Oilseeds and special crops / Oléagineux et cultures spéciales

CROP: Dry bean, *Phaseolus vulgaris* L.

LOCATION: Southern Alberta

NAME AND AGENCY:

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TITLE: BACTERIAL BLIGHT ON DRY EDIBLE BEAN IN SOUTHERN ALBERTA IN 1995

METHODS: Ten commercial dry bean crops within a 20 km radius of Bow Island, Alberta were surveyed on August 29 for bacterial blight diseases, caused primarily by *Pseudomonas syringae* pv. *phaseolicola* (halo blight) and *Xanthomonas campestris* pv. *phaseoli* (common blight). Ten plants were randomly sampled from each of five, equally spaced sites at the points of a 'W' shaped pattern that was walked in each field. The plants were returned to the laboratory where disease incidence and severity were assessed on the leaflets and pods. Leaf blight incidence was determined by examining one set of leaves from the lower, middle and upper portions of each plant sampled. The numbers of healthy and diseased leaflets were tabulated and the percentage of blighted leaflets was calculated for each crop. Blight incidence on pods was determined by examining one pod from the lower, middle and upper portions of each plant collected, then pooling the data and calculating the percent blighted pods per crop.

Leaf and pod blight severities were estimated visually on the same material used for disease incidence determination. A five-point rating scale was used, i.e.: clean (0) = no disease, slight (1) = 1-10% leaf/pod area blighted, moderate (2) = 11-25% blighted, severe (3) = 26-50% blighted, and very severe (4) = >50% blighted. Pieces of diseased leaf tissue from a small number of plants per crop were surface sterilized in 1% NaOCl for 20 seconds, rinsed three times in sterile distilled water, and plated onto two selective media, MSP (modified sucrose peptone agar) for *Pseudomonas syringae* pv. *phaseolicola* and MXP for *Xanthomonas campestris* pv. *phaseolicola*. The plates were examined after 1-3 days of incubation at room temperature and the bacteria present were identified.

RESULTS AND COMMENTS: Bacterial blight was found in all 10 crops (276.3 ha) surveyed (Table 1). Disease incidence was moderate to high in most crops, whereas severity was rated as slight. The average blight incidence was 66.5% for leaves and 62% for pods; average severity was 0.9 for leaves and 0.3 for pods. Both *Pseudomonas syringae* pv. *phaseolicola* and *X. campestris* pv. *phaseoli* were isolated from blighted leaves, but no attempt was made to systematically determine their relative frequencies. A high incidence of bacterial bean blights was also found in a similar survey of bean diseases in the Bow Island area by Huang et al. (1996).

REFERENCES:

Huang, H.C., G. Saindon, R.S. Erickson and P. Ma. 1996. Survey of diseases of dry bean in southern Alberta in 1995. Can. Plant Dis. Survey. 76: (1)93-94, 1996.

TABLE 1. Incidence and severity of bacterial blight on dry bean plants collected from ten commercial crops in southern Alberta in August, 1995.

Crop No.	Size (ha)	Cultivar*	Leaflets		Pods	
			Average incidence (%)**	Average severity (0-4)***	Average incidence (%)****	Average severity (0-4)***
1	51.4	NW 63	61.6	0.9	96.0	1.5
2	8.1	UI 906	24.0	0.3	50.7	0.6
3	60.7	NW 63	74.9	1.0	29.3	0.3
4	28.3	Viva	78.2	1.5	35.6	0.5
5	30.3	UI 1140	88.2	1.5	62.2	0.8
6	20.2	Othello	72.2	1.0	72.0	0.8
7	48.6	Othello	76.0	1.0	73.3	0.8
8	26.3	Othello	59.1	0.6	84.7	1.3
9	2.0	CDC Expresso	94.7	1.8	63.3	0.9
10	0.4	Taylor	45.8	0.5	52.7	0.8

* Bean types: Red Mexican (NW 63), Black (UI 906, CDC Expresso), Pink (Viva), Great Northern (UI 1140), Pinto (Othello) and Cranberry (Taylor).

** Percent leaflets with bacterial blight out of 450 leaflets examined per crop.

*** Rating scale: clean (0) = no disease, slight (1) = 1-10% leaf/pod area blighted, moderate (2) = 11-25% blighted, severe (3) = 26-50% blighted, and very severe (4) = >50% blighted.

****Percent pods with bacterial blight out of 150 pods examined per crop.

CROP: Dry Bean

LOCATION: Southern Alberta

NAME AND AGENCY:

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TITLE: SURVEY OF DISEASES OF DRY BEAN IN SOUTHERN ALBERTA IN 1995

METHODS: Eighteen irrigated crops of dry bean were surveyed for diseases on August 24, 1995 in the area surrounding Bow Island, Alberta. Each crop was sampled by selecting ten sites in a U-shaped pattern, approximately 20 m apart, with each site consisting of a 3 m long section of row (Howard and Huang, 1983). The number of plants with disease symptoms, and the number of healthy plants were recorded at each site. The percentages of plants with white mold, gray mold, and bacterial blights were calculated for each crop by averaging the incidence of disease at the ten sites. The level of disease in each crop was then characterized according to the following scale: (1) none (0% of plants infected), (2) trace (<1%), (3) light (1-10%), (4) moderate (11-25%), (5) high (26-50%), (6) very high (>50%).

RESULTS: Types of bean cultivars grown in southern Alberta were black, great northern, kidney, pink, pinto, and red Mexican. White mold (*Sclerotinia sclerotiorum*), gray mold (*Botrytis cinerea*), and bacterial blights (*Xanthomonas campestris* pv. *phaseoli*, *Pseudomonas syringae* pv. *phaseolicola*) were found in 1995 (Table 1).

White mold was present in all of the bean crops surveyed. The frequency of crops with moderate, high, and very high incidence of white mold was 28%, 39%, and 28%, respectively. The five crops with very high disease incidence had 56%, 74%, 83%, 90%, and 92% of plants infected by *S. sclerotiorum*. The disease was distributed throughout the entire bean production area surrounding Bow Island.

Gray mold was present in 15 of the 18 crops surveyed. The frequency of crops with moderate, high and very high incidence of gray mold was 6%, 6%, and 11%, respectively. The disease was found throughout the survey area.

Bacterial blights were present in all of the crops surveyed. The frequency with moderate, high and very high incidence of bacterial blights was 44%, 11%, and 28%, respectively. Bacterial blights were found throughout the survey area. Both common blight (*X. campestris* pv. *phaseoli*) and halo blight (*P. syringae* pv. *phaseolicola*) were present.

DISCUSSION: White mold, gray mold and bacterial blights were reported as major diseases of dry bean in southern Alberta (Huang and Erickson, 1994; Huang et al., 1995). The same diseases were widespread in southern Alberta in 1995. White mold was again the most serious disease. Although gray mold and bacterial blights were widespread in southern Alberta in 1993-95, the prevalence and incidence of these diseases was much higher in 1995 than in previous years. A high incidence of bacterial bean blight was also found in a survey of bean crops in the Bow Island area by Howard et al. (1996).

Dry bean is grown in rotation with cereals and oilseed crops in southern Alberta. The crop rotation practice appears to have no major impact on diseases as the incidence of the major diseases remains high each year. Since dry bean is grown under irrigation, the prevalence of diseases in dry bean may be related to the constant high humidity which is conducive to development of the three major diseases observed in southern Alberta.

TABLE 1. Diseases of dry bean in southern Alberta in 1995.

Disease incidence (% plants infected)	Number of crops		
	White mold	Gray mold	Bacterial blights
None (0%)	0	3	0
Trace (<1%)	0	8	0
Light (1-10%)	1	3	3
Moderate (11-25%)	5	1	8
High (26-50%)	7	1	2
Very high (>50%)	5	2	5

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4. Huang, H.C., G. Saindon and R.S. Erickson. 1995. Survey of diseases of dry bean in southern Alberta in 1994. Can. Plant Dis. Survey 75:131-132.

CROP: Field bean

LOCATION: Manitoba

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TITLE: DISEASES OF FIELD BEAN IN MANITOBA IN 1995

METHODS: Crops of field bean were surveyed for diseases at 23 different locations in Manitoba during the 1995 growing season. The fields were chosen at random from regions in southcentral Manitoba where most commercial field bean production takes place (Figure 1). The survey was conducted July 26 to August 6 when the crops were in the late-flowering and pod filling stages. Ten plants were sampled at each of five random sites for each crop surveyed. Diseases were identified by symptoms and rated as percentage of plants infected.

RESULTS AND DISCUSSION: Six diseases were observed on field bean in Manitoba in 1995 (Table 1). Common bacterial blight (*Xanthomonas campestris* pv. *phaseoli*) was the most prevalent disease, observed in 17 of the 23 crops. Bacterial brown spot (*Pseudomonas syringae* pv. *syringae*) and halo blight (*P. syringae* pv. *phaseolicola*) were the second and third most common diseases and were observed in 11 and 8 of the crops, respectively. Incidence of these bacterial diseases varied from 5 to 16% on average, but up to 30-40% infection was observed in several crops. Other diseases including bean common mosaic (BCMV), rust (*Uromyces appendiculatus*), and fusarium yellows (*Fusarium oxysporum* f. sp. *phaseoli*) were observed at low frequency. The incidence of these diseases in infected crops was less than 5%.

Due to the abnormally hot and dry weather in the summer of 1995, white mold (*Sclerotinia sclerotiorum*), reported as the most prevalent disease on bean in Manitoba in previous years, was not observed at the time of this survey.

TABLE 1. Prevalence and incidence of diseases in 23 crops of field bean in Manitoba in 1995

Disease	No. crops affected	Percent infection	
		Mean	Range
Common bacterial blight	17	5.9	1.0-10
Bacterial brown spot	11	16.5	1.0-40
Halo blight	8	14.0	2.0-30
Viral diseases	5	4.8	1.0-10
Rust	3	3.0	2.0-5.0
Fusarium yellow	1	5.0	5.0

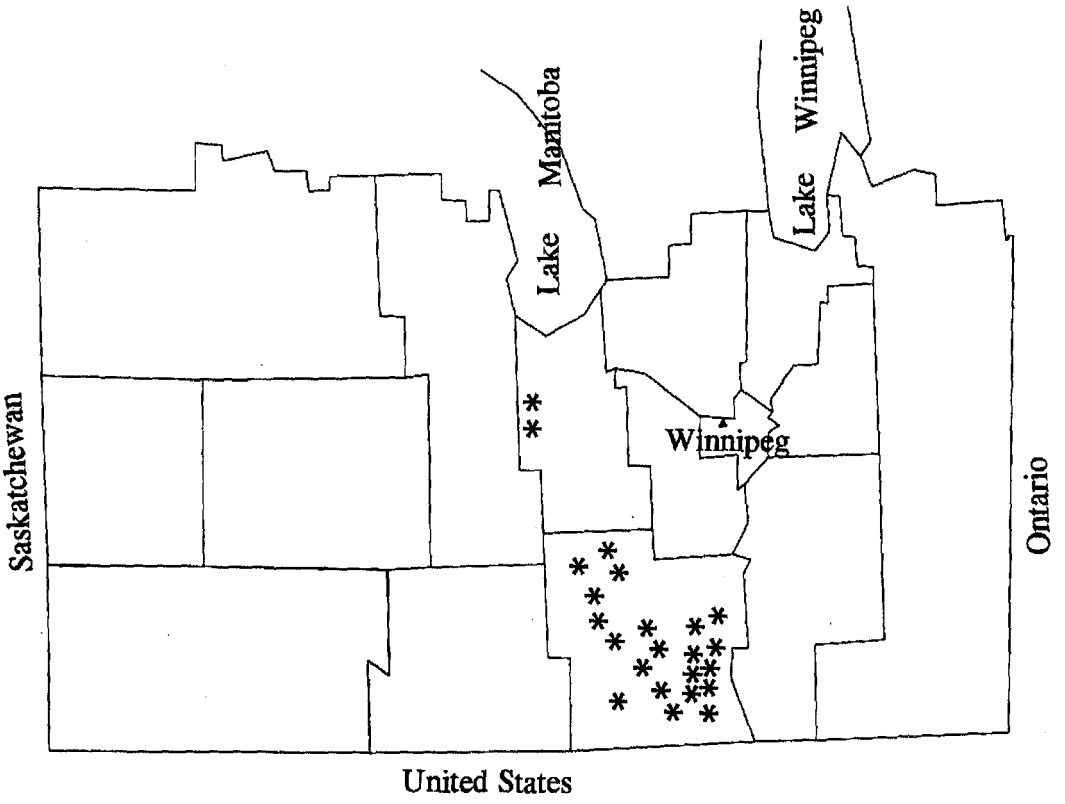

Figure 1. Locations of 23 field bean crops surveyed for diseases in southern Manitoba in 1995.

CROP: Canola

LOCATION: Alberta

NAME AND AGENCY:

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TITLE: BLACKLEG OF CANOLA SURVEY IN ALBERTA - 1995

INTRODUCTION AND METHODS: The provincial survey for virulent blackleg of canola (*Leptosphaeria maculans*) is now in its eighth consecutive year. Fieldmen in each of Alberta's 67 municipalities were assigned crops of canola to inspect, at the rate of one crop for every 2000 ha grown (2).

The approximately 2.0 million ha of canola grown was reflected in the survey numbers assigned to each municipality. Fieldmen were requested to pay particular attention to short rotation canola crops and to look for producers still continuing to grow cv. Westar. Because of its extreme susceptibility to blackleg, Westar is no longer recommended in Alberta. Private seed testing laboratories in Alberta and in Saskatchewan reported on the number of canola samples tested for the presence of virulent blackleg.

Agriculture and Agri-Food Canada seed inspectors reported on the presence of virulent blackleg in seed crops. Diagnostic confirmation of virulent blackleg- infected samples was provided by the Environmental Centre at Vegreville and laboratories at Fairview and Brooks.

RESULTS AND COMMENTS: In the Peace River Region of Alberta 2047 canola crops were surveyed in the 13 municipalities and virulent blackleg was confirmed in 62 with most instances, 44 crops, in the municipalities of Birch Hills and Smoky River (1). In 1994, 104 crops had been detected with virulent blackleg out of 2010 crops surveyed.

In the rest of Alberta only 804 crops were surveyed and 76 crops were confirmed with virulent blackleg. In several areas in central Alberta, virulent blackleg was confirmed in crops of the moderately tolerant Argentine cv. Bullet. In a crop follow up in one instance it was obvious that the infected plants were volunteer Westar in the Bullet crop. Seed inspectors did not report any obvious blackleg infestations in 904 crops inspected, totalling 10,000 ha. Results from 4 out of 7 private seed testing laboratories confirmed the presence of virulent blackleg in 23 out of 1247 samples tested. Four of the infected seed samples originated in Saskatchewan.

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1. Harrison, L.M. and P.D. Kharbanda. 1994. The First report on extensive spread and distribution of virulent blackleg of canola in the Peace region of Alberta, 1993. Can. Plant Dis. Surv. 74:92-93.

2. Kharbanda, P.D., I.R. Evans, L. Harrison, S. Slopek, H.C. Huang, D. Kaminski and J.P. Tewari. 1989. Blackleg of canola survey in Alberta - 1988. Can. Plant Dis. Surv. 69:55-57.

CROP: Canola

LOCATION: Peace River Region of Alberta

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TITLE: SPREAD AND DISTRIBUTION OF VIRULENT BLACKLEG OF CANOLA IN THE PEACE RIVER REGION OF ALBERTA IN 1995

INTRODUCTION AND METHODS: In 1993 and 1994, virulent blackleg *(Leptosphaeria maculans)* was found extensively in the Peace River region with over 100 canola crops infested (1, 2). The purpose of the survey in 1995 was to monitor the spread of blackleg where the prevalence was high in 1994 and to survey more canola crops in other municipalities where the disease was first observed. The survey was conducted from July to September 1995, with the cooperation of agricultural fieldmen in all 13 municipalities. Canola crops with shortened or no crop rotation were given priority in the survey. Crops were sampled as previously described (3). Additional samples were collected at the road access to crops and in low spots in the fields. Plants with wilted symptoms and blackleg-like lesions were collected. These specimens were tested to confirm virulent blackleg at the Regional Crops Laboratory, Fairview or the Pest Diagnostic Clinic, Vegreville.

RESULTS AND COMMENTS: A total of 2047 crops was surveyed in the Peace River region. There were 62 crops with confirmed virulent blackleg in 1995 in six municipalities, compared to 104 crops in 1994. There were seven municipalities where canola crops were surveyed but no virulent blackleg was found. In most of the canola crops disease incidence was at low or trace levels. There are a number of reasons for the reduction of virulent blackleg. The blackleg awareness and enforcement program had an impact by increasing the number of crops surveyed and selecting canola planted on canola stubble or other short rotations. Growers were encouraged to switch to tolerant Argentine cultivars and stop growing the susceptible Westar and Alto. Most growers did not grow canola on infested stubble and this practise reduced the severity and spread of blackleg. There are other factors accounting for less virulent blackleg in 1995. Dry weather in the northern part of the Peace River region were not conducive to disease development. In some municipalities all canola crops were surveyed but in others fewer were surveyed. The southern part of the Peace River region was wet and conducive to disease. However, the number of crops surveyed in the area was reduced from previous years and the crops selected were in new areas. Overall, the blackleg program is having a beneficial effect by keeping virulent blackleg in check and keeping disease levels low in the Peace River region.

REFERENCES:

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CROP: Canola

LOCATION: Saskatchewan

NAME AND AGENCY:

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TITLE: SURVEY OF CANOLA DISEASES IN SASKATCHEWAN, 1995

METHODS: Between 16 and 23 August 1995, 78 canola crops (at growth stages 5.1-5.4 [1]) were surveyed in Saskatchewan crop districts 1, 2, 5, 6, 7, 8 and 9 (Fig. 1), where the majority of canola in the province was grown. The number of crops surveyed per crop district (CD) was approximately in proportion to the area of canola seeded in each district [2], and the acreage in these seven districts accounted for 91% of the canola harvested in 1995 in Saskatchewan. Crops were usually surveyed along preplanned routes with a minimum of 50 km between survey sites. Twenty-plant samples from each of 5 locations per field, taken along a horseshoe-shaped path starting 25 m from the edge of the field, were collected and rated. A total of 54 *Brassica napus* and 24 *B. rapa* crops were assessed for the prevalence (% of crops infested) and incidence (% of plants infected per crop) of sclerotinia stem rot (*Sclerotinia sclerotiorum*), foot rot (*Fusarium* spp. and *Rhizoctonia* sp.), aster yellows (mycoplasma-like organism) and staghead (*Albugo candida*). Blackleg (*Leptosphaeria maculans*) lesions that occurred on any part of the canola stem were noted, as were basal stem cankers that destroyed or weakened the structural integrity of tissues [3]. The prevalence and severity (% surface area of pod covered by lesions) of alternaria pod spot (*Alternaria* spp.) was determined. Where any of these diseases was evident in the field but was not found in the 100-plant samples, it was rated as trace (<1%).

RESULTS: The overall prevalence of sclerotinia stem rot was low (<50%) in all crop districts but 8B (Table 1). Mean incidence was 1% or less (Table 2), down substantially from 1994 when it was 5% in *B. rapa* and 6% in *B. napus* [4].

Although the overall incidence of blackleg lesions was lower in 1995 (9% in *B. napus* and 15% in *B. rapa*) than in 1994 the incidence of basal stem cankers was higher (5% and 7%, respectively; [Table 2]). Likewise, the mean prevalence of basal stem cankers was higher than in 1994 (54% in *B. napus* and 75% in *B. rapa*).

The incidence and prevalence of foot rot and of aster yellows was lower than in 1994. While the severity of alternaria pod spot was even lower than in 1994, with means ranging from 0-1.7% in different crop districts, the prevalence was actually higher (82%).

The incidence of staghead in *B. rapa* was the same as in 1994 (2%); however, staghead was found in 79% of the fields.

COMMENT: In 1995, much of the southern portion of Saskatchewan had above average rainfall. The northwest part of the grainbelt (crop districts 7B and 9B), however, were very dry [2]. Warm, dry weather throughout the latter part of July and early August would appear to have pre-empted any threat of sclerotinia stem rot. These conditions did, however, influence the severity of blackleg as evidenced by the higher incidence of basal stem cankers.

The incidence of blackleg was most notable in the northeast (CDs 8 and 9A) where it was found in all crops surveyed, but especially in CD 8B which had on average 22% basal stem cankers. The highest incidence of basal stem cankers in 1994 (11%) was in CD 7B. As in 1994, the overall prevalence and incidence of blackleg lesions was higher in *B. rapa* than in *B. napus*. This is consistent with the lack of genetic resistance in *B. rapa* cultivars, compared with those of *B. napus*.

REFERENCES:

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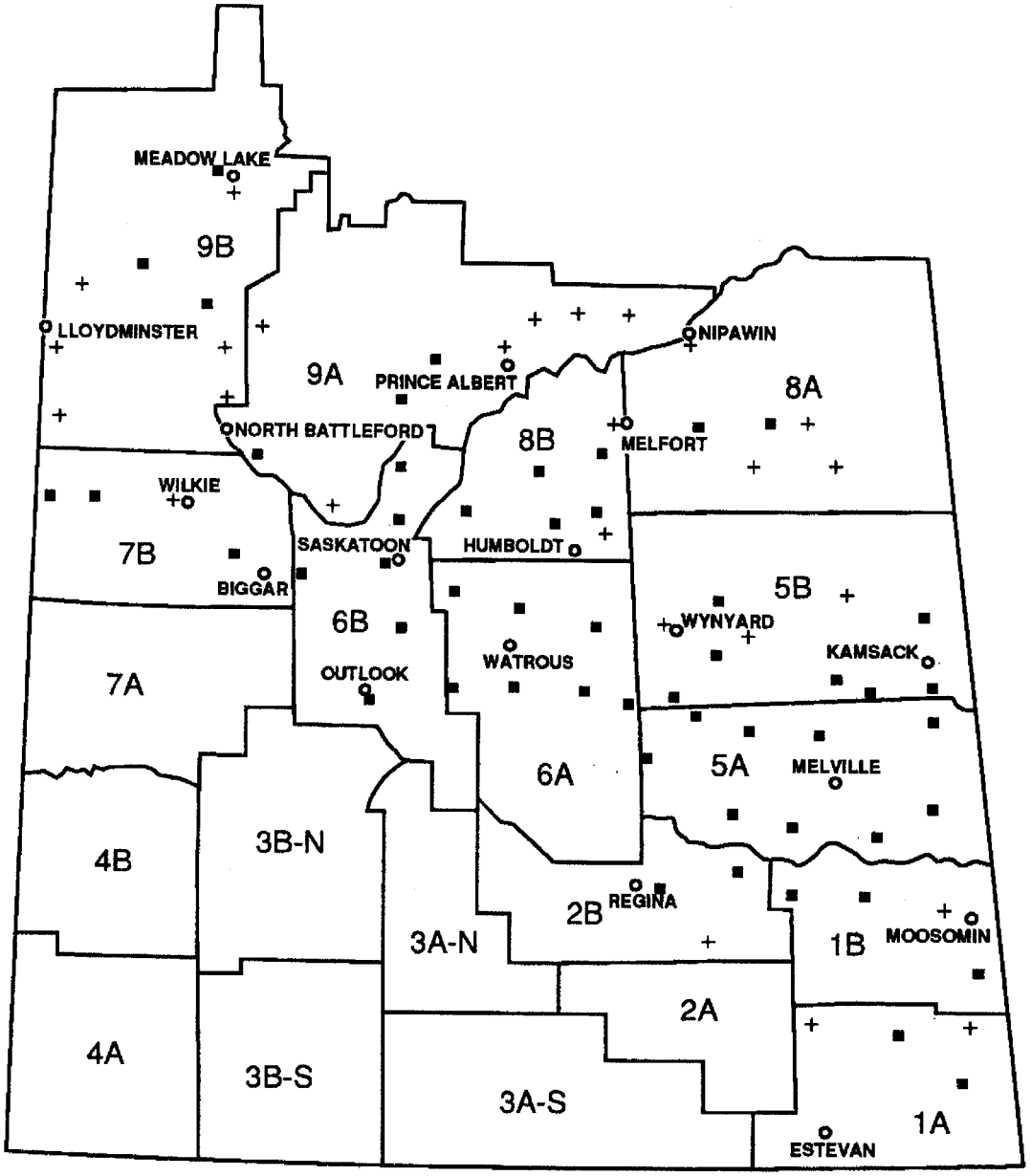
TABLE 1. Canola acreage, number of crops surveyed, disease prevalence and disease incidence or severity in Saskatchewan, 1995.

Crop district	Canola acreage x 1000	No. of crops surveyed		Sclerotinia stem rot		Blackleg		Alternaria pod spot	
		B. napus	*B. rapa*	P*	DI**	P lesions	DI lesions/ cankers	P	Mean % severity
1A	110	2	2	50	1	75	16/8	0	0
1B	137	4	0	0	0	50	2/1	0	0
2B	96	2	1	0	0	66	1/0	0	0
5A	258	9	0	11	<1	56	11/5	56	0.4
5B	250	7	3	20	<1	100	6/4	20	0.7
6A	296	7	0	14	<1	43	2/0	0	0
6B	167	6	0	33	<1	67	4/1	17	0.3
7B	163	3	1	0	0	75	9/2	0	0
8A	170	2	4	33	<1	100	17/9	0	0
8B	184	5	2	57	1	100	33/22	43	1.7
9A	270	3	6	22	1	100	10/4	56	1.0
9B	186	4	5	11	<1	89	16/5	11	0.6

* Mean % prevalence.
** Mean % disease incidence.



Legend: ■ B. napus, + B. rapa, O Town or City

Figure 1. Distribution of surveyed crops in Saskatchewan in relation to crop districts.

TABLE 2. Mean incidence or severity, prevalence and distribution of diseases in relation to categories of disease incidence or severity* in 24 crops of *B. rapa* and 54 of *B. napus* in Saskatchewan, 1995.

		Number of crops with						
		Stem rot	Blackleg lesion	Blackleg canker	Foot rot	Aster yellows	Staghead	Alternaria pod spot
B. rapa								
	0	16	1	6	13	6	6	4
	trace <1%	2				10	10	12
	1-5%	5	8	9	10	8	5	6
	6-10%	1	4	1			2	2
	11-20%		4	6	1		1	
	21-50%		6	2				
	>50%		1					
Mean	%DI*	1	15	7	2	1	2	1
Mean	%P**	33	96	75	46	79	79	83
B. napus								
	0	45	14	25	32	19		10
	trace <1%	0				24		39
	1-5%	8	18	18	22	11		5
	6-10%	1	7	4				
	11-20%		10	2				
	21-50%		1	5				
	>50%		4					
Mean	%DI*	<1	9	5	1	<1	n/a	<1
Mean	%P**	17	74	54	41	65		81

* Disease incidence, except for alternaria pod spot, for which severity is used.
** Prevalence.

CROP: Canola

LOCATION: Manitoba

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TITLE: DISTRIBUTION, PREVALENCE AND INCIDENCE OF CANOLA DISEASES IN MANITOBA IN 1995

METHODS: A survey of 100 canola crops in the four agricultural regions of Manitoba, Southwest, Northwest, Central, and Eastern - Interlake, were conducted in the last week of August and the first week of September. The majority of crops were *Brassica napus*. Results for the four crops of *B. rapa* were combined with those for *B. napus*. The presence of various diseases was noted in each field and disease incidence was determined from a sample of 50 plants. The routes taken in the surveys are shown in Figure 1.

RESULTS AND COMMENTS: The incidence and severity of blackleg and sclerotinia stem rot by Agriculture Region are presented in Table 1.

Blackleg (*Leptosphaeria maculans*) was the most prevalent disease observed in all crop regions except the Northwest where there were equal numbers of crops where blackleg and sclerotinia were present. The percentage of infested crops ranged from 38% in the Northwest region to 71% in the Central region with a provincial mean of 58%. The mean disease incidence within infested crops ranged from 15% in the Eastern - Interlake region to 31% in the Southwest region with a provincial mean of 26% The percentage of infested crops and the mean disease incidence on a province-wide basis in 1994 were 67% and 15% respectively (1). When blackleg was detected in crops in the 1995 survey severe symptoms were exhibited in most cases. These caused a definite yield loss, estimated to be about 10% on a province-wide basis. In contrast in 1994 the majority of blackleg infested canola crops showed mild symptoms and blackleg did not cause significant yield loss. The higher than normal summer temperatures over most of the agricultural regions of Manitoba in 1995 favoured the development of blackleg to a greater extent than in 1994 and 1993 when the summer climate was cooler and wetter than normal.

Sclerotinia stem rot (*Sclerotinia sclerotiorum*) was less frequently encountered than blackleg, except in the Northwest region. The percentage of infested crops ranged from 22% in the Southwest region to 60% in the Eastern - Interlake region with a provincial mean of 41%. The mean disease incidence ranged from 6% in the Central region to 14% in the Northwest region with a mean of 10%. This level of infection would likely result in about a 5% yield loss, which is lower than in 1994 when yield loss was estimated to be 7% (1). Approximately 20% of the canola in Manitoba in 1995 was sprayed with a fungicide, either Benlate, Rovral Flow, or Ronilan for control of stem rot. Warm dry weather during the month of July was unfavourable for the widespread and severe development of stem rot.

Other diseases such as Foot rot caused by *Rhizoctonia solani* was observed in only 5% of canola crops at only very low levels and was not a cause of significant yield loss. Black spot caused by *Alternaria spp.* was found in 24% of crops in the Southwest region, 52% in the Central region, 60% in the Eastern - Interlake and 77% of canola crops in the Northwest region. The severity of blackspot in most crops was only trace and it was not a cause of loss. Aster yellows (Aster Yellows Phytoplasma) was found in only two crops and was present at levels below 1%.

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TABLE 1. Prevalence and mean disease incidence of blackleg and sclerotinia stem rot in canola crops in Manitoba, 1995.

		Diseases			
		Blackleg		Sclerotinia	
Region	# of crops	% crops infested	Mean % disease incidence within infested crops	% of crops infested	Mean % disease incidence within infested crops
Northwest	31	38.7	17.3	38.7	14.0
Southwest	18	66.7	31.7	22	10.0
Central	21	71.4	16.9	33	6.9
Eastern	30	63.3	15.2	60.0	7.1
Provincial Average		67	15.5	41	10.4
Estimated yield loss					
Blackleg	10%				
Sclerotinia	5%				

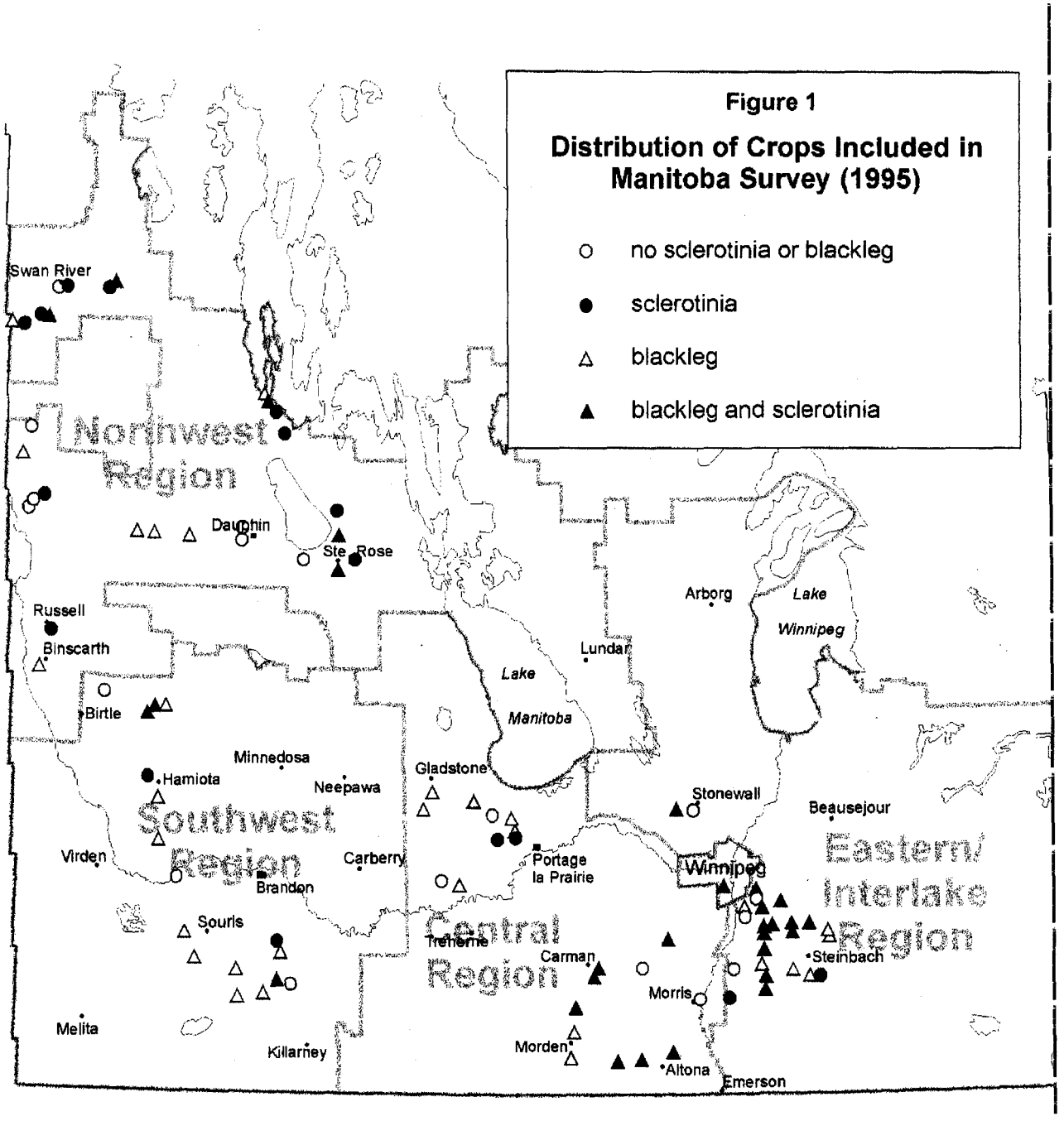
Figure 1
Distribution of Crops Included in Manitoba Survey (1995)
no sclerotinia or blackleg
sclerotinia
blackleg
blackleg and sclerotinia
Northwest Region
Southwest Region
Central Region
Eastern/ Interlake Region
Swan River
Dauphin
Ste Rose
Russell
Binscarth
Birtle
Minnedosa
Hamiota
Neepawa
Virden
Carberry
Brandon
Souris
Melita
Killarney
Gladstone
Portage la Prairie
Treherne
Carman
Morden
Morris
Altona
Emerson
Lake Manitoba
Lundar
Arborg
Lake Winnipeg
Stonewall
Winnipeg
Beausejour
Steinbach

CROP: Flax

LOCATION: Manitoba

NAME AND AGENCY:

K.Y. Rashid[1], E.O. Kenaschuk[1] and R.G. Platford[2]

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TITLE: DISEASES OF FLAX IN MANITOBA IN 1995

METHODS: A total of 56 flax crops in southern Manitoba and 12 in southeastern Saskatchewan were surveyed in 1995. Twenty-nine crops were surveyed on August 22, 18 on August 31, and 21 on September 7. Crops were selected at random. Each crop was sampled by two persons walking 100 m in opposite directions in the field following an "M" pattern. Diseases were identified by symptoms and the incidence and severity of each disease were recorded.

In addition, 15 samples of flax plants were submitted for analysis to the Manitoba Agriculture Crop Diagnostic Centre by agricultural representatives and growers.

RESULTS AND COMMENTS: Moisture conditions were adequate throughout the growing season in most flax growing regions in Manitoba. Flax stand and vigour were very good in most crops surveyed. Several crops were 1-3 weeks later maturing, and the yield in such crops must have been reduced by an early frost.

Pasmo (*Septoria linicola*) was observed in 66% of crops surveyed (Table 1). The incidence of pasmo ranged from 1 to 40% infected plants, and severity ranged from 1 to 20% stem and leaf area affected among 35 crops. Eight crops had 40-60% infected plants with 10-40% stem and leaf area affected. Only two crops had >60% infected plants with 40-60% stem and leaf area infected. The incidence and severity of pasmo varies from year to year and region to region depending on prevailing weather conditions towards the end of the season.

Fusarium wilt (*Fusarium oxysporum f.sp. lini*) was observed in 53% of the crops surveyed in 1995. The incidence of late wilt in 27 crops was <1% with disease severity ranging from 1-5%. Only 12 crops had 1-5% infected plants but still with only 1-5% disease severity. The incidence and severity of fusarium wilt at the seedling stage was not assessed in 1995.

Traces of aster yellows (Mycoplasma-like organism) were observed in only seven flax crops (10% of total crops). Rust (*Melampsora lini*) was not observed in any of the 68 crops surveyed, nor in the 30 rust-differential flax lines planted in nurseries at Morden and Portage la Prairie.

Of the 15 samples submitted to the Manitoba Agriculture Crop Diagnostic Centre, six were affected by root rot caused by *Fusarium, Pythium*, and *Rhizoctonia*, and two were affected by pasmo. In addition to disease problems, two samples were affected by herbicide injury, five affected by environmental stress, one affected by nutrient deficiency, and three affected by insect damage.

ACKNOWLEDGEMENTS: The assistance of L. J. Wiebe and G. Mardli in conducting this survey is gratefully acknowledged.

TABLE 1. Incidence and severity of pasmo and fusarium wilt on flax in southern Manitoba and southeastern Saskatchewan in 1995.

Crops Affected by Pasmo				Crops Affected by Fusarium Wilt			
No. and % of Crops	infested	Incidence*	Severity**	No. and % of Crops	infested	Incidence*	Severity**
23	(34%)	0	0	29	(43%)	0	0
11	(16%)	1-5%	1%	27	(40%)	1%	1-5%
12	(17%)	5-20%	1-5%	12	(17%)	1-5%	1-5%
12	(17%)	20-40%	5-10%	-	-	-	-
8	(12%)	40-60%	10-40%	-	-	-	-
2	(3%)	>60%	40-60%	-	-	-	-

* Incidence = Percentage of infected plants in each field.

** Severity = Percentage of stem and leaf area affected with pasmo; and visual estimate of wilt, yellowing of leaves, and plant vigour for fusarium wilt.

CROP: Lentil

LOCATION: Southern Alberta

NAME AND AGENCY:
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TITLE: SURVEY OF DISEASES OF LENTIL IN SOUTHERN ALBERTA IN 1995

METHODS: Eleven dryland crops of lentil were surveyed for diseases on August 11, 1995 in the area surrounding Warner and New Dayton, Alberta. Each crop was sampled by selecting ten sites in a U-shaped pattern, approximately 20 m apart, with each site consisting of a 3 m long section of row. The number of plants with disease symptoms, and the number of healthy plants were recorded at each site. Samples of diseased plants were collected, surface sterilized for 90 seconds in 70% ethanol, and cultured on potato dextrose agar at 20 C under light for 2 weeks, to verify the causal agent. The percentage of plants with each disease was calculated for each crop by averaging the figures at the ten sites. Disease incidence was then characterized according to the following scale: (1) none (0% of plants infected), (2) trace (<1%), (3) low (1-10%), (4) moderate (11-25%), (5) high (26-50%), (6) very high (>50%). The stand density was calculated for each crop using the average number of plants per m of row, based on 15 cm row spacing. The stand density of each crop was characterized according to the following scale: (1) normal (>100 plants/m^2), (2) reduced (70-100), (3) severely reduced (<70).

RESULTS: Gray mold (*Botrytis cinerea*) was found in all 11 crops surveyed (Table 1). Disease incidence ranged from 8 to 60%. The frequency of crops with moderate, high and very high incidence of gray mold was 36%, 27% and 9%, respectively. The disease was distributed throughout the entire area surveyed (Figure 1).

Reduced stand density was found in 8 of the 11 crops surveyed. Stand counts varied with crops, ranging from 50 to 110 plants/m^2. The frequency of crops with normal, reduced and severely reduced stand density was 27%, 46% and 27%, respectively. The crops with reduced stand density were distributed throughout the entire area surveyed.

DISCUSSION: Lentil is grown in the black soil zone in southern Alberta. Gray mold was found in lentil in Saskatchewan in 1994 (Morrall et al., 1995) and in dry bean in southern Alberta in 1993 (Huang and Erickson, 1994) and 1994 (Huang et al., 1995). Results of the 1995 survey indicate that gray mold is both widespread and severe on lentil in southern Alberta.

The recommended seeding rate for lentil would usually result in approximately 120 plants/m^2. All of the crops surveyed had plant densities less than this. The reduced or severely reduced plant densities in 8 crops may have been caused by damping-off or seedling blight.

TABLE 1. Diseases of lentil in southern Alberta in 1995.

Crop	Gray mold* (% plants infected)	Stand density** (plants/m^2)
1	60 VH	50 Se
2	50 H	62 Se
3	42 H	67 Se
4	36 H	73 Re
5	23 M	79 Re
6	21 M	91 Re
7	18 M	82 Re
8	17 M	87 Re
9	10 L	108 No
10	8 L	102 No
11	8 L	110 No

* L, low (1-10% of plants infected);
M, moderate (11-25%); H, high (26-50%);
VH, very high (>50%).

** No, normal (>100 plants/m2);
Re, reduced (70-100);
Se, severely reduced (<70).

REFERENCES:

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3. Morrall, R.A.A., M. Reed, J. Paisley and M. French. 1995. Seed-bornelentil diseases in Saskatchewan in 1994. Can. Plant Dis. Survey 75:150.

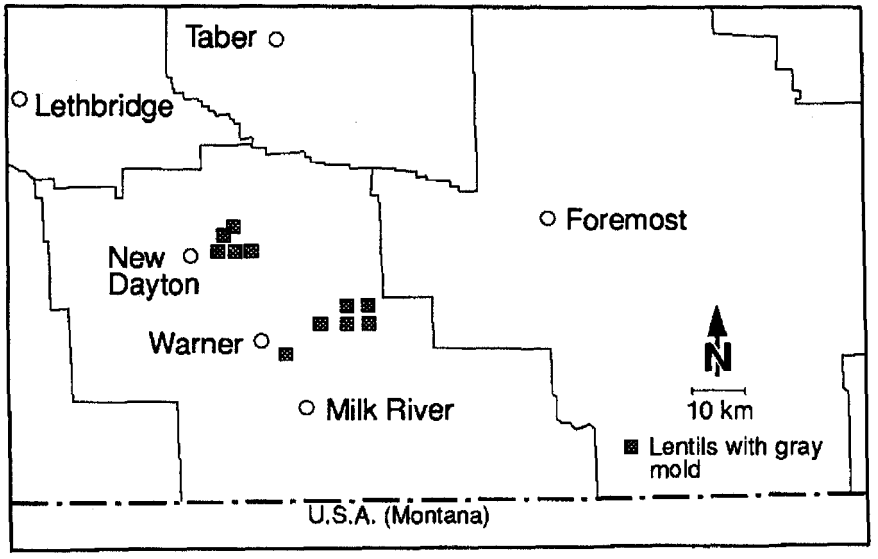

Figure 1. Distribution of gray mold of lentil in southern Alberta in 1995.

CROP: Lentil

LOCATION: Saskatchewan

NAME AND AGENCY:

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TITLE: SEED-BORNE DISEASES OF LENTIL AND PEA IN SASKATCHEWAN IN 1995

METHODS: No systematic survey of lentil or pea crops was carried out in the growing season. However, the results of agar plate testing of seed samples from the 1995 crop in Saskatchewan by four commercial companies were summarized and classified according to crop district [CD (1)] in Saskatchewan. The agar plate tests were conducted mainly to detect the pathogens causing ascochyta blight (*Ascochyta fabae* f. sp. *lentis*), anthracnose (*Colletotrichum truncatum*), and botrytis stem and pod blight (*Botrytis cinerea*) of lentil and ascochyta blights (*Mycosphaerella pinodes* and *A. pisi*) of pea. Not all lentil samples were tested for all three seed-borne pathogens. Furthermore, it was not possible to determine which of the lentil samples came from crops that had been sprayed with a foliar fungicide or grown from seed treated with a fungicide (2).

RESULTS AND COMMENTS: The growing season was marked by above-normal temperatures in June and relatively normal temperatures later. Rainfall was very variable in different areas of the province. In many southern areas [CD 1-4] early-season precipitation was above normal, but further north it was normal to below normal. In many central and northern areas rainfall was above normal in August, but many lentil and pea crops had been harvested by early August. In extreme west central and northwestern areas [parts of CD 7 and 9] drought prevailed throughout much of the season and yields were considerably reduced.

By early December nearly 1000 lentil seed samples and over 500 pea seed samples had been tested by the four companies. Levels of *Ascochyta* infection in lentil ranged up to 65.5% but about 8.5% of the samples were free of *Ascochyta*, in contrast with 5.7% in 1994. The overall mean level of infection was 3.6%; this is less than half the value in 1994 (2) and about the same as the average of the previous eight years. Levels of *Ascochyta* were generally higher in CD 2,3,4 and 5 than elsewhere (Table 1), reflecting generally wetter conditions in eastern and south-central areas. *Colletotrichum* was detected in only three samples at a level of 0.5% or less. *Botrytis* infection was not detected in 15.7% of the seed samples tested, compared with 25.9% in 1994. The highest level of *Botrytis* infection detected was 18.8% and the mean level was 2.1%. Both values are similar to those for 1994 (2). Levels of *Ascochyta* in pea seed ranged as high as 37.5%, but the overall mean was only 2.1%. Mean infection was lower in CD 7 than in the other crop districts from which substantial numbers of pea samples were tested, probably because of drier weather and a shorter history of pea cultivation.

REFERENCES:

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TABLE 1. Percentage infection of lentil and pea seed with pathogens in 1995 in relation to Saskatchewan crop districts.

Crop District	Ascochyta on Lentil		Botrytis on Lentil		Ascochyta on Pea	
	No. of Samples	Mean % Infection	No. of Samples	Mean % Infection	No. of Samples	Mean % Infection
1	30	0.7	0	-	13	2.3
2	154	3.2	13	2.3	9	0.8
3	172	5.3	133	2.5	8	0.6
4	4	6.3	0	-	0	-
5	13	3.3	0	-	35	1.7
6	193	3.1	118	2.3	53	1.1
7	158	2.3	125	1.4	35	1.0
8	41	2.2	7	1.4	248	1.8
9	0	0.8	5	2.5	54	1.3
Unknown*	204	4.5	0	-	63	0.6
Total	979	3.6	401	2.1	518	1.5

* Unknown samples were mostly from the south central area (CD 2 and 3).

CROP: Lentil

LOCATION: Manitoba

NAME AND AGENCY:

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TITLE: DISEASES OF LENTIL IN MANITOBA IN 1995

METHODS: Thirty - six crops of lentil were surveyed in southern Manitoba in July, 1995 primarily to assess levels of anthracnose. In addition three crops were monitored on a weekly basis throughout the growing season to assess disease development and plant stage.

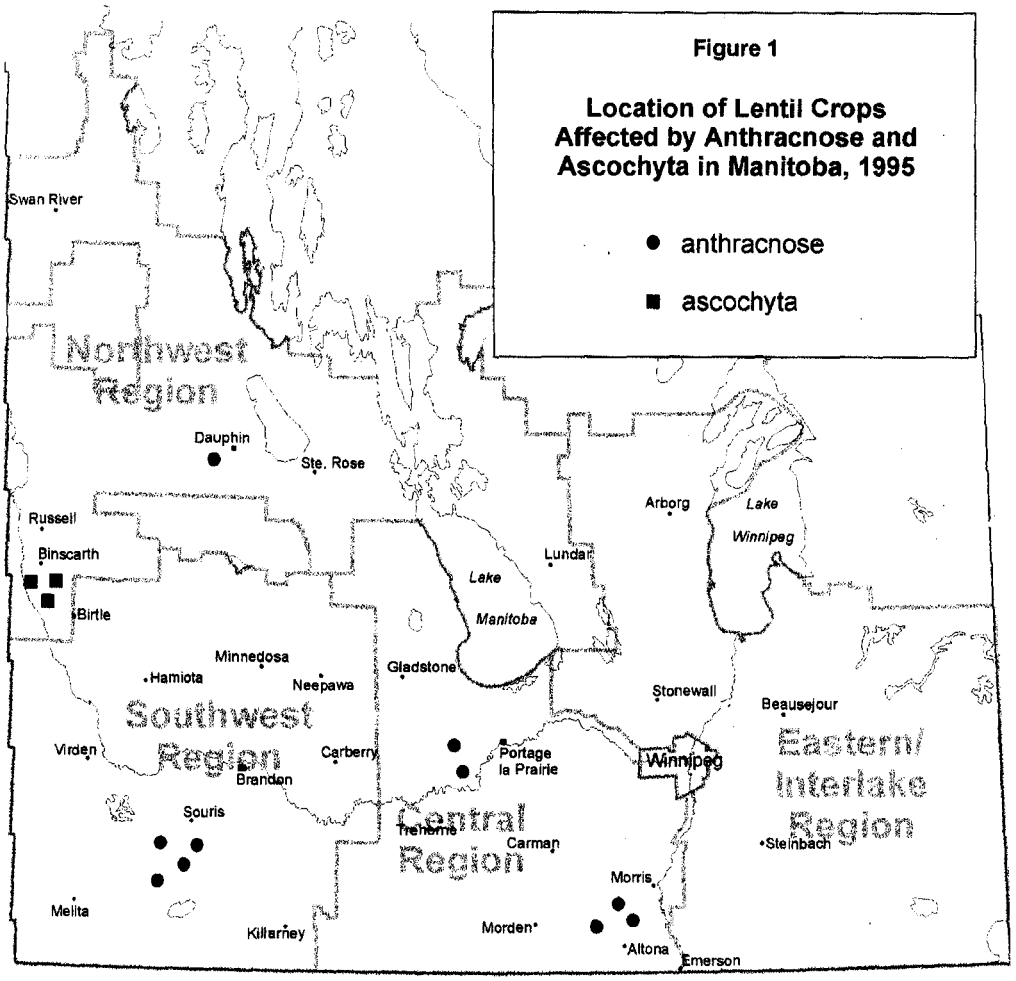
RESULTS AND COMMENTS: The prevalence of infested lentil crops and an indication of overall disease severity within the crops surveyed is presented in Table 1. The location of crops included in the survey is presented in Figure 1. Anthracnose was most severe in the southern part of the Central region in the Red River valley and in lentil crops near Portage la Prairie. The 8 crops surveyed in the southern Red River valley area were all found to be affected by anthracnose with three at a moderate level and five at a severe level. Crops surveyed in the northern part of the central region near Portage la Prairie were also all affected by anthracnose, two at a severe level and two at a moderate level. The major area of lentil production in Manitoba in 1995 was the southwest region south of Brandon. Anthracnose was present in most crops in this area but severity was less than in crops in the Central region where lentils have been grown for a longer period of time. Anthracnose was also severe in the southern part of the southwest region which included crops near Souris. Only one crop was free of anthracnose. Five crops showed a trace level, four moderate and one a severe level of anthracnose. Anthracnose was not detected in crops north of Brandon near Hamiota nor in the southern part of the northwest region near Binscarth. The one infested crop in the northwest region was near Dauphin and showed a severe level of infection.

In addition to the survey three crops of lentils were monitored from seeding in mid May until harvest in mid August. Two crops were in the Red River Valley area near St. Jean and one in the central region east of Carman. Root rot was evident at low levels by the third week of June when plants were in the 10 node stage. Heat canker was also evident in the crops monitored in the first week of July following two weeks of higher than normal temperatures. Weather conditions were very favorable for growth of lentil in Manitoba in 1995.

Anthracnose was first detected during the first week of July when plants were in the early flowering stage was very prevalent by the fourth week of July. The optimum period for application of Bravo (chlorothalonil) for control of anthracnose was between June 15 when most fields were in the 10-12 node stage and just starting to flower and July 15 when plants were in full bloom and starting to pod. The fields being monitored were sprayed during the last week of June when plants were in the 10 to 12 node stage.

TABLE 1. Prevalence and severity of anthracnose in Manitoba in 1995.

# Crops	Regions	No. of Crops in Anthracnose Severity Classes			
		Zero	Trace	Moderate	Severe
17	SW Region - South of Brandon	1	5	4	7
4	NW Region	3	—	—	1
8	Central Region - Red River Valley	—	—	3	5
4	Central Region - Portage la Prairie	—	—	2	2
3	SW Region - North of Brandon	3	—	—	— .



CROP: Field Pea

LOCATION: Peace River Region of Alberta

NAME AND AGENCY:
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TITLE: FIELD PEA ROOT ROT DISEASE SURVEY IN THE PEACE RIVER REGION OF ALBERTA IN 1995

METHODS: The field pea acreage has doubled in the last three years in the Peace River region with 29,000 ha grown in 1995. It was observed in previous years that root rot was the main disease in commercial field pea crops. However, no disease survey was conducted. This is the first systematic disease survey conducted throughout the Peace River region. Thirty-eight field pea crops were surveyed for root rot between late June and early August. In each field, ten plants were dug in a row at five sites equally spaced in a W pattern. The plants were returned to the laboratory where the roots were washed and root rot incidence and severity were assessed. Severity was assessed visually on a 0-4 rating scale where 0 = clean healthy root, 1 = slight, 1-10% root discoloration, 2 = moderate, 11-25% root discoloration, 3 = severe, 26-50% root discoloration and 4 = very severe, 51-100% root discoloration. Several diseased root pieces were plated on acidified potato dextrose agar to determine the root rot organisms present.

RESULTS AND COMMENTS: Root rot was found in all 38 crops surveyed (Table 1). The mean disease incidence was 64% and the mean severity rating was 1.2. The fungal organisms retrieved from the plated pieces were *Fusarium* species. Other diseases observed were sclerotinia stem rot, (*Sclerotinia sclerotiorum*), ascochyta blights (*Ascochyta* spp), downy mildew (*Peronospora viciae*), powdery mildew (*Erysiphe pisi*) and grey mold (*Botrytis cinerea*).

ACKNOWLEDGEMENTS: Many thanks to the following people for assisting with the field pea survey: E. Dalke, J. St.Onge, B. Anderson, C. Ducharme, S. Schaffert and K. Lehman.

TABLE 1. Incidence and severity of root rot in thirty-eight field pea crops in the Peace River Region in 1995.

Location	No.of crops	Incidence (%)		Severity (0-4)	
		Mean	Range	Mean	Range
Berwyn	4	81	64-94	1.4	1.0-2.1
Fairview	5	34	22-50	0.4	0.3-0.6
Fort Vermilion	4	86	76-96	1.7	1.3-2.1
High Level	3	85	70-98	2.6	1.6-3.6
High Prairie	5	24	10-38	0.3	0.1-0.5
Hines Creek	2	64	64-64	1.1	0.9-1.2
La Crete	3	75	50-90	1.2	0.9-1.5
La Glace	7	76	46-90	1.4	0.5-1.9
Spirit River	2	80	66-94	1.7	1.1-2.4
Worsley	3	63	40-98	1.2	0.5-2.5
TOTAL	38				

CROP: Pea

LOCATION: Southern Alberta

NAME AND AGENCY:
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TITLE: SURVEY OF DISEASES OF PEA IN SOUTHERN ALBERTA IN 1995

METHODS: Thirteen irrigated and five dryland crops of pea were surveyed for diseases on August 10 and 11, 1995 in the areas surrounding Enchant, Vauxhall, Taber and Warner, Alberta. Each crop was sampled by selecting ten sites in a U-shaped pattern, approximately 20 m apart, with each site consisting of a 3 m long section of row. The number of plants with each disease and the number of healthy plants were recorded at each site. The percentage incidence of each disease for each crop was calculated by averaging values at the ten sites. The level of each disease was then characterized according to the following scale: (1) none (0% of plants infected), (2) trace (<1%), (3) light (1-10%), (4) moderate (11-25%), (5) high (26-50%), (6) very high (>50%).

RESULTS: Root rot (*Fusarium* spp., *Pythium* spp.), ascochyta blight (*Ascochyta* spp.), gray mold (*Botrytis cinerea*) and sclerotinia rot (*Sclerotinia sclerotiorum*), were found in 1995 (Table 1). Powdery mildew (*Erysiphe pisi*) was not found.

Root rot was present in 16 of the 18 crops surveyed. The frequency of crops with moderate, high and very high incidence of root rot was 11%, 11%, and 17%, respectively. The three crops with very high disease incidence had 53%, 57%, and 64% of plants infected. The disease was distributed throughout the entire area surveyed in southern Alberta.

Ascochyta blight was present in 13 of the 18 crops surveyed. The frequency of crops with moderate and high incidence of ascochyta blight was 6% and 11%, respectively. The two crops with high disease incidence had 27% and 43% of plants infected. The disease was found in 12 of 13 irrigated crops, and 1 of 5 dryland crops surveyed.

Gray mold was found in 4 of the 18 crops surveyed. Disease incidence ranged from 0% to 10% of plants infected. The disease was found in both irrigated and dryland crops.

Sclerotinia rot was found in 3 of the 18 crops surveyed. Disease incidence ranged from 0% to 10% of plants infected. The disease was found in both irrigated and dryland crops.

DISCUSSION: Root rot has been reported as a disease of pea in northern Alberta (Hwang et al, 1995), southern Alberta (Howard et al, 1995) and southern Manitoba (Xue et al, 1995). It was the most prevalent disease of pea in southern Alberta in 1995. Ascochyta blight was widespread in irrigated crops and has the potential to affect dryland crops during a wet growing season. White mold and gray mold have been reported as major diseases of dry bean in southern Alberta in 1993 (Huang and Erickson, 1994) and 1994 (Huang et al, 1995). However, these two diseases were of minor importance on pea crops in southern Alberta in 1995.

TABLE 1. Diseases of pea in southern Alberta in 1995.

Disease incidence (% plants infected)	Number of crops				
	Root rot	Ascochyta blight	Gray mold	Sclerotinia rot	Powdery mildew
None (0%)	25	14	15	18	
Trace (<1%)	3	7	2	2	0
Light (1-10%)	6	3	2	1	0
Moderate (11-25%)	2	1	0	0	0
High (26-50%)	2	2	0	0	0
Very high (>50%)	3	0	0	0	0

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5. Xue, A.G., T.D. Warkentin, K.Y. Rashid, E.O. Kenaschuk and R.G. Platford. 1995. Diseases of field pea in Manitoba in 1994. Can. Plant Dis. Survey 75:156-157.

CROP: Field pea

LOCATION: Manitoba

NAME AND AGENCY:

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TITLE: DISEASES OF FIELD PEA IN MANITOBA IN 1995

METHODS: Crops of field pea were surveyed in 28 different locations in Manitoba during the 1995 growing season. The crops were chosen at random from regions in southwestern and southcentral Manitoba where most field pea crops were grown (Figure 1). The survey was conducted 26 July - 8 August when the crops were in the late-flowering and pod filling stages. Ten plants were sampled at each of five random sites for each crop surveyed. Diseases were identified by symptoms. Sclerotinia rot and fusarium wilt were rated as percentage of plants infected. The severity of other diseases was estimated using a scale of 0 (no disease) to 9 (whole plants were severely diseased).

RESULTS AND DISCUSSION: Ten diseases were observed on pea in Manitoba in 1995 (Table 1). Mycosphaerella blight (*Mycosphaerella pinodes*) was the most common disease, found in all crops surveyed. The disease was at low levels in most crops and severity ranged from only 0.1 to 3. Fusarium wilt (*Fusarium oxysporum* f. sp. *pisi*) was the second most prevalent disease being found in 16 of the 28 crops. Infection was near 13% on average, and as high as 80% in one field. Anthracnose (*Colletotrichum pisi*), bacterial blight (*Pseudomonas syringae* pv. *pisi*), and downy mildew (*Peronospora viciae*) were observed in 13, 12, and 9 of the crops, respectively, but severity was lower than 1.0. Powdery mildew (*Erysiphe pisi*) and septoria leaf blotch (*Septoria pisi*) were observed in 7 crops at the time of the survey, and sclerotinia rot (*Sclerotinia sclerotiorum*), gray mould (*Botrytis cinerea*) and pea mosaic caused by BYMV were observed in 1 or 2 of the 28 crops. The severity of these diseases was slight.

Of 29 samples of diseased field pea submitted to the Manitoba Agriculture Crop Diagnostic Centre, 15 showed root rot (*Fusarium* spp.), 9 mycosphaerella blight, 1 seed rot, 1 powdery mildew, and 3 damage caused by abiotic factors.

The severity of mycosphaerella blight in 1995 was lower than in previous years. This was due to the hot dry weather in the summer of 1995. This is the first time that fusarium wilt has been reported as a prevalent disease on pea in Manitoba. Short rotation intervals between pea crops appeared to be the main reason for crops with severe wilt. The abnormally hot and dry weather in June and July may have also contributed to the levels of wilting.

TABLE 1. Prevalence and severity of diseases in 28 field pea crops in Manitoba in 1995.

Disease	No. crops affected	Disease severity*	
		Mean	Range
Mycosphaerella blight	28	0.86	0.1-3.0
Fusarium wilt	16	12.9%	1.0-80%
Anthracnose	13	0.67	0.1-1.6
Bacterial blight	12	0.18	0.1-0.4
Downy mildew	9	0.93	0.1-2.6
Powdery mildew	7	0.26	0.1-0.4
Septoria leaf blotch	7	0.16	0.1-0.3
Sclerotinia rot	2	2.0%	1.0-3.0%
Gray mould	2	0.1	0.1
Pea mosaic	1	1.0	1.0

* Fusarium wilt and sclerotinia rot were rated as percent of plants infected; other diseases were rated on a scale of 0 (no disease) to 9 (whole plant severely diseased).

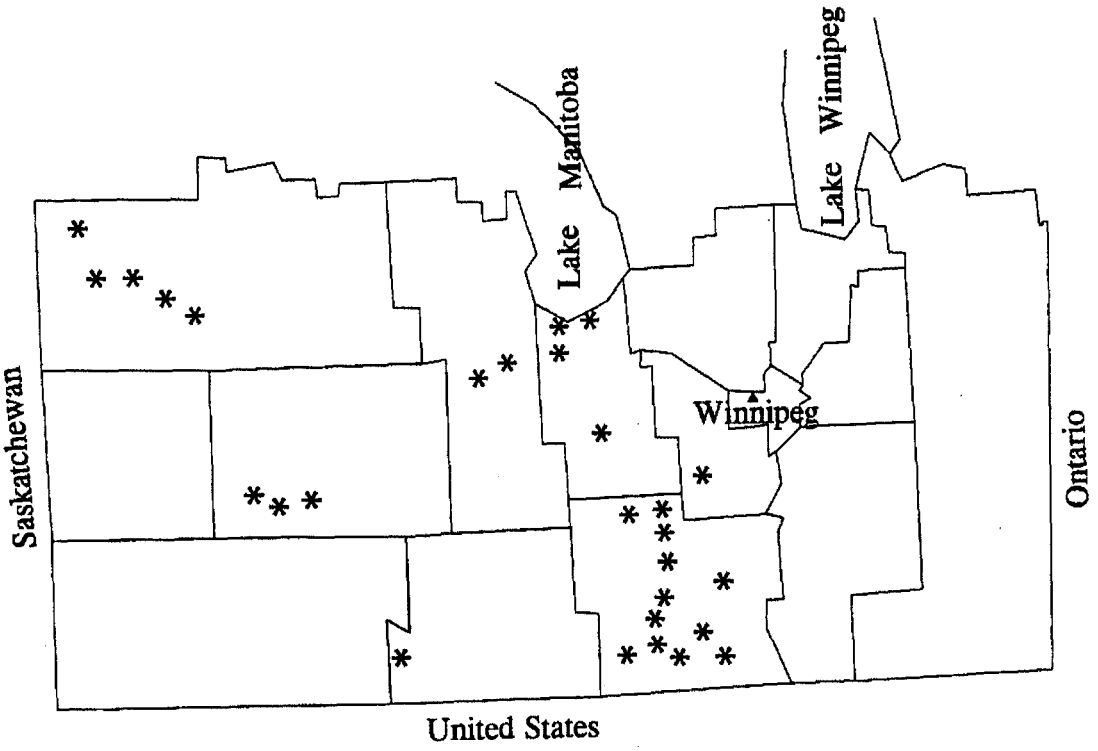

Figure 1. Locations of 28 field pea crops surveyed for diseases in southern Manitoba in 1995.

CROP: Sunflower

LOCATION: Manitoba

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TITLE: DISEASES OF SUNFLOWER IN MANITOBA IN 1995

METHODS: A total of 32 sunflower crops in southern Manitoba and 2 in southeastern Saskatchewan were surveyed in 1995. Twenty-one crops were oilseed hybrids and 13 were confectionery hybrids. Nineteen crops were surveyed in the last week of August, 11 in the first week of September and 4 in the second week of September. Crops were selected at random, and each crop was sampled by two persons walking 100 m in opposite directions in the field following an "M" pattern. Diseases were identified by symptoms and the incidence of downy mildew (*Plasmopara halstedii*), sclerotinia wilt or head and stem infections (*Sclerotinia sclerotiorum*), rhizopus head rot (*Rhizopus* spp.), and verticillium wilt (*Verticillium dahliae*) were estimated. Disease severity for rust (*Puccinia helianthi*), leaf spots (*Septoria helianthi* and *Alternaria* spp.), and phoma stem infections (*Phoma* spp.) were measured as percent leaf and stem area infected. A disease index was calculated for each disease in every crop based on disease incidence or disease severity (Table 1).

In addition, nine samples of sunflower plants were submitted for analysis to the Manitoba Agriculture Crop Diagnostic Centre by agricultural representatives and growers.

RESULTS AND COMMENTS: Wet soil conditions caused delayed seeding in most sunflower growing areas which resulted in a 1-2 week delay in sunflower maturity in Manitoba. Above normal soil temperatures at the seedling stage resulted in very low incidence of downy mildew. The crop conditions were generally good throughout the 1995 growing season. In most of the crops surveyed, stand was very good and vigour was good.

Sclerotinia wilt/basal stem infection was prevalent in 74% of the crops surveyed, with incidence ranging from trace to 20% infected plants (Table 1). Only one field east of Altona and another west of Lowe Farm had, respectively, 30 and 50% sclerotinia-wilted plants. Sclerotinia headrot and mid-stem breakage caused by ascospore infections were prevalent in 21% of the crops surveyed up to the second week in September, with incidence ranging from trace to 5% infected plants. The ratio of headrot to mid-stem infections varied among fields but headrot was more frequently encountered than mid-stem infections in most fields.

Headrot caused by *Rhizopus* spp. was identified in 24% of the crops surveyed, with incidence ranging from trace to 10% infected heads, due perhaps to the high temperatures prevailing in August and insect damage to sunflower heads. Rhizopus head rot has not been observed in the eastern prairies since 1988 when a hot summer and insect and grasshopper infestation caused great damage to sunflower heads and favoured infection by *Rhizopus* (1).

Verticillium wilt was prevalent in 68% of the crops surveyed, with incidence ranging from trace to 5% infected plants in oilseed hybrids, and from trace to 30% in confectionery hybrids. The prevalence and incidence of verticillium wilt in 1995 was higher than in previous years in both oilseed and confectionery hybrids (2). The high incidence of verticillium wilt in the confectionery hybrids is due to their lack of resistance.
Downy mildew was observed in only 26% of the crops surveyed, with incidence ranging from trace to 10% infected plants. The incidence of downy mildew in 1995 was very low in comparison with 1994 (2), due perhaps to the unfavourably high temperatures and normal soil moisture conditions at the seedling stage in 1995.

Rust was prevalent in 62% of the crops surveyed with incidence ranging from trace to 5% leaf area infected. Although rust incidence and severity were higher in 1995 than in 1994, this is the third consecutive year with low rust infections of sunflower in Manitoba (2).

Leaf spots caused by *Septoria helianthi* and *Alternaria* spp. were observed in 32% of the crops at <1% leaf area infected. Stem lesions caused by *Phoma spp.* were observed in 24% of the crops surveyed towards the end of the season, with incidence ranging from trace to 10% infected stems.

Of the nine samples submitted to the Manitoba Agriculture Crop Diagnostic Centre, two were infected with sclerotinia wilt. In addition to diseases, six samples were found to be affected by herbicide injury, one affected by nutrient deficiency, and one affected by insect damage.

ACKNOWLEDGEMENTS: The assistance of L. J. Wiebe and G. Mardli in conducting this survey is gratefully acknowledged.

REFERENCES:

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TABLE 1. Prevalence and intensity of sunflower diseases in 34 crops surveyed in southern Manitoba and southeastern Saskatchewan in 1995.

DISEASE	# AND % OF CROPS INFESTED	DISEASE INDEX*	
		MEAN	RANGE
Sclerotinia wilt	25 (74%)	1.1	T-4
Sclerotinia headrot	7 (21%)	1.0	T-1
Rhizopus headrot	8 (24%)	1.0	T-2
Verticillium wilt	23 (68%)	1.0	T-3
Downy mildew	9 (26%)	1.0	T-2
Rust	21 (62%)	1.0	T-2
Phoma stem lesion	8 (24%)	1.0	T-2
Alternaria/septoria leaf spot	11 (32%)	1.0	T-1
Stand	34	1.2	1-3
Vigour	34	1.6	1-3

* Disease index is based on a scale of 1 to 5: 1= trace to 5% disease, 2= 5% to 20% disease, 3= 20% to 40% disease, 4= 40% to 60% disease and 5= greater than 60% disease levels. Index is based on disease incidence for downy mildew, verticillium wilt, sclerotinia infections, and rhizopus head rot; and on disease severity measured as percent leaf area infected for rust and leaf spots, and percent stem infections for phoma. Indexes for stand and vigour are based on 1-5 scale (1= very good and 5= very poor).