Cereals

CROP: Barley

LOCATION: Central Alberta

NAME AND AGENCY:
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TITLE: BARLEY DISEASE SURVEY IN CENTRAL ALBERTA, 1987

METHODS: Twenty-four barley fields were surveyed in early August 1987 in the counties of Ponoka, Lacombe, and Red Deer, which form part of Census Division 8. This was one field surveyed per 25,000 acres sown. Each field was traversed in an inverted V and sampled at five sites about 20 paces apart. Diseases were identified by visual symptoms. In addition unusual conditions were noted.

Disease severity was assessed as follows:

trace	= < 1%
slight	= < 5%
moderate	= 5–25%
severe	= 25–100%

RESULTS: Common root rot (Cochliobolus sativus and Fusarium spp.) was the most prevalent disease with 100% incidence. Levels were low this year with **30%** of the fields in the slightly diseased category and the rest with only trace amounts. Loose and covered smut (Ustilago nuda, U. nigra and U. hordei) continue to be common, each infecting **33%** of all fields in trace amounts. Leaf diseases were very wide spread this year after a cool, wet July. Net blotch (Pyrenophora teres) was the leaf disease most often observed with 91% of the fields infected, versus 67% for scald (Rhyncosporium secalis). But scald symptoms were more severe with **33%** of all fields rating moderately diseased on the upper leaves (5–25%) in comparison to 25% for net blotch. Septoria leaf blotch (Septoria passerinii) was present on 25% of the fields with 1 field in the moderate category. About 12% of the fields surveyed had BYD symptoms in low amounts.

COMMENTS: In addition to the survey results there were several reports of Diamond barley exhibiting small heads with very light kernels. Examination of these plants showed evidence of common root rot on the above ground crown tissue. This may be a previously unnoticed characteristic of Diamond to be on the lookoutfor.

CROP: Barley

LOCATION: Saskatchewan

NAME AND AGENCY:
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TITLE: DISEASE SURVEY OF BARLEY FIELDS IN N.E. SASKATCHEWAN

METHODS: Forty seven barley fields were surveyed between June 29, 1987 and July 27, 1987 in crop districts 5b, 8a, 8b and 9a in N.E. Saskatchewan. The fields surveyed were selected at random in each crop district. One plant was selected every ten paces ten times in each field. Diseases were identified according to visual symptoms expressed on the plants and findings were recorded on a standard format sheet. Root rot severity was assessed as for wheat, according to the lesions of the subcrown internode where 0 = Healthy, 2 = Trace, 5 = Moderate, and 10 = severe (1, 2). All other diseases were assessed on the basis of percentage of leaf or stem area affected (3). Results for each disease were totaled and averaged over the total number of samples and fields surveyed to give the Disease Index. Percentage of fields affected was calculated by dividing the number of fields in which the disease was noted by the total number of fields surveyed. Any symptoms that were not recognized in the field were returned to the lab for incubation and identification if possible. Diseases listed as trace (T) were found in the field but not in the sampled plants.

RESULTS AND COMMENTS: In the table below loose smut (Ustilago nuda) disease index is the result of observations of percentage of heads infected over entire fields, rather than over the ten sampled plants in a field. This resulted from the disease being easily noted in the field, but never being in among the 10 randomly selected plants. The table also shows that net blotch (Drechslera teres) was the most severe disease found in a high percentage of fields and the spot biotype (4) was the most prevalent. Root rot (Bipolaris sorokiniana) followed in severity, but was found in every field surveyed. Scald (Rhynchosporuim secalis) was found in low levels in approximately two thirds of the fields surveyed. Other diseases such as Speckled leaf blotch (Septoria passerinii), loose smut (U. nuda), covered smut (Ustilago hordei), and spot blotch (Bipolaris sorokiniana) were found in low levels in a few fields.

REFERENCES

(1) Ledginham, R.J., et. al. 1973
Wheat losses due to common root rot in the Prairie Provinces of Canada, 1969–71. Can. Plant Dis. Surv. 53(3):113-122.

(2) Tinline, R.D. 1986
Agronomic practices and common root rot in spring wheat. Effect of depth and density of seeding on disease. Can. J. Plant Pathol. 8(4):429-435.

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A Manual of Assessment Keys for Plant Diseases.
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New types of virulence in Pyrenophora teres in Canada
Can. J. Plant Sci. 54(4):731-734.

Table. Barley Disease Survey in N.E. Saskatchewan, 1987

C.D.	Fields Assessed Number of Fields	Disease Index/% Fields Affected						
		Root Rot	Net Blotch	Scald	Speckled Leaf Blotch	Loose Smut	Covered Smut	Spot Blotch
5B	10	3.32/100.0	8.12/100.0	0.19/50.0	0.11/50.0	*1.00/20.0		
8A	14	2.81/100.0	6.04/85.7	0.98/64.3	0.27/57.1	*0.35/50.0	*T/14.3	
8B	12	3.68/100.0	10.79/100.0	0.74/66.7	0.39/25.0	*0.17/35.3		0.68/33.3
9A	11	3.11/100.0	5.77/100.0	1.20/72.7	*T/9.1	*0.27/36.4		
Total or Avg.	47	3.23/100.0	7.68/96.4	0.78/63.4	0.19/30.3	*0.44/34.9	<.1/3.6	0.17/8.3

*Disease found in the field, but not in the sampled plants

CROP: Barley

LOCATION: Saskatchewan

NAME AND AGENCY:
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TITLE: SASKATCHEWAN BARLEY LEAF DISEASE SURVEY, 1987

METHODS: Kits to grow and sample 25 (at 20 locations) or 40 (at 7 locations) barley genotypes, chosen to exhibit differential disease infection were mailed to co-operators to be planted in fields where barley had been grown in 1986. Co-operators included School of Agriculture volunteers, previous co-operators, pedigree seed growers and other barley researchers. The 27 locations were well distributed over the N.W., N.E. and S.E. portions of Saskatchewan. Leaf samples were obtained from 22 of the 27 locations and 5 additional sites.

RESULTS AND COMMENTS: The primary objective was to assess the relative prevalence of the spot and net forms of net blotch **(Pyrenophora teres).** The spot form was the most prevalent. Varieties had different reactions at different sites indicating more than one biotype of the spot form exists. Additional results are summarized in Table 1.

Table 1. Occurrence of barley leaf diseases, Saskatchewan, 1987

Disease	Number of locations: Heavy infection	Trace infection	Comments
Spot form net blotch **(Pyrenophora teres f. maculata)**	16	11	- found at all sites
Net form net blotch **(Pyrenophora teres** f. **teres)**	6	11	- more prevalent in the eastern regions
Spot blotch **(Cochliobolus sativus)**	1	17	- heavy infection at one location near Regina
Scald **(Rhynchosporium secalis)**	9	7	- heaviest in the northern region
Leaf rust **(Puccinia hordei)**	4	7	- heaviest in the southeast region
Septoria **(Septoria** spp.)	0	15	- more evident at the northern locations

CROP: Barley

LOCATION: Manitoba

TITLE: Incidence of Plant Diseases in Barley in Manitoba in 1987

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METHODS: Results are based on 73 samples of barley submitted to the Plant Pathology Laboratory and field examinations.

RESULTS: Barley yellow dwarf was present at high levels in the Eastern and Central regions. Some fields examined in the Eastern region near Steinbach had close to a 100% level of infection. Barley yields on clay soils were 3200-3800 kg/ha which indicates a 10-20% yield loss that could be attributed to barley yellow dwarf virus. On sandy soils south of Steinbach the affect of BYDV was much greater. Many of these fields showed an obvious drought stress in early July which was accentuated by the BYDV infection. The average yield in these fields was 1600-2200 kg/ha. Yield losses appeared to be in the range of 20-30%.

Flame chlorosis virus disease was identified in the Russell area of the Northwest region. This newly reported virus disease was first detected in 1985 in the Minnedosa area. Leaf diseases in most cases were less prevalent than in 1986 on account of the drier conditions especially during June and early July.

The incidence of leaf rust and speckled leaf blotch or Septoria of barley was also higher than the previous year. There are indications that speckled leaf blotch, a stubble borne disease is increasing in occurrence and severity within Manitoba.

CROP: Barley

LOCATION: Manitoba

TITLE: LEAF DISEASES OF BARLEY IN MANITOBA IN 1987

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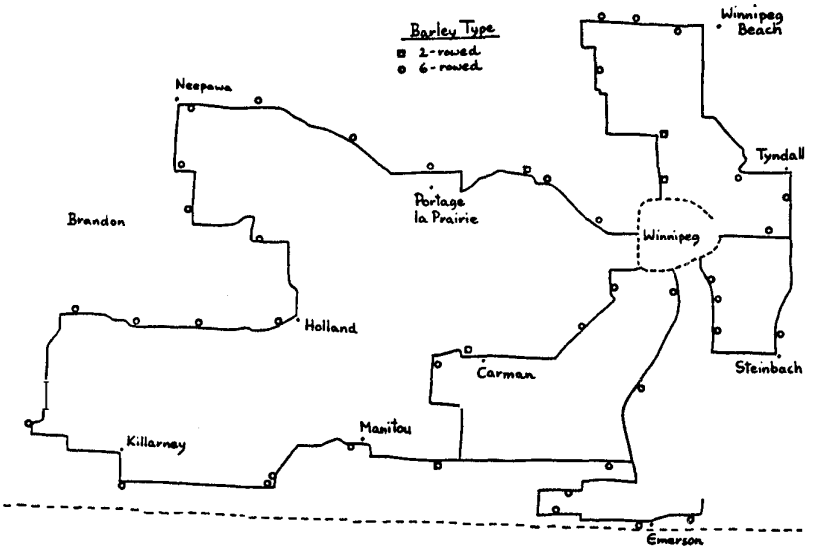
METHODS: 45 barley fields in south-central Manitoba were surveyed for leaf diseases from 15 to 31 July 1987 (Fig 1). Fields were selected at random along the survey routes. An inverted V transect about 100m long was sampled in each field and disease levels were assessed on 20-30 plants. Four categories were used: trace (<5% leaf area diseased); slight (5-15%); moderate (16-37%); and severe (38-100%). Ratings were given to both upper (flag and penultimate) and to lower leaves. Diseases were identified visually and/or subsequently in the laboratory.

RESULTS AND COMMENTS: The main leaf diseases were net blotch (Pyrenophora teres), spot blotch (Cochliobolus sativus), speckled leaf blotch (Septoria passerinii) and leaf rust (Puccinia hordei). Five fields (all in the eastern half of the surveyed area) were of two-rowed barley, but no distinctive pattern of disease incidence or severity was apparent between two-rowed and six-rowed barley types. Excluding leaf rust, leaf spot damage to upper leaves was rated as trace in 51% of fields, slight - 47%. moderate - 2% and severe - 0%. Damage was generally enhanced on lower leaves with 50% of fields having moderate or severe leaf spotting. Based on disease severity on lower leaves, leaf spots of barley were most prevalent in a band running south-east from Winnipeg to Steinbach, and one running north-south from east of Neepawa to the US border. The relatively low disease levels on upper leaves at the time of sampling (early to mid-dough, Zadoks' scale 83 - 86) suggest that yield losses due to leaf spots were generally minimal. Exceptions may have been the few fields that were rated as having moderate to severe leaf rust in addition to leaf spots. The incidence of speckled leaf blotch appears to be increasing.

Fig. 1



CROP: Barley

LOCATION: Manitoba and Saskatchewan

TITLE: Barley Smut Survey, 1987

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METHODS: In July, 1987, 217 barley fields were surveyed for *Ustilago hordei*, *U. Nigra* and *U. nuda* in Manitoba and Saskatchewan (Fig. 1). Fields of barley were selected at random at approximately 15 km intervals, depending on the frequency of the crop in the area. An estimate of the percentage of infected plants (i.e. plants with sori) was made while walking an ovoid path of approximately 100 m in each field. Levels of smut greater than trace were estimated by counting plants in a 1 m^2 area at at least two sites on the path. *U. nuda* and *U. nigra* were differentiated by observing germinating teliospores wifh a microscope.

RESULTS: See Table 1. Smut was found in 81% of the fields examined. The average level of infection was 1.6%. One field in north-western Manitoba had 40% covered, 8% false loose and 2% loose smut.

COMMENTS: The level of infection was the highest found in the last 25 years. Weather conditions appeared to favour infestation of seed and therefore high levels of smut again in 1988.

ACKNOWLEDGEMENT: The south-western loop (Fig. 1) was surveyed by J. Nielsen.

Table 1. Incidence of smut on barley, 1987

Province	Crop	% fields affected *U. hordei*	*U. nigra*	*U. nuda*	Mean % infected plants
Manitoba	2 row	21	29	50	1.7
	6 row	26	43	67	2.0
Saskatchewan	2 row	32	16	29	0.4
	6 row	37	21	83	1.6

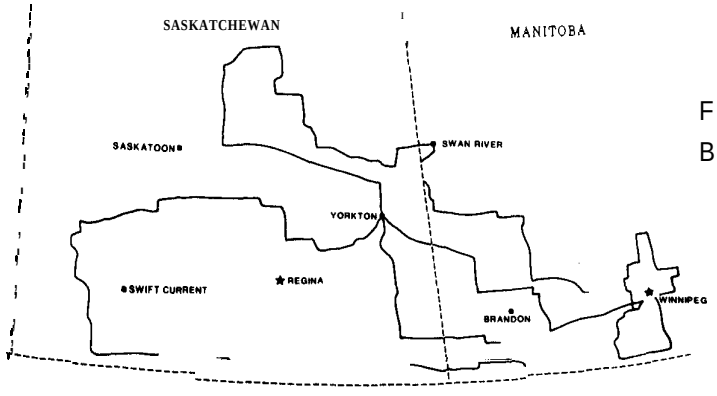

Figure 1.
Barley smut survey routes, 1987

CROP: Oats

LOCATION: Central Alberta

NAME AND AGENCY:
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TITLE: OAT DISEASE SURVEY IN CENTRAL ALBERTA, 1987

METHODS: Four oat fields were surveyed in August 1987 in the counties of Ponoka, Lacombe and Red Deer, which form part of Census District 8. This was approximately one field surveyed per 26,000 acres sown. Each field was traversed in a inverted V and sampled at 5 sites about 20 paces apart. Diseases were identified by visual symptoms. In addition, unusual conditions were noted.

RESULTS AND COMMENTS: Oats continues to be the most disease free cereal in Central Alberta. Blast was, as usual, the most common disease with 75% of all surveyed fields infected. Levels were generally < 1%with the exception of one field with 5% of the florets blasted. Septoria leaf blotch (Septoria avenae) was noticed in 2 of the surveyed fields with levels less than 5%"

CROP: Oats

LOCATION: Manitoba and Saskatchewan

TITLE: OAT CROWN RUST SURVEY, 1987

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METHODS: The occurence and severity of oat crown rust in Manitoba and eastern Saskatchewan was determined by frequent examination of commercial oat fields or stands of wild oats (Avena fatua L.), beginning in Manitoba in late June, 1987. The extent of the infections was determined in twenty-eight commercial oat fields in Manitoba in July and August, and four in Saskatchewan in August. Rust samples were collected from wild oats and from susceptible cultivars grown in farm fields and uniform rust nurseries for race identification in the greenhouse. The rust nurseries were located near Woodmore, Brandon, Morden, and Dauphin, Manitoba, and Regina, Indian Head, and Scott, Saskatchewan.

RESULTS AND COMMENTS: Crown rust was first found in trace amounts in Manitoba on June 26, 1987. The inoculum arrived about two weeks earlier than usual, but the development of the rust following the initial infections was slow and uneven because of dry conditions. By early August crown rust was widespread on wild oats in Manitoba, with the heaviest infections occurring in the southern part of the Red River Valley. However, most of the commercial oats grown in Manitoba in 1987 are highly resistant to the prevalent races of the rust. Only three of the twenty-eight commercial oat fields examined were found to have infections and these were light. Trace to light infections were found in two of the four commercial oat fields in eastern Saskatchewan. The race identification study is under way.

CROP: Oats

LOCATIONS: Manitoba. Saskatchewan, Alberta

TITLE: OAT STEM RUST SURVEY IN THE PRAIRIE PROVINCES. 1987

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METHODS: The extent of oat stem rust (Puccinia graminis f.sp. avenae) infection in the prairie provinces was determined by inspection of stands of wild oats (Avena fatua L.) and where possible, commercial oat fields. Most oat cultivars planted in Manitoba and eastern Saskatchewan are resistant to the prevailing western races of P. graminis avenae, thus most information was derived from wild-oat infections and from nurseries planted in Woodmore, Brandon. Morden and Dauphin, Manitoba and Regina. Indian Head and Scott, Saskatchewan. A survey into Alberta was made in late September where late fields of cultivated oats and wild oats were inspected. Surveys in Manitoba began in late June and continued through August, and in Saskatchewan in August and September. About 450 samples were collected for physiologic race analysis.

RESULTS AND COMMENTS: Oat stem rust was first found in trace amounts in southern Manitoba on July 23. and increased gradually until the second week of August. when the disease began to increase rapidly. However, most commercial oats in Manitoba were not affected due to their resistance, and most crops of susceptible cultivars ripened before extensive damage occurred. Some late fields of susceptible cultivars likely suffered some damage due to the sudden increase of stem rust, brought on by warm and humid weather. By September oat stem rust occurred continuously from Manitoba to southern Alberta, but infections through Saskatchewan and Alberta were light to moderate, and most fields had been harvested. No oat stem rust was found in central Alberta.

The analysis of the occurrence and distribution of physiologic races is currently in progress.

CROP: Spring Wheat

LOCATION: Saskatchewan

TITLE: LEAF DISEASES OF SPRING WHEAT IN SASKATCHEWAN IN 1987

NAME AND AGENCY:
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METHODS: Disease assessment was made on experiments conducted at Saskatoon, Shellbrook, Paddockwood and Weirdale. The experimental design was a randomized complete block with six replications. Each replication consisted of eight cultivars: Neepawa, Kenyon, Park, Oslo, Pembina, Wildcat, Potam and Columbus. Ten random plants from each plot were sampled on August 4 at Paddockwood and Weirdale, August 5 at Shellbrook and August 11 at Saskatoon. Flag leaves of these plants were rated for leaf-spotting diseases, using the Horsfall-Barratt scale. Pathogens causing the leaf-spotting diseases were identified. On July 30, a soft white spring wheat yield trial at Outlook was rated for leaf-spotting diseases. The disease assessment was made on two replications. Each replication consisted of 25 genotypes. A random sample of leaves were collected for the identification of pathogens causing the leaf-spotting diseases.

RESULTS AND COMMENTS: Occurrences of leaf diseases in spring wheat at five sites are presented in Table 1. At the time of disease assessment, septoria nodorum blotch was the predominant leaf disease at Outlook, Saskatoon, Paddockwood and Weirdale. At Shellbrook, both septoria nodorum blotch and tan spot were the main leaf diseases. At Paddockwood, Shellbrook and Weirdale, tan spot was the predominant leaf disease in early summer. Septoria tritici blotch started to appear in July and by mid-August was as prevalent as septoria nodorum blotch at Shellbrook. Leaf rust appeared in late summer at Outlook, Saskatoon and Weirdale.

At all sites, the plants were severely infected with leaf-spotting diseases, resulting in premature senescence of leaves. Severity of the leaf-spotting diseases was higher at the northcentral sites than at Saskatoon and Outlook. Head infection (average severity 10-25%) by **Leptosphaeria nodorum** was common throughout northcentral Saskatchewan.

Table 1. Occurrences of wheat leaf diseases at five sites in Saskatchewan in 1987.

Site	Disease
Outlook	SNB, TS and LR
Paddockwood	SNB, TS, STB and PM
Saskatoon	SNB, TS, STB, SAB and LR
Shellbrook	SNB, TS and STB
Weirdale	SNB, TS, STB, PM and LR

SNB = Septoria nodorum blotch; TS = tan spot; LR = leaf rust;
STB = Septoria tritici blotch; PM = powdery mildew;
SAB = Septoria avenae blotch.

CROP: Wheat

LOCATION: Saskatchewan

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TITLE: DISEASE SURVEY OF WHEAT FIELDS IN N.E. SASKATCHEWAN

METHOD: Sixty five wheat fields were surveyed for disease between June 29, 1987 and July 27, 1987 in Crop districts 5b, 8a, 8b and 9a in N.E. Saskatchewan. Fields surveyed were selected at random in each crop district. One plant was selected every ten paces, ten times in each field. Diseases were identified according to visual symptoms expressed on the plant and findings were recorded on a standard format sheet. Root rot severity was assessed based on a scale where 0 = Healthy, 2 = Trace, 5 = Moderate, and 10 = Severe according to the lesions found on the subcrown internode. (1, 2) All other diseases were assessed on perecentage of leaf or stem area affected (3). Results for each disease were totalled and averaged over the total number of samples and fields surveyed to give the Disease Index. Percentage of fields affected was calculated by dividing the number of fields in which the disease occurred by the total number of fields surveyed. Any symptoms that were not recognized in the field were returned to the lab for incubation and identification if possible. Diseases listed as trace (T) were found in the field, but not in the sampled plants

RESULTS AND COMMENTS: Septoria blotch (Septoria sp.) was the most severe and widespread disease followed by Tan spot (Drechslera tritici-repentis) and Root rot (Bipolaris sorokiniana). "Although Tan spot was found in fewer fields than Root rot, it had a higher disease index. Other diseases such as Powdery mildew (Erysiphe graminis), leaf rust (Puccinia recondita) and loose smut (Ustilago tritici) were found in a few fields, but in very low amounts.

Table. Percentage of Fields Affected and Severity of Diseases

	Field Assessed	Disease Index/% Fields Affected					
C.D.	Number of Fields	Root Rot	Septoria	Tan Spot	Powdery Mildew	Leaf Rust	Loose Smut
5B	17	1.57/100	9.07/100	1.12/82.4			*T/5.9
8A	12	1.43/83.3	11.75/83.3	1.64/75.0	0.82/8.3		
8B	15	2.90/93.3	14.62/100.0	7.27/86.7	0.51/6.7	0.08/20.0	
9A	21	2.27/100	5.47/100	5.68/61.9	1.37/28.6		*T/14.3
Total or Avg.	65	2.04/95.4	10.23/96.9	3.93/7.54	0.68/12.3	<0.1/4.6	<0.1/6.2

*T Disease found in the field, but not in the sampled plants

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(3) James, C. 1971
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Canada Dept. of Agriculture #1458

CROP: Spring Wheat and Spring Barley

LOCATION: Central Saskatchewan

TITLE: DISEASE SURVEY OF IRRIGATED CEREALS IN SASKATCHEWAN IN 1987

NAME AND AGENCY:
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(The support of the Saskatchewan Agriculture Development Fund is acknowledged).

METHODS: From Riverhurst to Warman along the South Saskatchewan River and associated irrigation canals, 20 fields of spring wheat and four fields of spring barley were surveyed three times during the growing season for diseases by collecting 40 plants from 10 sites in each field. All fields were being irrigated with a center pivot system. Sampling began inside the outside wheel track of the pivot and a diamond pattern was used with each collection site being 10 m apart. Individual plants were rated for foliar diseases using a 0–9 scale (Couture, L. 1980. Can. Plant Dis. Surv. 60:8-10). Common root rot was rated on subcrown internodes by scoring percent discoloration using the Horsfall–Barratt system. At harvest time, the same fields were visited again to collect head samples. These were used to assess for head discoloration and after threshing, kernel discoloration. Representative samples from leaves, crowns and heads were saved for detailed observation and/or plating to determine casual agents.

RESULTS: Plant samples were taken on the following dates with growth stages according to Zadoks et al. given in brackets: June 17, 18 (G.S. 20–31) then again on July 8, 10 (G.S. 45–69) then again on July 28, 30 with two fields on August 5 and one each on August 16 and 17 (G.S. 71–88). For these three times the average rating for foliar diseases in barley was 0.7, 2.3 and 6.7, respectively, and for wheat ratings were 1.0, 3.2, and 6.7, respectively. A 6.7 rating indicates 10–25% symptoms on upper leaves and greater than 50% symptoms on middle and lower leaves. On the first dates in wheat, 12 fields had plants showing leaf mottling symptoms affecting about 10% of the leaf area and up to 25% of the leaf area in one field. This symptom was not observed

later in the season. The average ratings for common root rot on barley were 3.0, 9.8 and 18.0, respectively, and 4.2, 10.0 and 15.6, respectively, on wheat. Prematurity blight was observed in low levels in two wheat fields. Take-all occurred in six wheat fields with an average of 8%of plants affected but the disease was not severe in that plants were not killed. Head samples were collected on August 25 and September 02 from only 18 wheat fields. All the other fields had been combined., The average head discoloration (glume blotch symptoms) was 2%, and 3% of kernels showed smudge/black point symptoms. Tombstone and pink kernels occurred in five fields of wheat but with less than 2% affected kernels. Loose smut occurred in three wheat fields at levels less than 2% affected plants. Determination of the causal agents of disease symptoms on foliage, crown and heads has not been done yet.

CROP: Wheat

LOCATION: Central Alberta

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TITLE: WHEAT DISEASE SURVEY IN CENTRAL ALBERTA, 1987

METHODS: Twelve wheat fields were surveyed in early August 1987 in the counties of Ponoka, Lacombe and Red Deer, which form part of Census District 8. This was one field surveyed per 9,000 acres sown. Each field was traversed in an inverted V and sampled at five sites about 20 paces apart. Diseases were identified by visual symptoms. In addition, unusual conditions were noted.

Disease severity was assessed as follows:

trace	=	$\leq$ 1%
slight	=	$\leq$ 5%
moderate	=	5–25%
severe	=	25–100%

RESULTS: Common root rot (Cochliobolus sativus and Fusarium spp.) was present in every field surveyed but only in trace amounts. Septoria leaf blotch (Septoria complex) was also present in every field with 42% of the fields showing moderate (5–25%) leaf damage. As well, 42% of all fields had 'septoria glume blotch with 40% of them moderately diseased. Both take-all (Gaeumannomyces graminis) and stem melanosis (Pseudomonas cichorii) were seldom observed and leaf rust (Puccinia recondita) occurred only rarely in the southern portions of the region. Stripe rust (Puccinia striiformis) was not observed at all. Powdery mildew (Erysiphe graminis) was common (42%) in trace amounts.

COMMENTS: The cool, wet July undoubted contributed to the amount of septoria leaf and glume blotch encountered.

CROP: Winter wheat

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LOCATION: Saskatchewan

TITLE: FOLIAR DISEASE SURVEY OF WINTER WHEAT IN SASKATCHEWAN, 1987

METHODS: From mid-May to mid-July, 96 winter wheat fields across Saskatchewan were surveyed for foliar diseases in 1987. Each field was sampled once early in the season (plants at Zadoks growth stage 18–38) and again after flag leaf emergence (Zadoks G.S. 54–71). For each sample from each field, 40 plants were collected in a diamond-shaped pattern (about 0.4 ha) and individually rated for foliar diseases present. Disease in the early sample was recorded as % plants with trace symptoms. For the second sample Couture's rating scale was used. The effect of the previous year's crop on development of leaf spotting diseases was examined.

RESULTS AND COMMENTS: Leaf spot was present in most fields in trace amounts in the first sample. Crop District 5 had the highest average number of plants infected per field, with 45%, followed by C.D. 3 (29.3%), C.D. 8 (25%), C.D. 2 (18.9%), C.D. 6 (16.3%), C.D. 1 (12.9%) and C.D. 4 (1.25%). In C.D. 8, an average of 28.2% of the plants sampled per field had trace amounts of powdery mildew in the early sample. Leaf spot incidence increased to close to 100% by the second sample and its severity also increased. C.D. 5 had the highest average severity (a rating of 6) (5% of the upper leaf area diseased). C.D.'s 1, 2, 3, 6, and 8 had average leaf spot severity ratings in the range of 4–5 (2–10% of the middle leaf area diseased) and C.D. 4 had the lowest (2.5) (5% of lower leaf area diseased). Powdery mildew was present with high severity in some fields in C.D.'s 5 and 8. Leaf rust was found in trace amounts in C.D.'s 5 and 8. Powdery mildew and take-all were considerably less prevalent and severe due to very dry conditions in the northeastern part of the province where these diseases are commonly a problem. Fields seeded into canola stubble or summerfallow had fewer plants with leaf spot symptoms in the early sample but no significant differences were found in leaf spot severity among fields with different previous crops in the second sample. Data are currently being gathered to determine the effect of 2- and 3-year previous cropping history on initial disease development. Determination of the causal agents of the leaf spotting.. diseases has yet to be completed.

REFERENCE: Couture, L. 1980. Assessment of severity of foliage diseases of cereals in cooperative evaluation tests. Can. Plant Dis. Surv. 60: 8–10.

CROP: Wheat, barley and oats

LOCATION: Manitoba, Saskatchewan and Alberta

NAME & AGENCY
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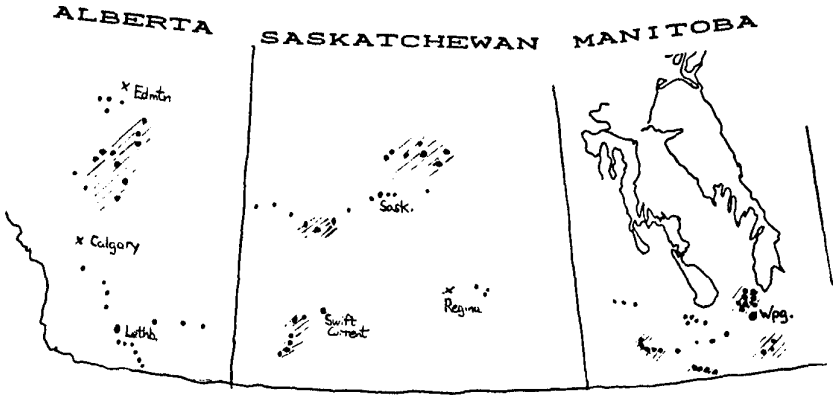
TITLE: BARLEY YELLOW DWARF SURVEY IN WESTERN CANADA

METHODS: Ninety-four cereal grain fields were surveyed from mid-June to mid-July, 1987 in locations as shown by dots on the map below. Barley yellow dwarf (BYD) was first tentatively identified in stands of bread- and durum wheat, barley and oats by visual symptoms, and representative samples of transplants and detached leaves with and without symptoms were collected for later analysis by aphid transmission and serological assay (ELISA). At 49 locations, representing all the regions examined in the survey, fields were traversed along the paths of diagonals and 50–100 leaf samples collected at random for later analysis of individual leaves by ELISA.

Initial estimates of severity were based on visual assessment of the proportion of visibly afflicted plans and the degee of stunting and loss of vigor of afflicted plants compared to escapes from the same field.

RESULTS AND COMMENTS: BYD incidence and severity were at historically high levels for cereal-growing regions of western Canada. In 'hot spot' areas (shaded areas on map) of southeastern Manitoba and north central Saskatchewan, as high a proportion as 100% of plants in a field were infected. Losses attributable to BYD ranged from 10-15% for crops on clay soils (Red River Valley) where drought stress was not severe, through 20–30% on sandy soils (south of Steinbach, Manitoba), to 80–90% for some durum wheat fields (near Domremy, Saskatchewan) where BYD infection at early plant growth stages had predisposed crops to potentiated drought stress and foliar fungal infections.

The principal factor that probably accounted for the much higher incidences of BYD in 1987 than in any of the previous three years was the arrival earlier than usual of aphid inoculum on strong southerly winds in late May and early June when many crops were at vulnerable early plant growth stages. In the Calgary area, snow in early June led to replanting of some fields, and these were almost completely free of BYD.



CROP: Wheat

LOCATION: Manitoba - Saskatchewan

NAME AND AGENCY:
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TITLE: INCIDENCE AND SEVERITY OF LEAF AND STEM RUST OF WHEAT IN THE EASTERN PRAIRIES IN 1987

METHODS: We examined more than 90 commercial fields of winter and spring wheats for severity and incidence of leaf and stem rust of wheat. Readings and samples were also collected at specially planted wheat nurseries throughout the eastern prairies.

RESULTS AND COMMENTS: Initial and secondary spread of leaf rust was easily found on winter wheat at Morden and Portage la Prairie, Mb. in early June, indicating that initial infection had occurred in mid-May. Leaf rust was widespread by early August, reaching high levels of infection in winter wheat and susceptible hard red spring cultivars in Manitoba and Saskatchewan. Neepawa and Katepwa were moderately resistant to moderately susceptible when examined in commercial fields in early August. Yield in these cultivars was not affected, however, as grain filling in the heads occurred before infection reached high levels. There was no or little leaf rust on cultivars Columbus, Roblin, Kenyon and durum varieties. Yield reduction due to leaf rust was minimal in 1987. Preliminary virulence studies indicate increasing levels of virulence on Lr24 and traces of virulence on Lr26.

Stem rust was first found on winter wheat at Moosomin, Saskatchewan. July 2nd, several weeks earlier than usual. Infections reached trace to light amounts on winter wheat and susceptible spring wheat cultivars over all of Manitoba and eastern Saskatchewan. Crop loss due to stem rust, was minimal, even in susceptible winter wheat. Preliminary virulence studies indicate race C53, the dominant race in the prairies for many years, still comprises 90% of the stem rust population.

CROP: Wheat

LOCATION: Manitoba

TITLE: FUSARIUM HEAD BLIGHT OF SPRING WHEAT IN MANITOBA IN 1987

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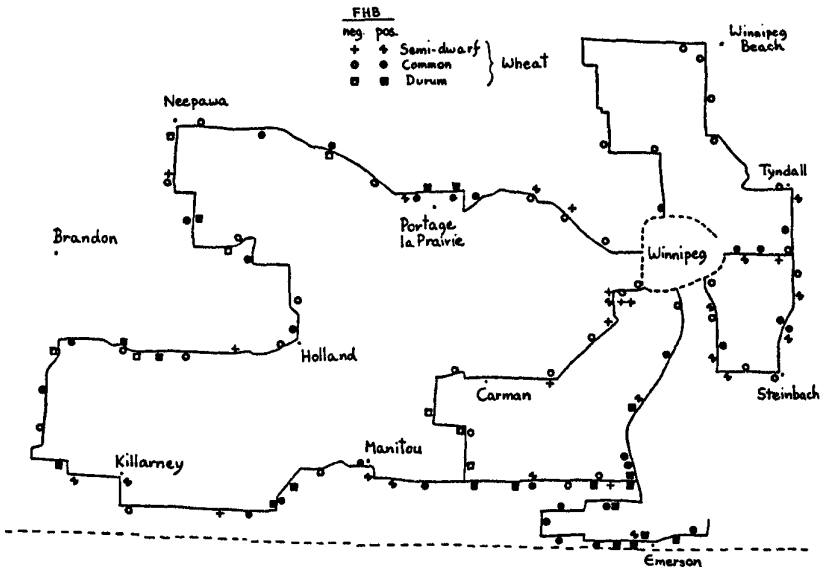
METHODS: 122 fields of common, durum and semi-dwarf wheats in south-central Manitoba were surveyed for Fusarium head blight (FHB) from 15 to 31 July 1987 (Fig. 1). Fields were selected at random along the survey routes. FHB was identified visually by sampling an area of about 50 x 30m at the edge of each field. When disease was evident at higher than trace levels four samples of at least 50 adjacent wheat heads were examined for FHB. Disease levels were categorized as: trace (tr - 0.5% heads infected); slight (0.5 - 5.0%); moderate (6 - 20%); and severe (>20%). Diseased heads were collected for pathogen identification.

RESULTS AND COMMENTS: The incidence of FHB in all fields was 55%. It was found in 46% (32 of 69) of common, 72% (18 of 25%) of durum, and 61% (17 of 28) of semi-dwarf wheat fields. FHB was widespread but was most concentrated in the area south of Winnipeg near the US border and was least common in the Interlake north of the city (Fig. 1). Most fields had FHB at only trace levels. The others, 10 durum and 2 common wheat fields, had FHB at slight (7 fields), moderate (4) or severe (1) levels. The latter two categories comprised only of durum types. Most fields with higher than trace disease were in the region directly south of Winnipeg and within 40km of the US border. The exception was of one durum field south of Neepawa with 10% FHB. Severity of infection on individual heads ranged from a single spikelet to the entire head. The higher

Fig. 1



CROP: wheat

LOCATION: Manitoba

TITLE: Incidence of Plant Diseases in Wheat in Manitoba in 1987

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METHODS: Results are based on 150 samples of wheat submitted to the Plant Pathology Laboratory and field examinations.

RESULTS: Thirty-four percent of samples were analysed for seed borne diseases, primarily Fusarium sp. on 1986 harvested seed, from the Central region adjacent to the Red River Valley. The highest levels of Fusarium occurred on Durum. Some seed lots showed as much as 60% level of Fusarium mainly a combination of F. graminearum and F. sporotrichioides. The average percentage of Fusarium was 23.3%. The Fusarium toxins, vomitoxin and HT2 were detected in some durum samples. Twenty-seven percent of samples showed Septoria sp. but the levels were less than 1986. An additional 6% of samples had glume blotch. The incidence and severity of tan spot and septoria in wheat in 1987 was much lower than in 1986. There has been a trend however in the past 2 years towards an increased incidence of Septoria, whereas tan spot now accounts for about two thirds of the leaf disease problems observed. Fourteen percent of samples showed root and crown rot. Five percent showed rust, primarily on winter wheat, but levels were much lower than 1986. Four percent of wheat samples were diagnosed as having barley yellow dwarf. Yield loss was less than 10%. Three percent of samples were affected by Fusarium head blight and three percent were affected by head moulds. Leaf rust was found at only trace levels on susceptible cultivars of spring wheat but was present at quite high levels on winter wheat in southern Manitoba. Loss from leaf rust in winter wheat was less than in 1986 because of the slower rate of development. Stem rust was not a problem on winter wheat in 1987.

CROP: Wheat

LOCATION: Manitoba

TITLE: LEAF DISEASES OF SPRING WHEAT IN MANITOBA IN 1987

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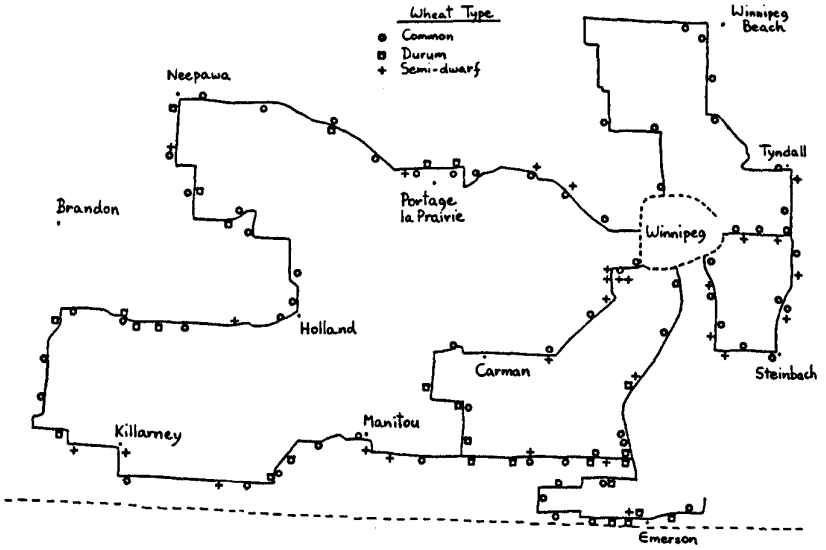
METHODS: 122 fields of common, durum and semi-dwarf wheats in south-central Manitoba were surveyed for leaf diseases from 15 to 30 July 1987 (Fig. 1). Fields were selected at random along the survey routes. An inverted V transect about 100m long was sampled in each field and disease severity was assessed on 20-30 plants. Disease levels were categorized as: trace (<5% leaf area diseased); slight (5 - 15%));moderate (16 - 37%); and severe (38 - 100%). Ratings were done on both the upper (flag) and lower leaves. Samples were collected for identification of the disease-causing pathogens.

RESULTS AND COMMENTS: The main diseases were septoria avenae blotch (Leptosphaeria avenaria f.sp. triticea) and tan spot (Pyrenophora tritici-repentis). Septoria nodorum blotch (Leptosphaeria nodorum) and septoria tritici blotch (Mycosphaerella graminicola) were found occasionally. These could not be differentiated with certainty on the basis of visual symptoms. Leaf spot severity was at trace levels in 32% of fields, slight - 49%, moderate - 18% and severe - 0%. The proportion of common, durum and semi-dwarf wheats with moderate disease severity was 17%, 32% and 7%, respectively. Damage was enhanced on lower leaves with 75% of fields rated in the moderate or severe category. Fields with severe leaf spot levels on lower leaves were scattered throughout the surveyed area. The relatively low disease levels on the flag leaf when sampled (late milk to early dough, Zadoks' scale 77-83) suggests that yield losses due to leaf spots were generally minimal. Septoria avenae blotch was more common than tan spot (3:1 ratio), the opposite to that found previously.

Fig. 1



CROP: Cereals

LOCATION: Ontario

NAME AND AGENCY:
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TITLE: CEREAL DISEASES IN ONTARIO, 1987

WEATHER: A relatively mild winter was followed by an early spring and an unusually warm sunmer; in most areas low precipitation in spring and early summer resulted in drought stress and reduced yield and test weight of most spring cereals. Foliar diseases were present early in the season but their development in most areas was suppressed by hot dry weather. Weather at harvest was generally excellent with no problems from sprouting or vomitoxin in soft white winter wheat.

Notable disease problems included dwarf bunt in winter wheat; powdery mildew in 6-row barley cultivars, including susceptibility of cv. Léger; and crown rust in oats, with the development and spread of a virulent race on formerly resistant OAC Woodstock and the appearance of other potentially dangerous new races in buckthorn-infested areas.

WINTER WHEAT: The acreage of winter wheat was much lower than usual because of unfavorably wet seeding conditions in the fall of 1986. Many fields were broadcast-seeded, and late-seeded crops were poorly established before winter. However, a combination of adequate snow cover, mild temperatures, and absence of a January thaw resulted in unexpectedly good survival. Snow molds caused light to moderate losses, with less plow-down than usual. Typhula incarnata T. ishikariensis, T. phacorrhiza, Microdochium nivale, and Myriosclerotinia borealis were involved. In Simcoe Co. survival was higher in drilled than in broadcast-seeded fields and desiccation stress in spring resulted in poor tillering and slow development. Late seedings and broadcast fields in several eastern counties also suffered from drought stress in early spring. Wheat spindle streak mosaic [WSSMV] was suppressed by the warm spring in the southwest, although symptoms were prominent in test plots at Ottawa. Powdery mildew [Erysiphe graminis] developed early and spread rapidly but was arrested by hot weather in most western counties; development was reported heaviest in fields that had been seeded to susceptible spring wheat in 1986. Manganese deficiency was widespread in dryer, lighter soils in the southwest. Leaf rust [Puccinia recondita] was light-moderate in most areas but moderate on upper leaves late in the season. Overwintered Septoria tritici infections were common in southwestern and eastern counties and in Perth-Huron, but development was slowed by dry, hot weather. Tan spot [Drechslera tritici-repentis] was generally light. Septoria glume blotch [S. nodorum] was widespread and moderate to severe in Perth-Huron and York-Simcoe. Take-all [Gauemannomyces graminis] was reported widely but was not severe in most fields. Yellow-dwarf [BYDV] was relatively light in all areas, although individual fields in Victoria and Northumberland showed up to 30% infected plants. Fusarium head blight [Fusarium graminearum] was light in most areas and no problems with mycotoxin levels were experienced in harvested grain.

Cocksfoot mild mosaic [CMMV] was detected in 18 of *26* fields of winter wheat in 16 counties in southern Ontario, but levels of infection were low (less than 12%). This disease is not regarded as potentially threatening at present, but inoculation tests have shown that while Fredrick is highly resistant or tolerant, newer cultivars are moderately susceptible (Augusta) or highly susceptible (Harus).

In a cooperative survey of winter wheat throughout southern Ontario, dwarf bunt was detected in 42 of 288 fields of pedigreed seed wheat in three counties but in only 1 of 308 commercial fields. Counties affected were Huron, Perth, and Simcoe.

SPRING WHEAT: The feed wheat Laval 19 and the western milling wheats Fielder, Katepwa, and Columbus were heavily infected by powdery mildew [Erysiphe graminis], but only a few pustules were noted on Max. Fungicide applications were considered cost-effective in some areas but not in others where mildew developed late on upper leaves. Septoria glune blotch and fusariun head blight were widespread and of moderate severity in fields east of Ottawa, especially in durum. In two adjacent fields of cv. Max, glune blotch was tr-light in the fall-plowed field and severe in the spring-plowed field. Leaf rust was not observed on resistant western cultivars, and incidence was late and generally light on susceptible cultivars. Septoria leaf spot and tan spot were moderate, especially on Max, and tan spot was most severe in second-year wheat crops. Take-all also was moderate in second-year wheat fields. Agropyron mosaic was detected in 5 of 8 spring wheat fields examined in the area east of Ottawa. This virus overwinters in Agropyron and is transmitted by windblown mites to wheat, causing infection about mid June. Warm dry weather in 1987 favored a buildup of mite populations. This disease is regarded as relatively minor, although in one field infection levels were high (17% visible symptoms) in late tillers produced from plants flattened by tractor wheels.

BARLEY: Relatively mild winter conditions resulted in good survival of winter barley crops in the main growing area. Yellow dwarf [BYDV] generally was less prevalent than usual, but moderate to severe levels were observed in two fields of winter barley in Middlesex Co. In spring barley, yellow dwarf levels were higher than usual in the Thunder Bay area, but elsewhere levels were generally low, reflecting low aphid populations in early summer and probably a low incidence of fall infection in winter cereals. Powdery mildew [Erysiphe graminis] was not a problem in winter barley or in 2-row barley, but it developed to moderate-severe levels on all 6-row barley crops in most areas, esoecially the south-central counties. The loss of resistance in the high-yielding cv. Léger is of concern. Scald [Rhynchosporium secalis] also was reported at moderate levels in Perth-Huron, Bruce-Grey, and York-Peel-Simcoe areas, especially in early-sown 2-row cultivars. Net blotch (Pyrenophora teres) was also reported in Bruce-Grey and some eastern counties; generally light infections of the spot form of net blotch were found on 2-row barleys. Manganese deficiency was noted in Norfolk-Brant-Wentworth-Elgin and in the New Liskeard area. In the northeast, scald was common, especially in

second-year barley crops, other leaf diseases were prominent in late-seeded fields, and scab [Fusarium spp.] was widespread. In the northwest, loose smut [Ustilago nuda], scald, and net blotch were reported by late June, and a high incidence of common root rot and head bliqht occurred in late August, especially on lighter soils. Pyrenophora-leaf stripe [Pyrenophora graminea] continues to be of concern in test plots and nurseries, but a field survey was not conducted.

OATS: In general, yield and test weight of oats were disappointing. Heat and drought stress resulted in high levels of blasting in the southwest. Red leaf (barley yellow dwarf virus) incidence and aphid populations were relatively low in most areas, except in Perth and Huron counties, where levels were moderate in some fields. Septoria leaf blotch and black stem (Septoria avenae) was light to moderate in some fields in the Niagara, central, and eastern areas where precipitation and high humidity occurred late in the season. The most important disease development in oats was the widening of the area in which the formerly resistant cv. OAC Woodstock was affected by crown rust. In 1986, isolates of Puccinia coronata virulent on OAC Woodstock were detected in trace amounts in localized areas of eastern Ontario. In 1987 light to moderate infections occurred at several locations in the eastern counties, and a moderate infection also was found in the Niagara-Haldimand area. In addition, other new races of P. coronata were detected in eastern Ontario that threaten all new rust-resixant cultivars now grown in western Canada. The continual development of new races of both stem rust and crown rust as a result of sexual recombination on alternate hosts in Ontario poses a serious threat to cereal production both in Ontario and elsewhere in North America where resistant cultivars are deployed. This situation will undoubtedly continue until efforts to control the populations of barberry and buckthorn are renewed.

CROP: Cereals

LOCATION: Quebec

NAME AND AGENCY: COUTURE, L., DEVAUX, A. and DOSTALER, A.
Agriculture Canada, Research Station
Ste. Foy, M.A.P.A.Q., Saint Hyacinthe, and
Universite Laval, Quebec

TITLE: HIGHLIGHTS OF CEREAL DISEASES IN QUEBEC IN 1987.

Weather conditions in southwestern Quebec up to the end of June were favourable for Fusarium head blight (F. graminearum) infections in spring wheat. Infections were observed in all regions and varied from 10 to 33% infected heads (average 19% heads and 5% spikelets) in cultivar Max in the Saint Hyacinthe region. Spring wheat Katepwa, as well as winter wheat cultivars which flowered earlier, were much less infected. Traces were also noticed in barley in southwestern Quebec.

From early July until the end of the season, very severe drought conditions in the Saint-Hyacinthe region caused a premature ripening of the heads (more than 30% in some fields of cv. Max) with symptoms much like those of take-all (Gaeumannomyces graminis). Take-all varied from less than 1% to 10% (average 8%) in surveyed winter wheat fields and from less than 1% to 8% (averaqe 3%) in surveyed spring wheat fields in the Saint-Hyacinthe region. It occurred also at light levels in barley in southwestern Quebec.

Leaf spot (Pyrenophora tritici-repentis mixed with Septoria nodorum) were observed in significant amounts (up to 19% necrosis on upper leaves) only late in the season when wheat plants were at the soft dough stage. Glume blotch (Septoria nodorum) was observed in slight quantities (less than 5% infected glumes) only in the Quebec City region and in the Eastern Townships.

Leaf rust of wheat (Puccinia recondita) prevailed at the late soft dough stage in significant quantities on susceptible cultivars in southwestern Quebec.

Early infection of powdery mildew (Erysiphe graminis) occurred in susceptible wheat cultivars like Katepwa (spring) and Yorkstar (winter) in southwestern Quebec. It was also light to moderate in barley in the same region.

Ergot (Claviceps purpurea) was widespread in barley fields in the Saguenay-Lac-Saint-Jean region. Its severity was such that it caused a large number of crops to be rejected or downgraded. It was also observed affecting about 0.1% heads in a field of Katepwa wheat at Saint Hyacinthe.

Net blotch (Pyrenophora teres) and scald (Rhynchosporium secalis) were widespread. Net blotch was moderately severe to heavy from southwestern Quebec to Lac-Saint-Jean; scald was fairly heavy in the Quebec City region. Spot blotch (Bipolaris sorokiniana) was light to moderate in southwestern Quebec. Bacterial blight (Xanthomonas campestris translucens) was found in some barley research plots.

Crown rust (leaf rust), caused by Puccinia coronata, was highly conspicuous west of Montreal where it was the most severe disease of oats. Elsewhere in

the province, its severity was very slight except in the Lower St. Lawrence and in the Saint Hyacinthe regions where it reached light to moderate levels.

Speckled leaf blotch, caused by Septoria avenae, was widely distributed in oat crops over the province. Its severity ranged from average to above average depending on regions.

Yellow dwarf, caused by the barley yellow dwarf virus (BYDV), was on the increase this year except in Abitibi where there was little. Its severity in oats was at least equal to the one of speckled leaf blotch and sometimes higher. It was most noticeable in eastern Quebec, in the Eastern Townships, and in the Lac-Saint-Jean region.

Various snow mould agents were detected in experimental plots and fields of winter cereals: Gerlachia nivalis, Sclerotinia borealis, and Typhula ishikariensis in wheat, triticale, and barley and Typhula incranata in wheat and triticale.

Smuts (Ustilago spp.) were usually very low in all crops.

CROP: Cereals

LOCATION: Prince Edward Island
New Brunswick
Nova Scotia

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C1A 7M8

TITLE: CEREAL DISEASE DISTRIBUTION AND SEVERITY IN THE MARITIME PROVINCES

WEATHER CONDITIONS: The 1987 growing season was considerably drier than normal during mid-summer and this contributed to a general lowering of disease severity. Rainfall at Charlottetown during July and August amounted to 7 mm and 40 mm compared to a 78 year average of 78 mm and 86 mm, respectively. This weather pattern was widespread throughout the Maritime Provinces excepting north-western New Brunswick which had more rainfall.

SPRING WHEAT: Spring wheat crops were not subjected to the normal disease pressures and little septoria glume and leaf blotch was detected on early seeded crops. All isolations from leaf blotch lesions on spring wheat yielded isolates characteristic of Septoria nodorum. Glume blotch symptoms were much reduced from previous years in all areas of the Maritimes with the exception of north-western New Brunswick. In north-western New Brunswick, glume blotch and fusarium head blight were more severe on spring wheat than in any other area of the Maritimes. This was attributed to the moist weather occurring in this area in July and early August. Fusarium head blight surveys indicated

that the most frequently isolated species from spring wheat heads were Fusarium poae, F. avenaceum, and F. sporotrichiodes. In north-western New Brunswick the moist environment favoured F. graminearum and F. avenaceum isolations from seed.

Powdery mildew, incited by Erysiphe graminis, was not a serious disease on spring wheat in 1987 with the exception of the cultivar, Katepwa.

Loose smut, incited by Ustilago tritici, was a more noticeable disease on spring wheat than in previous years although the level remained below 0.05% in field observations.

WINTER WHEAT: Winter wheat, like the spring wheat, was observed to have very low levels of septoria glume and leaf blotch. Levels of fusarium head blight were in general lower on winter wheat than spring wheat. Powdery mildew levels on the susceptible cultivars, Monopol and Absolvent were very low in fields in Nova Scotia where these cultivars are mainly produced. This was due to the widespread use of foliar fungicides, however disease levels on these and similar cultivars in untreated plot trials remained very high. Feed winter wheats were not affected by powdery mildew regardless of resistance levels since most of this crop is produced at much lower nitrogen fertility levels than cultivars destined for the milling trade.

Root diseases were more prevalent in 1987 than previous years and this may have been exacerbated by the dry weather. Take-all was particularly severe in research plots of winter wheat in the Truro area but to a much lesser extent in commercial fields.

Snow molds were not severe and winter survival throughout the Maritime Provinces was good. Where snow mold did occur, it was due primarily to Gerachia nivalis and to a lesser extent Typhula and Sclerotinia spp.

BARLEY: Spring barley production was enchanced by the low levels of leaf diseases recorded in all areas of the Maritime Provinces. Scald, incited by Rhyncosporium secalis was at relatively low levels and in general did not progress to the upper foliage. Net blotch, incited by Pyrenophora teres, was the predominant foliar disease on barley in the Maritimes. In general, however, impact on yield was not great with significant levels of disease only occurring during late stages of crop development, shortly before harvest. This was primarily due to low moisture levels in July and August when disease progression is usually greatest.

Common root rot was noticeably severe in fields of barley following barley in both New Brunswick and Prince Edward Island. This severity was not recorded when barley was planted following a non-cereal crop.

OATS: This species produced a healthy crop through out the Maritimes due to the reduction in severity of speckled leaf blotch incited by Septoria avenae. This was the only disease of consequence affecting the oat crop.