Blackleg and other diseases of canola in Saskatchewan in 1984 and 1985[1]

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In 1984 and 1985, basal stem canker caused by ***Leptosphaeriamaculans*** was severe on canola (***Brassica napus*** and ***B. campestris)*** in central Saskatchewan (crop districts 6 and 8B), the area in which it traditionally has been most prevalent. In 1984, yield losses were greatly increased by premature ripening of cankered plants by hot dry summer weather. In 1984, 28.5% of 151 fields surveyed in Saskatchewan had plants with basal stem infections, and in 1985, 43.0% of 142 fields had stem-cankered plants. Mean percent of plants per field with infections on leaves or stems was 13.1 in 1984 and 10.9 in 1985. Mean basal stem canker incidence was 9.1% in 1984 and 7.2% in 1985. The average estimated yield loss provincially was 7.2% in 1984 and 5.2% in 1985. Infection levels were very low in northern areas where much of the canola is grown. The mean yield loss in infected fields was 25.2% in 1984 and 12.2% in 1985. In both years diseases other than blackleg were of little importance in these surveys.

Can. Plant Dis. Surv. ***66:2, 51-53, 1986.***

En 1984 et 1985, la jambe noire causée par ***Leptosphaeria maculans*** a beaucoup affecté le canola (***Brassica napus*** et ***B. campestris***) dans le centre de la Saskatchewan (régions agricoles 6 et 8B), région ou elle a toujours été plus importante. En 1984, les pertes de rendements ont été beaucoup plus considérables en raison de la maturation prématurée des plants à chancre causée par la temperature estivale chaude et sèche. En 1984, 28,5 % des 151 champs inventories en Saskatchewan contenaient des plants infectés par la jambe noire comparativement à 43 % des 142 champs inventories en 1985. En moyenne, il y avait dans les champs infectés 13.1 % des plants avec des infections sur les feuilles ou les tiges en 1984 et 10,9 % en 1985. En 1984, l'incidence moyenne de chancre à la base de la tige était de 9,1 % et, en 1985, de 7.2 %. En 1984, on estimait la perte de rendement moyenne à l'échelle provinciale à 7.2 % et en 1985 à 5.2 %. Dans les regions nordiques ou l'on cultive beaucoup de canola, les taux d'infection Btaient peu élevés. En 1984, on a estimé la perte de rendement dans les champs infectés à 25.2 % et, en 1985, a 12.2 %. Durant ces deux années, les enquêtes ont montrb que les maladies autres que la jambe noire étaient peu importantes.

Introduction

Between 1978 and 1981 the prevalence and incidence of the virulent strain of blackleg (***Leptosphaeria maculans*** (Desm.) Ces. & de Not.) increased ten-fold in standing Saskatchewan crops of rapeseed/canola (***Brassica napus*** L. and ***B. campestris*** L.) (6). However, the province-wide average yield loss from basal stem canker was slight. In 1982, basal stem cankers were prevalent in several fields in central crop districts (C.D.) 6 and 8 (4). In 17 heavily infected fields, yield reductions ranged from 0 to 56%. Despite this, the average yield loss for Saskatchewan as a whole was estimated at 6%, due to low infection levels in northern and western areas. Although blackleg was prevalent again in 1983, yield losses of the magnitude seen in 1982 were not observed (5).

During the period 1978 to 1983, the prevalence and incidence of footrot (***Rhizoctonia solani*** Kuhn and ***Fusarium roseum*** Lk. emend. Snyder and Hansen) were highest in 1979 and 1982, with respectively, 80.7 and 79.3% of the fields infected and incidences of 16.0 and 8.5% (4, 6). Even in 1978. when the disease was least prevalent, infections were noted in over 40% of the fields and the mean incidence was 6.7%. Other diseases, with the exception of sclerotinia stem rot (***Sclerotinia sclerotiorum*** (Lib.) de Bary), were of minor importance from 1978 to 1983 (4, 5, 6). The following is a report of a disease survey of canola conducted in Saskatchewan in 1984 and 1985.

[1] ***Contribution No. 921, Agriculture Canada Research Station, 107 Science Crescent, Saskatoon, Saskatchewan S7N0X2.***

Accepted for publication March 11, 1986

Methods

Fields were sampled as in the 1983 survey while the plants were in flower (5). Basal stem canker severity was assessed (1) and all plants with basal cankers were considered when estimating yield losses (2).

Results

Blackleg. In 1985, basal stem canker was more prevalent but less severe than in 1984 (Tables 1 and 2). Forty-three percent of the 1985 fields and 28.5% of those from 1984 had cankered plants. The estimated yield loss in infected fields in 1984, 25.2%, was twice that in 1985. Mean stem canker incidence and incidence of all stem and leaf infections caused by L. ***maculans*** were similar in the two years. As in previous years stem canker was most prevalent and severe in central Saskatchewan (C.D. 6 and 8B). There was a relatively small area of heavy infestation around North Battleford (C.D. 9A and 9B). In both years the overall blackleg incidence was low in northern areas (C.D. 8a and 9). Prevalence and incidence of the disease increased considerably in C.D. 5 in 1985 and it has now spread from that area into western Manitoba (Petrie, unpublished data).

Footrot. The prevalence and incidence of footrot were the lowest observed since 1978. Infections were detected in only 36.4% of the 1984 fields and 25.4% of the 1985 fields (Table 3). The mean incidence was 2.2% and 4.3%, respectively.

Other diseases. With a few exceptions, other diseases were not noteworthy in either year. In 1984 pod drop (cause un-

Table 1. Prevalence, incidence and severity of the virulent strain of blackleg in standing crops of canola in 1984.

Crop District	No. of fields	Percentage of fields with plants infected		Percentage of plants per field infected		% fields with over		% loss in yield*	
		at stem base	on any part	at stem base	on any part	10% blackleg	20% blackleg	all fields	infected fields only
1	10	10.0	20.0	0.4	0.8	0.0	0.0	0.4	4.0
5	20	20.0	35.0	1.2	2.8	10.0	0.0	1.0	5.0
6	33	54.6	57.6	24.1	26.5	48.5	33.3	17.0	31.2
8A	19	15.8	52.6	1.3	8.0	21.0	10.5	1.0	6.3
8B	24	50.0	66.7	24.3	27.2	45.8	37.5	17.1	34.2
8	43	34.9	60.5	14.1	18.7	34.9	25.6	10.0	28.6
9A	19	21.1	63.2	5.1	14.1	26.3	21.1	3.5	16.5
9B	26	3.9	34.6	0.2	5.9	23.1	11.5	0.2	4.0
9	45	11.1	46.7	2.2	9.3	24.4	15.6	1.6	14.0
All	151	28.5	49.7	9.1	13.1	29.1	19.2	7.2	25.2

* Estimated according to McGee (1) and McGee and Emmett (2).

Table 2. Prevalence, incidence and severity of the virulent strain of blackleg in standing crops of canola in 1985.

Crop District	No. of fields	% fields with plants infected		% plants per field infected		% fields with over		% loss in yield**	
		at stem base	on any part	at stem base	on any part	10% blackleg	20% blackleg	all fields	infected fields only
5	27	40.7	51.9	3.9	6.2	22.2	7.4	2.6	6.9
6	27	55.6	59.3	9.3	14.0	37.0	22.2	6.8	12.3
8A	19	26.3	73.7	1.7	5.3	5.3	0.0	1.4	5.2
8B	27	63.0	74.1	16.1	23.4	51.9	33.3	11.5	18.2
8	46	47.8	73.9	10.2	15.9	32.6	19.6	7.3	15.3
9A	21	33.3	33.3	4.0	5.9	9.5	4.8	3.1	9.1
9B	21	28.6	38.1	5.3	6.9	23.8	9.5	3.8	13.3
9	42	31.0	35.7	4.7	6.4	16.7	7.1	3.4	11.1
All	142	43.0	55.6	7.2	10.9	26.8	14.1	5.2	12.2

* Estimated according to McGee (1) and McGee and Emmett (2).

known) occurred in 42.1% of the fields in C.D. 9A (the northeast). In one field, 60% of the plants were affected, and in another, 52%. Severity generally was light. Grey stem (*Pseudocercosporella capsellae* (Ell. & Ev.) Deighton) became prevalent in northern areas as the season progressed, but again infection was light. Alternaria black spot (*Alternaria brassicae* (Berk.) Sacc. and A. *raphani* Groves & Skolko) occurred at the "trace" to "slight" level of severity on high percentages of plants in many areas except C.D. 6. White rust (*Albugo candida* (Pers. ex Lév.) Ktze) was of very minor importance as was sclerotinia stem rot. However, the survey was conducted too early to adequately assess the latter disease.

In 1985, white leaf spot (*P. capsellae*) occurred in 63% of the fields in C.D. 8A (the northeast). Only occasionally were high infection incidences noted. In a field near Medstead (C.D. 9A), 100% of the plants had leaf spots, but damage was slight. Pod drop occurred at low levels in 44% of the fields in C.D. 5 (east-central area).

Discussion

In three of the last four years, basal stem canker has caused appreciable yield loss in Saskatchewan, principally in C.D. 6 and 8 (4, 5). In 1984 *L. maculans* produced ascospores on canola stubble unusually early in the growing season, resulting in early infection of the crop (Petrie, unpublished). Subsequently, hot dry summer weather contributed significantly to widespread premature ripening of plants with basal stem infections. Although a considerable increase in the prevalence of the virulent strain of *L. maculans* was found in C.D. 5, and

Table 3. Prevalence and incidence of footrot (*Rhizoctonia* and *Fusarium*) in canola crops in 1984 and 1985.

Crop District	% fields with infection		% plants infected per field (all fields)		% plants infected per field (infected fields only)		% fields with over 10% footrot		% fields with over 20% footrot	
	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985
1	30.0	_*	2.0	_*	6.7	_*	0.0	_*	0.0	_*
5	20.0	22.2	0.8	0.9	4.0	4.0	0.0	0.0	0.0	0.0
6	39.4	33.3	3.6	3.7	9.1	11.0	12.1	11.1	0.0	3.7
8	44.2	28.3	4.0	3.0	9.1	10.8	9.3	13.0	4.7	2.2
9	35.6	19.1	7.1	1.1	19.9	6.0	24.4	2.4	13.3	0.0
All C.D.	36.4	25.4	4.3	2.2	11.7	8.6	12.6	7.0	5.3	1.4

* Not surveyed.

although it has spread into Alberta and Manitoba, much of the northern growing districts (8A and 9) continue to have very little blackleg. It remains most severe in central C.D. 6 and 8B, the area in which it was first found on 1975 stubble (3). The increased severity of blackleg is attributed largely to an abundance of undecomposed canola residue bearing ascocarps of *L. maculans* (Petrie, unpublished). Crop rotations commonly used by producers are too short to permit natural destruction of this material. If rotations involving three to four years between canola crops had been widely practiced, there likely would have been appreciably less stem canker.

Acknowledgements

The assistance of Maurice Bahrey, Patricia Lewis, Timothy Klaassen, and Edward Knopf is gratefully acknowledged. Valuable support was received from an Alberta Farming for the Future grant.

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