The Weather and its Influence on Plant Disease

The 1957-58 winter on the lower mainland of B.C. was remarkable for its mildness despite killing frosts early in Oct. In the Vancouver area there was only one-half inch of snow and tender plants in sheltered gardens survived. Jan. and Feb. were unusually mild with above average rainfall. March and April were warm with more sunshine and less rain than usual. The month of May was the sunniest in 30 years and the rainfall was abnormally low. Rust appeared on fall-sown cereals in the middle of May in plots at the University.

Sunshine was average for June and above average for July. Gray mold rot caused by Botrytis cinerea was not a problem in strawberries and raspberries. Drought became general in July and continued into Aug. and much of the raspberry crop dried on the vines. Grains and pastures suffered from the summer drought but the pastures recovered following Sept. rains.

The first general frost occurred during the last week in Sept. but severe frosts did not occur until 15 Nov. A light snowfall followed on 17 Nov. Because of the severe water shortage during the summer in urban areas it is expected that many of the dried-out perennials and flowering shrubs may suffer considerable damage in the winter of 1958-59 (H.N.W. Toms).

In the B.C. Interior the winter was one of the mildest on record. Fruit trees and other perennial plants began to emerge from dormancy in early March and were, therefore, especially vulnerable to cold injury for a period of two months before the end of the normal spring frost season. Temperatures during this period, however, did not fall below 30°F and no serious frost injury was recorded.

By mid-spring the threat from parasitic diseases was serious. Ascospores of the apple scab fungus were mature in some districts by 1 April. Frequent light showers in April provided minimum apple scab infection periods and sparse foliage infections were found in several districts. Brown rot blossom and twig blight caused by Monilinia laxa was reported in apricot and chokecherry in some areas in early May.

From late April until early Sept. the weather throughout the B.C. Interior was steadily hot and dry. There were no additional apple scab infection periods in the Okanagan and Creston Valleys. However, in the moister area bordering the west arm of Kootenay Lake unsprayed trees had 100% fruit infection. Powdery mildew of apple was relatively severe for the first time

since the severe winter of 1955-56. Mild winters characteristically favor powdery mildew outbreaks in succeeding summers. Fire blight remained severe in scattered orchards in most districts, but the most serious spread again occurred in mid-summer rather than at blossom time (M. F. Welsh).

In the Creston Valley of B.C. there was some rainfall early in the season but the above average temperatures and low rainfall during the summer and fall eliminated the threat of any serious fungus disease problems (J. M. Wilks).

Severe drought conditions prevailed in 1958 in the northern and eastern portions of the Peace River area and c. Alta. The incidence of leaf diseases on barley, the major crop, closely followed the rainfall pattern and were therefore important only in the south and west portions of the area surveyed. Barley was the major crop, and scald the most prevalent disease. Scald incidence in most fields rated light to moderate, the degree of infection apparently being influenced by the intensity of barley cropping in the particular fields. Net blotch was present in trace to light amounts but it seemed likely that some of the late crops would be more severely affected before they matured. Bacterial blight was also important in some of the later crops. Septoria leaf blotch was practically absent. Loose smut was noticeably less prevalent than in 1957, probably reflecting unfavorable conditions for infection in 1958. Rootrots were prevalent in wheat fields but damage was less than in most years. Oats and flax were relatively free of diseases in 1958 (W. P. Campbell, W. P. Skoropad).

In s. Alta. the winter of 1957-58 was mild and winter wheat and herbaceous perennials had a higher than normal rate of survival. High temperatures in May favored the development of damping-off diseases in cereals and special crops. There was sufficient moisture throughout the growing season to provide conditions for the development of foliage diseases on all crops. (J. B. Lebeau).

The spring and early summer seasons were very dry in most of Sask. Rainfall was about 50% of normal over a large part of the province. Fortunately the temperature was also below normal. The effect of the cool. dry conditions was evident in the slow development of leaf and stem diseases, rust and ergot. These diseases were much less severe and appeared later than in other years. On the other hand, blossom end rot of tomato was more prevalent than usual. Frequent rains during Sept. encouraged rapid and heavy development of mildews on various crops and leaf spots of legumes (H. W. Mead).

In Man. the weather in April was warm with average rainfall and some seedling of cereal crops was done. The temperature at Winnipeg on 1 May was 12°F, the coldest on record, and the wind velocity was 24 m.p.h. On 12 May, in contrast, the temperature has risen to 90.5°F, the hottest on record, and the wind velocity was 30 m.p.h. The very low rainfall in May, the strong winds and the extremes of temperature resulted in patchy germination. Temperatures of 30-31°F were recorded at many places on 5 June and during the period 10-13 June. Many complaints of seedling blight, especially of barley, were received but due to the distribution patterns of the injury frost damage was usually not suspected. However, an accumulation of evidence indicated that it was always in the early-sown fields and fields where there were slight depressions that the most damage occurred. Presumably more rapid germination had occurred in these fields and because they were more advanced they were hardest hit by frost. At Brandon varietial differences in susceptibility to frost were noted. Damage to barley varied from the appearance of white band across the uppermost leaf to death of all above ground parts. Further frost damage occurrred near the United States border on 23 June, on which date Winnipeg had a record low of 33.8°F. The drought continued through to 27 June. Between 28 June and 4 July there were 4.73 inches of rain at Winnipeg and rain was fairly widespread in the province. The fields of frost-damaged barley, which had made little growth since the first frost, now showed a rapid recovery. After 4 July the weather was about normal with a tendency to become drier than usual as the season advanced.

The patchy germination was a factor leading to other troubles later in the season. For example, several reports from Sask. noted that 10 per cent or more of the oat plants were leaning badly or were flat on the ground though they showed no signs of wilting. These plants were characterized by very short crown roots and it was suggested that they were living on their seminal roots. Shallow seeding, soil drifting, and drought were probably responsible.

Another condition in which the stem was bent 1-2 inches above the second node was fairly common, usually in wheat. The condition, known as "knuckle joint", is said to be due to wind or heavy rain 1-10 days after heading (H.A.H. Wallace).

In s.w. Ont. the general weather picture was similar to that of 1957. Comparatively dry and warm weather in early April was followed by much cooler weather at the end of that month and during mucy of May. The average monthly temperatures were below normal for the entire summer. Frequent rain showers in the fruit and vegetable growing areas produced lush growth for most of the growing season.

Favorable conditions permitted the early planting and successful establishment of early vegetable crops. Big vein of lettuce was observed for the first time in the district. The comparatively cool spring growing season favored the expression of symptoms.

Several crops, particularly in Essex Co., suffered from one of the most severe and prolonged aphid infestations on record. The potato, melon and green peach aphids were among those most prevalent on vegetable crops. The prevailing low temperatures markedly reduced the effectiveness of aphicides. As a result of the high aphid activity tobacco and horticultural crops such as tomato, pepper, cucurbits, potato and lettuce became infected with one or more viruses. The damage resulting depended on the number and type of viruses involved and the time of infection.

Late blight appeared in a few unsprayed potato and tomato fields lying close to Lake Erie during Aug. and Sept. Although weather conditions were conducive to the spread and development of late blight, it was held in check by an adequate spray program. It was obvious from the location of the initial infections that spores were being blown in from diseased fields in Ohio (C.D. McKeen).

Weather conditions in s.w. Que. were extremely favorable for plant diseases in 1957. The spring was cool and humid and the humid conditions prevailed throughout the summer favoring the development of such diseases as late blight of potatoes and pea root rot.

Hailstorms in different areas caused varying amounts of damage to fruit, cereal and vegetable crops. An intense 30-minute storm with hailstones up to one inch in diameter occurred in the Rougemont apple growing district and caused losses of 75 per cent in one orchard and an average 50 per cent loss over a square-mile area. Apples were not only bruised but were cracked and torn and trees were partially defoliated. Corn and tomato fields also suffered severe damage.

Conditions were extremely favorable for apple scab in the spring. Mature ascospores were observed in 10 per cent of the perithecia examined on 10 April. Delayed development of the trees permitted them to escape possible infection periods of 21-22 and 28-29 April. A light infection occurred 3 May and the first heavy one 7-9 May. Nine infection periods occurred between 3 May and 25-26 June (L. Cinq-Mars).

In e. Que. precipitation was high and temperatures relatively low in June. These conditions retarded the development of fruit trees, small fruits and vegetables. During July and Aug. weather conditions worsened; temperatures remained below normal and rainfall was double the normal precipitation, amounting to 13.44 inches for the two months at Ste. Anne de la Pocatiere. This abnormal weather resulted in poor growing conditions

and favored disease development. Delayed flowering of apple trees, strawberries and raspberries was recorded in Bellechasse, Montmorency and Quebec counties. In the same counties ripening of strawberries was uneven and a high percentage of water in the fruits rendered them susceptible to Botrytis and Rhizopus rots. The development of gangrene of strawberries seemed also to be favored in the Charlesbourg and Orleans Island regions. Fusarium wilt of raspberry was severe in fields where drainage was poor, and spur blight was prevalent. Apple scab was extremely severe in unsprayed orchards on both the north and south shores of the St. Lawrence. Soft rot, caused by Erwinia carotovora, caused losses in Aug. in lettuce and early cabbage. Late blight was severe on tomatoes from mid-Aug. to mid-Sept. After mid-Sept. weather conditions returned to normal and the harvesting of fruits and vegetables was satisfactorily accomplished (L.J. Coulombe).

Late blight made its first appearance in Que. on 21 July in Chateauguay Co. This was 10 days later than in 1957. Between this date and the end of July scattered traces of the disease were found in the lower St. Lawrence district and in Portneuf, Chicoutimi, l'Assomption, Nicolet and Bonaventure counties. Weather conditions in Que. during July were favorable for the spread of blight. Temperatures were generally below normal in the northern and above normal in the southern parts of the province. Rainfall was much in excess of normal throughout the province, being 20-50 per cent more in the Saguenay and Gatineau regions and from 25-100 per cent more in the St. Lawrence Valley and s.e. Que.

Conditions remained favorable for the spread and development of late blight throughout Aug. It was generally cool, cloudy and wet. Rainfall, as in July, was far above normal and east of Quebec City it was more than double the normal amount for Aug. Later blight progressed rapidly and by 23 Aug. many fields in Isle Jesus were 75-90 per cent infected and tuber rot was also observed. All fields in the Eastern Townships were infected and farmers had great difficulty in keeping the disease in check. Similar conditions prevailed in several other districts.

Spread of blight continued in Sept. and by the end of the month unsprayed fields at Ste. Anne de la Pocatiere were practically defoliated. The variety Keswick was severely attached in Matapedia and Portneuf counties. Reports from potato insectors indicated that tuber rot was slight in comparison to foliage infection. Tuber rot was more severe in Matane and Rimouski where the disease appeared later. The greater use of vine killers in the lower St. Lawrence and Lake St. John districts probably reduced the incidence of tuber rot.

The abnormally high rainfall during the summer of 1958 favored potato diseases such as leak, common scab and black leg. Leak was particularly severe in loamy soil at Ste. Anne de la Pocatiere and common scab was severe in many portions of the same soil. Rhizoctonia and black leg were prevalent on stalks. Ring rot symptoms were much less prevalent in loamy than in sandy soil. The variety Teton, which was apparently free of leak on sandy soil at digging time, was severely affected after a week in storage. Black dot was not observed in 1958 (H. Genereux).

Nearly six inches of rain and six feet of snow fell during Jan., Feb. and March at Fredericton, N.B. A light snow cover persisted all winter and no extremes of cold were experienced. Consequently, most plants wintered well. Seeding operations began the first week in May which is about average for that locality. Approximately ten inches of rain fell during the latter part of May and June and July. During this period the weather was cool and most plants were retarded in growth.

Ascospores of the apple scab fungus formed early and abundantly and were partially ready for discharge the last week in April. The first spore discharge occurred 5 May and after that date only three more slight to moderate discharges occurred. Scab was severe in the St. John River valley except in adequately sprayed orchards. A series of frosty nights occurred during early June partially or completely destroying many ten ornamentals, tomatoes and strawberries. Continued cool and rainy weather during Aug. and Sept. delayed the ripening and harvesting of all crops by as much as two weeks. The prevailing weather favored the development of cucumber scab and late blight of tomatoes and potatoes resulting, in some instances, in considerable losses. The season was favorable for the development of bacterial ring rot of potatoes and its identification in the field. A relatively dry, frost-free period during the early weeks of Oct. permitted the harvesting of an average potato and a small apple crop (J.L. Howatt).

The July-Sept. period in 1958 was one of the wettest in 37 years on P.E.I. The rainfall for the period was 14.23 inches and was 3.77 inches greater than the 1922-1958 mean.

Late blight appeared earlier than usual. The mean relative humidity for the week beginning 8 July was 84.7, and 1.70 inches of rain fell. An additional inch fell the following week. Infected cull piles were found at Albany, Freetown and Milton on 15 July, and on 16 July the disease was observed in two fields at Uigg, its earliest field appearance in many

years. Thereafter it appeared throughout the province and an epiphytotic developed. Some inadequately sprayed fields were destroyed while the tubers were still below grade size and were consequently not harvested. Ohter fields were severely defoliated. The defoliation was reflected in reduced yields and further reductions were caused by late blight tuber rot. On the other hand, a well-planned spray program followed by the application of a top killer resulted in high yields of healthy tubers. The weather that favored the disease was also favorable for potato production (L.C. Callbeck).

The winter of 1957-58 in N.S. was one with little snow cover. Precipitation remained average and temperatures were above average. Soil moisture was favorable in the spring but was in deficit in July. Spring rains were favorable for fungus infections. Apple scab and diseases caused by Botrytic built up heavy infections in untreated crops. Late blight appeared early in July and, favored by weather conditions in Aug. and Sept., did much damage in poorly sprayed fields. Pin-point scab was more prevalent than usual by autumn. It was best controlled by a late Bordeaux spray (J. F. Hockey).

Phenological Data, 1958

First anthesis dates for plants recorded at Ottawa in 1958 were somewhat earlier than average for the first part of the year but from mid-May to the end of the season the majority of plants flowered later than usual. This change in the earlier trend in time of flowering was probably due to the cool and wet weather which persisted during the latter part of the growing season. Table 1 shows the number of years of observation on each plant, the dates of first anthesis in 1958 and the departure in days from the average date of previous years (I.J. Bassett).

On the whole, the 1958 season at Winnipeg, Saskatoon and Edmonton was somewhat early. An exception to this general pattern may have been the latter part of the season at Winnipeg where the wheat matured eleven days later than the average date. This may be attributed to relatively cool conditions during the month of July at Winnipeg (R.C. Russell).