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UCD rice research may help feed world

Relevance: A new variety of rice, designed by researchers at UC Davis, UC Riverside and the international Rice Research Institute in the Philippines to be flood-tolerant, has passed field tests and is expected to be available to farmers in Bangladesh and India soon. Pamela Ronald, a UC Davis rice geneticist involved with the project, says that "the impact of these new varieties is evident for farm families as well as at a national production level."

New flood-tolerant rice varieties, developed by an international team of researchers — including scientists at **UC Davis**, UC Riverside and the International Rice Research Institute in the Philippines — have passed field tests and are expected to soon be available to farmers in Bangladesh and India.

Flooding in those countries annually reduces rice yield by up to 4 million tons — enough rice to feed 30 million people.

The new flood-tolerant rice plants were developed by identifying a single gene — called Sub1A — that is responsible for flood tolerance in rice. Identification of the gene enabled the institute's plant breeders to use "precision breeding" to create the new rice varieties. The new plants are effectively identical to popular, high-yielding rice varieties, except they recover after severe flooding to produce abundant yields of high-quality grain.

The researchers anticipate that the flood-tolerant rice plants will be available to farmers within the next two years. Because the plants are the product of precision breeding, rather than genetic modification, they are not subject to the same regulatory testing that can delay release of genetically modified crops for several years.

"The impact of these new varieties is evident for farm families as well as at a national production level," said **UCD rice geneticist Pamela Ronald**, following an early November tour with her research colleagues of the flood-tolerant rice field trials in Bangladesh.

"To be part of this project as it has moved from my lab in California to rice fields in Asia has been inspiring, and the project underscores the power of science to improve people's lives," said Ronald, who led the effort to isolate the Sub1A gene. Her laboratory also showed that the gene is switched on when rice plants are submerged in water.

Collaborating with Ronald on the 13-year project were David Mackill, senior rice breeder at the International Rice Research Institute; Julia Bailey-Serres, a geneticist at UC Riverside; Kenong Xu, a postdoctoral researcher in Ronald's laboratory; and researchers at the Bangladesh Rice Research Institute and the Central Rice Research Institute of India.

Once Sub1A varieties are officially released within the next two years, the key will be dissemination to smallholder farmers in flood-prone areas. The International Rice Research Institute is leading this initiative through a grant from the Bill & Melinda Gates Foundation and Japan's Ministry of Foreign Affairs.

The research that led to the isolation of the Sub1A gene was funded by U.S. Department of Agriculture grants to Ronald, Mackill and Bailey-Serres. The breeding work was funded by the German Federal Ministry for Economic Cooperation and Development and the USDA.

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