The Weather and its Influence on Plant Disease

The winter of 1960-61 in the coastal areas of the B. C. mainland was again moderate. The minimum temperature recorded at the seacoast in January was 26°F and frost did not occur in February or March, Temperatures later in the spring, however, were below normal and rainfall was heavy in April and May. This combination of weather factors delayed the planting of cash crops and was responsible for many physiological disorders, particularly in early-planted celery and lettuce. Drier, sunny conditions commenced the first week in June and the summer as long and dry. Considerable defoliation took place in trees infected earlier with such foliar diseases as peach leaf curl, apple scab and willow blight. The first killing frost occurred on 3 October at the seacoast and on 22 October in the Agassiz region. Fall precipitation was greater than normal (H. N. W. Toms).

Total precipitation, for the 12-month period between 1 November, 1960 and 31 October, 1961 in the B. C. Interior, was 0.75 inches above the 45-year average, Rainfall was in excess of normal in April, May and July and below normal in June, August and September. Prolonged spring rains in the Kootenays provided ideal conditions for apple scab infections and, at the same time, made spraying operations difficult, Frequent rains in the Okanagan Valley, early in June, were responsible for some severe outbreaks of scab. In most cases, fruit infections appeared early enough for diseased fruits to be removed during thinning operations. Late-season rains favored new infections and pin-point scab was reported from several districts, chiefly on Winesap, Cool, wet, spring weather in the Kootenays also extended the bloom period for cherries and provided favorable conditions for the development of brown rot, In some orchards, 70% of the blossom clusters were affected. Rains during the harvesting of late varieties of cherries favored the development of a fruit rot caused by Pullularia pullulans.

The winter of 1960-61 was both wetter than normal and abnormally mild. The minimum temperature recorded at Summerland was 12°F and the mean temperatures for the months December to May were significantly above the average means. No winter injury or spring frost injury was experienced in the fruit-growing sections of the B. C. Interior, The period of hot summer weather was longer than usual. It began early in June and continued without a break until the end of August. The occurrence of some diseases was decidedly influenced by the prevailing high temperatures.

The exceptionally mild winter permitted the survival of the powdery mildew pathogen, Podosphaera leucotricha, in a large percentage of infected buds. Spring temperatures favored its development on leaves and new shoots, and all varieties were affected to some degree. The long, hot, dry period that began in June provided additional evidence that hot weather tends to retard the symptom expression of certain virus diseases of apple, Symptoms of ring russet and leaf pucker were much less pronounced in 1961 than in 1960 when cool temperatures prevailed early in the season. It is thought that the prolonged period of high summer temperatures might be responsible for the occurrence of a new disorder of Bartlett pear, tentatively called "cottony spot". The same conditions are also believed to be responsible for the low incidence of bull's-eye rot of apples, caused by Neofabraea perennans.

Soil temperatures in June, 1961 reached 80°F at the 6-inch level, some 5 degrees higher than in 1960. This could explain the reduced incidence of onion

smut and Verticillium wilt, which are favored by relatively cool soil temperatures and the increased incidence of Fusarium bulb rot of onions, which is favored by comparatively higher soil temperatures (G.E, Woolliams).

Spring, in northern Alberta, came relatively early and temperatures until Mid-May were near normal. From that time, until the first of September, the average temperature was about 5°F above the long-term normal. Rainfall, from Edmonton south, was much below normal while that north and east of Edmonton and in the Peace River District was adequate. The high temperatures had the effect of decreasing the incidence of scald on barley and stimulating net blotch. They were also probably responsible for the appearance of such diseases as corn smut. The distribution of some diseases, such as bacterial blight of barley, closely followed the rainfall pattern (W.P. Campbell), The weather, during the growing season in southern Alberta, was abnormally dry. Precipitation in June was only 50 per cent of normal. Rains in July helped crop conditions in the dark-brown soil regions but the drought continued in the brown soil zones of sautheastern Alberta, a condition that was further aggravated by the second hottest August on record, The effect of the dry conditions on the development of foliage diseases is exemplified by the low incidence of bacterial blight of beans (J.B. Lebeau).

Extreme drought and the absence of dews during the growing season in Saskatchewan militated against the develpoment leaf and stem spots, rusts, and similar diseases in 1961. Common root rot of cereals was favored by the dry conditions as were physiological disorders such as blossom end-rot of tomatoes, Unusually long periods of high temperatures were responsible for extreme heat canker and leaf banding of cereals, flax and garden crops (H. W. Mead, T. C, Vanterpool).

Weather conditions early in the spring in Manitoba were such that it was expected that an average crop might be produced on summerfallow. Surface moisture was in good supply in May and seeding operations were hampered by cool, wet weather, Precipitation between 1 April and 8 May was 38 per cent above normal and the mean temperature was 2.5°F below normal. Total precipitation by 12 July was, however, 54 percent less than normal and the mean temperature was 4.2°F above normal. The lack of precipitation and the higher than normal temperatures in June and July resulted in an early harvest of about a one-half normal crop of cereals.

Rust spore showers were recorded on 24 and 27 June but the hot, dry weather precluded any widespread rust infection. A trace of wheat leaf rust was found at Morden on 11 July but by 9 August only scattered infections were present in farmers' fields. Wheat stem rust was found on 24 July, about a month later than pormal. Oat stem rust was found on 1 August and mere traces of crown rust of oats and leaf rust of barley were found near Altona on 9 August. None of the cereal rusts developed appreciably and damage was negligible except possibly in a few late fields sown to susceptible varieties. Leaf spots and other plant diseases were likewise suppressed by the unfavorable climatic conditions (W, L. Gordon).

In southwestern Ontario, an unusually high incidence of Botrytis stem rot in greenhouse tomatoes that occurred during April and early May was correlated with soft growth brought about by LOW light intensities in earlier months. The total hours of sunshine in the Harrow area for the months of February, March and April were 15, 22, and 45 percent, respectively, below normal.

The occurrence of tobacco etch virus was again shown to be related to aphid infections which are, in turn, influenced by weather conditions. The cool, wet spring in 1961 delayed the build-up of aphid populations. The virus, consequently, was not transmitted from overwintering hosts to such susceptible crops as burley tobacco and pepper until they had almost reached maturity. Late season spread caused little loss. The same cool, moist spring weather is considered to have predisposed the foliage of such crops as potatoes, cucumbers, onion and tomato to infection by species of Alternaria.

Frequent rain showers and abnormally high temperatures in late August and early September favored a heavy outbreak of Stemphylium blight in many crops of tomatoes. Its occurrence is rare in southern Ontario (C.D. McKeen).

Considerable winter injury to peaches followed the very dry open fall of 1960 in the Niagara Peninsula, Ontario. The same condition, combined with a record heavy 1960 crop and a late outbreak of powdery mildew predisposed many vineyards to similar injury.

Spring development in 1961 was ten days to two weeks later than normal with considerable rainfall, Severe apple-scab infection periods occurred on 12-15 May, 31 May - 2 June, 8-10 June apd 20-21 June. Primary infections were numerous but with the advent of warm weather in July the activity of the disease declined. Despite frequent showers in August there was little further development or spread of scab.

The prolonged wet period of 20-21 June occurred just before the bloom period of grapes and was critical for the extensive development of downy mildew infections. The disease remained active in July and August rains spread infection to new growth, Rains on successive days in early June favored the spread and development of the shoot-lesion phase of the dead arm disease of grapes, Warm, dry weather in September was favorable for the rapid build-up of grape powdery mildew (G. C. Chamberlain),

Total rainfall of twenty-nine inches between early April and late November in southwestern Quebec influenced the development of apple scab. There were ten primary infection periods and some heavy losses were incurred. Late-season rains resulted in the development of some pin-point scab (R. Desmarteau). Late blight of potato was not serious, in Quebec until after the advent of heavy rains in August. Precipitation excesses over normal ranged from forty to eighty percent in the Gaspe, Eastern Townships and the Lake St. John regions. Late blight spread rapidly and many fields were defoliated, Losses' from tuber rot were high (H. Genereux).

Weather conditions in New Brunswick throughout the planting, growing and harvesting seasons were abnormal and, for the most part, unfavorable for potato production, Cold weather and heavy rainfalls delayed planting in some districts until mid-June. Summer rainfall was excessive in many areas of the province and late blight was general by late August. Heavy September and October rains resulted in a considerable amount of late blight tuber rot. The crop was harvested in a muddy, wet condition and rots caused by secondary, organisms were prevalent in storage (C. E. Robinson).

Temperatures in late April and early May in Nova Scotia were below normal. Perithecia of the apple scab organism developed very slowly and the first ascospore discharged occurred on 13 May, Apple buds also developed slowly and the first scab infection period was on 16-17 May. Foliage scab, which probably developed from this infection period, was observed on 6 June. Five infection periods of varying intensity occurred in May; four

heavy and one moderate infection periods were recorded in June, and one moderate and three light in July. The latter part of July and most of August were very dry, preventing any spread of scab. There were some prolonged wet periods in late August and early September and considerable late-season scab appeared, particularly on McIntosh (R. G. Ross).

The growing season in Prince Edward Island was characterized by high rainfall in June followed by drought conditions during July and most of August. Precipitation in September and October was normal and temperatures were above normal. Conditions in the spring were favorable to initial apple scab infection but lack of moisture during the summer militated against secondary spread. Low soil moisture was unfavorable to infection of crucifers by the clubroot organism. For the second year in succession, late blight of potato failed to cause serious economic losses. Low rainfall and low humidity delayed its appearance until September. Little tuber rot was encountered in the main plantings of Sebago. Drought conditions proved favorable to the development of powdery mildew on a number of crops and ornamentals (G, W. Ayers).