

Organic No Till Using the Cover Crop Roller

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The Carrington Research Extension Center, in conjunction with the Rodale Institute, has been evaluating the concept of organic no-till or practical methods for reduced tillage in organic production. For the past three growing seasons the Center has been evaluating reduced tillage on certified organic land near Rugby, ND, by using cover crops in combination with the cover-crop roller. The concept behind the roller is to terminate the cover crop without tillage or herbicides and provide a seedbed with high levels of residue remaining on the soil surface. To reduce the trips across the field, the cover-crop roller is mounted on the front of the tractor with a drill mounted on the rear, sowing the cash crop in one operation. This presents a number of challenges for the North Dakota farmer as compared to areas like Pennsylvania where the Rodale Institute is located where the roller was developed. The main challenges are a shorter growing season, which limits the options for seeding a cover crop and transitioning to a cash crop that would mature before frost, and the lower annual precipitation rates in North Dakota.

A summary of the field-scale work that has been done to date follows. Cover crops evaluated were winter rye and triticale, spring barley and oats, field pea, and sudan grass. The cover crop that had the greatest success was winter rye sown in the fall and rolled at heading time the next season. It was found that winter rye will terminate easily and provide a dense residue mat to seed into or provide season-long cover. Conditions that led to success were high levels of biomass or dry matter per acre, rolling at the proper stage of plant growth, and timing of rolling during the day. Levels greater than 5000 pounds dry matter per acre are recommended to achieve success in using the crop roller. Levels of 2000-3500 pounds of biomass were not adequate as they rolled poorly, did not lie flat, and did not provide a residue mat to suppress weeds. The crop stage that is best to kill the winter rye is early anthesis or pollen shed. Early in the day, when the plant is more turgid, is the best time to roll the cover crop.

The crop roller has been found to be an effective tool for killing cover crops while minimizing tillage and maintaining cover on the soil. The technique makes sense from the standpoint of fuel and time savings, weed suppression, moisture and soil conservation. It is a tool that may have other uses such as providing cover for winter grains or vegetable crops by seeding them into a rolled cover crop or in companion cropping to aid in the establishment of perennials such as alfalfa.

Overall, initial research suggests the use of cover crops in combination with the crop roller can minimize tillage or allow organic farmers to enter into no-till. Future work will continue to examine different cover crop species and their ability to work with this system. A trial was established this fall using rolled sudan grass to provide cover for winter wheat and triticale. This fall the Center also established a four-year rotational study using cover crops comparing no-till (rolled) to tilled (disked). This trial is a multi-state effort and is located near Robinson, ND, in a certified organic field.