Cover Crop Decomposition Dynamics in No-till Corn Production Systems

Cover crops are climate-smart practice to improve soil health and supply nutrients to support subsequent cash crops. Decomposition of cover crops are determined by the quantity (biomass) and quality (N content, biochemical composition) of the cover crop residues. This study aims to evaluate the performance (quality and quantity) of cereal rye (*Secale cereale* L.) and crimson clover (*Trifolium incarnatum* L.) and their individual and combined effects on residue mass loss rates in no-till corn systems. A field experiment was conducted at the Tennessee State University-Agricultural Research and Education Center (TSU-AREC) farm in a randomized complete block design (RCBD) with three replications and four cover crop treatments: (a) weedy control, (b) 100% cereal rye, (c) 100% crimson clover, and (d) a 50:50 rye-clover mixture. Litter bags used for decomposition study were retrieved seven times (0, 15, 30, 60, 90, 120, and 150 days) during the corn growing season.

Results showed that cereal rye had highest, crimson clover had lowest and rye-clover mixture had intermediate biomass (7186 kg/ha). Crimson clover had the highest N content (2.45%) and was dominated by the carbohydrate fraction, where cereal rye and rye-clover mixture had similar N content (1%) and biochemical composition with cellulose as dominant fraction. Decomposition was fastest in crimson clover, slowest in cereal rye and intermediate in mixture of rye and clover which highlights the influence of quality and quantity of cover crop residue on decomposition dynamics.

Keywords: litter bag, cover crop decomposition, cereal rye, crimson clover, nutrient release