Lakeside GRAIN & FEED LIMITED

PRECISION AGRICULTURE COMPLIANCE EXCELLENCE

THE Agromart GROUP

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Protecting your Nitrogen Investment 2.0

Continued from January's newsletter – let's look at nitrogen loss pathways:

Ammonia Volatilization

Urea (46-0-0) and 28% UAN (28-0-0) are the two of the most common commercial fertilizers used for nitrogen (N) sources. However, these forms of N are subject to being loss through ammonia volatilization (NH_3 gas is lost to the atmosphere) because of their urea content and the hydrolysis reaction that follows. In a nutshell, hydrolysis takes place when urea-based fertilizers are soil applied (without incorporation), a high level of water is present (heavy rainfall) and the urease enzymes in the soil start to breakdown the fertilizer into NH_3.

There are some risk factors to consider on your farm when it comes to ammonia volatilization and they all stem from your soil. Soils that pose the highest risk for this N loss pathway are ones that are warm and moist with urea fertilizers lying on the soil surface (ex. Broadcasted urea on wheat)– this is the perfect recipe for hydrolysis to occur. Do you know your soil's pH? The higher your pH, the more likely ammonia volatilization is to take place. Your soil's cation exchange capacity (CEC) matters too. Think of your soil's CEC like a cup (low CEC = espresso sized cup, high CEC = travel mug size). The lower your soil's CEC, the less holding capacity it has which means it has a lower ability to retain nitrogen and it can be lost more readily.

Now how do growers combat this type of nitrogen loss? Proper N management techniques and the use of products like Agrotain. The easiest way to avoid ammonia volatilization is to incorporate your N fertilizer, whether it be in a band or working your ground after a broadcast application of fertilizer. In certain situations (ex. An existing wheat stand), the ability to incorporate nitrogen is not feasible – this is where products like Agrotain have a fit. Agrotain is mixed with your N fertilizer (dry or liquid) and helps to delay/block hydrolysis from occurring. It is especially beneficial for surfaced applied N fertilizers because it helps the N to move into the soil and into a crop's growing root zone after a rain event without being lost as NH_3.

Nitrate Leaching

Nitrate N (NO_3) is readily available to plants but is easily lost. Nitrate leaching can take place after a heavy rainfall because of nitrate's ability to move through the soil so easily; the nitrate bypasses the crop's root zone and is virtually unavailable to the growing crop. This loss pathway occurs more often on lighter textured soils (see above regarding low CEC) and well drained soil types. But, like any of the loss pathways discussed, it can be handled with a few key management practices. Look to split apply N fertilizer – by spacing out your N applications, risk is spread as well as the chance for nitrate to be leached. Check your fertilizer's N source and minimize the amount of nitrate present. Since nitrate is easily lost through many pathways other than leaching, look for fertilizers that have multiple N forms within them (ex. Nitrate and Ammonium). Ammonium N (NH_4) is not as easily leached as nitrate because of its strong bond to the soil.

Denitrification

In over saturated soils (poorly drained soils/waterlogged soils), soil microbes have a limited oxygen supply and will use the oxygen in nitrate N for respiration. By doing so, your N is lost by being transformed into various gases and lost through denitrification. To help minimize your N from being lost through this pathway, think about using nitrification inhibitors (such as eNtrench). Nitrification inhibitors help to slow conversion of NH_4 to NO_3, therefore keeping your N in a form less like to be denitrified.