CROWN RUST OF OATS IN CANADA IN 1971[1]

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Disease development and crop losses in Eastern Canada

Oat crown rust caused by Puccinia coronata Cda. f. sp. avenae Eriks. was first found near Pilot Mound, Manitoba on Julv 21. Disease development was very slow during- the remainder of the growing season, and crop losses were confined to a few late sown fields. This was in striking contrast to the previous two seasons (1,2) during which crown rust increased rapidly and caused serious losses in the oat crop, particularly in the Red River area of Manitoba. By the end of August 1971, a light infection of crown rust was present throughout the oat growing regions of southern Manitoba, but damage to the crop was negligible.

Uniform rust nurseries

Ratings of crown rust intensity on 12 oat varieties grown in nurseries across Canada are presented in Table 1. Omitted from this table are nurseries grown at locations where no crown rust was detectable on any of the varieties, as well as nurseries from which rust intensity could not be estimated because of the shrivelled condition of the leaves.

As in previous years, the lines containing crown rust resistance genes Pc38 (R.L. 2924) and Pc39 (R.L. 2925) were not attacked by crown rust at any of the locations, and appear to afford effective protection against this disease. 'Saia' oats provided an equally high level of resistance, but because of its diploid chromosome complement its resistance is more difficult to incorporate in commercial hexaploid oat varieties.

Identification and distribution of physiologic races

The frequency of occurrence and distribution of 18 physiologic races of crown rust identified from 192 Canadian isolates is presented in Table 2. Although 15 different physiologic races were identified in the west, two of these, 295 and 326, comprised nearly 81% of all the isolates. These races attack almost all of the standard differential crown rust varieties. In contrast to the large population of race 264 found in Western Canada last year (1), only 5 isolates of this race were identified in the west in 1971. It appears to have been replaced by race 295, which increased from 9% of the rust population last year (1) to more than 43% this year.

In Eastern Canada 10 physiologic races were identified from 33 isolates. The picture in the east remained much the same as last year with respect to physiologic races in the crown rust population.

Virulence on the differential varieties

The percentage of crown rust isolates virulent on each differential variety from 1966 to 1971 is presented in Table 3. In Western Canada the decrease in supervirulent race 264 is reflected in the reduction in virulence on the varieties Victoria, Trispernia, and Bondvic. This reflects the first reduction in virulence on Trispernia and Bondvic since races of the pathogen began attacking them in 1966. The virulence situation in the east remains basically unchanged from previous years.

Table 1. Percentage infection of crown rust on 12 oat varieties at 10 localities in Canada in 1911

Location	Bond	Trispernia	Landhafer	CI 4023	Saia	Rodney ABDH	CI 3034	Rodney	Harmon	RL 2924	RL 2925	RL 2926
Brandon, Man.	70	0	45	65	0	65	40	70	65	0	0	65
Morden, Man.	65	0	25	50	0	65	20	65	50	0	0	15
Kemptville, Ont.	5	0	0	0	0	0	0	5	5	0	0	5
Thunder Bay, Ont.	20	0	0	5	0	0	0	10	5	0	0	5
Guelph, Ont.	15	5	0	5	0	10	5	20	10	0	0	5
Ottawa, Ont.	tr*	0	0	tr	0	0	0	tr	tr	0	0	0
Appleton, Ont.	5	0	0	tr	0	0	0	tr	tr	0	0	0
La Pocatibre, Qué.	tr	0	0	tr	0	tr	tr	tr	tr	0	0	tr
Macdonald College, Qué.	10	0	0	0	0	0	tr	5	5	0	0	0
Lennoxville, Qué.	5	0	0	5	0	tr	tr	tr	5	0	0	tr

* tr = trace infection, less than 1%.

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Table 2. Distribution of physiologic races of crown rust in Canada in 1971

Physiologic race	West		East		W & E Totals	
	No. of isolates	% of all isolates	No. of isolates	% of all isolates	No. of isolates	% of all isolates
203	11	6.9	5	15.0	16	8.3
205	1	0.6	0	0.0	1	0.5
210	1	0.6	4	12.0	5	2.6
216	4	2.5	2	6.0	6	3.1
227	1	0.6	0	0.0	1	0.5
228	0	0.0	3	9.0	3	3.1
259	1	0.6	1	3.0	2	1.0
264	5	3.1	1	3.0	6	3.1
268	1	0.6	0	0.0	1	0.5
216	2	1.3	0	0.0	2	1.0
295	69	43.5	7	21.0	76	39.5
320	0	0.0	1	3.0	1	0.5
326	59	37.2	4	12.0	63	32.7
333	1	0.6	0	0.0	1	0.5
341	0	0.0	5	15.0	5	2.6
345	1	0.6	0	0.0	1	0.5
368	1	0.6	0	0.0	1	0.5
427	1	0.6	0	0.0	1	0.5
Total races	15		10		18	
Total isolates	159		33		192	
Race:Isolate ratio	1:11		1:3			

Table 3. Percentage of Canadian crown rust isolates virulent on differential host varieties, 1966 to 1971

Location and year	Anthony	Victoria	Appler	Bond	Landhafer	Santa Fe	Ukraine	Trispornia	Bondvic	Saia
Western Canada										
1971	99	45	99	97	87	87	99	4	5	3
1970	96	86	97	99	93	92	75	55	55	2
1969	92	62	93	94	82	82	87	30	30	5
1968	90	48	90	95	82	81	95	10	10	3
1967	72	59	72	89	68	68	80	24	31	13
1966	66	58	62	82	24	23	83	2	2	4
Eastern Canada										
1971	63	42	60	87	36	36	100	3	3	0
1970	82	66	84	92	42	42	84	18	18	0
1969	50	44	50	93	21	24	97	7	7	10
1968	79	40	83	87	8	9	96	2	2	7
1967	47	54	50	86	10	11	95	2	1	13
1966	51	45	30	77	9	9	85	0	0	9

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Literature cited

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