



Rainy-Day Rice

Asian farmers will get a disaster-proof version of an essential crop

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By Melinda Dodd 2008



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Wet Work

Farmers plant rice seedlings in Thailand

After years of testing in muddy fields, genetically enhanced flood-resistant rice is about to hit agricultural markets in tropical Asia, following Indonesia, with India and Bangladesh up for approval later this year. Cambodia, Laos, Nepal, Thailand, the Philippines and Vietnam are expected to follow suit.

It's a major step forward for weatherproof crops, increasingly touted as essential to the long-term future of the world's food supply. Advances in biotechnology have improved this ancient grain, which accounts for up

to 70 percent of daily calories for people living in Asian countries. Imperiled by constant floods, rising sea levels and natural disasters, submerged rice survives just four days when deprived of light and oxygen. These new varieties last eight to 18 days.

The advance is urgently needed. "At least [58,000 square miles] of land in South and Southeast Asia are vulnerable to flooding, and floods will only increase," says Dave Mackill, a senior scientist with Manila's International Rice Research Institute (IRRI). In 2007, Cyclone Sidr destroyed 1.25 million tons of rice in Bangladesh; last year, multiple typhoons wiped out rice paddies in Vietnam.

To find a suitable template for the flood-resistant rice, Mackill turned to India's water-tolerant FR13A rice. Farmers stopped using the strain because of its poor yield, but its resilience intrigued him. To pinpoint the part of the rice genome carrying the trait, Mackill crossbred a hardy derivative of FR13A with another rice strain and derived 4,000 other rice plants from that cross. Geneticist Pamela Ronald of the University of California at Davis then searched the plants' DNA and unearthed Sub1A, a gene that triggers the grain to conserve energy when it is underwater. To create the final rice strain, Mackill cross-pollinated a Sub1A-containing plant with a high-yielding, better-tasting Indian rice variety.

In the coming years, IRRI researchers will supplement Sub1-class rice with a gene that resists flooding during the sensitive germination stage (something the Sub1 genes can't do). Also on the agenda: drought- and salt-resistant rice, now testing in nearly every Southeast Asian tropical country and China. Asia's inland and coastal areas often have salt-filled soil, which stunts rice growth.

The IRRI has already made its rice seed available to other research institutions and has been distributing it to Asian farmers for free. When sold by other seed growers on the commercial markets, the price should rival that of common varieties. "We anticipate adoption wherever submergence is a regular problem," Mackill says. If the rice is a success, climate-resistant crops may spread across the developing world, as well as the developed.

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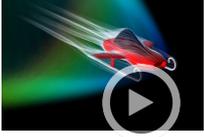
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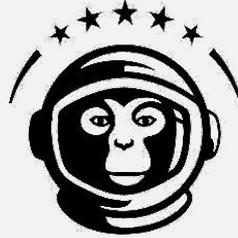
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