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Engineering crops for the 21st century

(September 2007)

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Can farmers get more bountiful harvests from the land without threatening the environment or taking away land from other needs?

A pair of UC Davis agricultural researchers argue that biotechnology -- genetically engineered crops -- is key to the future of food.

On the panel are Pam Ronald, a professor of plant pathology, and Eduardo Blumwald, who holds the Will W. Lester chair in pomology in the Department of Plant Sciences at UC Davis and leads the plant genome program at UC Davis.

Much of Ronald's work has focused on rice, the staple diet of half the world's population – more than 3 billion people. Blumwald's laboratory studies a wide range of plants, including rice, wheat, cotton and citrus fruit, as well as model plants such as tobacco, *Arabidopsis* and tomatoes.

Related news

- "New flood-tolerant rice offers relief for world's poorest farmers," UC Davis News Service, 8.9.06
- "Rice and wheat genome researchers receive nearly $10 million," News Service, 12.11.03
- "Rice genome sequencing provides another tool for feeding burgeoning global population, researcher says," News Service, 4.4.02
- "Genetically engineered tomato plant grows in salty water," UC Davis News Service, 7.25.01
- "Promise or peril?," *Dateline*, 4.28.00
- "Novel fund to repay developing nations for valuable genes," News Service, 5.22.97

Web sites

- Eduardo Blumwald's faculty Web page
- Department of Pomology
- Pamela Ronald's faculty Web page
- Pamela Ronald lab
- Department of Plant Pathology

Profiles

Pam Ronald, professor of plant pathology

Pamela Ronald is a professor of plant pathology and an expert on the rice genome – the complete set of genes that make up rice, which is the primary food for more than 3 billion people around the world.

She and her research colleagues have studied disease-resistance genes in rice and are now conducting research on rice as a model grass crop for developing biofuels.

By studying the structural and functional makeup of rice, they hope to better understand other economically important plants such as switchgrass, which has been identified as the most promising biofuel grass crop.

Ronald's lab is particularly interested in the cell walls of rice and an experimental plant called *Arabidopsis*. The researchers are looking for microbes that are especially adept at degrading those cell walls, which is a key step in the biofuels production process.

In addition to her research, Ronald teaches courses on the plants of the Sierra Nevada mountains, plant communities of California and the basic concepts of genetics.

Contact: Pam Ronald, Plant Pathology, (530) 752-1654, pcronald@ucdavis.edu

Eduardo Blumwald, professor of plant sciences

Eduardo Blumwald led the research team that discovered the plant gene responsible for conveying salt tolerance and developed the first truly salt-tolerant tomato plant.

His acclaimed research career has focused on how plants respond and adapt to harsh environmental conditions such as drought, cold, and salty soils or water.

During the past decade, he has concentrated on the impact of salinity on crops. Salty irrigation water damages most plants by upsetting their ability to take in water through their root cells. If salt concentrations are very high, flow of water into the plant is actually reversed and the plant dehydrates and dies.

Blumwald is continuing this research in hopes of developing other salt-tolerant crops that will be useful for agricultural production in areas of the world that have salty irrigation water and salt-damaged soils. In 2003, in recognition of these research achievements, he was awarded the prestigious Alexander von Humboldt Award.

He now is also investigating how genetic engineering can be used to enhance the way enzymes break down a plant's cell walls, as part of a multi-university research team studying development of biofuels.

Contact: Eduardo Blumwald, Plant Sciences, (530) 752-4640, eblumwald@ucdavis.edu