Manure Part II. Where does it fit into Sugar beet Production?

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Introduction:

Manure is an excellent nutrient resource. Like most good things in this world, it can be overused and cause production issues. Manure should only be applied once in the rotation at rates based on N application for the crop.

Crop Effects:

Sugar beet:

In a sugar beet rotation, manure application should only occur once in the rotation. That application should be directly after the sugar beet production year. For sugar beet, the biggest issue when using manure as a nutrient source is applying too much N. This could lead to quality problems. Application of manure to sugar beet may increase tonnage, but the quality issue could become an economic problem. Depending on the payment system of the sugar cooperative, the increased payment from the increase in root yield may beat the decrease in payment from the reduction in quality. Again, it depends on the economic system you are in.

Corn:

For corn, University of Minnesota research has documented a grain yield increase of 7 bushels per acre from manure application compared to non-manured corn production. This increase in grain yield can be attributed to N being available longer in the growing season or supplying some micronutrients needed by the corn plant, or better soil physical conditions.

Soybean:

Soybean does use nitrogen. Normally this is provided by N fixation. At the University of Minnesota, manure application was studied with pre-plant and side dress applications on soybean. From this research it was concluded that manure application did not consistently affect soybean grain yield. One negative was the stimulation of plant growth that led to conditions for white mold to thrive. This is not a direct effect on the incidence of the disease. The bigger canopy increased the humidity by reduction the air flow creating a better situation for the fungus to grow.

Small grains:

The main concern with manure application on small grain would be lodging. Too much N applied as manure will stimulate excess growth and thus causing the crop to lodge.

Organic matter and soil biology impacts:

Manure applications are good for soil organic matter and soil biology. Over time the amount of organic matter in the soil should increase. This does not occur over

night. Depending on several factors, it could take 15 to 20 years to increase OM from 2.5 to 3.5 %. The increase in OM can affect several soil physical factors that help plant growth and make the soil easier to till.

Summary:

Finally, with sugar beet and also soybean in the rotation, I would apply manure only once in the rotation and preferably not before sugar beet or soybean. I would also not over apply manure. It is very easy to over apply manure and have a large amount of N get into the soil nutrient system. Liquid manure sources such as liquid swine manure or liquid separated dairy manure, normally have a large amount of the N in the ammonium form and thus a large amount of the N available in the first year after application.

Current suggestions for manure management in sugar beet production:

1. Continue to apply the manure assuming a 50 % availability with an injection system.
2. Analyze the manure for dry matter, total N and ammonium-N and get the results in lb/1000 gallons of manure.
3. The application should not be at N rates greater than soil test nitrate-N + available manure-N equal 110 lb/A.
4. Apply the manure as uniform as possible.
5. Manure should not be applied more than once during the crop rotation.
6. Use a soil nitrate-N test to a depth of 4 feet to monitor the amount of nitrate-N in the soil profile before sugar beet production. If the amount of nitrate-N is greater than 150 lb N/A, do not use the field for sugar beet production.