Cover Crops Enable No-till without Herbicides

Because organic crop producers generally do not utilize herbicides, they have historically had limited access to conservation tillage practices that help retain soil organic carbon. Although no-till is possible in organic production when cover crop residue is used to provide weed control, this method is still in its infancy and has not been tested in many environments.

A recent *Agronomy Journal* article reports on a multi-year study testing organic no-till in the claypan soils of the central Midwest, which are characterized by very slow permeability, restricted root penetration, and low natural fertility.

The authors of the report found that achieving cover crop biomass sufficient for weed suppression was a challenge if soil fertility levels do not support maximum cover crop growth. Crimped cover crops can cause N immobilization and reduced corn yield. However, when there was adequate soil moisture and weed control from the cover crop, soybean grown under organic no-till was competitive with tilled treatments.

Organic no-till in this study was more successful in soybean and wheat than in corn. This indicates that organic producers in high-clay soils may be able to utilize a rotational no-till production system as part of an overall effort to control weeds while reducing tillage.


Diverse Rotations and Poultry Litter Improves Soybean Yield

Continuous cropping systems without rotations or cover crops are perceived as unsustainable for long-term yield and soil health. Continuous systems, defined as continually producing a crop on the same parcel of land for more than three years, is thought to reduce yields. Given that crop rotations and soil amendments (cover crops and poultry litter) may alleviate issues associated with continuous cropping, research into their combined effects is necessary to make recommendations that improve soil quality and yield.

In an article recently published in *Agronomy Journal*, researchers studied combinations of cropping sequence (corn, soybean, and cotton) and soil amendment/cover crops (hairy vetch, Austrian winter pea, wheat, poultry litter, and a fallow control) at two sites in Tennessee over a 12-year study period. Based on 12-year yields, a moderate-to-no yield penalty existed for continuous soybean, whereas yield benefits (11%) arose from poultry litter compared with wheat cover crop.

This study determined that across all study years, incorporating corn once within a four-year cycle resulted in 8% greater yields than continuous soybean, whereas cotton (once or twice within a rotation) did not. Consequently, including corn once within a four-year cropping rotation with poultry litter improved soybean yields, concurrent with increases in soil N, P, K, and soil organic carbon.