## The Weather and Its Influence on Plant Diseases

During the early part of the 1942-43 winter, the weather was mild and wet in the coastal areas of B.C.; during late January it was colder than normal; and the remainder of the winter was mild and comparatively dry. As a result of the cold period and possibly the preceding mild, wet weather, there was considerable winter injury of some overwintered seed crops such as cabbage and swedes, as well as of some ornamental plants.

Late blight of potatoes appeared later than usual; it is considered that the cold weather was a factor in killing unharvested affected tubers that might have initiated early infection.

In spring, precipitation was slightly above normal and, as usual, such diseases as tulip fire, hop downy mildew and some foliage diseases became quite prevalent.

The summer was comparatively dry, though showery, and harvesting weather was satisfactory. Even under these conditions downy mildews did considerable damage to the seed crops of onions, lettuce and spinach. Onion downy mildew, in particular, will probably always be a serious limiting factor in the production of onion seed in the coastal areas. (W. Jones)

In north-central and northern Alta., extensive winter killing and crown rot occurred in alfalfa and other forage crops. This damage was particularly severe in the Athabasca and Peace River districts, where there was little or no snow protection during severe weather in January. In the other affected areas crown rot was unusually prevalent, despite the good snow cover, and most of the frost injury apparently occurred after growth started in early spring. Seeding was delayed by cool, wet weather, which continued throughout the growing season in most of the northern and central sections. As a result, many foliage and stem diseases developed earlier than usual and some of them became very prevalent. The leaf and stem rusts of cereals appeared in July, but were retarded by the cool weather and severe local infections developed only in the very late stands. The abnormally wet weather of the past two seasons was apparently responsible for the establishment and spread of late blight of potatoes and bacterial wilt of alfalfa in the Edmonton district. In southern Alta. drought conditions prevailed, with the result that crop yields were low and few foliage and stem diseases were in evidence. During the late fall harvesting was completed under particularly favourable conditions in all parts of the province. (M.W.C.)

In Sask., generally, the land was in good condition for sowing, but low temperatures and frequent frosts retarded germination until late in May, when warm weather stimulated development. Precipitation was light up to the end of May. Some rainfall during the first week in June improved moisture conditions, but heavy frosts caused injury to garden and grain crops. Browning root rot of wheat became widespread following warmer weather during the second week of June and was severe on summer fallow crops in many areas; it caused retardation and lack of stooling, in contrast with the rapid growth and heavy stooling in healthy fields. Rainfall continued below normal in all except south central, south east and east central districts. This continuous dry

weather caused deterioration in the crop, but also limited injury from leaf spots and smut, both of which were scarce this year. Flax rust developed rapidly in mid-June, but did not spread extensively because of the dry weather. Some local severe infections, even on previously resistant varieties, were reported. The crop matured rapidly with very little head infection and only a general, dry weather type of common root rot. This was in contrast with the slow maturing crop of 1942 when moderate head infections and severe common root rot were present. Ergot of cereals was light this year in spite of the presence of many sclerotia in the seed and in the soil. This disease was undoubtedly checked by the dry weather. Unusually warm weather in Sept. caused the loss of many carrots in storage. (H.W. Mead)

Although abundant rains, well distributed throughout the growing period, afforded excellent conditions for the germination of rust spores in Man., cereal rusts, owing to adverse winds for northward dispersal of spores and to unfavourable temperatures during May and June, made little progress during the early part of the summer. Temperatures averaged 4 degrees below normal for May and June and during that period the air movement was generally from north to south, broken only infrequently by southerly winds usually of short duration. However, from the beginning of July to the end of the season the spread of rust was favoured by frequent and sustained southerly winds, and its development was favoured by temperatures slightly above normal. Not all the cereal rusts were affected to the same degree by the adverse weather factors. Stem rust of oats, which usually appears in Man. in late June and early July was only slightly retarded by the unfavourable weather of early summer; the later favourable conditions more than offset the early retardation and this rust became more prevalent than for several years past. The progress of leaf rust of wheat, crown rust of oats, and stem rust of wheat, which usually reach Man. before mid-June, was greatly checked by the adverse conditions in late May and June; although they developed rapidly during July and early August, their early retardation was not fully offset by the favourable conditions experienced later, and these rusts were somewhat less prevalent than usual. (B. Peturson)

On Feb. 14-15, temperatures ranging from 10 to 20° below zero in different sections of the Niagara peninsula, Ont., greatly injured peach fruit buds. In the western part of the district and on the escarpment, where temperatures were lowest, practically no buds survived. Elsewhere injury ranged from 30 to 60% buds killed. Some varietal difference in hardiness of buds was seen. Apparently as a combined effect of low temperature and of wet soil throughout the fall and winter, many peach trees were killed in poorly drained orchards.

April was unusually wet and cool, and May and June were also wet. After mid-summer the weather was generally dry.

Wet weather and soft ground interfered with dormant spray applications in peach orchards, with the result that leaf curl was abundant in orchards not sprayed before early March; after this date there was little opportunity for effective spraying.

Continued rains in May allowed heavy apple scab infection before bloom. The principal infection period was May 16-22, when frequent showers and poor drying conditions kept the trees almost continuously wet and prevented timely

spraying. Recurrent wet spells favoured spread of scab to fruit and new leaves. By mid-summer 73% of the foliage of unsprayed trees was severely scabbed and most fruit had either fallen or was badly scabbed. Sepal infection was common.

May weather favoured the development of brown rot apothecia, and blossom blight was common in all stone fruits. Brown rot of plums and peaches was less serious than anticipated, largely owing to the dry weather after mid-summer.

Leaf spot of sour cherries was not serious. Four moderately heavy ascospore discharges occurred before bloom and the unfolding of the leaves. Primary infection, evident on July 7, was light and presumably arose from the lighter discharges in June. The dry weather of late summer checked further development.

Fire blight was more abundant than for many years. The wet weather of May and June favoured the production and dissemination of exudate, and stimulated tree growth.

Downy mildew and black rot of grape were unusually abundant, especially where growth was dense. Growth of vines was heavy. (G.C. Chamberlain)

In the Ottawa district, Ont., and much, at least, of western Que., the season, except for July, was uncommonly wet and was somewhat cooler and cloudier than average. All spring planting was greatly delayed. There were two dry spells: July 6-18 was rainless at Ottawa, though thunder showers occurred elsewhere in the district; and from Sept. 15 to Oct. 14 there was only one inch of rain, all of which fell on two days. Precipitation was 70% above average in May and June, but was 40% below average in July, with the result that the heavy hay crop was largely gathered in good condition. August, with 9.05" against an average of 3.00", was the wettest ever recorded at Ottawa.

Downy mildews were unusually prevalent; several heavy attacks were noted on wild plants, in addition to the observations reported in the text under Aster, Hop, Radish, Sunflower, Viburnum, and Vitis.

Many foliage diseases were heavy, but certain rusts failed to develop to the extent anticipated from observations early in the season; attacks by Darluca filum were one factor in this inhibition. Although individual red clover plants in the open were heavily rusted, it was impossible to find the rust within some fields on July 1, the principal leaf parasite being Cymadothea. For the first time in the writer's experience slugs, long known to feed on rust sori, were an important controlling factor for at least two rusts: a natural infection of Puccinia orbicula on Prenanthes in the Arboretum was practically wiped out; and cultures of P. Carthami on safflower were completely destroyed in the greenhouse and in the open.

Most powdery mildews were scarce until early Oct. For the first time in many years, few plantings of perennial phlox were appreciably

disfigured by Erysiphe Cichoracearum. Even in Oct. heavily infected plants were rare, whereas generally all plantings are badly disfigured by the end of August, the disease being so common that it ordinarily escapes comment in the Survey. A notable exception was E. Polygoni on Delphinium, severe mid-season attacks being recorded in several places. (D.B.O. Savile)

In N.B. snow coverage was light and uneven throughout the winter and 27 days of sub-zero weather were experienced. April was cold, with considerable rain and snow. These conditions delayed soil drying. Due to a combination of cloudy weather, absence of drying winds, and cool nights, few fields were dry enough to work until the last week in May.

Horticultural crops, with the exception of roses and certain perennial plants came through the winter in good condition. Apples and small fruits wintered well. Pastures showed considerable winter injury and growth was slow in starting. Rain fell on 14 days in June, the total rainfall at Fredericton being 5.03". The wet weather considerably delayed planting, and many farmers did not finish seeding until early July. The rainfall for July also totalled 5.03". A downpour of 2.74" on July 30 caused considerable lodging in grain fields. August was also extremely wet, with 5.77" of rain. This rain lodged much grain and left many potato fields so wet that they could be neither cultivated nor sprayed. A total of 4.32" of rain was recorded for Sept., and 6.24" fell in Oct. In the six months' period May to Oct. inclusive, 29.85" of rain were recorded as compared with a 30-year average of 20.24".

There was comparatively little rust on grain. Late blight was prevalent on potato foliage, but little tuber rot was experienced except in unsprayed fields, where the crop was almost a total loss. The season was favourable for disease development in such crops as tomatoes, beans, squash and cucumbers. All crops matured late, particularly hay and grain. The fall was open and favourable to potato digging until Nov. 2. Despite this condition, due to delays caused by adverse weather a small acreage of potatoes and a considerable acreage of grain were unharvested. Ploughing ceased on Nov. 30 and on Dec. 2 the Saint John River froze over. (J.L. Howatt)

The winter and early spring of 1943 in Nova Scotia were generally favourable. Plants and trees wintered well and up until early in June soil conditions were favourable for spring farming operations. Some heavy rains early in May delayed operations for a few days. June, July and August were wet, with all the usual consequences. Compared with a 30 year mean of 9.25", the precipitation for these three months of 1943 totalled 16.71".

Orchard spraying was seriously affected by the weather and many growers failed to get the early sprays applied. The ascospores of Venturia inaequalis began functioning early in May and by June 10 unsprayed orchards showed up to 20% of the foliage affected. Conidia continued the spread of the fungus with disastrous results. It is estimated that less than 25% of the Nova Scotia apple crop packed out as No. 1 grade.

Potatoes suffered from wet soil during the season. Rotting of sets followed by a late blight epidemic caused severe losses in many fields.

Delayed digging of the crop avoided a still heavier loss in storage. The tomato crop was considerably reduced by conditions favoring both early and late blights. (J.F. Hockey)

Tree fruits, and small fruits other than strawberries, wintered well in P.E.I. Unfortunately the weather in 1943 was unusually favourable for the development of parasitic fungi and bacteria. As a consequence some important crops suffered greatly. A fairly dry April permitted early seeding in many areas. Early grain germinated well and developed excellent stands. In May, seeding was hindered by sustained rain (total 5.38" at Charlottetown). Germination, also, was retarded by the low mean temperature of 47.8° F. During this unfavourable period there were many outbreaks of seedling diseases, re-seeding being necessary in some instances.

Apple scab was destructive, being sustained by heavy and prolonged rains that seriously interrupted spray schedules. McIntosh, the main commercial variety, suffered severe scab infection, and the market quality of the crop was much lowered. Ascospore discharge began later than usual, but became general by mid-June, initiating an outbreak that developed rapidly and reached its peak in late Sept. Brown rot of stone fruits, always troublesome, caused a crop failure in 1943. Heavy blossom blight occurred during the humid weather of mid-June. With 3.48" of rain and a mean temperature of 64.6°F. in August, brown rot progressed rapidly, leaving most of the fruit infected both on the trees and on the ground. Plums reaching market in apparently sound condition rotted quickly.

Late blight of potatoes was exceptionally severe. Alternating days of rain and sunshine, with cool nights, were ideal for its development and spread in mid-July, and by the second week of Aug. many fields were completely destroyed. The mean Aug. temperature of 64.6°F. (optimum for mycelium development), together with frequent rains and heavy dews, gave perfect conditions for the epiphytotic, which continued through Sept. and until killing frosts occurred. Potato spraying conditions were most trying and many growers failed to protect their crops adequately. In spite of these difficulties, control of blight was achieved where spraying was done with the utmost attention to such requirements as frequency of application and spraying both ways on the row. Continued rains late in the season made good spraying impossible. With conditions remaining favourable for blight development, many growers had recourse to top killing and late digging, thus preventing serious tuber rotting.

Verticillium and Fusarium wilts of potato did not show up significantly in the field, wilting being noticeably offset by the unusually abundant soil moisture. Tuber examination, however, revealed that these diseases were active despite the absence of foliage symptoms. This was particularly true of table potatoes. Common scab, being a dry weather disease, was insignificant, while black leg, a wet weather disease, was very troublesome. (R.R. Hurst)