Cover Crop Management with Specialty Equipment for Organic No-Till

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Abstract

The Rodale Institute has designed a unique farming system that incorporates the benefits of no-till technology into an organic farming strategy based on the basic biology of cover crops. This system uses intensified cover crop management and a specially designed piece of equipment, called a roller/crimper, to reduce the number of field operations for organic corn production from nine (under standard plow-tillage) to two. Data compiled in 2007, based on field operations during the 2006 growing season, have shown that the organic no-till corn yielded up to 8.5 t ha^{-1}, 18% more than the standard organic plow-till yield of 7.2 t ha^{-1}, and 42% more than the non-organic chisel-plow yield of 6.0 t ha^{-1}. The key to the system is the roller/crimper, which is designed to crimp cover crop stems, laying them flat, and killing the biomass to form a weed-suppressing mat. Proper timing of rolling is essential because full cover crop kill is only achieved when the cover crop is at full flower. If the cover crop is rolled too early, in a vegetative growth stage, it will survive and rebound to compete with the cash crop. When challenges with cover crop kill timing, moisture dynamics and planter engineering are mastered, best results have shown that organic no-till corn and soybean systems can out-yield organic-plow-till and conventional systems with minimal inputs and energy costs. Organic no-till is a practical alternative to complete tillage and cultivation for production of many large seeded or transplanted row crops. The crop rotations and equipment required for this system are scale neutral, and current data suggests that organic systems can effectively incorporate no-till practices to increase yield and profit margins and reduce energy consumption and environmental impact.