POTATOES IN PRINCE EDWARD ISLAND[1]

and G.C. Ramsay[3]

rot, caused by Fusarium
proportions in Prince Edward
disease has shown that the high level

Economic losses due to Fusarium rot were not encountered in Prince Edward Island prior to the introduction of the highly susceptible variety Sebago, and although the disease has been observed each year, it was only in 1946, 1947 and 1960 that dry rot posed a serious problem to growers and shippers.

Published data (1) on experiments conducted at Charlottetown show that F. sambucinum enters the soil at time of planting in the form of spores adhering to the surface of the seed-piece and that effective control may be obtained through seed-piece treatment with an organic mercury fungicide. The extent of propagation of the pathogen in the soil is apparently dependent on the weather conditions that prevail during the growing season. Meteorological data for the crop production seasons in the years 1945-1960, together with information on the extent of Fusarium decay, are presented in Table 1.

It has been observed that epidemics of storage rot follow growing seasons in which conditions are characterized by low soil moisture, high rates of evaporation and above-average air temperatures and hours of sunshine, Rainfall for the period July - September was very light in 1945 and 1946, the evaporation rate was much higher than normal, and storage rot was prevalent in harvested crops. Heavy losses in the 1947 crop can not be correlated with low rainfall but a high evaporation rate together with above-normal temperatures and hours of sunshine during the growing season brought about drought conditions in many localities in Prince Edward Island. The sharp decline in the extent of decay found in the 1948 crop was concomitant with high soil moisture during the growing season. Rainfall was adequate, the evaporation rate was low and hours of sunshine were considerably below those in epidemic years.

'Contribution No. 106, Experimental Farm, Research Branch, Canada Department of Agriculture, Charlottetown, P.E.I.

[2] Plant Pathologist,

[3] District Inspector, Plant Protection Division, Production and Marketing Branch, Canada Department of Agriculture, Charlottetown, P.E.I.

Table 1. The occurrence of Fusarium storage rot in Prince Edward Island under varying weather conditions in the period 1945-1960.

	Average meteorological data recorded at Charlottetown, June - September				
	Rainfall (inches)	Evaporation rate (inches)	Air temperature °F	Sunshine (hours)	Estimated losses from storage rot
1945	2.48	4. 65	63.0	221.7	moderate
1946	2. 71	4. 42	62. 9	229. 3	heavy
1947	3.45	4. 19	63. 6	234.7	heavy
1948	3. 39	3.20	62.2	214. 9	light
1949-58	3. 19	3. 55	61. 9	213. 0	light
1959	2. 80	3. 05	62. 7	178.4	light
1960	2.34	4. 00	64.1	239.4	heavy

The period 1949-58 was characterized, for the most part, by excellent tuber yields and a combination of meteorological conditions which were not favorable for the disease. The epidemic in 1960 was preceeded in 1959 by a crop showing very little Fusarium decay. Although the 1959 rainfall was below average, evaporation was limited and soil moisture levels proved adequate for plant growth.

Losses due to Fusarium decay in 1960 were greater than in any previous year and it may be observed (Table 1) that meteorological conditions favored dessication of the soil to an extent not exceeded in any other period covered in this survey. During 1960, drought was more severe and storage rot more prevalent in Prince than in Queens and Kings counties. The data presented in Table 2 were compiled by the Seed Potato Inspection Service.

Table 2. The occurrence of Fusarium storage rot of potatoes in farm storages in the three countries of Prince Edward Island in 1960

County	Farm storages surveyed	Average per cent rot
Prince	248	8. 15
Queens	84	2. 50
Kings	37	1. 82

Further data on potato yields and the extent of decay were assembled from areas where rainfall was recorded. The results of this survey are presented in Table 3.

Table 3. The occurrence of Fusarium storage rot of potatoes in certain localities in Prince Edward Island.

District	County	Average monthly rainfall (June-Sept. (inches)	Yields in bushels 1960	Yields in bushels (average)	Per cent rot
O'Leary	Prince	1. 36	225	352(13 yrs.)	8.4
Urbanville	Prince	2. 40	300	328(15 yrs.)	1. 5
New London	Queens	2. 50	250	284(19 yrs.)	2.1
Charlottetown	Queens	2.34	287	287(3 yrs.)	2. 5
Alliston[1]	Kings	3. 28	143	177(13 yrs.)	0. 5
Monticello	Kings	2.43	350	251(19 yrs.)	1.3

[1]Very light soil.

A much greater extent of decay occurred in the O'Leary district than in other districts in Prince Edward Island, and the severity of the epidemic there can be correlated with very low rainfall. The Seed Potato Inspection staff has further noted that the pockets of heavy infection that occurred in other sections of the province in 1960 were associated with severe drought. Fusarium rot was not prevalent in Kings County and the limited infection was associated with adequate soil moisture levels during the critical period of tuber growth.

In assessing the factors associated with the occurrence of dry rot, consideration must be given to soil moisture levels at time of harvest. The pathogen enters the tubers through wounds \contracted at harvest, and tuber injury from contact with digger chains and bars is more likely to occur when the soil is very dry.

A substantial portion of the Prince Edward Island potato crop is harvested with the elevator-type digger and observations made in 1960 indicate that dry rot became readily established in bruises that occurred as the result of the passage of tubers over the bars of this type of machine. It was generally noted that tuber abrasions were less numerous and subsequent decay less where the crop was harvested with the beater and digger-picker types of harvesters, In harvesting with the beater digger the tubers come less in contact with metal machinery parts then with the elevator digger, and in digger-picker harvesting the crop must of necessity be handled slowly. Injury similar to that encountered with the elevator digger can occur when the crop is removed by combine harvesters, An essential precaution in potato lifting with elevator and combine harvesters is to keep tractor speeds at a minimum.

A, controlled inoculation experiment conducted in the winter of 1961 showed no differences in the susceptibility to storage rot of Sebago tubers produced under dry soil conditions and those produced under conditions of adequate moisture.

In summarizing the occurrence of storage rot in the 1960 potato crop in Prince Edward Island it is concluded that the greatest single factor contributing to the severity of the disease was the relatively high extent of soil infestation by the pathogen and that the propagation of the organism was favored by dry, warm soil during the period of plant growth,

Literature Cited

1. AYERS, G. W. and D. B. ROBINSON, 1956. Control of Fusarium dry rot of potatoes by seed treatment. Am. Potato Jour. 33: 1-5

EXPERIMENTAL FARM,
CANADA DEPARTMENT OF AGRICULTURE,
CHARLOTTETOWN, P. E, I.