SURVEY OF THE

PREVALENCE OF COMMON PLANT DISEASES

IN THE

DOMINION OF CANADA

1920

FIRST ANNUAL REPORT

DIVISION OF BOTANY
EXPERIMENTAL FARMS BRANCH
DEPARTMENT OF AGRICULTURE

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Following the action taken at the first annual meeting of the Canadian Phytopathological Society, expressing the desirability of accummulating data on the annual prevalence of the commoner plant diseases, an attempt was made during the summer of 1920 to institute such a survey. The success of the project depended entirely upon the number of observers who would contribute. The plan devised and carried out this year consisted of two principles, first, to ask only those professionally engaged in botanical or pathological work to assist and, second, to have these observers submit individual field records. The invitation to collaborate in the survey was therefore sent to all those who it was thought would be interested and they were supplied with forms for making reports. The present summary is based upon the field data as obtained from these reports. It is regretable that very few reports were received from some districts and, in many cases, the number of observations made on some crops are too few to legitimately take these as average conditions. Fortunately, summaries were prepared by collaborators for Manitoba, Saskatchewan, Alberta and British Columbia, which give briefly the conditions in those provinces. In eastern Canada, outside the Niagara Fruit Belt (Lincoln and Wentworth Counties, Ontario) the information at hand for this report for the most part consisted of a few scattered field reports from which it is unsafe to draw conclusions. However, the number of reports received from these districts and the average are given as a matter of record. Profiting by the experience of the first year, it is hoped that a better report will be forthcoming for 1921.

W. H. Rankin

W. P. Fraser

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D I S E A S E S O F C E R E A L C R O P S

- DISEASES OF BARLEY -

Stem rust caused by Puccinia graminis

Very few reports on barley diseases were received from the eastern provinces. The figures on stem rust follow:

Que. One report, 25%

Ont. (E) One report, 5%

Ont. (N) Six reports, average of 18.7%

Man. Four reports, 2 slight, 1 medium, 1 severe.

"Black stem rust occurred commonly on barley; but most of the crop matured before serious damage was caused by the rust." Bisby.

"Black stem rust caused little damage to barley; but it developed very abundantly on the host." Connors.

Sask & Alta. "Stem rust, Puccinia graminis, was common on barley wherever rust was prevalent, but did little or no damage." Fraser and Bailey.

Leaf rust caused by Puccinia simplex

This rust was recorded in a few cases (determination of the fungus was not checked).

Que. One report, 40% of leaf surface affected.

Ont. (E) One report, 10% of leaf surface affected.

Ont. (N) Six reports, averaging 18.7%.

Man. Four reports, 2 very slight, 1 moderate, 1 severe.

Loose smut caused by Ustilago nuda

This smut was common in all provinces from which reports on barley diseases were received. While the losses were not large, the few figures obtained show that this smut is important.

P.E.I. One report, 18%.

Que. Ten reports, average of 5.2%.

Ont. (E) Two reports, average of 4.8%.

Ont. (N) Five reports, average of 1 %.

Man. Four reports, 1 slight, 1 moderate, 2 severe.

"This barley smut was quite common. The same consideration as mentioned for loose smut of wheat apply here also". - Bisby.

"Loose smut was a very common smut on barley, up to 5% was observed to occur." - Connors.

Sask. & Alta. "This smut was common on barley, but generally the percentage was small, averaging not more than 1% to 5%." Fraser and Bailey.

Covered smut caused by Ustilago hordei.

Only a few detailed reports on this smut were received:

Que. Two reports, average of 15%.

Ont. (N) One report, 1%.

Man. One report, slight.

"Little of this smut was found." - Bisby.

"Observed only twice." - Connors.

Sask. & Alta. "Covered smut was not so common as the loose smut but occurred in many places." Fraser and Bailey. Five reports from Alberta gave an average of 3.8%.

Stripe, spot blotch and net blotch, caused by Helminthosporium gramineum, H. sativum and H. teres.

Only a few detailed reports were received from the eastern provinces:

Que. Three reports, averaging 2%.

Ont. (E) One report, 40%.

Ont. (N) One report, 50% (total loss of several acres),

Man. "Stripe disease was quite serious the past year, being probably the worst barley disease. The other Helminthosporium diseases, spot blotch and net blotch were not found to be serious the past year." - Bisby.

"Stripe disease or leaf blight was very serious at Winnipeg. It was in evidence elsewhere; but the damage done was difficult to determine." - Connors.

Sask. & Alta. "Stripe disease was not rare, in some places quite severe."

"Spot blotch was quite severe in some places, but was not serious generally. It was not nearly as common or severe as in 1919."

"Net blotch was present in many fields, but did not seem to cause much injury except in some small experimental lots, where the seed had been imported". Fraser and Bailey.

Minor diseases of Barley.

"Bacterial blight (Ps. avenae) and Helminthosporium were common north of Sudbury, Ontario. Considerable loss in some fields where infection ran from 5. to 25%. " - Faull.

"Bacterium translucens was collected at Winnipeg; but search at other points of the province did not reveal any of the disease." Connors.

DISEASES OF CORN

Smut caused by Ustilago zeae

Smut was reported from all the provinces in about the usual percentages expected. The figures for Quebec and eastern Ontario are, however, very high and constitute a considerable loss if they truly represent average conditions.

N.B. Two reports, average 2%.

Que. Four reports, average of 4.3%.

Ont. (E) Four reports, average of 8.5%.

Ont. (S) Two reports, average of 1.0%.

Ont. (N) One report, "high percentage."

Man. "Smut was widely distributed, but caused probably less than one half per cent loss." - Bisby.

Rust (Puccinia sorghi) and root-rots (Fusarium) were reported by Dr. Bisby as not found this year in Manitoba.

DISEASES OF OATS

Stem rust caused by Puccinia graminis.

This rust was common in the eastern provinces but not serious if the reports received represent general conditions:

N.B. Two reports, average of 5%.

Que. Eleven reports, average of 9%.

Ont. (S) One report, 5%.

Ont. (N) Ten reports, average of 3%.

Man. Five reports, all slight.

"Occurred in small amounts but was not serious."
Bisby and Connors.

Sask. & Alta. "It was present in a few places, but it was not at all common. No collections were made in Alberta." - Fraser and Bailey.

Leaf rust caused by Puccinia coronata

This rust was reported as follows:

N.B. Four reports, average of 33% of leaf surface affected.

Que. Twenty-two reports, average of 16% of leaf surface affected.

Ont. (E) One report, 50% of leaf surface affected.

Ont. (S) Three reports, slight amount.

Ont. (N) Ten reports, average of 27% of leaf surface affected.

Man. Three reports, slight amount.

"Fairly common but caused little loss"

Sask. & Alta. "Rare in Saskatchewan. No collection made in Alberta." - Fraser and Bailey.

Smut caused by Ustilago avenae and U. laevis

From the reports received, loose smut of oats was common in the eastern provinces and caused considerable loss, ranging from 3% to 7%. Covered smut was reported as especially destructive in Quebec where an average of ten reports showed 17%. These specimens were not seen for identification. The following figures for oat smut were received:

P.E.I. Two reports, average 5%.

N.B. Four reports, average 12%.

Que. Thirty-three reports, average 6%.

Ont. (E) Eleven reports, average 5%.

Ont. (S) Five reports, average 5%.

Ont. (N) Fourteen reports, average 3.5%.

Man. "Oat smut caused some losses, perhaps 1% for the Province. Many growers treat their seed to avoid smut." - Bisby.

Sask. & Alta. "These smuts caused some loss, usuallyonly a small percentage." - Fraser and Bailey.

Minor diseases of oats.

Spikelet sterility.

"Occurred in about the usual amount." - Bisby.

Leaf spots.

"Bacterial leaf spots are common in some districts of Saskatchewan and Alberta." - Fraser and Bailey.

DISEASES OF RYE

Stem rust caused by *Puccinia graminis*

Ont. (N) Found in one case causing 80% infection.

Man. "Stem rust was not abundant on rye, and caused little or no damage." - Bisby.

"Stem rust was not abundant on rye". - Connors.

Sask. & Alta. "Stem rust was not common on rye and did no damage." - Fraser and Bailey.

Leaf rust caused by *Puccinia dispersa*

Ont. (S) Two reports of heavy infection.

Ont. (N) One report of 80% infection.

Man. "Leaf rust was found quite commonly; but was not serious." - Bisby.

"Leaf rust was found frequently, but was not serious." - Connors.

Sask. & Alta. "Leaf rust was rare on rye, except in the Edmonton district where it was quite severe though apparently not doing serious injury." - Fraser and Bailey.

Smut caused by Urocystis occulta, was not reported from any provinces. It is known to occur in Manitoba, but is apparently rare and was not collected this year.

Ergot caused by Glaviceps purpurea

Ont. (E) One report, very slight.

Ont. (N) Two reports, average of 9%.

Man. "Ergot occurred commonly on rye; but the loss is estimated at less than one percent." - Bisby.

"Ergot, (Claviceps purpurea) was found occasionally.". - Connors.

Sask. & Alta. "Ergot was general, but usually not severe, not being more than 1% to 3%." - Fraser and Bailey.

A report from Alberta stated that ergot was severe around Edmonton.

Powdery mildew caused by Erysiphe graminis

Man. "Powdery mildew was found in considerable abundance on the lower leaves of rye at Winnipeg in July; but caused very little damage." - Bisby.

Sask. & Alta. "Powdery mildew was abundant at Edmonton on rye." - Fraser and Bailey.

DISEASES OF WHEAT

Stem rust caused by Puccinia graminis

This disease was not destructive according to the reports received, except in parts of Prince Edward Island and in Northern Ontario. Wheat was rusted badly in Quebec but the effect on yield was not indicated. A summary of conditions follows:

P.E.I. Four reports, average of 47%.

"Stem rust was very severe in Prince County, the crop being practically destroyed in many cases. In Queens County there was considerable rust but in Kings County the infection was light." Hetherington.

N.B. Two reports, showing 1% infection.

Que. Five reports, average infection, 47%.

Ont. (E) Two reports, 4% and 12%.

Ont. (S) One report, 12%.

Ont. (N) Three reports 83%.

"In the Rainy River District wheat was very badly rusted; crop almost entire failure. Oats, however, were fairly free from stem rust. No rain during the growing season. In the Thunder Bay District wheat of all varieties severely rusted." Hurst.

Man. Fifteen field estimates received; 2 very slight, 4 slight, 7 moderate and 2 severe, all near Winnipeg.

"The rust developed throughout July and the first part of August and became abundant on almost every variety, causing considerable damage to late planted wheat. It was first abundant on the leaves and sheaths and later attacked the stems, necks and heads." - Bisby.

"Rust did not develop as rapidly in the Western part of the province as it did in the Red River Valley. Only traces could be found up until July 19. Rainy weather the next week led to abundant development of rust. Considerable damage was caused in local areas on late wheat." - Connors.

Sask. "Late grain was heavily rusted over Saskatchewan but there was little damage. Early grain showed little rust. The distribution of the rust was much the same as in 1919, but stem rust was more severe in that year and did much damage in northern Saskatchewan to late grain." Fraser and Baily.

"In Almeda district rust was very severe; reduction in yield about 30%." - Hockey.

Alta. "In northern Alberta there was very little rust on the main crop, but on late grain a few pustules could be collected. In souther Alberta there was practically no stem rust. On very late grain a few pustules could be collected but none could be

found on the main crop.

No cereal rust were found in the Peace River District."

Fraser and Bailey.

Summary of dates of Appearance

(Bisby, Connors, Fraser and Bailey)

Province	Aecia open	Uredinia found
Man.	June 11 July 2,6,9,13 Aug. 4,9,13,19, 24 and 30 Sept. 16	June 30 - Winnipeg July 5 - Morris July 7 - Brandon July 10 - Virden July 17 - Rapid City
Sask.		July 9 - Weyburn July 14 - Indian Head July 15 - Yorkton July (last) Saskatoon Aug. (first) Scott.
Alta.		Aug. 12 - Edmonton.

Leaf rust caused by Puccinia triticina.

This rust was much more common in eastern Canada than in the west. Reports received show the following average percentage leaf surface affected:

P.E.I. Six reports, 34%.

N.B. Three reports, 10%.

Que. Six reports, 38%.

Ont. (E) One report, 65%

Ont. (N) Three reports, 83%.

Man. Fifteen reports, 2 very slight, 8 slight, 3 moderate and 2 severe.

Sask. One report, trace.

Alta. Four reports, very slight.

The following summary statements show that leaf rust was of little importance in the west.

Man. "Was fairly common, but it caused little or no loss in the yield." - Bisby.

"Probably did little damage.". - Connors.

Sask. "Not common, found here and there". Fraser and Bailey.

Alta. "Rare in Alberta." - Fraser and Bailey.

Loose smut caused by Ustilago tritici.

The reports received from the Eastern Provinces on this disease are not abundant enough for drawing conclusions. The figures follow:

P.E.I. Three reports, average 6%.

N.B. Three reports, average 8%.

Que. Seven reports, average 3.3%

Ont. (E) One report, 1%.

Ont. (N) One report, 3%.

Man. "Ten reports, 3 very slight and 7 slight.

"This smut occurred commonly in wheat, from a trace to about 1% or occasionally more. In certain cases, it may become necessary to make arrangements for treating for this smut by the hot water method, or for the discarding of seed lots more seriously affected." - Bisby.

"This smut was to be found quite frequently. Counts made gave from a trace to 2%." - Connors.

Sask. & Alta. "This smut was found commonly on wheat. One large field showed 5% infection. Generally fields were almost free or showed 1/2% to 1% of this smut." - Fraser and Bailey.

Bunt or Covered smut caused by Tilletia tricici and T. foeten:

No reports were received from the eastern provinces on this disease. The following are the summaries for the west.

Man. "Little bunt was found, and this was the low form Tilletia tritici. The high form Tilletia laevis was not collected. Most growers insure their wheat against this disease by formaldehyde tratment.". Bisby.

"Bunt on covered smut was not collected. Formaldehyde treatment of seed wheat by the farmer keeps this disease almost entirely in check.". - Connors.

Sask. & Alta. "This smut was not common except locally. All of the collections were Tilletia tritici, except in some check plots for smut control at Indian Head where the smut was Tilletia laevis." - Fraser and Bailey.

Scab caused by Gibberella saubenetii.

Ont. (E) "Was present to extent of 1% on Central Experimental Farm." - Drayton.

Man. "The summer was not sufficiently moist for the development of scab on wheat. A few specimens were sent in on August 20th from Minisota, and a few were found in Khapli wheat at Winnipeg." - Bisby.

"Scab was found on a few heads of Khapli wheat at M.A.C., Winnipeg. The dry season held this disease wholly in check. " - Connors.

Sask. & Alta. "Scab of wheat was not collected in Saskatchewan or Alberta, and very little was found in Manitoba. In 1919, scab was prevalent in Manitoba, doing a considerable local damage. A few collections were made in Saskatchewan, but no serious injury was done." - Fraser and Bailey.

Minor diseases of wheat.

Glume spot caused by Septoria:

Two reports from Prince Edward Island, 2% and 15%.

Reported from New Brunswick and Ottawa.

Not seen in Manitoba.

Not seen in Saskatchewan and Alberta. It was not rare there in 1919.

Root-rots caused by various fungi:

Caused some injury, especially to seedlings in Manitoba, but not serious.

Were common in some districts in Saskatchewan, and seemed to be due to a species of Helminthosporium.

Basal glume rot caused by Bacterium atrofaciens.

Not seen in Manitoba.

Collection made at Scott, Saskatchewan. It was severe in a few small plots. Also found at Morse.

Ergot caused by Claviceps purpurea.

Not seen in Manitoba.

Not found in Saskatchewan this year, several collections made in 1919.

Powdery mildew, caused by Erysiphe graminis:

Not found in Manitoba, Saskatchewan or Alberta.

Black chaff caused by Bacterium s.

Not found in Manitoba, Saskatchewan or Alberta.

Helminthosporium spotting:

Slight amount in Manitoba and Alberta.

Stripe rust caused by Puccinia glumarum.

"This rust was collected at Stettler, Alta, on Hordeum jubatum by Miss Newton. Attempts were made in the greenhouse to infect wheat but without results. This rust was collected in abundance on Hordeum jubatum at Edmonto, Alta, in 1919, but also failed to infect wheat." Fraser and Bailey.

D I S E A S E S O F F O R A G E C R O P S

DISEASES OF ALFALFA

Leaf spot caused by Pseudopeziza medicaginis.

A few reports were received as follows:

Ont. (E) One report, "heavy infection," - one, 10%.

Ont. (N) One report, "high percentage."

Man. "Leaf spot was quite common, but no great amount of damage was caused." - Bisby.

White spot (physiological?)

Man. "White spot (physiological?) See Phytopath 6:91) was found not uncommon at Winnipeg in the early part of the season. It did not appear to be serious, for the affected plants produced a good crop." - Bisby.

D I S E A S E S O F A W N L E S S B R O M E G R A S S

Sask. & Alta. "A leaf spot of Awnless Brome was quite severe in some districts in Saskatchewan. This disease has been prevalent in Western Canada for several years." - Fraser and Bailey.

D I S E A S E S O F C L O V E R

Rust caused by Uromyces trifolii.

Man. Rust ocourred commonly on white clover, killing many of the leaves. Aecia were abundant in late

June and early July, and were followed by uredinia and telia.". - Bisby and Connors.

Leaf spots

Man. "Clover leaf spots were not found in serious quantity." - Bisby.

DISEASES OF FLAX

Rust caused by Melampsora lini.

Man. "Rusted flax was sent in in July from Headingly; and about the same time and later was found on the plots at Winnipeg. The rust seen was not severe enough to affect seed production particularly, but the lesions on the stems were sufficiently abundant to lessen the value of the flax for fibre purposes." Bisby.

Sask. & Alta. "Rust was collected in several places and seemed to be generally distributed though in no place severe. A collection was made in the Peace River district." - Fraser and Bailey.

Wilt caused by Fusarium lini.

Man. "Wilt was not found." - Bisby.

Sask. "Wilt was severe in some fields in Saskatchewan and caused local losses." - Fraser and Bailey.

DISEASES OF HOG MILLET

Man. "A smut (Sorosporium syntherismae, determined by Prof. W. P. Fraser) was sent in on Sept. 1st from Keyes, Man. on "hog millet", (Panicum milaceum) Bisby.

DISEASES OF MEADOW FESCUE

Ont. "In plots of this grass grown at the Central Experimental Farm, Ottawa, from seed imported from Sweden, 90% of the plants were attacked by Helminthosporium." Drayton.

DISEASES OF SUNFLOWER

Rust caused by Puccinia helianthi.

This rust was reported on only from the western provinces.

Man. "Rust was quite serious on sunflowers through the province. Aecia (not necessarily all P. heliantni) were collected at Winnipeg from June 28th through July, and Uredinia were found in late July, followed the remainder of the season by telia (and uredinia), until many of the lower leaves were killed." Bisby.

"Dr. Bisby reports aecial stage on June 28th, Although the aecia were very common on the leaves at Winnipeg, the rust did not develop with the

rapidity that it did at Brandon where the aecial stage was not observed. The seriousness of sunflower rust is still an open question." - Connors.

Sask. & Alta. "Rust was quite common on sunflowers in Manitoba and Saskatchewan, and caused shrivelling of the lower leaves. It was not collected this season in Alberta, though previous collection were made". Fraser and Bailey.

Stem rot caused by Sclerotinia sp.

Man. "A rot of the stem of sunflower plants was found in the latter part of July in the plots at Winnipeg. The stem was usually attacked near the surface of the ground, although the lesion sometimes occurred higher on the stem. The plants died rather soon, and sclerotia were present outside and inside the affected portions of the stems. This disease threatens to be quite important, and work is being done with it. It appears to be quite widely distributed in Manitoba." - Bisby.

"A single plant was found at Brandon, Miss Newton also located the disease at Morden. It may be quite widespread, and an important factor in sunflower growing. A few weeds of the Compositae were attacked." - Connors.

Ont. "Sunflowers at the Central Experimental Farm, Ottawa, were found affected by a Sclerotinia to the extent of 1%." - Drayton.

Powdery mildew caused by Erysiphe cichoracearum.

Man. "Powdery mildew occurred on leaves of sunflowers which were allowed to grow until September." Bisby.

"Burning of the foliage (cause unknown) occurred to some extent at Winnipeg, Man." - Bisby.

DISEASES OF TIMOTHY

Stem rust caused by Puccinia graminis

Ont. "Volunteer timothy on Bear Island, Temagami Forest Reserve (northern Ontario) was found severely rusted, estimated at 50% infection." Faull.

Alta. A report from Alberta gave 15% infection of timothy stem rust.

DISEASES OF WESTERN RYE GRASS

Rust caused by Puccinia Clematidis.

Sask. & Alta. "Leaf rust was prevalent in some districts, but did practically no damage." - Fraser and Bailey.

Smut caused by Ustilago Agropyri.

Man. "Western Rye Grass smut has not been found locally this year." - Bisby.

Sask. & Alta. "This smut was not commonly observed though collected at Saskatoon and Indian Head". - Fraser and Bailey.

DISEASES OF FRUIT CROPS

- APPLE DISEASES -

Scab caused by Venturia Inaequalis

Ont. (E) "Out of 66 orchards examined in September a "noticeable" amount of scab was found on the fruit in 21 orchards. The average percentage of fruit scabbed was 0.35%. At the Central Experimental Farm 1% scab on the fruit was reported.

Ont. (S) "Only 5 orchards out of 73 examined in August showed a "noticeable" amount of scab. The average percentage of fruit scabbed was 0.07%. The check trees in a demonstration orchard in Norfolk County showed for Baldwin 1.3% scab and for Spy 8.5% scab; sprayed trees showed from 0.0% scab in four cases up to 10.8% for one greening tree. Seventeen sprayed trees out of 24 showed less than 1% scab. At Collingwood, Ont. sprayed trees showed 0.1% scab on Baldwin, 6.0% on Spy, 6.6% on Greening, 4% on Ben Davis and 6.9% on Snow. In all cases in southern Ontario little or no early infection took place. It was very difficult to find any scab on the leaves of sprayed orchards in August and the small percentage of scab on the fruit was limited, no doubt by the freedom from foliage infection." - Rankin and McCurry.

Man. "A small amount of scab occurred on leaves and fruit

of apples at Winnipeg. Spraying was not practiced and scab was not serious enough to warrant it." - Bisby.

B.C. " Apple scab is widespread on Vancouver Island and Lower Mainland but conditions are better this season than usual in this section. Absent fromDry Belt between North Bend and Salmon Arm, including the orchard area t Wallachin, reappears at Salmon Arm and along the Upper Okanagan Valley. At Vernon where irrigation begins it is only serious in McIntosh Reds and similar susceptible varieties or in very wet season. Two sprayings even on McIntosh Reds ordinarily give over 99% clean fruit.

From Vernon south the Okanagan and Similkameen district are almost free. Occasionally a little appears at Kalowna on McIntosh on the flats or where air drainage is poor. At Summerland, Naramata, Penticton and Keremeos, I have never seen the slightest indication of it in fruit or foliage. In the boundary country, e.g. Grand Forks it occurs in susceptible varieties. In the Kootenay and Arrow Lake section and in the Creston Valley it is the worst enemy of the apple growers although three sprays, Pink, Calyx, and one later will generally give 95% control even on McIntosh Reds. Late infection is negligible owing to the dryness of July and August and (usually) early September in B.C. generally. This season s c a b is worse than usual in these last sections although much of the infection is merely "pin head" spots in or around the calyx due to early infection. Much of the high percentage of scab this

season is due to the cold, wet, backward weather, protracting the blossoming period. As long as 25 days elapsed in some cases between the application of the "Pink" and the "Calyx" spray. Unsprayed McIntosh Reds will show 95% to 98% scab mostly severe, other varieties 75% to 90%. Variety Ontario appears to be the most resistant. The delayed dormant spray appears to be useful along the Kootenay Lake." - Eastham.

Twig blight caused by Bacillus Amylovorus

Ont. (S) "There was a noticeable amount of apple twig blight generally throughout Lincoln County in mid-summer. Counts made in 18 orchards and averaged together with 73 orchards showing only a slight amount or none, showed an average of about 1.5% of the twigs affected." Rankin and McCarry.

B.C. "Fire blight (B amylovorus) appears now to be confined to the Okanagan and Grand Forks district with a little at Salmon Arm, no new infections having been reported from the Kootenays. Owing to rigid inspection, better management of irrigation, elimination to a large extent of Trascendent Crabs and Spitzenbergs, the disease has been pretty well under control in apples since 1915." Eastman.

Apple tree anthracnose or black spot canker caused by Neofabraea mailcorticis (Cord.) Jackson.

B.C. "This is destructive on Vancouver Island and Lower Mainland. Disappear in the Dry Belt. Reappears at Salmon Arm where it is on the increase. Absent from the Okanagan south of Vernon and from the Boundary country but found slightly at Creston and elsewhere in the Kootenays but has never called for special treatment in that area. Damage difficult to estimate, young trees are often killed outright and sometimes full bearing ones. In a block of 20 year old Baldwins at Keatings, Vancouver Island, over 80% of the one and two year old growth was killed out each year in addition to numerous large cankers on the limbs. The yield of these trees was about 1-1/2 boxes (60 lbs.) per tree. After four years of experimental spraying in this block (without other treatment) the yield was averaging 9 boxes (360 lbs.) per tree. In the Fraser Valley the disease is even more severe. It is to be feared that with the abnormal seasonal condition this year (over 10 inches of rainfall in September) there will be a heavy infection of the disease before the usual fall spraying could be given." - Eastham.

- CHERRY DISEASES -

Brown rot caused by Sclerotinia cinerea.

Ont. (S) "In Lincoln and Wentworth Counties very little brown rot developed in cherries of any variety. The early season

was too dry, for the fungus to thrive. Cherries were abundant and were picked as fast as possible but even then the season was abnormally long and many remained on the tree until dead ripe. Over this three weeks or longer picking season brown rot had ideal conditions for spreading, showers and high humidity occurring almost daily, but for some reason rot was very scarce. The temperature was low throughout the period and this was possibly the limiting factor which prevented an epidemic. The dry early season from the time the buds swelled until ripening time with only one or two rains may have had some effect". Rankin and McCurry.

B.C. "Brown rot (Solerotinia) is often severe on stone fruits in the Fraser Valley but has been less serious than usual this year. It does not occur in the interior. Sweet cherries in the Kootenays, a fairly moist section, have so far never suffered from it. This season a severe case of blossom blight of sour cherries near Victoria was found to be due to Sclerotinia." - Eastham.

Leaf spot or yellows caused by Coccomyces hiemalis

Ont. "This disease was rare this season in the Niagara fruit belt. Even in August when a count was made it was found in small amounts only in 21 out of 151 orchards visited. A general average of 1.7% leaves affected was calculated". Rankin and McCurry.

GOOSEBERRY DISEASES

Leaf spot and anthracnose caused by Mycosphaerella and Pseudopeziza.

Ont. (E) Very little.

Ont. (S) Some slight amount in Lincoln County.

Man. Some leaf spot present.

Mildew caused by Sphaerotheca mors-uvae

Ont. (E) European varieties at the Central Experimental Farm showed about 75% of the leaf surface affected by mildew.

CURRANT DISEASES

Rust caused by Cronartium ribicola

Ont. (E) This rust was not found in over 70 plantings examined in Leeds County. The currants at the Central Experimental Farms, Ottawa, were reported with 60% of the leaves affected.

Ont. (S) "The blister rust fungus is common on currants, especially the cultivated black, in the Niagara fruit belt. Rust was found in 15 out of 63 plantings in August affecting an average of 5.0% of the leaves." Rankin and McCurry.

Leaf spots, caused by Mycosphaerella and Pseudopeziza

Ont. (E) These leaf spots of currants were rare.

Ont. (S) Very little of these leaf spots in Lincoln County.

Man. Slight amount.

-GRAPE DISEASES-

Mildews caused by Plasmopora viticola and Uncinula nec/ c.

Ont. (E) A slight amount of mildew was found in two vineyards out of 18 examined in September.

Ont. (S) "Very little of either mildew occurred in Lincoln County. A slight amount was found in 22 vineyards out of 144 examined. The average was about 1% of the leaves affected." - Rankin and McCurry.

-PEACH DISEASES-

Leaf curl - caused by Exoascus deformans

Ont. (S) "This disease was of little importance this year. The early spring was long and cold allowing abundant time for cultivating and spraying. Practically all growers got the spray on in time this year before the buds had swelled appreciaoly. The period for spraying lasted about three weeks. In unsprayed and neglected orchards it was usual to find about 12 or 14% of the leaves curled. As the season developed slowly there was a remarkably long period in which slight temperature changes could have caused an epiphytotic but the changes were so regular that there did not seem to be any favourable infection weather. The above figures for unsprayed orchards illustrate this point. In sprayed orchards curl was rare. Counts in about 30 orchards gave an average of from 0.14 to 1%." - Rankin and McCurry.

B.C. "Peach leaf curl was quite severe. It is general in the

province." - Eastham.

Brown rot caused by Sclerotinia cinerea

Ont. (S) "Negligible in importance throughout the Niagara fruit belt. Early season figures in Niagara and Grantham townships (Lincoln County) gave in 16 orchards no apothecia and an average of 1.1% blossom injury. In Louth and Clinton townships (Lincoln County) apothecia were found only in one orchard out of 15 and there was practically no blossom injury. The weather early in the season from the time apothecia usually develop until the fruit was set and growing was so dry, that the early development of brown rot was impossible. The crop was heavy, and thinning was neglected because of lack of labour, but brown rot did not develop seriously although fruit hung on the trees until over ripe in many cases. A survey conducted the last of August showed brown rot noticeable in only 14 orchards out of 156 orchards visited. The average amount of loss was only 0.15%. - Rankin and McCurry.

Little peach and yellows (cause undetermined)

Ont. (S) In a survey made in August of 154 orchards, little peach and yellows were found in 22. The average amount found was 0.2%.

- PEAR DISEASES -

Fire blight caused by Bacillus amylovorus

Ont. (E) At the Central Experimental Farm there was an average of 5% twig blight.

Ont. (S) "Very little twig blight occurred in the Niagara fruit district this year. There was little blossom blight also. In a survey made in August, twig blight was found in 34 orchards out of 131 with a general average of twigs killed of 1.0%." - Rankin and McCurry.

B.C. "In pear orchards at Kelowna serious loss has occurred chiefly from undetected root blight, but this source of loss also appears now to be better under control." - Eastham.

Scab caused by Venturia pirini

Ont. (S) "This disease was rare in Lincoln County this year. It was found during August in appreciable quantities in only 3 out of 100 orchards. The average percentage of fruit affected was 0.08%." - Rankin and McCurry.

- PLUM DISEASES -

Brown rot caused by Sclerotinia cinerea

Ont. (E) Estimates in August in six orchards showed an average loss of 0.2%. At the Central Experimental Farm the loss was 3%.

Ont. (S) "In the Niagara district careful records were kept on the development of brown rot. In 14 plum orchards in Niagara and Grantham townships (Lincoln County) no apothecia were found and blossoms injury to the extent

of 2.1% occurred. In Louth and Clinton townships (Lincoln County) apothecia were found in 3 out of 15 plum orchards in the ratio of one apothecial cluster to 2 trees. Blossom injury occurred to the extent of about 0.1%. Little damage was done to plums in general except that the more susceptible varieties rotted badly in certain locations near the lake. On the whole due to the heavy crop and the market situation, brown rot caused no monetary loss whatever. Plums were picked as fast and as long as the market demanded. Where the costs were prohibitive in relation to the price offered, whole sections of orchards (especially of certain varieties) were not picked at all. In a survey the last of August, brown rot was noticeable in 85 orchards out of 129 visited and there was an average tree run loss of 2.3%." - Rankin and McCurry.

Man. "A few plums were found rotted by Penicillium; but Sclerotinia was not found." - Bisby.

B.C. (see under cherries).

- RASPBERRY DISEASES -

Leaf curl of yellows (cause undetermined)

Ont. (E) Found in 62 out of 69 patches causing an average loss of 6% of the planting.

Ont. (S) "Found in localities to be very destructive. In a general survey made in early June (after some growers had carried out their yearly pulling of diseased bushes)

the following counts were obtained.

"14 plantings out of 52 showed leaf curl to the average extent of 13% diseased fruiting canes and 5% diseased suckers.

"In the remaining plantings the amount was slight. In another series of counts made in August, leaf curl was found in 35 out of 76 plantings, causing an average loss in the 76 plantings of 4.7% of the canes or 10.1% loss in the 35 plantings where it was present to any extent." - Rankin and McCurry.

Man. "Yellows affected a considerable percentage of the plants." - Bisby.

- STRAWBERRY DISEASES -

Leaf spot caused by Mycosphaerella fragaeriae

Ont. (E) But little leaf spot was found. It was found generally, no patch being free out of 25 examined but the amount even late in the season was only about 5% of the leaf surface affected.

Ont. (S) Very little noticed. Average of about 2% of the leaf surface affected in 23 patches examined late in the seasoh.

Man. Not serious.

B.C. "Leaf Spot. (Mycosphaerella) of strawberry is of slight account in the strawberry areas of the Vancouver Island and the Lower Mainland sections due partly to the short rotation necessitated by the root weevil and to the

practice of cutting and burning the foliage. In the Wynndell district near Creston, when weevil is absent and plantations are allowed to remain 4 to 7 years, the disease is more important. Spraying is employed there. Eastham.

MISCELLANEOUS NOTES ON FRUIT DISEASES

Apple black rot (Sphaeropsis malorum) "Has never been recorded in British Columbia". - Eastham.

Apple Neotria canker. "Occurs in a few of the back lot orchards in Vancouver City." - Eastham.

Mushroom Root rot (Armillaria Mellea) "One or two cases of this are noticed on various orchard trees each year in British Columbia. Chiefly from the Saanich Peninsula but also from Noten Hill, Salmon Arm and Kootenay Lake. The disease appears to be of very slight importance in B.C. compared with reports of injury from the Pacific States." Eastham.

Apple Powdery Mildew. "This is of little consequence in British Columbia, when spraying for apple scab is regularly followed. Around Penticton, however, and at other points in the S. Okanagan, when there is no apple scab summer spraying with lime sulphur is not being followed and mildew has become quite serious. So far it has not affected the fruit very badly, but produces a stunting of the growth difficult to estimate." - Eastham.

"Apple leaf spots occurred only slightly in Manitoba.". Bisby.

Apple cankers and winter injury. "Common in Manitoba. The long cold winters appear to be the limiting factor in growing most varieties of apple". - Bisby.

Apple silver leaf. "Occurred on a few trees in Manitoba." - Bisby.

Apple Penicillium fruit rot. "Occurred to a slight extent at Winnipeg". Bisby.

Cherry "Exoascus cerasi occurs on sweet cherries at Victoria, Vancouver and Agassiz, B.C., causing both leaf curl and witches brooms." - Eastham.

Currant - "Powdery mildew on black currant Sphaerotheca mors-uvae was quite severe on black currants at Saskatoon, Sask, but appeared too late to do serious injury." - Fraser.

Peach mildew (Sphaerotheca pannosa) "A few years ago this did much damage to the fruit in the commercial peach orchards of the S. Okanagan, B. C. Since the introduction of compulsory spraying with lime sulphur against the Peach Twig Borer (Anarsia Lineatella) in this district, mildews seem to have been much reduced. - Eastham.

Plum Pocket caused by Exoascus sp. "Quite common at Winnipeg, and sent in also from Thornhill on July 10th". - Bisby.

Plum Black Knot, (Plowrightia morbosa) "Occurs to some extent on wild plums throughout Manitoba." - Bisby.

Plum Silver Leaf. "Seriously affected a few trees at Winnipeg." Bisby.

Raspberry and blackberry orange rust Gymnoconia interstitialis. "This fungus has not been recorded in British Columbia." Eastham.

Raspberry yellow rust. "Occasioned some alarm last year in the Fraser Valley. (B.C.), but has been of trivial importance this year." - Eastham.

Raspberry and blackberry anthracnose. "This disease is of little importance in the Fraser Valley (B.C.) where these fruits are grown despite the moist climate. It is quite bad on the Snyder Blackberry at Hatzic. Logan berries appear to suffer most." - Eastham.

Raspberry and blackberry crown gall. "This disease is common on Snyder blackberry and loganberry.". - Eastham.

Notes on diseases of ornamentals.

Manitoba, (by Bisby)

"Aster wilt was occasionally present".

"Peonies were affected with Botrytis at Winnipeg and Portage la Prairie."

"Snapdragon rust, puccinia antirrhini, was observed for the first time this spring at the College, but inquiry indicates that it probably occurred in 1919, or possibly

earlier, in the gardens of certain growers.

"Sweet peas were very healthy in general, although there was considerable powdery mildew, (Microsphaera diffusa), later in the season. Rhizoctonia root rot was sent in from Dauphin."

DISEASES OF VEGETABLE CROPS

- ASPARAGUS DISEASES -

Rust caused by Puccinia asparagi D.C.

Ont. (N) One case reported as severe.

B.C. "Has not been observed in the Province." - Eastham.

- BEAN DISEASES -

Anthracnose caused by Colletotrichum lindemuthianum (Sacc. & Magn.) Br. and Car.

N.B. Two fields reported with slight to moderate infection and possible 8% loss.

Ont. (E) Forty-three reports principally from Leeds, Frontenac and Carleton Counties give an average estimate of severity of slight to moderate, with a possible average loss of 3%. One field was reported where the loss would run 95%.

Ont. (S) Reported as absent in majority of fields, with slight to moderate in some and occasionally causing a loss of 20%.

Ont. (N) Three reports give the severity as moderate.

Man. "Not reported as at all important." - Bisby.

Alta & Sask. "Not important." - Fraser and Bailey.

B.C. "Of little importance except in Lower Fraser Valley". Eastham.

Blight caused by Bacterium phaseoli E.F.S.

Que. Reported from 3 fields as causing an average loss of 40%.

Ont. (E) Bean Blight was not reported in Eastern Ontario in over 50 fields examined, except in Carleton County where it was reported general but the degree of severity was not indicated.

Ont. (S) Not mentioned in reports from the several counties.

Alta & Sask. "Not so common as in 1919. Few specimen's seen". Fraser and Bailey.

Mosaic (cause undetermined).

Que. Reported in one field as causing a loss of 2%.

Ont. (E) Reported from in 20 fields out or over 50 as slight to moderate.

Ont. (S) Reported in 15 out of 31 fields examined in Lincoln county as slight to severe with an average loss of about 13% in six fields. Reports from other counties fail to mention this disease.

Man. Noted in two fields near Winnipeg, slight, from 5 to 2.0% infection. Not important.

Root Rot caused by Fusarium sp.

N.B. Reported as present in one field in New Brunswick, causing a loss of 2%. (Identification not checked).

Man. Some sunscald and a trace of root-rot." - Bisby.

- CABBAGE DISEASES -

Que. Black rot severe in one field reported with loss of 80%.

Ont. (E) In over 55 fields examined in Leeds and Frontenac counties no disease was found. Black rot was found causing a moderate loss in fields near Ottawa, and club-root was severe in one case.

Ont. (S) In over 27 fields examined, no disease was found.

Ont. (N) Black rot, slight, found in one field.

Man. Out of 11 fields examined near Winnipeg, no disease was found.

B.C. "Club root was this year recorded for the first time in a city garden in Victoria.". - Eastham.

- CANTALOUPE DISEASES -

Wilt caused by Bacillus tracheiphilus E.F.S.

Ont. (E) Wilt serious in 2 fields causing 25% loss.

Ont. (S) Wilt serious in many fields causing 5 to 25% loss.

- CELERY DISEASES -

Ont. (E) In over 45 fields examined in Leeds and Frontenac counties, early blight was found in a few: in the others no disease of importance was noted.

Ont. (S) In over 10 fields examined a slight amount of early blight was found in one; others were free of the disease.

B.C. "Septoria blight not infrequent, but is of little consequence except in the Armstrong district."1 - Eastham.

- CUCUMBER DISEASES -

Ont. (E) In over 30 fields examined, 24 were free from disease. Wilt was reported in 3 fields as severe (25%) and one as slight.

Mosaic reported on Central Experimental Farm at Ottawa as very slight.

Ont. (S) In Lincoln County no disease was found in 10 fields examined. In other counties wilt was reported not uncommon and ranging from 10 to 75%.

Ont. (N) Mosaic reported as slight in one field.

"Practically a total loss in cucumbers at Temagami Station due to Fusarium". - Faull.

Man. "A wilting of cucumbers examined was attributed principally to dry weather, although there was a certain invasion of the roots by Fusarium and other organisms." Bisby.

- LETTUCE DISEASES -

Ont. (E) In 8 fields examined no disease was reported.

Ont. (S) In 7 fields examined in Lincoln County, no disease was reported.

Ont. (N) Downy mildew reported slight in one field.

- ONION DISEASES -

Ont. (E) In over 40 fields examined no disease was found except in 2 fields where downy mildew was causing severe damage, estimated at 50% loss.

Ont. (S) In over 12 fields examined, no disease was found in 10, while downy mildew in one had caused 5% loss and smut in another had caused 25% loss.

B.C. "Downy mildew occurred at Chilliwack. Injury seemed severe early in the season but the plants for the most part recovered and gave a very good crop." - Eastham.

- PEA DISEASES -

Ont. (E) Ascochyta leaf blight was severe at the Central Experimental Farm, Ottawa, and one field in Dundas County showed 20% "Leaf blight".

Man. "Garden peas suffered somewhat from root-rot." - Bisby.

Alta. & Sask. "Ascochyta blight was collected in a few places but it was not common. Septoria blight was found also". Fraser and Bailey.

- PEPPER DISEASES -

Man. "An Alternaria rot of pepper fruits caused considerable loss at Winnipeg." - Bisby.

- POTATO DISEASES -

The information regarding potato diseases at the disposal of the disease survey is inadequate for accurate figures on certain diseases. It is hoped that the percentage figures which follow will not be in all cases interpreted literally. The figures, as given,

represent general averages which were first made up by counties (for this work credit is due Mr. George Partridge of the Division of Botany, Ottawa) and then combined into averages for the Provinces. The original data for these figures were obtained from field inspection reports of the Potato Seed Certification Survey conducted by the Division of Botany, Ottawa. It must be remembered, however, that alghough accurate counts were made in this survey in several hundred commercial fields in every province, except British Columbia, the accuracy of deriving "percentage prevalence" figures from these reports is limited by the following factors:

1. Usually only one inspection of each field was made and therefore only the amount of any given disease was found, which was discernible on that date.

2. The date of visitation varied from June to September, according to conditions and section of the country, thus making the blackleg and wilt estimates often much too low.

3. Blackleg, leaf roll, mosaic and wilts were the main diseases the inspector looked for, and it is expected that he paid the most attention to these.

4. The inspector is allowed an indefinite classification under the headings of "weak plants" and "misses" which would if diagnosed increase the percentages of diseases present. This is especially true for Rhizoctonia.

5. The inspector is asked to grade the amount of early blight, late blight, tip burn and rhizoctonia, merely as absent, slight, moderate or severe. The use of these terms varies considerably and the records are thus hard to interpret.

6. The figures were in many cases obtained from fields where a higher grade of stock than the average was being grown. For this reason the figures represent conditions more as they exist in the best fields of each province than they do a general average for the province as a whole, and are therefore minimum figures so far as determining average losses is concerned.

On the whole, therefore, the averages here given are accurate only for mosaic, leaf roll and curly dwarf. The figures on blackleg, wilts and rhizoctonia are subject to interpretation as representing the general average of the amount found from day to day during July, August and September. The cummulative or total average percentage of blackleg, wilt and rhizoctonia would in each case be a higher figure.

The following list gives the number of acres of potatoes inspected in each province. The percentage prevalence figures given under each disease are the average percent per acre.

P.E.I.	886	Ont. (N)	472
N.S.	389	Man.	594
N.B.	1414	Sask.	246
Que.	3871	Alta.	182
Ont. (E)	991	B.C.	0
Ont. (S)	1072		

Late Blight, caused by Phytophthora infestans (Mont.) de Bary.

At the time the field inspection of potatoes was in progress (the date varying according to locality) no late blight was recorded in Manitoba, Saskatchewan or Alberta and practically none in British Columbia and Ontario. A small percentage of late blight was found generally distributed throughout Quebec

and New Brunswick and Nova Scotia. Late blight was also observed in Queens County, Prince Edward Island. The average percentage of late blight found in the fields was as follows:

P.E.I.	0.10	Ont. (N)	0.02
N.S.	0.22	Man.	0.0
N.B.	0.08	Sask.	0.0
Que.	0.46	Alta.	0.0
Ont. (E)	0.009	B.C.	„practically none".
Ont. (S)	0.15		

From this figures it will be seen that late blight was unimportant so far as the vines were concerned during July and August.

The following comments were received:

Man. "Late blight did not occur in 1920, and is probably rarely present on account of dry atmospheric conditions." - Bisby.

Sask. & Alta. "Late blight caused by Phytophthora infestans was not collected in 1920, nor has the writer ever observed it in Western Canada." - Fraser and Bailey.

B.C. "This is occasionally very destructive in the Lower Fraser Valley especially in the Chilliwack district. In the past two seasons the disease has been practically absent and the chief result of the Department's demonstration spraying for the disease has been to show the necessity of spraying earlier to guard against early blight. Late blight has not been recorded east of Agassiz and Chilliwack, and does not seem to be of much consequence on Vancouver Island." Eastham.

The following figures on the importance of late blight during the last five years in the Maritime Provinces were furnished by Mr. Paul A. Murphy.

Province	Period	P.C. of possible crop lost	Amount loss in bushels	Value per bush	Total value of loss in dollars
P.E.I.	1915-19	43%	3,900,000	.75	2,925,000
N.S.	1915-19	30%	2,800,000	1.00	2,800,000
N.B.	1915-19	25%	2,833,000	1.00	2,833,000

Total loss for Maritime Provinces from Late Blight $8,558,000

The following comments by Prof. Georges Maneux of Quebec Province (see Quebec Soc. Protection of Plants Ann. Report 12:43-46 are of interest regarding late blight and its control in Quebec in 1919.)

YEAR	ACREAGE	YIELD	AVER.	YIELD PER ACRE
1917	226,917	18,158,000		80.02
1918	264,871	38,936,000		147.00
1919	315,590	57,280,000		181.50

"It may be stated without fear of error that this increase corresponds to the ever-generalizing use of protection methods. Already weakened by the injuries of insects it (the potato) nevertheless pays a heavy debt to diseases, late blight particularly.... In 40 counties, 60 fields (spraying demonstrations) were established (1919)..... The plots sprayed with Bordeaux gave an average yield 50% higher than the checks.... The plots sprayed with insecticides only yielded 35% over the check...

leaving a net profit of $30. per acre over the check plots".

The rotting of the tubers was in many sections a serious factor.

Early blight caused by Macrosporium solani E. & M.

Early blight was present to a slight extent in all the provinces. It was not a factor in production in either the eastern or prairie provinces.

P.E.T.	slight		
N.S.	slight	Ont. (N)	very slight
N.B.	very slight	Man.	very slight
Que.	slight	Sask.	very slight
Ont. (E)	slight	Alta.	very slight
Ont. (S)	slight	B.C.	(see below)

Man. "Early blight was very rare." - Bisby.

Sask & Alta. "Early blight caused by Macrosporium solani was rather rare though common in 1919". Fraser and Bailey.

B.C. "Early blight has chiefly been serious on the Lower Fraser, notably around Cloverdale. In 1919, the losses were severe, the foliage being almost completely destroyed in some cases by the middle of August. Early blight, tip burn and drought together caused a total failure of the crop on certain peaty soils which burned up badly, but it would be impossible to allocate the amount of injury due to each factor. The disease has not been so serious this season." - Eastham.

Wilts caused by Fusarium

In the survey conducted for certifying seed potatoes no distinction between various "wilts" is made. The figures here given are for wilts in general; blackleg is, however, supposed to be recorded separately. It should be pointed out that the figures given below represent a general average of the amount of "wilt" found during July and August and do not give a true estimate of the cumulative or total general average. As the figures show, the wilts were not an important factor in production, except in British Columbia.

P.E.I.	0.03	Ont. (N)	0.002
N.S.	0.01	Man.	0.31
N.B.	0.01	Sask.	0.037
Que.	0.16	Alta.	0.02
Ont. (E)	0.02	B.C.	10.07 (see below)
Ont. (S)	0.08		

Ont. (N) "Slight net necrosis or internal brown streak believed to be "physiological" and not true Fusarium - Necrosis was found generally prevalent in Norther Ontario to an average of 60% of both the Irish Cobbler and Green Mountain stock offered for certification." Tucker.

Man. The summer was conducive to the development of wilt, and considerable occurred later in the season. The organism seems to be well distributed throughout Manitoba soils, but probably will not prove so serious in years when better weather for potatoes occurs." - Bisby.

Alta & Sask. "Wilt caused by Fusarium was not generally prevalent." - Fraser and Bailey.

B.C. "Taking the Province as a whole, probably the most serious diseases are the Fusarium wilts and rots. It is not unoommon to find 20% to 25% of the growing plants wilting, while the loss from "Jelly ends" or other forms of rot may reach 20% or more in individual shipments. "Jelly end rot is only reported from the irrigation districts and Ashcroft and Lillooet. Much of the trouble is due to the use of poor seed and absence of rotation, the growers being largely Chinese." - Eastman.

Stem-rot caused by (Rhizoctonia) Corticium vagum solani. Burt

This disease was not so common in the east as it was in Norther Ontario and west. It is expected that the figures given in the potato survey reports are much too low, since many hills counted as misses are due to this disease and many hills are overlooked early in the season.

P.E.I.	slight	Ont. (N)	3.0
N.S.	slight	Man.	0.8
N.B.	slight	Sask.	0.8
Ont. (E)	slight	Alta.	6.2
Ont. (S)	slight	B.C.	?

Ont. (N) "Rhizoctonia is more prevalent then in 1919 throughout Northern Ontario. The average percentage of hills affected by Rhizoctonia in Northern Ontario was about 3%. From 7 - 10% of the tubers show sclerotia." - Tucker.

"The tubers show sclerotia." - Tucker.

Man. "Rhizoctonia caused a great deal of damage the past year, and no portions of Manitoba are known to be free from this trouble. Dry stem rot caused many misses in the fields, and commonly attacked the underground parts during the growing season. The tubers in a large percentage of cases bear the sclerotia or the fungus. Seed treatment is apparently rarely practiced at present." - Bisby.

Alta. & Sask. "Rhizoctonia solani was very severe, much more severe than usual. It is difficult to estimate the percentage of loss due to this disease, but it must be very great." - Fraser and Bailey.

B.C. "Corticium Vagum Solani is also general; no estimates have been made on the injury from this disease." Eastham.

Scab caused by Actinomyces scabies (Thax). - Gussow.

Man. "Scab caused by Actinomyces scabies is common. Seed treatment is scarcely practised." - Bisby.

Alta. & Sask. "Scab was very common." - Fraser and Bailey.

B.C. "Scab is generally prevalent." - Eastham.

Blackleg caused by Bacillus atrosepticus Van Hall

This disease although commonly present everywhere did not assume great importanoe. The figures given below give only the average of percentages found on one inspection in the field and give no good idea as to the total loss later in the season and at digging

time.

P.E.I.	0.27	Ont. (N)	0.90
N.S.	0.15	Man.	0.33
N.B.	0.29	Sask.	0.57
Que.	0.57	Alta.	0.54
Ont. (E)	0.14 (very early)	B.C.	- -
Ont. (S)	0.14 (very early)		

Ont. (N) "Blackleg shows a decided increase over that found in 1919 where the weather was wet and cool early in the season. Mostly occurs late in the season and such potatoes are left in the field, stored potatoes showed an average of 0.5% blackleg." - Tucker.

Man. "Some blackleg occurred early in the season; but the dry season apparently checked it, so that little loss occurred.". - Bisby.

Sask. & Alta. "Blackleg was not so common as in the previous season, but in some places caused serious loss. " - Fraser and Bailey.

Tip burn and hopper burn

Tip burn and hopper burn were negligible factors this season according to reports received. The following are average estimates made in the certified seed survey:

P.E.I.	very slight	Ont. (N)	slight
N.S.	very slight	Man.	very slight
N.B.	very slight	Sask.	slight
Que.	slight	Alta.	very slight
Ont. (E)	slight	B.C.	?
Ont. (S)	slight		

Ont. (N) "Tip burn has been observed in all districts but appears to be most prevalent where the season has been a long dry one. It has been observed also in fields where the weather was wet and cold, and in these cases the Leaf Hopper has been found to be present in fair quantities, which leads one to the conclusion that they may be the cause of Tip Burn to some extent, but are certainly not responsible for all the tip burn seen, as I have been in many fields and made careful search where Tip Burn was present, and found none at all, or so scarce that they could not possibly have been responsible for the amount of injury seen. " - Tucker.

Man. "Tip burn scarcely occurred. Leaf hoppers were found, but not in abundance, although sphids were abundant. " - Bisby.

Mosaic (cause undetermined)

This disease was much less prevalent than last year except in Norther Ontario. The following figures from the 1919 and 1920 seed certification surveys for all varieties show the percentage of plants which showed definite mosaic symptoms:

	1919	1920		1919	1920
P.E.I.	2.9	1.19	Ont. (N)	2.0	4.29
N.S.	11.5	2.59	Man.	3.5	0.74
N.B.	12.5	1.50	Sask.	8.4	0.29
Que.	16.5	1.55	Alta	-	0.09
Ont. (E)	-	1.42	B.C.	-	(see below)
Ont. (S)	-	0.94			

From the 1919 figures for New Brunswick and Quebec and the 1918 figures for Southern Ontario, Mr. P. A. Murphy estimated the following losses due to mosaic.

Province	Year	% plants affected	% loss in crop	Loss in bushels	Loss in dollars
N.B.	1919	12.5	5.	525,000	525,000
Quebec	1919	16.5	5.	1,000,000	1,000,000
S. Ontario	1918	7.0	2.5	478,000	478,000

Ont. (N) "Mosaic has increased over 1919 throughout Northern Ontario, being somewhat more severe in the East than in the West." - Tucker.

Man. "Mosaic is not uncommon, but was found in 1920 to be not nearly so common as leaf roll. Some plants showed the "mosaic dwarf" appearance.". Bisby.

B.C. "Mosaic appears to be rather widely distributed but of slight intensity. The worst cases have been noticed in the Lulu Island districts during the past season where occasionally 25% or more of the plants showed it." - Eastham.

Leaf roll (cause undetermined)

This disease was apparently not so serious this season as it was in 1919, except in Quebec and Northern Ontario where an increase was recorded. This disease together with mosaic and blackleg were as usual the principal causes of reduced yields (up until digging time).

	1919	1920		1919	1920
P.E.I.	.03	.42	Ont. (N)	.9	2.55
N.S.	1.1	.24	Man.	8.4	.53
N.B.	1.1	.16	Sask.	11.9	.43
Que.	.05	1.33	Alta.	-	.06
Ont. (N)	7.2	4.19	B.C.	-	-
Ont. (S)		1.3			

Man. "Most of Manitoba potatoes appear to be quite badly affected with leaf roll. It was found occuring from a trace to 50% or more. The Horticulture Department is arranging for the distribution of certified seed to a few centers throughout the province. It is hoped that healthier, more vigorous stock may soon be generally grown." - Bisby.

Based upon previous estimated and experimental evidence that the yield is reduced from 3/5 to 4/5 in "leaf rolled" hilled, the approximate percentage reduction in yield for the different provinces follows:

P.E.I.	.26 to .34	Ont. (N)	1.53 to 2.04
N.S.	.15 to .20	Man.	.33 to .44
N.B.	.09 to .12	Sask	.25 to .34
Que.	.81 to 1.07	Alta	.03 to .04
Ont. (E)	2.52 to 3.36	B.C.	- -
Ont. (S)	.78 to 1.04		

- RHUBARB DISEASES -

Alta. & Sask. "A disease of rhubarb, probably bacterial was quite severe in some gardens at Indian Head and Scott in Saskatchewan". Fraser and Bailey.

- TOMATO DISEASES -

Leaf blight caused by Septoria lycopersici Speg.

Ont. (E) Slight amount in a few fields. In one case a loss of 25%.

Ont. (S) Not uncommon, moderate infection in many fields.

Man. "Not found"- - Bisby.

B.C. "Has not been recorded in B.C.". - Eastham.

Western blight (cause undetermined)

B.C. "Very serious in the S. Okanaga, not infrequently causing 20 - 25% loss." - Eastham.

Mosaic - (cause undetermined)

Ont. (E) In over 50 fields examined, mosaic was found in 15 fields, mostly showing only a few diseases plants.

Ont. (S) Not uncommon but only slight injury caused.

Man. "Not found". - Bisby.

"Two fields with slight amount, 0.5 to 2%." - Wilcox.

Blossom-end rot (non-parasitic)

Ont. (e) In over 50 fields examined blossom-end rot was common with an average loss of about 3%.

Ont. (S) In over 50 fields examined in Southern Ontario, principally in the Niagara Peninsula blossom-end rot was found only in a few fields and waw causing only a slight loss.

Man. "Blossom-end rot was the worst tomato disease. It was probably favoured by the very dry summer.

It was sent in from Dauphin and other parts of the province and occurred also in the greenhouses." - Bisby.

B.C. "General and especially injurious in the irrigated sections where most of the commercial crop is raised. Eastham.

Black-rot caused by Alternaria solani

Ont. (E) This disease caused an average of about 3% loss and was prevalent throughout Leeds and Frontenac Counties.

Ont. (S) Common, causing 2 to 5% loss.

Man. "Not found". - Bisby.

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