

## Evaluating Cover Crops Seeded into Standing Corn (Dundas SCIA Major Grant Project)

### Purpose:

Cover crops can provide many benefits to the soil. However, to date for areas with a relatively short growing season (2700 - 2900 CHU) there is little information available on the establishment/timing, management and benefits of cover crops established in standing corn. This project evaluates agronomic options which will optimize establishment and provide the most benefit from cover crops seeded in standing corn.

### Methods:

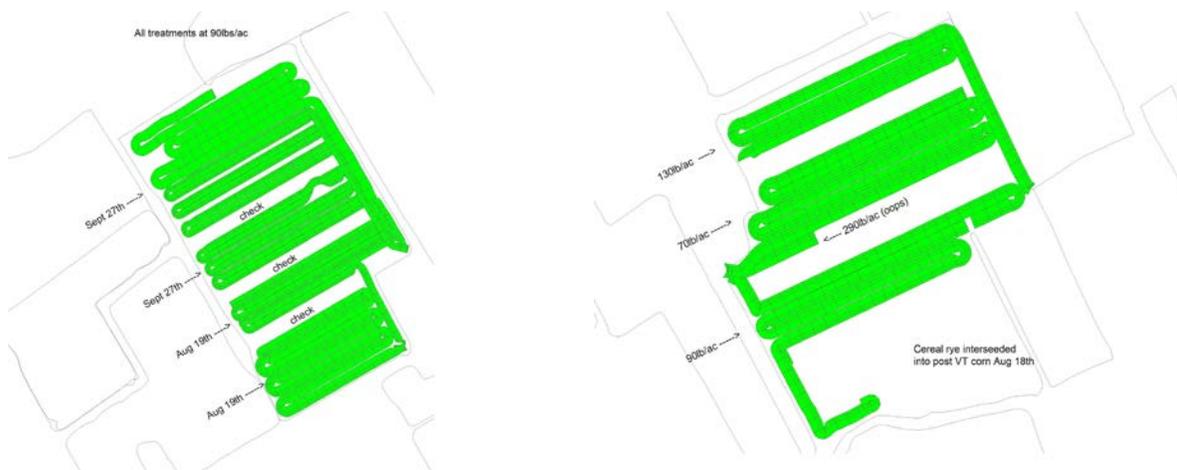
Cover crops were seeded in standing corn in August and in September. Cover crop species (yr 2), seeding rate and timing will be compared to evaluate the establishment and benefits of each. The species chosen was winter cereal rye. The reasoning behind this selection was due to its general availability, a comfortable knowledge of its winter survival rate and predictable biomass production. The high C:N ratio and slow breakdown fits in well with the corn/rye crop being followed by no-til soybeans. A target rate of 90-100lbs/ac is the co-operators goal as that corresponds to 20\$/ac. 70 and 130lbs/ac were also seeded for evaluation.

Two fields were used for the plots. Both are corn/bean rotations in min/no-til tillage environments and both are Morrisburg clay-loam soils. Both are fairly well drained and generally produce an even yield across the field. Two planting dates, Aug 19<sup>th</sup>, and Sept 27<sup>th</sup>. Strips of cereal rye were spread at varying rates ranging from 70-130lbs/ac in field 1 on Aug 19<sup>th</sup>. Multiple check strips were left untreated in both fields for comparison to 2015 soybean crop. In field 2 the two planting dates are compared at the same rate of application.

**Figure 1. Monitor Representation of Trial Location**

**Site 1 (date comparison, 42.4ac)**

**Site 2 (population comparison, 28.3ac)**



Simple spinner spreaders were attached to the boom of a New Holland SP275f sprayer equipped with 4 wheel steering to minimize headland trampling loss. 6 seeders were purchased but for the purposes of this experiment but only 4 were installed. 2015 will see all six seeders incorporated into the design. Time constraints and a concern about weight limited the project to 4 seeders for 2014. The attachment of the spinner spreaders to the boom was designed to allow the spacing between spreaders to be adjusted based on the density and characteristics of the seed being applied. For this experiment 16ft spacing gave excellent well distributed coverage during pan testing. For the range of species adapted for Eastern Ontario this spacing should work for most. The sprayer itself is a front mounted boom machine with over six feet of clearance making it ideal for travelling through full height corn. The boom easily keeps the spreaders well above the canopy to maintain even spreading across the entire width of the machine.

**Figure 2. Seeding Methods for Cover Crops**



The two different seeding dates presented different challenges for getting the cover crop established. Aug 19th the canopy was at absolute maximum, it was hypothesized that seed would be caught in the canopy but in reality little if any remained on the leaves for more than a day. 90% made it to the soil surface immediately. Due to the cool growing season corn was about 2 weeks behind schedule and light interception to the ground was behind by that factor as well growth after germination was very slow as a result. The second planting, Sept 27th, was 1 week after a very near killing frost. -2C to -4C for several hours on Sept 18th killed all tissue above the ear leaf. This caused the plants to keep their leaves outwards for several weeks instead of slowly lay over allowing light through like normal dry down. Development of the rye was slowed as a result. Also the dry leaves of the corn were easily pulled off by the passing machine and over large acres could cause issues with the machinery. Stalk breakage in both instances was minimal and equated to earlier fungicide applications that co-operator already made.

### **Results:**

Establishment was spotty, Aug 19th seeding was quick to germinate, an inch of rain fell a few days after seeding and incorporated the seed well. Rooting of the seedlings was an issue in places and stands suffered as a result. Approximately 50% of seed dropped

survived. Headlands established much thicker than the infill of the fields. Perhaps early season trampling is the cause for this. Once actively growing, development of the cereal rye was slow to progress. Plants made it to 2 leaf stage before development

**Figure 3. Representation of Cover Crop Establishment Success**

*Sept 15th (fairly typical of the catch)*

*Sept 27th (view from cab)*



halted until late October and the corn crop canopy had settled fully. The Sept 27th seeding date was poor initial germination. Again headlands established well but infill was almost an entire failure. Uncertain as to why but abnormally dry and hot conditions after seeding may have played a roll. At harvest hardly any cereal rye was visible from the combine in the infill of the field.

Harvesting of the corn wasn't affected by the cover crop growing underneath. The corn head did bury some of the crop but now with full light interception growth accelerated and evidence of the corn stalks harming the crop is yet to be seen. Wheel tracks from the combine/grain cart also had minimal effect on the cover crop. One field was harvested while frozen, and the other was dry enough to not make marks. After harvest growth accelerated and slowly decreased as is expected when temperature cool. Much of what established tillered and has excellent root growth down beyond 6 inches.

Interestingly enough, between Christmas and New Years during abnormally warm temperatures, a great deal of rye from the Sept 27th planting emerged in those locations where little if any was able to germinate. One leaf plants were scouted a healthy green colour for the few days until cold temperatures forced dormancy. It will be very interesting to see what these areas look like come spring during the stand analysis.

**Summary:**

The cereals rye germinated slowly while shaded by the corn, but once the canopy opened up growth accelerated to normal drilled seed rates. Populations of the cover crop will be evaluated prior to seeding of the soybeans. Thus far there hasn't been much analytical data collected. In spring and at the end of the first year data comparing seeding dates and various rates will be analyzed and decisions for year two will be made based on establishment but also factoring in cost.

#### **Figure 4. Cover Crop Establishment Success in Standing Corn**

*One of the best strips scouted before and after the combine*



#### **Next Steps:**

This trial will continue in 2015 with reporting of cover crop establishment in standing corn. This would be an excellent project to continue, with the addition of seeding dates, seeding rates and additional cover crop species. Anyone interested in participating in this project should contact or Gilles.

#### **Acknowledgements:**

Thanks to Ontario Soil and Crop Improvement Association for their financial support as well as Cedar Lodge Farms for investing in the seeding equipment and conducting the project.

#### **Project Contacts:**

Warren Schneckenburger, President, DSCIA [warrensneckenburger@msn.com](mailto:warrensneckenburger@msn.com)

Gilles Quesnel, OMAFRA, [gilles.quesnel@ontario.ca](mailto:gilles.quesnel@ontario.ca)

#### **Location of Project Final Report:**

Gilles Quesnel