Nitrogen Use by the Corn Plant and How to Protect It

By Cyndi Heath, CCA

As the rain and heat are coming on here in Western Wisconsin, it is with great pride that we see the results all of our hard work of tilling, planting, fertilizing, and spraying our corn crop grow with strides. We are being blessed with some beautiful crops so far.

Some of the questions that are running through a grower's mind at this time are:

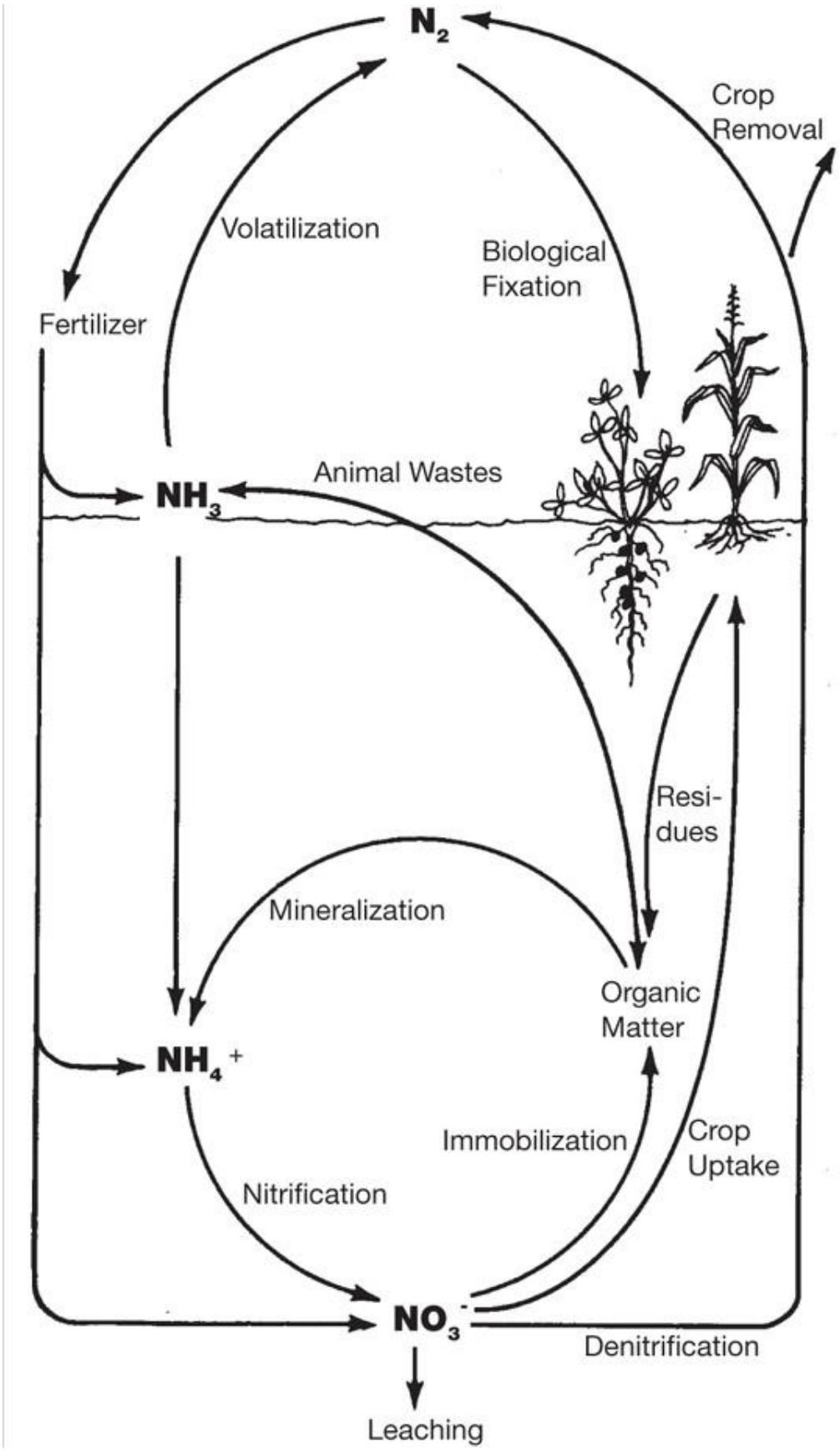
1) Do we have enough Nitrogen for our corn crop?
2) When and how much Nitrogen do we need to add more for optimum yield response?
3) What is the best way to protect the Nitrogen to insure that it will be available when the plant needs it?

There are many ways to check the Nitrogen amount that is available in the soil for the crop. These can be very beneficial, but can also be misleading due to the time difference from the when we take the analyses test for mineral Nitrogen that is in the soil to when we can actually apply Nitrogen. With Nitrogen being so mobile in the soil, it is not always possible for us to take these test results and apply them before the levels can change. Another example of a way to test Nitrogen levels is the Pre-Sidedress Soil Nitrate Test (PSNT). It is ideal for the test to be taken when the corn is around 12 inches tall using a soil probe taken at a 12 inch depth into the soil. In addition to the PSNT, some of the computer programs and hand-held monitors are also using chlorophyll imaging to determine color variation and extremes in the fields to determine the Nitrogen status.

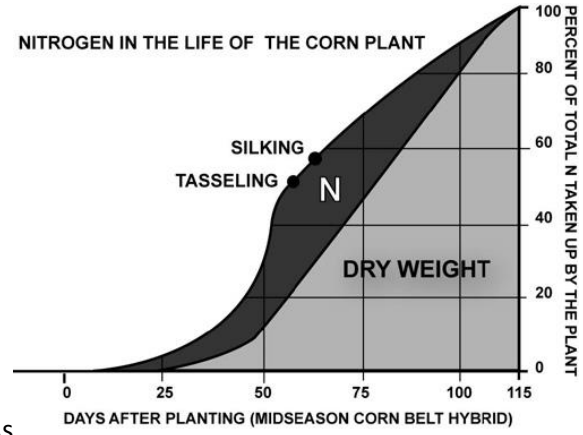
When applying sidedress Nitrogen to our corn crop, a little spread frequently is always best from the perspective that the plant will not be inadequate at any time and that we are less likely to lose Nitrogen due to environmental factors. Unfortunately, some of our fields don't have the terrain for us to frequently apply Nitrogen and we don't want to be running application equipment through our fields that often. It is good practice to apply your sidedress pass of Nitrogen in accordance with how much of the nutrient we put in our soil early, as well as how much we feel is still available to our crop.

If we are planning on making one sidedress Nitrogen application, it is also good to remember that the smaller our corn crop is, the more 'forgiving' it will be for tire traffic. Leaching of nitrate out of the root zone and denitrification are processes that cannot be directly controlled and risk can be reduced if remainder of N is applied when the corn is ready for it. Penn State recommends 50 to 90 percent of the required N be applied as sidedress pass (or passes) when the corn is 10 to 20 inches tall.

There are many ways of protecting our Nitrogen from disappearing prior to the corn plant using it, with one of the most common ways being with nitrogen stabilizers. There are many different forms of nitrogen stabilizers which are chosen with what type of Nitrogen source is used. They have different ways of protecting our Nitrogen, but they all have the same goal in mind and the one you choose can vary on what you, your soil, and your crop are comfortable with. The following figure shows how Nitrogen works it way through our soil through the process called "The Nitrogen Cycle."


N_2
Crop Removal
Volatilization
Biological Fixation
Fertilizer
Animal Wastes
NH_3
Resi-dues
Mineralization
Organic Matter
NH_4^+
Immobilization
Crop Uptake
Nitrification
NO_3^-
Denitrification
Leaching

Every corn field will have different requirements for Nitrogen, as we need to take into account the many different types of soil throughout our diverse landscape, the field's history of legume and manure credits, the cation-exchange capacity, and what we have already applied for nutrients. We need to fertilize our crop to optimize the soil potential, without over applying nutrients that can be lost unnecessarily. This figure shows how and when Nitrogen is used by the corn plant during its life cycle.



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Please feel free to contact us at Black's Valley Ag to help you make decisions that will best fit your fields' needs and your fields' yield goals. We can help you customize your farm's cropping plan to best utilize the needed nutrients to help make 2018 a successful year.

Cyndi Heath, CCA
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Works Cited

Beegle, Douglas, Ph.D. and Philip Durst, Nitrogen Fertilization of Corn, Penn State Extension, May 2014.

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