COMPARISON OF NITROGEN MINERALIZATION FOLLOWING US AND BRAZILIAN COVER CROPS FOR A SOUTHERN PIEDMONT SOIL

Harry H. Schomberg[1], Dinku M. Endale[1], Ademir Calegari[2], Ricardo Peixoto[3], Mário Miyazawa[2], Miguel L. Cabrera[4],

[1]United States Department of Agriculture, Agricultural Research Service, J. Phil Campbell, Sr. Natural Resource Conservation Center, Watkinsville, Georgia, USA

[2]Instituto Agronômico do Paraná (IAPAR), Londrina, Paraná, Brazil

[3]EMBRAPA Agrobiologia, Seropédica, Rio de Jenaro, Brazil

[4]Soil and Crop Sceinces Dept., University of Georgia, Athens, Georgia, USA

ABSTRACT

Conservation tillage is used on over 40 percent of the 24 million cropland acres in the southeastern USA. Black oat (*Avena strigosa* Schreb) and oilseed radish (*Raphanus sativus* L.) could be useful alternatives to crimson clover (*Trifolium incarnatum* L.) and winter rye (*Secale cereale* L.) cover crops in the southeast to increase cropping system diversity and reduce the potential for disease and pest buildup. Successful adoption of new cover crops in conservation tillage systems requires understanding of their influences on N availability. We compared black oat and oilseed radish to crimson clover, and rye for effects on N mineralization from fall 1998 to 2002 at the USDA Agricultural Research Service, J. Phil Campbell, Sr., Natural Resource Conservation Center, Watkinsville, Georgia. Rye produced 40 to 60% more biomass while N contents were similar to the other cover crops. Oilseed radish and black oat N contents were similar to crimson cover. Black oat, oilseed radish and crimson clover C:N ratios were less than 30 while rye averaged 39. Amount of N mineralized in 90 days measured with in situ soil cores was 1.3 to 2.2 times greater following black oat, crimson clover, and oilseed radish than following rye. Variability of N mineralization measurements was greater for two years we planted cotton probably associated with N fertilizer application. The rate of N mineralization (k) was 20 to 50% slower following rye than the other three cover crops. The combination of rye residue amount (larger than other cover crops) and its greater C:N ratio, N demand by soil microorganisms following rye caused net immobilization. This supports the recommendations of others to increase N fertilizer for summer cover crops following rye. Soil N mineralization dynamics following black oat and oilseed radish were similar to that following crimson clover which indicates they could be used as cover crops in the southeast without changes in N recommendations.