

CORN NITROGEN EVALUATION IN SOUTH DAKOTA

Anthony Bly¹, Sara Berg¹, Pete Sexton¹, and Ron Gelderman²

¹South Dakota State University, Brookings, SD, ²SDSU retired.
anthony.bly@sdstate.edu, sara.berg@sdstate.edu, peter.sexton@sdstate.edu

ABSTRACT

Current Nitrogen (N) recommendations for corn in South Dakota use an N rate calculator approach (yield goal x 1.2 – soil test Nitrate-N (0-2 ft) – legume credits – other credits such as manure application or N in starter fertilizers + 30 lbs N/a for no-till). The N coefficient has been modified in the past from 1.45 in 1975, to 1.3 in 1982 and currently 1.2 determined 1991. The N coefficient is in dire need of re-evaluation because corn hybrids and cultural practices have no doubt improved production efficiencies. Lower average rainfall in South Dakota as compared with other Midwest states has kept the need to credit the residual soil test nitrate in the top 2 feet of the soil profile when determining an appropriate N rate for corn. Residual nitrate-N in the top 2 feet of the soil profile can be quite significant because of lesser leaching events. Corn yield also varies across South Dakota because of soil type and decreasing precipitation totals from the southeast to the northwest and evapotranspiration differences increasing generally from northeast to southwest. An organized research effort began in 2013 and continued into 2014 to recalibrate corn N recommendations in South Dakota. The research was not continued in 2015 due to lack of funding and adequate personnel to complete the work. The 2013-2014 data, in combination with data from other corn N rate research projects from 1994 to 2013 will be included in the evaluation. The evaluation of the 2013 and 2014 data using the linear/plateau method for determining an N coefficient for yield showed that the mean N coefficient (lbs N/bu yield goal) has decreased from the current 1.2 to 1.0 lbs N/bu of corn yield goal. Combining all of the corn yield an N rate response data from 1994 to 2014 showed a good relationship between soil test nitrate-N (STN) and fertilizer N (FN) to relative corn grain yield ($r^2=0.70$).

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PROGRAM CHAIR:

John E. Sawyer
Iowa State Univ
Ames, IA 50011
(515) 294-7078
jsawyer@iastate.edu

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(605) 692-6280
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