The Weather and Its Influence on Plant Diseases

The season of 1937 was in general favourable for plant growth in the coastal sections of British Columbia. This was especially true on Vancouver and the neighboring islands, where the precipitation is generally low during the summer months. In 1937 the rainfall was 1.5 inches above the average for June at Sidney, although no rain fell in July. Cereals and small fruits were particularly benefited.

January and February were colder than in 1936, rainfall in March was below average and spring was rather late. During the heavy rains in June, the various foliage diseases such as apple and pear scab, reached almost epidemic proportions. Late blight of potatoes appeared on the mainland near the end of July, about two weeks later than last year. It is believed the drier weather in early July delayed its appearance. Rainy weather around harvesting time was favourable to downy mildew infection of the cones of the hop crop and much damage resulted. While rainfall was heavy during June, damage caused to the various diseases was about average for the region.

Weather conditions throughout the cultivated sections of Alberta were unusual in 1937. With the exception of a small area centering on the St. Paul district, no rain of any account fell until the middle of July. The lack of rain combined with the very light precipitation in 1936 resulted in a drought. High temperatures were frequent and drying winds prevailed, and the soil moisture was so deficient that a very light crop seemed certain, but beginning July 14, very heavy rains fell in a wide radius about Edmonton. Good rains also fell over the area south and east roughly bounded by a line extending from Calgary to Drumheller and northeast to Vegreville. After July 15 the temperature was cool. The Peace River country, including Grand Prairie and the adjacent areas in British Columbia did not receive rain until early August, when the main wheat crop was nearly ripe. Yields of late-seeded crops, particularly oats, potatoes and pastures improved. Soil and weather conditions were, in general, not favourable to disease development. Severe killing frosts were very late; consequently late fields of wheat, barley, oats, potatoes, and other crops continued to grow until October.

In Saskatchewan seeding was well under way on April 27. Moisture conditions varied from good in the eastern and northern areas to poor in most of the south, central, and western areas, with very little subsoil moisture. The weather was cool at that time. The early part of May was alternately cool and warm with no rain and growth was slow. There was some rain at Saskatoon on the 11th and 12th and

again on the 24th. This last rainfall was received also in parts of the south, east, and north. Germination in the drier areas was uneven and some soil drifting occurred. Some good rains fell during the last week of May in the Saskatoon district and the weather was moderately warm. The first week of June was cool and dry. High winds in the south did serious damage to the crops which were already suffering from drought. Pastures also were in bad shape. No rain fell until June 23. By this time the crops in a large area of the province had deteriorated seriously from drought. Summerfallowing was late and was not being done at all in some areas because of lack of moisture and feed. Following a few showers on the 23rd, 24th and 26th, the province experienced a period of very hot dry weather with high winds. This lasted until July 14 and July 15, when general rainfall improved the feed situation but it was too late to save the crops in southern, central and western Sask. Rain also fell on the 20th, 21st, 22nd and 24th. These rains permitted germination of late-sown coarse grains. Some damage was done by hail. The weather remained alternately cool and warm with scattered showers early in August. Harvest began early in August and general by the 10th. The weather was moderately warm and dry during most of the month. Some districts in the drought areas received rains late in August and during September and were able to produce fair crops of late oats both for feed and seed, there being no killing frost until Oct. 5. These rains also improved potato crops in those areas. Soil moisture in some parts of the drought area improved greatly during September and early October.

The crop season, then, was marked by extreme drought. Stem rust was present in a negligible quantity; browning rootrot was widespread, but its symptoms and effects were confused by drought. Common rootrot was found everywhere and was severe in some of the dry areas. Another feature was the severity and extent of root and bulb rot of ornamentals such as gladiolus.

Rainfall, air temperature and soil temperature at Saskatoon are given below:

	Total Rainfall	Mean Air Temp.	Mean soil temp.at 6 ins.
April	0.49		
May	1.29	54.5° (12.5°C)	9.5°C
June	0.48	64.2° (17.9°C)	16.9°C
July	0.96	71.2° (21.8°C)	20.5°C
August	1.33	64.8° (18.2°C)	16.7°C

Seasonal rainfall 1937 April-July 3.22 ins.
" " 1904-1920 " " 6.92 "

In the Niagara peninsula of Ontario the early part of the season was cool with plenty of moisture. These conditions favoured the development of leaf curl, which was very prevalent in a number of orchards. It also favoured the development of Verticillium wilt in peaches, sweet cherries and other susceptible hosts. Continued showers and fog on May 26-27 resulted in a heavy infection of brown rot on the young fruit of sour cherries as the shucks were splitting. Losses amounting to 75% of the fruit occurred. Other stone fruits escaped due to the earlier splitting of the shucks. The greater amount of moisture in June favoured development of powdery mildew and shot-hole on both sweet and sour cherries. Late season rains caused late scab infection of apples.

Winter conditions in New Brunswick set in earlier in 1936-37 than for the previous year. The soil froze and thawed a number of times in October and ploughing operations ceased November 7. The December rainfall, totalling 5.38 inches, was the heaviest ever reported at the Fredericton Station. Light snowfalls and rains during December and January, followed by cold weather, covered the fields with ice. Owing to the absence of snow in the early winter months, frost penetrated to a greater than average depth. Low rainfall in April and the first week of May, militated against the rapid thawing of the soil. However, a heavy rainfall on May 10 brought out all the frost, but owing to frequent rains thereafter, seeding was delayed until May 29. The lack of snow, heavy rains and intermittent thawing and freezing resulted in a great amount of winter killing to such ornamental plants as the tulip, hollyhock, honeysuckle, foxglove, spirea, phlox, etc. Many coniferous trees and hedges were also injured, as well as hay and clover. Ascospores of the apple scab fungus were first discharged May 10th, at which time the blossoms were in the pre-pink stage. Heavy to light discharges were recorded until after the flowers had bloomed. The spread of apple scab was enhanced by the rainy weather of May and June, which prevented timely applications of fungicides, and delayed as well, seeding operations in many parts of the Province. The rainfall of July and August was meager, and the hot weather in these months was responsible for early maturing of most crops. Leaf rust of wheat was first recorded July 10, stem rust August 4 and late blight of potatoes July 11. The fall was open and favourable for harvesting. On October 17 and 18, 8 degrees of frost were recorded, causing considerable damage to potato tubers.

The winter of 1936-37 was one of light snowfall in Nova Scotia and frequent intervals of mild weather. The ground was frequently bare and conditions generally were

such that organisms, which over-winter on fallen leaves, etc. made an early development in 1937. Vegetation was not affected to the same degree, as the air and soil temperatures during March and April were close to average. May and June were months of higher precipitation than normal, with the result that early rusts, mildews, and leaf spots made quick progress on unprotected plants. The months of July and August were comparatively dry and a slight drought experienced. Many annuals appeared to suffer at this time, particularly sweet corn, but no permanent injury resulted.

The fall months were close to average in temperature and precipitation. Considerable damage resulted to the apple crop from heavy winds during the early part of the harvest season, both as windfalls and as bruised and blemished apples whipped but not dropped by the winds. The late fall months and early winter were mild and open with trees going into the winter in good condition. Normal defoliation of trees was the rule.

Crops were planted at the usual time in Prince Edward Island except in the western districts, where excessive soil moisture conditions necessitated a delay in seeding. Grains were planted early in an effort to escape rust epidemics. June was cool with heavy rainfall and high humidity. Associated with these conditions was a severe epidemic of Botrytis twig blight, a hitherto unreported disease of wild cherry (Prunus pennsylvanica). Botrytis blight of peonies was quite prevalent during June and early July.

July and August were hot and dry, one heavy rainfall only having occurred during these months, this being on August 11. Crops suffered considerably from the drought, and wilt of Irish Cobbler potatoes was more severe than during any previous year on record.

Symptoms developed early and were marked owing to the dry conditions prevailing during the growing season. Moisture and temperature conditions in 1936 were favourable to growth of potatoes and wilt was not so serious a factor. In 1935 plants were exposed to a dry period from July 22 to August 20 and wilt was only slightly less severe than in 1937.

Late and early blight of potatoes were not serious factors affecting production during the past season. Considerable late blight was in evidence on late Green Mountain stock in September, this month being cool and damp with wide fluctuations in temperature.

Crown rust of oats was very severe during the past summer. The most severe outbreak observed occurred on the Experimental Farm plots which are in close proximity to buckthorn (Rhamnus cathartica) the alternate host of crown rust. Stem rust of wheat reached serious epidemic proportions in some localities.

Brown rot of stone fruits was quite severe on sweet cherries and plums, infection on the hosts occurring in June when high moisture conditions prevailed; thus it would appear that the hot weather served to promote its growth within the host tissue. During the fall when the plums were ripening the excessive rainfall caused considerable spread of this disease from fruit to fruit. Shot hole of cherries was more prevalent than usual, spray schedules at present in use by fruit growers being apparently ineffective in checking this disease. Infection and subsequent development of this destructive disease was much greater during the early part of the season when high moisture conditions prevailed.

Except for those diseases discussed above, foliage and other diseases did not materially effect production during the season of 1937. Lack of complete turnip brown heart control by borax has been attributed to the lack of sufficient moisture to render the boron available.

Recording Phenological Data

R.C. Russell

In the table below is summarized the phenological data gathered at Winnipeg, Saskatoon and Edmonton in 1937. We had no one stationed at Indian Head last summer, so no records appear for that place. The observations for the other places were made by B. Peturson, R.C. Russell and G.B. Sanford.

Table 1. Summary of Phenological data taken at Winnipeg, Saskatoon and Edmonton in 1937.

Name of Plant	Winnipeg		Saskatoon		Edmonton	
	a	b	a	b	a	b
Pulsatilla ludoviciana	-	11/4	17/4	26/4	6/5	10/5
Populus tremuloides	30/4	2/5	20/4	27/4	13/4	18/4
Phlox hoodii	-	-	28/4	4/5	-	-
Acer negundo	7/5	7/5	3/5	5/5	2/5	4/5
Ranunculus ovalis	-	-	2/5	5/5	-	-
Cogswellia villosa	-	-	29/4	6/5	-	-
Betula papyrifera	15/5	-	4/5	6/5	30/5?	3/6?
Hierochloe odorata	19/5	20/5	12/5	15/5	-	-
Amelanchier alnifolia	15/5	17/5	7/5	12/5	9/5	13/5