

Organic Zero-Till in the northern U.S. Great Plains Region: Opportunities and Obstacles

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SUMMARY

The use of killed cover crop mulch for weed suppression, soil erosion prevention and many other soil and crop benefits has been demonstrated in organic no-till or zero-till farming systems in eastern U.S. regions and in Canada. Implements have been developed to make this system possible by terminating cover crops mechanically with little if any soil disturbance. Ongoing research in the U.S. northern Great Plains is being conducted to identify cover crop species and termination methods for use in organic zero-till (OZ) systems that are adapted to the crop rotations and climate of this semiarid region. Current termination strategies must be improved so that cover crop species are killed consistently and early enough in the growing season so that subsequent cash crops can be grown and harvested successfully. Delaying termination until advanced growth stages improves killing efficacy of cover crops and may provide weed-suppressive mulch for the remainder of the growing season, allowing no-till spring seeding of cash crops during the next growing season. Excessive water use by cover crops, inability of legume cover crops to supply adequate amounts of N for subsequent cash crops, and failure of cover crops to suppress perennial weeds are additional obstacles that must be overcome before the use of killed cover crop mulch can be promoted as a weed control alternative to tillage in the U.S. northern Great Plains. Use of vegetative mulch produced by killed cover crops will not be a panacea for the weed control challenges faced by organic growers, but rather one tool along with crop rotation, novel grazing strategies, the judicious use of high-residue cultivation equipment such as the blade plow, and the use of approved herbicides with systemic activity in some instances, to provide organic farmers with new opportunities to incorporate OZ practices into their cropping systems. Emerging crop rotation designs for organic no-till systems may provide for more efficient use of nutrient and water resources, opportunities for livestock grazing before, during, or after cash crop phases, and improved integrated weed management strategies on organic farms.

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