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Corn Nitrogen Rate Calculator Update

John E. Sawyer

Iowa State University, jsawyer@iastate.edu

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Abstract

The [Corn Nitrogen Rate Calculator](#) is an online tool that allows determination of nitrogen (N) application rates for corn production and is helpful in determining the effect of fertilizer and corn price on needed rates. The method for calculating suggested N rates is based on a regional (Corn Belt) approach to N rate guidelines. Details on the approach are provided in the regional publication [Concepts and Rationale for Regional Nitrogen Rate Guidelines for Corn](#). This approach and the Corn Nitrogen Rate Calculator are now being used by seven states across the Corn Belt: Iowa, Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin.

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Corn Nitrogen Rate Calculator Update

by John Sawyer, Department of Agronomy

What is the Corn Nitrogen Rate Calculator?

The [Corn Nitrogen Rate Calculator](#) is an online tool that allows determination of nitrogen (N) application rates for corn production and is helpful in determining the effect of fertilizer and corn price on needed rates. The method for calculating suggested N rates is based on a regional (Corn Belt) approach to N rate guidelines. Details on the approach are provided in the regional publication [Concepts and Rationale for Regional Nitrogen Rate Guidelines for Corn](#). This approach and the Corn Nitrogen Rate Calculator are now being used by seven states across the Corn Belt: Iowa, Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin.

Nitrogen (N) Response Trials Added

The Iowa N response database in the calculator was recently updated, with response trials added from 2011 research. There are now 214 trials for corn following soybean and 111 trials for corn following corn. Being able to easily update the database with recent data is one of the many advantages to this dynamic database approach for corn N rate guidelines. Having new response trial data allows rapid updating with changing hybrid genetics, rotations and climatic conditions.

With the updated database, calculated N rates have increased slightly from previous years. The table below gives the N rate at the maximum return to N (MRTN) and the profitable N rate range from the updated calculator for several N: corn grain price ratios (price of N fertilizer in \$ per lb N divided by the price of corn in \$ per bu). You can work with any price of N and corn you wish when running the calculator. 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 selected N fertilizer product rate and cost.

Nitrogen rates determined from the calculator are directly the total fertilization amounts for each rotation, with no need to further adjust rate for previous crop. That is, for the soybean-corn rotation, there is no need to subtract a "soybean credit" as the rotation effect is already accounted for by the N rate trials that the database is derived from.

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 ²	Range ³
\$/lb:\$/bu	----- lb N/acre -----			
0.05	156	142 - 172	220	201 - 240
0.10	135	123 - 147	192	178 - 204
0.15	120	111 - 129	174	162 - 185
0.20	109	100 - 118	157	146 - 168

¹ Price per lb N divided by the expected corn price. For example, N at \$0.50/lb N and corn at \$5.00/bu is a 0.10 price ratio. Corn held at \$5.00/bu for all price ratios.

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 January 31, 2012 (<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).

Resources for N Rate 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 (PM 2015) can be ordered through any ISU county extension and outreach office, from the ISU Extension Online Store at <https://store.extension.iastate.edu/>, or by calling (515) 294-5247. An electronic copy of the publication is available at www.extension.iastate.edu/Publications/2015.pdf

The ISU Agronomy Extension Soil Fertility website is located at:

<http://www.agronext.iastate.edu/soilfertility/>

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

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