Gene's past could improve the future of rice

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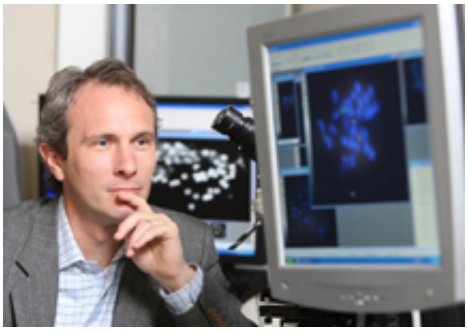

Purdue researcher Scott Jackson looks at an image of the rice genome. He traced the evolutionary history of rice in an effort to improve future varieties. (Purdue Agricultural Communications photo/Tom Campbell)

(PhysOrg.com) -- In an effort to improve rice varieties, a Purdue University researcher was part of a team that traced the evolutionary history of domesticated rice by using a process that focuses on one gene.

Scott A. Jackson, a professor of agronomy, said studying the gene that decides how many shoots will form on a rice plant allows researchers to better understand how the gene evolved over time through natural selection and human interaction. Understanding the variations could allow scientists to place genes from wild rice species into domesticated rice to create varieties with more branching, increased plant size or other favorable characteristics.

By comparing the domesticated plant to other wild rice species, they

discovered a lot of genetic variation in rice over millions of years.

"This is a way to find these valuable genes in non-domesticated rice and bring them into cultivated rice," Jackson said. "We need to grow more food to feed the human population, and it needs to be done on less land and with less water. This could be the way to do that."

Jackson worked with Rod A. Wing of the University of Arizona and Mingsheng Chen of the Chinese Academy of Sciences in Beijing, and they were the corresponding authors for the study. Their findings are published in the Proceedings of the National Academy of Sciences online version this week.

The research team developed a tool to compare genes in different species of Oryza, of which domesticated rice is a species. Jackson said the comparisons showed how rice has changed from as far back as 14 million years ago. As rice adapted to climate changes and other natural circumstances, its genetic structure changed, keeping some genes and losing others.

About 10,000 years ago, humans began making their own genetic modifications, albeit unknowingly, by choosing plants that had favorable traits. As they stopped growing plants with unfavorable characteristics, genes responsible for those traits disappeared.

"Humans knew that if the seeds stayed on the plant, or it had a higher yield, they could save some of the seeds to plant next year," Jackson said. "That was unintentional breeding."

Those favorable genes are still around in wild rice species because they were valuable for plants in other climates or situations, he said.

Jackson was involved with earlier research that looked at cell structure in

rice and also is studying the gene responsible for flowering in rice plants. Once those genes are better understood, scientists can match the best genes for particular climates to give growers better yields.

One example can be found in a variety of rice that has genes making it drought-resistant. Scientists could breed those genes into domesticated rice in Africa where water shortages can devastate crops.

Provided by Purdue University