

Field Trials of New Nitrogen Use Efficient Rice Show Increased Productivity, Leading to Increased Food Security and Reduced Fertilizer Dependence

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DAVIS, Calif.; Nairobi, KENYA; Palmira, COLOMBIA, (September 10, 2013) – Arcadia Biosciences, Inc., an agricultural technology company focused on developing technologies and products that benefit the environment and human health, the African Agricultural Technology Foundation (AATF), and the International Center for Tropical Agriculture (CIAT) today announced the completion of two years of field trials of Nitrogen Use Efficient (NUE) rice at CIAT’s research fields in Colombia. In both years, African NERICA rice with Arcadia’s NUE technology produced significant yield increases relative to conventional NERICA rice.

At 50 percent of normally applied nitrogen fertilizer, NUE rice lines out-yielded the conventional NERICA control variety by 22 percent in the first year trial, and by 30 percent in the second year trial.

“These results for NUE NERICA rice, combined with earlier results in Japonica rice and our recently announced commercial milestone for NUE Indica rice, clearly demonstrate the efficacy of NUE technology in all major types of rice,” said Eric Rey, president and CEO of Arcadia. “There is clear potential for NUE technology to make a major contribution to global food security while also reducing the carbon footprint of rice farming.”

As the world’s second-largest crop, rice plays a critical role in food security for more than half of the world’s population. In Africa, rice is one of the most cultivated and important food crops. According to the Food and Agriculture Organization of the United Nations, farmers in Sub-Saharan Africa (SSA) produce about 20 million metric tons of rice annually, yet the continent imports 9 million metric tons, which is valued at \$4 billion. Most of the rice in SSA is produced and consumed by small-scale farmers who are often constrained by the cost and availability of new technologies that could help them increase food output.

Agriculture is the world’s second-largest industrial source of greenhouse gas emissions. Nitrogen fertilizer, applied to increase crop yields, is one of the largest contributing factors to these emissions. With conventional growing practices, crop plants absorb less than 50 percent of nitrogen fertilizer applied to fields. Much of the remainder becomes a water contaminant or is volatilized as nitrous oxide, a greenhouse gas 300 times more potent than carbon dioxide. In some countries, rice is among the most nitrogen-intensive crops. Globally, rice production accounts for nearly 16 percent of total fertilizer use. Arcadia’s NUE technology can significantly reduce the need for nitrogen fertilizer and simultaneously improve food security, enhance farm economics and minimize greenhouse gas emissions from rice farming.

In 2008, Arcadia donated key agricultural productivity technologies to the AATF for use in African NERICA type rice. Under the agreement, AATF received a cost-free license to Arcadia’s NUE, Water Efficiency and Salt Tolerance technologies. As part of Arcadia’s stated commitment to agricultural and environmental improvement in the developing world, the company received no monetary compensation for the licenses granted to AATF.

The NUE rice field trials at CIAT resulted from nearly five years of collaboration between Arcadia and AATF, funded by the United States Agency for International Development (USAID) under Feed the Future, the U.S. Government’s global hunger and food security initiative. The CIAT field trials served as initial validation and screening of NUE rice lines prior to field trials in Africa, which are now underway. These trials are part of the Nitrogen Use Efficient, Water Use Efficient and Salt-Tolerant (NEWEST) rice project to improve the productivity and sustainability of rice production across Sub-Saharan Africa.

According to Dr. Prince Addae, the NEWEST Rice Project Manager at AATF, the enhanced performance of the NUE lines at CIAT is expected to be duplicated in Africa for use by smallholder farmers.

“The improved rice varieties will enable farmers to improve their rice production and food security for their families and also get more proceeds from the sale of increased produce,” Dr. Addae said. “The expected benefits from the NEWEST

rice project include a reduction of the continent's dependence on imported mineral nitrogen fertilizers to boost rice yields, reclamation of croplands abandoned because of soil nutrient depletion and salt accumulation and farmers access to improved rice varieties better suited to nitrogen-deficient, water-deficient and saline environments," he added.

About Arcadia Biosciences, Inc.

Based in Davis, Calif., Arcadia Biosciences is an agricultural technology company focused on the development of agricultural products that improve the environment and enhance human health. Arcadia's agronomic traits, including NUE, Water Efficiency, Salt Tolerance, Heat Tolerance, and Herbicide Tolerance, are all aimed at making agricultural production more economically efficient and environmentally sound. Arcadia's health technologies and products create healthier nutritional ingredients and foods with lower cost of production. For more information, visit www.arcadiabio.com.

About The African Agricultural Technology Foundation (AATF)

AATF is an African-led charity designed to facilitate and promote public/private partnerships for the access and delivery of appropriate proprietary technologies with potential to increase the productivity of resource-poor smallholder farmers in Sub-Saharan Africa. For more information, visit www.aatf-africa.org.

About the International Center for Tropical Agriculture (CIAT)

CIAT is an international agricultural research organization focused on eco-efficient agriculture that is, farming systems that better harness the available resources to be more competitive and to sustainably increase productivity, while leaving a smaller environmental footprint. CIAT significantly contributes to major global initiatives that seek to reduce rural poverty, strengthen food security, improve human health and nutrition, and sustainably manage natural resources throughout the developing world. For more information, visit www.ciatnews.cgiar.org.

About the United States Agency for International Development (USAID)

USAID invests in ideas that work to improve the lives of millions of men, women and children around the world by investing in agricultural productivity; combating maternal and child mortality and deadly diseases like HIV, malaria and tuberculosis; providing life-saving assistance in the wake of disaster; promoting democracy, human rights and good governance around the world; fostering private sector development and sustainable economic growth; helping communities adapt to a changing environment; and elevating the role of women and girls throughout all our work. For more information, visit www.usaid.gov.

About Feed the Future

Feed the Future is the U.S. Government's global hunger and food security initiative. With a focus on smallholder farmers, particularly women, Feed the Future supports partner countries in developing their agriculture sectors to spur economic growth and trade that increase incomes and reduces hunger, poverty and undernutrition. For more information, visit www.feedthefuture.gov.