

PRECIPITATION AND NITROGEN THIS SPRING

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Most of Iowa has not received high precipitation amounts this spring, however, some regions have – most notably Western Iowa (see maps). Wet springtime conditions typically raise the question about the status of applied nitrogen (N).

An updated summary of long-term N rate trials with continuous corn and corn rotated with soybean conducted at seven ISU research and demonstration farms in Iowa from 1999 to 2015 indicates that springtime precipitation (March through June or April through June) can be used to estimate chance for needing an N rate greater than the MRTN rate suggested by the Corn Nitrogen Rate Calculator (CNRC) (<http://cnrc.agron.iastate.edu/>). The database from the long-term trials provided 136 crop rotation/site-years of data. The analysis indicates that the Southeast area of Iowa (Chariton and Crawfordsville research sites) should use March through June precipitation total, and the rest of the state April through June precipitation total. Those precipitation totals were evaluated for each of the site-years against the occurrence of an economic optimum N rate (EONR) more than 20 lb N/acre greater than an MRTN rate (MRTN rate of 137 lb N/acre for corn following soybean and 190 lb N/acre for continuous corn). Why the more than 20 lb N/acre? Assumed need of at least a 20 lb N/acre rate to be worthwhile to apply (ex. cost of application) and to provide some buffer due to uncertainty in the analysis.

For the majority of Iowa, evaluation of the precipitation and N response data indicates that a total April-June precipitation amount of more than approximately 16 inches (like a critical level) correctly indicates if the MRTN rate was either adequate or at least 20 lb N/acre short. The percentage of correct determination (adequate or at least 20 lb N/acre short) is 75%. For Southeast Iowa, evaluation of the precipitation data indicates that an approximate total March-June precipitation amount of at least 17 inches correctly indicates if the MRTN rate was either adequate or at least 20 lb N/acre short. The percentage of correct determination (adequate or at least 20 lb N/acre short) is 76%. In both areas of Iowa obviously not a perfect determination, but pretty good odds of a correct determination. Many things affect soil N supply and N loss, which is why the evaluation is not perfect. In addition, ponded areas of fields would have more gaseous loss through denitrification, so short-term high precipitation events could cause more rapid N loss than indicated by the springtime total, especially when soils are warm. Or high rainfall events cause runoff and therefore not all of the precipitation would affect N in the soil. Therefore, variation in N loss, additional N need, and potential for crop response will vary among fields. Also, the unusual high precipitation late last fall could heighten the potential for additional N needed this year in some fields and with some fall N application situations.

If the precipitation total in your area or at your farms to date (until the end of June) is close to or more than 16 inches within the April-June time period (majority of Iowa) or close to or more than 17 inches within the March-June (Southeast Iowa), consider an additional N application – if your total N applied by that time is not more than an MRTN rate. Unfortunately, the precipitation totals are not reliable enough to indicate how much additional N would be needed. It is directionally correct (that is, the more precipitation is above the indicated precipitation totals, the

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more N needed), but cannot not be calibrated to a specific rate. Somewhat depending on the already applied N rate, a suggestion would be to limit a supplemental N application to no more than 50 lb N/acre. This suggestion assumes that an N rate was already applied close to the MRTN rate. If the rate to date was much less than the MRTN rate, then more than 50 lb N/acre could be considered. If an N rate was well above a CNRC suggested rate, then the chance of being short is less than indicated by this approach.

