

# S-A-V-E On Nitrogen

## Rice Farmers Can Lower N Rates With New Soil Test

**BETTY VALLE GEGG-NAEGER**

MidAmerica Farmer Grower

**STUTT GART, ARK.**

**A** new nitrogen soil test for rice known as N-ST\*R was highlighted by Dr. Trent Roberts, Assistant Professor with the University of Arkansas Division of Agriculture, recently.

"We're highlighting the inaugural release of N-ST\*R for rice produced on silt loam soils," he said. "At least in the issue year we think we'll be able to process anywhere from 5,000 to 10,000 soil samples. That means a decent number of producers interested in the technology will be able to send in soil samples to see if they can reduce their nitrogen rate on rice produced for silt loam soils."

Roberts' group has had 13 field-scale strip-trials this year and all 13 of those site results support a lower N rate recommendation than would normally be applied by the producer. In this initial year of field scale demonstrations, researchers find the potential for this technology is more widespread than originally thought.

This particular soil test has been developed in the last 10 years. The science behind it is a quantification of a specific fraction of soil nitrogen that's not prone to loss mechanisms.

"Traditionally, soil analysis has looked at inorganic nitrogen like ammonium and nitrate," he said. "The problem with those two fractions is they are most prone to loss either through leaching or denitrification which are aggravated in a rice production system. The fraction that we measure is an organic fraction of nitrogen, like amino acids and amino sugars. It's a fairly stable form of organic nitrogen that breaks down and becomes available to the plants throughout the growing season. The particular thing about rice that makes it work so well is the production system that we use has the highest nitrogen use efficiency in the world when managed properly. In the direct seeded, delayed flood rice culture, when you put the flood on you eliminate a lot of variables like temperature, water and oxygen. When these fields go anaerobic due to the flooded conditions, you really temper a lot of those things that control the release of nitrogen in the soil. That controlled release is what helps us get such good relationship between the soil test value and the rice yield."

Through the development of N-ST\*R, the producer is going to get three choices of nitrogen rates that will produce 90 percent (Economic Optimum), 95 percent (Optimum) or 100 (above optimum) percent of relative yield.

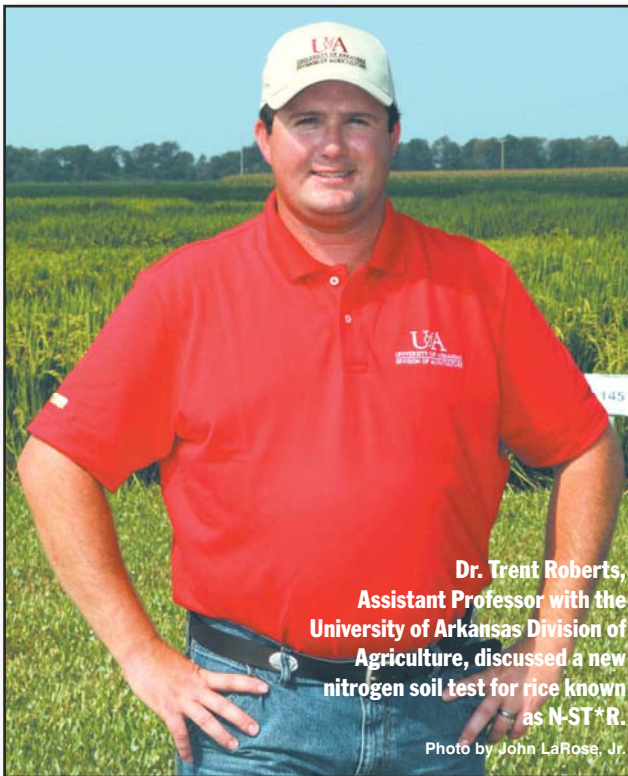
"The idea behind that is based on either the economics or the farmer's particular production practices. The farmer can pick the nitrogen rate recommendation that will best fit his management system," Roberts said.

"What we found with the 95 percent and 100 percent relative grain yield predictions is there is about a 30 unit difference in those N rates but they're never different than the farmer practice," he continued. "That right there tells you can get a 30 unit reduction in nitrogen per acre and still basically maximize your yield while significantly increasing profitability. But what we've seen at least in Arkansas this year is we've had predicted nitrogen rates anywhere from 35 to 130 units of N per acre. If you're able to cut your nitrogen inputs by 50 to 75 units of N per acre, that's a big savings in terms of your production costs."

N-ST\*R is site specific nitrogen management,

so regardless of crop rotation or field history, it's going to provide the best estimate of a particular field's fertilizer needs. There will be variability from field to field.

"This is the first test of its kind and regardless of whether or not it saves you money, it's going to provide a site specific N rate so you know you're going to be maximizing your yield based on your nitrogen inputs," Roberts stated. "Also, with this particular type of technology



**Dr. Trent Roberts,**  
Assistant Professor with the  
University of Arkansas Division of  
Agriculture, discussed a new  
nitrogen soil test for rice known  
as N-ST\*R.

Photo by John LaRose, Jr.

when we get this specific we have to be very careful about minimizing our losses and so with this N-ST\* R recommended N rate we're going to have to push producers to flood in a timely fashion and use recommended urea inhibitors such as NBPT (tradename Agrotain, Arborite). Those are things we have to highlight because over time we've built some insurance into our nitrogen rates and N-ST\*R takes all that insurance away. However, we do have the technology now where we can flood and use inhibitors to make this work."

Over the past four years we have worked closely with Tim Walker (Mississippi State University), Dustin Harrell (Louisiana State University) and Gary McCauley (Texas A&M University) to validate the N-ST\*R program on silt loam soils across the Mid-South rice producing regions. Currently, N-ST\*R can predict field-specific nitrogen rates for rice produced on silt loams soils in Arkansas, Louisiana and Mississippi, and within the next few years we will have a reliable nitrogen rate recommendation for Texas producers as well. The N-ST\*R program, through the cooperation and collaboration of these researchers, has been designed to work across a large geographical area and variability in production systems.

The N-ST\*R program is about saving money.

"If we can decrease input and production costs, while maintaining yields that means our producers are more profitable," Roberts summed. "In uncertain times, N-ST\*R will tell you how much nitrogen you need to maximize yield and ensure that you are optimizing your nitrogen fertilizer inputs." Δ

*BETTY VALLE GEGG-NAEGER: Senior Staff  
Writer, MidAmerica Farmer Grower*



Link Directly To: **RICETEC**



Link Directly To: **VERMEER**