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## **DIRECT SEEDING OF CORN INTO ALFALFA SOD**

By

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### **Abstract**

Alfalfa is a very popular forage crop in Southern Alberta for feeding livestock. Typically alfalfa is grown for 5 years and then taken out of production by intensive tillage. A less practiced method to take alfalfa out of production is to spray the forage with a non-selective herbicide and then direct seed into the sod with a low disturbance opener. A project was conducted at the Canada-Alberta Crop Development Initiative (CACDI) farm at Lethbridge, Alberta to demonstrate the less practiced method.

The AgTech Centre demonstrated the direct seeding of Roundup Ready corn into alfalfa sod with three types of seeding equipment. Plant counts were measured randomly throughout the areas seeded by each seeding unit and results were analyzed. Results showed that direct seeding corn into alfalfa sod with various types of seeding equipment works and is a viable method to take alfalfa out of production.

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## DIRECT SEEDING OF CORN INTO ALFALFA SOD

### Introduction and Background

Alfalfa is a very popular forage crop in Southern Alberta for feeding livestock. Typically alfalfa is grown for 5 years and then taken out of production by intensive tillage. Another method of taking the alfalfa out of production is to chemfallow for a season by spraying a non-selective herbicide on the alfalfa as required to stop the growth of the plants. A less practiced method is to direct seed into the sod with a low disturbance opener. The latest mentioned practice is the most ideal and recommended practice due to the improvement of the soil structure, moisture conservation, organic matter and enhancement of the micro environment to ensure a healthy direct seeded crop establishment.

An ideal crop to direct seed into sod is a herbicide tolerant variety. The benefits of direct seeding a herbicide tolerant crop is the ability to spray a chemical at anytime throughout the various growth stages to eradicate all other undesirable plant species including the forage. By the end of the season, the forage should be completely out of production and the land will not be exposed to erosion. The soil structure will improve and income will be gained from the harvested crop by direct seeding into sod.

The AgTech Centre demonstrated direct seeding of Roundup Ready corn into the alfalfa sod with several types of equipment during the 2002 growing season. Plant counts were measured for each seeding implement 3 weeks after the majority of the crop emerged. A field day was organized and several groups toured the demonstration site.

This demonstration trial shows producers that corn can be direct seeded into alfalfa sod. The entire agricultural industry and environment benefited by showing producers an alternative farming practice that saves soil moisture, structure and erosion as a result of reduced tillage.

### Experimental Procedure

The demonstration site was at the Lethbridge CACDI farm. The field is a 6 ha (15 ac) pivot irrigated dark brown chernozemic soil. Dekalb Roundup Ready corn was direct seeded 3.2 cm (1 ¼ in) deep into the alfalfa sod on May 30<sup>th</sup>. Half of the field (3 ha or 7.5 ac) was seeded with a Precision John Deere 1780 Max Merge II Disk Row Crop planter, 2 passes were seeded with a 5.2 m (17 ft) Flexi-coil 5000 airdrill outfitted with Stealth Narrow Knife Single Shoot openers, and 8 passes were seeded with the 2.4 m (8 ft) AgTech Research Plot airseeder outfitted with Flexi-coil Barton Double Shoot Disk openers (See Figure 1 for seeded area outlay). The Flexi-coil airseeder tank had a special segmented roller for accurate rate seeding of corn. The precision planter was set on 38 cm (15 in) row spacings, the Flexi-coil 5000 was set on 23 cm (9 in) row spacings and the AgTech seeder was set on 30 cm (12 in) row spacings. The seeding rate used was 87,000 seeds/ha (35,208 seeds/ac) or 26.3 kg/ha (23.5 lb/ac) with all 3 seeding units.

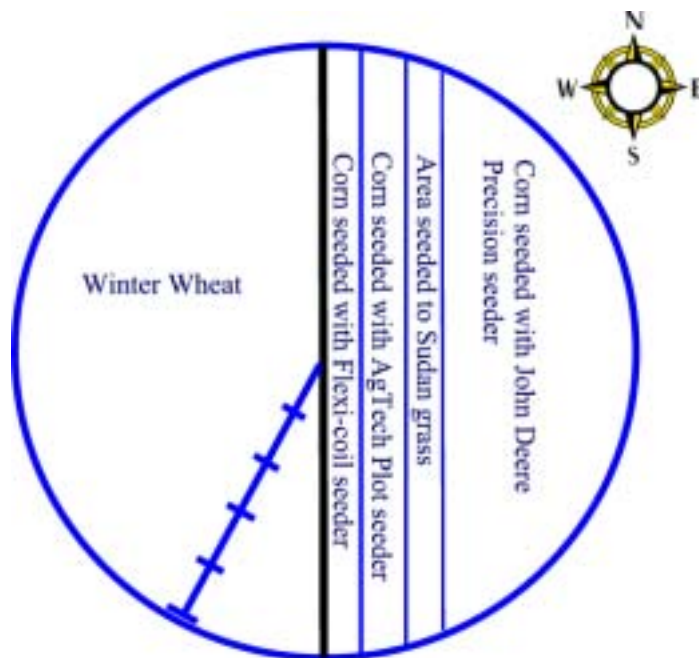


Figure 1: Seeding outlay of the pivot irrigated field.

On May 17<sup>th</sup> the field was broadcasted with 34-0-0 nitrogen fertilizer at a rate of 134 kg/ha (120 lbs/ac) of actual N. Phosphate in the form of 11-52-0 was pre-banded on May 18<sup>th</sup> with a low disturbance disk applicator at a rate of 50 kg/ha (45 lbs/ac) of actual P.

Several glyphosate applications were made on the alfalfa and corn crop as outlined in Table 1. All glyphosate applications were applied with a 3 pt hitch mount hi-clearance sprayer outfitted with 112 L/ha (10 gal/ac) nozzles.

Table 1: Glyphosate alfalfa and corn crop applications.

<i>Date</i>	<i>Operation</i>	<i>Rate of Roundup</i>
Fall 2002	Crop burndown	5 L/ha (.44 gal/ac)
May 28	Pre-crop burnoff	2.5 L/ha (.22 gal/ac)
June 25	In crop application	2.5 L/ha (.22 gal/ac)
July 3	In crop application	2.5 L/ha (.22 gal/ac)

The corn crop was irrigated with several passes of the pivot throughout the growing season as outlined in Table 2. Well above average rainfall was received through the month of May amounting to around 25 cm (10 in), eliminating the need to irrigate until mid July.

Table 2: Irrigation applications of water.

<i>Irrigation Date</i>	<i>Water Applied</i>
July 14	1.25 in (3.2 cm)
July 23	1.25 in (3.2 cm)
August 1	1.25 in (3.2 cm)
August 6	1.25 in (3.2 cm)
September 16	1.25 in (3.2 cm)

Several random corn plant counts were measured in 61 cm (2 ft) areas along the seed rows on July 12<sup>th</sup> for all three planters.

The corn was harvested for silage on October 3<sup>rd</sup> with a John Deere self propelled forage harvester.

## Results and Discussion

The desired plant stands for the different row spacings and the average actual plant stands for each planter used are listed in Table 3. Due to mechanical problems at the start of seeding with the AgTech plot seeder, a very heavy seed rate (296,170 seeds/ha or 80 lbs/ac) was applied for approximately 15 m (50 ft) on the first pass. The plant counts were measured on this over-seeded strip and observations were made.

**Table 3:** Desired and average actual plant counts for each seeding drill.

<i>Seeding Drill</i>	<i>Desired Plants per 61 cm (24 in)</i>	<i>Actual Plants per 61 cm (24 in)</i>
John Deere Row Crop Planter	2	2.9
AgTech Plot Seeder (Normal Rate)	1.6	4.3
AgTech Plot Seeder (Heavy Rate)	6.5	17.5
Flexi-coil Narrow Knife Seeder	1.2	3.5

The average actual plants per 61 cm (24 in) was 50% higher for the precision planter and 300% the desired population count for the other seeding systems. This indicates none of the drills had precise seed metering systems. The John Deere Row Crop Planter was the most accurate. All the plant stands for each drill appeared to be very good. Calibration of the metering systems for each drill was performed prior to seeding, but a longer calibration test is required for more accuracy.

The AgTech and John Deere seeders had very similar looking stands. There were no bare patches and the emergence looked very even indicating the metering systems metered evenly but at a high rate.

The Flexi-coil seeder had many bare patches and patches with dense growth, indicating surging of the meter system. The average plant population of the bare and dense areas was equal to the population stands of the other two seeders.

The heavy seed rate plant stand with the AgTech seeder was very dense but the growth was poor. The plants were yellow compared to the lush green appearance of the other seeder planted areas. The plants were also half the height of the plants in all the rest of the field throughout the growing season. The heavy seed rate area likely resulted in a poor plant yield.

A hail storm passed through the entire corn patch on August 10<sup>th</sup> causing significant damage. Yield results were not measured due to the damage. Silage harvest results taken on October 3<sup>rd</sup> indicated a 15 tonne/ha (6 ton/ac) yield at 62% plant moisture which is significantly low for this type of crop.

## Summary and Conclusions

Generally, any low disturbance type of seeder can be used to direct seed into alfalfa sod and result in good crop establishment. Direct seeding into sod with a herbicide resistant crop, will benefit the soil in all aspects and the alfalfa crop can be taken out of production effectively and efficiently while growing a crop for profit in the first season after an alfalfa crop.

Careful attention must be used when setting and calibrating the seeding unit to meter corn. The plant counts indicated none of the seeding units used for this demonstration had accurate metering.

## Acknowledgements

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