HINKLER AGTECH INITIATIVE

‘Smart’ Picking Bag Technology

INTRODUCTION

This trial was undertaken as part of CQUniversity’s Hinkler AgTech Initiative. The Initiative aimed to increase the productivity and profitability of the Bundaberg region’s agricultural sector through greater availability and utilisation of agricultural technology (AgTech). An extensive consultative process undertaken with agribusinesses identified on-farm needs that may be addressed using AgTech. Trials of selected AgTech products and services were then undertaken in partnership with agribusinesses and technology providers to determine the technologies’ efficacy in on-farm conditions. This summary provides an overview of findings from one of the technology trials, including grower feedback and considerations for other growers when deciding whether to utilise the technology in their own enterprise.

Background

The harvesting of tree crops, including lychees and avocados, is generally undertaken manually to avoid bruising and impact damage. For commercial orchards, the harvesting process is the most labour-intensive and time-consuming aspect of production and any improvements to the efficiency of this process can make a significant difference to a grower’s bottom line. Accurate data and information are critical for improving harvesting efficiency and growers are turning to innovative technologies to ensure they make well-informed decisions.

The Technology

Growlogic’s ‘Harvest Ant’ technology is based on a combined harness / bag unit that incorporates several inbuilt sensors. The sensors provide real-time information such as harvested fruit weight, location and time to a computer program. This information can then be analysed to provide individual picker efficiency information. The collected data can also provide yield maps and crop insights. The 33L high-visibility canvas bag and lightweight polycarbonate harness used in this trial are also ergonomically designed to distribute the weight of fruit from a picker’s neck and shoulders more evenly across the torso.

The Trial

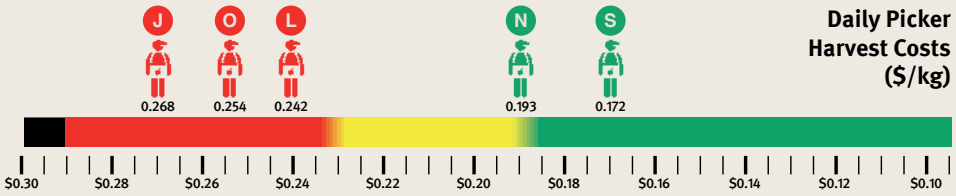
For this trial, Harvest Ant picking units were integrated into commercial harvesting operations on a lychee orchard and avocado orchard in Bundaberg. The pickers trialling the bags included both male and female workers and ranged from those with little or no experience to seasoned pickers. During the harvest, selected pickers used both traditional picking bags and the Harvest Ant units and were interviewed afterward to gain feedback.

As pickers returned to in-field collection points, their fruit-drops were weighed and timed by research assistants as a means of ground truthing data from the picking units.

RESULTS

The bags performed reliably during both harvests with no failure of electronic or physical components and a range of data was collected and analysed. For example, as shown in the diagram below, the weight of fruit picked by individual pickers was combined with picking durations and pay rates to produce individual “Daily Picker Harvest Costs” ($/kg of picked fruit).

As shown, the costs of individual pickers varied between 17c/kg and 27c/kg - a 59% variation. A similar analysis for the lychee harvest demonstrated a 70% variation.



The avocado data was also combined with growth regulator application rates and farm overlays to produce a yield map for the entire orchard. The results indicated yield variations (kg/tree) of up to 37% between unregulated and regulated rows.

Pickers reported that the harness provided greater support than conventional bag systems although some pickers commented on the additional heat generated by the harness chest plates. Female pickers reported the most discomfort due to the inflexibility and 'one-size-only' nature of the chest plate. Some lychee pickers also noted that reflection from the fluorescent orange bags affected their ability to select ripe fruit based on colour.

Value to Business

Component prices for the 'Harvest Ant' system are shown below:*

Component	Cost ($*)
Picking Bag Unit (Including harness, weight sensors & smart node)	465.00
Gateway	2700.00
Software (Varies according to extent of system)	2500.00

This trial demonstrated that the greatest value of this technology is its clear identification of inefficiencies in harvesting processes. Based on trial results, both growers have made improvements to reduce picker walking distances, and time that the fruit spends at high temperatures in the paddock between bag-drops and packing. One grower also used the data to establish a benchmark picking rate (kg/day) and provided incentives for the team to maintain that rate. He noted a marked improvement in overall picker performance because of this initiative.

Grower Feedback

Trial Summary Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I see value in this technology					✓
I found the technology easy to use					✓
The technology was easy to integrate within my business				✓	
I was satisfied with the service provided by the AgTech company					✓
I intend using this technology in my business				✓	
I recommend this technology to other growers				✓	

Other Considerations

When deciding whether to use Harvest Ant technology, growers should consider:

- Commercial manufacturing of the canvas Harvest Ant bags as trialed, was unable to proceed due to international Covid-19 restrictions. Growlogic has since replaced the bag with a polycarbonate bucket which was trialed separately with the same lychee grower.
- Since this trial, Growlogic has made significant improvements to the harness system, and plan to produce it in different sizes to suit individual pickers.

Further Information

For further information on this trial and results, email CQUniversity's agricultural research team:
agriculture@cqu.edu.au

For all enquiries regarding availability and sale of the 'Harvest Ant' system, contact Growlogic:
growlogic.com.au

Summaries of other technology trials undertaken through the Hinkler AgTech Initiative are available at:
bundabergagtechhub.com.au

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