# Burrus Buzz

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## Nitrogen Management - Do I Need Inhibitors This Spring?

*by Matt Montgomery*

Many growers have taken an important fertilizer management lesson to heart. If fall applied nitrogen (N, anhydrous gas) is an option in their area (north of Illinois Rt 16 or north of US Rt 36 in Missouri), they realize it should only be applied after soil temperatures have settled below 50 degrees. They also know that such applications must be made with a nitrification inhibitor. Nitrification inhibitors maintain nitrogen in a form less prone to loss. Some growers have taken this important lesson to heart and contemplate using an inhibitor with spring applied anhydrous. Is that a good idea?

Nitrification inhibitors are literally bacteriacides – they kill the bacteria responsible for converting N fertilizer into easily lost forms of nitrogen. This allows nitrogen to stay in the soil instead of being lost via leaching or volitalization. Inhibitors reduce these denitrifying bacteria for a while, but the population eventually recovers. That recovery is not immediate. It takes some time for denitrifying bacteria to bounce back.

The bacteria responsible for this conversion are not a bad thing in and of themselves. Their ability to convert nitrogen is not really the problem. The problem with such bacteria is the timimg of when they do their work. We want that work to happen. We just want it to sync better with the crop.

Plants take up most nitrogen with water flowing into the root system. Taking up nitrogen via this pathway actually requires that N be converted (by bacteria) to its water soluble, easily lost form. For the plant to take up nitrogen when it needs it, we want this converted nitrogen (nitrate) to be there. We want those bacteria to have done their job. We just don't want nitrates to appear in water when no plants are present. When nitrates are present and plants are not, nitrogen is usually lost as it seeps away with groundwater or as it migrates into the atmosphere.

We don't want nitrates in the soil or in soil water during the fall or winter. Yet, getting everything done in the spring is a pretty big job. Since the logistics of springtime planting push many growers toward fall applications, our only option is to suppress these nitrogen converting bacteria until corn roots finally appear the following spring.

It's a great system. Hit the bacteria hard. Let cold winter soils stall their recovery. Hold on to most of that fall nitrogen. Allow the bacteria to recover in the spring. Convert that nitrogen into a water soluble form once the bacteria recover. Allow nitrogen to then flow into roots as the corn plant approaches the "few leaf stage" (when the corn plant begins to use a few to several pounds of nitrogen per day).

Let's stop for a second though. Let's think about our original question. Do we need nitrification inhibitors in the spring?

Remember that, in the late spring/early summer, we actually want nitrogen in its water soluble (yet more easily lost) form. If we want nitrogen to be converted to this form in the late spring/early summer (when the corn plant desperately needs it), do we really want to slow down nitrogen's conversion in the spring? The answer is (usually) no. To apply a nitrification inhibitor in the spring might actually keep that nutrient in a form the plant cannot access easily. In other words, a nitrification inhibitor in the spring will keep nitrogen from being as readily available to the plant when it needs it the most. That can equal yield loss. For this reason, Burrus does not recommend nitrification inhibitors with spring applied anhydrous in the majority of the Burrus footprint. We would recommend that nitrogen fertilizer be applied only as anhydrous if applications occur more than a couple weeks ahead of planting. That form of nitrogen (anhydrous) should provide just enough work for bacteria to delay conversion and sync nitrate presence with crop need.