

# Trees: As supplies drop, average price for trees increase

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were more than 750 growers producing 8 million trees each year.

Chal Landgren, a Christmas tree specialist for OSU at the North Willamette Research and Extension Center, said there are fewer trees available now to keep up with the usual demand.

"We're coming off a period where too many trees were planted and a lot of growers have gone

out of business because of the boom-and-bust cycle," Landgren said.

As supplies have dropped, the average price for trees has also increased. Sales data from the National Christmas Tree Association show that, between 2015 and 2018, retail prices rose 23% from \$62 to \$73 — including a 5% jump last year.

Landgren said the 2019 market is looking a lot like 2018, and he doesn't see much relief on the way. The

situation was compounded by unusually hot and dry summers in Oregon's Willamette Valley the past two years that led to higher seedling mortality rates for trees, he added.

"Most Christmas trees are grown without irrigation," Landgren said. "Growers who had particularly a large amount of Noble fir that was planted ... they had real high mortality rates. Some people lost their entire plantings for those years."

Driving around the area, Landgren said families should still have plenty of options at U-cut tree lots, though he recommended getting out early to find the perfect tree.

In addition to the wholesale venture, BTN of Oregon operates a U-cut Christmas tree lot named Tree Kings Farms. The lot celebrated its opening week-end the day after Thanksgiving, and will remain open through Dec. 22.

"We have a good supply of trees for the U-cut," Tyler Stone said. "It's definitely not an issue."

Ben, Tyler and Nathan Stone took over the family business from their father, Mike, who got his start in the Christmas tree industry more than 60 years ago. Despite recent challenges, the brothers say 2019 was a good year for growing conditions, plentiful labor and transportation at the farm.

One major concern

with the wholesale shortage is whether people will be driven to buy an artificial tree, Ben and Tyler said. The industry has supported a checkoff program of 15 cents per tree, which goes toward promoting and marketing live Christmas trees.

"We're trying to get our message out there, that our product is more environmentally friendly than the China-made plastic (trees), he said.

# Robotics: 'The core issue we need to solve is the durability'

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Now, the apples are all picked by hand. Shortages of pickers have led to increased use of foreign guestworkers at high wages that have driven up all wages, increasing labor costs for growers. Robotic picking could save millions of dollars in labor and alleviate picker shortages.

Abundant Robotics and FFRobotics, of Emeq-Heffer, Israel, appear to be the only two companies in the world close to prime time with robotic apple harvesters.

Abundant Robotics has done limited commercial harvesting. FFRobotics is still testing its prototype but has sold one machine in Europe.

Avi Kahani, owner of FFRobotics, believes more competitors will emerge because the potential market is huge — apple and citrus production in the U.S., Europe, South America and China.

A retired mechanical engineer, Frank Moore, in Pasco, Wash., also has been working on a robotic apple picker.

## Abundant Robotics

Abundant Robotics began working on its concept in 2013. Early funding included \$550,000 in grants from the Washington Tree Fruit Research Commission in Wenatchee, Wash. Abundant Robotics received a \$10 million investment from Google a couple of years ago and will spend about \$12 million developing its system, Steere said.

A major milestone was reached last spring in New Zealand, where Abundant Robotics announced the world's first commercial robotic apple harvest. It was limited but apples picked by robot entered the normal sales chain.

The next step was small-scale harvesting in Washington this fall.

"Our goal in 2019 was small scale commercial trials and then scale up machines for larger commercial operations in 2020. That was our goal. We're not quite there yet," Steere said at the end of harvest in early November.

Too many critical parts broke down too often, he said. For example, the robotic arms and mechanisms that physically do the picking were not durable enough, he said.

"The core issue we need to solve is the durability of the hardware we designed," he said, "but all the metrics around the machine like speed of picking and ripeness and various aspects, we're happy with what we're seeing there."

The company has conducted non-commercial field trials in Washington for several years. It came this year



Dan Wheat/Capital Press

**Avi Kahani, of Israel, and his robotic apple picker with H-2A foreign guestworker housing in the background, near Quincy, Wash., on Nov. 6. Robotic pickers may soon replace human pickers.**

with two machines for commercial work. One machine was damaged during transportation. Harvest continued using the other.

Robotic picking took place each week from mid-August to the end of October, Steere said. Limited volumes of various apple varieties were picked for more than 10 companies, large and small, in the Yakima and Wenatchee districts.

## FFRobotics

On the edge of a Kanzi apple block in a Columbia Fruit Packers orchard east of Quincy, Wash., a pickup and an unusual machine sat a few hundred feet away from new housing for H-2A-visa foreign guestworkers.

It didn't look like anything was going on but in a tight space between the machine and a row of apple trees a man sat on a folding chair working on a laptop.

Another man, standing nearby, displayed a ready grin and Israeli accent.

Avi Kahani, CEO and co-founder of FFRobotics, simply referred to the fellow on the chair as "Or," and explained he was working on the machine's software.

A few minutes later, they gave a demonstration. A slight hum for a couple of minutes as the machine sensed where apples hung on the trees. Metal arms rapidly shot out, two each from three levels. On the end of an arm, three prongs, soft but sturdy, grabbed an apple. The arm retracted quickly for the apple to be placed on a soft conveyor. Each pick happened so fast you could miss it.

A series of conveyors moved the fruit to a table atop the platform where one to four workers could sort out culls or clip stems. If those tasks aren't needed the fruit flowed across the table, through a few turns and into a bin. It's all gravity and conveyor flow. The whole machine can be operated by one person whose main task is

to steer it at the ends of rows.

Eventually, stem clipping will be automated. The machine will also be used for pre-harvest crop thinning, Kahani said.

He noted the irony of testing his machine so close to housing for H-2A-visa foreign guestworkers, the use of which has been increasing in recent years to meet the labor shortage.

"Machine and H-2A right here. This is much more appealing," Kahani said referring to the machine. "This is the future and it is here." Two years ago, Kahani predicted he would have units ready to sell by the end of 2018 or beginning of 2019. Now he says he has sold one in Europe, is working to close a U.S. sale and envisions full-scale production in two to three years. He plans to open a U.S. office soon to support his activities in North America and especially in Washington.

He will mount his machines on mobile platforms built by Automated Ag Systems in Moses Lake, Wash., that are similar to the hundreds of Bandit Xpress and Bandit Cub apple harvest assist platforms that company has been building.

## The Cyclone

Automated Ag is also working with DBR Conveyor Concepts of Conklin, Mich., to perfect the Cyclone, a machine that helps pickers.

To use the system, people on various levels on a mobile platform pick into small buckets strapped to their chests. Those buckets in turn feed into vacuum tubes and bins. The system eliminates the need for ladders and picking into bags and dumping them by hand into bins.

"We are looking at having them in production for next year's harvest. We have about 10 people who want them and a lot more interest," said Kelly Dagorret, Automated Ag office manager.

## Robotic differences

Abundant Robotics uses a single robotic picker vacuum arm that sucks apples off trees while FFRobotics uses six arms per side picking with finger-like prongs and conveyors instead of vacuum assist.

A full vacuum system requires more horsepower, taking up more space on a platform.

Abundant Robotics is capable of picking one apple per second and in New Zealand last spring was picking 10 to 20 bins in 24 hours. It is designed to pick 30 or 40 bins, Steere said.

While neither company is ready to talk publicly about prices and costs, both Steere and Kahani aim to harvest fruit at a lower cost than human picking.

"It must be economical to the grower," Kahani said.

They have different business plans.

Steere will retain ownership of his machines and contract out to custom harvest for growers, large and small. Kahani doesn't want to get into contract harvesting and will sell his machines to growers or people who want to provide contract harvesting.

"For us as a small start-up from Israel it would be hard to be a full-service (contract harvest) company," he said.

Steere said he is concentrating on Washington first but sees no reason his service wouldn't eventually expand into Oregon, Idaho and California.

He said steepness of terrain is not a problem and that his machine can go anywhere tractors can. He said his system detects 95% of apples on a tree but the problem is limbs and trellis wires getting in the way of picking.

## 'A big ask'

Karen Lewis, Washington State University Extension tree fruit specialist in Ephrata, has studied mechanical pruning, thinning and harvest for



Abundant Robotics

**A robotic vacuum tube sucks apples from trees and whisks them into a bin on an Abundant Robotics harvester last February in New Zealand.**

several years.

She says while it "appears to have been a difficult year for Abundant Robotics" with mechanical issues, FFRobotics "had a real wakeup call" on row spacing and different tree canopies.

The companies learned a lot and got a lot of industry feedback, she said.

"Avi's machine can expand and retract, the whole machine, which is good. It's just not narrow enough," she said.

Growers remain interested in robotic picking but some are getting "a little impatient," she said.

"It's a big ask to ask a robot to come out here and do everything as planned and not expect some bumps and delays," Lewis said. "I'm still confident that both these companies are fully committed. Goal lines get moved. Neither one of these companies is abandoning ship. They are still in and that doesn't always happen with startups."

Lewis said the industry will benefit from having the options of contracting for harvest service or buying machines.

"If we want to mitigate size and scale conditions in the industry, small and big growers, you will need to have different ways to access the technology," she said. "Some can do well in a purchase agreement and others won't want to. If we don't have multiple business models as options we won't get the adoption we're seeking."

## Hopeful growers

Washington Fruit & Produce Co., Yakima, and Stemilt Growers LLC., Wenatchee, are among the largest tree fruit companies in the state that have participated in robotic harvest testing in their orchards.

They each own and use several Bandit Xpress manual picking platforms and have tested the non-robotic Cyclone in past years.

Nick Plath, farm and field staff manager at Washington Fruit & Produce Co., Yakima, said he does not think the company plans to buy any Cyclones. Last year, he said,

they bruised apples too much.

"Abundant Robotics picked some pinks (Cripps Pink apples) for us at the tail end of harvest but due to the freeze it wasn't what we hoped it would be. I believe they were contracted to pick 1,000 bins and weren't able to hit that number," Plath said. "But we're interested in continuing to work with them."

Washington Fruit & Produce will continue to analyze robotics with the hope of buying a machine when price and efficacy meet company expectations, he said.

West Mathison, president of Stemilt Growers, said it's inspiring to see "smart people from outside our industry" help solve big challenges.

"We saw a number of good demonstrations and are looking forward to seeing how they each evolve and improve," Mathison said.

Jeff LaPorte, director of field services at Chelan Fruit Cooperative in Chelan, said the co-op's members are interested in robotic harvesting but being smaller-scale growers, they will wait to see how it works out for bigger companies before making any decisions.

"There is continual stress on the labor market, but our growers are small and tend to be wait-and-see," LaPorte said.

They probably won't be able to afford to buy machines individually, but some might buy a machine collectively or hire a contract service, he said. Steep slopes are also a concern, he said.

Some 160 miles to the south, Rob Valicoff, president of Valicoff Fruit Co., Wapato, relies on 200 H-2A and 15 domestic workers to harvest his crops. He tested a non-robotic Cyclone in the fall of 2018 but said he's too small an operator to buy one.

He said he would hire a contract robotic apple picking service if it were priced right.

"I hope robotics take hold. We need to take some pressure off manual labor and costs," Valicoff said. "I don't know if a robot will be much cheaper at first, but there should be no injuries and L&I (state Labor & Industries) claims."

# Campaign: 'There's a lot of misinformation and lack of understanding about the river'

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citing their impacts on federally protected salmon and, more recently, orcas.

"There's a lot of misinformation and lack of understanding about the river and all of the different, amazing things it delivers to our region and to the nation," said Kristin Meira, executive director of the association.

Ads are running in magazines throughout Washington state and on Facebook.

Meira said the campaign will run through early January.

The abundance of misinformation is "really unfortu-

## ONLINE

Faces of the Snake River

<https://www.snakeriver-faces.com/>

Washington survey

<https://www.surveymonkey.com/r/VG558Z5>

nate," she said.

"It ends up doing a disservice to the very species we're all interested in helping, whether it's salmon or orca," she said. "The idea you can do one action in one area and have those species recover is unfortunately just not how

it works. But unfortunately, those very simplistic messages are being delivered all around the region, including to our decision makers."

The association relies on information from federal agencies, particularly NOAA Fisheries, on species recovery and to highlight the impact of the dams.

Meira said a colleague put out a call for information about the number of jobs the dams provide over the summer.

Fairfield, Wash., wheat farmer Marci Green is featured in the campaign.

"Just like every farmer in Eastern Washington, most of

our wheat is exported," Green said. "The most fuel-efficient and cost-effective way for us to get our crops to the ports in Portland and Vancouver is by truck and barge on the Snake and Columbia River."

Barges using locks at the Snake River dams move nearly 10% of all U.S. wheat exports to international markets most years.

"Anything we can do as the agricultural industry to get the word out and communicate why the river system is important to our industry and to the economy of the whole state and the Pacific Northwest, we need to do," Green said.

The association also asks residents to provide comments to an online questionnaire offered by consultants hired by the office of Washington Gov. Jay Inslee to gather and summarize the effects of retaining or removing the four dams. Responses will go into a report to Inslee.

Meira said it's too early to tell whether efforts to combat the misinformation are making a dent.

"We're hopeful these will be eye-opening pieces that will help better connect people to parts of the region where they may have heard a little bit, but don't really

understand (or) don't know the connection that all of us have," she said.

Green hopes to get the public to consider science and not respond solely to emotion. She isn't sure how to measure the effectiveness of ag's messaging.

"I have to hope that we're making some kind of an impact," she said. "It's one of those things that always comes up, it's one of those issues that we are constantly up against. I don't see the issue going away any time soon. It's going to take a lot of perseverance and telling our side of the story over and over and over again."