Stem rust of oats in Canada in 1975[1]

J. W. Martens and R. I. H. McKenzie

Stem rust *[Puccinia graminis* f. sp. *avenae]* was first found on oats *(Avena sativa)* in mid July. Light infections developed on late fields in Manitoba and eastern Saskatchewan. Races C10 and C23 continue to predominate in western Canada with 55% and 36% of all isolates. In eastern Canada, the predominant race was C9. A culture of race C9 with virulence on resistance gene *Pg13* was again found in both eastern and western Canada.

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La rouille de la tige *[Puccinia grarninis* f. sp. *avenae]* a été observee pour la premiere fois chez l'avoine *(Avena sativa)* a la mi-juillet. De legeres infections se sont developpees dans certaines plantations tardives au Manitoba et dans l'est de la Saskatchewan. Les races C10 et C23 ont continue de dominer dans l'Ouest avec 55 et 36% respectivement de tous les isolats. Dans l'Est, la race C9 a predomine. Une culture de la race C9 virulente sur les varietes possedant le gene Pg13 de resistance a egalement ete observee dans l'est et l'ouest du Canada.

Prevalence and crop losses in western Canada

Stem rust of oats caused by *Puccinia graminis* Pers. f. sp. *avenae* Eriks and E. Henn. was first found in southern Manitoba on July 10, somewhat earlier than normal. Light infections developed throughout most of Manitoba and eastern Saskatchewan but they caused no crop losses except in small areas in central and eastern Manitoba where a few late fields with infections exceeding 50% of the stem area were observed in late August.

Uniform rust nurseries

Rust nurseries comprising the oat, *Avena sativa* L., cultivars Fraser, Hudson, Rodney, C.I. 3034, C.I. 4023, C.I. 9139, R.L. 2924, R.L. 2925, R.L. 2926, and R.L. 2970 were grown at 31 locations across Canada. Trace to moderate infections of rust were observed at Fredericton, N.B.; Lennoxville, Que.; Guelph and Sunbury, Ont.; and Brandon, Man. No rust infections were observed in nurseries grown at St. John's West, Nfld.; Charlottetown, P.E.I.; Kentville, and Truro, N.S.; Macdonald College, Normandin, La Pocatiere and Quebec, Que.; Appleton, Kapuskasing, Kemptville, New Liskeard, Ottawa, Thunder Bay, and Vineland, Ont.; Durban and Morden, Man.; Indian Head, Melfort and Scott, Sask.; Beaverlodge, Edmonton, Lacombe and Lethbridge, Alta., and Agassiz and Creston, B.C.

Physiologic races

Field collections were established on the oat cultivar Victory and physiologic races were identified by the infection types produced on seedlings of 'Rodney 0' single-gene lines as indicated in Table 1. A supplementary set comprising the cultivars C.I. 9139 (unknown genotype) and R.L. 2926 *(Pg 73)* was also included in the study. All 229 field cultuires were avirulent on C.I. 9139 resistance, but two cultures of C9 from Ontario and one C9, two C28, and one C29 from Manitoba were virulent on *Pg 73* resistance. Races C10 and C23 continued to predominate in western Canada and comprised 55% and 36% of all isolates, respectively. This represents a resurgence of race C23 from a low of 7% in 1974 to its former levels (2). Numerous rare and several new races also appeared in western Canada. The avirulent race C26 *(Pg 1, 2, 3, 4, 8 9, 13/)* first found in experimental plots in 1973 (1) was isolated from a field collection made at Poplar Point, Man., and the discovery of races C28 and C29, both with virulence on *Pg 73,* adds to the growing list (1) of races with virulence on this source of resistance. It is interesting that virulence on *Pg 73* has developed in spite of the fact that no commercial oats are grown that possess this resistance gene. With the exception of race C9, none of the races so far identified presents a threat to the cultivar Hudson, which combines resistance conferred by genes *Pg 2, Pg 4* and *Pg 9.* The frequency of virulence on lines carrying single resistance genes (Table 2) has in most cases declined from the previous year (2), but the appearance of virulence on *Pg 73* in field cultures in western Canada is cause for concern.

[1] *Contribution No. 716, Research Station, Agriculture Canada, Winnipeg, Manitoba R3T 2M9.*

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Literature cited

1. Martens, J. W. 1974. Stem rust of oats in Canada in 1973. Can. Plant Dis. Surv. 54: 19-20.
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Table 1. Distribution of physiologic races of oat stem rust in Canada in 1975

Race no.	Virulence formula (effective/ineffective *Pg* host genes)	No. of isolates from: N.S. + N.B.	Qué.	Ont.	Man.	Sask.	Total isolates	Percentage of total isolates
C 1	1,2,3,4,8/9				1		1	0.4
c 4	1,4,8,9/2,3			1			1	0.4
c 5	4,9/1,2,3,8					1	1	0.4
C 6	1,8/2,3,4,9			1			1	0.4
c 7	1/2,3,4,8,9			1			1	0.4
C a	3,8/1,2,4,9	1		4			5	2.2
C 9	8/1,2,3,4,9			9	1		10	4.4
C10	9/1,2,3,4,8	1		3	86	28	118	51.5
C14	8,9/1,2,3,4	1			6		7	3.0
C17	1,3,8/2,4,9			1			1	0.4
C19	1,2,4,8,9/3					2	2	0.9
c21	1,8,9/2,3,4	1					1	0.4
C23	2,4,9,13/1,3,8		1		61	13	75	33.0
C24	1,2,8/3,4,9,13				1		1	0.4
C26	1,2,3,4,8,9,13/				1		1	0.4
C28	3,8,9/1,2,4,13				2		2	0.9
C29	3,9/1,2,4,8,13				1		1	0.4
Total		4	1	20	160	44	229	

Table 2. Frequence of virulence in the oat stem rust population on various types of resistance in eastern and western Canada in 1975

Source of isolates	Percentage of isolates virulent on cultivars with the following genes for resistance: *Pgl*	*Pg2*	*Pg3*	*Pg4*	*Pg8*	*Pg9*	*Pg13*
East	80.0	96.0	76.0	92.0	24.0	68.0	8.0
West	97.5	61.2	97.5	61.2	92.1	1.4	1.4