

# The past, present and future of citrus mechanical harvesting

J.D. Whitney, B.R. Hyman, F.M. Roka

Acta Horticulturae 965: 183-188. 2012.

---

## Abstract

Manual citrus harvesting involves two operations—picking and roadsiding. Picking involves removing fruit from the tree and placing it in a tub (processed citrus) or pallet bin (fresh citrus) positioned at the base of a tree. Roadsiding involves collecting the filled tubs/pallet bins and transporting them to a central location in a grove where they are off loaded into the bulk trailers which hauls the fruit to processing plants or packinghouses. During the 1950s, specialized equipment with hydraulic boom arms was developed to mechanize fruit roadsiding. Picking fruit, on the other hand, has relied on the same technology employed by the early Spanish explorers when they first manually planted citrus trees in Florida, i.e., hand labor. Interest in mechanizing the fruit removal operation has been long standing among Florida growers. In the 1950s, time and motion studies were conducted on conventional manual harvesters to determine ways to improve their productivity by replacing ladders with mobile platforms. Despite productivity gains of between 30-40%, investments into platforms, picking aids, man positioners, etc. never proved to be economically feasible. Early work on mass harvesters started in the 1950s and continued through the 1960s, mainly utilizing limb, air and trunk shakers for citrus fruit removal for processing. Fruit loosening abscission chemicals were used but mass harvesters were not commercially viable. Serious consideration into mechanical harvesting was renewed in the mid 1990s and the industry research effort produced several systems that included both trunk and canopy shakers with limited commercial acceptance. Research is ongoing into robotic technologies and clearance of an abscission chemical. This paper shows some of the mass harvesting technology that has been developed for citrus processed fruit.