CORN FERTILITY UPDATE

For anyone growing corn, the following information from Dr. Trent Roberts (Assistant Professor, Crop, Soil & Environmental Science) is highly recommended for your corn fertility program.

Preplant N Management in Corn

With the weather warming up and the unusually mild winter that we experienced, a lot of producers are interested in getting a head start on their 2016 corn crop. As most producers know, N is the fuel that powers large corn yields and its proper management throughout the season is critical not only for maximal yield production, but also producer profitability. Nitrogen is essential for optimal corn production, but the problem is that N is a great magician. You can apply it as urea one day and within a matter of weeks it can be transformed to various organic and inorganic components that can render it lost or unavailable for corn uptake.

Preplant or at-planting N can help get the corn crop off to a good start, but unfortunately this application timing is very inefficient, with as little as 30-50% of preplant-N making it into the corn plant by harvest. The season-total N uptake for a 225 bu/acre corn crop is ~250 units N/acre, with some of this N coming from both the soil and added fertilizer-N. As a general rule of thumb, a high-yielding corn crop will only contain 25-30 units of N per acre at the V8 growth stage when sidedress N is generally applied. Current work in Arkansas shows that the majority of the N in the plant at the V6 growth stage is actually provided by the soil, not the preplant-N fertilizer. Another useful thing to keep in mind is that corn demands for N are quite small until the V8 growth stage when corn begins rapid biomass and nutrient accumulation. So knowing what we know about corn N needs throughout the season, how do we need to manage preplant N to ensure that we are maximizing corn grain yield, but not wasting money?

1. Preplant-N rates in corn should be 30-50 units N/acre as this is the least efficient N application time.

   Moving N fertilizer that you would typically apply preplant to an in-season application timing such as sidedress or pretassel will increase its uptake and result in greater return on your N fertilizer investment.

2. Preplant-N fertilizer sources should be restricted to ammonium or ammonium-forming fertilizers, such as urea, ammonium sulfate, DAP, MAP, and ESN (Environmentally Smart Nitrogen). By using ammonium-based fertilizers you delay the potential losses of N through leaching and denitrification that will occur in fertilizers that contain nitrate. Although ammonium-based fertilizers can eventually be converted to nitrate, this is a process that takes time and varies from soil to soil. Therefore, an ammonium-based fertilizer is more likely to be plant available for a longer period of time. The product ESN is a polymer-coated urea that protects urea and slowly releases it for plant uptake over time and is dependent on soil moisture and soil temperature. ESN is an excellent preplant-N alternative, but is sometimes cost prohibitive if the season-total N rate is not being applied preplant.

3. Preplant or at-planting-N should be incorporated to increase uptake efficiency. Placement of preplant-N as well as other preplant-fertilizers such as P, K and Zn are critical and have potentially the greatest influence on nutrient uptake and utilization. Banded or incorporated preplant-N will have the greatest potential for corn uptake and the closer you can place preplant-N within the root zone of a developing corn plant the more likely it is to be taken up and not lost.

4. Preplant applications of ammonium sulfate or DAP that are incorporated into the bed prior to planting to meet P and S needs will often times supply adequate N to carry the corn plant until the sidedress N application.

   Overall, preplant-N is more prone to loss before the V6 growth stage when sidedress-N is typically applied and therefore producers should be very careful about the rates and ways that they apply preplant-N to ensure that their investment is not wasted.
The most efficient approach to optimize corn N uptake and reduce loss potential is to apply 30-50 units N/acre and incorporate into the bed immediately prior to planting. Remember that the further in front of planting that you apply your preplant-N fertilizer; the less likely it is to be there when the corn plant is actually large enough to use it. Also, preplant-N that is not incorporated into the bed has very little opportunity to be taken up by the corn plant prior to the V6 growth stage due to the limited root system not being able to “reach” the N until later in the growing season (after sidedress). Understanding how and when corn takes up and utilizes N will help you determine when and where preplant-N can be helpful, but surface broadcast applications of preplant-N are very inefficient and that fertilizer would be better used at sidedress than preplant when the corn plant is actually large enough to access and utilize the N.

WEED CONTROL IN CORN
There are a lot of different opinions today about what should, or should not be done when it comes to growing a crop; this is especially true when it comes to herbicide programs. Dr. Tom Barber, Extension Weed Scientist, has done some interesting research on this matter. Below is some of what he has said from an article he posted on the University of Arkansas Research and Extension Row Crop Blog. If you would like to read the full article please go to http://www.arkansas-crops.com/2016/03/17/control-programs-maximize/

One of things pointed out is the importance of using a pre and a post herbicide program. This program, as you can see in the figure in the next column appears to have some significant yield advantages over the others. According to Dr. Barber, “These data represent six site years of replicated trials which all seem to say the same thing. We can continue to harvest high corn yields with a one shot program that includes a PRE or POST herbicide tankmix. However, over the duration of this study we have increased our corn yields by at least 20 bushels with a two application program for corn weed control, especially in years with wet springs that seem to push back the planting window into the middle of April or later. Based on these data and conversations with growers, I think it is fair to say that we are leaving several bushels on the table by relying on a one-pass herbicide program in corn.” - See more at: http://www.arkansas-crops.com/2016/03/17/control-programs-maximize/#sthash.YHwwRAyZ.dpuf

Sincerely,
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Staff Chair