSION

By mid-summer the trees with reduced height and those summer pruned appeared to have additional shoot growth in the lower portions of the tree. On 13 October we counted the number of shoots with a diameter >0.5cm plus all live hangars below nine ft. Hangars with multiple shoots were counted as one. Results of these counts are in Table 1.

Table 1. Number of shoots and live hangars below 2.7M (nine ft).

Tree lowered	26.8 a
Summer shoot removal	23.6 a
Standard pruning	17.6 b

Both treatments resulted in significantly more shoot growth and hangar survival in the lower 2/3 of the tree. The data shows that the Doctor Davis trees responded favorably to lowering the tree and to increasing light with the practice of vertical shoot removal.

SECOND YEAR

After the 99 harvest, the whole orchard was topped mechanically about 20cm (8 in) above the current height. On 20 Feb 00 a commercial crew pruned the entire experiment. They were instructed to prune the trees normally without being told what the treatments were. On 2 March 00 we lowered the trees in treatment 3 once again to maintain the height at the level set the previous year which was 3.4M (11 ft). On 9 June 00 I pruned out all upright shoots and a small amount of lateral growth in the upper 1/3 of the tree in treatment 2. In July a commercial pruning crew came through the test plot and removed several very vigorous upright shoots on each tree and made a few heading cuts on very long hangars. Post harvest, the whole block was again mechanically topped and lowered about 8-10cm (3-4 in).

RESULTS AND DISCUSSION

On 17 Nov 00 we again counted the total number of shoots and hangars below 2M (6.6 ft). This year we only measured the shoots below 2M because this was the portion of the tree with the greatest problem with fruit wood renewal. We counted only hangars and shoots that were alive and had a diameter of about 0.5cm or greater. My experience is that shoots with diameter less than that in the area of the tree with low light usually do not survive the winter. The data is presented in table 2.

Table 2. Number of shoots and live hangars below 2M (6.6 ft).

Tree lowered 26.0
 Summer shoot removal 22.0
 Standard pruning 21.5
 Coefficient of variation = 15.3

The data from year 2 showed a numerical trend favoring the lowered trees. It is our impression that the summer pruning by the commercial crews negated some of the differences resulting from the treatments. During subjective observations during the season, treatments 2 and 3 appeared to have more shoots and more vigorous shoots below 2M. We will be repeating the test one more year, taking extra precautions to exclude the commercial crews during the spring and summer.

Table 3. Matrix of pruning operations.

	Standard pruning by crew	Reducing height of tree	Summer shoot removal	Water sprouts headed by crew	Machine topped post-harvest	Shoots Counted
Treatment 1	Feb 99 Feb 00			July 00	Sept 99 Sept 00	Oct 99 Nov 00
Treatment 2	Feb 99 Feb 00		May 99 Jun 00		Sept 99 Sept 00	Oct 99 Nov 00
Treatment 3	Feb 99 Feb 00	Feb 99 Mar 00			Sept 99 Sept 00	Oct 99 Nov 00

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