Geophysical Research Abstracts
Vol. 21, EGU2019-9275, 2019
EGU General Assembly 2019


# Modeling Water Potential and Nitrogen Mineralization from Surface-applied Cover Crop Residues

Carson Dann (1,2), Miguel Cabrera (2), and Francesco Morari (1)

(1) University of Padova, Department of Agronomy, Food, Natural resources, Animals and Environment, Padova, Italy (carsonelizabeth.dann@studenti.unipd.it), (2) University of Georgia, Department of Crop and Soil Sciences, Athens, Georgia, USA (carson.dann25@uga.edu)

Modeling Water Potential and Nitrogen Mineralization from Surface-applied Cover Crop Residues

Carson Dann1,2, Miguel Cabrera2, and Francesco Morari1

1University of Padova, Department of Agronomy, Food, Natural resources, Animals and Environment, Padova, Italy
2University of Georgia, Department of Crop and Soil Sciences, Athens, Georgia, USA

Nitrogen (N) mineralization from cover crop residues can provide significant amounts of N for subsequent crops, effectively reducing the amount of fertilizer N needed and lowering input costs for the producer. Simulation models can be useful to estimate nutrient release from cover crop residues and better determine credits for N fertilizer applications. In a conservation tillage system, residues remain on the soil surface and decomposition is largely dependent on residue temperature and water potential. Residue temperature can be measured with available sensors, but sensors for continuously measuring residue water potential are not currently available. We developed a sub-model of residue water potential based on water transfer between residue, atmosphere, and soil according to water potential gradients existing between them. These gradients are estimated using data commonly collected by weather stations, such as air temperature, relative humidity (RH), soil water content and precipitation. Model calibration studies included measurement of fluctuations in residue water potential under field conditions; effects of RH and soil moisture on residue wetting and drying rates; effects of precipitation on residue water potential; changes in moisture release curves throughout the decomposition period; and estimation of residue saturation point. Using data from aforementioned studies, we model water potential of crimson clover (Trifolium incarnatum L.) and cereal rye (Secale cereale L.) to more accurately estimate N mineralization from surface-applied cover crop residues. Model estimates of N mineralized from crimson clover and rye residues were compared to measured values in a field study.