



Competitive Agricultural Systems in Global Economy Nitrogen Management in Irrigated Cotton

Issue

The traditional approach to nitrogen management in irrigated cotton has been to push for maximum high yields by applying large amounts of nitrogen fertilizer. Historically, in many parts of Arizona, nitrogen application rates have exceeded 200 pounds per acre per season. Although yields may increase, there are serious drawbacks to this practice. Over the last 10-15 years the luxuriant vegetative growth resulting from these high nitrogen applications has harbored damaging insect populations and diseases in Arizona's cotton fields. Studies during the same period have shown that aggressive nitrogen fertilizer application can actually increase the loss of nitrogen from the soil. In the past, nitrogen fertilizer has been relatively inexpensive for Southwest desert growers, but early in 2001 those costs rose approximately 30 percent, where they remained throughout 2002.

What has been done?

To help Arizona cotton growers reduce their reliance on high nitrogen applications in their fields, University

of Arizona researchers studied and documented nitrogen uptake patterns and requirements in the crop. UA College of Agriculture and Life Sciences researchers then designed nitrogen management guidelines and recommendations that pinpointed the best times to apply nitrogen in the proper amounts. Over the last 13 years this comprehensive nitrogen management strategy has been implemented in a statewide extension education plan for cotton growers that includes bulletins, reports, articles and grower meetings.

Impact

The cost of cotton production has been high during the last several years, but the market price has been low. UA demonstration projects on cooperating cotton farms have realized yields equivalent to commercial yields, using less nitrogen input, which has saved approximately \$30 per acre in nitrogen application costs. If adopted statewide, the annual savings, at February 2002 nitrogen prices, would be about \$15-\$20 per acre. If 200,000 acres of the

total cotton acreage in Arizona were affected, this would equate to \$3 to \$4 million in savings to the growers. Growers would be using approximately 150 pounds per acre, compared to a more common rate of about 200 pounds per acre, a 25 percent reduction. In 200,000 acres of cotton, this means 5,000,000 pounds of nitrogen fertilizer would be withheld, resulting in less rampant vegetative growth, fewer insect problems and improved plant use of residual nitrogen in the soil. It would also protect groundwater from excess leaching of nitrogen compounds, thereby protecting the environment.

Difficult market conditions, which are the worst they've been since the Great Depression, have no doubt served as a stimulus in encouraging growers to make these changes. Approximately 60 percent of the cotton growers in Arizona are using more conservative nitrogen management strategies than they were five to ten years ago. Fortunately, the information in the educational program associated with these management decisions was already in place.

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Contact

Jeff Silvertooth, professor and head
Department of Soil, Water and Environmental Science
429 Shantz Bldg, #38
College of Agriculture and Life Sciences
The University of Arizona
Tucson, AZ 85721
Tel: (520) 621-7228, FAX: (520) 621-1647
silver@ag.arizona.edu