EFFECT OF TIME OF N FERTILIZER APPLICATION ON CORN GRAIN YIELD IN IOWA

Randy Killorn[1]

The current concern about the impact of nitrogen (N) fertilizer use on the environment has caused a shift in the thinking about N management. Crop producers are interested in techniques (application methods) that will maximize the amount of N fertilizer harvested in the crop, and conversely minimize the amount remaining in the soil after harvest.

Split applications or sidedress applications are common approaches currently being studied as a way to increase the efficiency of N fertilizer management. The idea is to apply the N fertilizer immediately prior to the time of high demand by the crop, thereby minimizing the length of time the fertilizer is in the soil, and reducing the chance that losses will occur. This approach has appeal to farmers because no specialized equipment is required, and to fertilizer dealers because it introduces a marketing strategy for different forms of N fertilizers. There are data to support this strategy on coarse textured ("sandy") soils that are irrigated or in areas where precipitation exceeds evapotransporation. There are no data to substantiate the effectiveness of the method on fine textured soils.

An experiment was initiated in 1987 to compare the effectiveness of applying all N fertilizer either prior to planting in the spring or sidedressed when the corn plants reach the V6 growth stage (normally early June). Seventeen sites were established in Iowa to account for different soils and climates. Nitrogen fertilizer at rates of 0, 60, 80, 100, 120, 140, and 180 pounds N/a was applied either prior to planting or when the crop reached the V6 growth stage (6 collars visible on the stalk). Treatments were arranged in a randomized complete block design with 4 replications. The exact dimensions of the plots varied depending on the row spacing, but all plots contained 6 rows and were 40' in length. Plots were hand harvested by picking ears from 20' of the center two rows.

Even though yields were generally high even with no N applied, measurable responses to N occurred at 12 of the 17 sites. Yield responses to time of application occurred at 8 sites. There were 7 sites where sidedressing the N resulted in lower yields than applying the N prior to planting. The average decrease was 8.7 bu/a (range = 4 - 19 bu/a). Sidedress applications yielded an average of 33 bu/a

[1]Associate Professor and Extension Agronomist, Iowa State University

more than preplant applications at one site. There was no apparent correlation with previous crop or soil type. In other words, where responses will occur is not predictable on the basis of this data. Secondly, the probability of no response or a negative response to sidedressing N was far greater (16:1) than the probability of a positive response.

PROCEEDINGS OF THE EIGHTEENTH

NORTH CENTRAL EXTENSION - INDUSTRY SOIL FERTILITY WORKSHOP

9-10, November 1988, Holiday Inn St. Louis Airport North

Bridgeton, Missouri

Volume 4

Program Chairman:

K. A. Kelling

Department of Soil Science
University of Wisconsin-Madison

CREDITS

The professionalism shown by Ms. Barbara Brown in typing portions of this document and in helping organize its preparation is acknowledged and appreciated.

Department of Soil Science
University of Wisconsin-Madison

and

Potash and Phosphate Institute
2805 Claflin Road
Suite 200
Manhattan, Kansas