9-18-2006

Corn Nitrogen Rate Calculator Web tool updated

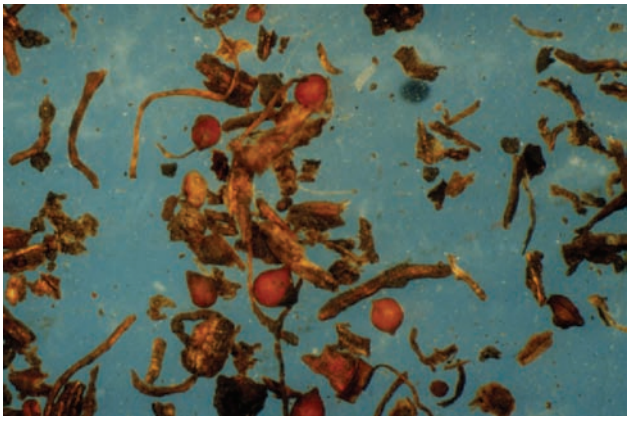
John E. Sawyer
Iowa State University, jsawyer@iastate.edu

Corn Nitrogen Rate Calculator Web tool updated

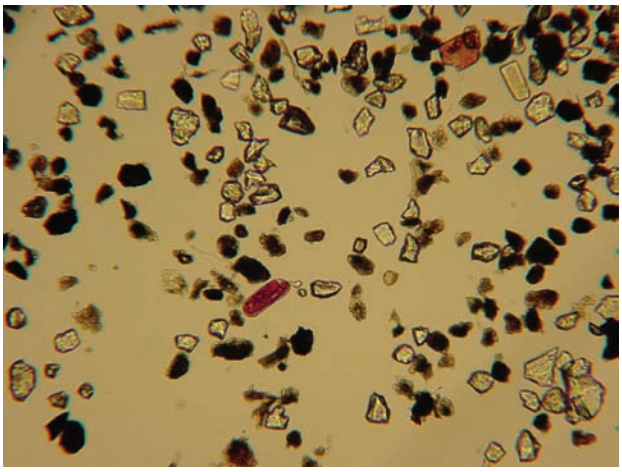
Abstract
Last fall the Corn Nitrogen (N) Rate Calculator Web tool went online. It is a resource that aids N-rate decisions for corn production and is helpful in determining the effect of fertilizer price on application rates. The method for calculating suggested N rates is based on a regional (Corn Belt) approach to nitrogen-rate guidelines. Details on the approach are provided in the regional publication, Concepts and Rationale for Regional Nitrogen Rate Guidelines for Corn, PM 2015. Background information and interpretation of suggested N-rate guidelines were previously provided in an ICM newsletter article.

Keywords
Agronomy

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences



SCN cysts and similarly sized sediments recovered from soil by sieving. ***(Greg Tylka)***



Pink-stained, oval-shaped SCN egg among soil sediments recovered from soil by sieving. ***(Greg Tylka)***

growing season from near the row of stunted and/or yellow soybeans may reveal whether SCN is the cause of the observed symptoms. The only time soil samples should not be collected is when soil conditions are very wet; nematodes are difficult to extract from soil with the consistency of mud.

The price for complete nematode counts is $30 per sample for in-state samples and $60 per sample for samples from outside Iowa (new pricing began August 1, 2006). Analysis of soil samples for SCN eggs is $15 per sample for Iowa samples and $20 per sample for out-of-state samples.

Soil samples for complete nematode counts and SCN egg counts can be sent to the ISU Plant Disease Clinic, 323 Bessey Hall, Iowa State University, Ames, IA 50011. Samples should be accompanied by a completed *Plant Nematode Sample Submission Form* (ISU Extension publication PD 32) and a check for the processing fee.

Greg Tylka is a professor of plant pathology with extension and research responsibilities in the management of plant-parasitic nematodes.

Soils

Corn Nitrogen Rate Calculator Web tool updated

by John Sawyer, Department of Agronomy

Last fall the Corn Nitrogen (N) Rate Calculator Web tool went online. It is a resource that aids N-rate decisions for corn production and is helpful in determining the effect of fertilizer price on application rates. The method for calculating suggested N rates is based on a regional (Corn Belt) approach to nitrogen-rate guidelines. Details on the approach are provided in the regional publication, *Concepts and Rationale for Regional Nitrogen Rate Guidelines for Corn,* PM 2015. Background information and interpretation of suggested N-rate guidelines were previously provided in an *ICM* newsletter article (**www.ipm.iastate.edu/ipm/icm/2005/10-10/nprice.html**).

Nitrogen-deficient corn

Nitrogen response trial databases for each state are used in the calculator. The database for Iowa was updated this summer with 18 additional response trials from 2005 research. With the updated database, calculated N rates are similar but have changed slightly from last year. The table at the right gives the N rate at the maximum return to N (MRTN) and the profitable N-rate range for several N:corn grain price ratios. You can work with any price of N and corn you wish when running the calculator. Other updates to the calculator include ability to select a specific fertilizer product, and N prices can be entered by price per pound of actual N or per ton of fertilizer material. The output information includes the N rate at the MRTN, the profitable N-rate range, the net return to N application, the percent of maximum yield, and the N-product rate and cost.

Nitrogen rate guidelines in Iowa for different N and corn grain prices.

Price Ratio[1]	Corn Following Soybean		Corn Following Corn	
	Rate[2]	Range[3]	Rate	Range
$/lb:$/bu	lb N/acre			
0.05	145	126 – 169	205	184 – 237
0.10	123	108 – 144	179	158 – 201
0.15	110	94 – 126	155	140 – 176
0.20	96	83 – 112	143	126 – 158

[1]Price per lb N divided by the expected corn price. For example, N at $0.25/lb N and corn at $2.50/bu is a 0.10 price ratio.

[2]Rate is the lb N/acre that provides the maximum return to N (MRTN). All rates are based on results from the Corn N Rate Calculator as of Sept. 1, 2006 (http://extension.agron.iastate.edu/soilfertility/nrate.aspx).

[3]Range is the range of profitable N rates that provides a similar economic return to N (within $1.00/acre of the MRTN).

Fall Nitrogen Applications

The N-rate response databases used in the Corn N Rate Calculator are derived from spring and sidedress fertilizer applications. However, the same calculated N rates are suggested for fall applications. Remember, the timing of fall-applied N is after soils cool to 50 °F and the weather forecast is for continued cooling. The only fertilizer N suggested for fall applications is anhydrous ammonia, and an inhibitor should be considered to further slow conversion of ammonium to nitrate. Waiting for cold soils (the colder the better) helps reduce the risk of fall/early spring conversion to nitrate and will help increase success of fall applications. Those guidelines will not, however, guarantee success. Since it is impossible to predict weather conditions from late fall through early spring that might affect N conversion and loss, the only reasonable approach is to use the same rate as for spring preplant and sidedress applications. If conditions become conducive for N losses, then adjustment can be made after evaluation of that loss potential. Applying more N at fall application to offset possible lower efficiency leads to lower economic return and increased chance for too much N in the soil if losses do not occur.

Resources for N Application Decisions

The Corn Nitrogen Rate Calculator Web tool is located at **http://extension.agron.iastate.edu/soilfertility/nrate.aspx**.

The regional publication, *Regional Nitrogen Rate Guidelines for Corn,* can be ordered through any ISU Extension county office, on the Web through the ISU Extension Distribution Center at **https://www.extension.iastate.edu/store/**, or by calling (515) 294-5247. An electronic copy of the publication is available at **www.extension.iastate.edu/Publications/2015.pdf**.

Web sites for soil temperatures are located at **http://extension.agron.iastate.edu/NPKnowledge/**

http://mesonet.agron.iastate.edu/agclimate/display.php?src=/agclimate/daily_pics/4in-temp-out.png

http://mesonet.agron.iastate.edu/agclimate/display.php?src=/agclimate/daily_pics/soil-hilo-out.png.

The *Don't Go* fall N poster is located at **http://www.extension.iastate.edu/Publications/IPM69A.pdf**.

The ISU Agronomy Extension Soil Fertility Web site is located at **http://extension.agron.iastate.edu/soilfertility/**.

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