

Modeling in-situ N Mineralization from Cover Crops in a Georgia Ultisol

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Advanced Crop and Soil Sciences Seminar

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Miller Plant Sciences Building, Room 2401

Accurately estimating the amount of plant-available N from soil and crop residues is important for N management in cropping systems. The ability to accurately estimate the amount of N from cover crop mulch that will become plant available could help reduce over and under application of mineral fertilizers and help smallholder farmers maximize the critical services that organic inputs provide in regards to agricultural productivity. Estimating the amount of N that will be mineralized from cover crop residues is challenging because of the complexity of the process and the variety of factors involved, including residue quality, temperature, water content, drying and rewetting events, and soil characteristics. Because many factors are involved in the mineralization process, simulation models are useful tools for estimating N mineralized from cover crops. Some of the most widely used models for simulating an entire crop-soil system are CERES models. Previous work in Georgia showed that the N subroutine of the DSSAT (Decision Support System for Agrotechnology Transfer) family of models, CERES-N, could be calibrated to provide good estimates of N released from rye (*Secale cereal* L.), wheat (*Triticum aestivum* L.), oats (*Avena sativa* L.), and crimson clover (*Trifolium incarnatum* L.) residues when decomposing on the surface of a Cecil soil. Rate constants in this model need to be validated for different cover crop residues and soils. The objective of this study is to provide data needed to validate the rate constants of mineralization for cover crop residues identified in previous studies. We will compare the CERES-N simulation results with N mineralization results from an in-situ field study using soil cores. Austrian winter pea (*Pisum sativum* L.) and rye (*Secale cereale* L.) will be allowed to decompose on the surface of the soil. Samples will be collected over 60 d and root mean square error RMSE will be used to evaluate model performance.

REFERENCES

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- Schomberg, H.H., and M.L. Cabrera. 2001. Modeling in situ N mineralization in conservation tillage fields: Comparison of two versions of the CERES nitrogen submodel. *Ecol. Model.* 145:1-15.