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I N T R O D U C T I O N .

The following is a report on the prevalence of plant diseases during the year 1922.

The success of this survey is due to the splendid reports which have been received from the following collaborators:-

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(Coast and Kootenay Districts).
 - (H.R. McLarty, Officer in Charge Dominion
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(Okanagan Valley and Salmon Arm).
 - (A.T. Davidson, Plant Disease Inspector.
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C E R E A L D I S E A S E S

WHEAT

STEM RUST, caused by Puccinia graminis Pers.

Alberta-

Owing to the dry weather the cereals ripened prematurely, and this prevented many of the plant diseases attaining any serious proportions (DeLong). The weather was very dry in Central and Northern Alberta during the season, and plant diseases were even less than usual. Very little rust was observed on early sown grain. On very late grain a few pustules were present. Collections were made on very late seeded wheat at Edmonton and Vermilion. A little rust was present on heavily irrigated plots at Lethbridge. None could be found on very late seeded wheat at Lacombe.

Saskatchewan-

Stem rust was first found on barberry on May 30th near Saskatoon; the pycnia were advanced and the aecia about opening at Indian Head on June 1. Heavy infection was present at Outlook on June 12th. The aecia^a had been shedding spores for some time. Collections were made at Melville, Sask., on July 12th. It was general by the 18th in Southern Saskatchewan. In the first week of August collections were first made at Saskatoon and Rosthern, and rust was general in Northern Saskatchewan, though only a few pustules here and there in each field by the second week. Late in the season rust was present at

Edmonton on very late wheat, but the main crop showed no rust. There was a considerable development of rust in Southern Saskatchewan, but little injury was done by stem rust this season. This was probably due to the dry weather that prevailed in July. Not since 1915 has wheat been less injured by rust in Western Canada.

Manitoba-

Pycnia were observed on our Agricultural College's five barberry shrubs on May 15, and open aecia on May 18, or about two weeks earlier than last year. Wheat was sown adjoining these shrubs on May 1. It burst shot blades on June 15, and showed rust spots on June 25. This rust developed rapidly within a 30 yard radius of the barberry bushes, and had reached the black spore stage by July 5. This wheat plot extended for 200 yards; but the rust did not spread more than 50 yards for some time, and until there was a general infection throughout the province. On July 12 a survey of rust on the college farm was made as follows:-

<u>From Barberry</u>	<u>Leaves</u>	<u>Per Cent Infected</u>	
		<u>Stem</u>	<u>Heads</u>
30 ft.	100	100	100
200 yds.	100	-	-
$\frac{1}{4}$ mile	20	-	-
500 yds.	20	-	-
600 yds.	22	-	-
700 yds.	5	-	-
750 yds.	15	-	-
1000 yds.	trace	-	-
$\frac{5}{8}$ mile	10	-	-

From here on the infection varies with variety from 5-15%. Beyond the $\frac{1}{2}$ mile the infection is mostly leaf rust. Black stage not visible except in plots adjacent to Barberry.

It was obvious that the rust on the far fields of the farm had not come from the barberry infection centre, as distant fields and other parts of the province had rust as early and as bad as the college plots.

The stem rust was very irregular this year throughout the province, and it would be difficult to account for the severity in some parts and absence in other parts (V. W. Jackson).

Stem rust on wheat was first reported in Western Canada by H. Groh from Manitoba Agricultural College, collected on July 10th. A collection was made on the same date at Morden by W. E. Lake. The latter collection showed secondary infection, so that it must have been present for some days.

Ontario-

Grey County: Comparatively little.

Grenville County: Farmers in this district have variously estimated the loss from stem rust from 25 to 50%. Possibly 25% would be a conservative estimate.

Haldimand County: While present in all parts of the county, was not sufficiently severe to do a great deal of damage.

Wellington County: Grain rusts were not as bad as usual this year.

Port Arthur: Grains were quite seriously affected with stem rust.

Gore Bay: Stem rust was very serious on late grains this year, with a loss estimated at 35%.

Emo: The loss is estimated at 30%.

New Brunswick-

This disease occurs quite generally in New Brunswick. All of the eight fields examined showed its presence. It did not appear to be so active or abundant in 1921 and 1922 as in previous seasons, possibly on account of the dry summers. Losses not estimated.

Prince Edward Island-

Prevalent to a greater extent than last year, and in many cases the crop was severely attacked. Generally speaking, the most severe infection occurred on the most vigorous growth.

LEAF RUST, caused by Puccinia triticina Eriks.

Alberta-

Trace present at Lacombe (DeLong). Not collected elsewhere.

Saskatchewan-

Generally present, but not abundant as in 1921. The first collection was made on June 20th at Manitoba Agricultural College.

Manitoba-

Not nearly so prevalent as in 1921. Although present from July 1st, it did not seem to develop as one would expect from the wet July we had, and the effect on the crop was perhaps very slight.

Ontario-

This disease has caused little or no damage to the wheat this year.

Prince Edward Island-

Very prevalent on both leaves and sheaths, though more abundant on the former.

STINKING SMUT, caused by Tilletia laevis Kuhn and Tilletia tritici (Bjerk) Wint.

Saskatchewan-

Not usually present in best farming sections. One large field near Saskatoon showed 15% infection.

Manitoba-

Developed in 237 heads per fortieth of an acre in untreated check plots from "tagged" seed. This was the worst we have had it in seven years, perhaps because conditions were more favourable (sown Apr. 28, on new ground). As Formaldehyde is generally used throughout the province, very little bunt is noticeable, however.

Ontario-

Waterloo County: This disease caused a loss of 3%.

Grenville County: No serious complaint has been made of this disease.

Haldimand County: It is always present, but not so prevalent this year as in the past. The loss is estimated at 5%.

Wentworth County: It is noted among the diseases most prominent in this county, causing thousands of dollar's worth of loss.

Northern Ontario: No appearance of serious damage having been incurred.

Quebec-

Found in isolated cases, but not causing as serious losses as the loose smut.

New Brunswick-

Found in five of the eight fields examined. Only a few heads in each case. It has been observed to the extent of 1% in previous years.

Prince Edward Island-

Very little of this disease observed this year.

LOOSE SMUT, caused by Ustilago tritici (Pers.) Rostr.

Saskatchewan-

General in occurrence but not more than 1 to 5% in places which came under observation.

Manitoba-

Was more prevalent this year, as were all the smuts on our "Bunt" control plots. Smut averaged 84 heads to the fortieth of an acre or 3360 per acre (June 28.) The other college wheat and fields inspected throughout the province seemed equally infected, and would warrant the use of hot water treatment, especially for barley, which was very badly infected with loose smut this year.

Ontario-

No appreciable damage was observed due to this disease.

Quebec-

Quite serious, and doing much more damage than the stinking smut.

New Brunswick-

Present in the eight fields examined, varying from a few

heads to 3%, average about $\frac{1}{2}$ of 1%. Has frequently been noted during past years on the Experimental Farm, Fredericton.

Prince Edward Island-

General, infection averaging from slight to 4.7%.

Average of fall fields examined would be about 2%.

SCAB, caused by Gibberella saubinetii (Mont) Sacc.

Saskatchewan-

Collections were made at Tisdale. Not generally present.

Manitoba-

A few diseased plants collected at Winnipeg. A Fusarium was found causing damage to wheat at Treesbank.

It probably belonged to this species.

New Brunswick-

Quite common on wheat during the last two seasons; not so pronounced in 1922 as in 1920-21. It promises to be an important disease. It has also been noted on Barley in the test plot at the Experimental Station, Fredericton.

Prince Edward Island-

Found in the three counties this year, being more general than last year, with correspondingly higher infection due to more favourable weather conditions for its development. Average infection 2.5%.

GLUME SPOT, caused by Septoria nodorum Berk.

Alberta-

Trace only (DeLong).

Saskatchewan-

Not much observed. Collections were made in Southern Saskatchewan.

New Brunswick-

Has been noted in every wheat field examined since 1918, occurring on all parts of the plant above ground. It is believed to be one of the chief causes of poor crops. In many cases it does not become apparent until the plants are maturing. Dawson's Golden Chaff, a fall variety, at least shows resistance, if not immunity. No treatments so far tried have given promising results.

GLUME ROT, caused by Bacterium atrofaciens McCulløch

Alberta-

Collections made at Lloydminster; not common.

Saskatchewan-

Not severe in any locality surveyed, though collections were made at various places.

Manitoba-

Collections were made at Winnipeg; not common.

ERGOT, caused by Claviceps purpurea (Fr.) Tul.

Saskatchewan-

Collected on Durum wheat in Southern Saskatchewan.
Not common.

Manitoba-

A few collections were made on wheat.

New Brunswick-

Does not occur generally. Found three infected heads in one field near Sackville. The disease is probably of minor importance.

KRINKLE JOINT: cause unknown

Alberta-

About 10% of affected plants were present in some plots at the Dominion Experimental Station at Lacombe. Present also in surrounding districts (DeLong).

Saskatchewan-

This is marked by a kink or abrupt bend on the lower internodes of the stem. As the plants become old the stem breaks at this point and the plant falls over. It was found most severe in the variety Major.

POWDERY MILDEW, caused by Erysiphe graminis DC.

Saskatchewan-

This was prominent in plots at Rosthern.

Prince Edward Island-

Several heavy infections observed. Not general.

HEAD BLIGHT and STEM ROT,
caused by Helminthosporium sativum (P) K. & B.

Saskatchewan-

A Helminthosporium was common on the stems and heads of wheat, causing blight of heads and rot of the base of the stems. The spores closely resemble H. sativum. It was common and severe on Durum wheats.

OATS

STEM RUST, caused by Puccinia graminis Pers.

Saskatchewan-

Distribution similar to stem rust of wheat; appearing in some places before wheat stem rust. The stem rust was very severe on late oats in Southern Saskatchewan, and must have lessened the yield to a considerable extent.

Manitoba-

Very severe on late oats in Southern Manitoba. Appeared early at Brandon.

Ontario-

Waterloo County: Responsible for a loss of about 15%.

Grenville County: A loss of 10% would be a conservative estimate.

Frontenac County: Quite prevalent on late sown grain that had lodged.

Haldimand County: Present in all parts of the county, but not sufficiently severe to do a great deal of damage.

Lanark County: The percentage of fields affected is quite high. Some fields of late oats were so badly affected that not over 5% of the plants headed, and it had to be cut green for feed.

Wentworth County: This was among the most prominent diseases this year.

Northern Ontario: Quite serious, with losses estimated from 15 to 20%.

New Brunswick-

Present in most fields and developing more severely late in the season; early observations not positive.

Prince Edward Island-

General throughout the province and often severe.

LEAF RUST or CROWN RUST, caused by Puccinia coronata Cda.

Saskatchewan-

The aecial stage of this rust was very severe on

Rhamnus cathartica in Southern Saskatchewan in early

summer. It was so abundant that the buckthorns appeared yellow at some distance. It was present, but

less severe, in the northern part of the province.

The crown rust was very severe in Southern Saskatchewan and extended northward as far at least as Saskatoon, but not nearly so severe as in the south.

Manitoba-

Very severe on late oats in Southern Manitoba.

Ontario-

Grey County: Prevalent, though no serious loss incurred.

Huron County: This has been by far the most destructive disease this year. While its ravages cannot be said to have been general, yet in quite a few cases we have had bad attacks of this disease. In the vicinity of Belgrave two or three farmers have had their oat crops injured to the extent of about 50%. In this locality we found a good many buckthorn hedges. Two or three miles from the locality where the buckthorn hedges were, oats were as fine a crop as you could expect to see.

Brant County: A number of farmers in this district report that oats which should have yielded from forty to fifty bushels per acre are only yielding from eighteen to twenty bushels. This must be due entirely to the rust of grain. Farmers agree that leaf rust of oats is largely responsible for this decreased yield.

Waterloo County: Damage done to the extent of about 15%.

Lampton County: Late sown oats as usual have suffered considerably.

Frontenac County: Quite prevalent on late sown oats which had lodged. The damage amounted to about 5%.

Durham County: Rusts have been particularly bad this year in oats, especially the Leaf Rust. Some very promising fields filled so poorly that they were not worth thrashing. I would estimate that the damage done by this disease throughout, was at least 10%, and I am putting it low.

Haldimand County: This disease has been very bad during the past season. There is one section of the county where the oat crop was practically a total failure due to this disease. I may state that there is a Buckthorn hedge on one of these farms, and for a distance of about three miles in each direction the oat crop is practically a total loss. When the oat crop in this district started to ripen it was so badly affected with rust that it simply wilted down and the grain did not fill up. While this section is of course very exceptional, I would estimate that the loss due to this disease for the entire county is between 15 and 20%.

Wellington County: Not so bad as usual this year.

Lanark County: 75% of the oats were affected with leaf rust to a greater or lesser extent.

York County: There was considerable leaf rust this year.

Wentworth County: This disease has caused thousands of dollars worth of loss throughout this county this year. Many fields of oats which gave promise of good crops turned out very poorly on account of leaf rust.

Oxford County: This is the only disease which has done appreciable damage in this county this year.

This damage has been observed chiefly in sections in which Buckthorn hedges are growing. In the areas examined I would estimate the damage done by this disease at not less than 5% of the total crop.

Port Arthur: The loss on account of leaf rust is about 3%.

Dryden: Quite severe.

Emo: Very little damage has been done this year.

Prince Edward Island-

General, but apparently causing little damage.

SMUT, caused by Ustilago avenae (Pers.) Jens.
and Ustilago levis (K. & S.) Magn.

Alberta-

Considerable present in S. Alberta varying from 1 to 10%.

Saskatchewan-

Covered smut common, but not generally above 5%, usually much less. Loose smut not much observed.

Manitoba-

Covered smut present. No data as to percentage available.

Ontario-

Wellington County: The result of six surveys in which actual counts were made in this county, which is fairly representative for the whole Province of Ontario, showed that the amount of oat smut present in the fields averaged 3%.

Grey County: In some fields this disease was as high as 10%.

Frontenac County: The loose smut of oats has caused from 5 to 20% loss, the higher amounts only occurring in a few cases.

Haldimand County: Loss from this disease was very small.

Lanark County: The amount of smut present this year was the smallest in the history of the county. I do not think there would be over 2% of smut present. Large numbers of fields were entirely free from this trouble.

Wentworth County: This was one of the prominent diseases in the county this year.

Port Arthur: The loose smut of oats has caused more loss here this year than it has ever done before in the district, some fields being fully 50% smut, while there were very few fields indeed that were not slightly affected. The loss from this disease would probably average about 15% of the oat crop.

Dryden: A great deal of loss has been caused this year by loose smut of oats; on an average I think this loss would amount to 20% and in some cases run as high as 40%.

Gobe Bay: This disease is quite common and generally distributed.

Emo: There has been very little damage this year.

New Brunswick-

Loose smut is present in all sections of the province.

Twenty-five fields examined showed from 2% to 10%.

The average was $4\frac{1}{2}\%$ infected. No field was found free from it. A higher count would probably have been obtained if careful record had been made on the same fields throughout the season.

Covered smut was not recorded in any of the fields.

Prince Edward Island-

Very common, and severe in exceptional cases, where infection ranged as high as 21%. Average of all reports, however, was 4.1%.

HALO BLIGHT, caused by Bacterium coronafaciens Elliot

Saskatchewan-

Common and quite severe in some fields.

SCAB, caused by Gibberella Saubinetii (Mont.) Sacc.

New Brunswick-

This disease was first noted as being of importance in fields on the Experimental Farm, Fredericton, in 1920, where as high as 5% of the heads were infected. It was observed in five fields out of twenty-five examined in 1922, averaging about $\frac{1}{2}$ to 1%. Not recorded as serious.

BARLEY

STEM RUST, caused by Puccinia graminis Pers.

Alberta-

Small amount present in North-eastern Alberta. None collected in Edmonton, Lacombe or Lethbridge districts.

Saskatchewan-

Common on barley, but not doing much damage. Distribution generally the same as the stem rust of wheat

Manitoba-

General, but not causing much damage.

Ontario-

Port Arthur; Very slight. Not more than 20%.

Prince Edward Island-

Very common throughout the province; while infection was usually slight to moderate, several severe cases observed.

SMUT, caused by Ustilago nuda (Jens.) K. & S.
and Ustilago Hordei (Pers.) K. & S.

Alberta-

Present. Collections made at Raymond and Vermilion.

Saskatchewan-

Covered smut present, varying amount; generally only a small percentage present, but in some fields five to ten per cent.

Loose smut observed, but not much. One field at Rosthern showed about ten per cent.

Ontario-

Frontenac County: Loose smut has been noticed in a few cases, but the damage did not exceed 5%.

Haldimand County: Loose smut present, though I am unable to estimate the loss.

Prince Edward Island-

Loose smut was fairly general where barley was grown, infection averaging about 5.2%.

STRIPE DISEASE, caused by Pleospora gramineum Diet.

Alberta-

About one per cent present (DeLong).

Saskatchewan-

General in occurrence and quite severe in some localities.

Manitoba-

General, quite severe in some localities.

Prince Edward Island-

Generally present, though usually only to a slight extent.

NET BLOTCH, caused by Helminthosporium teres Sacc.

Alberta-

About 2% present.

Saskatchewan-

Not common; collections were made at several places.

Manitoba-

Present, but not severe.

Prince Edward Island-

Not observed.

LEAF SPOT or SCALD,
caused by Rhynchosporium secalis (Heins) Davis.

Alberta-

Collections were made on the plots of the University field experiments at Edmonton. It was quite severe in a few spots, but not general. This disease was present last year at Edmonton in about the same degree of severity. This is the first report in Canada of this disease which is serious in the Mississippi Valley.

RYE

LEAF RUST, caused by Puccinia dispersa E. & H.

Alberta-

Present on winter rye at Lacombe.

Saskatchewan-

Common on winter rye. General.

Manitoba-

Common on winter rye.

ERGOT, caused by Claviceps purpurea (Fr.) Tul.

Alberta -

About 3% present (DeLong).

Manitoba -

Present as usual, but not severe.

STEM RUST, caused by Puccinia graminis Pers.

Manitoba -

Present, but not severe.

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

ALFALFA

LEAF SPOT, caused by Pseudopeziza medicaginis (Lib.) Sacc.

British Columbia, Coast and Kootenay-
Quite common as usual, but rarely doing any serious
damage.

Alberta-
About 5 to 10% present.

Prince Edward Island-
General, but not severe.

ROOT ROT or WILT, caused by
Sclerotinia trifoliorum Eriks.

British Columbia, Coast and Kootenay-
No new infected areas reported.

Prince Edward Island-
Absent.

DOWNY MILDEW, caused by Peronospora trifoliorum de Bary

Prince Edward Island-
Absent.

CLOWERS

POWDERY MILDEW, caused by Erysiphe polygoni DC.

Manitoba-
Present in clover at Morden.

Eastern Canada-
Extremely prevalent this season. Reports from every

province indicate its presence being widespread. In Ontario specimens have been sent from as far north as Sudbury and Temagami. In Western Quebec Dr. Dickson says, "Present to an astonishing extent - fields of clover looking as though powdered with flour."

New Brunswick-

Practically every field or patch of clover was infected in 1922. The leaves were distinctly whitened. Its common occurrence and rapid development was due to the wet weather of June and July.

Prince Edward Island-

This disease was general throughout the province, and in many cases the leaves were severely infected.

RUST, caused by Uromyces trifolii (Pers.) Fcl.

Alberta-

Locally common.

Saskatchewan-

A collection was made at Melford. Not observed elsewhere.

Prince Edward Island-

Present to a moderate extent. Not general. In no case severe.

SOOTY SPOT, caused by Phyllachora trifolii (Pers.) Fcl.

Manitoba-

Collected at Winnipeg. Conidial stage only.

Western Quebec-

Was of frequent occurrence, but did not cause any perceptible loss.

MOSAIC, cause unknown

Western Quebec-

Was again common in certain areas.

New Brunswick-

This disease has not been observed in New Brunswick.

LEAF SPOT, caused by Pseudopeziza trifolii (Pers.) Fckl.

New Brunswick-

This fungus developed abundantly on clovers throughout New Brunswick, and undoubtedly causes considerable loss in quality and quantity.

CORN

SMUT, caused by Ustilago Zeae Schw.

Ontario-

Exceptionally prevalent in Carleton County, causing a loss varying from 2 to 10%.

Prince Edward Island-

Not observed.

RUST, caused by Puccinia sorghi Schw.

Manitoba-

Collections made at Morden. Not severe.

Prince Edward Island-

Not observed.

FLAX

RUST, caused by Melampsora Lini DC.

Saskatchewan-

Not commonly observed. A few collections made.

Ontario-

Quite common on the experimental plots at the Central Experimental Farm at Ottawa, causing considerable loss in the fiber qualities of some plots.

Prince Edward Island-

Slight infection observed.

WILT, caused by Fusarium Lini Bolley.

Saskatchewan-

Not general. Very severe in some fields in the southern part of the province.

GRASSES

STEM RUST, caused by Puccinia graminis Pers.

Alberta-

Collected on Hordeum jubatum at MacLeod.

Saskatchewan-

Common on susceptible grasses late in the season.

Manitoba-

Common on susceptible grasses.

ERGOT, caused by Claviceps purpurea (Fr.) Tul.

Saskatchewan-

Common on many grasses, particularly the following:

Agropyron smithii Rydb.

Spartina pectinata Bosc.

Calamagrostis americana Scrib.

Elymus macounii Vasey.

Agropyron repens (L) Beauv.

RUST, caused by Puccinia clematidis (DC.) Lagerh.

Manitoba-

Common on Agropyron tenerum Vasey, and other species of Agropyron, Bromus and Elymus.

STRIPE RUST, caused by
Puccinia glumarum (Shum.) Er. and Hu.

Alberta-

Collections were made on Hordeum jubatum at MacLeod.

SMUT, caused by Ustilago Agropyri Clinton

Alberta-

Specimens of this smut were sent in from Olds by
H. S. MacLeod.

MILLET

SMUT, caused by Sorosporium Syntherismae (Peck.) Farl.

Saskatchewan-

Collected on University plots at Saskatoon by
Professor Kirk.

SUNFLOWER

DROP or WILT, caused by Sclerotinia sp., probably libertiana

British Columbia, Coast and Kootenay-

Found at two points in the lower Fraser Valley. Only
a small percentage of plants affected.

Okanagan and Salmon Arm-
A slight infection on the Experimental Station,
Summerland.

Manitoba-

Present at Winnipeg, but not common.

Quebec-

Samples of sunflower stems suffering from Sclerotinia
rot and wilt were sent in from all parts of Quebec,
indicating its widespread occurrence. It has been
impossible to ascertain the infection percentage.

Ontario-

A very heavy infection in the sunflowers for seed
at the Central Experimental Farm, Ottawa, causing the
death of 45% of the plants in a two acre patch.

RUST, caused by Puccinia helianthi Schw.

Saskatchewan-

Generally present, but not doing much damage.

Manitoba-

General in Southern Manitoba, but not very severe.

Ontario-

Exceedingly common at the Central Experimental Farm, Ottawa, causing a certain amount of defoliation, but the extent of the loss is questionable.

Quebec-

Was exceedingly common (75%) during September.

POWDERY MILDEW, caused by Erysiphe cichoracearum DC.

Manitoba-

Present on experimental plots at Brandon. Not severe.

BURNING of foliage

NOTICED in Vernon district and at Experimental Station, Summerland. At Summerland trouble was apparently brought about by drought.

F R U I T D I S E A S E S

APPLE

SCAB, caused by Venturia inaequalis (Cke.) Wint.

British Columbia, Coast and Kootenay-

Owing to the abnormally dry summer, Scab was much less in evidence than usual; even unsprayed McIntosh Red at the Coast have only shown 5 to 10% infection in many cases.

Okanagan Valley and Salmon Arm-
Some Scab occurs in the Salmon Arm and Vernon districts but no losses have occurred where the ordinary sprays have been applied.

Manitoba-

Collected at Winnipeg and Morden.

Ontario-

Prevalent throughout the province. Many unsprayed or poorly sprayed orchards suffered a comparatively heavy late infection on fruit.

Quebec-

There was a heavy infection wherever spraying was not done or where orchards were poorly sprayed.

New Brunswick-

This disease is ever present, and causes a very large amount of damage every year. Spraying, while greatly reducing infection, seldom completely eliminates it. Certain varieties are more infected than others. It can always be found in any orchard on the twigs, leaves and fruit. Probably more severe in 1922 than in 1921.

Prince Edward Island-

This disease was present to a much larger extent than during the previous year, though it was well controlled by spraying. Where spraying was neglected leaf and fruit infection averaged 26% and 58% respectively.

FIRE BLIGHT, caused by Bacillus amylovorus (Burr) Trev.

British Columbia, Coast and Kootenay-

There was an increased amount of this on the West Arm of the Kootenay Lake, especially at Harrop. No new areas of infestation reported.

Okanagan Valley and Salmon Arm-

This disease was again serious in the Salmon Arm and Northern Okanagan districts. South of Kelowna the disease has been kept well in hand.

Ontario-

There was a comparatively heavy infection of twig blight on apples in various parts of the district. Little effort is made during the season to prune out diseased branches.

New Brunswick-

No records with positive diagnosis. It is not of common occurrence.

Prince Edward Island-

Very little found this year.

BLACK ROT CANKER, caused by Physalospora cydoniae Arn.

Manitoba-

Present, attacking the leaves at Morden. Not severe.

Ontario-

Present in many orchards, but no severe fruit infection.

Quebec-

While not common, was frequently found.

New Brunswick-

This is probably the most destructive fungus found in the apple orchards of New Brunswick. It is especially active in producing cankers. The almost complete destruction of some orchards is attributed to it. It has been exceptionally active following the severe winter of 1918. Leaf spots caused by it are exceptionally common and probably materially assist in the early defoliation of trees.

Prince Edward Island-

Not observed.

EUROPEAN CANKER, caused by Nectria galligena Bres.

British Columbia, Coast and Kootenay-

Has been noticed in a few trees on city lots in Vancouver, but apparently of no economic importance to the apple industry.

Prince Edward Island-

Not observed.

ANTHRACNOSE, caused by Neofabraea malicorticis (Cord) Jack.

British Columbia, Coast and Kootenay-

The usual amount was found in unsprayed orchards at the Coast, but fall spraying is now being carried out with almost complete control in commercial orchards.

Okanagan Valley and Salmon Arm-
Cankers from this cause in Salmon Arm and occasionally in the Vernon district. Infection as a rule is not severe, spraying being only advisable in certain cases.

BITTER ROT, caused by
Glomerella rufomaculans Späuld. & Von Sch.

Quebec-

Found in two orchards on Fameuse apples, but only to a slight extent.

New Brunswick-

This fungus causes considerable injury in the form of a bitter rot of the fruit and cankers on the branches. Has been noted from several sections of the province.

SOOTY BLOTCH, caused by
Gloeodes pomigena (Schw.) Colby

Ontario-

Found in occasional orchards which are poorly cared for. Northern Spy appeared to be most susceptible, with infections ranging up to 12% of the fruit.

POWDERY MILDEW, caused by
Podosphaera leucotricha (E. & E.) Salm.

British Columbia, Okanagan Valley and Salmon Arm-
Although there was a serious infection last year, this disease was this year practically absent throughout the whole district. This has been due, no doubt, to weather conditions being unfavourable for the fungus during the early part of the season.

Prince Edward Island-
Not observed.

COLLAR ROT, caused by Armillaria mellea (Vahl.) Quel.

British Columbia, Okanagan Valley and Salmon Arm-
There is throughout the whole Okanagan and Salmon Arm districts a very considerable amount of this disease. While no systematic count has been made to determine the number of trees affected, it would be safe to say that at least thousands of trees are lost throughout the whole district every year.

LEAF SPOT, caused by Phyllosticta sp.

Quebec-

In one orchard to the extent of 100%.

FRUIT SPOT, caused by Cylindrosporium pomi Brooks

New Brunswick-

This fungus is rather prevalent and causes considerable loss some seasons. In 1919 some orchardists reported 100% of the fruit infected on some trees.

BROWN ROT, caused by Sclerotinia cinerea (Bon.) Wor.

Quebec-

Was noted from many sources on Yellow Transparent and Montreal apples.

SILVER LEAF, caused by Stereum purpureum Pers.

In 1919 and 1920 this disease was very prevalent and caused considerable uneasiness among fruit men. During 1921 and 1922 many of the trees infected in previous seasons failed to show symptoms. However, the disease is present in practically every orchard, probably not exceeding 1% of the trees.

CANKER, caused by Nectria sp.

Cankers on young trees and branches of apples, particularly in the St. John Valley nursery, have been noted each year. These may follow winter killing and are attributed to Nectria cinnabarina (Tode) Fr.

PHYSIOLOGICAL DISEASES

BITTER PIT

British Columbia, Okanagan Valley and Salmon Arm-

Has occurred throughout the whole district and is more prevalent this year than last. Several car-load lots have been turned down because of it.

Ontario-

Few varieties affected. Baldwins showed up to 75% infection in Lincoln County.

DROUGHT SPOT

British Columbia, Okanagan Valley and Salmon Arm-
Losses from this source have been very considerable,
the disease occurring in several orchards in each
district. In some orchards the loss from this
cause was as high as 75%.

CORE ROT

(Note: The writer has not seen any literature giving an exact description of this trouble. It is characterized by a few corky spots in the neighbourhood of the vascular ring at the core, and by a somewhat water cored appearance inside this vascular ring. The injury occurred at some time before thinning.)

British Columbia, Okanagan Valley and Salmon Arm-
In the Salmon Arm district an exceedingly heavy loss has been incurred through this disease.. Fully twenty-five thousand boxes of Wealthies and from 30 to 40% of the Jonathan and McIntosh varieties were found to be unmarketable.

WINTER INJURY

British Columbia, Okanagan Valley and Salmon Arm-
In the Salmon Arm district and occasionally in certain orchards throughout the Okanagan, there was considerable loss due to winter injury of the roots. North of Salmon Arm, the trees in a few orchards were severely injured at the crown.

CHERRY

BROWN ROT, caused by Sclerotinia cinerea (Bon.) Wor.

British Columbia, Coast and Kootenay-

Only present in Coastal area. Very little on fruit this season. Severe blossom blight on cherries, especially Olivets, at Gordon Head, Victoria, 10% to 75% of the blossoms being destroyed.

Saskatchewan-

Common on the wild chokecherries at Prince Albert and Saskatoon, causing a twig blight.

Manitoba-

Present on cherries at Morden.

Ontario-

Orchards having poor air drainage or adjacent to peach orchards showed from light to heavy blossom blight. Several reports of 100% blossom blight from such orchards. Fruit infections were more serious on varieties of sweet cherries, causing up to 75% loss. Losses in shipments ran up to 100%.

Prince Edward Island-

Little appreciable damage was caused by this disease. Affected fruits averaged about 1.5%.

LEAF BLIGHT, caused by Coccomyces sp.

Ontario-

An excellent year for comparison of the effects of spraying. Unsprayed orchards suffered from 75-100% defoliation. Sprayed orchards were only slightly attacked. An orchard was noted where one-half of

the trees had received two applications and the other half three applications of spray. The former suffered 30-40% defoliation, whereas there was practically no disease present on the latter.

Prince Edward Island-

General, affected leaves averaging 6%.

POWDERY MILDEW, caused by
Podosphaera oxyacanthae (DC.) deBary

Saskatchewan-

Common on sand cherries at Saskatoon.

Manitoba-

On cherries at Morden.

BLIGHT, caused by Coryneum beijerinckii Oud.

Saskatchewan-

This blight was very severe on the leaves and fruit of the cultivated sand cherries at the University of Saskatchewan.

CURL, caused by Taphrina cerasi (Fcl.) Sad.

One case of this disease was observed in the Penticton district.

CURRENT

RUST, caused by Cronartium ribicola F. de Wal.

British Columbia, Coast and Kootenay-

The area in which the disease was discovered last year has been much extended, the disease being present at the Coast for over one hundred miles north of Vancouver and east to the Cascade Range. Unfortunately it has also been located in the Railway Belt of the Interior from Chase to Revelstoke and south to Beaton, Arrowhead and Mabel Lake. The disease on Ribes has been less severe than last year. Some plantations of R. nigrum which showed 100% telial infection in October last year showed little or none at the same time this year.

Ontario-

Commonly found throughout the district, but not as serious as leaf spots. Defoliation of many patches by this agency two to three weeks after the leaf spot defoliation.

Prince Edward Island-

One very severe case of this disease was found in Queen's County, in a plantation of black currants about 90% of the leaves were infected. This is the first record of its occurrence in this province. White pines growing in the vicinity did not show any symptoms of the disease.

LEAF SPOTS, caused by Mycosphaerella grossulariae Lag.
Pseudopeziza ribis Kle.

British Columbia, Coast and Kootenay-
Present in the Lower Maitland and Vancouver Island
areas, but not serious.

Saskatchewan-
Present at Scott and Indian Head. Not severe.

Ontario-
Severe infections throughout the district, causing a
heavy defoliation in many patches prior to the usual
defoliation from these causes.

Prince Edward Island-
Leaf spots were much more in evidence this year, and
in many cases the foliage was severely infected.

RUST, caused by Puccinia grossulariae Lag.

Saskatchewan-
Common on wild and cultivated currants and goose-
berries.

Prince Edward Island-
Not observed this year.

POWDERY MILDEW, caused by
Sphaerotheca mors-uvae (Schw.) B. & C.

Saskatchewan-
Very severe on the twigs of black currants on the
University plantation.

GOOSEBERRY

POWDERY MILDEW, caused by
Sphaerotheca mors-uvae (Schw.) B. & C.

British Columbia, Coast and Kootenay-
General, but not usually severe on American varieties

These constituted the majority of the varieties grown.

Prince Edward Island-
Not observed.

RUST, caused by Puccinia pringsheimiana Kleb.

Specimens of this disease were sent to the Central
Laboratory, Ottawa, from Winnipeg, Man., and Matapedia,
Que.

LEAF SPOTS, caused by
Mycosphaerella grossulariae (Fr.) Lind. Pseudopeziza ribis Kleb.

British Columbia, Coast and Kootenay-
Present, but not serious.

Prince Edward Island-
Very prevalent, though causing little apparent injury.

GRAPE

BLACK ROT, caused by Guignardia bidwellii (Ell.) V. & R.

Ontario-
Early infections were quite common in the local vine-
yards, but the disease was fairly well controlled by
spraying. Many vineyards which had been poorly kept
or were in dead air-pockets suffered up to 50% loss.

DOWNY MILDEW, caused by
Plasmopara viticola (B. & C.) Berl. & deToni

Ontario-

Reported present from all parts of the district.
Loss not severe, up to 2%. Most of the infection
was on leaves.

Quebec-

Common this year on leaves, tendrils, shoots and
fruit.

POWDERY MILDEW, caused by Uncinula necator (Schw.) Burr.

Ontario-

Not serious enough to cause appreciable loss. Slight
infection on berries in some vineyards.

DEAD ARM, caused by
Cryptosporella viticola (Red.) Shear.

Ontario-

Not as prevalent as reported last year. This disease
was confused with chlorosis due to wet feet this year,
in which case affected vines gradually recovered.

PEACH

CURL, caused by Taphrina deformans (Fcl.) Tul.

British Columbia, Okanagan Valley and Salmon Arm-

A few cases of the disease were observed where a
spray had not been applied. Sprayed orchards sus-
tained no loss.

Ontario-

About the usual amount present throughout the Niagara district. Few cases of severe defoliation. The growers seem well satisfied with the early spring spray as a control measure.

BROWN ROT, caused by
Sclerotinia cinerea (Bon.) Schr.

Ontario-

A few orchards near the lake suffered a severe early twig and blossom infection. Later infections on the fruit were continuous throughout the season, and in some orchards serious killing of the twigs was noticeable. The Mountain Rose variety were most susceptible to this latter type of infection. Specimens were obtained showing the development of discolored wood running 12-18 inches from the clinging rotted fruit. The loss due to brown rot was not of importance this year on account of the very heavy crop.

SCAB, caused by Cladosporium carpophilum Thüm.

Ontario-

Of little importance in this district. A few orchards reported a moderate infection, practically none in most.

YELLOWS: cause unknown

Ontario-

This disease is kept in check by the inspection service under the Ontario Government. A few isolated

trees were found in Lincoln County. These are all marked for eradication.

. POWDERY MILDEW, caused by
Sphaerotheca pannosa (Wal.) Lev.

Ontario-

Found in orchards where air drainage is poor. Affected trees showed as high as 100% leaf infection. Not general in severity.

PEAR

FIRE BLIGHT, caused by
Bacillus amylovorus (Burr) DeToni

British Columbia, Okanagan Valley and Salmon Arm-
This disease has again been very serious in certain districts, while others have been almost free. In Salmon Arm, Vernon and Kelowna, blossom infection was severe in spite of a very vigorous attempt on the part of the growers to get their orchards clean during the winter. In the Penticton and Summerland districts the growers have obtained the upper hand, with the result that there were practically no losses this year. On the whole, however, conditions are improved over those of a year ago.

Ontario-

Most destructive disease of pears in the Niagara district. Very common this year on both apples and pears.

Prince Edward Island-
Not observed.

SCAB, caused by Venturia pyrina Aderh.

British Columbia, Coast and Kootenay-

Much less than usual. Even at the coast the fruit was almost clean.

Ontario-

Prevalent in many localities, causing a cracking of fruit where attacked heavily. Specimens were received from London, Ontario, showing very severe cracking and splitting of the fruit due to scab.

Prince Edward Island-

Very slight.

CROWN GALL, caused by Bacillus tumefaciens E.F.S.

Ontario-

A small orchard in Grantham township was severely attacked. Several trees were killed which on digging out were found to have a large number of galls of various sizes on the roots. The soil had been previously planted to raspberries.

CORE ROT: cause unknown

This trouble appears to be of a physiological nature, and is characterized by a breaking down of the fruit at the calyx end, and by the formation of an abnormal number of stone cells in the flesh. In the Penticton district one orchard was affected where about 5% of the fruit was lost. (Okanagan Valley and Salmon Arm)

PLUM

BROWN ROT, caused by
Sclerotinia cinerea (Bon.) Schr.

British Columbia, Coast and Kootenay-
Of little importance this year.

Manitoba-
Present on plums at Morden.

Ontario-
Not serious until fruit ripened. Heavy infection at
that time in many orchards. Loss not appreciable on
account of heavy crop and low price.

Quebec-
Cultivated plums suffered to the extent of 1%.

Prince Edward Island-
Was found to a moderate extent. In no case, however,
did it cause serious damage.

PLUM POCKETS, caused by
Taphrina pruni (Fcl.) Tul.

Saskatchewan-
Severe at Rosthern. Reported from several places.

Manitoba-
Much more prevalent than usual. Severe at Winnipeg.
Collected also at Cartwright and other points.

Ontario-
Quite prevalent, especially at Nairn Centre, Powassan
and Ottawa.

Quebec-
Wild plums heavily infected; cultivated ones infected
in Indian Lorette, Lanovale and other places.

Prince Edward Island-
Not observed.

BLACK KNOT, caused by
Dibotryon morbosum (Schw.) T. & S.

Prince Edward Island-

Occurs in some districts, but is not general. Severe cases were only found in neglected orchards.

LEAF SPOT, caused by Coccomyces prunophorae Higg.

Not common. An orchard of Japanese varieties in Louth township suffered a moderate defoliation due to a combination of this disease and bordeaux spray injury. (Ontario)

RASPBERRY

MOSAIC; cause unknown

British Columbia, Coast and Kootenay-

Noticed this year in the Barnaby district, but did not seem to be doing any great degree of injury.

Ontario-

This disease is becoming increasingly important throughout the entire Niagara district. Considerable spread was reported in fruiting plantations and young plantations adjacent to these. It is hoped that the advent of certified disease-free stock will materially aid in the control of both leaf curl and mosaic. In addition to the districts reported in last year's survey may be added:

Elgin County: (St. Thomas to Port Burwell)
13 plantations Cuthbert showing from
1 to 10% mosaic.
3 plantations Cuthbert apparently free.

Northumberland County: (near Brighton)
1 plantation Cuthbert - 7%.

Simcoe County: (near Waterford)
1 plantation Cuthbert 20 acres, near
Port Rowan - 15%.

Other plantations near Waterford with 0 - 20% mosaic present. The younger plantations 2 - 4 years old are most severely affected in this district, indicating a comparatively recent introduction.

Quebec-

Was especially noticeable this season. In this district the Colombia variety was added to the susceptible list.

Prince Edward Island-

General this year, and in several cases more severe than in the previous season. Little spread, however, appeared to have taken place.

LEAF CURL: cause unknown

Ontario-

About the same prevalence as reported last year. Growers are taking a more active part in attempting to control this disease. Heavily affected plantations were dug out and new plantations are being carefully rogued.

Prince Edward Island-

The occurrence of this trouble this year was comparable to that of the previous. The Cuthbert was the only variety found to be affected.

SPUR BLIGHT, caused by Mycosphaerella rubina (Pk.) Jacz.

Ontario-

Prevalent to a slight degree in many localities, but not doing any damage. Most noticeable in the Herbert variety.

CROWN GALL, caused by Bacterium tumefaciens E.F.S.

Ontario-

Common, but not causing much damage in fruiting plantations. Reported as severe in a Snyder black-berry patch near Waterford, causing the formation of excrescences on the canes for 1 - 2 feet above the ground.

ANTHRACNOSE, caused by Gloeosporium venetum Speg.

Ontario-

Not common on red varieties, but commonly found on black varieties throughout the district. Slight to severe on Marlboro in Waterford and London districts. Slight on Cuthberts near Waterford.

BLUE STEM, caused by Acrostalagmus caulophagus Lawrence

Ontario-

Found present in several plantations of black raspberries and in seedling plots at Vineland. The organism was isolated and its identity established by comparison with the original description given by W. H. Lawrence (Wash. Agr. Expt. Sta. Bul. 108, 1912).

WINTER INJURY

Ontario-

Raspberry plantations three years old and upwards suffered severe winter injury in many localities. Entire plantations were destroyed in some cases. The injury was done after Feb. 6, 1922, but no attempt has been made to determine the actual cause or time.

STRAWBERRY

POWDERY MILDEW, caused by Sphaerotheca humuli (DC.) Burr.

Saskatchewan-

Rather severe at Saskatoon. Also present at Rosthern.

Ontario-

Present to slight degree in many parts of the district. No serious loss reported, as control measures are commonly practised against this disease.

Prince Edward Island-

General, and often severe. Average leaf infection in plantations examined - 12%.

LEAF SCORCH, caused by Mollisia earliana (E. & E.)

Ontario-

This is the most serious disease on strawberries in Southern Ontario. Losses up to 50% of the crop have been reported due to the defoliation of the plants and consequent poor set of fruit. Many patches showed up to 100% infection on leaves and petioles.

Applications of Bordeaux mixture give very good control for both this disease and leaf spot. Sulphur dust is useless.

Prince Edward Island-
Not observed.

LEAF SPOT, caused by
Mycosphaerella fragariae (Schw.) Link.

Saskatchewan-
Present at Saskatoon. Not severe.

Ontario-
Generally distributed throughout the Niagara district.
Only a few cases of loss up to 20% reported from this disease.

Prince Edward Island-
General in distribution, but in most cases the infection was slight.

APRICOT

WINTER INJURY

Considerable damage was caused by winter injury to the crown and roots. (Okanagan Valley and Salmon Arm)

QUINCE

RUST, caused by Gymnosporangium sp.

Ontario-
Of little importance, but present in isolated orchards in varying degrees of severity.

LEAF BLIGHT, caused by Fabraea maculata (Lev.) Atk.

Ontario-

Severe infection of the black spot or fruit spot stage of this disease was reported from Queenston district. Shipments of fruit showed a marked inferior condition due to this spot. No reports concerning leaf blight are available.

VEGETABLE AND FIELD CROP DISEASES

ASPARAGUS

RUST, caused by Puccinia Asparagi DC.

Not of serious importance; nevertheless it has been found wherever looked for late in the season. A few heavy infections noted.

RUSTY TIPS: cause unknown

A rusty browning of the marketable tips has been noted from time to time both in the gardens of growers and on the stock offered for sale. There is no indication that the yield is reduced, but many of the tips are unmarketable. This disease has been noted in New Brunswick, Quebec and Ontario.

BEAN

ANTHRACNOSE, caused by
Colletotrichum lindemuthianum (S. & M.) B. & C.

British Columbia, Coast and Kootenay-
Present in Fraser Valley, but not important.

Manitoba-
Severe on some varieties at Morden.

Quebec-
Prevalent, the season being ideal for its rapid development and spread.

New Brunswick-

Common everywhere on all bush beans; seldom if ever on pole beans. It frequently causes a loss of from 50% to 75%. Not so severe during the last two seasons, but more severe in 1922 than in 1921. In 1921 it did not develop until very late in the season on account of the exceptionally dry season. This disease is very much more common and injurious in New Brunswick than in Ontario or Western Quebec. It occurs on stems, leaves, pods and seed.

Prince Edward Island-

Very prevalent; severe in a few localities.

BACTERIAL BLIGHT, caused by
Pseudomonas Phaseoli E.F.S.

Saskatchewan-

Present, but not as severe as usual.

Manitoba-

Quite severe in some localities.

Quebec-

Prevalent, the season being ideal for its development and spread.

New Brunswick-

This disease does not develop to the same extent as in Ontario and Quebec, and is not nearly so destructive in New Brunswick. Usually present in the form of leaf spots. In 1920 some lots of beans were badly injured during early growth. Common, but not serious in 1922.

Prince Edward Island-

Generally distributed, and in some cases heavy infections were found. As a general rule, however, prevalence was moderate.

MOSAIC: cause unknown

Quebec-

Less noticeable, although frequent.

New Brunswick-

This disease is not common in New Brunswick, although noted in a number of gardens. It is known to be carried in the seed and to spread from diseased to healthy plants. Most beans planted in New Brunswick are obtained from Ontario sources; consequently, the amount present depends to a large extent on the conditions of the crop in Ontario and Québec from which the seed came. It is impossible to give any general statement on the spread of the disease or the amount which might develop if the growers used local seed. Data available would indicate that it does not naturally spread rapidly under New Brunswick conditions. It has been noted in considerable abundance in former years in Ontario and Quebec.

STEM ROT and WILT, caused by
Sclerotinia libertiana (Fckl.)

Quebec-

Of local occurrence and quite common.

New Brunswick-

This fungus is present in a large proportion of the soil in the Experimental Station garden at Fredericton. It has caused serious loss to the bean crop during the last five seasons. In some sections the crop has been completely destroyed. It has been observed in

different sections of New Brunswick, Québec and Nova Scotia.

RUST, caused by Uromyces appendiculatus (Pers.) Link.

New Brunswick-

This trouble has only been noted once on bush beans and three times on pole beans. When present it proved very destructive, attacking stems, leaves and pods, resulting in greatly decreased yields and inferior pods. If common this disease would be equally as serious as anthracnose.

BEET

New Brunswick-

Beets are grown only in home gardens and by vegetable gardeners, and then only to a very limited amount. There are no field sugar beets grown in New Brunswick.

RHIZOCTONIA

New Brunswick-

This disease occurs quite commonly, but not of serious proportions. Four years ago considerable injury was noted in the sugar beet fields of Southern Ontario.

SCAB, caused by Actinomyces scabies (Thax.) Gûs.

The scab caused by this organism seldom occurs.

LEAF SPOT, caused by
Cercospora beticola Sacc.

New Brunswick-

This disease is quite common, and usually present to a limited extent, but no serious injury has been noted. Four years ago in Southern Ontario several fields visited showed many of the older leaves dead and badly infected, causing appreciable injury.

CABBAGE

BLACK ROT, caused by
Pseudomonas campestris (Pamm.) E.F.S.

Ontario-

Prevalent in many fields to a moderate extent. Loss not great, as the crop is heavy and prices are low.

CARROT

RHIZOCTONIA

New Brunswick-

This fungus frequently causes a storage rot of carrots. The trouble has not been noted in the field, but infection undoubtedly takes place before or at the time of harvesting. Not important.

ROT, caused by Sclerotinia libertiana Fckl.

New Brunswick-

A disease noted during 1920 and 1921, causing a yellowing and browning of the top and a browning of the crown

of the carrot is attributed to this fungus. The fungus was isolated from infected carrots and also carrots showing rot in the spring. Its occurrence in different sections is suspected.

CELERY

LATE BLIGHT, caused by
Septoria petroselini Desm.

Quebec-

Common and serious on Paris Golden, but Self Blanching was only slightly affected.

Ontario-

Especially destructive in storage beds, causing a rot of the leaves.

EARLY BLIGHT, caused by
Cereospora apii Fr.

Ontario-

Very prevalent in Lincoln County and causing a serious loss in many plantings.

New Brunswick-

Not common nor ordinarily destructive; one very severe outbreak noted.

SOFT ROT, caused by
Bacillus carotovorus E.F.S.

New Brunswick-

Occasionally soft rot becomes troublesome, developing late in the season. No cases noted in 1922.

CUCUMBER

ANTHRACNOSE, caused by
Colletotrichum lagenarium (Pers.) E. & H.

New Brunswick-

Present, but not noted as being severe during the last two seasons. Three years ago several cucumber fields were severely infected, causing heavy losses, both vines and fruit being injured. The disease has also been noted as causing considerable injury to pumpkins, particularly on the fruit.

WILT, caused by Bacillus tracheiphilus E.F.S.

New Brunswick-

This disease has not been noted; wilted vines have been observed, but could not be attributed to this organism.

Quebec-

Occurred in practically every plot. The wilting was of the slow-developing type.

MOSAIC: cause unknown

New Brunswick-

The mosaic of Cucumbers is common in gardens on the lower St. John River; several severe cases have been noted and others reported.

LETTUCE

DROP, caused by Sclerotinia libertiana Fckl.

New Brunswick-

This disease almost invariably develops on plants left in the gardens until the flower stalks commence to form. It is frequently accompanied by Botrytis infection.

ONION

SMUT, caused by Urocystis cepulae Frost

Quebec-

Was serious in several large areas near Montreal.

DOWNY MILDEW, caused by
Peronospora schleideni Ung.

Quebec-

Occurred in isolated areas, and while alone it was not serious, great loss was sustained because it was followed rapidly by a Botrytis sp.

NECK ROT, caused by Botrytis alii Munn.

Saskatchewan-

Present in stored onions at Saskatoon.

PINK ROOT or ROOT ROT, caused by
Fusarium malli Taub.

Quebec-

Present and serious, the wilted leaves being attacked

by a Botrytis sp. and the loss aggravated.

PEA

POWDERY MILDEW, caused by
Erysiphe polygoni DC.

British Columbia, Coast and Kootenay-
Present in garden peas, but generally appearing too
late to do much harm.

Prince Edward Island-
Present, but to a slight extent; not general.

ROOT ROT, caused by various fungi - undetermined.

Ontario-

Out of 3,000 acres of peas in the Wellington district
of Prince Edward County, about 14% loss was sustained.
This loss is placed at \$12,000 for 1922 (J.F.Hockey).
In certain parts of the province, especially in Prince
Edward County, there has been a great deal of trouble
with wilt and blight of canning peas. This trouble
is probably due to a fusarium, at least in part, the
exact species I am not prepared to state. The same
disease is present to some extent in other canning
regions of the province, but not quite as bad as in
Prince Edward County (R.E. Stone).

MOSAIC

Quebec-

This disease was found in rather isolated areas.

PEPPER

BLOSSOM END ROT: cause unknown

British Columbia, Okanagan Valley and Salmon Arm-
Caused considerable damage wherever peppers were grown.
In the case of one grower the loss was 45% of the crop.

TOMATO

WESTERN YELLOW BLIGHT: cause unknown

British Columbia, Okanagan Valley and Salmon Arm-
Severe only in Osoyoos and Meremeos districts, caus-
ing losses of from 15 to 30% of the crop.

BLOSSOM END ROT: cause unknown

British Columbia, Okanagan Valley and Salmon Arm-
Of general occurrence. Not severe.

LEAF SPOT, caused by Septoria lycopersici Speg.

Ontario-

Very prevalent throughout the Niagara district,
causing up to 75% reduction in yield. This disease
continued for some time and completely defoliated
many crops.

New Brunswick-

This fungus causes considerable damage to tomatoes in
New Brunswick. It was not noted as being severe in
1922. Among the growers in the Grand Lake section
it causes heavy losses, some reporting as high as 50%
of the crop, due to premature defoliation of the plants.

LEAF MOLD, caused by Cladosporium fulvum Cke.

New Brunswick-

Identified on tomato fruit collected at the Experimental Farm. Occurrence elsewhere not noted.

DOWNY MILDEW, caused by
Phytophthora infestans (Mont.) DeBary

New Brunswick-

Has been reported in previous years. One garden at New Castle was severely infected this year. It is probably more prevalent than observations indicate.

EARLY BLIGHT, caused by
Alternaria solani (E. & M.) J. & G.

Quebec-

Very common during late August and September, and spotting of the fruit with a subsequent rot occurred in September.

New Brunswick-

Noted in several gardens, but not considered of importance. Only definitely identified on specimens from three sources.

ANTHRACNOSE, caused by
Colletotrichum phomoides (Sacc.) Chest.

New Brunswick-

This disease has frequently been observed on tomatoes in the Experimental Farm garden in former years, but not noted in 1922.

MOSAIC: cause unknown

Quebec-

Present, but not to the same extent as in 1920 and 1921.

New Brunswick-

Observed in only one garden in 1922. Three plants showed well-marked Mosaic and did not produce an average crop. The disease was also observed in one garden in 1921. It is not common in New Brunswick.

Prince Edward Island-

General, but not severe.

WILT, caused by Sclerotinia libertiana Fekl.

New Brunswick-

This fungus has been identified with the premature death of individual plants on the Experimental Farm during the last three seasons. It has not been noted elsewhere.

TURNIP

CLUB ROOT, caused by Plasmodiophora brassicae Wor.

New Brunswick-

This disease is the most widely distributed and most destructive disease of turnips and cabbage in New Brunswick. There is no section free from it; possibly this is due largely to the fact that most soils in the province are acid. The sections most severely infected are in the live stock or mixed farming sections. Some live stock men, particularly in parts

of Westmoreland, Albert, King's and Queen's Counties, are unable to successfully grow turnips on account of the disease. The truck growers on the lower St. John sustain heavy losses with their cabbage and turnip crop through Club Root.

Prince Edward Island-

Very few cases observed. Moderate in severity.

BLACK ROT, caused by
Pseudomonas campestris (Pammel) E.F.S.

New Brunswick-

The black rot of cabbage is present in most fields to the extent of approximately $\frac{1}{2}$ of 1%, but not considered serious.

SOFT ROT, caused by
Bacillus carotovorus Jones

New Brunswick-

Soft rots are present in practically every field of turnips or cabbage. Apparently they are more abundant following heavy infestations of aphids. Localized sections of fields are frequently badly injured. Damage estimated at 2%.

WHITE RUST, caused by Cystopus candidus (Pers.) Lev.

New Brunswick-

Have noted it on three occasions; not believed to be of importance.

DOWNY MILDEW, caused by
Peronospora parasitica (Pers.) DeBary

New Brunswick--

Always present, particularly late in the season, but
no apparent injury.

STORAGE ROTS

New Brunswick--

Probably caused by various organisms; species of
Bacteria, Fusaria, Botrytis and Sclerotinia have been
isolated. Frequently 10 to 25% and even more of the
turnips placed in storage rot before spring are af-
fected, particularly if not kept very cool and well
ventilated. This heavy percentage of rot is also
believed to be due to the fact that turnips grown
here show no signs of maturing before harvesting.

RHUBARB

CROWN ROT: cause unknown

A disease probably due to bacteria, is prevalent in
Saskatchewan. It seems to be increasing in severity.

ORNAMENTAL PLANT DISEASES

ASTER

WILT, caused by Fusarium conglutinans Wall.

Ontario-

Very common this year, causing considerable losses in private gardens and commercial aster plantations.

STEM ROT, caused by
Sclerotinia libertiana Fckl.

New Brunswick-

This fungus has been frequently noted as causing a stem rot of asters at the Experimental Station, Fredericton, but not elsewhere. It has also been noted on numerous other flowering plants in the same vicinity. Whole patches of flowers have been killed down in August and September. It was also noted on sunflowers in 1920 at Middleton, N.S.

YELLOWs: cause unknown

Ontario-

Common at the Experimental Farm, Ottawa, but not as bad as last year.

New Brunswick-

This is by far the most serious disease. During the last seven years not a single aster bed has been examined which did not contain a large proportion of injured plants; frequently from 50 to 75% were infected. The trouble is equally distributed in all sections of the province.

BARBERRY

RUST, caused by Puccinia graminis Pers.

Manitoba-

The aecidial stage was present on barberries in the city of Winnipeg, but not at all severe.

HOLLYHOCK

RUST, caused by Puccinia malvacearum Mont.

New Brunswick-

This disease is very destructive; no plants have been examined which were free from it. A hedge set in May this year, was almost completely defoliated by September. Other such cases have been reported. Some varieties show some resistance.

HONEYSUCKLE

POWDERY MILDEW, caused by
Microsphaera alni (Wall.) Salm.

Manitoba-

Quite severe at Morden.

IRIS

RHIZOME ROT, caused by
Bacillus carotovorus E.F.S.

Ontario-

Iris growers in Ottawa have experienced severe losses from this disease, particularly in the more recently introduced varieties.

Quebec-

Prevalent wherever this plant is grown. There appears to be little doubt that injury to the rhizomes during spring cultivation opens points of infection in the plants.

PEONY

LEAF AND STEM SPOT, caused by
Septoria paeoniae West var. berolinensis Allesch.

Quebec-

Very prevalent.

OTHER DISEASES

Quebec-

During the late summer an Alternaria leaf spot and Cladosporium blight became common. In one large nursery the roots of newly planted peonies blackened and died. They were like india rubber in texture. The trouble appears to be due to a Fusarium sp.

ROSES

RUST, caused by Phragmidium spp.

Manitoba-

Rust of the genus Phragmidium was very common on wild roses and present on the cultivated roses at Morden.

SWEET PEA

STREAK, caused by
Bacillus lathyri M. & T.

Quebec-

Occurred frequently, especially during September.

MOSAIC: cause unknown

Quebec-

Mosaic was noticeable in many plots, but was not so common as "stignonose" and leaf curl caused by aphids.

F O R E S T A N D S H A D E T R E E D I S E A S E S

ARBOR VITAE

RED BRANCH (See BALSAM)

BALSAM

RED BRANCH (See also ARBOR VITAE, PINES
and SPIKE BRANCH of SPRUCE)

The commonest theory for the cause of this disease is that of snow pressure, but it has been found that the most frequent cause is a combination of two factors, namely, insect gnawing of the bark and the subsequent drying out of the living tissues at the same level.

This disease is of frequent occurrence in Eastern Canada. The dead, red-needled branches are conspicuous against the dark green setting of normal, living foliage.

The insects concerned are bark beetles of the genus Monohamus. The so-called Spike Branch disease of Spruce is brought about by the same cause.

(J.H. Faull)

BUTT and HEART ROTS, caused by various fungi

The amount of loss due to butt and heart rot fungi of forest trees generally is enormous; they are easily the most destructive agents of the forest. Mature stands will show a destruction up to 50% or more. The butt rots as a rule do not extend more than a few feet from the ground, while

the heart rots work throughout the merchantable parts of the trunks.

In the balsam there are three important butt rots and one heart rot. Some of the fungi found associated with the butt rots have been Polyporus balsameus Peck, Poria sub-acida Pers. and possibly Polyporus schweinitzii Fries. The heart rot known in Quebec as "hemlock rot" of balsam, is probably the outstanding menace of the balsam stands of Eastern Canada at the present time. In some stands recently cut, over 65% of the timber has been rejected from this cause. Its definite distribution cannot be stated, but so far it has been found in Northern Ontario, Western Quebec and is extremely common in middle and Eastern Quebec.
(J.H. Faull)

RUSTS

Among these, the rusts which have various ferns as their secondary hosts cause the greatest damage, especially to seedlings and younger trees. The other rusts are probably of little or no economic importance at any time.

Caeoma arctica with the alternate phase Melampsora arctica on willows has been found on balsam in Nova Scotia but has not yet been reported from Ontario.

The following is a list of the balsam rusts found in the Temagami Forest Reserve with their alternate hosts:-

<u>Abies Balsamea</u>	<u>Alternate Hosts</u>
<u>Peridermium columnare</u> (O & I) Blueberry Rust of balsam	<u>Calyptospora columnaris</u> (III) on <u>Vaccinium pennsylvanicum</u> and <u>V. canadense</u>

Abies Balsamea

Alternate Hosts

Peridermium pustulatum (O & I)
Fireweed rust of balsam

Pucciniastrum pustulatum
on Epilobium angustifolium
(II & III) and E. adenocaulon
(II & III)

Peridermium balsameum (O & I)
Fern rusts of balsam

Uredinopsis Osmundae (II & III)
on Osmunda claytoniana and
O. cinnamomea
U. mirabilis II & III on
Onoclea sensibilis
U. Struthiopteridis II on
Onoclea struthiopteris
U. Phegopteridis (II & III)
on Phegopteris Dryopteris
U. Atkinsonii (II & III) on
Asplenium filix-foemina

Peridermium pycnogrande Bell.
(O & I)
Fern rust of balsam

U. polypodophila Bell. (II)
on Polypodium vulgare
(Connection with balsam not
yet established by artificial
inoculations)

Peridermium pycnoconspicuum
Bell. (O & I)
Fern rust of balsam

Hyalospora Aspidiotus (II)
on Phegopteris Dryopteris

Peridermium elatinum (O & I)
Chickweed rust of balsam

Melampsorella elatina (II)
on Cerastium vulgatum and
Stellaria graminea

(J.H. Faull)

BUTTERNUT

LEAF SPOT, caused by
Gnomonia veneta Kleb.

Quebec-

Practically all the butternut trees were defoliated
at least a month earlier than normally.

ELM

LEAF SPOT, caused by Dothidella ulmi Duv.

Quebec-

Most of the American elms in Eastern Quebec carried

approximately a 30% infection.

HORSE CHESTNUT

LEAF SPOT, caused by
Phyllosticta sphaeropsidea E. & E.

Ontario-

Very prevalent throughout Southern Ontario, causing a heavy defoliation in mid summer and later.

PINES (See also WHITE PINES)

RED BRANCH (see BALSAM)

POPLARS

RUST, caused by Melampsora medusae Thum.

Manitoba-

Quite severe on poplars at Morden, causing defoliation. Collections were also made at other places.

MILDEW, caused by Uncinula salicis (DC.) Wint.

Manitoba-

Common in shady places.

SPRUCE

SPIKE BRANCH (See RED BRANCH of BALSAM)

WHITE PINES

BLISTER RUST, caused by
Cronartium ribicola F. de Wald.

See also under CURRANTS Page 35.

Pinus monticola Dougl.

British Columbia-

Infected trees have been found closely associated with diseased currants and gooseberries. At Daisy Lake on the Pacific Great Eastern Railway rust is epidemic. On a plot of two acres, 80 trees from 1 to 5 inches in diameter have been killed. In many cases, as a result of the large number of separate infections, death has occurred previous to the production of aecidia.

Pinus albicaulis Engelm.

British Columbia-

One case of infection on this species was found in the university grounds at Point Grey.

Pinus strobus L.

Eastern Canada-

No diseased white pines were found at the northern limits of distribution of the rust.

In Nova Scotia the disease was found at the following points: Kentville, Weymouth, Truro, River John, Nappan, Pictou and Rockingham Station. In all cases it was the cultivated black currant (Ribes nigrum L.) which was infected.

In New Brunswick rust was found at Little Shemogue on black currants.

WILLOW

CANKER, caused by Dothichiza populea S. & B.

New Brunswick-

Trees dying, presumably from this cause, have been noted near Port Elgin, Little Shemogue and Bayside.

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