

WINTER WHEAT PRODUCTION IN CENTRAL SASKATCHEWAN

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INTRODUCTION

Winter wheat can not be successfully grown on summerfallow, in Central Saskatchewan, due to winter kill. Work done by researchers and farmers, indicates that it might be possible to prevent or reduce winter injury, by modifying management practices. Seeding directly into standing stubble and using the stubble to trap snow may increase winter survival. It was felt that winter wheat would fit well into Saskatchewan Wheat Pool's existing Zero Till Program.

Some advantages of winter wheat are as follows:

1. Re-distribution of labour requirements.
2. Protection of the soil from wind and water erosion.
3. Increased weed competition.
4. Early development reduces the risk of diseases such as rust.
5. Pasture and forage potential.
6. Yield.
7. Early maturity.
8. Higher returns than fall rye.

Some of the disadvantages of winter wheat (in standing stubble) are as follows:

1. Winter kill?
2. Market potential.
3. Harvest of previous crop may not be completed in time for optimum seeding date.
4. Drought at seeding may reduce germination.
5. Special drill may be required to seed through heavy straw.
6. Difficult to deep band nitrogen.
7. Increase in certain disease such as snow mold.

OBJECTIVES

To determine the commercial feasibility of producing winter wheat in standing stubble using field scale equipment.

METHODOLOGY AND OBSERVATIONS

The Haybuster 1205 No Till Drill, was used for the 1978-79 and 1979-80 tests. In the fall of 1980, a Noble 2000 Hoe-press drill, with narrow openers was used to compare methods of seeding. All tests, except the fallow comparisons and worked stubble, took place on zero till blocks.

Norstar winter wheat treated with liquid Vitavax was used through out the program.

Soil tests were completed on all blocks for each year of the program. Nitrogen fertilizer was broadcast with a Barber Spreader on all blocks.

1978-79

The 1978-79 study consisted of one 1.7 hectare block (Block H), seeded conventionally to barley in 1977, and zero till Neepawa wheat in 1978. The 1978 Neepawa crop yielded 3,360kg/ha (50 bushels/acre) and trash management was not used. Treated Norstar was seeded 3cm deep at a seed rate of 84kg/ha on September 26, 1978. Phosphate fertilizer, at 82kg/ha, 11-51-0 was placed with the seed. Ammonium nitrate at 95kg/ha nitrogen, was broadcast on the plot October 25. A spray treatment of 0.28kg/ha (4 oz.) of 2, 4-D was applied October 18.

In 1979, a Hoe-torch tank mix was sprayed June 5. Rain occurred within 1/2 hour of the treatment and the plot was resprayed June 11.

The crop was swathed August 13 and combined August 24.

Observations

The heavy straw from the previous crop caused significant seeding problems with the haybuster drill. Heavy straw and chaff were pushed into the double disc opening during seeding, which resulted in the seed being surrounded by crop residue instead of soil. This problem, in spite of adequate moisture, resulted in only a 40% establishment of the crop.

In spring, no winter kill was observed on the plot, however, 100% winter kill occurred on a nearby summerfallow plot of winter wheat. Due to the thin stand, volunteer barley and wild oats were severe problems. In addition, the 2, 4-D applied in the fall did not kill flixweed. As a result, a thin, weed infested stand of winter wheat occurred. Maturity was also delayed by the late seeding date and the thinness of the stand.

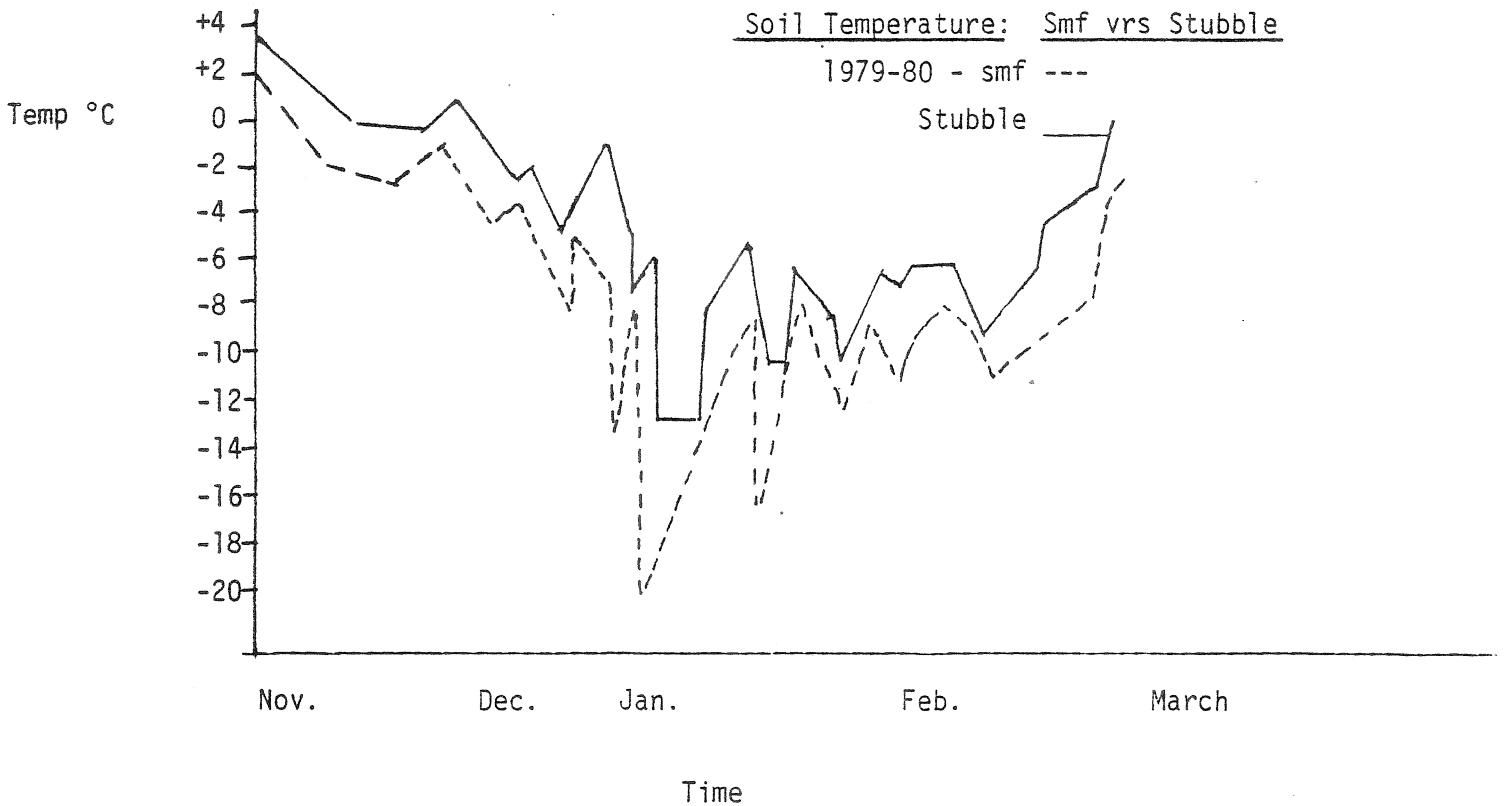
The block yielded 1,657kg/ha (24.9 bushels/acre) which included 20% dockage (again mostly volunteer barley.)

1979-80

Two 1.7 hectare blocks were used to test winter wheat in 1979-80. Block H previously cropped to winter wheat and block G, which was zero till chemical summer-fallow, were used for the test. Both blocks were seeded at 70kg/ha (with 60 kg/ha 11-51-0) on September 7, 1979. A similar seeding operation was carried out on a summerfallow area. Urea at 67kg/ha nitrogen was broadcast November 6, on 3cm of snow.

Thermocouples were placed 5cm deep in block G, and on a nearby summerfallow block, and soil temperatures recorded twice weekly from November to June.

A graph showing the results follows.



In the spring of 1980, 0.56kg/ha of 2, 4-D (8 oz.) was sprayed on both blocks to control winter annuals. Hoe-grass was sprayed May 13, and Bucril M, May 30, to control weeds.

Block G (winter wheat on chemical fallow) was swathed August 12, and combined September 1, 1980.

Observations

Crop residue was not a problem in 1980, due to the previous light crop of winter wheat on block H, and chemical fallow on block G. As a result, seed placement was excellent on both blocks. Dry weather before and after seeding, resulted in a dry seed bed on the winter wheat stubble, and less than 10% emergence occurred prior to freeze up. This block was taken out of production in June, 1980. Moisture reserves were excellent on block G (chemical fallow) and an excellent stand of winter wheat became established. The crop was at the 4 leaf stage at freeze up.

In spring, winter kill was not observed on either block, while 100% winter kill occurred on a nearby summerfallow field. Soil temperature measurements correctly predicted the survival of winter wheat in stubble and winter kill in summerfallow. Two small areas of block G were covered by water in spring and did not survive. Block G was very weed free and spraying post-emergently may not have been required.

Extremely hot, dry conditions in April, May and June had a stressful effect on the winter wheat and limited the potential yield. The Norstar yielded 2,169kg/ha (32.3 bushels/acre) of good quality wheat which contained very little dockage.

FALL 1980

In an expansion of the program, 4 separate blocks were seeded to winter wheat. Treated Norstar was seeded on the following areas:

1. Winter wheat stubble.
2. Chemical summerfallow
3. Worked stubble (tandem disc)
4. Conventional summerfallow

In addition to the haybuster, a Noble 2000 hoe-press drill equipped with narrow openers was used to compare seeding methods.

All blocks were seeded 5cm deep, September 10, 1980 at a seed rate of 70kg/ha with 11-51-0. 2, 4-D at 0.56kg/ha (8 oz.) was sprayed on all plots October 27, 1980. Urea at 56kg/ha N was broadcast on snow December 15 on the winter wheat stubble and on the worked stubble. Nitrogen was not applied to the chemical fallow or conventional fallow blocks.

Observations

All 4 blocks established a moderately good stand by freeze up. Emergence and establishment was slightly improved with the hoe drill. Very little standing stubble was left on the chemical fallow block, so this may have an effect on winter survival.

CONCLUSIONS

It has been demonstrated that winter wheat can survive in Central Saskatchewan when seeded directly into standing stubble, provided good establishment can be achieved in the fall.

Further research will be needed to determine the management techniques required to improve fall establishment of this crop.

If management methods can be found that will increase the establishment in the fall, winter wheat may become a commercially viable crop in the future.

GEH/je

REFERENCES

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