

## POTENTIAL N LOSS – SPRING 2017

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Lately it seems to be an every-year question, and no exception this spring – has there been nitrogen (N) loss from my applied N? That question should also include what has been the N loss from the soil N supply or residual nitrate-N. There is usually tile drainage every spring (well, probably at some point every spring), and sometimes but not usual in the late fall (remember a couple of years ago). Also, losses if soils become saturated (free water filling the soil pores, standing water, anaerobic conditions) and soils are warm – then denitrification (biological conversion of nitrate to N gas). So some N loss from soils is typically occurring, just can be small or large depending on many factors. Prediction of the effect on N supply, additional N fertilization need, etc. in wet periods is difficult. There are several approaches to take in making estimates of N status or loss.

Also remember that guidelines for N application rates for corn in Iowa do take into account “normal” N losses as N rate research trials are conducted in the field and with good management. This is especially important as those N rate trials incorporate supply and loss of soil derived-N, not just applied N. This means that accumulation of N rate research trials builds in variation of soil N supply and climatic conditions.

### Approaches to estimating N loss

Use the Late Spring Soil Nitrate Test (LSNT). Use of that test in Iowa corn production was recently described in a new Extension and Outreach publication ([CROP 3140](#)). The LSNT test for estimating plant available N before sidedressing has been around for many years.

Use modelling, which is relatively new for production ag. There are several currently in the market place, including the Iowa State University Extension and Outreach [FACTS](#) web site that supplies information on nitrate-N in the soil profile (that website is not yet updated for the 2017 year, but will be soon so keep checking).

Estimate nitrate-N production and then loss during periods of soil saturation. An example of this was discussed in a 2014 ICM News article ([Estimating Nitrogen Loss in Wet Corn Fields](#)). Important components are the estimation of how much nitrate-N has formed from applied N by the time of wet conditions, and the length of soil saturation (which can vary greatly across fields, ex. ponded vs. not ponded areas and runoff vs. infiltration). When soils are warm, this loss pathway can be rapid and large, but slow when soils are cool or there is little nitrate.

Use the springtime rainfall total. Details of this approach were covered last spring (June 6, 2016) in an ICM News article ([Precipitation and nitrogen this spring](#)). The amount of spring rainfall to trigger the potential for additional N application need was updated with research data from 2016. Those rainfall totals are now 17.8 inches from March 1 to June 30 for Southeast Iowa, and 15.5 inches from April 1 to June 30 for the majority of Iowa. These rainfall totals have about a 76 percentage for estimating correctly (adequate N or deficit N) if N loss is sufficient enough to consider additional N application. One does not need to wait until the end of June to add up the

total. That can be done on an on-going basis and if the total begins to approach those values, then be thinking about plans for applying additional N (according to precipitation maps, we have not reached those rainfall totals, but localized amounts could be different). A caveat to use of the rainfall totals is if there are heavy, short duration, rainfall events. If water runs off the field, and does not get into the soil profile, then there should be a discounting off the total. Also, if the rainfall reaches those totals in the early spring, there should also be some discounting off the total due to less nitrate buildup and less denitrification with cool soils. For example, total rainfall amounts in just an individual month, like April or May, do not provide the same level of success as when June rainfall is included. The rainfall triggers are related to use of suggested economical N rates (MRTN) from the Corn Nitrogen Rate Calculator. If higher or lower N rates were applied to fields, then the odds of needing additional N go up or down.

## Resources for nitrogen rate decisions

[Use of the Late-Spring Soil Nitrate Test in Iowa Corn Production \(CROP 3140\)](#)

[Corn Nitrogen Rate Calculator](#)

[ISU Extension and Outreach Soil Fertility Web Site](#)

[Nitrogen Use in Iowa Corn Production \(CROP 3073\)](#)

[Concepts and Rationale for Regional Nitrogen Rate Guidelines for Corn \(PM 2015\)](#)

