Residual Effects of Nitrogen Fertilization on Soil Nitrogen Pools and Corn Growth

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8:00 AM LILLY Hall 2-425

Major Professor: Jim Camberato

Meghan Moser

Meghan Moser grew up on a grain farm in Perrysburg, OH and attended The Ohio State University where she received a bachelor's degree in Environmental Science and discovered her love for dirt. In August of 2014, she started her Master's program with Dr. Jim Camberato in the Agronomy Department. Outside of research, Meghan enjoys riding horses, camping, and '90s style rollerblading.

**Meghan is currently for hire wishes to pursue a career in soil conservation. **

Abstract:

Nitrogen (N) fertilization of corn (*Zea mays* L.) may increase, decrease, or not affect the N supplying capacity of the soil. Six field-scale corn N rate trials were established in corn-soybean rotations in diverse soil types across Indiana. Six N rates ranging from about 24 to 272 kg N ha^{-1} were replicated 4 to 6 times at each site and re-applied to the same plots for each of four corn crops. In the fifth corn season, 2015, half of the replications at each location were supplied starter fertilizer only (~28 kg N ha^{-1}), thus allowing for the determination of residual N from previous N rate treatments. Soil samples were obtained from starter-only plots at depths of 0-20, 20-40, and 40-60 cm shortly after corn planting. There were no differences at the beginning of the 5th corn season in soil total N, NO_3-N, or NH_4-N due to cumulative N rate. When soil collected shortly after planting the 5th corn crop was incubated in the laboratory under ideal temperature and moisture, there were no differences in N mineralization across cumulative N rates. When corn was grown in the 5th corn season with starter-only and the predominant form of N available to the crop was derived from the soil, there were no differences in plant N content at physiological maturity relative to cumulative N rate applied in the previous four corn seasons. Nitrogen rates above and below the optimum N rate needed to maximize corn yield in a corn-soybean rotation resulted in no differences in soil N or N supplying capacity in the 5th corn season. Overall, we concluded that variation in corn N rate as much as 1,088 kg N ha^{-1} over 4 corn growing seasons had negligible effects on soil N concentration and supplying capacity for Indiana corn-soybean rotations.