Considering risk in nitrogen application decisions for corn rotations in Tennessee

By Christopher N. Boyer, Roland K. Roberts, and James A. Larson, Department of Agricultural & Resource Economics, University of Tennessee, Knoxville; M. Angela McClure, Department of Plant Sciences, West Tennessee Research & Education Center, University of Tennessee, Jackson; and Donald D. Tyler, Department of Biosystems Engineering & Soil Science, West Tennessee Research & Education Center, University of Tennessee, Jackson

Research is extensive regarding the agronomic benefits of rotating corn with various crops, such as increased corn yields and reduced nitrogen fertilization needs compared with continuous corn production. However, the majority of this research on corn rotation effects has concentrated on the Corn Belt area of the United States, where rotating corn with alfalfa, oats, soybeans, and wheat has been a common practice for decades. Less is known, however, about corn rotation effects in the southeastern United States. A recent study found corn yields increased by 12 and 16% for corn grown after cotton and soybeans, respectively, relative to continuous corn. The higher yields improved expected net returns by 16 and 20% for corn grown after cotton and corn grown after soybeans, respectively. However, the economically optimal nitrogen rates were similar for continuous corn, corn grown after cotton, and corn grown after soybeans.

Although these studies are helpful in determining the impact of rotations on optimal corn yields and nitrogen rates, they do not consider how rotations affect risk (variability in yield or profit) and how the risk preferences of individuals impacts optimal corn yields and nitrogen rates. Although studies analyze the impact of risk on optimal nitrogen fertilizer rates, few studies jointly consider the rotation and risk effects on optimal nitrogen rates on farms located in the southeastern United States. Research was conducted at the University of Tennessee to (1) determine the effects of risk on optimal nitrogen fertilizer rates for continuous corn, corn grown after cotton, and corn grown after soybeans and (2) to identify the optimal corn rotation for risk-averse corn producers. Results were reported in the May–June 2015 issue of Agronomy Journal.

Data were collected from a seven-year (2006–2012), corn-rotation, nitrogen-fertilizer experiment in Tennessee.

doi:10.2134/cs2015-48-3-7