

Nurseries use robots to move pots, perform other tasks

By Kate Campbell

Meet Harvey, a hardworking employee who may be showing up more frequently at California nurseries and greenhouses. A 90-pound robot, Harvey is designed to continuously perform repetitive tasks, such as moving, spacing, collecting and consolidating the millions of containers that nursery operators use to grow and deliver plants to customers.

Harvey, actually HV-100, is the first robot produced by a Massachusetts startup, Harvest Automation.

Jim Hessler, general manager of Altman Plants in Vista, said his nursery company has been testing the robots for the past three years.

“We got our first production model about a year ago. Now, we have eight robots and we’re using them in all areas of our operation—field growing, greenhouses and shade houses,” Hessler said, adding that he expects the units to pay for themselves in about a year.

California’s nursery plant production was valued at approximately \$3.5 billion in 2012, ranking it as the state’s fourth most valuable commodity. Worldwide, the wholesale value of nursery and greenhouse production is about \$50 billion, with the labor cost for moving pots estimated at \$3.2 billion a year.

Harvest Automation CEO John Kawola said labor represents about 40 percent to 50 percent of the cost to produce nursery and greenhouse crops. The “cost per move” for containers using manual labor is about 5 cents.

“We think robots can do it for about 3 cents per move,” Kawola said.

Each \$30,000 nursery and greenhouse robot operates with sensors, lasers and gyroscopics tailored to specific operations. HV-100s are powered by rechargeable lithium-ion batteries with a 4-hour life. They can work continuously, including in the dark, without pausing for rain, cold or heat, Kawola said.

It’s not just that Harvey is a steady worker; the futuristic technology also helps solve other issues facing agriculture



HV-100 robots designed to handle repetitive tasks in nurseries and greenhouses are now being produced and used in California.

today, Kawola said, including meeting demands for higher quality products at less cost, increasing worker productivity and improving sustainability. Mechanizing tedious and physically tiring tasks helps reduce workplace injury and improves job satisfaction for workers who are freed to perform high-skilled jobs.

Kawola said the company expects an innovation surge in agriculture-related technology and plans to produce other robots for managing different tasks in a variety of crops.

At a time when agricultural workers are becoming harder to find, researchers say robots are being developed to replace manual labor in the harvesting of fruits and vegetables. Weeding robots have the potential to replace chemical herbicide application.

Automation technology inherently addresses the issue of a dwindling labor force, agricultural labor experts say.

At Altman Plants, shipping season is always a challenge, Hessler said.

“We need to get all our usual work done around the nursery and still get all the shipping done,” he said. “The

HV-100s have really helped us during what is always a busy season.”

Hessler said his company is using the robots in all areas of the nursery.

“We like working with robots and at this point they’re part of the family. We don’t call all of them Harvey. We have names for them like Batman and Robin and Tom and Jerry,” he said.

As robotics begin to find their place in farming and ranching operations, government agencies are also giving researchers a financial boost. The U.S. Department of Agriculture announced last fall that it was awarding \$4.5 million in grants to spur development and use of robots in agricultural production.

The University of California, Davis, has been awarded \$1.1 million by USDA to develop relatively small, inexpensive robots to help strawberry harvesters work more efficiently. Strawberries are planted on about 40,000 acres in California and the crop is hand harvested.

During a seminar on the market for agricultural robots that he presented last week to agricultural engineering students at UC Davis, Kawola said it’s important to make the right choices about the right product to bring to market.

“We chose to develop robots for nursery and greenhouse operations because it’s a large, global market and the U.S. crop value, at about \$100,000 an acre, is among the highest value of any crop,” he said.

Harvest Automation has defined the market for nursery and greenhouse robots at about 700 U.S. nursery and greenhouse operations, representing about 60 percent of the sector’s production.

Up to 40 percent of the agricultural tasks now performed by manual labor can be performed by robots, Kawola said.

“Industry sectors with significant manual labor needs derive about \$40,000 in revenue per employee vs. \$175,000 per employee for those sectors with effective mechanization,” he said.

In the past, Kawola said, robotics and agriculture have



Harvest Automation CEO John Kawola, left, joined University of California agricultural engineering professor Stavros Vougioukas in a university lab where robots for harvesting field crops are being developed.

not been of particular interest to venture capitalists, who have focused more on high tech and medical device startups. Things are changing, he said, noting opportunities to develop robots to help with inventory control, integrated plant maintenance, order fulfillment, production analysis and planning are showing the potential for good returns to venture capital investors.

Hessler said he sees growing interest in robots among nursery and greenhouse owners. His company held an open house recently that drew about 25 nursery and greenhouse operators in the San Diego County area interested in seeing a demonstration of the technology.

“We like the robots,” Hessler said. “But really, it’s only one part of our system. We recognize the need to understand how all the parts work, so these technological systems can be integrated and adapted to work within unique farming and ranching operations. That’s the next task.”

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