The Weather and Its Influence on Plant Disease

In the Coastal area of British Columbia during 1940, the weather was characterized by a very mild winter, a wet and mild early spring and a dry June. Due to the low precipitation in June, the yield of field crops was in general below average.

Leaf mould of tomatoes appeared earlier than usual in greenhouses and caused considerable damage. The disease was probably favoured by the higher than average temperature in late winter and early spring.

The mild winter and higher precipitation in early spring was favourable for the early spread of leaf spots of grasses, tulip fire, narcissus smoulder and downy mildew of hops. The dry weather in June checked most of these diseases, particularly downy mildew of hop and yellow rust of raspberries.

Late blight was general on potatoes in the Lower Mainland, but damage was mostly confined to tubers dug late; rainfall was slightly above average in October.

In Alberta, the winter of 1939-40 was exceptionally mild and there was relatively little mortality in the over-wintering stands of legumes, grasses, and winter wheat. Seeding was greatly delayed by a wet, late spring, but subsequent growth was rapid under the generally favourable conditions which prevailed during June and July. Browning root rot of cereals was much less prevalent than in 1939 and did not cause any appreciable damage. Certain foliage diseases, however, developed rapidly under the moist conditions in July and were unusually common.

Crop maturity was hastened by hot, dry weather during August. In some districts this resulted in premature ripening and shrivelling of the grain. Under these conditions stem and leaf rust of wheat spread slowly, despite unusually heavy primary infections, and there was very little rust damage. Take-all of wheat caused the least damage observed in several years, but common root rot of cereals was not noticeably reduced. Very little frost damage occurred, in spite of the late season. Harvesting of the heavy crop was delayed by wet weather in September and considerable threshing was not yet done when the snow came in late October.

Seeding started at Saskatoon on April 22, 1940, which was about a week earlier than in 1939.

While the supply of moisture varied widely in different parts of the province, there was probably sufficient for germination in most districts. Certain districts had no reserve moisture in stubble land due to the heavy crop of 1939 and lack of rain and snow after its harvest, and some soil drifting occurred early in May. Seeding was delayed in south central, southwestern, and the southern part of west central Saskatchewan due to wetness of the land. The weather during the normal seeding period

in southern Sask. was cold and backward. With the exception of the areas mentioned above, most districts were suffering from lack of moisture by the fourth week in May and some uneven germination and retarded growth were evident. Rainfall up to this time was unevenly distributed and the weather varied from cool to warm. Drought conditions in east central, northern, and the northern part of south central Sask., forced the crops prematurely during June and they headed early and were light. The weather was generally cool during June and some frost occurred, causing some damage in low areas. Crops in many areas, notably south east, Regina-Weyburn and central, suffered a serious decline during the first three weeks in July. This was due to hot weather and lack of rain. Up to this time the crop was generally free of disease except for small areas where rust-susceptible varieties of wheat were grown. In these areas in south central and south western Sask. where rainfall was abundant, stem rust became severe on the susceptible varieties and light on others and some damage was caused. Leaf rust of wheat and leaf spots of wheat, oats and barley also were prevalent in the wetter areas, notably northeastern Sask. Common rootrot was slight during the cool weather in June but increased in severity in July especially in the dry areas. On the whole it was less severe than in 1939. Severe browning rootrot was found in N.E. Sask. where moisture conditions were good. In general the areas of severe infection were small and scattered and on the whole the disease was less severe than in 1939. This may be due to the almost complete absence of hot dry winds and the occurrence of cool and moderately good growing weather in June. The weather during the first two weeks in August varied from extremely hot to moderately warm and precipitation was light. Some early reports of damage to threshed grain by cracking were received; this is popularly associated with dry hot weather during ripening. Later, occasional rainfalls, together with warm weather caused some sprouting of unthreshed wheat and also of threshed wheat stored in piles in the fields.

Observations on weather conditions in Manitoba will be found under stem rust of wheat.

The weather in the Niagara Peninsula was particularly favourable for the development of fungus diseases. Rainfall was not only above the average in May and June, but periods of precipitation were more numerous and the monthly mean relative humidity was higher. The hours of bright sunshine were very few in May and generally the temperature remained cool. Spells of continued wet, cool weather would last for 4-6 days. One such spell occurred during the blooming period of peaches and cherries and resulted in an exceptional amount of blossom blight. It also favoured a heavy primary scab infection of apples and unusual instances of spray injury from materials ordinarily employed with safety. Another more or less prolonged wet spell occurred in the latter part of June. In this period secondary apple scab lesions became numerous, brown rot of green fruit, especially cherries, developed, the latter an unusual occurrence. It was at this time also that the initial infection of Cherry Shot-hole developed which later became epidemic. In late August frequent rains and prolonged damp periods initiated a serious outbreak of brown rot of the maturing early varieties of peaches. The backward weather delayed the normal ripening of the fruit and at the same time favoured the rot.

In Quebec, the fall of 1939 was generally mild. Snowfall in October was heavier than usual, but on account of mild weather and frequent rains, snow did not remain on the ground. There was very little snow in November and December and rainfall was heavier in the eastern than in the western part of the Province. Winter months in 1940 were colder than those of the past 5 years; snowfall was also very light and the ground in several districts was barely covered with snow. Fortunately there was no freezing and thawing and consequently meadows and pastures were in good condition in the spring.

Due to frequent rains and cold weather during the latter part of May and the early half of June, seeding was late throughout the Province, especially in eastern and northern Quebec. Growth was slow but pasturage was abundant. May and June were exceptionally wet; precipitation was much above the average for the last 16 years. In fact it was the wettest June since 1917. Serious damage was caused to crops on low lands. In certain localities potato tubers rotted in the soil. Although apple scab appeared between June 8-10, which is about 10 days later than last year, the disease was severe in neglected orchards. Even in well-cared for orchards it was difficult to control the disease on account of the frequent rains that delayed spraying. Fire blight appeared in early June and spread rapidly in certain localities.

Throughout the Province, frosts were reported during the summer months. During the last part of June heavy frosts caused considerable damage to young crops. Beans, corn, cucumbers, tomatoes, tobacco and potatoes suffered more than other crops. On the Island of Orleans a 50% reduction of the strawberry crop was attributed to late frosts. A hail storm on the last day of June injured orchard crops south of Montreal and field crops, especially tobacco, in the Three Rivers and Joliette districts.

July and August were rather dry. As the majority of days were cloudy, the temperature was low, August being exceptionally cool. Frosts were reported from various districts in July and August. Around Montreal, hollow heart was quite common in potatoes due to rapid and excessive growth. Garden crops suffered from various rots on account of the excessive moisture accumulated in the soil during June. Sand storms in July caused some damage to young growing crops around Joliette and Three Rivers.

Late blight appeared toward the middle of July in western Quebec and on the last days of July the first symptoms were observed in the lower St. Lawrence. However, in fields well exposed to winds, the disease did not spread until the latter part of August or September, while in other fields the disease became severe in early August, favoured as it was by cool nights and heavy dew. Although September and October were relatively dry months as compared to the same months during the last five years, the potato crop in a large number of fields was severely affected with late blight. August, September and October were remarkable for their long hours of sunshine, especially in eastern Quebec. Heavy frosts were registered in September and in a few localities snow covered the ground

early in October before crops reached complete maturity.

Winter conditions in New Brunswick during 1939-40 were somewhat less rigorous than the average. Since only 0.49 inches of rain fell during January and February, relatively little ice formed in the fields. There was no great depth of snow on the ground at any time, but an adequate blanket covered the fields from December 30 until March 31.

Grasses and clovers, strawberries, apple orchards and small fruits came through the winter in good condition.

Spring ploughing began May 7, and the seeding of wheat and oats May 15. During the last few weeks of May, rain storms were frequent, causing in many cases, on poorly drained soils, exceptionally late planting of grains and potatoes.

Satisfactory weather was experienced during the blooming period of apples which was moderately light. The development of perithecia in over-wintered apple leaves was considerably delayed and the number of fruit bodies developed per leaf was the lowest ever recorded. The first ascospore discharge was recorded May 25, when the blossoms were in the pink stage of development. Apple scab was unimportant in well-sprayed orchards but destructive in those poorly sprayed. Russeting was general in orchards sprayed with copper sprays during the pre-blossom stages when wet cool weather prevailed.

The first eighteen days of July were marked by only two light rainfalls, but the last thirteen days of the month were wet or cloudy. Powdery mildews were general and severe on certain varieties of grain during the last week of July. Leaf rust of wheat was first noted July 25, but this year's infection was of little importance. Stem rust of wheat was observed July 31, but only traces of the disease were noted throughout the season. Late blight of potatoes developed during the second week in July. The infection spread rapidly during the next two weeks and was then checked by dry weather conditions.

Almost four inches of rain fell in August but the downpours were confined to four specific dates. Crown rust of oats appeared August 9, in oat fields adjacent to buckthorn. This rust caused little if any damage except in oat fields adjacent to the alternate host.

September was characterized by frequent heavy rainfalls accompanied in many cases by strong winds. Much lodging of grain occurred. Late blight of potatoes became general and a serious epiphytotic was averted by a killing frost of 3 degrees on September 27.

Ten degrees of frost were recorded October 17 and 14 degrees on October 21. On the latter date one inch of snow also fell. A considerable acreage of potatoes and nearly all the root crop were unharvested at this

time. The ground thawed October 25, enabling harvesting of these crops. Frequent rains in this month kept the soil in a very wet condition. Ploughing ceased November 23.

Apple trees retained their foliage late on into the month of December.

The spring opened slowly in Nova Scotia, with vegetation somewhat backward in development. Early seeding of grain crops was possible in some areas, but wet soil forced late seeding in many. The summer was cool, but unfavourable to any serious epidemic or wind- or rain-borne diseases. Insect vectors of virus diseases were plentiful on potatoes and carrots. The mid summer was comparatively dry as well as cool, and root crops, strawberry plantings, etc., made their best growth during September when moisture and temperature conditions were more favourable.

Severe gales in September and frosts in mid October caused considerable damage to fruit and root crops. There were some indications of slight winter injury to trees from the October freezes.

The winter of 1940 was milder than the previous year in Prince Edward Island. With a good blanket of snow remaining throughout the season and no January thaw, winter killing of clovers, shrubs and garden perennials was at a minimum.

Mean temperatures for both April and May were higher than in 1939, but April was lower and May only slightly higher than the previous five year average. Total precipitation for the two months was also higher than the five year average and as a result sowing and planting operations were somewhat delayed. No discharge of brown rot or apple scab spores was noted before the blossom period and consequently these diseases were not severe during the past season.

June was warmer than the previous year and 2.77 inches of rain fell in contrast to 1.18 inches in 1939. This provided excellent growing weather and grain and early planted potatoes made vigorous growth during the month.

July temperatures were approximately normal and although August was a dry clear month the mean temperature was 4.6 degrees lower than in 1939. Only slight infections of leaf and stem rust of wheat, and barley occurred and crown rust of oats was almost non-existant. The light precipitation during August and the abundance of sunshine and clear days were factors in controlling any outbreaks of late blight.

During September 8.05 inches of rain fell as compared to 4.04 inches in 1939 and a mean temperature of 59.2 degrees for the month provided suitable conditions for late blight. As a result, at digging time considerable late blight rot was in evidence in fields that had not been sprayed late in the season.

October, while not as wot as the previous year, was considerably colder, thus the harvesting of potatoes, turnips and mangels was somewhat delayed. In some instances potatoes were slightly damaged in the fields from frost. Nine inches of snow fell during October and the first killing frost was recorded on October 17.