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Orchard "Slenderizing"

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Today we are going to talk about one of the most crippling problems in the industry—overgrown orchards. Raymond Marsh spoke of the problem in 1940, and there have been seven articles in the Yearbook since then.

I would like to touch briefly on two other related topics to tree size management:

1. Waiting to prune an orchard after a freeze until the extent of damage is known, and

2. The rate of regrowth after stumping at different heights.

I will address these two first, since most of us already know the need of planning to thin and then actually following through with the project.

Pruned 1 week after freeze. *Unpruned after freeze.*

These are orchards side-by-side, both equally damaged by the freeze in December 1990; but in one case, the orchard was whacked back within six weeks of the freeze, and the other was left to its own recourse. I hope you agree with me that the one on the left has recovered more fully than the one precipitously pruned. The more wood removed, the more of the nutritional materials needed to push new growth are removed, as well as the buds to cause new growth are removed. The lower the buds are on the trunk, the longer they have been under hormonal control, and the harder they are to push.

The tree will tell you where to make cuts. Buds push from the least damaged wood. We have had cool weather this summer and the full extent of damage is not known. It is

important to wait for a good few days of heat spell, so that partially damaged wood will collapse to sound wood. Many growers will see trees suddenly die back next summer, due to wood that was affected but which was not sufficiently tested by the cool weather this year.

Dr. Mary Lu Arpaia and I were given the opportunity by the Limoneira Company to do a stumping trial on trees severely affected by the freeze. In April, trees were stumped to 6 feet, 10 feet, and 15 feet. In June, July, August, and September, they were rated for rate of regrowth and vigor of the leaves. The regrowth was rated as a percent of new leaves covering the stumped branches.

July 15, 1991—6 foot.

July 15, 1991—10 foot.

July 15, 1991—15 foot.

As you can see in Figure 1, the results are quite dramatic. There is a significant lag time in regrowth of the 6-foot treatments. No doubt, the removal of wood containing stored carbohydrates, the fewer buds for regrowth, and the long hormonal suppression of those buds near the base of the tre are the causes of the lag.

Of course the key is, which treatment will get the orchard into production more rapidly, and this is why we will be monitoring this orchard for several years. We do nave the data that show that once ladder work is required in an orchard, the labor costs rise. The

6-foot treatment done with chainsaw on the ground cost $2.43 per tree; but once a ladder was required, the higher treatment costs rose to $15.09 and $16.28, respectively. It's dangerous work! But if the larger trees result in greater yield in a year, it may be worth the added stumping costs.

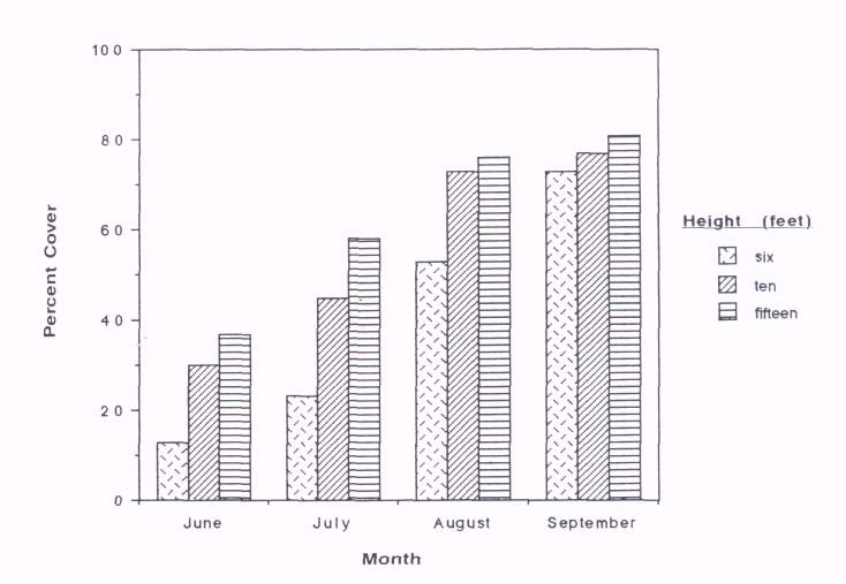

Figure 1. Regrowth with stumping height.

Stumping Costs
($ / tree)
15 ft. — $16.28
10 ft. — $15.09
6 ft. — $2.43

Figure 2. Stumping Costs

Orchard that has not been thinned.

I include this information on delayed pruning after a freeze and stumping height because it is related to thinning. In each of these practices, we are trying to maximize

the amount of leaf surface to promote photosynthesis.

Now to the crucial question of thinning. How many present have thinned their orchards? (Audience responded by show of some hands) How many have not? (Other hands raised) One of the benefits (?) of the freeze was that many growers saw lost income for two years, so they decided that this was the year to do it.

But why do orchards need to be thinned? Trees need sunlight to drive photosynthesis, and the more leaf area to intercept sunlight, the more photosynthesis. The shape of an avocado tree 25 feet high and 30 feet in diameter will have a canopy area exposed to the sun of 2,812 square feet, and the orchard of 40 trees to the acre will have 112,480 square feet of exposure. A crowded, tabletop-like orchard will have merely 43,560 square feet of exposed canopy area. And it will be in the upper reaches in this canopy where the few hard-to-pick fruit are.

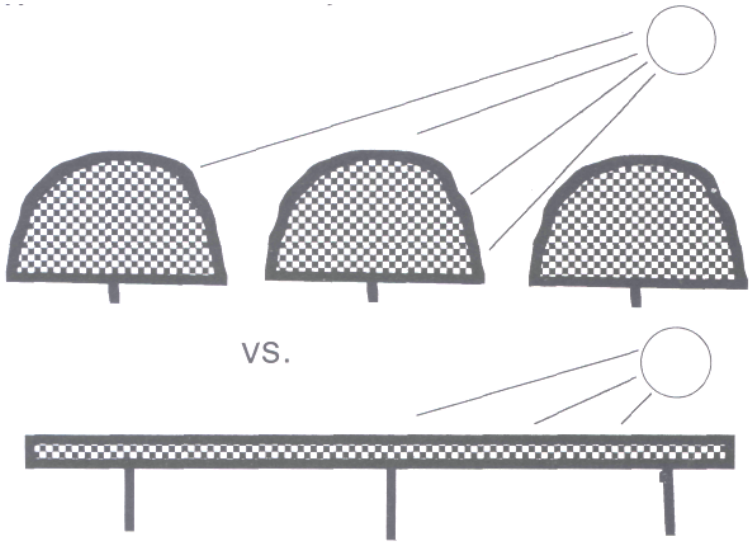

Figure 3. Trees need sunlight to drive photosynthesis.

I like the image that Mr. Marsh has of a table top of balloons that as they fill, they encroach on each other and force more exposed surface to the top of the balloons.

Figure 4 shows the results of a young, ambitious farm advisor, Len Francis. The variability of yearly production is shown here, but also shown is how timely thinning improved production with time. In this case, it took three years; but frequently, improved grove yields can be noted within two years, depending on how severe the crowding.

Of course, it is important to maximize early productivity by a higher spacing than the eventual tree spacing of the mature orchard, but thinning of the orchard must be anticipated as part of the overall production plan of the orchard. The more densely (to a point) a grove is planted, the sooner productivity begins. At about $20,000 for the five-year development costs, it is important to get early productivity.

There is no set rule for timing thinning, since it is function of climate, soil, variety, and

original tree spacing. Most orchards need only two thinning in their lifetimes—and on hillsides with thin soils, maybe only one. However, if you are in an area like Carpinteria with deep soils, it may take three.

The guideline to follow is, thin before crowding and before loss of sunlight causes shading of the skirts. Plan ahead, and find the will to do the job when it is time.

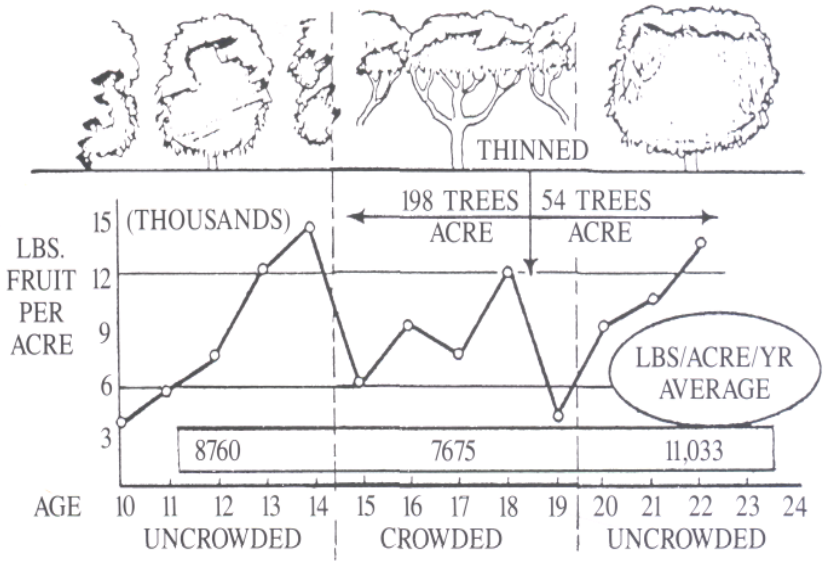

Figure 4. Results of a thinned Fuerte avocado orchard in San Diego County.

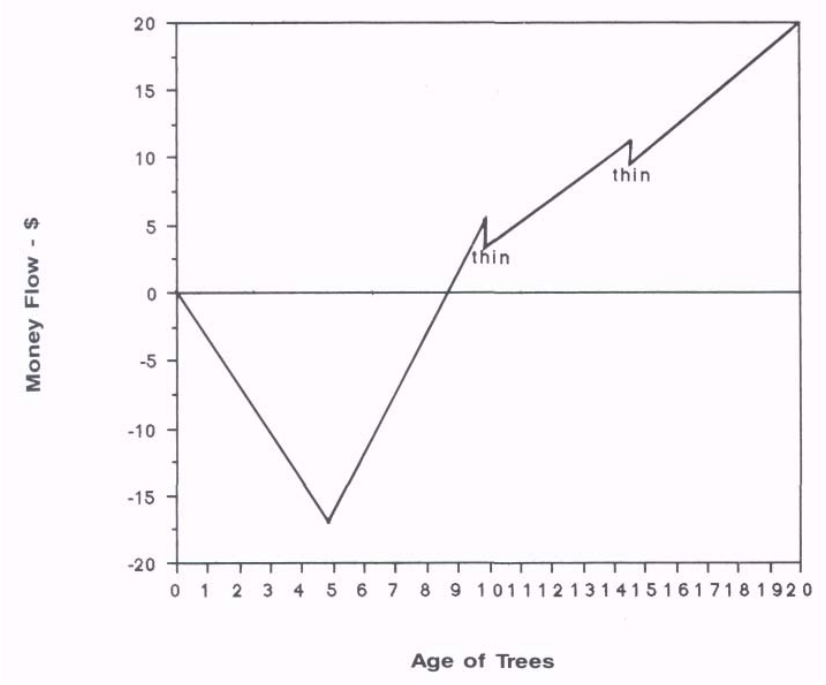

Figure 5. Orchard thinning must be anticipated as part of the overall production plan.