

## WINTER WHEAT AGRONOMY SURVEY

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### Introduction

A weed survey of Saskatchewan winter wheat fields was organized in 1985 and 1986, by A.G. Thomas and R.F. Wise from the Agriculture Canada Research Station in Regina, Saskatchewan. Weeds were counted in a total of 804 fields during the two-year survey.

In order to obtain information on management practices used by winter wheat growers, a questionnaire was mailed to the owner operator of each surveyed field. Supplementary information on cropping history, crop production, and weed control was obtained in the questionnaire. The essential purpose of the questionnaire was to provide background data that might aid in the understanding of variation, density and distribution of weeds.

This survey depended on a voluntary completion and return of the questionnaire. Only 47% of the surveys were returned in 1985. This is a relatively low return compared to other weed survey projects and may be partially due to the scarcity and difficulties in locating the fields and in determining who farmed the land. However in 1986 70% of the questionnaires were returned.

In 1985 a fairly uniform distribution of surveyed fields occurred across the province. However, due to the late harvest of 1985 few winter wheat fields were sown in the northern and south-eastern parts of the province. Therefore, a majority of fields in the 1986 survey were located in

the southwestern portion of the province. When interpreting the data from the questionnaire it is important to remember which area of the province the survey represents.

The remainder of this paper will look at the agronomic practices used by the surveyed growers over the two year period and interpret differences or similarities in these procedures. Recommendations for winter wheat production and actual "in the field" production procedures will also be compared.

### RESULTS AND DISCUSSION

Most growers had indicated that they had used home grown seed or seed obtained from another farmer. The 20% increase in the use of home grown seed from 1985 to 1986 was likely the result of more seed being available after 1985's winter wheat crop (Table 1). Home grown seed is a good seed source if it has been properly cleaned and is of good quality. Nearly 50% of the seed used during the 2 years of the survey had been cleaned at country elevators (Table 2). Approximately 30% of the seed was cleaned at stationary cleaning plants. The latter is a much better system for giving weed free seed, important for good weed management.

Table 1: Source of Winter Wheat Seed

Source	Percentage (based on acreage)	
	1985	1986
Home grown	49.9	71.5
Other farmer	31.3	19.2
Seed grower	15.3	5.7
Elevator agent	0.3	2.3
Seed company	3.1	1.3

**Table 2: Method of Cleaning Winter Wheat Seed**

Source	Percentage (based on acreage)	
	1985	1986
Country elevator	47.7	45.4
Stationary seed cleaning plant	36.1	25.4
Mobile seed cleaning plant	8.1	19.0
Farm cleaned	8.0	10.2

The seeding operation is the most important step in the successful production of stubble-in winter wheat. At extension meetings one thing always rings loud and clear; seed into standing stubble, seed shallow and seed on time.

It has been shown that 8 cm of unpacked snow, will provide excellent insulation cover to overwinter winter wheat. Standing stubble is an excellent means of catching the snow and this is crucial for winter wheat production. The questionnaire responses indicate that the growers know the importance of this snow cover and are very careful when harvesting the stubble crop to maintain adequate stubble height (Table 3). As shown in Table 4, 85% of the winter wheat acreage is seeded into standing stubble. Drills with minimum disturbance to the stubble are being used throughout the province as shown in Table 5.

**Table 3: Height of Standing Stubble when Winter Wheat was Seeded**

Height (cm)	Percentage (based on acreage)	
	1985	1986
8-15	9.7	14.9
16-25	68.3	41.8
26-35	18.1	34.3
36-60	3.9	9.0

**Table 4: Type of Seedbed Used for Winter Wheat Crop**

Category	Percentage (based on acreage)	
	1985	1986
Standing untilled stubble	82.0	88.9
Tilled fallow *	9.4	5.1
Chemical fallow	--	4.4
Tilled stubble	8.6	1.5

\*Tilled and chemical fallow were not differentiated on the 1985 questionnaire.

**Table 5: Implements Used to Seed Winter Wheat fields**

Implements	Percentage (based on acreage)	
	1985	1986
Hoe press drill	30.7	41.2
Air seeder	36.2	34.7
Double-disc press drill	11.4	20.0
Double disc drill	6.6	4.2

Seeding date may be the weakest area of winter wheat grower production practices. In 1985 large percentages of the acres sown to winter wheat in all soil zones were seeded late according to the recommendations (Table 6). In 1986 a definite improvement was made in the brown and dark brown soil zones. The black and gray soil zones actually seeded later in 1986 than in 1985, probably due to the late harvest of the 1985 crops.

Table 6: Seeding Dates of Winter Wheat Fields

Dates	Percentage of Acreage							
	Brown		D. Brown		Black		Gray	
	85	86	85	86	85	86	85	86
Aug. 18-31	3	9	4	8	-	13	32	33
Sept. 1-14	22	33	39	61	57	37	52	33
15-28	62	48	48	26	40	37	18	34
Oct. 29-12	14	5	10	4	3	2	-	-
13-26	-	3	-	1	-	-	-	-

Seeding depth and rate data was only collected in the 1986 questionnaire survey. As shown in Table 7, 45% of the winter wheat was sown between 1.0 and 2.5 cm, which is well within the recommended depth of 4 cm or less. Of those surveyed, 44% reported that they seeded at a rate of 1 bushel/acre (51-60 lbs/acre) and 24% seeded at 1.5 bushels/acre (71-90 lbs/acre) (Table 8). The higher seeding rates probably occur in the areas of higher moisture in the black soil zone.

**Table 7: Depth Used to Sow Winter Wheat (1986)**

Depth (cm)	Percentage (based on acreage)
1.27	4.8
2.54	40.5
3.81	33.4
5.08	14.1
6.35	2.7
7.62	4.1
10.16	0.4

**Table 8: Seeding Rate of Winter Wheat**

Rate (lbs/acre)	Percentage (based on acreage)
20-40	10.0
41-50	12.2
51-60	43.9
61-70	7.9
71-90	23.8
91-120	2.2

Table 9 shows the crops grown previous to the winter wheat crop. In 1986 only 14.6% of the acreage of winter wheat was seeded on an oilseed crop stubble compared with 31.6% in 1985. At first glance it appears that the acreage of these crops is down in 1985 but in reality the majority of the surveyed fields occurred in the southwest which is not an oilseed production area. Spring cereal crops account for 42.3% of the previous crop in the 1986 survey. In 1986 10.8% of the winter wheat was grown on fallow land. A surprisingly large percentage (32%) of the acres of winter wheat were seeded on winter wheat stubble. Producers in the dry areas of the

province must not feel that winter wheat on winter wheat stubble will lead to disease problems.

**Table 9: Crop Grown Previous to Winter Wheat**

Crop	Percentage (based on acreage)	
	1985	1986
Spring cereal	39.9	42.3
Oilseed	31.6	14.6
Winter wheat	10.5	32.0
Fallow	11.8	10.8
Other	6.3	0.3

Winter wheat is a good crop to use in extended rotations. Only 9% of the winter wheat in Saskatchewan was grown in a crop-fallow rotation (Table 10). Winter wheat grown in a fallow-crop-crop rotation accounted for 42.4% of the acreage grown. The other 48% was grown in some type of continuous cropping system.

**Table 10: Cropping Practices for the Last Six Years**

Category	Percentage (based on acreage)
Six years continuous crop	17.9
Five years of crop and one year of summerfallow	30.7
Four years of crop and two years of summerfallow	42.4
Three years of crop and three years of summerfallow	9.0

Winter wheat responds very well to fertilizer; especially nitrogen. The most popular fertilizing system used in winter wheat production is an application of ammonium phosphate in the fall with the seed followed by a broadcast application of ammonium nitrate in the spring. About 20% of the growers used a one time application of fertilizer in the fall or spring (Table 11 and Table 12). The average granular rates of nutrients applied with the seed over the 2 year survey period was 12 kg/ha of nitrogen and 26 kg/ha of phosphate, probably in the form of ammonium nitrate (11-51-0). The most popular nitrogen source in the spring is a broadcast application of ammonium nitrate (34-0-0). The average application rate was 40 kg/ha. Some producers are using a blend of 34-17-0 which is also broadcast in the spring and no ammonium phosphate is applied at seeding. Spring applied phosphate averaged 30 kg/ha (Table 13).

**Table 11: Number of Fertilizer Treatments Used on Winter Wheat Fields**

Number of Treatments	Season	Percentage (based on acreage)	
		1985	1986
1	Fall	17.9	22.4
1	Spring	25.4	15.0
2	Fall and Spring	52.3	54.7
2	Fall	3.1	2.6



**Table 12: Methods Used to Apply Fertilizer to Winter Wheat Fields**

Method	Percentage (based on acreage)	
	1985	1986
Broadcast	52.7	47.8
Seed-placed	44.8	40.4
Banded	1.7	6.1
Sprayed	0.7	5.8

**Table 13: Average Granular Rates of Nutrient**

Nutrient	1985 (kg/ha)	1986 (kg/ha)
Nitrogen-Fall	11.5	12.2
-Spring	44.4	38.5
Phosphorus-Fall	26.4	25.5
-Spring	33.7	25.0

### Conclusion

The most important production factors that are over looked by winter wheat growers is the timeliness and depth of the seeding operation. Growers have realized that snow cover is crucial in the production of winter wheat and have adopted the stubble-in theory quite well. Implements are used for seeding that leave plenty of stubble standing for snow catch. In general it appears that the growers have adopted a fairly good fertility program that is so important in winter wheat production.

All in all winter wheat producers appear to be getting a fairly good grasp on the stubble-in production system, for growing winter

wheat. Extension services in the past have been excellent and with a little more help to the growers and some help from mother nature, winter wheat production should continue to be viable in all areas of Saskatchewan.

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