

## Ontario Tree Fruit Innovation and Technology Roadmap

### Integrated Packing Systems with Optical Sorter and Sizer

#### Evaluating New Technologies

	Feasibility and cost	Implement	Labour Reduced	Changes in production	Training for staff	Impact on risk of COVID-19 Transmission
	low, medium, high	easy, medium, challenging	% estimate	easy, medium, hard	none, medium, high	none, low, medium, high
Integrated Packing systems	high	medium	30-50	medium	medium	high

Current Status – Innovative packing systems can be programmed to learn what is trying to be achieved for daily pack-out plans based on set parameters. The systems can optimize and organize packing tables, for example 40 pack positions in packhouse would all be optimally organized by volume and type of pack. It is a very efficient system which can increase fruit volume throughput exponentially with same number of packers (60-70% more fruit through packhouse) and double throughput on bulk orders. Packing technology also includes optical sorters (computer vision) with high tech cameras that take multiple images of individual fruit and wavelengths of infrared. Images allow the machine to cull out defects, bruising and internal injury as well. The weight sizers send fruit into different packing areas at high speeds for many fruits per second per lane. Digital images can detect multiple diameters and plot equatorial and shoulder diameters using a stem detection feature for apples and stone-fruit. New systems detect and grade minor to major defects ranging from skin blemishes, insect damage and misshapen fruit. The systems also detect physical damage, identifying problems that are often difficult pick up with the naked eye but will cause fruit to breakdown in market.

Feasibility of Implementation - The capital cost of this equipment it high. Space is also an issue in some cases new buildings or additions must be added to house the equipment. Pack lines and packing processes would need to be reconfigured when adding new equipment.

Impact on Labour - These innovative systems allow packhouses to reduce the labour required for sorting, while significantly improving the consistency and accuracy of the sorted product. New systems can increase fruit volume throughput exponentially with same number of packers (60-70% more fruit through packhouse) and doubled the throughput on bulk orders. New and innovative packing lines generally reduce labour, but crews are still needed to run the equipment

and troubleshoot if needed. Visual sorters make packing more efficient by sending pre-sorted product to packers removing the decision-making process. Packers overall have been able to reduce their labour in the packing house by 40-50% with new automated equipment.

COVID-19 Mitigation Risk – This technology significantly increases labour efficiency and reduces labour requirements and therefore would significantly reduce the risk of exposure and transmission of COVID-19 in pack houses.

Pack house crews are using PPE. Plexiglass barriers occasionally are used, and each packer has their own cubical for isolation.

Need for Change, Research and Training – Implementation would require significant operational/process change, knowledge and training would be required.