

Conclusions from Organic Wheat Experiment Valuable For Both Organic and Conventional Wheat Producers

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This past summer Dr. Hans Kandel, Extension Educator in Red Lake County, and I conducted an experiment to evaluate non-chemical methods for weed control in spring wheat. There are a number of organic producers in the region, and production has been primarily focused on one crop – soybeans. Organic certification requirements dictate that farmers must have acceptable crop rotations. Usually, a given crop can only be grown once every three years. Organic farmers are in great need of an acceptable, economically viable crop to rotate in a production system with soybeans. Hard red spring wheat (HRSW) is an excellent rotational crop in a system with soybeans. There appears to be reasonable market demand for organically grown HRSW. However, many organic farmers are reluctant to grow HRSW because of concerns about weed control. The results of the study we conducted have turned out to be valuable to both organic and conventional wheat producers.

The Experiment

Two HRSW varieties were selected, Alsen and Reeder, that had good yield potential, good protein and baking quality characteristics, and good levels of resistance to fusarium head blight and common leaf diseases. There were two planting dates, May 14 and May 28. There were three different harrow treatments ranging from 3 to 6 passes with a 4 bar spring tooth harrow. In total there were 12 treatments and 24 plots (two replicates x two planting dates x two varieties x three harrow treatments). The experiment was conducted on a field used for certified organic production.

Stand counts were taken before and after each harrow operation to determine stand loss due to harrow operations at different stages of wheat development. Visual evaluations of weed control were taken prior to harvest. At maturity, plots were harvested and yield, moisture content, protein, and test weight data were obtained.

Results

Stand and Weed Control

Harrowing produced a similar amount of stand reduction in both Alsen and Reeder. The May 28 planting date had slightly better stand (8%) than the May 14 planting date.

Harrow treatment effects on stand were as follows:

- Initial plant populations ranged from 1.40 to 1.71 million plants/A.
- Final stands ranged from 1.21 to 1.42 million plants/A.
- Total stand loss ranged from 12% (May 14 planting, 3 harrow treatments) to 24% (May 28 planting, 6 harrow treatments).
- There was slightly more stand loss due to harrow treatments for the second planting date (18%) than for the first (14%).
- 3-4 harrow operations – average total stand loss = 14%
- 4-5 harrow operations – average total stand loss = 18%
- 5-6 harrow operations – average total stand loss = 18%

Weed control was evaluated visually using a relative number scale of 1 to 5, where 1 = no weeds present and 5 = very weedy. Weed control was not significantly affected by planting date or number of harrow operations. There was, however, a significant varietal effect: Reeder apparently competed better against weeds, and had a better weed score than Alsen.

| Variety | Weed Control Score | |
|---------|--------------------|-----------------|
| Alsen | 2.69 | |
| Reeder | 2.32 | LSD (0.05) 0.35 |

Take Home Lesson on Stand and Weed Control:

Harrowing early results in more wheat stand reduction, however other research indicates that early harrowing is essential for effective weed control. Late harrowing does not reduce wheat stand, but is generally not effective for weed control. Harrowing can be an extremely effective form of weed control if done when weeds are in the 'white stage' (after they have sprouted but before they have emerged and turned green). Harrowing is an essential tool for organic growers, and an under used one for conventional growers. Conventional growers can potentially save the cost of a post-emergence grass herbicide by using timely harrowing. A grower should increase seeding rate by 10% pure live seed for every harrow operation planned. Reeder compete more effectively with weeds than Alsen in this study.

Yield

The variety Reeder out-yielded the variety Alsen by 5.1 Bu/A (Fig. 1). May 14 planting resulted in a 10 Bu/A yield increase compared to the May 28 planting (Fig. 2).

The number of harrow operations did not significantly affect yield (Fig. 3).

Take Home Lessons on Yield:

In organic HRSW production, just as in conventional HRSW production, varietal selection is very important. Disease resistance and protein potential are particularly important to the organic farmer. In this research study one variety, Reeder, had better yield, protein, and competitiveness against weeds than the other variety, Alsen. Planting date is also very important. Early planting is as important to the organic farmer as it is to the conventional farmer. In this study a 14 day delay in planting resulted in a 10 Bu/A yield loss. It was postulated that in an organic system delayed planting may be beneficial for weed control by allowing for control of the first flush of weeds by tillage prior to planting. However, in this study delayed planting resulted in lower yield and was not beneficial for weed control, and had the same amount of weed pressure as early planting.