CROWN RUST OF OATS IN CANADA IN 1965[1]

George Neischmann[2]

Disease development and yield losses in Western Canada

Crown rust of oats, Puccinia coronata Cda. f. sp. avenae Erikss., was first found near Morden, Manitoba on July 13, 1965. By early August, trace amounts of the disease occurred as far west in southern Saskatchewan as Weyburn, and as far north as Melfort. Except for southern Manitoba, no appreciable increase in the incidence of crown rust was detected in Western Canada until the end of the season. Moderately severe infections of crown rust (50% to 80% intensity) developed in late-sown fields of 'Rodney' and 'Garry' oats in southern Manitoba by mid-August.

Losses due to crown rust were negligible in most oat fields in Western Canada during 1965. Even in the Red River Valley of southern Manitoba, crown rust developed too late in the growing season to cause important losses, except in occasional late-sown fields.

Table 1. Percent infection of crown rust on 10 oat varieties at 10 locations across Canada.

Locality										
Indian Head, Sask.	tr*	0	0	tr	tr	tr	tr	0	0	0
Brandon, Man.	10	0	50	20	25	tr	20	30	tr	0
Morden, Man.	50	tr	70	80	70	5	60	30	tr	0
Glenlea, Man.	40	1	60	50	60	10	50	50	1	0
The Pas, Man.	0	0	0	0	0	tr	0	0	0	0
Guelph, Ont.	0	0	0	tr	tr	0	tr	tr	0	0
St. Catharines, Ont.	tr	tr	0	0	0	0	0	0	0	0
Krmptville, Ont.	50	0	50	20	50	0	30	10	0	0
Merrickville. Ont.	50	40	50	60	50	20	40	50	50	10
Macdonald College, Que.	tr	0	tr	0	0	0	0	0	0	0

*tr - trace infection, less than 1 percent.

Disease ratings in the crown rust nurseries

Crown rust intensity readings on oat varieties grown at nurseries across Canada are presented in Table 1. Nurseries in which no crown rust was found, and those in which rust intensity could not be estimated because of the poor condition of the leaves, were omitted from Table 1.

Crown rust was not observed on any of the oat varieties grown at 9 of the 10 nurseries in British Columbia, Alberta, and Saskatchewan. Only traces of crown rust were detected on some varieties grown at Indian Head, Saskatchewan and The Pas, Manitoba. Nurseries in the Red River Valley of Manitoba, particularly at Glenlea and Morden, were heavily infected. Results from the crown rust nurseries agree with the survey data and with the seasonal rust reports with respect to the distribution and intensity of crown rust in 1965.

Readings from nurseries in Eastern Canada indicated that crown rust infection was very light in 1965, apart from the buckthorn-infested area of southeastern Ontario. Crown rust was not found on any of the eight nurseries grown in the Maritimes, and except for traces on a few varieties at Macdonald College, it was not detected in Quebec. Severe crown rust infection occurred on oats in the Kemptville and Merrickville nurseries in eastern Ontario which are in the centre of dense buckthorn infestations. Even the varieties 'Trispernia' and 'Ceirch du Bach' were heavily infected at Merrickville. Crown rust infections were very light in all other regions of Ontario. Traces of infections were found on a few varieties from the Guelph and St. Catharines nurseries, while no crown rust appeared in the other nurseries in Ontario.

1 Contribution 207 from the Canada Department of Agriculture Research Station, Winnipeg, Manitoba.

2 Plant Pathologist, Canada Department of Agriculture Research Station, Winnipeg, Manitoba.

Table 2. Distribution of physiologic races of Puccinia coronata avenae collected on oats in Canada in 1965.

Physiologic race	Number isolates west	% of all isolates west	Number isolates east	% of all isolates east	Total isolates east and west
201	2	1.2			2
202	3	1.9			3
203	5	3.1	2	10	7
210	4	2.5	4	20	8
211	10	6.2	2	10	12
213	8	5.0			8
216	1	0.6			1
226	1	0.6	1	5	2
230	1	0.6			1
231	3	1.9			3
274	12	7.4			12
279	12	7.4			12
281			1	5	1
283	1	0.6			1
284	3	1.9	1	5	4
293	5	3.1	1	5	6
294	19	11.8	3	15	22
295	5	3.1			5
297			1	5	1
299	1	0.6			1
320	1	0.6			1
324			1	5	1
326	7	4.3			7
327	2	1.2			2
330	2	1.2	1	5	3
333	1	0.6			1
338	39	24.2			39
339	5	3.1			5
341	1	0.6	2	10	3
New races	4	2.5			4
Totals	158		20		178

Distribution of physiologic races

A total of 178 crown rust isolates, comprising 32 physiologic races, were identified in 1965. Very few of these cultures originated in Eastern Canada. As far as could be determined from the few isolates available, there was little change in the composition of the crown rust population in the east.

Races virulent on the varieties 'Landhafer' and 'Santa Fe' again made up more than half the crown rust population in Western Canada in 1965. As indicated in Table 2, the most frequently occurring biotype was race 338 (resistance formula 1, 8, 9, 10). It comprised one-quarter of the isolates identified from Manitoba and Saskatchewan. In contrast to the situation in 1964 (1), no races were identified in 1965 which attacked the differential varieties 'Trispernia' and 'Bondvic'. Highly virulent races like 264 and 276, which attack the differential varieties 'Trispernia', 'Bondvic', 'Landhafer', and 'Santa Fe', and which constituted 14% of the crown rust population of Western Canada in 1964, were not isolated this year.

Three races, with previously undescribed virulence combinations on the crown rust differential oat varieties, were isolated in 1965. Their resistance formulae are: 1, 2, 6, 7, 8, 9, 10; 1, 4, 8, 9, 10; and 1, 6, 8, 9, 10.

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Literature cited

1. Fleischmann, G. 1965 Crown rust of oats in 1964. Can. Plant Dis. Survey 45: 15-18.