Forage legumes / Légumineuses fourragères

CROP: Alfalfa

LOCATION: Alberta, Saskatchewan, Manitoba

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TITLE: SURVEY OF BLOSSOM BLIGHT OF ALFALFA ON THE CANADIAN PRAIRIES IN 1995

METHODS: The presence of *Botrytis cinerea* and *Sclerotinia sclerotiorum,* the causal agents of blossom blight, in alfalfa flowers was assessed in Alberta (AB), Saskatchewan (SK) and Manitoba (MB). Seed production fields in the Peace River region of northern AB and in MB were examined in late July. In SK, fields were assessed in mid-July and again in early August. In southern AB, visual assessments of symptoms (florets fused and matted with fungal hyphae, or sclerotia in flowers) were made in mid- to late-August.

In northern AB, five flower racemes were collected from each of six sites in each field. Four florets per raceme were plated onto acidified potato dextrose agar, without surface sterilization. In SK and MB, the oldest floret from each of four racemes, at each of 10 sites per field, was plated. The plates were incubated on the laboratory bench, and the incidence of pathogens was assessed after about ten days. Fungi were identified by microscopic examination of cultural characteristics, and some of the fungi were isolated into pure cultures for detailed examination. In southern AB, 100 racemes were rated at each of 10 sites in each field for blight symptoms.

RESULTS AND COMMENTS: The mean incidence of *B. cinerea* in/on alfalfa blossoms in SK was greater than 60% in July (Table 1), with a range from 3% to 90% in individual fields. The central region had above-normal rainfall, and substantial blossom blight was observed. The incidence of *B. cinerea* in the central region fell sharply in August, probably due to dry weather in July. Rainfall in spring and early summer in northern SK was well below average; the level of *B. cinerea* in/on flowers was still high, but few symptoms were noted.

In northern AB, blossom blight was severe in some fields. The incidence of *B. cinerea* in/on alfalfa flowers in each field was very high (Table 2), with a mean of 79% and range of 37 - 98%. The field with 37% infection was sprayed twice with benomyl during flowering to reduce blossom blight. In contrast, the incidence of *B. cinerea* was low in MB (Table 1). Symptom incidence in southern AB averaged only 8% (Table 3), but 30% of racemes were affected in one field near Enchant. The incidence of *S. sclerotiorum* in/on alfalfa flowers was generally less than 15% (Tables 1 & 2). The highest level observed was 25% at a site in northcentral SK.

Although high levels of *B. cinerea* occurred at many sites in SK and northern AB, severe symptoms of blossom blight only occurred in areas with high rainfall.

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TABLE 1. The incidence of *Botrytis cinerea* and *Sclerotinia sclerotiorum* in/on alfalfa flowers in Saskatchewan and Manitoba in 1995.

Region	No of fields	Date	Incidence (%) *Botrytis*	Incidence (%) *Sclerotinia*
Saskatchewan				
- Northcentral	5	July	58	1
	4	August	64	8
- Northeast	2	July	65	0
	2	August	59	nd*
- Central	2	July	71	15
	2	August	11	6
- Northwest	2	July	64	nd
	2	August	42	nd
TOTAL	11			
Manitoba				
- Eastern	2	July	23	5
- Central	1	July	0.5	6
- Interlake	2	July	2	1
TOTAL	4			

*nd = not done.

TABLE 2. The incidence of *Botrytis cinerea* and *Sclerotinia sclerotiorum* in/on alfalfa flowers in the Peace River region of Alberta in 1995.

Location	No of fields	Date	Incidence (%) *Botrytis*	Incidence (%) *Sclerotinia*
Donnelly	2	July	88	11
Eaglesham	6	July	83	8
Fairview	3	July	75	11
Manning	2	July	65	3
Peace River	3	July	78	8
TOTAL	16			

TABLE 3. The incidence of blossom blight symptoms in alfalfa flowers in southern Alberta in 1995.

Location	No of fields	Date	Blossom blight (%)
Enchant	4	August	12
Tilley	3	August	7
Rosemary	4	August	2
TOTAL	10		

CROP: Alfalfa

LOCATION: Saskatchewan

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TITLE: LEAF SPOT SEVERITY IN ALFALFA SEED FIELDS IN SASKATCHEWAN IN 1995

METHODS: The incidence and severity of leaf spot diseases were assessed in 11 alfalfa seed production fields in Saskatchewan in 1995. Each field was assessed in mid July and again in early August, by making visual ratings at 10 regularly-spaced intervals along a transect of the field. Each rating consisted of an estimate of percent leaf area affected at 0.3 m height within the canopy, together with an assessment of the dominant foliar pathogen at that site. Microscopic examination of samples collected in each field was carried out occasionally to confirm the identity of the pathogens. Mean leaf spot severity values were calculated for each field, and for each region.

RESULTS AND COMMENTS: Rainfall in spring and early summer across the northern grainbelt in Saskatchewan was below average, but portions of the central region had above-normal rainfall. These rainfall patterns were reflected in the level of leaf spot severity (Table 1). In the north, the mean leaf area affected in July was less than 35%, but mean severity was over 70% in the central region, where rainfall was higher. By August, disease severity had fallen dramatically in the central region, probably as a result of dry weather in July, while mean severity increased slightly in other areas of the province. The dominant pathogen in most fields was spring black stem (*Phoma medicaginis*), with yellow leaf blotch (*Leptotrochila medicaginis*) dominant in some fields in the north, and common leaf spot (*Pseudopeziza medicaginis*) occurring at low levels in all regions.

TABLE 1. Leaf spot severity and the dominant foliar pathogens in alfalfa seed production fields in Saskatchewan in 1995.

Region	No. of fields	Date	(%) Leaf spot Severity	Range	Dominant pathogen*
Northwest	3	July	34	12-70	YLB, CLS, SBS
	3	August	58	41-74	SBS, YLB, CLS
Northcentral	3	July	31	20-37	SBS, CLS, YLB
	4	August	47	20-74	SBS, CLS, YLB
Northeast	2	July	15	15-15	YLB, SBS, CLS
	2	August	27	23-30	SBS, CLS, YLB
Central	2	July	72	63-81	SBS, CLS, YLB
	2	August	32	29-34	SBS, CLS, YLB

* SBS = black stem (*Phoma medicaginis*), CLS = common leaf spot (*Pseudopeziza medicaginis*), YLB = yellow leaf blotch (*Leptotrochila medicaginis*), are listed in descending order of importance for each site.

CROP: Potato (*Solanum tuberosum* L.)

LOCATION: Southern, central and north-central Alberta

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TITLE: SURVEY OF POTATO STORAGES IN ALBERTA FOR LATE BLIGHT ON TUBERS, 1994

INTRODUCTION: Late blight on potato was quite extensive in north-central Alberta according to a field survey conducted in the summer of 1994 (Can. Plant Dis. Surv. 75:171:178). Disease levels were low in central Alberta and late blight was not found in the south. A survey of potato storages was conducted to monitor the extent of late blight infection of tubers from the 1994 crop. Knowing the extent of late blight on tubers could provide useful information on the potential for late blight in 1995 and aid provincial potato specialists in devising disease control strategies.

METHODS: The storages were surveyed from 8 December 1994 to 13 January 1995. To determine the incidence of late blight infection on the tubers, 100 - 150 tubers were randomly collected from each pile/bin of potatoes inspected. In some storages, it was not possible to collect random samples, hence tubers were collected from only the accessible areas. The tubers were washed and visually insepected for late blight symptoms. Those showing surface symptoms were cut to check for rusty brown and grainy discoloration going inwards from the surface, which is characteristic of late blight infection.

Infected tubers were shipped to the Charlottetown Research Station for isolation of the fungus and determination of mating types and metalaxyl sensitivity.

RESULTS AND COMMENTS: Late blight infection in tubers was observed in almost all the storages on farms that had foliar late blight during the growing season (Bisht *et. al.* 1994). Infected tubers were observed in 70% of the storages in north-central Alberta, having a range of trace to 33% late blight incidence (Table 1). In central Alberta, 40% of the storages had tuber infection, ranging from a trace to 10% incidence. Suprisingly, in southern Alberta, where no late blight was found in the summer 1994, there were 4 storages (14%) where infected tubers (trace to 24% incidence) were found. The fields on these farms had not been surveyed in the summer.

In areas where the fungus was present, and wherever the growers did not use fungicides, the level of tuber infection was generally signicantly higher than where fungicides were used (Table 2). Growers who stopped the spraying early or did not use a fungicide along with the top-killing herbicide(s), also experienced high levels of tuber infection. Province-wide, 79% of the farms surveyed used fungicides and had 1.6% tubers infected, compared to 5.4% tuber infection when no fungicides were used. Application of contact fungicides, alone or in combination with a systemic fungicide, Ridomil-MZ, significantly reduced disease incidence and severity. In north-central Alberta, the contact fungicide Bravo 500 was most used; Ridomil-MZ was used in only two fields. Use of fungicides (contact as well as systemic) was quite common in southern Alberta. Extensive application of Bravo/Dithane DG and Ridomil by farmers, along with unfavourable weather conditions for late blight development may have prevented the occurrence of the disease in the south.

Other diseases and disorders recorded during the survey were : bacterial soft rot (*Erwinia carotovora* subsp. *carotovora*), blackleg (*Erwinia carotovora* subsp. *atroseptica*), early blight (*Alternaria solani*), scab (*Streptomyces scabies*), silver scurf (*Helminthosporium solani*), wilts (*Fusarium* spp. and *Verticillium* spp.), and herbicide damage.

From the diseased samples sent to PEI, 107 fungal isolates were recovered (Table 3). The studies on the mating type and metalaxyl sensitivity of these isolates showed that all isolates except one were of A1 mating type and, in general, sensitive to metalaxyl. One isolate obtained from a table potato crop was found to be A2 mating type and it had intermediate resistance to metalaxyl. The seed used to grow this crop was brought from BC. An intermediate level of resistance to metalaxyl was found in 7 isolates, 2 of which were from tomato plants from home gardens. Importation of pototo seeds and tomato seedlings from areas with A2 mating type could lead to sexual reproduction in the fungus.

A major outbreak of late blight was reported from southern Alberta in 1992 (Howard et. al., 1993), and very little occurred in 1993. A severe outbreak of late blight in the north-central potato growing areas of Alberta in 1994 translated into high numbers of infected tubers in many storages. As a control strategy, growers were advised to keep their storages very cool and well aerated. They were also advised to grade out infected tubers early in the spring so that the culls would freeze out in the open and be buried during spring tillage operations.

ACKNOWLEDGEMENT: The Potato Growers of Alberta provided partial funding for conducting the storage survey.

REFERENCES:

1. Howard, R.J. *et. al.* 1993. Potato late blight survey in southern Alberta - 1992. Canadian Plant Disease Survey 73:106-108.

2. Bisht, V.S. *et. al.* 1994. Late blight of potato in Alberta - 1994. Canadian Plant Disease Survey 75:171-178.

TABLE 1. Occurrence* of late blight infected tubers in potato storages in Alberta, 1994.

	Storages			Tuber infection	
	Surveyed	No. with late blight	% with late blight	Incidence (%)	Range (%)
North-central	19	14	74	5.3	0-33
Central	10	4	40	0.8	0-10
Southern	28	4	14	1.8	0-24

* Storages in the three regions of Alberta were surveyed between 7 December 1994 and 13 January 1995.

TABLE 2. Tuber infection with late blight in relation to the usage of fungicides in potato fields in Alberta, 1994.

Region	Fungicide[1] used	No. of farms	No. of samples	% tubers infected	Range (%)
North-central	Yes	14	51	4.0	0-22[2]
	No	5	18	9.0	0-33[3]
Central	Yes	6	21	0.3	0-5
	No	4	10	1.9	0-10
Southern	Yes	25	56	0.4	0-20[4]
	No	3	9	5.4	0-24

1 Fungicides used were Bravo 500 or Dithane DG alone or with Ridomil MZ.
2 High incidence because some of the spray programs could not keep pace with the disease progress in the field.
3 Levels of tuber infection would have been higher, but many highly diseased fields were not harvested.
4 In spite of the use of Ridomil MZ, the disease incidence was high. An intermediate resistance to metalaxyl was noted. The seed used to grow the crop from which this sample was obtained was imported from British Columbia.

TABLE 3. Results of the mating type and metalaxy sensitivity study on Alberta isolates of the late blight fungus.[1]

Total isolates tested	107[2]	
Mating type		
A1	106	(99.1%)
A2	1	(00.9%)[3]
Metalaxyl reaction		
Sensitive	100	(93.5%)
Intermediate resistance	7	(6.5%)
Resistant/insensitive	0	

1 Results obtained from Charlottetown Research Station, Agriculture & Agri-Food Canada.
2 Two of the 107 isolates were obtained from tomato plants; also two isolates in this study were from table stock tubers in the potato storages.
3 This isolate was obtained from table stock tubers in potato storage in a southern Alberta farm. It was intermediate in its sensitivity to metalaxyl. The source of the seed, used to grow the crop from which the isolate was obtained, was British Columbia.