

VALUE OF TILLAGE PRACTICES AND NITROGEN RATES FOR CORN PRODUCTION

J.R. Wessel and F.E. Below
University of Illinois-Urbana

Abstract

Most N recommendations for corn (*Zea mays* L.) production in the U.S. Midwest do not consider tillage as a factor when an appropriate N rate is determined. Our objectives were to determine the response of grain yield and RTN to increasing rates of fertilizer N for corn grown in three tillage systems. Tillage by N rate experiments were conducted at eight Central Illinois site-years at three locations and years (1998-2000). Tillage systems employed were: zero-till, where no tillage was performed at any time; strip-till, where narrow bands (~8 inches wide on 30 inch centers) of deep tillage were performed in the fall; and mulch-till, where deep fall tillage was followed by shallow spring tillage. Each tillage system had six rates of N fertilizer that ranged from 0 to 200lbs N per acre in 40lb increments. The N fertilizer was broadcast on the soil surface within a few days after planting. Grain yield response to applied N was best described by either a linear-plateau (mulch and strip) or quadratic-plateau (zero) function. Tillage interacted with N rate due to increasing yield with increasing tillage at low N rates, while at high N rates zero-till produced higher yields than mulch-till. The zero-till unfertilized control produced 105 bushels per acre, strip-till 125, and mulch-till 133. The amount of fertilizer N required to produce a yield equal to the mulch-till control was 27lbs N per acre for zero-till, and 14 for strip-till. Return to N was maximized (MRTN) at 142lbs N per acre for mulch-till, 160 for strip-till, and 187 for zero-till. For a given N rate, the likelihood of achieving N sufficiency generally increased with increasing tillage. For producers utilizing strip-till, N rates at the maximum end of the range suggested for MRTN should be sufficient, however, zero-till requires considerably more N, suggesting a sizable adjustment upward is appropriate.

PROCEEDINGS OF THE
THIRTY-SEVENTH
NORTH CENTRAL
EXTENSION-INDUSTRY
SOIL FERTILITY CONFERENCE

Volume 23

November 14-15, 2007
Holiday Inn Airport
Des Moines, IA

Program Chair:

Greg Schwab
University of Kentucky
Lexington, KY
(859) 257-9780
gjschw2@uky.edu

Published by:

International Plant Nutrition Institute
772 – 22nd Avenue South
Brookings, SD 57006
(605) 692-6280
Web page: www.IPNI.net