# Frost Seeding Winter and Spring Cereals

## Purpose:

To evaluate the potential of frost seeding to increase spring cereal yields and to extend winter cereal seeding opportunities.

## Methods:

Two replicate field length trials were established in from December 2005 to April 2006. Treatments included winter wheat and spring cereals seeded into frost (not frozen) soil at various dates. Spring cereal trials included treatments assessing seeding rates and final populations, as well as seed placed starter fertilizer trials. Populations evaluated included the lowest recommended seeding rate, the highest recommended seeding rate, and a rate approximately 20% higher than the highest rate. (0.8, 1.2, 1.6 million seeds/acre for oat, 1.2, 1.6, 2.0 million seeds per acre for spring wheat). Seed placed starter fertilizer trials used 50 pounds/acre of MAP (11-52-0) versus no starter fertilizer.

## Results:

Winter cereals were frost seeded at three locations, with the data presented in Table 1. Frost seeding of winter wheat was very successful at both the Lucan and Huron locations, indicating that winter wheat could be successfully seeded much later than traditional recommendations. The frost seeding at the Perth location was not successful, with a very poor stand surviving the winter. The main reason for this difference is thought to be the amount of frost in the ground at the time of seeding. At both the Lucan and Perth site, frost was at a minimum to carry the seeding equipment. The drill was easily able to penetrate the frost, and place the seed into the soil rather than on the soil surface. At the Perth location, the frost was considerably harder, and the drill was barely able to create a slot at all to drop the seed into. As a result, much of the seed remained at or near the soil surface. Without the insulating effect of soil to protect these seeds, many of them did not survive the cold temperatures and lack of snow experienced later in the winter. The resulting stand was extremely thin and would not be acceptable.

At both the Huron and Lucan sites, stands were acceptable but barely so. Seeding rates had been maintained at all locations at 1.6 million seeds/acre. Growers would be advised to increase seeding rates to a minimum of 2.0 million seeds/acre if considering seeding late into frost. However, these trials do indicate an opportunity for growers to help stands that have experienced difficulty from wet fall conditions, or when planting some wheat is essential to the growers operation and fall conditions do not permit this to occur.

**Table 1: Frost Seeded Winter Wheat**

| Site | Date Planted | Yield |
|---|---|---|
| | | bu/ac |
| Lucan | Dec.17, 2005 | 59.9 |
| Huron | Jan. 24, 2006 | 57.8 |
| Perth | Jan. 24, 2006 | 31.2 |

Spring cereals were frost seeded at three locations, with the data presented in Tables 2 through 5. The conclusion is OBVIOUS!! Frost seeding shows huge yield advantages, and impressive test weight gains. These differences appear exacerbated when a poor rotation is followed. Spring wheat following soybean shows much higher yields, particularly when seeded later into dry soil conditions, than following corn. Test weights respond in the same manner.

There appears to be a slight yield advantage to increased seeding rates under frost seed conditions that does not exist under dry soil conditions. However, it is doubtful if these yield increases offer an economical response, after seed costs are taken into account.

**Table 2: Thorndale Oat Data**

| | Yield | | Test Weight | |
|---|---|---|---|---|
| **Population** | **Frost** | **Dry** | **Frost** | **Dry** |
| | **bu/ac** | | **lbs/bu** | |
| 0.8 | 139.8 | 120.2 | 37.2 | 35.5 |
| 1.2 | 142.1 | 122.7 | 37.4 | 36.2 |
| 1.6 | 139.1 | 118.9 | 37.2 | 35.8 |
| Average | 140.3 | 120.6 | 37.3 | 35.8 |

**Table 3: Thorndale Spring Wheat after Corn**

| | Yield | | Test Weight | |
|---|---|---|---|---|
| | **bu/ac** | | **lbs/bu** | |
| **Population** | **Frost** | **Dry** | **Frost** | **Dry** |
| 1.2 | 53.2 | 35.5 | 54.8 | 51.7 |
| 1.6 | 63.8 | 40.0 | 59.0 | 51.7 |
| 2.0 | 64.6 | 42.7 | 59.9 | 52.6 |
| Average | 60.5 | 39.4 | 57.9 | 52.0 |

**Table 4: Thorndale Spring Wheat after Soybean**

| | Yield | | Test Weight | |
|---|---|---|---|---|
| | **bu/ac** | | **lbs/bu** | |
| **Population** | **Frost** | **Dry** | **Frost** | **Dry** |
| 1.2 | 66.8 | 55.6 | 60.7 | 59.0 |
| 1.6 | 65.9 | 58.7 | 61.0 | 58.9 |
| 2.0 | 70.4 | 58.1 | 61.0 | 59.3 |
| Average | 67.7 | 57.5 | 60.9 | 59.1 |

**Table 5: Huron site**

| Date Planted | Yield |
|---|---|
| | **bu/ac** |
| Jan. 24 frost | 49.3 |
| Mar.22 frost | 48.0 |
| April 21, dry | 32.9 |

## Summary:

Frost seeding trails on both winter and spring cereals has proven most successful. While there are some considerations around winter cereals (lower yield, less winter survival), spring frost seeding results are nothing short of incredible. Significantly higher yields and higher test weights make this a practice every grower should attempt!

## Next Steps:

Further study is required on winter cereal frost seeding. Further study is required on seeding rates for frost seeded spring cereals.

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## Location of Project Final Report:

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