DISEASES OF VEGETABLES IN ORGANIC SOILS OF SOUTHWESTERN QUEBEC IN RELATION TO CLIMATE IN 1969 AND 1970

René Crête,[1] Leon Tartier,[2] and Thomas Simard[3]

Abstract

In 1969 and 1970, foliar diseases of carrot and onion were observed in late August and early September, but they did not develop to epidemic proportions. A new root disease of carrot caused by Rhizoctonia sp. was observed for the first time in 1969 and again in 1970. Onion smut was observed on 48% of the farms surveyed in 1970. In general, diseases of vegetables grown in organic soil were less severe in 1970 than in 1969. This is attributed to climatic conditions characterized in 1970 by a lower than normal precipitation for the months of June, July, and August.

Resume

En 1969 et 1970, les brûlures foliaires de la carotte et de l'oignon sont apparues à la fin d'août et au ddbut de septembre mais n'ont pas atteint le seuil épidémique. Une maladie nouvelle sur la carotte causée par Rhizoctonia sp. fut observde pour la premiere fois en 1969 puis en 1970, Le charbon de l'oignon fut observde sur 48 pour cent des fermes visitées en 1970. En general, la sévérité des maladies de legumes cultivés en sol organique a été moins accentuée en 1970 qu'en 1969. Ceci est attribuable aux conditions climatiques caracterisdes par une pluviosité nettement au-dessous la normale pour les moins de juin, juillet et août.

Introduction

This survey has been conducted annually since 1959 (3) to determine the occurrence, distribution, and severity of diseases on the main vegetable crops grown in orqanic soils in southwestern Quebec (4). In 1963 (5), the object was extended to study the annual development of foliar diseases, such as blights of carrot, onion, and potato, in relation to climatic conditions, especially precipitation.

Methods

The surveys began in 1969 at the end of August, and in 1970 during the second week of September. The general method described previously was followed, and the diseases were evaluated according to an index devised in 1961 (4) and modified in 1966 (6). The pertinent meteorological data recorded at Ste. Clothilde, Que., (Table 1) were obtained from Mr. C. Péron, CDA Research Station, St. Jean, Que.

Results and discussion

The prevalence of diseases in 1969 was noticeably greater than in 1970 (Table 2). Carrot blights caused by Alternaria dauci (Kuhn) Groves & Skolko and Cercospora carotae (Pass.) Solh.; onion leaf blight caused by Botrytis squamosa Walker, purple blotch of onion caused by Alternaria porri (Ell.) Cif., and late blight of potato caused by Phytophthora infestans (Mont.) de Bary developed earlier and were more severe in 1969 than in 1970. Late blight was severe in unsprayed early crops of potato in 1969, whereas in 1970 the disease was insignificant in both early and late crops. Lettuce diseases were also more important in 1969, especially early in the season. Late blight of celery (Septoria apiicola Speg.), with light to moderate infections in 1970, had not been observed since 1966 (6). White rot of onion, Sclerotium cepivorum Berk., was again recorded for both years in the same fields, while onion smut (Urocystis magica Pass. ap. Thum.), seemed to be increasing in 1969. Therefore in June 1970 an extensive onion smut survey was conducted in 44 fields representing 60% of the onion growers and 70%

[1] Phytopathologist, Canada Department of Agriculture, Research Station, St. Jean, Quebec.

[2,3] Phytopathologists, Research Service, Quebec Department of Agriculture, St. Hyacinthe and Montreal, Quebec.

[3] Present address: P.O. Box 28 D'MIQ, Tetuan, Maroc.

of the onion producing area. The results are published elsewhere (1). A new root disease of carrot was observed for the first time in 1969 and again in 1970 in the same field. The causal agent was tentatively identified as Rhizoctonia sp. The symptoms greatly resembled those of rhizoctonia crown rot and cavity spot of muck-grown carrots described by Mildenhall and Williams in 1970 (2). The cavity spots were the most conspicuous symptoms observed.

In general, the results of 1969 and 1970 presented similarities with those of 1963 and 1964 (5). In these years foliage diseases developed about 1 month later than in 1961, when epidemics of foliage diseases of carrot, onion, and potato appeared early in the season (4). The years 1964 and 1970 were characterized by notably lower than average rainfall in June, July, and August, and it was during those years that disease development and intensity were the least serious. In 1969 the June rainfall was well above the long-term average but half of this amount fell during the last week of the month. The month of July was dry and did not permit an extensive build-up and spread of inoculum. Therefore the disease intensity was less than expected. Early and repeated fungicide applications following our recommendations may also have contributed to keeping the foliar diseases at a low level, thus preventing serious economic losses.

Table 1. Total precipitation (inches) and mean temperatures (°F) from May to September at Ste. Clothilde, Châteauguay Co., Québec

	May		June		July		August		September	
Year	P	T	P	T	P	T	P	T	P	T
1969	2.12	51.9	5.70	63.4	2.27	66.2	4.36	67.4	2.69	57.3
1970	3.16	54.3	2.03	63.5	2.23	70.1	3.15	68.4	4.40	58.8
31-year average	3.24	53.8	3.40	63.8	3.56	67.8	3.40	65.6	3.16	57.2

Literature cited

1. Crête, R., and L. Tartier. 1971. prevalence of onion smut, Urocystis magica, and losses in the organic soils of southwestern Quebec in 1970. Can. Plant Dis. Surv. (In press)

2. Mildenhall, J. P., and P. H. Williams. 1970. Rhizoctonia crown rot and cavity spot of muck-grown carrots. Phytopathology 60:887-890.

3. Simard, J., et R. Crête. 1959. Observations sur quelques maladies des cultures de legumes en terre organique du sud de Montreal. Societe de Quebec pour la protection des plantes, 42e rapport p. 23-24. (1960).

4. Simard, J., R. Crête, and T. Simard. 1961. Vegetable diseases on muck soils in the Montreal area in 1961. Can. Plant Dis. Surv. 41:353-356.

5. Simard, T., R. Crête, and J. Simard. 1965. Foliage diseases of vegetables in Quebec in 1963 and 1964 and their relationship to rainfall. Can. Plant Dis. Surv. 45:96-99.

6. Simard, T., R. Crête, and L. M. Tartier. 1966. The relationship between climate and foliar diseases on muck grown vegetables in 1966. Can. Plant Dis. Surv. 46:129-130.

Table 2. Diseases of vegetables grown in the organic soils of southwestern Quebec in 1969 and 1970

Crop	Diseases and causal agent	Disease rating*	Area affected 1969 Fields	1969 Acres	1970 Fields	1970 Acres
CABBAGE	Black rot (*Xanthomonas* campestris)	4	1	3		
	Clubroot (*Plasmodiophora brassicae*)	2	1	5	1	5
SWEDE TURNIP** (Rutabaga)	Mosaic (Virus)	1	4	92		
		2	2	30		
		3	4	109		
		4	5	41		

Table 2 (Cont'd)

Crop	Diseases and causal agent	Disease rating"	Area affected 1969 Fields	1969 Acres	1970 Fields	1970 Acres
CARROT	Foliar blights	0	1	5		
	(*Alternaria* dauci and/or	1	9	102	6	80
	Cercospora carotae)	2	4	54	4	118
		3	3	27	1	3
		4	5	26	1	10
	Rhizoctonia crown rot and cavity spot (Rhizoctonia sp.)	1	1	10	3	25
	Aster yellows (Mycoplasma)	1	4	32	9	197
	Nematode root knot	1	3	16	1	8
	(Meloidoyyne *hapla)*	3			1	12
CELERY	Late blight	1			1	20
	(*Septoria* apiicola)	3	1	1	1	5
	Pink rot (*Sclerotinia* sclerotiorum)	1	3	22	1	10
	Aster yellows (Mycoplasma)	1	4	60	4	60
	Mosaic (Virus)	1			4	60
	Mn deficiency	1	1	4	4	40
LETTUCE	Downy mildew (*Bremia* lactucae)	1	4	14	2	9
	Drop	1	3	7	2	9
	(Sclerotinia sclerotiorum)	2	1	4		
	Bottom rot	1	3	10	2	7
	(Rhizoctonia solani)	3	1	1		
	Aster yellows (Mycoplasma)	1	8	24	3	11
	Mosaic (Virus)	1			3	11
	Tip burn	1	1	2	1	2
	Chemical injury	3	1	6		
		4	1	3		
ONION	Leaf blight	1	13	175	6	86
	(Botrytis *squamosa)*	2	4	18	2	20
		3	1	28		
	Botrytis sp. (on spanish onions)	1			1	3
	Purple blotch	1	11	130	6	86
	(Alternaria *porri)*	2			1	10
		3	2	25	1	10
	Fusarium bulb rot (Fusarium oxysporum f. cepae)	1			2	13

Table 2 (Cont'd)

Crop	Diseases and causal agent	Disease rating*	Area affected 1969 Fields	1969 Acres	1970 Fields	1970 Acres
ONION (Cont'd)	white rot (*Sclerotium cepivorum*)	1	3	25	3	25
	Smut (*Urocystis magica*)	0	2	55	23	797
		1	2	45	19	449
		2	1	8	2	136
		3	1	10		
		4	1	1	1	1
	Calcium deficiency	1	1	10		
	Herbicide damage	4	1	6		
	Wind damage	1			1	50
PEPPER	Early blight (Alternaria solani)	1	1	3		
		3	1	3		
	Sun scald	3			1	3
	Blossom-end rot	2			1	3
POTATO						
Early crop	Late blight (Phytophthora *infestans*)	4	3	3		
Late crop	Late blight (Phytophthora *infestans*)	1	4	18		
		4	1	8		
	Early blight (Alternaria solani)	1	3	20	2	20
	Fusarium wilt (Fusarium oxysporum f. *tuberosi*)	2			1	10
	Rhizoctonia (Rhizoctonia solani)	1			1	10
	Gray mold (Botrytis cinerea)	1			1	10
	Leaf roll (Virus)	1	4	25	1	2
		2	1	10		
	Simple mosaic (Virus)	1			2	20
	Purple top (Virus)	1	2	15		
SPINACH	Downy mildew (Peronospora effusa)	1	1	10		
		3	2	20		
TOMATO	Bacterial speck (*Pseudomonas* tomato)	1	1	3		
	Leaf mold (*Cladosporium* fulvum)	3	4	30 x 100 ft greenhouse		
	Blossom-end rot	1	1	3		

* Footnotes on following page

Table 2 (Concluded)

* Disease ratings of 0 to 4 indicate disease severity classes representing % affected plants in the case of virus or soil-borne diseases, or the % leaf area affected by foliar diseases.

Rating	Disease severity (%)
0	0
1	1- 10
2	10- 30
3	30- 60
4	60-100

** In L'Assomption co., north of Montreal, no survey of swede turnips was made in 1970, but mosaic was as prevalent as in 1969.