

**Modified rice called nice for environment**  
**Bernadette Tansey, Chronicle Staff Writer**

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A Davis biotechnology company is collaborating with China's top rice-growing region on a project designed to reduce the huge contribution of agriculture to global warming.

Arcadia Biosciences has agreed to adapt its genetically engineered strain of rice to grow in China, where it may lower the need for nitrogen fertilizer because it absorbs the element nitrogen more efficiently than naturally occurring varieties.

Nitrogen-based fertilizer contributes to climate change because soil bacteria convert it into nitrous oxide, a greenhouse gas that has almost 300 times the power to induce global warming as carbon dioxide, Arcadia chief executive Eric Rey said.

The company's collaboration with the Ningxia Hui Autonomous Region of China may also help establish a new source of revenue for farmers if the partners can demonstrate that the rice strain reduces greenhouse gas emissions.

If the benefit is recognized by governments that are signatories to the Kyoto Protocol -- an international agreement among industrialized nations to reduce greenhouse gas emissions -- growers who use less fertilizer would be able to sell "carbon credits" on world trading markets.

Buyers of the credits are companies that need to offset their own excess gas emissions to avoid government penalties. A coal-fired power plant in England, for example, could someday buy credits from Chinese rice farmers, Rey said.

Emissions from agriculture contribute about 15 percent of the world's greenhouse gases, according to a report published by the World Resources Institute.

Nitrous oxide represents about half of those agricultural releases. The other half are carbon-based gases including methane and carbon dioxide.

Rice production consumes about 20 percent of global nitrogen fertilizer use and China is the world's largest user of these fertilizers, Arcadia said.

Rey estimated that China could generate \$330 million of carbon credits per year if it converted to rice crops requiring less fertilizer.

The company declined to disclose revenue estimates for the use in China of its Nitrogen Use Efficiency rice, which has not been commercialized in any country. Rey said it could take six years or more to reach the marketing stage, pending regulatory approvals.

Such projects often face scientific and financial hurdles, said Bill Freese of the Center for Food Safety, a watchdog group that opposes the rapid adoption of genetically modified crops.

No company has widely commercialized a genetically engineered crop variety that increases nitrogen efficiency, Freese said. About 81 percent of agricultural varieties produced through gene splicing are sold based on their ability to tolerate herbicides, he said.

Such engineered traits can produce unintended health risks or environmental consequences, Freese said.

If China allows genetically modified strains in its rice supply, it could face the rejection of its rice exports in countries such as Japan because of consumer resistance, he said.

The Center for Food Safety advocates thorough evaluations by government regulatory agencies of the impact of genetically engineered crops on health and global ecology.

The organization supported a lawsuit against Monsanto's modified form of alfalfa in federal court in San Francisco, where a judge ruled Thursday that planting must halt until the U.S. Department of Agriculture completes an environmental impact review.

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