

## POST-HARVEST SOIL NITRATE FOLLOWING CORN PRODUCTION IN EIGHT MIDWESTERN STATES

C.J. Bandura<sup>1</sup>, C.A.M. Laboski<sup>1</sup>, J.J. Camberato<sup>2</sup>, P.R. Carter<sup>3</sup>, R.B. Ferguson<sup>4</sup>,  
F.G. Fernandez<sup>5</sup>, D.W. Franzen<sup>6</sup>, N.R. Kitchen<sup>7</sup>, E.D. Nafziger<sup>8</sup>, J.E. Sawyer<sup>9</sup>, J. Shanahan<sup>3</sup>

<sup>1</sup>University of Wisconsin–Madison, Madison, Wisconsin,

<sup>2</sup>Purdue University, West Lafayette, Indiana,

<sup>3</sup>DuPont Pioneer, Johnston, Iowa,

<sup>4</sup>University of Nebraska-Lincoln, Lincoln, Nebraska,

<sup>5</sup>University of Minnesota, St. Paul, Minnesota,

<sup>6</sup>North Dakota State University, Fargo, North Dakota,

<sup>7</sup>USDA-ARS, Columbia, Missouri,

<sup>8</sup>University of Illinois at Urbana-Champaign, Urbana, Illinois,

<sup>9</sup>Iowa State University, Ames, Iowa

bandura@wisc.edu

### ABSTRACT

Applying nitrogen (N) at economically optimal rates (EONR) and at times of rapid crop uptake are practices that are thought to minimize the amount of residual soil nitrate (RSN) in the profile that may be susceptible to loss. The objective of this study was to evaluate the effects of rate (0 to 280 lb N/a in 40 lb increments) and timing (pre-plant (PP) or PP plus V9 sidedress (PP+SD)) of N application on corn grain yield and RSN in the top 3 feet of soil relative to the calculated EONR. Thirty-two site years were established between 2014 and 2015 in Illinois, Indiana, Iowa, Minnesota, Missouri, Nebraska, North Dakota, and Wisconsin. At 20 of the 32 locations, the EONR for PP was greater than for PP+SD by an average of 33 lb N/a. Average grain yields in 2014 at the EONR were not different between N application timings, but were slightly greater for PP+SD than for PP in 2015. Nitrogen application rate significantly ( $P < 0.10$ ) affected RSN at 30 of 32 sites. Nitrogen application timing was significant at 19 of 32 sites; 18 of those 19 sites had average RSN levels that were greater for PP+SD than PP by an average of 50 lb N/a. Average residual soil nitrate values at the EONR were significantly different ( $P < 0.05$ ) across sites in both years with values of 31 and 49 lb N/a for PP and PP+SD, respectively, in 2014; and 49 and 64 lb N/a for PP and PP+SD, respectively, in 2015. While applying N as a split application tended to lower the EONR, it also resulted in greater amounts of RSN remaining in the soil profile that could be subsequently lost to the environment.

**PROCEEDINGS OF THE**

**46<sup>th</sup>**

**NORTH CENTRAL**

**EXTENSION-INDUSTRY**

**SOIL FERTILITY CONFERENCE**

**Volume 32**

**November 2-3, 2016**  
**Holiday Inn Airport**  
**Des Moines, IA**

PROGRAM CHAIR:

**Dorivar Ruiz Diaz**  
Kansas State University  
Manhattan, KS 66506  
(785) 532-7213  
ruizdiaz@ksu.edu

PUBLISHED BY:

**International Plant Nutrition Institute**  
2301 Research Park Way, Suite 126  
Brookings, SD 57006  
(605) 692-6280  
Web page: [www.IPNI.net](http://www.IPNI.net)

ON-LINE PROCEEDINGS:

<http://extension.agron.iastate.edu/NCE/>