

Robots to revolutionize US farms, ease labor woes (Update)

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In this May 23, 2013, photo, field operations manager Matthew Rossow tests the lettuce bot in Salinas, Calif. In the Salinas Valley, the lettuce capital of the world, entrepreneurs with the Silicon Valley company Blue River Technology are testing the Lettuce Bot, a boxy robotic machine that can thin fields of lettuce, a job that now requires detailed hand work by 20 farm workers. (AP Photo/Marcio Jose Sanchez)

Researchers are now designing robots for the last frontier of agricultural mechanization—fruits and vegetables destined for the U.S. fresh market, which have resisted mechanization because they're sensitive to bruising.

The robots are designed to handle these delicate crops by integrating advanced sensors, powerful computing, electronics, computer vision, robotic hardware and algorithms, as well as networking and high precision GPS localization technologies.

On a windy morning in California's Salinas Valley, a tractor pulled a wheeled, metal contraption over rows of budding lettuce plants. Engineers from Silicon Valley tinkered with the software to ensure the machine was eliminating the right leafy buds.

The Lettuce Bot can "thin" a field of lettuce in the time it takes about 20 workers to do the job by hand.

Most agricultural robots won't be commercially available for at least a few years. But in this region known as America's Salad Bowl, where for a century fruits and vegetables have been planted and harvested by migrant workers, the machines could prove revolutionary.

"There aren't enough workers to take the available jobs, so the robots can come and alleviate some of that problem," said Ron Yokota, a farming operations manager at Tanimura & Antle, the fresh produce company that owns the field where the Lettuce Bot was being tested.



In this May 23, 2013, photo, the lettuce bot is dragged by a tractor during tests in Salinas, Calif. In the Salinas Valley, the lettuce capital of the world, entrepreneurs with the Silicon Valley company Blue River Technology are testing the Lettuce Bot, a boxy robotic machine that can thin fields of lettuce, a job that now requires detailed hand work by 20 farm workers. (AP Photo/Marcio Jose Sanchez)

Research into fresh produce mechanization was dormant for years because of an over-abundance of workers and pressures from farmworker labor unions.

In recent years, as the labor supply has tightened and competition from abroad has increased, growers have sought out machines to reduce labor costs and supplement the nation's unstable agricultural workforce. The federal government, venture capital companies and commodity boards have stepped up with funding.

"We need to increase our efficiency, but nobody wants to work in the fields," said Stavros G. Vougioukas, professor of biological and agricultural engineering at the University of California, Davis.

But farmworker advocates say mechanization would lead to workers losing jobs, growers using more pesticides and the food supply becoming less safe.

Fresh fruit harvesting remains the biggest challenge. In addition to mistakes in deciphering color and feel, machines have a hard time distinguishing produce from leaves and branches. And most importantly, matching the dexterity and speed of farmworkers has proved elusive.

"The hand-eye coordination workers have is really amazing, and they can pick incredibly fast. To replicate that in a machine, at the speed humans do and in an economical manner, we're still pretty far away," said Daniel L. Schmoldt at the U.S. Agriculture Department's National Institute of Food and Agriculture.

In California, engineers with the Spanish company Agrobot are working with local growers to test a strawberry harvester.

The machine is equipped with 24 arms whose movement is directed through an optical sensor. It allows the robot to make a choice based on fruit color, quality and size. The berries are plucked and placed on a conveyor belt, where the fruit is packed by a worker.

Experts say it will take at least 10 years for

harvesters to be available commercially for most fresh-market fruit—not a moment too soon for farmers worried about the availability of workers, said Lupe Sandoval, managing director of the California Farm Labor Contractor Association.

"If you can put a man on the moon," Sandoval said, "you can figure out how to pick fruit with a machine."

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