

HURRICANE DAMAGE TO COMMERCIAL FRUIT TREES IN DADE COUNTY

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The hurricane of September 15, 1945, as you know, had a top wind velocity of 150 to 160 MPH. The path of greatest destruction was only 40 miles wide running from the town of South Miami to slightly south of Florida City. The lowest barometer reading was 28.09 at the Army Air Base. This area embraces 75 to 90% of the production of avocados, limes and mangos in the state. Winds of hurricane force lasted approximately four hours, the lull lasting between 45 and 50 minutes.

This paper deals mainly with damage to avocados, limes and mangos.

Damage to Avocados: The damage to avocados varied greatly depending upon size and height of trees, and to a lesser degree on variety and condition of the tree at the time of hurricane. There seems to be some little difference in ultimate damage between a grove which was encircled with an Australian-pine windbreak or other type of windbreak, and those not having any windbreak. The wind breaks did some good while the wind was 90 to 100 miles but when the wind reached a higher velocity than this the windbreak was blown over on to the fruit trees, causing more damage than the wind itself. Trees that were high and very large blew down quickly and suffered more damage than those that were not as tall. There was some difference between varieties but this was due mainly to the type of growth that these varieties have; that is, if they are short, low-headed trees rather than tall, slender ones. It seems to me there was one variety which suffered considerably less damage than other varieties and that is the Collinson. They seemed to stand up better than other varieties of the same age and height. (However, we do not recommend propagating Collinsons for several other reasons.) Generally, West Indian varieties are recovering much slower than either Hybrid or Guatemalan, one outstanding exception being the Pollock, which recovered very quickly. Trapp is coming back very slowly, some dying. Of the Guatemalans, the Taylor is making the quickest recovery.

Damage to avocados can be classed roughly into three types—root damage, bark damage and breakage of limbs and foliage. Root damage was severe to both the trees that went over and trees that were not blown over. In the case of trees that were not blown over, any number of them are dying back. In the case of bark damage, this was mainly caused by sunburn before the trees could be put up, which in some groves was very severe. It was also caused by twisting of the limbs and trunk resulting in breaking and damage of the cambium layer. The third type of damage mentioned was caused by the force of the wind breaking the limbs, in some cases limbs as large as 10 and 12 inches in diameter; also breakage resulting from the tree falling on the ground.

In setting trees up after the storm, the tops were cut back to leave a surface equal to or

slightly more than the estimated good roots. Some growers cut their trees back to within 3 or 4 feet from the ground; other growers did not cut their trees back at all; but the most prevalent method used was that of cutting the top back equal to the remaining root system, and at the present writing this appears to have been the better way, although at present writing it is really too early to tell which will prove to be the better method. Incidentally, it is still too early to evaluate the total damage to trees. The props that we used were saplings cut from the woods, 2x4 lumber, or 1x6 slabs. Two to three props were used per tree.

There were various kinds of fertilizer used, such as 4-9-3, 4-8-6, 4-7-5 and 5-7-5. Most of the fertilizer used did not contain any of the minor elements, such as magnesium, manganese, etc. The best results seem to have been obtained from 4-7-3 or 5-7-5 mixtures containing 1% to 2% magnesium. Poundage varied from one-third application to a full application, and while a full application unquestionably wastes some fertilizer it seems to have gotten a little quicker response. Wherever possible a mixed fertilizer having an organic nitrogen content of 20% to 40% was applied with a mechanical spreader.

Some growers used a tractor with rope or cable to pull up trees. Before pulling the tree up the dirt was dug out from under the roots so that the tree could again be set approximately vertical. The dirt was then put around the roots either by hand or with the use of a small bulldozer.

The approximate cost of raising the trees, fertilizing, putting dirt on the roots, pruning and hauling all of the dead wood out, varied greatly depending upon the size of the grove and the amount of damage in the grove. On the average, the cost of setting large trees 12 years old and older varied from \$40 to \$140 per acre, one of the greatest single expenses being the cost of hauling out all brush, etc.

Some fruit was salvaged from practically all groves. This fruit averaged from \$1.75 to \$3.50 per tomato field box delivered to the packing house. In some cases this figure was lower depending upon the amount of scarred fruit and the variety. The Taylor variety brought about the highest price and the West Indian varieties the lowest price. Fruit could be salvaged for not over 5 to 6 days after the hurricane. Fruit on the ground after that date was too sunburned to salvage. Groves that had not been fertilized for top production and consequently were considerably harder and had less foliage were not damaged as severely as those which had been well fertilized.

Some groves since the hurricane have shown a decided zinc deficiency which has required the use of zinc sprays.

Persian Limes: Damage to limes varied greatly between root-stocks, lemon root-stock, being blown over very easily whereas grape fruit stock held well in the ground. However, I do not recommend the planting of citrus on grapefruit rootstock except on very low land. The greater part of the plantings in Dade County are on lemon root-stock. Cleopatra mandarin root-stock could be classed in between the grapefruit and the lemon root stock in damage.

Damage to the tops or to the budded part was severe, mainly due to twisting and splitting of the limbs and bark, resulting in considerable infection by *Diplodia*.

In the case of trees that were badly split it was deemed advisable to cut them back to just above the bud. Trees that were not so badly split were pruned back only past the split. In these latter cases, where trees were pruned this way, considerable dead wood is still developing.

Lime trees were put up in much the same manner as the avocado trees and the fertilizer used was the same. Damage to foliage could be roughly estimated as at least 50%. Trees that were blown over and subsequently propped up are bearing some fruit this year, meaning those limes which were good and were not damaged.

Mangos: The damage to Mangos was probably more severe than to any other kind of tropical fruit. Mango trees with limbs having a diameter up to 14 and 16 inches were broken off three to five feet from the ground as well as being blown over, and in some cases, trees were blown out of the ground. Their putting up and care was much the same as for the avocados. It is doubtful if there will be a good crop of fruit on Mangos for three years at least, and perhaps considerably longer. Small mango trees of varieties such as the Brooks and Sandersha were not damaged as severely as the Haden on account of their smaller size.