FORAGE RESEARCH UPDATES

MINNESOTA-Sidedressing and Soil Testing for Enhanced Nitrogen Fertilizer Management in Corn Following Alfalfa on Fine-Textured Soils Jeff Coulter, Zane Walker, Michael Russelle, University of Minnesota; Matt Yost, USDA-ARS

n fine-textured soils, first-year corn following alfalfa responds to nitrogen (N) fertilizer about half of the time, but reliable methods to predict N fertilizer need are lacking. In 14 Minnesota on-farm trials on fine-textured soils in 2014, five rates of N fertilizer were applied at planting or as a sidedress in first-year corn following alfalfa. At seven sites where grain yield increased with N fertilizer, the economically optimum N rate (EONR) at a 0.1 fertilizer cost/grain price ratio (\$0.40/lb N/\$4.00/bu) at planting was 70-100 lbs N/ac at five sites, 125 lbs N/ac at one site, and 180 lbs N/ac at another. At four N-responsive sites (57%), applying N as a sidedress reduced the EONR by 32-46% (20-50 lbs N/ac) without reducing grain yield; at the other sites timing of N application did not alter the EONR. Soil-test results from 0-12" samples collected at sidedressing produced encouraging but inconsistent predictions of N fertilizer need. The pre-sidedress soil nitrate test (PSNT; critical level set at 21 ppm) correctly identified all seven N-responsive sites and the lack of responsiveness at two sites (nine sites were correctly identified). It also predicted five "false positive" sites, which would have led to unnecessary N application 36% of the time. The Illinois soil nitrogen test (ISNT) identified a similar number of sites correctly – ten using a critical level of 225 ppm and eight using a critical level adjusted for soil organic matter. However, the ISNT predicted three "false negatives" using either critical level, which would have led to yield losses from omitting N application on 43% of N-responsive sites. Results confirm N fertilizer requirements of first-year corn following alfalfa on fine-textured soils may be reduced with sidedressing and soil testing can help identify N-responsive sites.