

Robot Citrus Harvester Tested

Successful tests of a robot citrus picker in a central Florida grove may lead to commercial development of the machine by an Italian manufacturer, according to a state agricultural engineer.

"When we first began testing our robot picking arm in the laboratory about two years ago, the research attracted a lot of attention. As a result, an Italian company gave us a \$204,000 grant for additional research to improve the robot and now they want to develop it commercially," explained Dr. Roy C. Harrell, assistant professor with the Institute of Food and Agricultural Sciences (IFAS) at the University of Florida.

"We never thought our Florida research project would end up in Italy," he added. "With our limited resources, I think we've done about everything we can in developing the robot picker here in Florida. The Italians are committed to making it a commercial success."

After more field tests in mid-January (1988) at Simpson's Groves near Mt. Dora, he explained, the experimental robot harvester will be shipped to Agricultural Industrial Development S.p.A. in Catania (Sicily), the Italian equipment manufacturer that funded much of the IFAS research in Gainesville.

Dr. Salvatore Torrisi, managing director of the Italian company, said his firm is working with IFAS researchers because of their expertise in robotics.

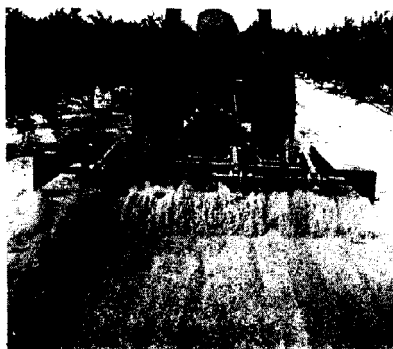
"Robotic harvesting is a difficult but promising new field. Years of research and development will be necessary before a commercial machine becomes a reality," Torrisi said.

Continued on Page 53



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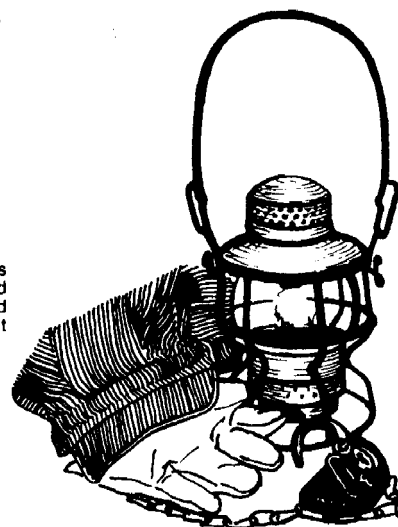
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Robot

Continued from Page 51

The robot consists of a single picking arm mounted on a mobile control vehicle. He said a commercial version of the machine will have several "intelligent" picking arms that can "see" or identify individual fruit on the tree and then zoom in to pick it.

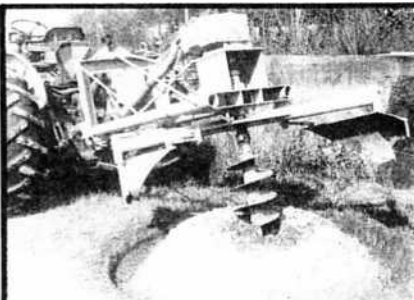
The robot has a color television camera on the end of the picking arm to find orange-colored or ripe fruit on the tree. A sonar sensing unit—similar to that used in automatic focus cameras—provides the computer with information on the distance between the target fruit and the tip of the picking arm.

Signals from the camera are fed into a computer which analyzes the information to determine if there is ripe fruit in view. If there is, the computer points the robot to the fruit and extends the picking arm out until contact is made with the fruit. A lip then rotates behind the fruit and severs the stem, allowing the fruit to drop into a collection bin.

All of these functions, Harrell explained, occur within seconds, allowing the machine to pick fruit rapidly.

"Under ideal operating conditions, the robot picking arm would be able to pick and deposit one fruit every two seconds. With 12 arms, the rate of harvesting would be six fruit per second which adds up to a fast stream of fruit going into the collection bin," Harrell said.

On-board computers would signal problems to the operator. Design of the system would have a high degree of modularity to simplify repairs and improve reliability.



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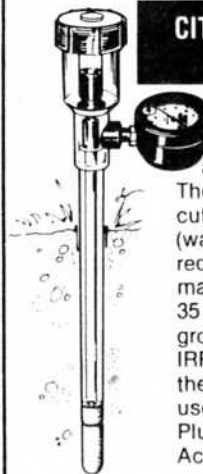
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