THE THINGS YOU DISCOVER ON YOUR WAY TO DISCOVERY

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Our gypsum project hit a few roadblocks in 2017 with a delayed start date, unpredictable soil results, wet weather, delayed corn silage harvesting, rutted fields and late or no cover crop plantings. Let's just say things didn't go exactly as planned. All of these things complicated our analysis, but we were able to get a year of results. We also learned a couple important lessons that apply to farming and research projects in general.

Results Thus Far

The original objective was to use gypsum amendments in high-test P fields as a way of managing phosphorus, while also improving soil health and yield. We soil sampled and then applied amendments on two farmer's fields in sod. This was tilled in and corn silage was planted. We estimated corn populations and yield and soil sampled again in the fall. We had four treatments: fluegas gypsum, "Black Ag" gypsum, mined gypsum and a control plot (rates based upon product recommendations). We sampled the soil at 3 depths and each treatment was replicated 4 times on each farm field. Unfortunately, the first-year results showed no significant differences in corn population or yield by treatment. Neither did the results show any significant differences in available or reserve soil test phosphorus by treatment (all definitions of "significant difference" are based on alpha=0.1).

Lesson Learned

The first obstacle we ran into turned into an important lesson, though we probably should have known better. We relied on soil tests from the farmer's NMP to determine what fields to study. However, we did not think about how field variability would affect where the phosphorus actually was! One field we chose seemed ideal during planning, but it turns out it was not ideal based on soil test irregularity. We got the first soil test results back after we had begun the project, only to realize the soil in that corner of the field was very low in soil test phosphorus (P). In fact, looking at the field we discovered one section of the field was very high in P, which gradually decreased as you moved across the field. And the lowest P was where we chose to do our replicated trial. Oops. Why was this the case? Most likely there were historic applications of manure, or a manure stack, on the section of the field closest to the road, being easy to spread on. Applying this knowledge, we looked at adding another field to the study. We pre-sampled a field that was supposed to be high in P at a nearby farm and discovered the same problem! The result came back low. Then we used some basic sleuthing, and realized the field had multiple soil types. In this case, it wasn't the closest part of the field that was higher in P, it was the further half of the field, that had a different soil type. Soil type, not history, was playing a role in soil P. We found two fields originally tested with "high P" that for different reasons were not consistently "high P" across the entire field.

The Big Take-Away

We know that fields are not uniform, and soils can vary greatly within small distances. When we have a field that is high in soil test P, it is probably worth the small effort and time to break that field into sections based on management, landscape and soil type, and test them separately. If results come back consistent, manage it as one field, but if they come back drastically different, that means you should manage them separately. Now, I know that isn't always realistic, but from a nutrient and yield point of view, if half your field is actually low in phosphorus, wouldn't you want to know that?

More Results to Come

We have another year of our project to measure soil nutrients, corn silage, cover crops and soil health tests before we come to our final conclusions about gypsum amendments, and more reporting to come. Stay tuned for part 2 where I describe the other lesson we learned that does not have to do with gypsum.

(Left) Measuring corn silage yields on gypsum plots.