Effect of Differential Training Regimes on Early Production and Gross Returns in French Prunes

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Introduction:

It has been shown repeatedly that early production in young prunes is inversely related to the severity of pruning and training. More recently concerns related to wind throw of trees have led many growers to return to the more severe type of training which was practiced in the past. It was felt it was necessary to demonstrate the economic impact of this more severe pruning.

Objectives:

To demonstrate the effect of various training regimes on early production and returns in a replicated trial.

Procedure:

French prunes on Myrobalan 29 rootstock which were planted in Orland in the spring of 1995 on a 15' x 19' spacing were subjected to 6 different training/pruning regimes (Table 1). The experimental design was a randomized complete block with six single-tree replicates.

Table 1. Pruning Regime Prior to Crop Year

Treatment	1996	1997	1998	1999
1	3 scaffolds selected and headed at 30"	Headed at 30"	Headed at 30"	Headed at 30"
2	3 scaffolds selected and lightly tipped	Lightly tipped	Lightly tipped	Lightly tipped
3	3 scaffolds selected and not headed	Unheaded	Unheaded	Unheaded
4	3-5 scaffolds selected and competing limbs bent	Competing limbs bent	Competing limbs bent	Unheaded
5	3-5 scaffolds selected and lightly tipped	Unpruned	Unpruned	Unpruned
6	3-5 scaffolds selected and lightly tipped	Unpruned	Unheaded	Unheaded

Unless unpruned or bent, all trees were pruned in a vase-shape and competing and crossing limbs were removed. The only differences between treatments 1, 2, and 3 were the lengths at which the new growth was headed. With treatment 4, 3 to 5 primary scaffolds were selected and all competing limbs were bent nearly to or to the breaking point to reduce their competitiveness with the permanent limbs. This strategy was followed until prior to the 1999 cropping year when they were long pruned similar to treatment 3. Treatment 5 was unpruned after 1996 until 2000, and 6 was left unpruned in 1997, and then pruned like treatment 6 until 2000 when all the trees were pruned uniformly by the grower similar to treatment 1.

Trees were hand picked from 1997 to 1999, and mechanically harvested in 2000. The total fruit from each tree was weighed, and a 4 pound fruit sample was taken. The samples were dried and dry away ratios, fruit size, and number of dry fruit per pound were determined. Dollar value of the fruit was determined using the Prune Bargaining Association prices. The data was analysed using Fisher's least significant difference test. Statistics were not run on the dollar value of the 1998 crop because the value per ton was determined from a correlation of dry away ratios to prune sizes, not from actual prune sizes.

Results and Conclusion:

As expected dry yield, gross value per acre, accumulated dry yield and accumulated gross value per acre were inversely related to the severity of pruning (Tables 2 and 4). Treatments 3 through 6 had more than $3000 per acre more in accumulated value by the end of the 6th season than Treatment 1. Treatment 5 (unpruned from the second dormant season until prior to the 2000 crop) set an extremely heavy crop in 1999 which resulted in small fruit sizes, higher drying ratios (Table 3) and reduced crop in 2000 indicating that it should have been returned to annual pruning earlier as was done with treatment 6. The bending treatment showed potential for early production while still developing a structure suitable for heavy production later on.

During the experiment two trees from the unpruned treatment (5) were blown over. No trees in the other treatments were lost. While this trial did not contain enough trees to evaluate blow over potential treatments 2 and 3 would seem to offer potential for increased early production with minimal increased risk due to blow over. In order to take advantage of the early production offered by some of these pruning strategies other practices which could affect tree anchorage should be considered. These include rootstock selection, planting depth, row orientation scaffold height, berm height, time of pruning and early defoliation.

Table 2. Dry Yield/Acre

Trt	3rd leaf 1997	4th leaf 1998	5th leaf 1999	6th leaf 2000	Accumulated Dry Yield
1	136A	727A	3350A	5948BC	10162
2	324AB	1903B	4838AB	7602C	14667
3	521BC	2769B	6863C	6513BC	16666
4	874D	4930C	7978CD	4715AB	18497
5	740CD	**5477C	**9140D	2688***A	18045
6	870D	2825B	6616BC	6835C	17146
*$LSD_{0.05}$	268	1011	1852	1900	

*using Fisher's method **average of 5 trees ***average of 4 trees

Table 3. Drying Ratios and Dry Fruit per Pound

Trt.	1997		1998		1999		2000	
	Dry Away	#/lb	Dry Away	#/lb	Dry Away	#/lb	Dry Away	#/lb
1	2.77	44.9	2.55	46.7	2.34A	37.2AB	3.04	49.5BC
2	2.77	44.1	2.70	48.6	2.30A	35.5A	3.34	53.5C
3	2.87	43.7	2.76	45.6	2.46AB	39.7AB	3.18	48.5BC
4	2.72	39.2	2.78	53.0	2.58B	45.5B	3.00	44.6AB
5	2.74	39.3	2.67	46.9	3.06C	74.6C	2.80	40.4A
6	2.79	41.9	2.71	46.0	2.51AB	43.5AB	3.42	48.4BC
*$LSD_{0.05}$	NS	NS	NS	NS	0.21	8.7	NS	6.3

*using Fisher's method

Table 4. Dollar Value per Acre

Trt.	1997	1998	1999	2000	Accumulated Income
1	66A	336	1745A	2873BC	5020
2	160AB	865	2530AB	3539C	7095
3	256BC	1291	3532C	3172BC	8250
4	432D	2155	3988C	2331AB	8906
5	382CD	2525	3526C	1626A	8059
6	450D	1312	3357BC	3307C	8426
*$LSD_{0.05}$	155		881	882	

*using Fisher's method