ERGOT IN CEREALS IN WESTERN CANADA IN 1953

I. L. Conners

There has been some concern in the last few years over the prevalence of ergot in cereals, particularly wheat, in Western Canada. In order to obtain some basic data, the four Plant Pathology Laboratories, of the Botany and Plant Pathology Division, located in the Prairie Provinces undertook to conduct special field surveys for ergot or give the disease special attention when cereal crops were being observed for other diseases. The data thus obtained have been made available for summary.

Table 3. Fields of Wheat inspected for Ergot by Province and Crop District, 1953

	Manitoba		Saskatchewan		Alberta	
C.D.	Total	Ergot	Total	Ergot	Total	Ergot
1	7		16	2	56	
2	26	2	18		89	1
3	37	1	27	4	17	
4	4	1	14	2	27	
5	2		25	2	40	10
6	4	1	48	4	57	17
7	15	3	24	6	77	22
8	18	1	22	2	53	17
9	8		18		2	
10	8				48	11
11	8	1			18	2
12	3				-	
13	3				11	
14	-				25	2
15					23	
16					102	4
Total	143	10	212	22	645	86
% Ergot		7.0		10.4		13.3

Table 4. Fields of Barley inspected for Ergot by Province and Crop District, 1953

	Manitoba		Saskatchewan		Alberta	
C.D.	Total	Ergot	Total	Ergot	Total	Ergot
1	2		3		15	
2	23	2	4		22	1
3	21		4		9	
4	5	1	1		6	
5	-		2	1	6	1
6	2		2		21	5
7	3		5	4	12	4
8	7		6		46	1
9	2		2	1	4	1
10	8	2			25	5
11	2				34	3
12	5	1			-	
13	4				10	1
14	1				56	4
15					17	
16					93	1
Total	85	6	29	6	376	27
% Ergot		7.1		20.7		7.2

Table 5. Fields of Rye inspected for Ergot by Province and Crop District, 1953

	Manitoba		Saskatchewan		Alberta	
C.D.	Total	Ergot	Total	Ergot	Total	Ergot
1	3	3	-		2	2
2	7	7	-		4	
3	10	10	-		1	
4	1	1	-		-	
5	-		-		2	2
6	2	2	-		5	3
7	4	4	1	1	9	7
8	7	7	-		2	1
9	1	1	2	1	-	
10	1	1			3	
11	4	4			-	
12	1	1			-	
13	2	2			-	
14	-				7	7
15					-	
16					23	9
Total	43	43	3	2	58	31
%Ergot		100.0		66.7		53.4

The results of the surveys for ergot in wheat, barley and rye are shown in Tables 3-5. It is evident from Table 3 that ergot in wheat was heaviest in Alta., where in Crop Districts 5-8 over 25% of the fields examined were affected. A similar concentration occurred in Crop District 7 of Sask. A map (Fig.2) perhaps shows the distribution more graphically. Each field found affected in Sask. is represented by a large dot. In the other two provinces, each dot, large or small, represents a place where one or more affected fields were encountered. The large dots in Man. and Alta., along with those in Sask., denote the relative prevalence of ergot in wheat across the Prairies. In Man., the varieties affected were: Lee, 5 fields; Redman, 4; and Garnet, 1; but the clean fields were not identified to variety.

The surveys for ergot in barley (Table 4 and Fig.2) reveal that the level of infection and distribution pattern in the crop is similar to that of wheat. The number of fields observed in Sask. was limited. However, in Crop District 7 of both Alta. and Sask., over 25% of the fields were affected by ergot.

In rye (Table 5 and Fig. 2), the level of infection was much higher, ergot being present in all 43 fields examined in Man. Although the observations in Sask. were used to estimate the level of infection, they were far too few on which to base a reliable estimate.

Table 6. Estimated Percentage of the Cereal Acreage affected by Ergot in 1953

Crop	Province			Mean	Weighted Mean
	Man.	Sask.	Alta.		
Wheat	7.0	10.4	13.3	10.2	10.8
Barley	7.1	20.7	7.2	8.3	11.5
Rye	100	66.7	53.4	73.0	64.7

MAPS OF WESTERN CANADA

showing

Distribution of Ergot in Grain Crops

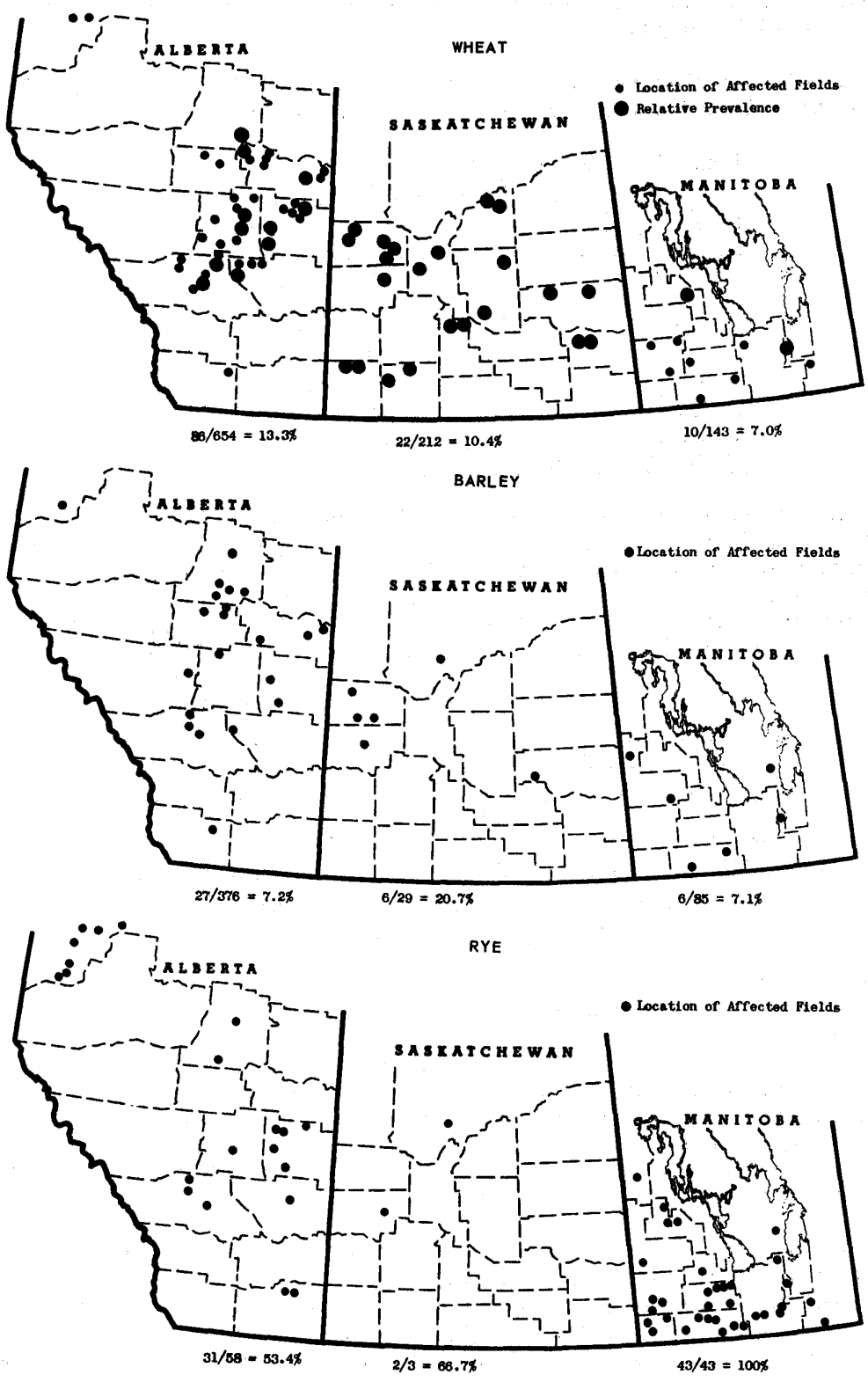

FIGURE 2

To summarize the field observations for 1953 (Table 6), it is estimated that slightly over 10% of the wheat and barley crops and about 65% of the rye crop were affected by ergot.

It may also be observed that the level of ergot infection in individual fields of wheat and barley was much less than in those of rye. Table 7 shows that

Table 7. Level of Ergot Infection in Cereal Fields in Alberta

Infection (%)	Wheat	Barley	Rye
0	559	349	27
tr.	69	22	18
1-3	12	3	3
4-10	4	2	6
15-25	1	-	1
50-75	-	-	3
Average (affected fields)	0.7	0.9	9.0

about ten times as much ergot developed in affected rye fields than in those of wheat or barley in Alta. The same general relationship held true in the other two provinces, although in areas where few fields of wheat and barley became infected there was less ergot in the rye. In Man., the infection in the affected rye fields averages 0.2%, but often the infection was quite heavy about the margins of the field (first 20 feet), up to 50% of the heads carrying ergot.

Table 8. Volunteer Rye as a source of Ergot in other Cereal Crops in Saskatchewan

Crop	Number of Fields		Source	
	Clean	Affected	Crop	Vol. Rye
Wheat	190	22	12*	12
Barley	23	6	5	1
Oats	14	1	0	1

*Two of the 12 fields also contained volunteer rye affected by ergot

Probably the most significant observation this year was the importance of 'volunteer' rye as a source of ergot in crops of wheat and other cereals (Table 8). Only a trace of ergot was present in the wheat itself, whereas the infection in the rye was mod. to sev. (5 to 15 or more ergot bodies per head) in 7 fields and tr. to sl. in the other five. In some fields the rye plants arose from seed occurring as an impurity in the crop being sown and in others they were volunteers from a previous crop. Similar observations were made in Alta., but no rye was observed in wheat fields in Man. Ergot was found in the oat crop in only one field near Colinton, Alta.

The presence of ergot was observed repeatedly in grasses growing about the headlands and at the edges of fields in all three provinces. Dr. W.P. Campbell, of the Edmonton laboratory, recorded ergot in 11 grass species in northern and central Alta., Bromus inermis and Agropyron repens being most frequently infected. Dr. W.L. Gordon noted ergot in several grasses, particularly A. trachycaulum and B. inermis.

It is almost certain that the level of ergot infection in the various cereals differs considerably from year to year. Only by continuing the observations over a period of years will it be possible to determine how serious the problem really is. There is some indication that the level of ergot does fluctuate greatly in different years. From the Grain Trade in Canada were collected figures on the production of rye in Western Canada, the amount inspected, the amount graded ergoty, and the percentage graded ergoty from the present back to 1932, the first year apparently when rye graded ergoty was separately recorded in the published reports (Table 9). It will be noticed that the percentages of rye graded ergoty (Fig. 3) in 1942 and 1943 exceed by a considerable margin the rather high levels of recent years.

Table 9. Production of Rye in Western Canada and Percentage of Crop Graded Ergoty upon Inspection

Crop Year	Production	Inspected		Percentage Ergoty
		Total	Ergoty	
	'000 bu.	'000 bu.	bu.	%
1953 (Aug.-Oct.)	26,230	4,620	354,293	7.7
1952-53	22,924	14,353	1,455,997	10.1
1951-52	15,980	9,217	18,806	0.2
1950-51	11,200	7,710	590,383	7.7
1949-50	7,550	9,355	119,681	1.3
1948-49	22,350	15,817	411,468	2.6
1947-48	11,630	9,623	80,179	0.8
1946-47	7,278	5,495	9,498	0.2
1945-46	4,476	2,823	117,875	4.2
1944-45	7,109	4,319	256,460	6.1
1943-44	5,870	8,338	1,064,500	12.8
1942-43	23,000	5,414	830,000	15.3
1941-42	9,989	4,982	46,835	0.9
1940-41	12,250	4,844	6,460	0.1
1939-40	13,700	5,030	10,955	0.2
1938-39	9,340	2,026	7,150	0.4
1937-38	4,280	1,410	1,370	0.1
1936-37	3,201	2,256	25,080	1.1
1935-36	8,379	1,959	56,990	2.9
1934-35	3.664	1,022	34,500	3.4
1933-34	3,104	1,307	53,400	4.1
1932-33	7,270	2,693	80,830	3.0

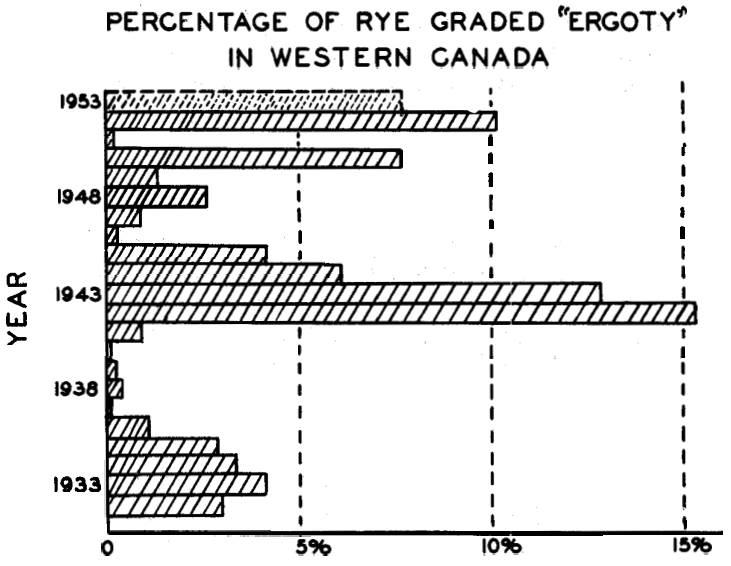
PERCENTAGE OF RYE GRADED "ERGOTY"
IN WESTERN CANADA
YEAR
1953
1948
1943
1938
1933
0
5%
10%
15%

FIGURE 3