Other Fertility Research


Dennis Abbas describes his research at the August field day.

Dennis and Eve Abbas, Hampton, carried out a trial that may not look like a fertility experiment. They compared two planting populations of corn, looking for effects on nitrogen sufficiency. This was the second year of the trial. Dennis figures that in their organic cropping system, nitrogen can be a limiting factor for corn. So he wonders if reducing the number of plants competing for that nitrogen might actually have the effect of improving each plant's N status - and therefore overall yields.

As Table 4, click to view indicates, it didn't seem to work that way in 1999. Whereas in 1998 they at least saw higher leaf N at the low population, this year there was no difference in leaf nutrients. Stalk nitrate-N was close to zero for both population treatments, which wasn't an unusual result in PFI 1999 trials. The higher population actually would yield significantly better if rep 1 were eliminated from the analysis. As it is, the yield difference is nonsignificant, and the extra seed cost is the only economic difference. It may be that any nitrogen benefit from reduced population is offset by the greater number of ears at higher populations. But Dennis would like to see some more data before he draws final conclusions from this experiment.

John and Jean Sellers, Corydon, graze beef cows and sell hay. John is also active in the effort to make switchgrass a biofuel for southern Iowa. Sellers wants to make the best use of local resources, including a by-product of lysine production. This by-product is 107+7+7+7S per ton. John spiked it to 145+45+45+7S and applied it at the 1-ton rate in strips to a mixed grass-clover hay field (Table 4). The fertilized strips yielded nearly 90 percent more than the check treatment, although with only three replications in the experiment, it wasn't a difference that was statistically significant. As such, the input costs were pretty staggering. If you assume that the yield difference observed was in fact because of the application, then the yield benefit marginally outweighs cost by $10-$15. The test is encouraging. But to convince other producers to use this material, we may need to see how it works without the additional fertilizers that doubled the treatment cost in this trial.


Backed by switchgrass, John Sellers showed a watering system near to the fertility experiment.

Another alternative fertilizer use trial was carried out by **Arlyn and Annette Valvick**, of Swea City, but instead of putting an alternative fertilizer on a standard crop, they applied a standard fertilizer - nitrogen - to a crop that usually doesn't receive it - soybeans. Soybeans have a symbiotic relationship with Rhizobium bacteria that make atmospheric nitrogen available to the plant "in return for" sugars. However, Arlyn had read in the April, 1996 issue of Soybean Digest how some southern farmers were applying nitrogen and sulfur to soybeans in mid-season for a yield increase. On August 1, Arlyn soil-applied a mix of UAN and ammonium thiosulfate to two different soybean varieties, one following corn and the other following soybeans (Table 4). He saw no yield benefit at all in these two trials. With leaf tissue samples from only two replications, it is not possible to tell whether additional nitrogen and sulfur were getting into the plants. The developing soybean crop probably used the additional nutrients, but the fertilizer didn't increase the total amount of nutrients converted to grain.

Expect to see more trials with manure and compost in the year 2000, because several ISU scientists have a project that involves PFI. For 1999 we have just one trial to show you. **Colin and Carla Wilson and Dan and Lorna Wilson**, Paullina, repeated a trial with the composted bedding/manure from their swine facility. As in 1998, there was no yield difference between the corn that received compost (nearly 7 tons) and the corn that did not (Table 4). (Both treatments received 40 lbs of nitrogen before planting.) As in 1998, stalk tests at the end of the season suggested the crop ran out of nitrogen in both treatments. In 1999 mid-season leaf samples suggested that tissue levels of N, P, K, and S might actually be lower in compost-treated corn. So how composted was this material? It had not been turned, and basically just sat in a windrow for a year. Did it pull nutrients "out" of the soil to complete its breakdown after application? PFI trials in 2000 will help shed light on these questions.

Steve and June Weis, Osage, had potassium on their minds in 1999, and they approached the topic with two kinds of trials. Steve tried a fall deep-band application of 0+2+48 before corn (Table 4). The application did result in significantly more potassium in the mid-season leaf samples, although K levels in both treatments would be considered adequate. Given the fairly large LSD of this trial, the 6.3-bushel yield difference between treatments isn't close to being statistically significant. If it were, it still wouldn't have paid for the fertilizer and application.

Steve and June also tried to get at nutrient sufficiency in an indirect fashion by examining the effect of tillage on potassium uptake. See below for those trial results.

Arlyn Valvick showed the soybean fertility plots at a late August field day.

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