The power transmission system was redesigned to offer ground speeds as low as ¼ mph. This was found to be important for satisfactory performance of the cutting mechanism under adverse cutting conditions such as large and dense tangerine growth.

Power requirements were found to be a function of variety, size and density of growth, forward speed and condition and size of saw teeth. Saw teeth were kept sharp longer with the rotor-type topper than with the straight boom. Saws at the basal end of the straight boom had relatively small wood to cut compared to the large, dense wood encountered by the remaining saws. They, therefore, maintained their sharpness much longer. With the rotor-type cutter, every saw was worked equally and all saws wore at the same rate. Only four saws were used instead of seven. Since only two saws were actually doing the cutting at any one time and because of the nature of the rotor and its fly wheel effect, power requirements were in the range of only 30 B.H.P. at the engine, which was rated at 40 B.H.P. at operating speed. Power available was sufficient for this type design under most conditions. Under certain circumstances, as in heavy tangerine work, it was necessary to drive forward until the rotor stalled and then back up and try again.

Two different tooth sizes were tried: one set of 32-inch saws had 320 teeth, the other 80. In hedging and topping all varieties, the 320-tooth saws produced a smoother cut than the 80-tooth saws. However, in topping large diameter tangerine wood, it was found that the 80-tooth saws did not bind as much as the finer tooth saws and, therefore, reduced rotor stalling appreciably.

The rotor-type topper proved to be very effective in removing the cut brush from the top of the trees.

Summary

Two tree topping principles were investigated for use in Florida citrus groves, the straight boom design and the rotor design. Although both can be used to remove the tops of citrus trees, the rotor-type topper was found to have lower power requirements, lower saw blade maintenance and greater ability to remove resultant brush from the tree tops. An added feature was gained by pivoting the boom at its basal end so that the equipment could be used for either hedging or topping. This feature may be attractive to growers whose size of operation does not warrant the ownership of two separate units.

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THE INFLUENCE OF PRUNING ON SIZE AND QUALITY OF FLORIDA GRAPEFRUIT

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The proportion of bearing citrus groves which are being hedged has been increasing since the development of the hedging machine by Prosser in 1953 (9). The greatest increase has occurred very recently, because many growers are concerned over increased production costs and lower net returns in severely crowded and canopied older groves, and because the response of hedged trees has generally been very favorable. Norris (6, 7) reported that hedging in several groves in Lake County substantially increased pack-out of tangerines, and to a lesser extent, increased the pack-out of grapefruit and oranges.

Grierson (1) studying the influence of pack-out on grower profits stated, "With Duncan grapefruit the pack-out achieved could determine whether the crop was handled at a profit or a loss." He also concluded that to increase net returns of grapefruit (and tangerines), it

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