

Genomics Research Focuses On Rice Variety Improvement

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Crop varieties can be improved through the study of genomics without creating genetically transformed varieties. That is the mission of a multi-state research project led by the University of Arkansas System's Division of Agriculture.

RiceCAP, or Rice Coordinated Agricultural Project, is funded by a \$5 million grant from the U.S. Department of Agriculture. Jim Correll, a Division of Agriculture professor of plant pathology, coordinates projects by 25 principal investigators in 12 states, the International Rice Research Institute in The Philippines and the International Center for Tropical Agriculture in Columbia.

"Genomics is the study of the coded information about an organism stored in its DNA," Correll says. "The RiceCAP project is conducting genomics research to develop new tools for conventional plant breeders."

RiceCAP also has an educational and outreach mission, and has produced a five-minute video podcast that provides an overview of the project. The podcast is on the RiceCAP Web site at http://www.ricecap.uark.edu/outreach_downloads.htm.

Plant breeding, as practiced since the 19th century, is the process of crossbreeding plants to develop an improved variety. The process can take seven to 10 years from the first cross of

parent plants to the release of an improved variety. The U of A Division of Agriculture has one of the nation's leading rice breeding programs based at the Rice Research and Extension Center near Stuttgart.

Breeders now use genetic markers identified through genomics research to speed up the process. Markers reveal the presence of genetic material linked to a particular genetic trait, which allows breeders to more efficiently screen plants for crossbreeding.

"Markers are genomic tools, but that doesn't mean we are developing genetically engineered rice varieties," Correll says. That point is important, because many export customers for Arkansas rice will not accept genetically engineered rice, he says.

RiceCAP is focused on two genetic traits that have been difficult for breeders to improve – resistance of rice plants to the fungal disease sheath blight and milling yield, or the portion of rice kernels that remain whole after milling. Both are difficult problems because they are controlled by environmental factors as well as genetics and because they involve multiple genes, Correll says.

As they identify new markers for use by plant breeders, RiceCAP scientists are also increasing the understanding of the genomics of rice in general and sheath blight resistance and milling yield in particular, Correll says. Δ