## Oilseeds and special crops / Oléagineux et cultures spéciales

**Crop / Culture:** Dry Bean

**Location / Emplacement:** Southern Alberta

**Name and Agency / Nom et Organisation:**
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**Title / Titre:** SURVEY OF DRY BEAN FOR SCLEROTINIA WHITE MOLD IN SOUTHERN ALBERTA IN 1988

**METHODS:** The survey was carried out during August 4-10 in five fields in the County of Lethbridge. Ten sites of 3-m row samples, with approximately 18 m between samples, were selected and surveyed in each field following a U-shaped pattern. The number of plants with symptoms of white mold (Sclerotinia sclerotiorium) and the total number of plants at each site were recorded. The disease incidence in each field was calculated based on average percent of infected plants from the 10 sites.

**RESULTS AND COMMENTS:** White mold was found in three fields. The average number of plants infected in the three fields was 8.1, 15.1, and 13.0%, respectively. The cultivars in the three diseased fields were Viva in one and Red Mexican in the other two.

**Crop / Culture:** Field pea and field bean

**Location / Emplacement:** Manitoba

**Title / Titre:**

**Name and Agency / Nom et Organisation:**
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INCIDENCE OF PLANT DISEASES IN PULSE CROPS IN MANITOBA IN 1988

**METHODS:** The results are based on samples of pulse crops submitted to the Plant Pathology Laboratory and on field examinations.

**RESULTS:**

Field Pea: The incidence of plant diseases in field pea in 1988 was less than in 1987. Mycosphaerella blight (Mycosphaerella pinodes) was much reduced in severity from 1987 because of dry weather. The most conspicuous problem was powdery mildew (Erysiphe polygoni). Three fields in the Portage area showed heavy development of mildew in August. Other diseases observed were bacterial blight (Pseudomonas pisi) in one field, and low levels of root rot and damping off (Fusarium spp. and Pythium spp.) in seven fields. The environmental stress of moisture deficiency and high temperatures was the major cause of yield loss in field pea in 1988.

Field Bean: Dry weather during the growing season prevented many of the normal problems in field bean. Sclerotinia white mould (Sclerotinia sclerotiorum) was not a significant problem. Root rot (Fusarium spp.) was detected in four fields south of Winnipeg in the central region. Bacterial blight, (Xanthomonas phaseoli) was found in three fields at low levels. In the area bounded by Carman, Plum Coulee and Winkler, yield loss from drought was in excess of 50%. In the other field bean growing areas around Portage and Whitemouth, normal to slightly above normal crops were harvested with very little disease loss.

**Crop / Culture:** Canary Grass

**Location / Emplacement:** Saskatchewan

**Name and Agency / Nom et Organisation:**
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**Title / Titre:** CANARY GRASS DISEASE SURVEY IN N.E. SASKATCHEWAN, 1988

METHODS: Five fields of canary grass were surveyed for diseases between August 10 and 29, 1988, in crop district 8a. Fields surveyed were selected at random and sampled by collecting ten plants from each field at ten pace intervals. Diseases were identified by symptoms, and the severity of each disease recorded as an estimate of the percentage of leaf, stem or root area affected. Results for each disease were averaged over the total number of samples, and fields surveyed to give the disease index. Number of fields affected over total number of fields surveyed gave % fields affected.

RESULTS AND COMMENTS: Three diseases were found affecting canary grass. Root rot and spot blotch (Bipolaris sorokiniana) and a septoria leaf spot (Septoria triseti) are shown in Table 1 with their severity and frequency of occurrence.

Table 1. Prevalence and severity of diseases of Canary Grass in North East Saskatchewan

| Disease | % Fields Affected | Disease Index |
|---|---|---|
| Root Rot | 40 | 3.4 |
| Septoria Leaf Spot | 60 | 21.8 |
| Spot Blotch | 20 | 7.0 |

**Crop / Culture:** Canola

**Location / Emplacement:** Alberta

**Title / Titre:** BLACKLEG OF CANOLA SURVEY IN ALBERTA - 1988

**Name and Agency/ Nom et Organisation:**

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METHODS: Two surveys of blackleg of canola, caused by the highly virulent strain of Leptosphaeria maculans, were carried out during the summer of 1988. In one survey, canola fields were surveyed by individual pathologists in particular Census Divisions (Table 1). Each field was sampled by traversing the path of an inverted V and examining canola plants at 5 spots about 30 meters apart. At each spot, 10 plants were examined visually and plants suspected to be infected with blackleg were collected for laboratory testing. The virulent nature of blackleg was confirmed by cultural methods (1). Blackleg severity was assessed from low to very severe based upon the depth and size of stem lesions: healthy = no lesion; low = small basal lesion; moderate = lesion up to several cm long; severe = stem girdled but not severed at base; very severe = stem severed, plant lodged.

The second survey was done in August by agricultural fieldmen throughout the province using the same sampling method. To confirm the disease, canola samples suspected of blackleg infection were forwarded to one of the cooperating plant pathologists at Brooks, Fairview, Olds, or Vegreville.

RESULTS: The results are summarized in Tables 1 and 2. The area in Alberta found infested with virulent blackleg is shown in Figure 1.

COMMENTS: Blackleg incidence and severity were higher in 1988 than in any of the years since 1983 when the disease was first recorded in Alberta. The disease was found at several new locations, and was particularly severe around Paradise Valley, Viking and Sedgewick. In Census Division 10, severely infested fields were detected as early as June. The disease was found in 90% of the fields surveyed, mostly in the southern half of this Census Division, and was severe in 25%. The average yield loss in this area is estimated to be about 10%; however, in one field it was more than 60%. In Census Division 7 the disease was confirmed in 45% of the fields surveyed.

In the survey conducted by agricultural fieldmen, a total of 821 fields were examined throughout the province. All fields found infested (Table 2) are located in either Census Divisions 10 or 7.

In southern Alberta, a virulent blackleg-infested field was located near Lyalta. This field, however, was not a part of the organized survey reported here. It is the most southern location where the disease has been found so far.

REFERENCE: 1. McGee, D.C. and G.A. Petrie. 1978. Variability of Leptosphaeria maculans in relation to blackleg of oilseed rape. Phytopathology 68:625-630.

TABLE 1. BLACKLEG OF CANOLA SURVEY BY PLANT PATHOLOGISTS IN ALBERTA - 1988.

| Census Divisions | Acreage (Thousands) | No. of fields surveyed | Surveyors | Fields infested with highly virulent blackleg |
|---|---|---|---|---|
| 1 + 4 | 36 | 13 | Huang | 0 |
| 2 + 5 | 282 | 14 | Kaminski | 0 |
| 3 + 6 + 9 | 207 | 11 | Kaminski | 0 |
| 7 | 496 | 24 | Slopek | 11 |
| 8 + 11 | 335 | 18 | Evans | 0 |
| 10 | 661 | 37 | Kharbanda | 33 |
| 12 + 13 + 14 | 279 | 11 | Tewari | 0 |
| 15 | 1,241 | 120 | Harrison | 0 |

TABLE 2. BLACKLEG OF CANOLA SURVEY CONDUCTED BY AGRICULTURAL FIELDMEN IN ALBERTA - 1988

A. Virulent blackleg of canola confirmed

| Locality | Number of fields surveyed | Number of fields with virulent blackleg |
|---|---|---|
| County of Flagstaff #29 | 35 | 5 |
| County of Minburn #27 | 20 | 5 |
| County of Paintearth 118 | 10 | 1 |
| M.D. of Provost #52 | 2 | 2 |
| M.D. of Wainwright #61 | 10 | 2 |
| County of Vermilion River #24 | 19 | 2 |

B. Virulent blackleg of canola not found

| Locality | Number of fields surveyed | Locality | Number of fields surveyed |
|---|---|---|---|
| M.D. of Acadia #34 | 1 | County of Smoky Lake #13 | 11 |
| County of Athabasca #12 | 9 | M.D. of Smoky Lake #130 | 32 |
| County of Beaver #9 | 10 | M.D. of Spirit River 1133 | 12 |
| County of Camrose #22 | 29 | M.D. of Starland #47 | 8 |
| M.D. of Clearwater #99 | 10 | County of Stettler #6 | 17 |
| M.D. of Fairview #136 | 16 | County of Strathcona #20 | 7 |
| M.D. of Foothills #31 | 10 | M.D. of Taber 114 | 9 |
| County of Forty Mile P8 | 5 | County of Thorhild #7 | 10 |
| County of Grande Prairie #1 | 26 | M.D. of Westlock #92 | 10 |
| M.D. of Kneehill #48 | 13 | County of Wheatland | 20 |
| County of Lac Ste Anne #28 | 10 | M.D. of Willow Creek #26 | 5 |
| County of Lacombe P14 | 11 | I.D. #16 (Valleyview) | 18 |
| County of Leduc #25 | 10 | I.D. #17 E (Slave Lake) | 12 |
| County of Lethbridge #26 | 11 | I.D. #17 W (Peace River) | 19 |
| County of Parkland #31 | 10 | I.D. #18 (Bonnyville) | 10 |
| M.D. of Peace P135 | 15 | I.D. #19 (Spirit River) | 18 |
| County of Ponoka #3 | 11 | I.D. #20 (Spirit River) | 15 |
| County of Red Deer #23 | 19 | I.D. #21 (Worsley) | 54 |
| M.D. of Rockey View #44 | 10 | I.D. #22 (Peace River) | 30 |
| County of St. Paul #19 | 10 | I.D. %23 (High Level) | 22 |
| | | S.A. #4 (Consort) | 10 |

C. Virulent blackleg survey not done

County of Barrhead #11
* M.D. of Bighorn #8
M.D. of Bonnyville #87
*M.D. of Cardston #6
M.D. of Cypress #1
County of Lamont #30
County of Mountain View #17
County of Newell #4
M.D. of Pincher Creek #9
M.D. of Sturgeon #90
County of Two Hills #21
*County of Vulcan #2
*County of Warner #5
County of Wetaskiwin #10
I.D. 114 (Evansburg)
I.D. #15 (Fort Assiniboine)
I.D. #18 (Lac La Biche)
SA #2 (Hanna)
SA #3 (Oyen)

* Not much canola grown this year.

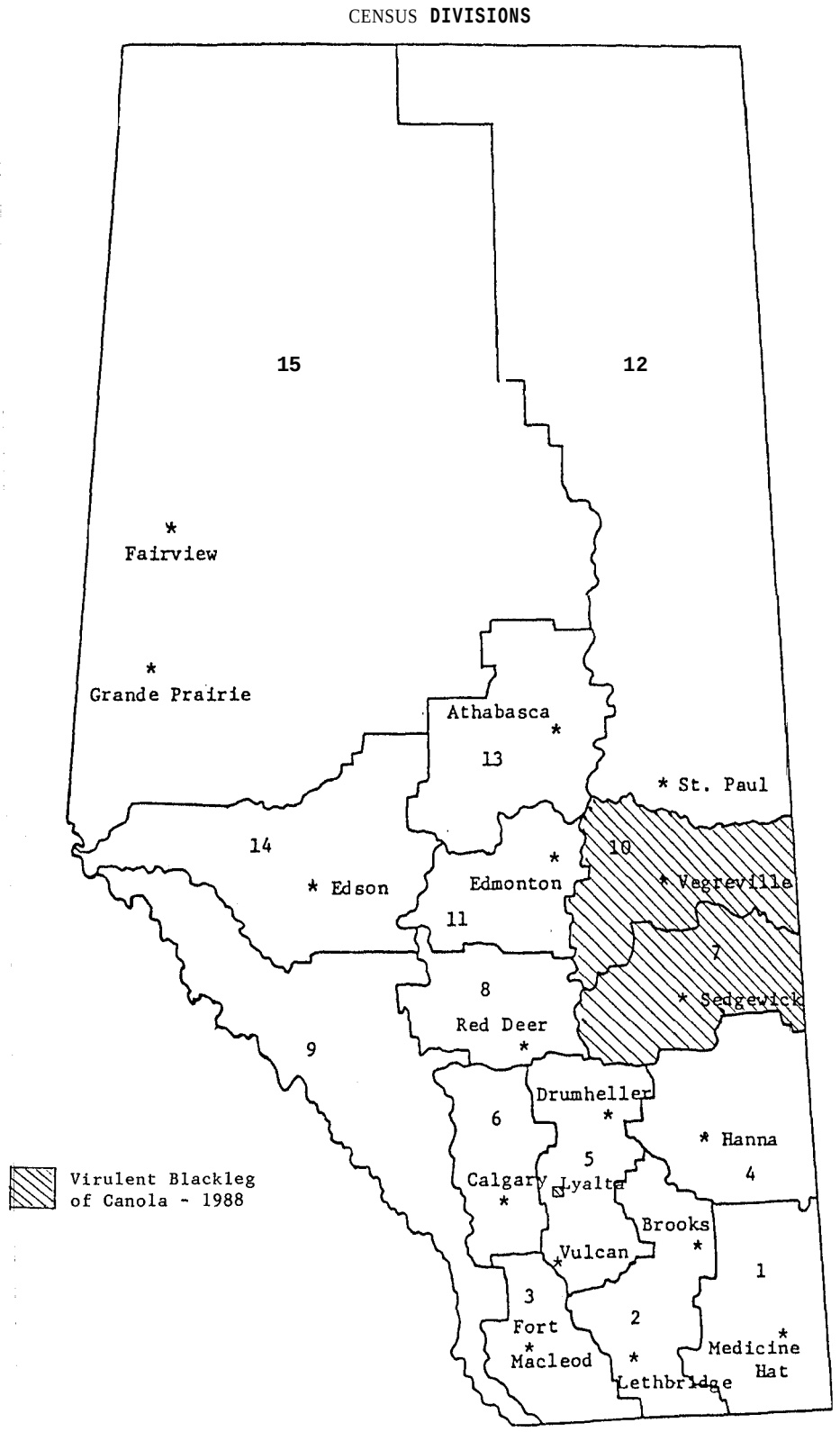


**FIGURE** 1. Distribution of highly virulent blackleg *of* canola in Alberta, 1988.

**Crop / Culture:** Irrigated Canola

**Location / Emplacement:** Southern Alberta

**Title / Titre:**

SURVEY OF IRRIGATED CANOLA FOR BLACKLEG DISEASE IN SOUTHERN ALBERTA IN 1988

**Name and Agency / Nom et Organisation:**

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**METHODS:** Irrigated canola fields were surveyed for incidence of blackleg (Leptosphaeria maculans) during August 30-31, 1988 in the Counties of Lethbridge, Forty Mile, Warner and Vulcan and the Municipal District of Taber. Canola plants were examined for symptoms on stems by inspecting five sites in each field, with two 1-meter rows at each site, and recording the numbers of diseased and healthy plants. Range and average percent infection were determined for each field.

**RESULTS AND COMMENTS:** Of the 13 fields surveyed, blackleg was found in only one crop of Brassica napus located in the County of Warner. The disease incidence varied from 0 to 10%, averaging 1.4%. Isolation from plant samples showed that the disease was caused by the avirulent strain of L. maculans. This is the first report of blackleg disease on irrigated canola in southern Alberta.

**Crop / Culture:** Irrigated Canola

**Location / Emplacement:** Southern Alberta

**Name and Agency / Nom et Organisation:**

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**Title / Titre:** SURVEY OF IRRIGATED CANOLA FOR SCLEROTINIA STEM ROT IN SOUTHERN ALBERTA IN 1988

METHODS: Irrigated canola fields were surveyed for incidence of sclerotinia stem rot (Sclerotinia sclerotiorum) during August 30-31, 1988, in the Counties of Lethbridge, Forty Mile (Bow Island) and Warner and the Municipal District of Taber. Canola plants were examined for symptoms on stems, leaves and/or pods by inspecting five sites in each field, with two 1-meter rows at each site, and recording the number of diseased and healthy plants. Range and average percent infection were determined for each field.

RESULTS AND COMMENTS: Twelve fields, two Brassica campestris and ten B. napus, were surveyed. Of the 12 fields surveyed, sclerotinia stem rot was found in three fields in the County of Lethbridge and Municipal District of Taber (see Table below). The disease incidence in the positive fields varied with sites, ranging from 0 to 20% and the average number of plants infected was 1.1% in each field. Disease was found in both fields of B. campestris.

In 1988, there were fewer fields with sclerotinia stem rot than in 1986 and 1987, and the disease incidence was light. This low level of disease may be due to the severe drought in southern Alberta in 1988.

Table. Survey of irrigated canola for sclerotinia stem rot in southern Alberta in 1988.

| Districts | No. fields | | % infected plants | |
|---|---|---|---|---|
| | Surveyed | Diseased | Range | Average |
| County of Forty Mile | 5 | 0 | 0 | 0 |
| County of Lethbridge | 3 | 1 | 0–4 | 0.5 |
| Municipal District of Taber | 3 | 2 | 0-20 | 1.6 |
| County of Warner | 1 | 0 | 0 | 0 |
| Total | 12 | 3 | 0-20 | 1.1 |

**Crop / Culture:** Rapeseed/Canola

**Location/Emplacement:** Alberta

**Name and Agency / Nomet Organisation:**
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**Title / Titre:** CANOLA DISEASE SURVEY IN THE PEACE RIVER REGION IN 1988

METHODS: In August 1988, a disease survey was conducted on rapeseed/canola fields in the Peace River Region of Alberta. The total area of canola production in the region in 1988 was approximately 1.2 million acres. The total number of fields included in this survey was 115. The diseases included in the survey were root rot, foot rot, sclerotinia stem rot, black spot and blackleg.

Fields were sampled by walking into each one in a V pattern and collecting the first plants at a site 50 paces from the edge of the field. Ten plants were selected at random at each of five sites along the V 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: The results are given in Tables 1 and 2.

COMMENTS: The root rot complex was the most prevalent disease affecting 100% of the 115 fields sampled with 99.1% of the sampled plants infected (Table 1). The average severity of root rot was 2.4 (Table 2). Incidence of sclerotinia stem rot was high for this area with 35% of fields infected. Incidence of black spot and foot rot was high with 49.9% and 28.5% respectively.

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 1988.

| Disease | % fields infected | % plants infected |
|---|---|---|
| Root Rot (Rhizoctonia, Pythium, Fusarium) | 100 | 99.1 |
| Black Spot (Alfernaria spp.) | 97 | 49.9 |
| Foot Rot (Rhizoctonia, Fusarium) | 84 | 28.5 |
| Sclerotinia (Sclerotinia sclerotiorum) | 35 | 5.0 |
| Avirulent Blackleg (Leptosphaeria maculans) | 17 | 1.2 |

Table 2. Incidence and severity of root rot in canola fields in the Peace River Region in 1988.

| Crop | number of fields | % root rot | root rot rating |
|---|---|---|---|
| canola | 115 | 99.1 | 2.4 |

**Crop/Culture:** Canola

**Location/Emplacement:** Saskatchewan

**Name and Agency/**
**Nom et Organisation:**
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**Title/Titre:** SURVEY OF BLACKLEG, SCLEROTINIA AND FOOTROT IN SASKATCHEWAN CANOLA CROPS, 1986

METHODS: Two hundred and fifty-seven canola fields were surveyed after swathing during August and September, 1986. The majority were sampled by agricultural representatives according to instructions provided to them. Twenty-five stem bases per field were collected by pulling up 5 plants every 25 paces while walking a diagonal from the edge of the field. All samples were mailed to a central location for disease assessment and culturing. Isolations were made from a maximum of 6 stems per field for determination of blackleg virulence, according to the method of McGee and Petrie (1978).

RESULTS AND COMMENTS: Results broken down by crop district are shown in the table. The majority of agricultural representatives in canola growing areas participated in the survey. However, some areas were sampled more heavily than others (see table).

The virulent strain of blackleg (Leptosphaeria maculans) was found in 65% of fields sampled. The mean percentage of infected plants per field was 29% for all fields or 45.5% for fields where blackleg was detected. Blackleg was most damaging in crop district 8B and was generally severe through most of north central Saskatchewan. Virulent blackleg was not detected in crop district 1B.

Blackleg levels were higher than those reported in the past. In 1984 and 1985, virulent blackleg was found in 28.5% and 43% of canola fields respectively (Petrie, 1986). The increase in incidence in 1986 may be partly explained by the later sampling time and partly by the continued natural spread of the pathogen.

Sclerotinia stem rot (Sclerotinia sclerotiorum) was found in 31.1% of fields surveyed at a mean incidence of 3.9% of plants per field. Incidence was highest in crop district 9B followed by 5B. Incidence of Sclerotinia appeared to be limited by dry weather early in the season.

Footrot (Rhizoctonia solani, Fusarium spp.) was found in 35.8% of fields at a mean incidence of 3.1% of plants per field. The highest disease incidence was found in crop districts 1B and 9B. Incidence was generally light.

REFERENCES:

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

(2) Petrie, G.A. 1986. Blackleg and other diseases of canola in Saskatchewan in 1984 and 1985. Can. Plant Dis. Surv. 66(2):51-53.

Table. Incidence of blackleg, Sclerotinia and footrot of canola in Saskatchewan, 1986

| Crop District | Number of Fields Surveyed | BLACKLEG* % Fields Affected | BLACKLEG* Mean % Incidence | SCLEROTINIA % Fields Affected | SCLEROTINIA Mean % Incidence | FOOTROT % Fields Affected | FOOTROT Mean % Incidence |
|---|---|---|---|---|---|---|---|
| 1b | 7 | 0 | 0 | 0 | 0 | 57.1 | 9.1 |
| 5a | 17 | 47.1 | 3.2 | 23.5 | 2.2 | 47.1 | 3.2 |
| 5b | 33 | 63.6 | 22.0 | 36.4 | 7.7 | 12.1 | 0.6 |
| 6a | 13 | 76.9 | 42.3 | 7.7 | 0.2 | 15.4 | 1.0 |
| 6b | 9 | 88.9 | 53.3 | 22.2 | 4.0 | 22.2 | 7.1 |
| 7b | 10 | 100.0 | 51.2 | 30.0 | 2.4 | 40.0 | 3.2 |
| 8a | 57 | 49.1 | 14.0 | 22.8 | 2.2 | 42.1 | 2.4 |
| 8b | 49 | 96.0 | 58.0 | 24.5 | 1.9 | 34.7 | 2.3 |
| 9a | 33 | 54.5 | 25.9 | 36.4 | 3.6 | 30.3 | 1.7 |
| 9b | 29 | 58.6 | 21.8 | 72.4 | 10.8 | 58.6 | 8.5 |
| Total or Average | 257 | 65.0 | 29.0 | 31.1 | 3.9 | 35.8 | 3.1 |

* virulent strain

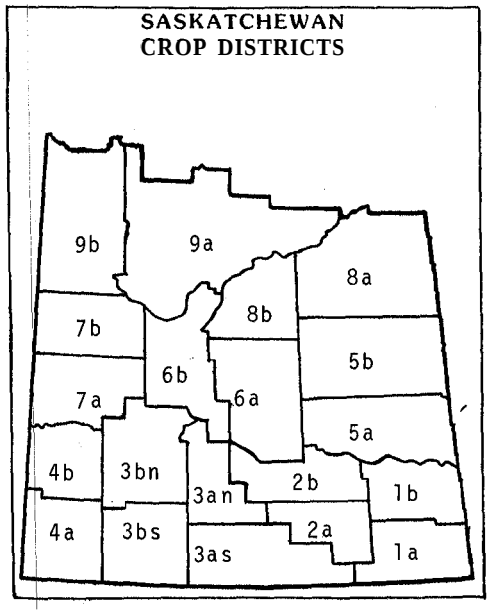


Figure 1. Saskatchewan crop districts and sub districts

**Crop / Culture:** Canola

**Location / Emplacement:** Saskatchewan

**Name and Agency / Nom et Organisation:**

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**Title / Titre:** CANOLA DISEASE SURVEY IN N.E. SASKATCHEWAN, 1988

**METHODS:** Forty canola fields were surveyed between August 10 and 29, 1988, in crop districts 5b, 8a, 8b, and 9a. Fields surveyed were selected at random in each crop district, and sampled by collecting ten plants from each field at ten pace intervals. Diseases were identified by symptoms, and the severity of each disease recorded as an estimate of the percentage of leaf or stem area affected. Results for each disease were totaled and averaged over the total number of samples and fields surveyed, to give the disease index (DI). Number of fields affected over total number of fields surveyed gave % fields affected (%FA).

**RESULTS AND COMMENTS:** No root rot phase and only very low levels [0.05 DI/0.5 %FA] of the foot rot phase of the root rot complex (Rhizoctonia sp., Fusarium spp.) were found in 1988. Low levels were also found of the staghead phase of white rust (Albugo candida) [0.015 DI/0.2 %FA] and aster yellows (Aster yellows mycoplasma-like organism) [<0.01 DI/0.2 %FA]. No downy mildew (Peronospora parasitica) was observed. The other diseases, blackleg (Leptosphaeria maculans), black spot (Alternaria sp.), white rust and sclerotinia stem rot (Sclerotinia sclerotiorum) were above 1987 levels (Table 1).

Table 1. Severity and Prevalence of Canola Diseases

| Crop District | No. Fields | Disease Index/% Fields Affected | | | |
|---|---|---|---|---|---|
| | | Blackleg | Black Spot | White Rust | Sclerotinia |
| 5b | 8 | 6.4/100 | 1.8163 | <.1/13 | 0/0 |
| 8a | 15 | 6.3/100 | 5.6180 | 1.5/33 | .3/7 |
| 8b | 9 | 12.7/100 | 4.9189 | 2.6/33 | 0/0 |
| 9a | 8 | 12.7/100 | 12.61100 | 1.7/50 | .2/25 |
| Total or Avg. | 40 | 9.0/100 | 6.2/83 | 1.5/33 | <.1/1 |

**Crop/Culture:** Canola

**Location/Emplacement:** Manitoba

**Title/Titre:** SURVEY OF PLANT DISEASES OF CANOLA IN 1988

**Name and Agency/ Nom et Organisation:**

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METHODS: Results are based on a survey during the third week of August of 73 fields distributed throughout, southern Manitoba. Sixty-nine fields of Brassica napus (Argentine canola) and four fields of Brassica campestris (Polish canola) were included. Prevalence and incidence of diseases were recorded (Table 1).

RESULTS: Disease reaction was similar in both types of canola. Disease loss was generally less than in previous years. For the first time since the canola survey was initiated in 1970 no selerotinia stem rot (Sclerotinia sclerotiorum) was detected. The absence of this disease can be attributed to the very dry weather that prevailed over most of the season and in particular in the later part of June and the first few weeks of July. Most of the fields surveyed in the central and eastern regions were free of disease. Blackleg (Leptosphaeria maculans) was the most prominent disease, occurring in 29% of fields surveyed at an average incidence within infested fields of 25%. Blackleg caused an estimated 5% yield loss in Manitoba in 1988 and was the only disease that caused losses above 1%. There were two areas where blackleg was a severe problem. In the southwest region, particularly near Elgin and Souris, the percentage of infected fields was 62% with an average incidence of 30% and losses about 10%. Severe blackleg was also detected in the northwest region, north of Dauphin and near Gilbert Plains. Infested fields were also detected near Russell, Roblfn, Benito and Kenville, just south of Swan River. In the northwest region 31% of fields were infested with an average disease incidence of 24% within fields. Losses were determined to be in the range of 10–15%. Blackleg was detected in the central region only in one field near Portage la Prairie and was not detected in the eastern region. A sample from a field near Arborg in the Interlake region sent to the Plant Pathology Laboratory was also found to be affected by blackleg. Other diseases detected in the survey were alternaria black spot (Alternaria sp.), foot rot (Rhizoctonia solani), gray stem (Pseudocercosporella capsellae) and downy mildew (Peronospora parasitica) (Table 1).

Although the canola crop in most areas escaped the effects of plant diseases, it was severely damaged by heat and moisture stress. It has been estimated that average Manitoba canola yields were reduced about 30% from 1987.

Table 1: Prevalence and Incidence of Diseases of Canola (B. napus and B. campestris) in Manitoba in 1988.

| Disease | PREVALENCE (Percentage of fields affected) | DISEASE INCIDENCE (Percentage of plants affected within infested fields) | Estimated Yield loss % |
|---|---|---|---|
| Blackleg | 29 | 25 | 5 |
| Foot rot | 8 | <5 | trace |
| Black spot | 17 | 10 | trace |
| Stem rot | 0 | 0 | trace |
| Gray stem | 5 | <5 | trace |
| Downy mildew | 5 | <5 | trace |
| Aster yellows | 4 | <1 | trace |

'Based on 73 fields surveyed

**Crop/Culture:** Flax and Sunflowers

**Location/Emplacement:** Manitoba

**Name and Agency/**
**Nomet Organisation:**
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R. G. PLATFORD,
Manitoba Agriculture

**Title/Titre:**
SURVEY OF FLAX AND SUNFLOWER DISEASES IN MANITOBA IN 1988

**FLAX**

METHODS: A total of 51 flax fields were surveyed south of Highway No. 1 in southern Manitoba. Twelve fields were surveyed on July 20, 20 fields on July 27, 8 fields on August 4 and 11 fields on August 22. In addition 8 samples submitted to the Manitoba Agriculture Plant Pathology Laboratory were analysed.

RESULTS: Poor emergence and heat canker were very common especially in areas severely affected by drought, where thousands of hectares had to be reseeded. Most of the fields had high weed populations, were moderate to poor in vigour and had two to three stages of plant growth due to non-uniform emergence. Only one field showed a trace (<1% disease incidence) of wilt (Fusarium oxysporum f. sp. lini) and seven fields showed a trace of aster yellows (Aster yellows mycoplasma-like organism). Pasmo (Septoria linicola) was observed only in the eastern region of the province late in the season. Disease incidence was 10% in two fields and up to 5% in five other fields. Rust (Melampsora lini) was not encountered in any of the fields surveyed, nor on the flax differential sets planted at Morden and Portage la Prairie. The samples of flax submitted to the Manitoba Agriculture Plant Pathology Laboratory mainly exhibited heat canker resulting from environmental stress. Heat canker was particularly severe on samples from the central region, south of Carman.

**SUNFLOWER**

METHODS: A total of 35 sunflower fields were surveyed in Southern Manitoba (4 confectionery and 31 oilseed sunflower). Ten fields were surveyed on July 20, 13 on July 27, 4 on August 4, 2 on August 22 and 6 on September 1. A disease index was estimated for each field based on disease incidence [DI] or disease severity [D.S.] (Table 1).

RESULTS: Rhizopus head rot (Rhizopus spp.) was the most common and widespread disease (trace to 40% DI in 75% of fields surveyed after August 1st). This could be attributed to the high incidence of insect and grasshopper damage to the heads early in the season. The first signs of this disease were observed during the first week of August. The second most common disease was sclerotinia wilt (Sclerotinia sclerotiorum) which was observed during and after flowering and ranged from trace to 40% DI in 63% of the fields surveyed. Rust (Puccinia helianthi) showed 80-100% DS values in the western part of the province (predominantly race 3, still under investigation). Values of trace - 10% occurred in the eastern part of the province and predominantly race 1 was involved. Verticillium wilt (Verticillium spp.) was observed in 54% of fields surveyed and ranged from trace to 50% DI in various fields. Traces of downy mildew (Plasmopara halstedii) and septoria leaf spot (Septoria helianthi) were observed only in two fields. Phoma (Phoma spp.) was observed at low levels towards the end of the season and, combined with the drought conditions, might have contributed to the premature ripening of some fields. Three samples of sunflower submitted to the Plant Pathology Laboratory were found to be affected by rhizopus head rot and two were affected by sclerotinia wilt.

Table 1. Sunflower fields affected and disease severity.

| Disease or Vigour | Prevalence (% of fields infested) | Mean disease index* | Range of disease index |
|---|---|---|---|
| Rhizopus head rot | 75% | 1.9 | 1-3 |
| Sclerotinia wilt | 63% | 1.6 | 1-3 |
| Verticillium wilt | 54% | 1.4 | 1-4 |
| Rust | 57%@ | 1.9 | 1-5 |
| Downy mildew | 6% | 1.0 | 0-1 |
| Sclerotinia head rot | 0 | 0 | 0 |
| Botrytis head rot | 0 | 0 | 0 |
| Septoria leaf spot | 6% | 1.5 | 1-2 |
| Vigour** | 100% | 1.6 | 1-3 |

* Disease index is based on a scale of 1-5 (1= trace to 5%, 2= 5% to 20%, 3= 20% to 40%, 4=40% to 60% and 5= >60% disease). Index is based on disease incidence for all except rust, which is based on disease severity (i.e. leaf area diseased).

** Vigour index is based on a 1-5 scale (1= very high vigour and 5= very poor vigour)

@ Most of the rust-infected fields were in the western part of the province and were predominantly affected by race 3 of the rust.

**Crop / Culture:** Flax

**Location / Emplacement:** Saskatchewan

**Name and Agency / Nom et Organisation:**

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**Title / Titre:** FLAX DISEASE SURVEY IN N.E. SASKATCHEWAN, 1988

**METHODS:** Twenty three flax fields were surveyed between August 10 and 29, 1988, in crop districts 5b, 8a, 8b and 9a. Fields surveyed were selected at random in each crop district, and sampled by collecting ten plants from each field at ten place intervals. Diseases were identified by symptoms, and the severity of each disease recorded as an estimate of the leaf, stem or root area affected. Results for each disease were totaled and averaged over the total number of samples and fields surveyed to give the disease index. Number of fields affected over total number of fields surveyed gave % fields affected.

**RESULTS AND COMMENTS:** Very low levels of disease were found in 1988. Pasmo (Septoria linicola) was present in 33% of the fields with a disease index of 0.79, i.e. at about one fifth the levels in 1987. Root rot (Fusarium sp.), rust (Melampsora lini) and aster yellows (aster yellows mycoplasma-like organism) were not found in any of the fields sampled.

**Crop/ Culture:** Lentil

**Location/ Emplacement:** Manitoba

**Name and Agency / Nom et Organisation:**

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**Title / Titre:** ANTHRACNOSE AND OTHER DISEASES OF LENTIL IN MANITOBA IN 1988

METHODS: Because of the discovery in Southern Manitoba in 1987 of a new anthracnose disease of lentil caused by Colletotrichum truncatum (1), a survey of crops in all major areas of lentil production in Manitoba was undertaken in 1988. Some fields were visited twice or more during the summer, others only once, usually in July. During visits a semi-quantitative assessment of anthracnose was made by walking at least 100 m through the crop and rating disease severity as none, slight, moderate or severe. Percentage heat canker, the presence of other diseases and the density and height of the crop were also noted. In most cases the owner of the field was contacted and background information on cultivar, seed source, crop history and agronomic practices was collected. In a few cases samples of the seed planted or harvested were obtained. Subsamples of 400 seeds were surface disinfected in dilute NaOCl and plated on Difco-Bacto potato dextrose agar to assess incidence of seed infection with C. truncatum.

RESULTS AND COMMENTS: The regions where lentil crops were inspected are shown in Fig. 1. Anthracnose was found in 18 fields out of 65 inspected, but mostly at low levels (Table 1). Crops with more than slight disease severity were observed only in regions where anthracnose had been reported in 1987 (1), and severity was generally lower than in 1987. However, anthracnose is clearly widely distributed in Manitoba, including in regions close to the border with Saskatchewan, which is the major producer of lentil in Canada. A survey of lentil crops throughout Saskatchewan in 1988 (R.A.A.M., unpublished data) failed to detect anthracnose, even in the regions closest to the Manitoba border.

In the present survey anthracnose was detected on three lentil cultivars, Eston (9/35 fields) French Green (5/19 fields) and Laird (4/9 fields). However, no relationship of disease severity could be demonstrated with cultivar, crop history or agronomic practices, probably because of the low levels of disease. Isolation from seed samples showed incidences of infection of planted seed from 0 to 0.2% and of harvested seed from 0 to 1.9%. The value of 1.9% coincided with the one crop that was severely diseased.

During the survey anthracnose symptoms were found on wild Vicia sp. in lentil crops and on faba bean in three fields in the Portage area. A fungus identical in morphology to C. truncatum isolated from lentil in 1987 (1) and during the present survey was isolated from these hosts. In greenhouse tests isolates of C. truncatum from lentil were pathogenic on several cultivars of faba bean and pea as well as lentil. Thus, it appears that anthracnose of lentil is caused by a pathogen with a relatively wide host range.

Many lentil crops in Manitoba in 1988 were in poor condition due to drought and extreme heat, especially in early June. One reflection of this was a very high incidence of heat canker (Table 1); in addition many crops were very short and matured early. The weather probably resulted in the low severity of anthracnose in the Portage, St. Jean and St. Joseph areas, as well as the fact that other lentil diseases were found at only trace levels.

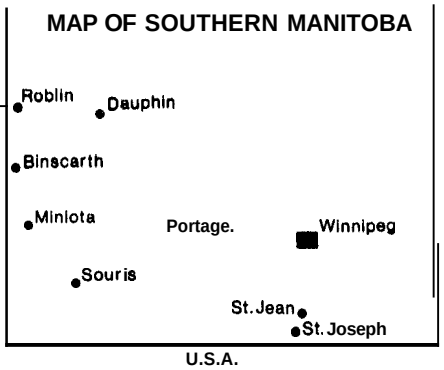
Reference: 1) Morrall R.A.A. 1988. A new disease of lentil induced by Colletotrichum truncatum in Manitoba. Plant Dis. 72:994.

Table 1. Number of lentil crops in relation to anthracnose and heat canker in eight regions* of Manitoba in 1988 **

| Region | Severity of Anthracnose | | | | Incidence of heat canker | | |
|---|---|---|---|---|---|---|---|
| | None | Slight | Moderate | Severe | 5-10% | 15-20% | >25% |
| St. Jean | 7 | 4 | 2 | | 4 | 5 | 4 |
| St. Joseph | 4 | 2 | 1 | | | 2 | 5 |
| Portage | 12 | 3 | 1 | 1 | 12 | 3 | 1 |
| Souris | 2 | 2 | | | 3 | | 1 |
| Miniota | 4 | 1 | | | 2 | 2 | 1 |
| Binscarth | 7 | | | | 2 | 2 | 2 |
| Dauphin | 10 | | | | 6 | 4 | |
| Roblin | 1 | 1 | | | 1 | 1 | |

* See Fig. 1 for locations. ** Missing data for 2 crops.

**Fig. 1**



**Crop / Culture:** Pea

**Location/ Emplacement:** Saskatchewan

**Name and Agency/ Nomet Organisation:**

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**Title / Titre:** PEA DISEASE SURVEY IN N.E. SASKATCHEWAN, 1988

METHODS: Twenty fields of pea were surveyed from August 10 to 29, 1988, in crop districts 5b, 8a and 8b. Fields surveyed were selected at random in each crop district, and sampled by collecting ten plants from each field at ten pace intervals. Diseases were identified by symptoms, and the severity of each disease recorded as an estimate of the percentage of leaf or stem area affected. Root rot and foot rot severity was assessed on a scale where 0 = healthy, 2 = trace, 5 = moderate, and 10 = severe. Results for each disease were totaled and averaged over the total number of samples and fields surveyed to give the disease index. Number of fields affected over total number of fields surveyed gave % fields affected.

RESULTS AND COMMENTS: The drought in 1988 probably reduced some diseases, but not powdery mildew, as it was the most prevalent disease (Table 1). Mycosphaerella blight was more prevalent and severe than in 1987, but ascochyta leaf spot (*A. pisi*) and septoria leaf blotch (*Septoria pisi*) were not found this year. Anthracnose was found at very low levels in 1988.

Table 1. Severity and prevalence of pea diseases

| Disease | Disease index | % Fields affected |
|---|---|---|
| Mycosphaerella Blight (*M. pinodes*) | 12.9 | 100 |
| Foot Rot (*Ascochyta* spp.) | 1.8 | 80 |
| Root Rot (*Fusarium* spp.) | 1.9 | 90 |
| Powdery Mildew (*Erysiphe polygoni*) | 33.0 | 100 |
| Downy Mildew (*Peronospora viciae*) | 0.7 | 5 |
| Anthracnose (*Colletotrichum pisi*) | 0.1 | 5 |

**Crop / Culture:** Spring and Winter Rapeseed

**Location/Emplacement:** Ontario

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**Title / Titre:** INCIDENCE AND SEVERITY OF BLACKLEG IN SPRING AND WINTER RAPESEED IN ONTARIO, 1988.

**METHODS:** The incidence and severity of blackleg [Leptosphaeria maculans] in spring and winter rapeseed in Ontario was determined during the period July 5 to August 16, 1988. Twenty-six winter and 45 spring rapeseed fields were examined in Middlesex, Wellington, Huron, Perth, Bruce and Grey counties. Sampling and crop loss assessment methods were as described by Peters and Hall (Can. Plant Dis. Surv., this issue).

**RESULTS:** Blackleg was observed in 20 fields of winter rapeseed (77%) and 14 fields of spring rapeseed (31%). The mean incidence of diseased plants was 29.5% in winter rapeseed and 2.2% in spring rapeseed. The mean disease severity was 0.6 for winter rapeseed and 0.03 for spring rapeseed. The maximum incidence and severity values recorded were 80% and 1.6 in winter rapeseed and 20% and 0.4 in spring rapeseed. Average and maximum crop losses were estimated to be 2.7% and 23.1% in winter rapeseed and 1.2% and 15.7% in spring rapeseed.

**Crop / Culture:** Winter Rapeseed

**Location / Emplacement:** Ontario

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**Title / Titre:** INCIDENCE AND SEVERITY OF BLACKLEG IN WINTER RAPESEED IN ONTARIO, 1986 AND 1987.

**METHODS:** The incidence and severity of blackleg [Leptosphaeria maculans] in winter rapeseed in Ontario was determined during the period 1-23 July. Seventy-two fields in 1986 and 49 fields in 1987 were examined in Huron, Perth, Bruce, Middlesex and Wellington counties. A diamond-shaped sampling pattern with sides 20 m long was initiated 30 m from the edge of each field. Single plants were collected at 2-m intervals for a total of 40 plants per field. Severity of blackleg symptoms on the crown was rated on a scale of 0 (no disease) to 4 (crown completely girdled). The presence of the causal agent was confirmed by plating crown pieces onto agar media. Crop loss was assessed from the relationship between seed yield and disease severity of 250 plants collected from each of 5 fields in each year.

**RESULTS:** Blackleg was observed in 66 fields (92%) in 1986 and 49 fields (100%) in 1987. The mean incidence of diseased plants was 31.8% in 1986 and 69.1% in 1987. The mean disease severity was 0.7 in 1986 and 1.5 in 1987. The maximum incidence and severity values recorded were 82.5% and 2.5 in 1986 and 100% and 3.6 in 1987. Average and maximum losses in seed yield were estimated to be 5.0% and 29.2% in 1986 and 7.5% and 27.3% in 1987.

**Crop / Culture:** Safflower

**Location / Emplacement:** Southern Alberta

**Name and Agency / Nom et Organisation:**

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**Title / Titre:** SURVEY FOR SEEDLING BLIGHT OF SAFFLOWER

METHODS: From June 2–15, 1988, 10 safflower fields in southern Alberta (Fig. 1) were surveyed for disease when crops were at the seedling stage. The survey procedure consisted of walking through each field in a teardrop pattern and stopping at ZOO-pace intervals a total of 10 times. At each stop, plants within a 1 $m^2$ area were counted, carefully dug to preserve the roots intact, bagged, and returned to the laboratory. Plants were washed, examined for disease symptoms, and rated for disease severity. Samples of diseased tissue were assayed for fungal pathogens by surface sterilizing in 1% sodium hypochlorite, rinsing in sterile water, and plating onto selective media. Plates were incubated at 20°C for 5–7 days before observation. prevalent fungal species were subcultured for pathogenicity tests, which are pending.

RESULTS AND COMMENTS: Root rot and/or stem canker were found in all fields. These were collectively termed seedling blight, and disease incidence and severity ratings were made accordingly (Table 1). No leaf diseases were observed. Plant density ranged from 20.6 to 83.3/$m^2$. A stand of 40–70 plants/$m^2$ is considered optimum under Alberta conditions. Seedling blight incidence varied from 5.8 to 53.3%. In field #1, the crop was disced under because of disease. The disease severity index ranged from 2.0 to 16.7. In general, seedling blight incidence and severity were low in safflower fields in 1988. The predominant fungi isolated and average % tissue pieces colonized by each were: Alternaria spp. - 44%, Fusarium spp. - 37%, and Pythium spp. - 9%. Rhizoctonia solani was isolated in only one case. Some stem cankers were caused by high temperatures at the soil line (heat canker).

Table 1. Safflower survey data, 1988.[1]

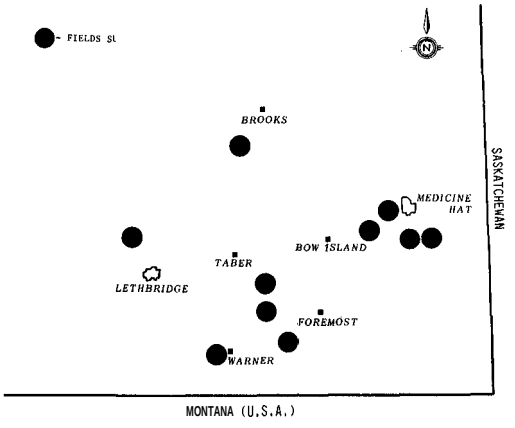
| Field | Stand | Seedling blight | |
|---|---|---|---|
| No. | (plants/$m^2$) | Incidence (%) | Severity[2] |
| 1 | 24.2 | 53.3 | 16.7 |
| 2 | 83.3 | 16.3 | 7.3 |
| 3 | 32.2 | 6.2 | 3.0 |
| 4 | 45.3 | 13.5 | 5.7 |
| 5 | 23.9 | 12.1 | 5.8 |
| 6 | 24.0 | 5.8 | 2.0 |
| 7 | 37.5 | 11.5 | 6.9 |
| 8 | 28.3 | 12.4 | 4.7 |
| 9 | 21.9 | 13.7 | 5.7 |
| 10 | 20.6 | 12.6 | 4.4 |
| Avg. | 34.1 | 15.7 | 6.2 |

[1] Figures in this table are averages of 10 sampling sites/field.

[2] Severity Index $= \left[\frac{(S_1 \times 1)+(S_2 \times 2)+(S_3 \times 3)}{T \times 3}\right] \times 100$

Where $S_1$ = No. of plants with 1–25% of stem/root blighted.
$S_2$ = No. (of plants with 26–75% of stem/root blighted.
$S_3$ = No. of plants with 76–100% of stem/root blighted.
$T$ = Totaf no. plants examined, including healthy ones.

Figure 1. Safflower fields surveyed in 1988.




REFERENCE: Mundel, H.-H., Roth, B., and Kubik, J.J. 1987. Safflower production in Alberta. Agri-Fax factsheet, Alberta Agriculture, Edmonton, AB.

**Crop/Culture:** Soybean

**Location/Emplacement:** Ontario

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**Title/Titre:** STRAINS OF SOYBEAN MOSAIC VIRUS IN SOUTHWESTERN ONTARIO, 1979-81.

METHODS: The incidence of soybean mosaic was surveyed in the summers of 1979, 1980 and 1981 in the eight southwestern Ontario counties (Essex, Kent, Elgin, Lambton, Oxford, Middlesex, Perth and Huron (3). A total of 100 samples were collected each year for a period of 3 years. Of the 300 samples, 265 were successfully transferred to Amsoy 71 seedlings in a 21 ± 3°C greenhouse by mechanical inoculation. They were subsequently assayed on a set of differential hosts for the identification of soybean mosaic virus (SMV). The differential hosts included NN tobacco, Haro Nova tobacco, Chenopodium amaranticolor, crimson clover, soybean (Harosoy, **Amsoy** and Columbia), cucumber, bean (Bountiful, Fleetwood and Black Turtle Soup), pea and cowpea.

Isolates initially identified as SMV were further examined by electron microscopy for the presence of flexuous rods in cell sap of infected plants. Reaction to SMV antiserum was determined to confirm the SMV identity.

Strains of SMV were determined based on a series of differential soybean cultivars (Table 1).

RESULTS AND COMMENTS: Based on the test results (Table 1) two additional SMV strains were found in Ontario in addition to those reported by Cho and Goodman (1). One of the strains (H1) found in Ontario causes severe tip necrosis to several cultivars of soybean and was similar to strain C14 reported by Lim (2). This strain was frequently found in Essex county and was particularly prevalent in the breeders' nursery at the Harrow Research Station.

Table 1. Response of differential soybean cultivars to SMV isolates from soybean in southwestern Ontario

| | SMV Strain | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Soybean | G1 | G2 | G3 | G4 | G5 | G6 | G7 | H1[a] | H2[a] |
| Williams | S(M)[b] | S(M) | S(M) | S(M) | S(M) | S(M) | S(M) | S(M) | S(M) |
| Franklin | S(M) | S(M) | S(M) | S(M) | S(M) | S(M) | S(M) | S(M) | S(M) |
| PI 96983 | R | R | R | R | R | R | S(N) | R | S(M) |
| PI 483.084 | R | R | R | R | R | R | R | S(N) | S(M) |
| PI 486.355 | R | R | R | R | R | R | R | R | R |

[a] An unclassified SMV isolated in southwestern Ontario.
[b] R = resistant (no symptom) and S = susceptible with mosaic (M) or necrotic (N) symptoms: based on reactions of 10 soybean plants for each SMV isolate.

REFERENCES:

1. Cho, E.K. and R.M. Goodman. 1982. Evaluation of resistance in soybeans to soybean mosaic virus strains. Crop Sci. 22: 1133-1136.

2. Lim, S. M. 1985. Resistance to soybean mosaic virus in soybeans. Phytopathology 75: 199-201.

3. Tu, J. C. 1986. Incidence of soybean mosaic virus and tobacco ringspot virus in southwestern Ontario. Can. Plant Dis. Surv. 66: 49-50.