

5-21-2007

Corn response to supplemental nitrogen

John E. Sawyer

Iowa State University, jsawyer@iastate.edu

Follow this and additional works at: <http://lib.dr.iastate.edu/cropnews>

 Part of the [Agricultural Science Commons](#), [Agriculture Commons](#), and the [Agronomy and Crop Sciences Commons](#)

Recommended Citation

Sawyer, John E., "Corn response to supplemental nitrogen" (2007). *Integrated Crop Management News*. 1082.
<http://lib.dr.iastate.edu/cropnews/1082>

The Iowa State University Digital Repository provides access to Integrated Crop Management News for historical purposes only. Users are hereby notified that the content may be inaccurate, out of date, incomplete and/or may not meet the needs and requirements of the user. Users should make their own assessment of the information and whether it is suitable for their intended purpose. For current information on integrated crop management from Iowa State University Extension and Outreach, please visit <https://crops.extension.iastate.edu/>.

Corn response to supplemental nitrogen

Abstract

Once you have determined that enough nitrogen (N) loss has occurred and that supplemental N application is needed, what's next? Rainfall after supplemental N applications will be important for plant uptake. If the applied N is within the active root system, and if there is a need for the N, corn yield can be increased with N applied until shortly after silking. If the supplemental N stays near the soil surface, and is not available to the plant, then the application will be wasted.

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

INTEGRATED CROP MANAGEMENT

Search

Get the latest research-based information on crops. [Sign up to be notified](#) when new content is available!

ICM > 2007 > IC-498(10) -- May 14, 2007

Current Newsletter

You are viewing **archives** for the newsletter from 1993-2007. For current news, see [Integrated Crop Management News](#).

Archives 1993-2007



Announcements



Crop Production



Insects and Mites



Pesticide Education



Plant Diseases



Soils



Weed Management

[Image Gallery](#)

Printable Version

Printable version of this page

Related Articles

Don't double dip soybean
November 12, 2007

Carbon and nitrogen cycling with corn biomass harvest
August 6, 2007

Nitrogen loss: How does it happen?
May 14, 2007

[Estimating nitrogen](#)

Corn response to supplemental nitrogen

by John Sawyer, Department of Agronomy

Once you have determined that enough nitrogen (N) loss has occurred and that supplemental N application is needed, what's next?

Corn yield response to supplemental N

Rainfall after supplemental N applications will be important for plant uptake. If the applied N is within the active root system, and if there is a need for the N, corn yield can be increased with N applied until shortly after silking. If the supplemental N stays near the soil surface, and is not available to the plant, then the application will be wasted.

Yield responses that return income greater than the costs for application and fertilizer have been observed for N applied up to and slightly beyond the tassel stage. The magnitude of yield increase is dependent upon the severity of N deficiency, when the N is applied, and the ability of the crop to recover and respond to applied N (the growth and yield potential left after water damage and early-season N deficiency). Rainfall is important to have the supplemental N in or move into the zone of active root growth. Dry soil conditions will limit response.



N being sidedressed. (John Lundvall)

Several studies in Iowa have documented yield increase from N application after periods of

losses -- early spring
2007

May 14, 2007

Measuring the nitrogen
status -- 2007

May 14, 2007

Corn Nitrogen Rate
Calculator Web tool
update

April 9, 2007

Increasing the frequency
of corn in crop

sequences: Grain yield
and response to nitrogen

-- a research update

February 12, 2007

Nitrogen fertilization for
corn following corn

February 12, 2007

Corn Nitrogen Rate
Calculator Web tool
updated

September 18, 2006

New publication offers
rationale for nitrogen use
in corn production

July 31, 2006

excess rain. In late spring 1995, four fields with a full rate of fall-applied N in Boone County, Iowa, had additional N sidedress injected as anhydrous ammonia. The data showed an average yield increase of 15 bu/acre from addition of 50 to 75 lb N/acre (A.M. Blackmer, 1996 [Integrated Crop Management Conference proceedings](#), see *Estimating Nitrogen Losses* pages 55-59). In similar studies, significant yield responses in some fields to additional N (urea-ammonium nitrate solution--UAN) injected when corn was 1-foot in height or surface banded at the R1 growth stage were measured in 1999 after the warm fall-winter and wet spring (Ellsworth et al., 1999, [Integrated Crop Management Conference proceedings](#), pp. 301-304).

A recent study conducted in 2004-2006 at 30 sites in Iowa with corn following soybean (J. E. Sawyer and J. P. Lundvall, project progress reports located at the [Iowa State University Agronomy Extension Soil Fertility Web site](#), nitrogen topic area) indicated an 8 bu/acre yield increase (177 vs. 185 bu/acre) from supplemental N applied at the V15 to R1 growth stages in response to corn plant N-deficiency stress sensing. A reduced preplant or early sidedress N rate of 60 lb N/acre had been applied, the corn N-deficiency stress was monitored, and then supplemental N was applied as indicated by plant sensing. The supplemental N was applied with high clearance sprayers equipped with drop nozzle or coulter injection bars at 28 sites with an average rate of 55 lb N/acre. While these sites were not subjected to excessively wet conditions, the reduced rate treatment in the study does simulate potential for N-deficiency stress development and yield response to N applied in the mid- to late vegetative growth period. While the yield was increased with the supplemental N, applying 120 lb N/acre preplant or early sidedress had a 7 bu/acre higher yield (192 vs. 185 bu/acre) and no need for supplemental N application. In this study, the best response to supplemental N occurred with earlier season application and good rainfall after N application to moist soils.

Applying supplemental N

When conventional application equipment can be moved through the field (i.e., the soils are dry enough and the corn is short enough), then injection of anhydrous ammonia or UAN solutions would top the list of best options. Next would come UAN surface dribbled between corn rows, then broadcast urea. Broadcast UAN solution should be avoided on corn larger than the V7 growth stage. With tall corn, supplemental UAN will need to be applied with high-clearance equipment. Injection coulters or drop tubes between every other row or every row should work equally well. Urea can be broadcast with a buggy, if it can be driven between corn rows, or aurally applied.



Supplemental N being applied with high clearance equipment. (John Lundvall)

John Sawyer is an associate professor with research and extension responsibilities in soil fertility and nutrient management.

This article originally appeared on pages 153-154 of the IC-498(10) -- May 14, 2007 issue.

Updated 05/17/2007 - 11:31am