## The Weather and its Influence of Plant Disease

The winter of 1958-59 in the coastal areas of B.C. was moderate. Temperatures fell below 25°F on only three days in Jan,, the coldest day being 3 Jan. with a minimum temperature of 11"F. The last spring frost occurred in March but cooler than average temperatures in May retarded the initial growth of annual vegetables and ornamentals.

As a result of the moderate winter some aphids, Myzus persicae, may have survived in sheltered locations in the coastal areas. There was also a large over-wintering egg population following the heavy peach aphid infestation in the fall of 1958. Many virus-infected volunteer potato plants also survived. The serious outbreak of potato leaf roll necrosis which occurred in 1959 is thought to have been influenced by the overwintering of the vector and infected hosts,

Spring and summer rainfall were above normal and the generally overcast, showery weather was probably responsible for the higher incidence of blackleg which was found in all areas of the province. Late blight occurred in slight to moderate amounts in central B.C., Lulu and Sea: Islands and on Vancouver Island. The first killing frost at Vancouver was on 3 Nov. (N. Mayers, H.N. W. Toms).

Only three days of sub-zero temperatures were experienced in the Okanagan and Arrow Lakes districts. Fruit tree damage was confined to some spur and bud damage in the northern areas and upper valleys. Frost, however, occurred in most districts in'central B.C. during the last week of April causing additional bud damage in many orchards. This resulted in a severe reduction in the sweet cherry crop and a marked reduction in the apple crop in some areas.

March and April were abnormally dry with a total rainfall, for the two months, of only 0.5 in. However, a period of wet, cloudy weather in mid-May, coinciding with temperatures of 42"-60"F, provided an adequate infection period for apple scab. In districts from Kelowna north,' orchards which did not receive an eradicant spray at this time suffered moderate to severe scab outbreaks, whereas orchards in which an eradicant was used up to 5 days after the infection period were essentially free of scab. The wet weather did not coincide with the period of pear bloom hence, though fire blight was present in scattered orchards, it was not a critical problem,

Except for late June and the month of July, summer temperatures averaged below normal and skies were characteristically qvercast. Most types of fruits were of lower quality than usual; soft, and susceptible to bruising.

Cool weather in the Arrow Lakes area prolonged cherry blossoming over a three-week period. Frequent rains occurred during the latter half of the bloom period and brown rot blossom blight was extensive in both sprayed and unsprayed orchards. Despite further rain, infection did not spread to green fruit. Unusually dry weather prevailed during harvest and brown rot of ripe fruit was negligible.

During the apple-harvesting season, the periods 13-26 Sept. and 7-13 Oct. were almost continuously damp. Pin-point scab developed abundantly on several varieties during storage, Bull's-eye rot also appeared in stored apples of an unusually wide range of varieties in the northern districts,

The relatively cool weather that prevailed in early summer favored the rymgtom expression of some virus diseases. Marked symptoms of leaf pucker of apple appeared in leaves formed before the end of June. The associated fruit symptoms were more severe than they have been for several years, Symptoms of sour cherry yellows were also pronounced. Surveys conducted in a number of plantings of Montmorency revealed a much more extensive incidence of yellows than previous observations had indicated (M. F. Welsh, L. E, Lopatecki),

Spring came early in 1959 in northern Alberta and warm, dry conditions prevailed in March and April, May and June were cool and dry. This sequence of weather did not favor an early development of disease, Wet weather in July and August favored the development of appreciable amounts of leaf diseases in cereal plots at Edmonton, Generally, disease was not a factor in crop production in northern Alberta in 1959 except stem-break of flax in the Port Vermilion area and rust on the flax variety Redwing wherever it was grown in the Peace River district (W. P. Campbell).

Snowfall was heavy in southern Alberta during the winter of 1958-59 and the chinook winds caused ice sheeting in many fields. This condition was responsible for damage to forage crops, The weather during the summer was cool and cloudy and favored the development of some foliage diseases (J. B. Lebeau),

In Saskatchewan the early part of the growing season, up to July, was unusually dry, Soil moisture was inadequate for even germination in any but the northeastern area. At many points precipitation was only 40-50 percent of normal, The incidence of common root rot was much higher on wheat seedlings in the dry areas than in the northeast. Leaf and stem diseases of forage legumes, cereals and grasses developed very slowly but became common after the late-June rains, Stem rust of cereals was negligible because of lack of inoculum. Leaf rust of wheat was moderate in intensity and powdery mildew of clover developed rapidly after July. Blossom-end rot of tomatoes was unusually prevalent (H. W. Mead).

Temperatures were 2-6°F below normal in the Prairie Provinces in May. During June and July tempeatures favored rust development and averaged 2-4°F above normal over most of the area, In Aug., temperatures in the extreme southern parts of Manitoba and Saskatchewan were slightly above normal but elsewhere in the prairie area they were 2-4°F below normal.

During most of the growing season of 1959, except in some areas in eastern and northwestern Manitoba and in northeastern Saskatchewan, rainfall was much below normal, July was a very dry month with rainfall generally averaging about one-third to one-half of normal. August precipitation was rather erratic Rainfallwas quite deficient in southern Saskatchewan and southwestern Manitoba but above normal elsewhere in Manitoba and in northeastern Saskatchewan.

The pattern of cereal rust development during the summer of 1959 was determined to a large extent by the distribution of rainfall during the growing season (B. Peturson, G. J, Green, D. J. Samborski).

The prolonged cold winter in southwestern Ontario was responsible for serious winter-killing of peach trees in the Harrow-Leamington area. The higher incidence of winter-kill on the light, well-drained soils than on soils with a greater moisture-holding capacity indicated quite clearly that the dry soil condition at the time of freeze-up predisposed trees to winter injury.

Abundant sunshine in Jan. and Feb. favored excellent growth of tomato and cucumber crops under glass. The heavy, succulent growth that resulted produced conditions favorable to serious Botrytis infections which became evident in April and May. Exceedingly high summer temperatures over a prolonged period were injurious to the fall greenhouse tomato crop in southern Ontario. Setting was poor on the first three trusses, and in several houses the physiology of the plants was so altered that normal pollination and fruit setting failed to occur when cooler weather arrived.

The hot, dry summer favored the outbreak of black mold in cooking onions grown in the Erieau Marsh near Blenheim, Ont. The disease appeared characteristically after the onions had been in storage a few weeks. The disease was much less serious in the Leamington Marsh where precipitation was higher.

A combination of weather, plant growth and perhaps other factors militated against an early-season build-up of aphid populations an vegetable and tobacco crops. Consequently, serious virus epidemics in burley tobacco and vegetable crops did not occur in 1959 (C. D. McKeen).

Psolonged, near-zero temperatures beginning in December in the Niagara Peninsula of Ontario caused considerable damage to many fruit trees and vines. Grape vines suffered generally in all areas from considerable dying-back of canes and in some areas mature vines were completely killed. Deep ice covered many fruit farms for most of the winter causing severe damage to strawberry plantations (W, S. Carpenter, R. Wilcox).

The 1959 growing season in the Niagara Peninsula was characterized by dry, warm weather and disease development was meagre. Rainfall in May totalled 2.66 in. including a heavy shower of 1.25 in. on 31 May. Rain showers occurred on ten other occasions during the month but they were generally of short duration and not critical for infection. Warm temperatures, with a mean of 66°F, accompanied by light showers in the early bloom period for pears favored the development of fire blight blossom infection which later progressed to produce a scattering of spur-and twig blight. This infection was spread widely by a heavy wind and rainstorm on 6 July and in a few orchards the infection spread to fruits on the lower parts of the trees.

The June rainfall totalled only 0.88 in. Temperatures reached the high 80's to 90's on seven occasions with a maximum temperature of 91 on June 10 and 29. These conditions were most unfavorable for disease development, Apple scab, which is generally well established in early June, could be found only on a single leaf on unsprayed trees. This marked the lowest incidence of scab ever recorded in the St. Catharines laboratory orchard, Mild weather during the bud-break and blossom period of sour cherries influenced the symptom expression of cherry yellows, Yellowing and leaf casting were extremely slight.

Rainfall in July, at 1.27 in., was also below normal and high temperatures prevailed. An outstanding feature of the July weather was a damaging storm accompanied by hail, heavy wind and rain on 5 July. This storm battered the cherry crop, much of which was left unharvested; caused severe damage to grapes, splitting the berries and shattering clusters; and pock-marked apples, pears and peaches in a wide swath extending from Beamsville to the Niagara River,

In late July many reports were received concerning leaf scorch of pear foliage, a condition related to high temperature, prolonged dry weather, mite infestation and the use of certain acaricides. A similiar trouble occurred in 1958 under similiar conditions,

The weather in August continued very warm with a maximum temperature of 93°F recorded on the 14th and 15th. Scalding of peaches occurred and skin-cracking and dimpling of the skin appeared in sulfur-sprayed orchards. The rainfall was greater in August and there wdre periods of high humidity, This favored the development of powdery mildew of grapes and sour cherries, Brown rot was a minor factor during peach harvest but Rhizopus rot was common on fruit held for a few days in storage.

The development of sooty blotch was favored by late-season rains and cooler weather, particularly on late varieties such as Spy apples and Kieffer pears (G,C. Chamberlain),

The growing season in 1959 in the lower St. Lawrence River area was not especially favorable for plant disease development. Vegetation developed normally in May but growth war greatly retarded between 6 and 15 June when cold, raw weather) prevailed. During this period serious damage was suffered by young leaves of trees, ornamentals and vegetable crops,

At the end of June apple scab was well established and by early July considerable infection of apples by Gymnosporangium rust was evident, Excessively warm weather and low precipitation in July checked both disease development and plant growth.

The high humidity in late August and early September favored outbreaks of Botrytis on herbaceous ornamentals. The disease was checked by a return to more normal Conditions late in September (L.J. Coulombe).

In the Annapolis Valley of Nova Scotia, conditions were very favorable for apple scab development in 1959. The first ascospore discharge occurred on 27 April and discharges continued until 18 June. The first infection period was on 31-12 May and scab lesions appeared 28 May. There were 10 heavy, 4 moderate and 1 light infection periods during May, June and July. The duration of four heavy infection periods in June was 50, 68, 30 and 84 hours respectively. August and September were very wet and, where protection was inadequate, late OF pin-point scab developed profusely. Despite the severe scab conditions most growers obtained good control of scab by applying extra sprays (R.G. Ross).

Winter and early spring conditions were such in Prince Edward Island that extensive winter-killing occurred in strawberxy plantations and berry yields were drastically reduced, Clovers, alfalfa and other legumes were also practically eliminated from stands of hay.

Discharge of ascospores of the apple scab pathogen took place over a 22-day period beginning 1 June, Appreciable discharge was recorded 1-4 June, 9 June and 19 June, Smaller discharges occurred on three other occasions, The first infected leaves were seen 17 June,

The precipitation at Charlottetown for the July-September period, at 7.03 in., was 3.33 in, below the 38-year average. However, there were 45 days in which rain fell and, though many of these rains were only mists and unrecorded, the relative humidity was often high for long periods. From 4-11 August some rain or drizzle fell every day and the mean relative humidity for the period was 93.1 percent. Similarly, the week 12-18 August had a mean humidity of 87.6 percent and the last week of August and the first week of September had relative humidities of 85.1 and 81 percent respectively. Late blight of potatoes was first reported on 15 July. It developed rapidly in August due to adequate free moisture and the long periods of high humidity. Yield was reduced by an estimated 15 per-cent,

Club root of crucifers presented little or no problem in 1959 and this could be correlated with the below-average rainfall, However, a bacterial rot originating at or near the crown in swede turnips and in the above ground portion of the stem of cauliflower was quite prevalent.. Infection ranged from 50-80 percent in some turnip fields. The high humidities during August, together with lower than average sunshine, seemed to favor the establishment of the pathogen in growth cracks and mechanical wounds (J.E. Campbell).