Oilseeds and special crops / Oléagineux et cultures spéciales

Crop / Culture: Canola

Location / Emplacement: Manitoba

Title / Titre: Distribution, Prevalence and Iucideuce of Canola Diseases in 1990

Name and Agency / Nom et Organisation:

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Methods: Two surveys were conducted in southern Manitoba. Duriug the first, 45 fields of Brassica napus were surveyed in the southern crop districts in the secoud week of August. During the second, 33 fields of B. napus and 5 fields of B. rapa (B. campestris) were surveyed in the northeru crop districts in the third week of August. The presence of various diseases was noted in each field. For each field, disease iucidence was determined on a sample of 50 - 60 plants. In addition, results are included from one sample that was received by the plant pathology laboratory of Manitoba Agriculture.

Results and Comments: Blackleg, caused by Leptosphaeria maculans, was found in 41 of 84 fields (Table 1; Figure 1). Fields with blackleg were found in most crop districts. Mean incidence was low (< 10%) in fields of eastern crop districts and very high (> 70%) in fields of western crop districts. Observed symptoms included the typical stem cauker, grey discoloration of the stem and elongated lesions on various parts of the stem. Disease severity on the affected plants was very variable. In some fields, infected plants did mature somewhat earlier, but still gave a fair seed yield.

Sclerotinia stem rot, caused by Sclerotinia sclerotiorum, was observed in 32 fields (Table 1; Figure 1). Affected fields were fouud in most crop districts. Disease incidence was less than 5% in most fields, but reached 10% in some.

Footrot, caused by Fusarium spp. and Rhizoctonia solani, was observed in 21 fields distributed throughout Manitoba (Table 1). Prevalence was higher in crop districts 4, 5 and 6 than in other districts. In most fields incidence was less than 10%, however; it reached 24% in one field in district 4. A trace of aster yellows was observed in seven fields, distributed among several crop districts.

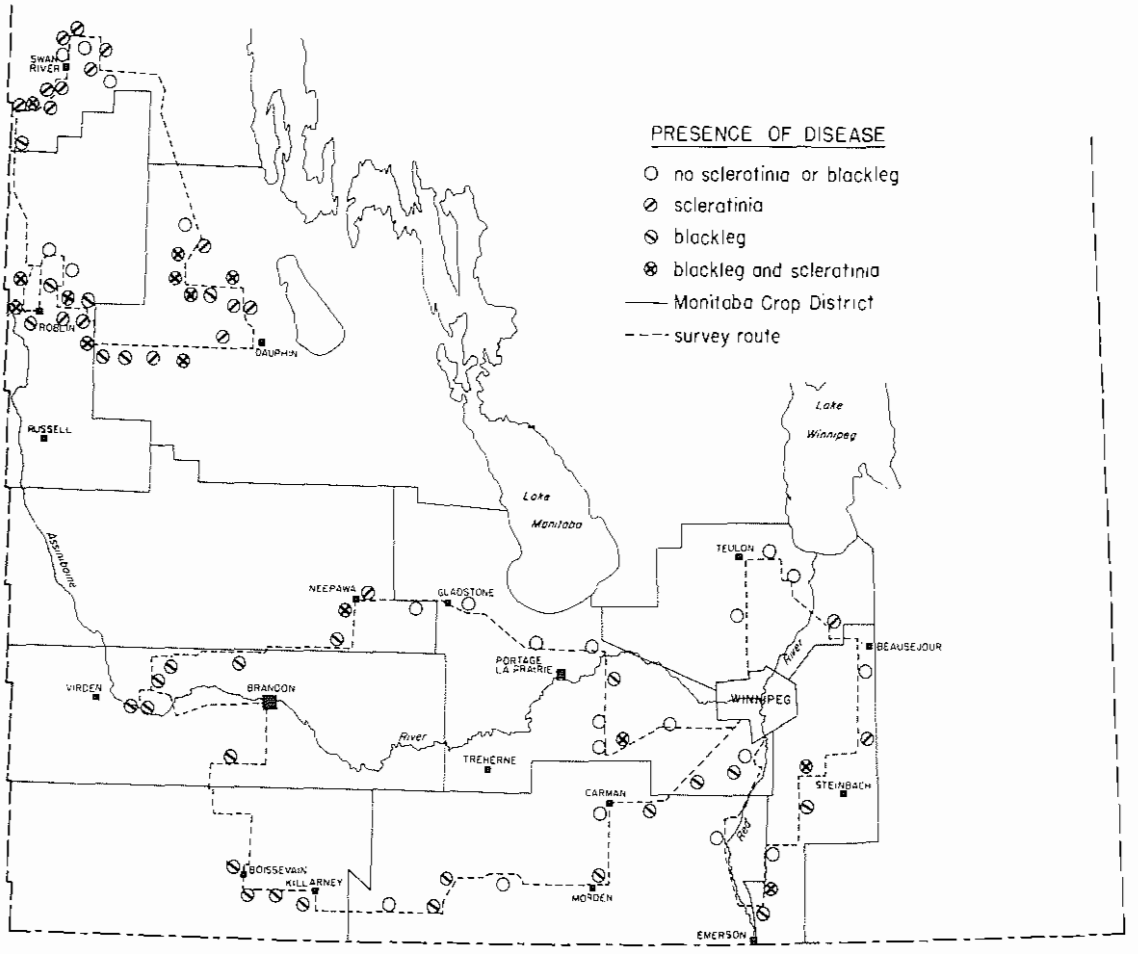
Staghead, caused by Albugo candida was observed in two fields in crop district 4. Incidence was 4% in both fields. Blackspot, caused by Alternaria spp., was observed in one field in crop district 4. Aphids were present in many fields throughont Manitoba. Severe infestations were observed in districts 7, 8, 9 and 11.

In summary, footrot, blackspot, staghead and aster yellows were present at low levels in 1990. The yield loss caused by these diseases will be negligible. Aphids were present in large numbers. The effect of aphids on seed yield is unkuown, but the observed infestations suggest that they may have had an effect. Sclerotinia was generally present in low levels. The yield loss caused by sclerotinia will be small. Blackleg was observed in many fields and often at very high levels. Based on the seed yield of infected plants, yield losses up to 50% may be attributed to blackleg in individual fields in 1990.

Table 1. Prevalence and incidence of canola diseases by crop district in Manitoba in 1990.

Crop District	No. of sampled fields	Number of affected fields				Range of Incidence%	
		Blackleg	Sclerotinia	Foot rot	Aster Yellows	Blackleg	Sclerotinia
1	5	5	–	1	–	18–98	–
2	6	6	–	–	–	12–66	–
3	4	2	2	1	–	18–48	2–4
4	11	7	6	7	3	2–76	2–6
5	13	2	9	4	–	2–10	2–10
6	14	8	10	6	2	4–94	2–12
7	12	4	1	1	1	2–70	5
8	8	4	–	–	–	2–38	–
9	7	3	3	1	1	2–10	3–8
11	4	–	1	–	–	–	5
Total	84	41	32	21	7		

DISTRIBUTION OF FIELDS INCLUDED IN MANITOBA CANOLA SURVEY (1990)



Crop / Culture: Canola

Location / Emplacement: Saskatchewan

Title / Titre: CANOLA DISEASES IN N.E. SASKATCHEWAN, 1990

Name and Agency / Nom et Organisation:

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METHODS: Seventy-five canola fields were surveyed between July 31 and August 14, 1990 in Saskatchewan Agriculture Crop Districts 5b, 8a, 8b and 9a. Fields were sampled by collecting one plant at ten sites located on a diagonal transect. Diseases were identified by symptoms, and the severity of each disease recorded as an estimated percentage area affected of the leaf or stem. Root rot and blackleg were assessed on a scale of 0=healthy, 2=trace, 5=moderate and 10=severe. Results were averaged over the total number of samples and fields, and the disease index, an estimate of severity, was calculated for each disease. The percentage of fields affected was calculated for an estimate of prevalence.

RESULTS AND COMMENTS: Black spot (*Alternaria* spp.) was the most severe disease this year (Table 1), followed by blackleg (*Leptosphaeria maculans*). White rust of leaves and staghead of flowering shoots (*Albugo candida*) were less severe than the average for the last three years. Downy mildew (*Peronospora parasitica*) was present for the first time in two years, but not as severe as in 1987. Root rot (*Rhizoctonia solani* & *Fusarium* spp.) was present at low levels. In addition to the diseases in the table, stem rot (*Sclerotinia sclerotiorum*) and aster yellows (mycoplasma) were found at very low levels in crop district 9a.

Table 1. Severity and prevalence of canola diseases in 1990

Crop District	No. Fields	Disease index/% fields affected					
		Black spot	Black-leg	White rust	Stag-head	Downy mildew	Root rot
5b	13	1.0/92	0.6/38	0.2/23	0.1/15	0/0	0/0
8a	21	2.2/100	0.9/52	0.5/48	<0.1/5	<0.1/5	<0.1/5
8b	21	1.3/86	0.8/71	0.1/14	0.1/5	0/0	0/0
9a	20	3.4/100	0.6/55	0.3/25	0.3/15	<0.1/5	<0.1/5
Total or average	75	2.1/95	0.7/56	0.3/28	0.1/9	<0.1/3	<0.1/3

Crop / Culture: Canola

Location / Emplacement: Saskatchewan

Name and Agency / Nom et Organisation:

T.K. Turkington and R.A.A. Morrall
Department of Biology
University of Saskatchewan, Saskatoon
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Title / Titre:

Surveys of sclerotinia stem rot of canola in Saskatchewan, 1985 to 1990.

METHODS: Canola crops were surveyed for sclerotinia stem rot (Sclerotinia sclerotiorum) from 1985-90 in several areas (1) of Saskatchewan. Disease incidence was assessed at Meadow Lake, Melfort, Outlook, and Shellbrook; however, not all areas were sampled in each year. Crops were visited in August shortly before swathing and disease incidence assessed by counting the number of infected plants out of a random sample of 200 plants at each of 4-5 sites. The sampling sites were randomly located in each field and were at least 10 m from the edge and spaced >50 m apart. Mean disease incidence (MDI) (%) was then calculated for each crop.

RESULTS AND COMMENTS: Overall mean disease incidence and the number of crops in three incidence categories (MDI = 0, MDI > 0 but < 20, and MDI ≥ 20) are reported for each year and location in Table 1. Mean disease incidence was highest at Meadow Lake in 1986 (19.7%) and 1989 (20.7%), and lowest at Outlook in 1988 (1.4%). The majority of crops had some sclerotinia, but very few had MDI over 20%. The exception was at Meadow Lake in 1986 and 1989 where a substantial number of crops had MDI ≥ 20%. Differences among years may have reflected moisture conditions. In general fungicide application to coutrol sclerotinia stem rot would have been economical in approximately 11% of the crops from 1985-90.

REFERENCES:

1. Jesperson, G.D. 1990. Survey of blackleg and sclerotinia in Saskatchewan canola crops, 1989. Can. Plant Dis. Surv. 70: 69-70.

Table 1. Sclerotinia survey data for various areas of Saskatchewan, 1985-90.

Year, area & crop district	Sample size	Overall mean disease incidence (%)	Number of crops with mean disease incidence (MDI) (%) of MDI = 0	MDI > 0 but < 20	MDI ≥ 20
1985					
Melfort 8	201	8.8	6	176	19
1986					
Meadow Lake 9B	37	19.7	0	21	16
Melfort 8	78	4.9	15	58	5
Shellbrook 9A	14	8.0	0	12	2
1987					
Melfort 8	61	2.5	15	44	2
1988					
Meadow Lake 9B	42	8.8	0	36	6
Outlook 6B	23	1.4	9	14	0
1989					
Meadow Lake 9B	18	20.7	0	10	8
1990					
Meadow Lake 9B	36	3.0	5	31	0

Crop / Culture: Canola

Name and Agency / Nom et Organisation: K.L. Conn and J.P. Tewari
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Location / Emplacement: Central Alberta

Title / Titre: SURVEY OF ALTERNARIA BLACKSPOT AND SCLEROTINIA STEM ROT OF CANOLA IN CENTRAL ALBERTA IN 1990

METHODS: Sixty-three randomly selected fields of canola were surveyed in central Alberta during the third week of August, 1990. Fifty-nine of these fields were of Brassica campestris and 4 were of B. napus. The disease severity at 2 locations within each field, away from the edge or corners, was estimated visually and the average recorded. For assessment of alternaria blackspot caused by Alternaria brassicae, percent areas of siliqua covered with lesions were determined using an assessment key (Conn et al., 1990). Fields with less than 1% alternaria blackspot were categorized as having trace levels. For assessment of sclerotinia stem rot caused by Sclerotinia sclerotiorum, the percentage of stems with symptoms was determined. Fields with between 0 and 1% sclerotinia stem rot were categorized as having trace levels.

RESULTS AND COMMENTS: Every field surveyed had alternaria blackspot. Percent areas of siliqua covered with lesions ranged from trace levels to 20% (Fig. 1). If the fields with trace levels are set to 0%, then the mean percent area of siliqua covered with lesions for the 63 fields was 2%. In the survey of 57 fields in 1989 the mean was 20% (Conn and Tewari, 1990). This difference was probably due to weather. In 1989 the latter part of July and early part of August were wet, whereas in 1990 it was hot and dry during this period in most areas. The percentage of stems with sclerotinia stem rot ranged from 0 to 70% (Fig. 2). If the fields with trace levels are set to 0%, then the mean percent sclerotinia stem rot for the 63 fields was 10%. In the survey of 57 fields in 1989 the average was 12% (Conn and Tewari, 1990). The average percentage of sclerotinia stem rot was not affected much by the weather in early August, but the extent of infection on plants was. During 1989 infection was present both on the lower and upper parts of stems. In 1990 infection was largely confined to the lower parts of stems.

During this survey the presence or absence of some other diseases was also noted. Staghead caused by Albugo candida and aster yellows caused by MLO were observed in the majority of fields surveyed. In 1989 these diseases were found in 2 fields only (Conn and Tewari, 1990). Some fields had as many as 3 stagheads per square meter. Gray stem caused by Pseudocercosporella capsellae was present in many fields again this year.

ACKNOWLEDGEMENT: This survey was financed by grants from the International Development Research Centre, Ottawa and the Natural Sciences and Engineering Research Council of Canada, Ottawa.

REFERENCES: Conn, K.L., Tewari, J.P. and R.P. Awasthi. 1990. A disease assessment key for alternaria blackspot in rapeseed and mustard. Can. Plant Dis. Surv. 70(1):19-22.

Conn, K.L. and J.P. Tewari. 1990. Survey of alternaria blackspot and sclerotinia stem rot in central Alberta in 1989. Can. Plant Dis. Surv. 70(1):66-67.

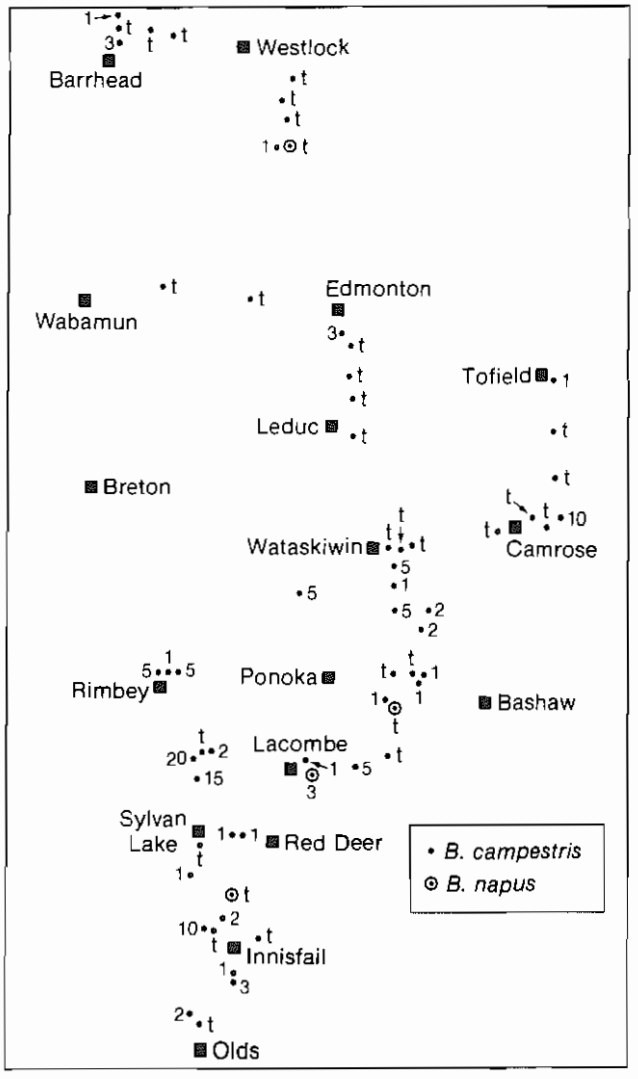

Figure 1. Locations of fields in central Alberta surveyed for alternaria blackspot in 1990. The numbers represent percent areas of siliqua covered with lesions. Fields with less than 1% infection were categorized as having trace (t) levels.

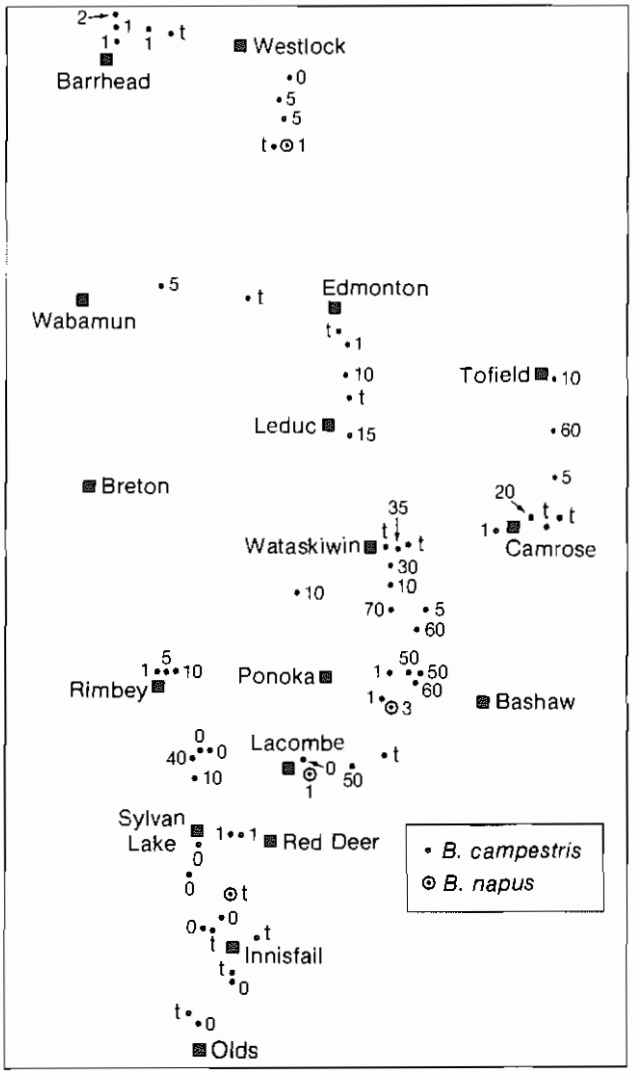

Figure 2. Locations of fields in central Alberta surveyed for sclerotinia stem rot in 1990. The numbers represent percent of stems with symptoms. Fields with between 0 and 1% infection were categorized as having trace (t) levels.

Crop / Culture:
Canola

Location / Emplacement:
Alberta

Title / Titre:

BLACKLEG OF CANOLA SURVEY
IN ALBERTA - 1990

Name and Agency / Nom et Organisation:

EVANS, I.R., Plant Industry Division, Alberta Agriculture, Edmonton, Alberta
KHARBANDA, P.D., Alberta Environmental Centre, Vegreville, Alberta;
HARRISON, L., Regional Crop Laboratory, Alberta Agriculture, Fairview, Alberta;
KAMINSKI, D., Alberta Special Crops and Horticultural Research Center, Brooks, Alberta.

INTRODUCTION AND METHODS:

A third annual province-wide survey for virulent blackleg of canola (Leptosphaeria maculans) was carried out in July and August. The survey was done by provincial/municipal fieldmen and Agriculture Canada seed inspectors with diagnostic assistance from plant pathologists at Brooks, Fairview, and Vegreville.

This year's survey was again based on inspecting a minimum of one commercial field for every 2,000 ha of canola in Alberta. Co-operators were asked to survey fields where producers grew canola on canola or followed very short rotations. Number of fields surveyed was determined by the acreage of canola grown in each of the 67 municipalities and districts. Each field was sampled as previously described (1).

RESULTS AND COMMENTS:

The results are summarized in Table 1. Infested fields continue to be concentrated in east-central Alberta, census divisions 7 and 10 (2). There are still municipalities in and around this region in which no virulent blackleg has been found. Provincewide blackleg was present in 3 out of 595 pedigreed seed fields surveyed. The infested seed fields were found in census division 10.

Spring weather conditions were conducive to blackleg infection and development. Levels of disease, however, were lower in 1990 than 1989, although the disease was found in new locations that included the Counties of Thorhild and Wetaskiwin. The lower disease incidence was likely due to most farmers following a 4-year crop rotation recommended for canola. In total, including seed fields, 1579 canola fields were surveyed this year. Southern and western Alberta are relatively free of virulent blackleg and to date none has been found in the Peace Region.

In the east central region 85 out of 293 canola fields had trace to 5% levels of blackleg. On a provincewide basis this translates into 85 out of 984 commercial fields, giving an average of just under 10%. Overall yield losses from virulent blackleg in Alberta would not be expected to exceed 1% of actual canola yields.

TABLE BLACKLEG OF CANOLA SURVEY IN ALBERTA - 1990

Municipalities with Confirmed Virulent Blackleg of Canola

MUNICIPALITY	NUMBER OF FIELDS SURVEYED	NUMBER OF FIELDS WITH VIRULENT BLACKLEG
EAST CENTRAL ALBERTA		
Co. of Thorhild #7	14	2
Co. of Paintearth #18	16	7
Co. of Flagstaff #29	101	23
Co. of Beaver #9	25	7
Co. of Smoky Lake #13	8	1
Co. of Vermilion River #24	31	9
Co. of Minburn #27	36	11
M.D. of Provost #52	40	22
M.D. of Wainwright #61	17	2
M.D. of Wetaskiwin #10	5	1
TOTAL	293	85

REFERENCES:

1. Evans, I.R., P. Kharbanda, L. Harrison, D. Kaminski, 1990. Blackleg of canola survey in Alberta - 1989. Can. Plant Dis. Surv. 70(1):63-64.

2. Kharbanda, P.D., I.R. Evans, L. Harrison, S. Slopek, H.C Huang, D. Kaminkei, and J.P. Tewari, 1989. Blackleg of canola survey in Alberta - 1988. Can. Plant Dis. Surv. 69(1):55-57.

3. McGee, D.C. and G.A. Petrie. 1978. Variability of Leptosphaeria maculans in relation to blackleg of oilseed rape. Phytopathology 68:625-630.

Crop / Culture: Rapeseed/Canola

Location / Emplacement: Alberta

Name and Agency / Nom et Organisation:
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Alberta Agriculture
Regional Crops Laboratory
Fairview, Alberta
T0H 1L0

Title / Titre: CANOLA DISEASE SURVEY IN THE PEACE RIVER REGION IN 1990

METHODS: A survey of 78 rapeseed/canola fields was conducted in July and August, 1990 in the Peace River region of Alberta. The total area of canola production in 1990 was approximately 700,000 acres (283,000 hectares). The diseases reported in this survey were the same as in 1988 and 1989 and include root rot, foot rot, sclerotinia stem rot, black spot and blackleg.

Fields were sampled by walking into each one in a W pattern and collecting the first plants at a site 100 paces from the edge of the field. Ten plants were selected at random at each of five sites along the W pattern for a total of 50 plants per field. Disease incidence was recorded on every plant. Root rot ratings were recorded using a 0-4 scale, where 0 = no lesions on taproot, 1 = light brown lesions on taproot but no girdling, 2 = coalesced brown lesions on taproot but no girdling, 3 = dark brown lesions girdling taproot above main laterals (wirestem appearance), 4 = severe necrotic lesions on taproot, roots rotted off and plant dead.

RESULTS AND COMMENTS: The results are given in Table 1. The root rot complex was, as in previous years, the most prevalent disease, affecting 100% of the fields surveyed with a mean of 96.4% of the plants infected (Table 1). Disease incidence was higher than in 1989 when a mean of 47.6% of plants were infected. In 1990 disease severity was higher than in 1989 but slightly lower than in 1988. Mean root rot ratings in 1988, 1989 and 1990 were 2.4, 1.1 and 2.2, respectively. Prevalence of Sclerotinia stem rot decreased in 1990, due to extremely dry weather after flowering, with 41% of fields infested compared to 48% in 1989. The incidence of stem rot decreased with a mean of 9.6% of plants infected per field. Prevalence of black spot, foot rot and avirulent blackleg increased in 1990 with 95%, 92% and 52% respectively. No virulent blackleg was found. Other diseases observed were greystem, white rust (staghead), sulphur deficiency, herbicide damage, pod drop from drought stress and sooty mold. Insect damage from maggots, lygus bugs, bertha army worms, diamond back moth larvae, and cut worms was also observed.

Table 1. Prevalence and incidence of root rot, foot rot, sclerotinia stem rot, blackleg and black spot of canola in the Peace River region in 1990.

Disease	Prevalence (% fields infested)	Incidence (% plants infected)
Root Rot (*Rhizoctonia*, *Pythium*, *Fusarium*)	100	96.4
Black Spot (*Alternaria* spp.)	95	32.3
Foot Rot (*Rhizoctonia*, *Fusarium*)	92	34.0
Stem Rot (*Sclerotinia sclerotiorum*)	41	9.6
Avirulent Blackleg (*Leptosphaeria maculans*)	38	4.3

Crop / Culture: Canola

Location / Emplacement: Alberta

Name and Agency / Nom et Organisation: SLOPEK,S.W. & M.Anderson
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Title / Titre: SURVEY OF SCLEROTINIA STEM ROT IN SOUTH-CENTRAL ALBERTA, 1990

METHODS: Thirty-five randomly selected swathed canola fields were surveyed for stem rot (*Sclerotinia sclerotiorum*) from September 18 to 20. Fields were surveyed by walking 50 paces into the field and then proceeding along an inverted "V" sampling pattern. One hundred canola stems (stubble) were examined at each of 5 locations along the sampling pattern at 25 pace intervals. The number of stems with discrete stem rot lesions and/or bleached stems resulting from stem rot infection were recorded.

RESULTS AND CONCLUSIONS: Stem rot was found in all of the fields surveyed. The percentage of infected stems per field ranged from 0.2 to 46.0 with a mean of 8.8 per field. The field with 46.0 percent infected stems was very weedy, in particular, with Canada thistles. This may have been a factor in the build-up of stem rot in this field. Using the yield loss formula developed by Morrall, Dueck & Verma (1984) that states percent yield loss due to stem rot is generally 0.4 to 0.5 x percent infected plants, it is estimated that stem rot resulted in at least 3.5 to 4.4 percent yield loss in south-central Alberta. Actual yield losses may have been higher; the percentage of infected plants was probably underestimated since only the lowest part of the stem (stubble) could be assessed for stem rot infection. Precipitation in the survey area for the period of May 1 to July 31 was above normal in 1990 in the Red Deer (174 percent of 1951 - 1980 average precipitation) to Calgary (125 percent) region. Stem rot levels may therefore have been higher in 1990 than in most years in this area.

REFERENCES: Morrall,R.A.A., J.Dueck, and P.R.Verma. 1984. Yield losses due to sclerotinia stem rot in western Canadian rapeseed. Can.J.Plant Path. 6:265 (Abstr).

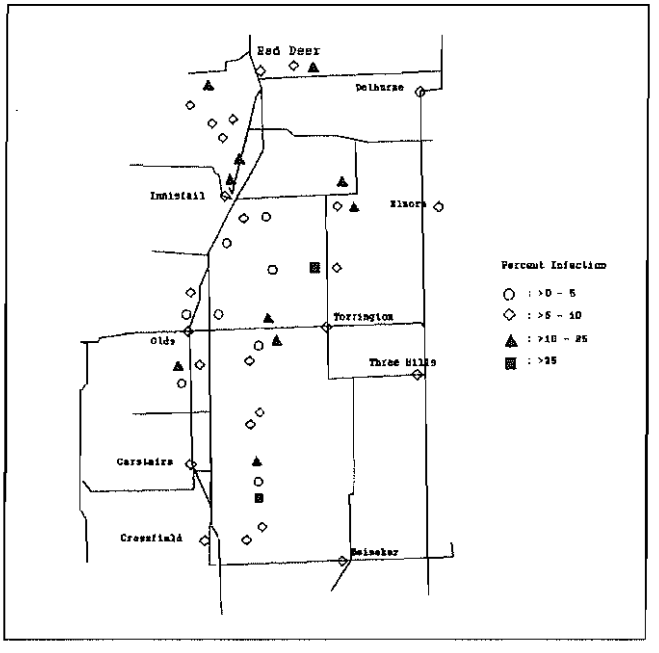

Figure 1. Locations of fields surveyed for stem rot in 1990.

Crop / Culture: Flax

Location / Emplacement: Manitoba

Title / Titre: SURVEY OF FLAX DISEASES IN MANITOBA IN 1990

Name and Agency / Nom et Organisation:

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Methods: A total of 33 flax fields were surveyed in southern Manitoba in 1990. Nineteen fields were surveyed on July 25, six on August 2 and eight on Augusr 21. Fields were selected at random in different regions. Each field was sampled by two persons walking 100 m in opposite directions inside the field following an inverted V pattern. Diseases were identified by symptoms and the incidence and severity of each disease were recorded. In addition, 25 samples of flax were submitted for analysis to the Manitoba Agriculture Plant Pathology Laboratory by agricultural representatives and growers.

Results: Crop emergence was good and tbe stand was good to excellent in most of the fields surveyed. The soil moisture was relatively adequate and the crop vigour was generally good to fair in most fields. The incidence of heat canker was very low in the spring. Fusarium wilt (Fusarium oxysporum f. sp. lini) was observed in two fields; 5% infected plants in one field and less than 1% in the other. Pasmo (Septoria linicola) and leaf spotting (Alternaria linicola) each occurred at less than 1% severity in single fields. Rust (Melampsora lini) was not observed in any of the 33 fields surveyed nor on the 30 rust differential lines planted at Morden and Portage la Prairie. Aster yellows (Mycoplasma like organism) was not encountered in this survey. Chlorosis, a nutritional disorder, was observed in three fields in southeast Manitoba with a severity range of 5% to 50% chlorotic plants.

Of the 25 samples submitted to the Manitoba Agriculture Plant Pathology Laboratory, 3 showed seedling blight (Rhizoctonia solani, Fusarium spp.), 9 root rot (Fusarium spp. including 3 with Fusarium equiseti and 2 with Fusarium acuminatum), 1 fusarium wilt (Fusarium oxysporum f. sp. lini), 8 envircnmental srress and 4 herbicide injury.

Crop / Culture: Flax

Location / Emplacement: Saskatchewan

Title / Titre: FLAX DISEASES IN N.E. SASKATCHEWAN, 1990

Name and Agency / Nom et Organisation:

C. Kirkham and B. Berkenkamp
Agriculture Canada Research Station
P.O. Box 1240
MELFORT, Saskatchewan S0E 1A0

METHODS: Thirty-five flax fields were surveyed between July 31 and August 14, 1990 in Saskatchewan Agriculture Crop Districts 5b, 8a, 8b and 9a. Fields were sampled by collecting one plant at ten sites located on a diagonal transect. Diseases were identified by symptoms, and the severity of each disease recorded as the estimated percentage area affected of the leaf, stem or root. Results were averaged over the number of samples and fields, and the disease index, an estimate of severity, was calculated for each disease. The percentage of fields affected was calculated for an estimate of prevalence.

RESULTS AND COMMENTS: Relatively low levels of disease were found in 1990 (Table 1). Root rot (several fungi) showed levels similar to the last three years. The percentage of fields affected by pasmo (*Septoria linicola*) was similar to past years, however, the disease index was considerably below the value of 5.0 recorded in 1987. Aster yellows, usually found in trace amounts, was not found this year, nor has rust been found in the last four years.

Table 1. Severity and prevalence of flax diseases in 1990

Crop District	No. fields	Disease index/% fields affected	
		Root rot	Pasmo
5b	6	0/0	0.3/100
8a	13	<0.1/8	0.8/77
8b	8	0/0	0.5/88
9a	8	0.2/13	1.7/88
Total or average	35	<0.1/5	0.8/88

Crop / Culture: Lentil

Location / Emplacement: Manitoba

Name and Agency / Nom et Organisation:
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Title / Titre: Anthracnose of lentil in Manitoba in 1990

METHOD: Anthracnose of lentil caused by Colletotrichum truncatum was first identified in Manitoba in 1987. Surveys in 1988 and 1989 found that the disease was preseut in all major areas of lentil production. A survey of the Rosenort/St. Jean area south of Winnipeg and the Portage La Prairie area west of Winnipeg was conducted in Manitoba in the 1990 season. During visits a semi-quantitative assessment of anthracnose was made by walking at least 100m through the crop. A disease severity rating was recorded as none, slight, moderate, or severe by closely examining plants for signs of defoliation, stem and leaf lesions.

RESULTS AND COMMENTS: In the Rosenort/St. Jean area the disease was detected in 23 out of 24 fields surveyed. The disease was slight to moderate in a few fields and severe in most. In the Portage region 12 out of 16 fields visited were infected by C. truncatum. The disease was moderate in most fields, severe in a few and slight in one field.

Samples from a moderately infected commercial faba bean field were collected and determined to be infected with anthracnose. Restricted anthracnose lesions were found on field pea plants grown on infected lentil stubble as part of a disease nursery. Field pea plants from a number of commercial fields were also collected; however, fungal isolations were not successful. Selected isolates from lentil, field pea and faba bean were confirmed by the Biosystematics Research Institute, Ottawa, Canada as Colletotrichum truncatum (Schwein.) Andrus and W.D. Moore.

Anthracnose was observed in fields sown with lentil for the first time as well as in fields where lentil was in a minimum 4-year rotation, indicating that anthracnose can build up rapidly even when lentil is not sown on lentil stubble. Temperature and precipitation appear to have favored the development and progression of the disease until early August. Dry conditions thereafter appeared to inhibit further disease development with many producers still reporting an average to above average yield. Significant yield losses are possible with anthracnose if infected fields receive normal precipitation near the end of the growing season. In 1989 yield losses from anthracnose based on plot results were estimated to be between 40% and 60%.

REFERENCE: R.A.A. Morrall, R.J. Gibson and C.C. Bernier. 1990. Anthracnose of lentil in Manitoba. Can. Plant Dis. Survey.70(1):79.

Crop / Culture: Lentil

Location / Emplacement: Saskatchewan

Name and Agency / Nom et Organisation:

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Department of Biology,
University of Saskatchewan,
Saskatoon, Saskatchewan, S7N 0W0.

Title / Titre: DISCOVERY OF LENTIL ANTHRACNOSE IN SASKATCHEWAN IN 1990

METHODS: Anthracnose of lentil, caused by Colletotrichum truncatum (Schwein.) Andrus & W.D. Moore has been a cause of concern in Manitoba in recent years (2,3,4). On July 13 1990 a lentil crop near Zealandia, Saskatchewan (90 km S.W. of Saskatoon) was found to be infected with the disease. As this was the first report of anthracnose in Canada's largest lentil producing province, a survey was organized.

A message was sent to all extension agrologists employed by Saskatchewan Agriculture, plus several other individuals involved in the lentil industry. These people were invited to check samples of lentil crops in their regions and send plants with suspicious symptoms to our laboratory. When specimens with anthracnose were received, visits were made to the regions where they originated in order to inspect additional crops. Also, lentil crops in some regions were inspected during the course of other work. In regions of extensive lentil cultivation, generally only every fifth lentil crop was inspected. Usually at least a 100 m long pathway through each field was checked for disease. In a few cases several visits were made to the same crop to observe disease progress. When symptoms were uncertain, specimens were brought back to the lab; these were checked microscopically for the presence of setae of C. truncatum, often after incubation in a moist chamber.

In September, after harvest, an article was published in a newsletter mailed to most pulse crop growers in the province. Farmers were invited to send specimens of plant residues and seed from crops that they suspected might have anthracnose. Plant residues were inspected microscopically, as described above. Seed samples were surface-disinfected for 10 min in 0.6% NaOCl, plated on Bacto-Difco potato dextrose agar amended with 25 ppm ampicillin and 25 ppm streptomycin sulphate and incubated at room temperature for 10 days. Seed samples from crops observed to be severely diseased during the field survey were also obtained and plated.

RESULTS AND COMMENTS: Specimens of plants were received from 63 crops between July 20 and August 24 and specimens of plant residues or seed were received from nine crops after harvest. Field inspections were made in 85 crops between July 15 and August 27. The intensity of survey was not proportional to the lentil acreage in different crop districts.

Anthracnose was detected on lentil in several parts of Saskatchewan (Fig. 1, Table 1). Almost all samples received and crops inspected were cv. Laird, which is predominant in Saskatchewan, but the disease was also found on cv. Eston. In the crop where the disease was originally discovered and in several others nearby, disease progressed considerably from mid-July to mid-August when swathing took place. In these and other crops where the disease was severe, anthracnose was not uniformly distributed in the field. Most seed samples which tested positive for anthracnose showed less than 5% infection. However, in one severely diseased crop where multiple samples were collected from different parts of the field, seed infection ranged from 0 to 24%.

The majority of anthracnose-infested crops were either in a triangular area bounded by Wiseton, Bounty and Zealandia (Crop Districts 6B and 7A), near Laird (65 km N of Saskatoon, Crop District 6B) or near Bellevue (85 km N.E. of Saskatoon, Crop District 8B). All three areas are regions where there has been extensive lentil cultivation for at least 15 years. The wide distribution of anthracnose in these and other parts of Saskatchewan suggests that the disease has been present for at least several years. Anecdotal evidence about the effect of severe anthracnose infestation on yields was obtained from three farmers growing cv. Laird. Comparisons were made between severely and less severely diseased areas in the same field, or between severely diseased and relatively healthy crops seeded nearby at the same time. Losses of 12% (1900 vs. 2130 kg/ha), 16% (1900 vs. 2250 kg/ha) and 70% (800 vs. 2700 kg/ha) were suggested. Two farmers reported difficulty swathing severely diseased plants because of lodging.

Ascochyta blight was commonly found in seed and plant samples submitted to the laboratory and in crops inspected in the field, especially in Crop Districts 7B, 8A, 8B and 9A. Although this disease remains a major problem for lentil producers in Saskatchewan (1,5), it did not usually cause severe seed discoloration in 1990 because of dry weather in August. Most lentil growers in Saskatchewan in 1990 harvested a bumper crop of high quality seed.

ACKNOWLEDGEMENTS: The financial assistance of the Saskatchewan Pulse Crop Development Board and the Western Grains Research Foundation is gratefully acknowledged. Technical assistance was provided by Rosanne Beaulé. We appreciate the assistance of Neil Whatley, Bert Vandenberg and a number of extension agrologists and farmers who provided us with samples.

Table 1. Records of anthracnose and ascochyta of lentil in 1990 relative to Saskatchewan crop districts

Saskatchewan Crop District*	No. of plant or seed samples sent to lab			No. of crops inspected in field		
	Total	Infected with anthracnose	Infected with ascochyta	Total	Infected with anthracnose	Infected with ascochyta
1A	1	1	0	-	-	-
2A	1	0	0	-	-	-
2B	4	0	3	-	-	-
3B-N	9	2	3	8	0	7
3B-S	5	0	3	-	-	-
4B	5	0	0	-	-	-
5A	2	0	0	-	-	-
5B	9	0	5	-	-	-
6A	2	0	0	-	-	-
6B	12	2	3	41	19	11
7A	8	1	0	17	3	2
7B	13	0	7	-	-	-
8A	-	-	-	6	0	5
8B	1	0	0	8	3	3
9A	-	-	-	5	0	5

* See Fig. 1 for location of crop districts

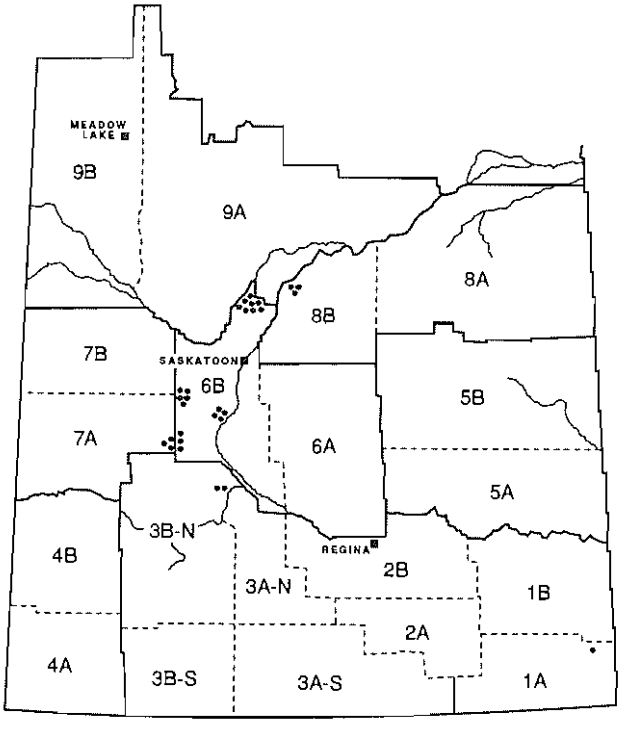

Figure 1. Map of Saskatchewan crop districts showing locations where lentil anthracnose was found in 1990.

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Crop / Culture: Field Pea and Field Bean

Location / Emplacement: Manitoba

Title / Titre: Diseases detected on field pea and field bean in southern Manitoba in 1990

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FIELD PEA

Method: Twenty-six fields were examined in 1990. Eight were surveyed on July 5, 9 on July 25, and 9 on July 26. The fields surveyed in southern Manitoba were located: 1) in the area around Portage la Prairie (west of Winnipeg), 2) in the area including Morden, Plum Coulee, Altona and Roland (southwest of Winnipeg), and 3) in the area of Morris, St. Jean and St. Joseph (south of Winnipeg). The survey in each field followed an inverted 'W' pattern beginning approximately 50 m from the edge of the field with 20 m separating the 5 points. Five plants were sampled at each point for a total of 25. Disease diagnosis was based on visible symptoms except for ascochyta leaf and pod spot and anthracnose where the similarity of symptoms necessitated microscopic examination of the foliage or isolation onto agar.

Results: Mycosphaerella blight (*Mycosphaerella pinodes*) was found in 22 of 26 fields (85%), bacterial blight (*Pseudomonas pisi*) in 23 (88%), downy mildew (*Peronospora viciae*) in 16 (62%), leaf blotch (*Septoria pisi*) in 3 (12%), anthracnose (*Colletotrichum* sp.) in 3 (12%), and ascochyta leaf and pod spot (*Ascochyta pisi*) and pea streak virus in one field each (4%).

Comments: The percentage of fields with mycosphaerella blight increased from 50% in early July to 85% in late July while severity varied from trace to moderate. Bacterial blight, however, was more prevalent and severe in early July but severity decreased as a dry period set in. Downy mildew was observed in both survey periods at trace to light levels; in general it was more prevalent and more severe around Portage la Prairie. It was quite common to find mycosphaerella blight, bacterial blight and downy mildew in the same field. Powdery mildew did not develop into a problem in commercial fields in 1990, except in highly susceptible cultivars. It was found in two fields of semi-leafless cultivars, one Radley and the other probably Tipu. Aphids were not a severe problem except in the Portage la Prairie area.

Interesting observations this season were: 1) finding anthracnose in two commercial fields and in research plots near Portage la Prairie and at Morden; severity was light, 2) finding ascochyta leaf and pod spot in a commercial field and in research plots at Morden, and 3) finding septoria leaf blotch in a commercial field. It may be that the recent appearance of anthracnose and ascochyta leaf and pod spot reflects the change in cultivars grown.

In 15 samples of field pea examined at the Manitoba Agriculture Plant Pathology Laboratory, 5 showed mycosphaerella blight (*Mycosphaerella pinodes*), 2 anthracnose (*Colletotrichum* sp.), 6 fusarium root rot (*Fusarium* spp.), 2 environmental stress, and 1 herbicide injury.

FIELD BEAN

Twelve fields were examined in the early part of July. Common blight was present in most fields; it was quite severe in some. As drier weather developed bacterial blight severity dropped drastically.

In 22 samples of field bean examined at the Manitoba Agriculture Plant Pathology Laboratory, 15 showed common blight (*Xanthomonas phaseoli*), 3 fusarium root rot (*Fusarium* spp.) and 4 herbicide injury.

Crop / Culture: Pea

Location / Emplacement: Saskatchewan

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Title / Titre: PEA DISEASES IN N.E. SASKATCHEWAN, 1990

METHODS: Twenty-four fields of pea were surveyed between July 31 and August 14, 1990 in Saskatchewan Agriculture Crop Districts 5b, 8a, 8b and 9a. Fields were sampled by collecting one plant at ten sites located on a diagonal transect. Diseases were identified by symptoms, and the severity of each foliar disease recorded as the estimated percentage area affected of the leaf or stem. Root rot and foot rot were assessed on a scale of 0=healthy, 2=trace, 5=moderate and 10=severe. Results were averaged over total number of samples and fields, and the disease index, an estimate of severity, was calculated for each disease. The percentage of fields affected was calculated for an estimate of prevalence.

RESULTS AND COMMENTS: Disease levels in 1990 were generally lower than the 1987 to 1989 average (Table 1). Severity of mycosphaerella blight (*Mycosphaerella pinodes*) and powdery mildew (*Erysiphe polygoni*) was less than half the average value. Foot rot (*Ascochyta* sp.) was similar to the three year average disease level, but root rot (*Fusarium* spp.) was considerably reduced. Downy mildew (*Peronospora viciae*) was also similar to the average, but ascochyta leaf spot (*Ascochyta pisi*) was not found this year. Sclerotinia stem rot (*Sclerotinia sclerotiorum*) was found at low levels for the first time in four years.

Table 1. Severity and prevalence of pea diseases from 1987 to 1990

Disease	Disease index/% fields affected	
	1990	1987-1989 average
Mycosphaerella blight	5.9/100	12.9/91
Powdery mildew	4.5/17	18.8/69
Foot rot	1.5/75	1.8/76
Root rot	0.1/4	1.5/69
Downy mildew	0.3/8	0.3/9
Ascochyta leaf spot	0.0/0	0.4/28
Sclerotinia stem rot	0.1/4	0.0/0

Crop / Culture: Soybean

Location / Emplacement: Southwestern Quebec

Title / Titre: INCIDENCE OF SOYBEAN DISEASES IN THE ST-HYACINTHE REGION IN 1990

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MATERIALS AND METHODS: A preliminary survey was conducted in 1990 in 11 soybean fields in the St-Hyacinthe region. The purpose of this study was to determine the incidence of the different diseases that could be observed visually walking randomly in each field. Samples of diseased plants were taken to the laboratory for identification of the pathogens that could be isolated on culture media or readily observed on prepared sectioned and stained tissues. After harvest, seed samples were disinfected and plated on selective media to identify the seedborne fungi.

RESULTS AND COMMENTS: The 1990 growing season was characterized by frequent rains in June and towards the end of the season, especially at harvest. These conditions were favorable for disease development throughout the season. Seedling diseases were not observed. Downey mildew (Peronospora manshuria) varied from trace to severe infections. Bacterial pustule (Xanthomonas campestris) was observed in all fields varying from trace to low infections. Bacterial blight (Pseudomonas syringae) was present in some fields with only very low infections. Tn five fields symptoms of mosaic and mottle were observed in trace amounts but the pathogens were not identified. Several different leaf spots were found in low amounts in most fields and could not be readily identified from symptoms described in the literature. The fungi isolated from these spots are: Ascochyta sp., Phyllosticta sp., Septoria sp., and Alternaria sp.. Physiological diseases such as sunburn injury and ozone pollution were commonly found in low amounts in all the fields surveyed. Stem, pod, and seed diseases were quite common in all fields just before harvest: Fusarium graminearum and F. equisiti were isolated from basal stem cankers of many specimens. Pod and stem blight as well as stem canker (Diaporthe phaseolorum) were present in most fields. Anthraenose caused by both Colletotrichum and Glomerella was commonly observed on affected stems in all fields. Severe infection of plants by Sclerotinia sclerotiorum was observed in one field especially where the soil was not well drained. Pod infection by Fusarium graminearum, Phomopsis sp., and Perenospora manschuria were observed in moderate quantities in all the fields. Seed discoloration ranging from slight and extensive dark spots as well as reddish, purple, and dull white areas were quite common in the harvested grain of all the fields. Table 1 summarizes the percentage diseased seeds from which several fungi were isolated or observed.

Table 1. Percentage diseased soybean seeds from which different fungi were isolated or observed.

	% Seed discolored or shrivelled				
Fungi	Dark	Reddish	Purple	Dull White	Shrivelled
Alternaria sp.	75.0	42.2	-	30.8	38.2
Bipolaris sp.	1.4	-	-	-	-
Botrytis sp.	-	-	-	-	2.9
Cercospora kikuchii	-	-	100.0	-	
Cladosporium sp.	1.4	-	-	-	-
Epicoccum sp.	-	-	-	-	2.9
Fusarium avenaceum	1.4	-	-	-	-
Fusarium anthrophylum	-	-	-	7.7	-
Fusarium equisiti	1.4	-	-	-	-
Fusarium graminearum	19.4	59.7	-	-	14.7
Fusarium moniliforme	1.4	-	-	-	-
Fusarium oxysporum	-	-	-	7.7	-
Fuarium sambucinum	-	-	-	-	2.9
Fusarium sporotrichoides	12.5	36.8	-	23.1	23.5
Sclerotinia sclerotiorum	-	-	-	-	11.8
Peronospora manshuria*	-	-	-	100.0	-
Phomopsis sp.	8.3	5.3	-	15.4	2.9
Verticillium nigrescens	11.1	10.5	-	7.7	-

*Direct observation on seed surface.

Crop / Culture: Sunflower

Location / Emplacement: Manitoba

Title / Titre: SURVEY OF SUNFLOWER DISEASES IN MANITOBA IN 1990

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Methods: A total of 69 sunflower fields were surveyed in southern Manitoba in 1990. Twenty fields were surveyed on July 25, four on July 30, 23 on August 2, 13 on August 21 and 9 on September 6. Fields were selected at random in different regions. Each field was sampled by two persons walking 100 m in opposite directions inside the field following an inverted 'V' pattern. Diseases were identified by symptoms and the incidence of downy mildew, sclerotinia wilt and verticillium wilt were recorded. Disease severity for rust and septoria leaf spot were measured as percent leaf area infected. A disease index was calculated for each disease in every field based on disease incidence and disease severity (Table 1). In addition, 28 samples of sunflower were submitted for analysis to the Manitoba Agriculture Plant Pathology Laboratory by agricultural representatives and growers.

Results: The crop conditions were generally good with a stand range from excellent to good and a vigour range from good to fair. Rust (Puccinia helianthi) was the most common and widespread disease on sunflower. The prevalence and severity of rust observed in 1990 were lower than levels observed in previous years (1). Rust was observed in 68% of the fields surveyed with severity ranging from 1% to 60% leaf area infected. The severity of rust in most fields surveyed in July was in the 1% to 5% range. Fields surveyed towards the end of the season had 20% to 60% leaf area infected.

The prevalence and incidence of verticillium wilt (Verticillium dahliae) were high in 1990. The disease was observed in 60% of the fields surveyed with incidence ranging from 1% to 50% infected plants. The highest disease incidence was in the non-oil sunflower hybrids which are more susceptible to this disease.

The prevalence and incidence of sclerotinia wilt (Sclerotinia sclerotiorum) were low in comparison to those observed in previous years (1). This disease was observed in 57% of fields surveyed with incidence ranging from 1% to 30% infected plants.

Downy mildew (Plasmopara halstedii) was observed at higher levels than in previous years (1). The disease occurred in 30% of the fields surveyed and the disease incidence ranged from 1% to 10% infected plants. However, disease incidence up to 60% was observed in the low spots of some fields where the soil moisture level was probably high at the seedling stage.

Septoria leaf spot (Septoria helianthi) was observed in 22% of the fields snrveyed at trace to 1% severity. Traces of stem lesions (Phoma spp. and Phomopsis spp.) were observed in various sunflower fields towards the end of the season. Other diseases such as sclerotinia head rot (S.sclerotiorum), botrytis head rot (Botrytis spp.) or rhizopus head rot (Rhizopus spp.) were not encountered in this survey.

Of the 28 samples submitted to the Manitoba Agriculture Plant Pathology Laboratory, one each showed sclerotinia wilt, downy mildew, rust, verticillium wilt, septoria leaf spot and alternaria leaf spot. Five of the samples showed environmental stress from dronght conditions. In addition to diseases, 17 of the samples were found to be affected by herbicide drift.

Table 1. Prevalence and severity of sunflower diseases in southern Manitoba in 1990.

Disease	% of fields infested	Mean of disease index*	Range of disease index
Downy mildew	30%	1.1	1-2
Rust	68%	1.1	1-4
Sclerotinia wilt	57%	1.2	1-3
Verticillium wilt	60%	1.2	1-4
Septoria leaf spot	22%	1.0	1
Stand	-	1.2	1-5
Vigour	-	1.6	1-4

* 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, sclerotinia wilt and verticillium wilt, and on disease severity measured as percent leaf area infected for rust and septoria leaf spots. Indexes for stand and vigor are based on 1-5 scale (1= very good and 5= very poor).

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