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Can Gene-Altered Rice Rescue the Farm Belt?

By **ALEXEI BARRIONUEVO**

WATSON, Mo. - Like an expectant father, Jason Garst stood in calf-deep water and studied the three-foot-high rice plants growing in a flooded field here.

It was a curious sight in northwest Missouri, where the growing season is considered to be too short for rice. Mr. Garst, a sixth-generation farmer, is hoping at least one of the 12 varieties on his test plot will sprout this fall. If one does, he will start growing rice plants that have been genetically engineered to produce proteins found in human milk, saliva and tears. Once converted into a powder form, those proteins would be used in granola bars and drinks to help infants in developing countries avoid death from diarrhea.

"I know in my heart that this will be better than anything else we are doing," said Mr. Garst, 35, who also farms soybeans and potatoes.

The rice project is backed by a private company called Ventria Bioscience but also has the support of the state and a local university, which are hoping to reverse the long decline in the area's farm economy. But the project has run into opposition from environmental groups and even the beer giant Anheuser-Busch amid fears about the health effects of genetically engineered crops, making Mr. Garst's little rice paddy a piece of a larger battlefield.

The economic and academic ambitions of the Missouri project make it unique, but the arguments echo those heard in similar disputes in Europe and, increasingly, in the United States. Critics of Ventria's plans are concerned that the gene-altered rice could contaminate regular rice crops and pose a health risk to consumers, scaring off buyers. Ventria and its academic partner in the project, Northwest Missouri State University, say they can control the potential for contamination. And they say the risks are minimal when balanced against the potential for the special rice to help cut the costs of drugs and save lives.

The debate has a certain urgency in the Farm Belt because it highlights the challenge facing much of the region's economy: finding new products that will reduce farmers' reliance on commodity crops. As equipment has become more efficient and foreign competition has stiffened, farms have consolidated and profit margins have shrunk, forcing farmers to plant ever more acres to squeeze out a living. The genetic engineering work that Ventria and other companies are doing can add value to products

like rice, offering farmers a more stable income that does not rely on steep government subsidies.

"There is no question that this represents a chance to transform the economy of the region," said Mark Drabenstott, director of the Center for the Study of Rural America at the Federal Reserve Bank of Kansas City. "For regions like northwest Missouri, there is not a long list of economic alternatives."

Despite opposition, Ventria's plans to grow genetically engineered rice - eventually to commercial scale - are going forward. The company began growing rice in North Carolina this summer after getting approval from the Agriculture Department. Once Ventria decides where it will grow rice in Missouri, it will have to apply for a permit from the department, a process expected to take two to three months.

Dean L. Hubbard, president of Northwest Missouri State, persuaded Ventria last year to move its operations from Sacramento to new buildings planned for the Northwest campus in Maryville, about 90 miles north of Kansas City.

Seeking a way to reverse the area's slide in population, Dr. Hubbard teamed up with Melvin D. Booth, a Northwest Missouri alumnus who previously ran two large biotechnology companies. The two approached Ventria about making it part of the university's plan to form joint ventures with young biopharmaceutical companies.

Ventria was already considering similar offers from universities in Georgia, Louisiana and North Carolina, but Scott E. Deeter, Ventria's chief executive, agreed to visit the university last August. Mr. Deeter said that on the ride from the Kansas City airport, he was intrigued when Dr. Hubbard described the university's program to heat and cool the campus using bio-fuel derived from paper and wood chips.

At the meeting, Mr. Garst presented him with a research paper he had prepared on what it would take to grow rice in northern Missouri. "It was very impressive," said Ning Huang, Ventria's vice president for research and development, who was there.

Finally it came down to whether Ventria scientists would agree to move to Maryville, population 10,000, from California. Next year 13 will move, including Dr. Huang.

Under the agreement reached last November, Ventria will pay farmers more than double what they make on their most profitable crop, and pay Northwest Missouri \$500 an acre for crops grown on university land. The university is spending about \$10 million to help build a production and teaching complex, and the state is kicking in another \$10 million.

Atchison County, Mo., where Mr. Garst's farmland is, has lost more than 1,000 people, or 14 percent of its population, since 1990. The town of Watson, once a thriving rural hub with three grocery stores and an opera house, has just over 100 people and no place to buy a soda. Most buildings have been boarded up.

"To reverse the population slide, you have to make it profitable to farm," Dr. Hubbard said. "My dream is that 10 years from now, this rural economy has been transformed, that it is vibrant again and people are renovating their downtowns."

The fate of Mr. Garst's experimental rice plot has loomed larger since Ventria encountered resistance to planting its rice in the southern part of the state, where rice has traditionally been grown.

When the company was considering Missouri as a place to grow its rice, it talked to Anheuser-Busch, which uses Missouri rice in its beer. Mr. Deeter said Anheuser-Busch initially did not raise any opposition to the project. But when Ventria tried to plant rice in southern Missouri this spring, the beer maker threatened not to buy any rice grown in the state. The company feared a consumer backlash if people thought gene-altered rice could end up in their bottles of Bud.

For Missouri's farm economy, the risk of growing pharmaceutical rice is high. More than half of Missouri's rice is sent abroad, to the European Union and Caribbean countries that are especially sensitive about genetically modified products.

"We are still having to make statements to our customers that the rice we export is not genetically modified," said Carl Brothers, the vice president for marketing at Riceland Foods, which markets more than half of Missouri's rice. "We are concerned longer term that if Ventria and others get involved that will get harder to say."

The two companies reached a truce in April: Ventria agreed not to grow genetically modified rice within 120 miles of commercial rice crops. "We can continue to purchase rice grown and processed in Missouri as long as Ventria's growing areas remain sufficiently far from commercial rice production," said Francine Katz, a spokeswoman for Anheuser-Busch.

That deal suddenly made four test plots in the northern part of the state, including Mr. Garst's, all the more important, since Ventria's agreement with Northwest Missouri State calls for the company to grow 70 percent of its rice in the state.

To prove to its customers that it would have a diverse supply base, Ventria must grow in at least one other location in North America, and is also searching for a growing area in the Southern Hemisphere to be able to produce year-round. In June, Ventria planted 70 acres of genetically modified rice in North Carolina. There, environmentalists continue to attack the company, saying the rice poses a threat to other crops and the human food chain.

Ventria's rice fields are just a few miles from a rice-seed-screening research center and are also close to two wildlife refuges with large populations of migrant birds and swans that environmentalists contend could transport Ventria's rice seeds into wild areas. Storms and floods, environmentalists say, could also lead to rice contamination.

"Just washing away in a big rain- storm is enough," said Margaret Mellon, director of the food and environment program at the Union of Concerned Scientists in Washington. Scientists at Ventria, which is yet to make any money from its bio-rice, say rice is among the safest crops for genetic engineering. Rice stalks pollinate themselves, so the altered genes, which are synthetic versions of human genes, cannot be easily transferred to plants in other fields. And Ventria requires farmers to employ a "closed system," using dedicated equipment and a production process where the seed is ground into a powder before it leaves the farm.

But critics say that there is no way to guarantee that the farmers will follow all the government regulations and Ventria's rules, and that they are worried about the risk of contamination because it would be hard to detect. "We simply wouldn't know if a contamination event took place," said Craig Culp, a spokesman for the Center for Food Safety, in Washington.

Dr. Hubbard acknowledged that there are risks, but he said he believed that they were minimal.

Federal regulations have been tested before, most notably in 2002, when drug-producing corn made by ProdiGene began sprouting in soybean fields near its Iowa and Nebraska sites. The Agriculture Department seized 500,000 bushels of soybeans and assessed the company nearly \$3 million in fines and disposal costs. Earlier, in 2000, a gene-altered variety of corn that was approved for animal feed but not for human consumption was found in taco shells and other grocery items, prompting recalls.

Mr. Garst is a modern breed of farmer with a master's degree and a healthy interest in science. And he himself has done whatever he can to wring more from his commodity crops, even trying out a \$300,000 tractor that steers automatically using a global-positioning satellite to till straighter rows.

"Obviously, you will not see pharmaceutical crops from here to Kansas City," he said of Ventria's project. "But there will be pockets in this area where you will see development. If you keep two more farmers in this area it is huge - there are four of us now."