

June 26, 2015

PREDICTING NITROGEN NEED ON CORN IN-SEASON

Corn growth is starting to pick up the pace and is looking better and greener in many places. You definitely can tell on the river and creek bottoms what is going to grow good and what is bad.

I've received a few questions wondering if or how much nitrogen has moved out of the root zone because of the water movement in the soil profile. Where there was standing water too long, the lack of oxygen to the plant causes yellowing and denitrification of nitrogen. A considerable amount of denitrification has probably occurred in those areas while in other parts of the field the nitrogen may have just moved down some.

There is a 12 inch soil test when corn is smaller (6-12 inches tall measured from the ground to the center of the whorl) that some agronomists use to determine if supplemental nitrogen needs to be sidedressed to the corn crop. It's called the PSNT test.

As the PSNT has been adopted by agriculture (especially in the Eastern cornbelt) there has been a great demand to make calibrated nitrogen recommendations based on the test results. Given that the original purpose of the PSNT was simply to identify soils that were non-responsive to nitrogen, we ask a lot of this test by using it to accurately calibrate soil nitrogen status levels or nitrogen recommendations. However, some progress in this area has occurred. There is agreement on the general range of soil NO₃-N that is considered critical for adequate corn growth without additional nitrogen applications. This range is from 21 to 30 ppm NO₃-N in the top 12 inches of the soil when the corn is in the 4 to 6 leaf stage. A lot like to see 25 ppm at this stage.

Another tool is the Maize-N model developed by UNL Agronomy. This computer tool can be used to assist producers that are using a beginning season background nitrogen rate and then sidedressing or chemigating with additional nitrogen. To learn more go to:

<http://hybridmaize.unl.edu/maizen.shtml>

Rescue treatments can be addressed by sidedressing nitrogen but if we always have a rescue approach, some yield is usually lost by the time nitrogen is applied and available to the crop. Richard Ferguson, UNL Soil Scientist, says that other than a reference strip or sensor-based approach, he doesn't know of a good signal to accurately decide if you need another 30 lbs of nitrogen in-season such as with chemigation.

His work has concentrated on active sensor data at the V10 stage as the best source of in season assessment. His research with on the go sensor technology has shown more reliability than foliar sample data on corn, because of the variation of the foliar sample data.

Ferguson worked with canopy reflectance data using a RapidSCAN CS-45 Handheld Crop Sensor (Holland Scientific, Lincoln, NE). This technology has been used to determine nitrogen application rate in season with good success. In years like this, this would be good to have more of these kind of tools available to us to make informed economic decisions.

Until we implement new tools and technology in-season, there is still a lot of guess work involved with predicting nitrogen need in-season on corn.

Randy Pryor, Extension Educator

University of Nebraska-Lincoln Extension in Saline County • 306 West 3rd Street, Wilber, NE 68465

Phone (402) 821-2151 • Fax (402) 821-3398 • e-mail: randy.pryor@unl.edu