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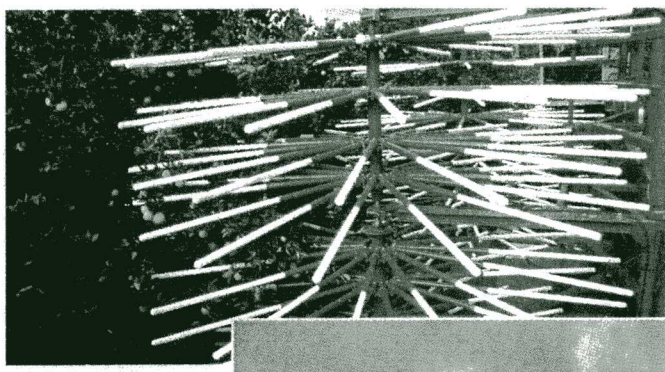
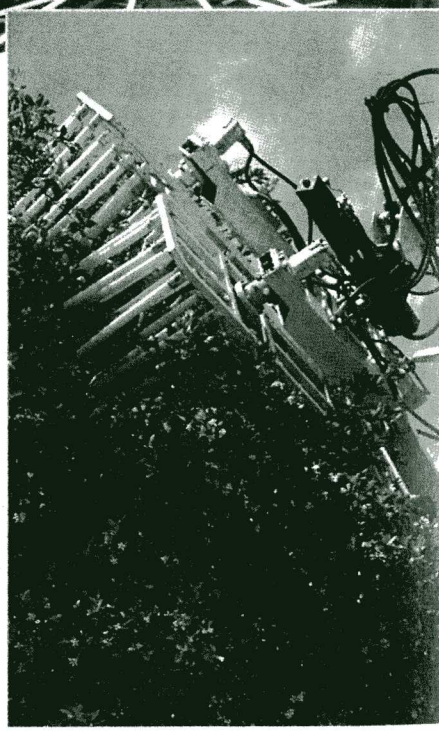
# Scientists still trying to make mechanical harvesting easier

By Monica M. Lewandowski

Scientists are continuing to work on ways to make harvesting citrus fruit an easier task. A team of researchers from the University of Florida's Institute of Food and Agricultural Sciences, Citrus Research and Education Center, was recently contracted by the Florida Department of Citrus to conduct abscission studies that will facilitate the development of mechanical harvesting technologies. These studies are critical to the industry because rising harvesting costs and labor shortages will pressure growers to turn to more cost-effective harvesting methods, according to Galen Brown, Ph.D., the administrator of the FDOC's harvesting program.





*Abscission agents can significantly increase the effectiveness of mechanical harvesting machines, which are currently in use or under development.* ***Top right,*** *the USDA-ARS-built Double-Drum Canopy Shaker uses twelve-foot-long nylon rods that rotate and shake foliage to harvest citrus.* ***Bottom right,*** *the Mongoose Harvester developed by J&G Harvesting/Mongoose Inc., in Arcadia, uses a hydraulic arm to penetrate the foliage and shake fruit into a catch bin.*

## Abscission

It's a bit of a puzzle why most oranges do not fall from the tree like other fruits, such as apples and cherries. When a fruit falls to the ground, there is a lot more involved than just gravity. A complex set of metabolic changes must also occur in the plant. This process, called abscission, involves cellular changes that occur at the breaking point, an abscission layer, located near the fruit's point of attachment to the tree. In the cells of the abscission layer, enzymes start to digest and loosen the cell walls, thus weakening the attachment. The weight of the fruit, sometimes with the help of the wind, causes the abscission layer to separate, and the fruit falls off the tree.

## "Loosening" oranges

The process of abscission seems slow to occur, if at all, for most oranges. The CREC team of Jacqueline Burns, Walter Kender, Uli Hartmond, Dennis Lewandowski, Masoud Salyani and Jodie Whitney are trying to figure out how to "turn on" the abscission process in citrus trees.