

## **Roller/Crimper Effectiveness on Crop Type and Timing**

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### **F**ield scale - Blaine Schmaltz Farm, Rugby, ND

During 2008, we focused on rolling winter rye at two different biomass levels along with timing of rolling. The more biomass produced, the better the rye crop was killed by the roller. The two levels of biomass were 7290 lbs. DM/ac (63-inch tall) and 3364 lbs. DM/ac (50-inch tall). The two timings were at early anthesis (2 days after initiation) on June 19 and one week later on June 26. Generally, when levels of biomass were high, the rye terminated easily regardless of the timing, although it still appeared to kill better with the first rolling at early anthesis. The lower levels of biomass were not killed at satisfactory amounts with either timing indicating the need for heavy growth in the rye cover crop. High levels of biomass with winter rye again proved to provide field-scale, season-long cover and weed suppression at Blaine's farm in Rugby, ND. As a matter of fact, when the organic inspector observed the rolled rye she thought a herbicide was used to kill the rye.

This year at Blaine's farm we did not plant into the rye cover crop. Although the CREC did build a JD 750 no-till plot drill, it was not completed in time to use at cover crop termination. The drill was used to sow winter cereals into a rolled cover crop (sudan grass) in the fall of 2008 at the Research Center.

### **Small plot – NDSU Carrington Research Extension Center**

Observations from the past three years of rolling cover crops illustrate that fall-sown winter rye has good potential as a cover crop to roll in North Dakota. A replicated field trial was established in the fall of 2007 to determine if differences exist among winter rye varieties as to degree of residue and how well they are killed by the crop roller. Biomass data gathered show no significant differences in amount of dry matter accumulated. Termination rating scores indicate that the higher the biomass levels, the better the variety was killed by the roller. This year rye heading dates were somewhat abnormal, as varieties normally have greater differences in heading date.

Due to the shorter growing season in North Dakota, it appears that short-season cover crops are important for this system. The experience gained from this project point out the need for earlier maturing cover crops, or even earlier maturing varieties within a species such as rye. Rye varieties bred or selected to mature even a week earlier would make a big difference with this system in our environment. To address this need, plant selections were made in the summer of 2008 from the experimental winter rye line DR02. The two selection criteria used were heading and anthesis dates. The first heads that appeared within the line were tagged as well as the plants that first had anthers appear 5-6 days later. Any plants that were tagged for both heading and anthers were selected and replanted in the fall of 2008. The overall objective is to try and select a line that would reach the rolling stage earlier.

In 2008, field peas were rolled to determine how effective the roller is at terminating field peas. The variety used was DS Admiral, which is a semi-leafless yellow field pea that is grown for grain production. The peas were rolled on two dates, June 30 and July 3. Flower initiation occurred on June 26. Total DM biomass of the peas was 5050 lbs./ac, with a canopy height of 43 inches. The peas rolled well but did not die from the roller despite the time of day or day of rolling. They remained flat but continued to stay green and flower. This coming growing season we will use a different variety and type of pea to examine with the roller. The pea type we will use will be a long-vine forage pea. The idea is that this type of pea will have a growth habit similar to hairy vetch and therefore, the roller may work better with this type of pea.

The CREC is experimenting with rolled cover crops as a winter cover to protect fall-seeded winter grains such as wheat, triticale, and rye. The rolled cover crop would provide insulation against harsh winter temperatures and retain snow, which would provide protection as well as moisture. The CREC

established a replicated field trial on certified organic land from a June 18 planted sudangrass cover crop. Treatments were imposed on September 16, 2008, with sudangrass DM biomass levels of 7042 lbs./ac and plant heights of 9.4 feet. Three termination methods were used in this trial: rolling; shredding; and shredding and disking. The winter cereals were sown into the cover crop on September 26, with a JD 750 no-till plot drill. Stand establishment was good to excellent on all three treatments. After the harvest of the winter cereals the intention is to maintain the tillage treatments imposed and to compare organic no-till to organic tilled.

### **Summary**

There are a number of different challenges for farmers in North Dakota who would like to use the roller-crimper. A shorter growing season limits the options for seeding a cover crop and transitioning to a cash crop which will mature by frost. Buckwheat, dry beans, and annual forages appear to be the best choices for this short window. Because this area gets a lower annual precipitation rate (about 17-19 inches annually), farmers may have difficulty in establishing a cash crop following a cover crop and producing adequate cover crop biomass to make the roll/crimper concept work here. Aside from these issues, we found that the roller-crimper was a good tool for killing cover crops. The technique makes sense from the standpoint of fuel savings, time savings, weed suppression, and moisture and soil conservation.

### **Future work**

Overall, it appears that 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. This fall the CREC established a four-year rotational study using cover crops comparing no-till (rolled) to till (disked). This trial is a multi-state effort and is located near Robinson, ND in a certified organic field. A replicated field trial was also established in the fall of 2008 to compare the effect of the roller on seven winter rye varieties. The objective of this trial is to determine if differences exist among rye varieties on how well they are terminated by the crop roller.



**Cover crop is rolled down and crimped. Rolling improves the efficacy of cover crop termination.**