

The Weather and Its Influence on Disease

In B.C., the fall of 1953 was one of the wettest on record. Because of heavy rains some bulb growers, particularly those on the mainland, were unable to complete the planting of crops until mid-December. In some fields the soil was so wet that it worked poorly and remained in a lumpy condition throughout the growing season. The winter was generally cool and wet, but the ground did not freeze to any depth. Losses from drowning were heavier than usual. The growing season opened at least two weeks later than usual and continued to be backward throughout. Flowers for the early market were not ready for cutting for at least 3 weeks later than in 1953. The wet season prevented effective cultivation and weed control. Foliage diseases were very prevalent and caused heavy losses, except where the recommended control measures were followed. Weedy fields and those confined by woods were sev. affected by leaf diseases (N. Mayers).

In B.C., the summer of 1954 was one of the wettest on record and as a result many agricultural crops were adversely affected. The precipitation was in general high and conversely the amount of sunshine was low. Under these conditions, the stand and growth of potato crops were good in the early part of the season, but, when the weather continued wet into mid-summer and early fall, weed control in and cultivation, spraying and harvesting of the crop were hampered. In the northern part of B.C. field frost in early October caused a 60% loss in the potato crop (H. S. MacLeod).

On Vancouver Island, the summer was relatively cold and moist. In the spring iris and tulip buds suffered sl. injury from frost in some low-lying fields. This injury may have provided conditions favourable for *Heterosporium* leaf spot, which was more prevalent than usual on bulbous iris. In general, secondary infection by tulip fire was less than 1953 and its reduced prevalence was due to the rainfall being less than usual in May. On the other hand, soil moisture was ample for development of daffodils and tulips as the bulbs of these plants were well sized at harvest.

Late blight of potatoes was first observed in early August. As a result of high precipitation in that month the disease became epidemic on potatoes and tomatoes. Infection of orchard grass by a new downy mildew (*Sclerophthora* sp.) was favoured by very high rainfall in November. Pure stands of the grass were sev. affected in some fields (W. Jones).

On the lower mainland, the winter of 1953-54 was characterized by very heavy snow cover in January and absence of any winter damage to small fruits. The spring was cold and the mean temperatures for May, June and July were the lowest on record. Rainfall was well above average in June and early July. From mid-July to mid-August the weather was dry but a period of rainy weather lasted from mid-August to mid-September. October was relatively dry and November very rainy. Although only 0.01 in. of rain was recorded from 12 July to 13 Aug., a total of 7.93 inches fell between 1 June and 30 Sept. This total is about 2.4 in. above

the 15-year average. Conditions favouring late blight development prevailed from 14 Aug. until 19 Sept. as during that period some precipitation occurred on all but six days. Potato growers were warned by the Assistant Provincial Plant Pathologist that a serious outbreak was likely to occur. Extensive foliage infection was prevented by fungicides, but considerable loss resulted from tuber infection (H. N. W. Toms).

In the Okanagan and the Kootenays the winter was mild with average snowfall, except in the eastern Kootenays, where more snow fell than usual. Moisture was above normal until early July, but growing conditions were excellent for most crops. The potato crop was harvested under favourable conditions and proved to be excellent (H. S. MacLeod).

The spring of 1954 in Alta. was the coolest on record. The highest daily temperature at Edmonton did not exceed 29° F. during the last ten days of April and for the growing period of May to September, inclusive the average temperature was nearly two degrees below the long-term average. The summer was very cloudy, with extended periods of fog or light rain, particularly in August. South-east winds in June brought showers of stem rust spores. Stem rust of wheat was first recorded in Alberta on 6 July. The damp weather favoured the development of the rusts and other foliage diseases of the cereals and legumes. The latter half of August was either foggy or overcast. Late blight, which started to develop about mid-August, ruined many fields of potatoes in the Edmonton district (W. P. Campbell).

At Saskatoon, Sask., the summer of 1954 was one of the wettest, coolest and dullest on record. Crops could not make adequate use of the extra moisture because the low temperatures and insufficient sunshine did not favour growth. Precipitation was recorded on 80 of the 153 days during the months of May to September, or on 36 days more than usual. In August rain fell on 23 days, with a record total of 6.96 in. (T. C. Vanterpool).

In Saskatchewan, the spring was cold and backward especially in the northeast. Moisture was plentiful in most parts and germination was good, but growth was slow. Rainfall was much above normal in most areas. During the wet weather in June, many wheat fields turned yellow as a result of attack by Helminthosporium tritici-repentis. Very shortly afterwards, wheat began to show infection by stem and leaf rust, which appeared first about 20 June in the Saskatoon - North Battleford area. Cool, showery weather delayed crop development and favoured rust development. The wheat crop headed about 2 weeks later than usual and was already partially defoliated by leaf rust. Cool wet weather continued during July and August. As a result, there developed one of the worst epidemics of leaf and stem rust in the history of the province; the ripening of the crop was also delayed. Danger from frost became acute and frost damage was considerable in the northeastern part of the province. The weather continued wet during September and much of the wheat was harvested in a damp condition; in some areas the fields were too wet for

movement of machines. Dry cool weather in October allowed the harvest to be completed. Wheat was mostly low in grade but oats and barley were of good quality except where frost had damaged the crops (H. W. Mead).

Weather conditions in Man. were very similar to those experienced in Sask. (see Rust Nurseries report). They greatly favoured the development of leaf and stem rust on wheat. On account of the severity of the rust epidemic, wheat yields in Man. were very similar to those obtained in Sask., except that the crop was harvested under somewhat better conditions. Leaf diseases of barley were also very destructive in Man. (B. Peterson).

In the Niagara peninsula, Ont., showers were frequent and weather dull 25-30 April. As the mean temperature remained below 50° F., little primary scab infection took place in spite of a 30-hour wetting period when the apple buds were at the tight cluster bud stage. Warmer weather the first few days of May advanced buds to the full pink stage. Brief wet spells with night temperatures below 40° F. were unfavourable for scab infection. Sparse primary infection was found 17 May, but ascospore discharge remained low and scab development very slight through June and July. As a result of frequent rains in late August and September new scab infections appeared on the terminal leaves and fruit on unsprayed trees. Fruit on sprayed trees was harvested free of scab but some late-season infection developed on apples in common store.

Also because of cool weather during the blooming period, very little blossom blight developed in the laboratory orchard, St. Catharines, on pear trees, which were mass inoculated with the fire-blight organism when the trees were in bloom. However when the temperatures moderated in late May and June, spur and twig blight developed freely on the inoculated trees.

On the other hand, the season was such that brown rot was prevalent and widespread on stone fruits in the Niagara peninsula. Apothecia were first noted on 29 April when peach trees were still in the pink bud stage. Apothecia continued to develop through the bloom period. Although it was cool, warm rains lasting 8 hours on 3 and 7 May provided conditions favourable for blossom infection of peaches and sweet cherries. The outbreak of blossom blight was followed by rot in the green and ripe fruit of cherries. In some varieties the fruit clusters were destroyed. On peaches the blight spread from the blossoms into the twigs, where cankers developed and considerable die-back occurred. Undoubtedly spore inoculum was very abundant when the fruit was harvested. In addition humidity and temperature were optimum for brown rot development over much of the period during which the fruit was moving from the orchard to the consumer. Rot was particularly heavy in early varieties of peaches.

Rains in August and early September favoured powdery mildew infection on the grape variety Agawan. Extra spray applications were required to prevent loss of foliage.

An unusual outbreak of rot caused by Phytophthora cactorum developed on Kiefer pears held in common store. It was established that the fruit had been left after they were picked in containers in the orchards where they were exposed to splashing and flooding by heavy rains on 2-3 Oct. and frequent showers and high winds on 10-15 Oct. Spores of the fungus had been splashed or washed, along with soil particles, onto the fruit (G.C. Chamberlain).

In southwestern Ont., the early part of the season was quite normal, but crops suffered from a long period of drought in the middle of the summer, July being the driest month on record over most of the area. As a result, physiologic disorders, such as manganese deficiency in soybeans and blossom-end rot of tomatoes were more destructive than usual. On the other hand many of the parasitic diseases were of little importance in 1954 (A.A. Hildebrand).

In the Ottawa valley, rainfall was plentiful throughout the season. As a result late blight and several other parasitic diseases were more abundant than usual. Frequent rains delayed farm operations particularly during haying (E.H. Peters).

In southwestern Que., the 1954 season was one of the wettest on record, the rainfall being particularly heavy in the spring months. As a result, sowing and planting was delayed and crops in general were adversely affected. The conditions also favoured the development of disease in most crops; only those on well-drained locations and thoroughly protected by fungicides yielded well. Pastures and grasses were the only crops that benefited from the wet season (L. Cinq-Mars).

At Ste Anne de la Pocatiere, Que., the mean temperature was slightly below the average in May and June, considerably below in July, somewhat below in August and was normal in September. Rainfall was substantially above average throughout the season. Rain and northeasterly winds in May and rainy cool weather in early June delayed seeding until 15 June. Aecia of crown rust were abundant on Rhamnus cathartica and R. alnifolia. Blister rust was conspicuous in stands of young white pine. In July, apple scab was prevalent in most orchards and proved very difficult to control. In August, the weather was still wet and cool and in consequence diseases such as black leg and late blight of potatoes were very prevalent. Mushrooms were exceptionally abundant. September was likewise wet; diseases such as the rusts of cereals, late blight of potato and tomato, and apple scab were epidemic. Thus climatic conditions in 1954 were very favourable to plant diseases (H. Genereux).

Although sub-zero temperatures were recorded at Fredericton, N.B., on 15 days in January, with a low of -17° F. on one night, these temperatures were about normal for the month. Sub-zero temperatures were recorded only on 4 days in February and one in March; a good blanket of snow covered the ground during this period and as a result there was little winter injury to perennial crops.

During April, May, and June the weather was cool, wet and dark.

Rain fell almost every other day and amounted to nearly 16 in. for the three months. As a result, many growers were delayed in sowing their grain or planting potatoes. The first discharge of ascospores of the apple scab fungus took place on 10 May. July, August and September were cooler than usual and almost 15 inches of rain fell in the period. Under these conditions much of the mown hay was lost before it could be cured. Crops of pumpkins, squash, cucumber, beans and corn failed to mature properly. Both parasitic and saprophytic fungi were abundant. Late blight of potatoes appeared about 18 July and where strenuous efforts were made to control the disease it was held partially in check. Where the control practices were indifferent, the vines rotted early in the season, in some fields just as the tubers had formed. In most fields bacterial soft rot was prevalent in tubers affected by late blight. Late blight developed so early that bacterial ring rot was almost impossible to detect in the field. Most apple orchards suffered severely from scab. Wet weather delayed harvesting of the potato crop and caused large amounts of soil to adhere to the tubers. Frost in late September caused considerable injury to potatoes still unharvested. October and November were also wet and cool (J. L. Howatt).

Total precipitation at Kentville, N.S., for 1954 will probably be slightly above the 40-year average of 40.58 in. However, the distribution was not normal as 12.7 in. fell in January and February, an excess of 5.4 in. while most of the months during the growing season showed a marked deficit. The deficit during the summer might have caused a drought condition, but the monthly mean temperatures during these months were 1 to 2 degrees lower than usual and there were many dull, cloudy days with frequent showers. The net result was that there were periods favourable for plant diseases, particularly in August when rainfall was slightly above average.

Late blight of potatoes was found in July in a commercial field and developed steadily. By mid-August the disease was destroying potato fields in Yarmouth and Digby counties but timely spraying held it in check in the commercial areas. September was dry and harvested potatoes show very little blight rot. The torrential rainfalls associated with a number of the big storms of the 1954 season missed the Annapolis Valley. Yarmouth and Digby counties received a 6 in. rainfall in June that was light at Kentville, and the rainfall associated with the two hurricanes Carol and Edna was only .75 and .47 in. respectively.

The dull, cloudy weather favoured willow blight, which was very sev. on the few surviving trees and suckers that can be found in N.S. It was also favourable for development of grey mould and crops such as strawberries, tomatoes and gladioli showed greater amounts than usual (J. F. Hockey).

At Charlottetown, P.E.I., precipitation was above average for the first 3 months of 1954, and totaled 15.98 in. made up of 7.13 in. rain,

and 88.5 in. of snow. Snow coverage was adequate during this period. During the remaining months of the year, excepting May and July, precipitation was below average despite the fact that the crop season was damp and cool and rain fell on 16, 19 and 18 days respectively during July, August and October. Sunshine was also below average during these three months. There were 157 frost free days recorded at Charlottetown between 4 May and 8 Oct.

Weather conditions were generally favourable for foliage diseases during the growing season. Apple scab and late blight of potatoes were sev. and frequent applications of fungicides were necessary in order to obtain a fair measure of control. Unsprayed and poorly sprayed potato fields were destroyed early by late blight and a very light crop was harvested from these fields. Club root was sev. in infested fields of Laurentian swedes. Bean anthracnose was unusually sev. and cucumber scab was destructive in home and market gardens. Commercial growers of pickling cucumbers escaped the disease by planting the resistant variety, Maine No. 2. Septoria culm rot was severe on Abegweit oats. The aecial stage of crown rust was of less prevalence on buckthorn than usual because of dry weather in June and early July; however, this rust was quite general on oats. Black leg and Verticillium wilt of potatoes were not serious (J.E. Campbell).

In Nfld., spring planting was greatly delayed as precipitation during March, April and May totaled 14.6 in. of which 5.5 in. fell in May. During the summer and fall months 21 in. were recorded and temperatures were relatively high. Thus conditions were ideal for the development of many diseases, especially late blight and wart of potato. The hay crop was good but continuous rainy weather during haying caused spoilage of many tons of hay. Frost on 7 and 8 Oct. destroyed the tops of potatoes and wet, cold weather greatly retarded harvesting of the tubers (G.C. Morgan).

Notes on Some Nematode Problems, 1954

A.D. Baker

Nematode Laboratory, Entomology Division, Ottawa

The golden nematode, Heterodera rostochiensis (Wollenweber, 1923) Franklin, 1940, has not yet been found in any part of Canada. Unfortunately on February 15, 1955, The Victoria Daily Times erroneously reported its probable presence in British Columbia. As this was a false rumor The Times was asked to correct the statement.

The sugar-beet nematode, Heterodera schachtii Schmidt, 1871, did not occasion any severe injury in sugar-beet fields of the Sarnia, Ont., area in 1954. A possible lowering of the infestation level may be due to more strict attention to crop rotations in this district.