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### **Abstract**

The most recent efforts to research and develop mechanical harvesting systems for Florida citrus were initiated in 1995. The main impetus for these efforts grew out of the industry's concern to lower harvesting costs so that their products would remain competitive in the global marketplace. The major thrust of this research and development program has been mechanical harvesting of oranges destined for processing. In most cases, the machinery development was supported by loans or grants from the Florida citrus industry to encourage participation by machinery manufacturers. Several concepts were investigated including canopy area shake, canopy pull-and-catch, trunk shake, continuous canopy shake, and fruit pickup systems. Initially the trunk shake-catch systems were the most widely used, whereas the continuous canopy shake-catch systems have been developed and also used most recently. All shake-catch systems require some tree skirting to be efficient as compared to none required for manual harvesting. During the 2002/03 season, a total of 20+ shake-catch systems were operated and harvested approximately 15,000 of the 600,000 acres of Florida oranges at a cost of 10 to 30% less than manual harvesting costs depending on fruit yield, etc. Considering all system machine operators, one machine operator does the work of 5 to 10 manual harvesters. Hand gleaners normally follow the shake-catch system, which leave 10 to 15% of the oranges, with around 5% left in the tree and 5 to 10% on the ground from preharvest drop and oranges lost from the catchframe. The trunk shake-catch and continuous canopy shake-catch systems have capacities of approximately 0.5 and 1.0 acres per hour, respectively. Successful harvesting of the Valencia poses a problem for all shakers late in the season because the current mature crop must be removed with minimal removal of next season's immature crop. Approximately 25 shake-catch systems are expected to harvest 20,000 acres of processed oranges during the 2003/04 season.