Abstract

Evaluation of canopy cover, biomass of cover crops and weeds in organic cropping systems.

Cover crops have gained significant attention in organic production systems that contribute to soil health, nutrient management, and overall ecosystem stability. A research field trial was conducted on organic cover crops in Fall 2023 at the Tennessee State University organic farm in Tennessee. Ten cover crops evaluated, namely Daikon Radish, Field Peas, Tilling Radish, Barley-Quest, Hairy Vetch, Medium Red Clover, Mammoth Red Clover, White Clover, Winter Rye, and Crimson Clover. Field experiment was set-up in Randomized Complete Block Design (RCBD) across forty plots in four replications and each field plot measured 16ft by 7ft, including a control without cover crops. Data collected on wet-biomass and dry-biomass, canopy cover was assessed via drone to take plot pictures and the 'Canopeo' app to analyse cover, and weed density in November and December. Drone imagery enabled a more precise and extensive analysis of canopy cover, capturing entire plots which is impractical with handheld cameras. In terms of canopy cover, Medium Red Clover was prominent with 78.8%, while the least was Winter Rye with 30.85%. Cover crop wet biomass was highest in Daikon Radish (12279.0 lb/ac) and lowest in Winter Rye (2042.2 lb/ac). Highest dry biomass recorded in Field Peas (1401.5 lb/ac) and lowest in Crimson Clover (351 lb/ac). Weed biomass was low in Hairy Vetch (0.04 oz/ft^2) and Tillage Radish (0.09 oz/ft^2). High biomass of weeds was observed in Crimson Clover (0.32 oz/ft^2) and Barley (0.25 oz/ft^2). The study revealed that higher cover crop biomass negatively correlates with weed biomass. The study highlights how various cover crops enhance soil health and fertility, with their biomass adding organic matter and canopy reducing erosion. Preliminary research trial suggests tailored cover crop selection based on specific soil and environmental conditions and more efficient and sustainable farming practices.