INMC Meeting Notes: October 7, 2022

Attendees:

Members: David Hardy, Deanna Osmond, Luke Gatiboni, Christine Lawson, Josh Vetter, Michael Shepherd, David Crouse, Steph Kulesza, Colleen Hudak-Wise, Ramesh Ravella

Guest: Alan Franzluebbers, Ellie Rauh (Department of Environmental Quality)

Alan gave a presentation around Soil-test Biological Activity using nitrogen. Measures biological activity using flush of CO_2 (3d) and then it is related to N release. Provided information on N release and plant growth in greenhouse and field. Only looked at sidedress N, 4 N rates (0, 50, 100, 150). There were many questions about the presentation.

INMC Meeting Notes: October 28, 2022

Attendees:

Members: David Hardy, Deanna Osmond, Luke Gatiboni, Christine Lawson, Ramesh Ravella, Michael Shepherd, Steph Kulesza, Colleen Hudak-Wise, David Crouse

There are three major issues regarding the Soil-test Biological Activity test for making N rate decisions in NC: one is technical, one is logistical, and one is regulatory.

Technical concerns

The Soil-test Biological Activity does not account for N losses and therefore is not a complete mass balance to determine N application needs. By using dry soils, it provides the CO_2 burst that is related to readily available N but it does not estimate or predict the amount of N that is mineralizable during the growing season. This rate represents a maximum N release rate, not necessarily an expected or realistic rate. The N factors proposed by Dr. Franzluebbers' work are much greater than N factors collected from > 300 N trials conducted by NC State University on corn. There is insufficient study to discriminate between different tillage types and N sources. Furthermore, the testing completed at Virginia Tech indicates the Soil-test Biological Activity test cannot be used for N rate determination.

Data from NC demonstrate that this method would overestimate N in poorly drained soils, such as those in the Tidewater. These soils are normally saturated and by drying and aerating them, the test would overestimate N. If the test were to be used, soils would need to be divided by drainage, physiographic region, texture, etc. Dr. Franzluebbers' table that he presented suggested that both recommended too much and too little N. The error is in either side. The environmental consequences of implementing rates on either extreme can be significant, particularly when rates are used for establishing N rates for animal waste management. Extremely low N rates can result in insufficient crop growth for nutrient utilization. Excessive N rates can result in N losses from the fields. Finally, the N factors used were much greater than any determined through experimentation; N rates were also much greater and much less than any measured data.

Logistical Issues

The particle size for analysis is different for CO_2 analysis from traditional soil testing; thus, two different samples would be needed and two different sample streams would be required in the lab. Incubation is

4 days, which would take a great deal of time and space in the soil test lab and this is very personnel intense. The lab has neither the space nor the personnel to run this test and it would require an extra fee. Lastly, this test is very difficult to calibrate and can have considerable variability.

Regulatory Issues

It would be difficult to regulate N rates if the Soil-test Biological Activity method was adopted for use. Also the Soil-test Biological Activity would require annual updates to waste plans along with annual soil sampling. NC General Statute 143-215.10C(e)(6) request soil testing at least once every three years. Use of the Soil-test Biological Activity would be a default override of NC Statutes, which would have difficulty in overcoming a challenge.

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