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2009 Results, Issue 1  
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**Practice Highlights**

- Frost seed cheap red clover seed at 10 to 12 pound per acre in March or early April into winter wheat
- Mixing the seed with a spring granular fertilizer applications works well
- Check herbicide rotation restrictions so red clover is not injured by carry-over
- Choose fields with low weed populations because broadleaf weed herbicide options are few
- Red clover will be 6 to 8 inches tall at wheat harvest
- Red clover top growth can be used as a green manure, harvested for feed or grazed
- Nitrogen credit in corn will be 50 to 80 lbs/a. This practice has best returns when N fertilizer is expensive

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**Frost Seeding Red Clover into Winter Wheat Shows Potential**

**Background**

Past research in Iowa and southern Wisconsin has shown frost seeding red clover into winter wheat has the potential to be a valuable cover crop. A previous publication from the University of Wisconsin Nutrient and Pest Management Program by Stute and Shelley found numerous benefits from this practice including:

- Green manuring the red clover provided 50 to 80 lbs/a nitrogen credit in corn the following year.
- Fall forage potential range of 0.33 to 3.26 tons of biomass/a, depending on weather.
- Average forage biomass of 1.7 tons /a.
- Cover cropping may be eligible for cost share funds under conservation programs.

**Objective**

To determine if past successes of frost seeding red clover into winter wheat at other locations can be successful in Winnebago County soils, climate and conditions.

**Local Research and Demonstration Methods**

Three winter wheat growers in Winnebago County, near Fremont, Winneconne, and Oshkosh, provided a quarter acre in a corner of a wheat field for this research. Red clover was frost seeded with a hand-held broadcast spreader in 20 by 50 ft strips. One farm harvested corn silage in the previous year while two farms had soybeans. The frost seeding was performed on two dates, March 18-19 and April 8-9 in each field. On each date there were two applications. One application mixed 10 lbs/a of red clover with the granular fertilizer applied at a rate of 70 lbs/N per acre. The second application was 15 lbs/a of red clover alone. Ideally, both applications would have used 10 lbs/a but the spreader could not apply that low of rate.

**Methods continued...**

All frost seedings were performed in the morning with temperatures ranging from 28° to 45° F. At the time of spreading in March, the soils were very wet and somewhat thawed. In April, the temperature at spreading was colder than March so the soil surface was frozen yet moist when thawed later in the day. All soils were typical sticky clay loam or silty clay loam. These soils have a shrink-swell tendency improving the success of frost seeding. The winter wheat was 1 to 3 inches tall in March and 2 to 5 inches tall and tillering in April.

**Data Collection and Observations**

Emergence counts were taken on May 22. Red clover establishment results are presented below.

	<b>Red Clover Population Plants per ft<sup>2</sup></b>
<u>Farm</u>	
Fremont	7
Winneconne	12*
Oshkosh	18*
<u>Planting Date</u>	
March 18-19	10
April 8-9	15
	Not Different
<u>Seeding Rate</u>	
15 lbs/a	15*
10 lbs/a	9
	* Statically Greater

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# Winnebago County Agriculture Community Based Research Summary

## Frost Seeding Red Clover into Winter Wheat Shows Potential continued...

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### Establishment Data Collection and Observations

The clover did not establish as well at the Fremont location as the other fields. The Fremont location had corn silage in the previous year. While collecting emergence data, some red clover seedlings clearly had bleached leaves and necrotic leaf margins. Upon further discussion with the farmer, it was learned the herbicide Lumax was applied to the corn in the spring of the previous year. Lumax contains an active ingredient called mesotione, a pigment inhibitor, with symptoms typical of the damage found in the clover. Lumax has an 18 month crop rotation restriction before planting a crop such as red clover; therefore insufficient time had passed. This served as a reminder to review the herbicide history before trying a new cropping practice.

Clover established better at the Winneconne location; however it was noted that within a plot, there were stony areas where the clover did not establish as thick. The Oshkosh location, which was a long time no-till field, had excellent establishment in all areas of the plots.

In 2009, planting between March 18 and April 9 did not influence the clover density. Frost seeding any crop should be timed when there is a pattern of freeze-thaw cycles over night to day. This opens up cracks in the soil improving seed to soil contact. Seeding before mid-March is not recommended because plants could germinate too early and be frost damaged later.

Plant density was directly related to seeding rate. Seeding at 10 pounds and acre resulted in 9 plants/ft<sup>2</sup> and seeding at 15 pounds per acre resulted in 15 plants/ft<sup>2</sup>. Mixing the clover into the fertilizer was a convenient way to consistently spread the seed at the desired rate of 10 lbs/acre.

**June 2, 2009: Three inch tall red clover in the understory of winter wheat in the no-till field. Box elder seedlings can also be found.**



**October 16, 2009: Eight to ten inch tall red clover (right) suppressing foxtail (left) otherwise found in the fallow untreated areas.**

### Growth Data Collection and Observations

No herbicides were used during the growing season on these plots. MCPA amine appears to be the only broadleaf herbicide that can be used in wheat that will not also kill the red clover. Overall, weed density was low.

Plant height data was collected during the first two weeks in July. The Fremont and Winneconne fields had clover that was 6 inches tall on July 9 and the Oshkosh field had clover that was 8 inches tall on July 14. For farms interested in baling clean wheat straw, the cutter bar height should be approximately 8 to 10 inches above the ground so clover is not also harvested. The clover will not be adversely affected if clipped as part of harvest.

Considering the short height of the clover and information from past research, it is unlikely wheat yield was adversely affected by the clover; however, due to the small plot size, there are no treatment yield estimates available from this study.

The Winneconne plot was located next to a cow yard and provided a nice pasture area after wheat was harvested and clover re-grew. Cows quickly grazed the forage. This indicates wheat fields adjacent to cow yards could be good candidates for frost seeding. Be mindful of bloat from grazing fresh clover though.

The no-till field had achieved 8 to 10 inches of growth before the killing frost. The stand, pictured above, was very thick and could potentially be harvested had the temperature been warm enough in 2009 to encourage more top growth. The clover should be killed in late fall with herbicides.

Pre-sidedress nitrate samples will be collected in 2010 to verify nitrogen credits from the red clover cover crop.