Mechanical harvesting – the harvester's perspective

By Timothy M. Spann

AUTHOR'S NOTE: This article is the second in a three-part series that will examine mechanical harvesting and its impacts on the citrus industry from the perspective of the major stakeholders.

The acreage of Florida citrus being mechanically harvested has been creeping up each of the last several seasons. Despite this trend, less than 10 percent of the total crop is mechanically harvested. A number of persistent issues, as well as some new ones, combine to keep mechanical harvesting from taking off. The previous article in this series discussed some of those issues on the grove side of the equation. Here the factors on the harvesters' side will be discussed.

Currently, the cost of mechanically harvesting citrus in Florida is barely edging out hand harvest. The slower than expected yield recovery following the hurricanes, combined with labor availability not being as critically low as anticipated, have prevented the cost of hand harvest from escalating as rapidly as predicted a couple of years ago. On the mechanical harvesting side, the skyrocketing cost of oil has not only affected fuel costs, but also the cost of all other machine components with ties to the petroleum industry: hydraulic lines, hydraulic fluid, tires, etc. When the additional increases in insurance, maintenance and skilled labor costs are considered, it is easy to see why mechanical harvesting has not yet yielded the economic savings expected. However, machine owners and operators, as well as others in the industry, still believe that economics will be the ultimate driving force that moves Florida's citrus crop to be primarily mechanically harvested.

THE GREENING FACTOR

At first one might not suspect that greening and the ongoing tree loss associated with it has much impact on mechanical harvesting, but it does. Mechanical harvesters, both the large continuous canopy shake and catch machines and the pull-behind canopy shake machines, rely on grove uniformity for maximum productivity. For the large shake and catch machines, missing trees create gaps in the catch frame system, allowing fruit to fall to the ground. Tree gaps also affect how both types of machines engage the tree canopy, resulting in the operators having to make more machine adjustments as they harvest to compensate for the variability, reducing fruit removal percentage and lowering machine productivity. Canopy variability that results in decreased fruit removal or increased fruit drop increases the need for gleaning. Thus, when machine productivity declines due to poor grove health, the slack must be made up with hand labor. These additional labor costs, plus the cost of fuel to drive the machines past each missing tree, keep mechanical harvesting from reaching its true potential.

Grower acceptance of mechanical harvesting has been an ongoing issue since the earliest machines were introduced decades ago. Mechanical harvesting companies are well aware of growers concerns and share them. Harvesters understand that if their machines harm trees, they will quickly find themselves out of business. This is one reason why harvesters have been so closely involved in the process of developing and registering the abscission compound CMNP. The use of this compound significantly decreases the force needed to remove fruit from a tree, allowing machine operators to reduce the force of their machines and relieve grower concerns of tree damage.

The registration of CMNP will also increase machine efficiency by allowing mechanical harvesting of Valencias later into the season. Currently, Valencias cannot be mechanically harvested once next season's crop reaches about 1-inch diameter. Mechanical harvesting beyond this point will remove young fruitlets and significantly reduce next season's yield. But parking a $1 million dollar machine when fruit are still hanging on the tree is tough to do. This limitation has surely kept some people from purchasing additional machines or getting into the business at all.

LOAD ALLOCATIONS

Another issue that is a perennial concern for harvesters is load allocations from the processors. As previously mentioned, idle mechanical harvesting equipment is not efficient. Mechanical harvesting efficiency is maximized when machines operate continuously, 24/7. However, the current system is set up to receive a daily quota of loads per grower from many different growers at the same time. This is to keep harvesting crews employed for the full season and deal with processing plant capacity restraints. While this works for hand harvest crews, it does present some limitations and frustrations to mechanical harvesters since daily harvesting quotas may be less than mechanical harvesters need to operate efficiently.

Another aspect of the load allocation issue that comes into play relates to the current need to suspend mechanical harvesting before the end of the Valencia season. Harvesters would like to see more allocation to mechanical harvesting early in the Valencia season, to maximize machine use, and save hand-harvest allocations until later in the season when the machines stop operating. While this does make sense for those owning/operating mechanical harvesters, it raises the question of how to keep the hand crews in place until they are needed during the late season.

There is general agreement among all segments of our industry that economics will eventually be the factor that drives us to mechanical harvesting. As we move in that direction, there are a number of questions that must be answered and concerns to be addressed. Each year as the mechanically harvested acreage increases, these questions and concerns are being addressed as researchers continue their work and harvesters gain experience in more groves and conditions. When the time comes, our industry will be ready to embrace mechanical harvesting. The great unknown for now is, when will that time be?

Timothy Spann is an assistant professor at the University of Florida's Citrus Research and Education Center.