

# Wild Oats Infestation of Field Crops in 1973

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Economic loss from wild oats infestations in 1973 probably was greater than in past years because of the higher prices obtained for agricultural products, the early spring crop seeding and the long period of wild oat emergence. Nevertheless, one probably can say safely that even in years of lower infestations, wild oats is North Dakota's No. 1 pest.

Wild oats has long been known for its sovereignty in many agricultural fields throughout North Dakota, with heaviest infestations occurring in the Red River Valley. Wild oats was estimated to cost the state of North Dakota approximately \$35 million in yield losses, and production and marketing expenses in the 1950's.

In 1973, a survey was conducted to obtain a more up-to-date estimate of the degree of wild oats infestation in wheat and barley fields in the area. Fields were observed and then rated for their estimated density of wild oats infestation as research and extension personnel traveled by automobile to various field day tours. Estimates were visual because a large sample representative of the entire state was desired. Time required to make actual wild oats density counts would have limited the sample with the available time

and personnel. Visual estimates were based upon the appearance after heading of plants in competition research plots containing known wild oats infestations. Further, actual counts were made in fields at a later date to validate the wild oats density estimates.

Levels of infestation were rated on a scale of 0-10. A field with no visible wild oats was rated as 0. Ratings of 1 and 2 were given to fields with low levels of infestation, indicating only slight yield losses. This group often included fields which obviously had been treated for wild oats control but exhibited sprayer skips. A rating of 3 was given to fields exhibiting a level of infestation high enough for which we considered that control measures would have been warranted economically to reduce yield losses from wild oats competition. Ratings were given up to 10, with 10 indicating a field so heavily infested that determination as to whether or not it might

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**Table 1. Number and per cent of wheat fields with various ratings of wild oats infestation as determined through observation by weed science personnel from an automobile along selected routes.**

Rating 0-10	Fargo to Crookston		Fargo to Grand Forks		Fargo to Wahpeton		Mapleton to Valley City, and Jamestown to Carrington		Williston to Waford City		Dickinson to Mandan		Average	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	8	7	6	5	19	24	17	19	5	7	8	6	63	10
1	13	11	17	14	18	23	19	21	16	23	27	21	110	18
2	14	12	16	13	9	11	19	21	17	25	17	13	92	15
3	23	20	21	18	5	6	10	11	9	13	23	18	91	15
4	15	13	17	14	14	18	9	10	7	10	18	14	80	13
5	12	10	7	6	0	6	5	5	5	7	15	12	44	8
6	12	10	12	10	2	3	5	5	3	4	6	5	40	7
7	11	9	12	10	5	6	0	0	4	6	11	9	43	7
8	7	6	7	6	0	0	3	3	3	4	3	2	23	4
9	1	1	3	3	5	6	3	3	0	0	1	1	13	2
10	0	0	2	2	2	3	1	1	0	0	0	0	5	1
Total	116		120		79		91		69		129		604	

**Table 2. Number and per cent of barley fields with various ratings of wild oats infestation as determined through observation by weed science personnel from an automobile along selected routes.**

Rating 0-10	Fargo to Crookston		Fargo to Grand Forks		Fargo to Wahpeton		Mapleton to Valley City, and Jamestown to Carrington		Williston to Watford City		Dickinson to Mandan		Average	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	19	21	10	20	13	26	10	18	1	4	1	3	54	18
1	19	21	6	12	13	28	13	24	8	32	6	19	66	22
2	14	15	9	18	7	14	16	29	5	20	5	16	56	18
3	19	21	4	8	8	16	9	16	3	12	4	13	47	15
4	13	14	6	12	2	4	4	7	4	16	1	3	30	10
5	4	4	6	12	1	2	0	0	0	0	3	10	14	5
6	3	3	2	4	3	6	0	0	2	8	1	3	11	4
7	0		4	8	0	0	1	2	1	4	5	16	11	4
8	0		1	2	1	2	2	4	1	4	2	6	7	2
9	0		1	2	1	2	0		0		3	10	5	2
10	0		0		0		0		0		0		0	
Total	91		49		50		55		25		31		301	

possibly be a tame oats field was extremely difficult.

Drs. Alan Dexter, Stephen Miller, Calvin Messersmith, Lawrence Mitich, John Nalewaja, Jerzy Pudelko and Kazimierz Adamczewski and research assistants Steven Hudson, Gary Schultz and Joel Knudson all were involved in conducting the survey. Three to five of these research persons were involved in a given segment of the survey.

A summary of the survey results on wild oats infestations in wheat and barley fields along the selected routes is presented in Tables 1 and 2. Ninety per cent of all wheat fields in the survey area contained some degree of wild oats infestation, and 57 per cent of the fields were so heavily infested that they received a rating of 3 or more. Conversely, only 10 per cent of the wheat fields appeared free of wild oats infestation. Barley fields were infested less with wild oats than wheat fields, with 18 per cent of the barley fields having no wild oats and 41 per cent with an infestation rating of 3 or more.

Lower levels of wild oats infestation in barley than in wheat fields probably are a result of barley's better competitive ability. A light wild oats infestation in barley would be suppressed and might not be visible to an observer in an automobile. Further, barley often is seeded later than wheat, and with the later or extra tillage to reduce the stands of early emerging wild oats

the competitive advantage of barley becomes very beneficial.

Distribution of fields at the various levels of wild oats infestation was similar along all routes from which the estimates were made. However, the area along I-29 north of Fargo had the highest wild oats infestation, with approximately 70 per cent of the wheat fields rated 3 or more.

Fields on the northern border of North Dakota were omitted from the survey. When this survey was conducted enroute to various field days or tours, the growing season in the northern part of the state had not progressed enough for wild oats to be visible in the grain fields.

Wheat and barley production losses in North Dakota from wild oats infestation were estimated at 57 and 16 million bushels, respectively (Table 3), from this 1973 survey. These losses were based upon the Crop Reporting Service's July 1 predicted production, estimates of yield losses and extent of wild oats infestation. The estimate of the per cent yield loss was set at 5 per cent increments between 0 and 50 per cent for the 0 to 10 infestation ratings (Table 3). This assessment appeared logical and realistic based upon competition studies we have conducted in the past. A 5 per cent yield loss for a field with a rating of 1 was perhaps somewhat high, since some fields in this group were only partly infested. However, the 50 per cent yield loss in fields having a rating of 10 probably was conservative.

Another source of potential error in the estimated yield losses might possibly occur if the selected areas surveyed were not representative of the entire state. However, the similarity in levels of wild oats infestation among the various areas surveyed indicated that the fields observed were representative of all fields in North Dakota.

These observations of infestation levels and estimates of yield losses reveal that wild oats cost North Dakota a \$195 million loss in reduced wheat and barley yields, assuming wheat at \$3.00 and barley at \$1.50 per bushel (the loss would be much greater if late 1973 price levels are used). Even this staggering cost is only a part of the total economic loss, since it does not include any yield losses from wild oats competition in such other crops as flax, oats, soybeans, sugar beets or sunflowers. Further, the estimate does not include the losses and cost that wild oats cause through extra transportation and storage, expenses for chemical and mechanical control of wild oats, increased dockage discounts at marketing and yield losses from delayed seeding for wild oats control.

The \$195 million, or approximately 19 per cent loss from wild oats infestations in wheat and barley fields, appeared unrealistic at first to the author. We considered that perhaps the "windshield survey" gave an overestimate of the level of wild oats infestation. Thus for validation purposes, another survey was conducted in which wild oats infestation levels in fields were esti-

mated from the windshield, and then numbers of wild oats per square yard were determined by actual counts in the field. Four areas were sampled in each of the six fields. The wild oats infestation rating and the average number of wild oat plants per square yard are given below:

Field	Infestation rating	Average wild oat plants/yard <sup>2</sup>
1	4	126
2	3	81
3	6	189
4	4	108
5	3	90
6	3	81

These results obtained from actual field counts indicated that our estimates of yield losses based on the 5 per cent increased loss for each added level of infestation rating probably was conservative. The fields rated as having an infestation of 3 actually had over 80 plants per square yard. Based upon previous research<sup>1</sup>, fields with a rating of 3 would cause a 25 per cent yield loss.

In our present survey, we estimated the yield loss from wild oats in fields rated 3 as being only 15 per cent.

<sup>1</sup> Bell, A. R. and J. D. Nalewaja. 1967. Wild oats cost more to keep than to control. *N. D. Farm Res.* 25:7-9.

**Table 3. Potential wheat and barley production in 1973 if wild oats had not been present in the fields.**

WHEAT					BARLEY				
Wild oats infestation Level	% Fields	Estimated yield loss, %	1973 production <sup>1</sup> Mil. Bu.	Potential production Mil. Bu.	Wild oats infestation Level	% Fields	Estimated yield loss, %	1973 production <sup>1</sup> Mil. Bu.	Potential production Mil. Bu.
0	10	0	24.7	24.7	0	18	0	17.1	17.1
1	18	5	44.5	46.8	1	22	5	20.9	22.0
2	15	10	37.0	41.1	2	18	10	17.1	19.0
3	15	15	37.0	43.5	3	15	15	14.2	16.7
4	13	20	32.1	40.1	4	10	20	9.5	11.9
5	8	25	19.8	26.4	5	5	25	4.7	6.3
6	7	30	17.3	24.7	6	4	30	3.8	5.4
7	7	35	17.3	26.7	7	4	35	3.8	5.8
8	4	40	9.9	16.5	8	2	40	1.9	3.2
9	2	45	4.9	8.9	9	2	45	1.9	3.5
10	1	50	2.5	5.0	10	0	50	0	0
Total			247.0	304.4	Total			94.9	110.9
Loss from wild oats				57.4	Loss from wild oats				16.0

<sup>1</sup> Production is based upon the Crop Reporting Service July 1 estimated production.