FOLIAGE DISEASES OF VEGETABLES IN QUEBEC IN 1963 AND 1964 AND THEIR RELATIONSHIP TO RAINFALL

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Abstract

Observations made over a six-year period in the muck soildistrict south of Montreal indicate that early establishment of foliage diseases may be expected and fungicide applications required in July when the June rainfall is close to or above the 27-year average. Rainfall in June notably lower than the 27-year average indicates a late development of diseases and, therefore, no fungicide sprays should be required in July.

Résumé

Des observations échelonnées sur une pkriode de six ans dans la region des sols organiques du sud de Montreal indiquent qu'il y a risque d'implantation hâtive des maladies foliaires lorsque le total des pluies de juin approche ou dépasse la moyenne de 27 ans. I1 peut alors être nécessaire de commencer les traitements fongicides en juillet. Par ailleurs, une precipitation de juin notablement inférieure à la moyenne de 27 ans serait un indice d'un développement tardif des maladies foliaires et de l'inutilité d'avoir recours à des traitments fongicides en juillet.

Introduction

Since 1959, annual surveys of the plant diseases occurring on the principal vegetable crops grown in muck soils south of Montreal have been carried out. The object of these surveys was to follow disease development in the area and to try to relate this development to annual climatic conditions, especially rainfall. The general method used is described in an earlier report (3). The diseases observed in 1963 and 1964 and their intensityare listed in Tables 2 to 5. The annual rainfall for 1959 to 1964 and the 27-year average rainfall from June to Septemberfor the period 1938 to 1964, recorded at Ste. Clotilde, Que., were obtained from M. C. Peron, of the Research Station at St. Jean, Que, and are presented in Table 1. These figures are considered to be representative of the general situation in the muck soildistrict.

Table 1. Rainfall in inches at Ste-Clotilde (Chateauguay).

Year	June	July	August	September
1959	3.46	1.44	5.18	1.43
1960	3.19	1.54	1.56	4.31
1961	3.32	5.12	3.77	0.52
1962	1.93	4.76	4.59	2.76
1963	2.83	1.62	6.04	3.13
1964	1.72	2.91	3.03	1.19
27-year average	3.50	3.50	3.39	3.15

Results and discussion

In general, the results for 1963 were similar to those presented for 1962 (4). In both years, foliage diseases were observed about one month later than in 1961 and did not develop extensively. In 1964, the situation was even less critical; the diseases developed about45 days later than in 1961 and, in general, traces only were recorded early in September.

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Table 2. Diseases in the Ste-Clotilde region.

CROP	DISEASES	DISEASE INTENSITY 1963	1964
CARROT	Alternaria leaf blight (Alternaria dauci)	4-tr./4 fields	1-tr./4 fields
	Cercospora leaf blight (Cercospora carotae)	4-tr./4 fields	2-sl./4 fields
	Root-knot nematode (Meloidogyne hapla)		1-tr./4 fields
CELERY	Bacterial blight (Pseudomonas apii)	2-tr./4 fields	
	Pink rot (Sclerotinia sclerotiorum)	1-tr./4 fields	
LETTUCE	Aster yellows (callistephus virus 1)	3-tr./3 fields	1-tr./1 field
	Downy mildew (Bremia lactucae)	3-tr.-sl./3 fields	1-tr./1 field
	Mosaic (virus)	3-tr./3 fields	
	Root-knot nematode (Meloidogyne hapla)	1-tr./3 fields	
ONION	Calcium deficiency	1-tr./4 fields	
POTATO	Early blight (Alternaria solani)		1-tr./3 fields
	Late blight (Phytophthora infestans)		1-tr./3 fields
	Herbicide injury	1-tr./3 fields	
	Tip burn	3-tr.-sl./3 fields	
SUGAR BEET	Leaf spot (Alternaria tenuis)	2-tr./2 fields	

Table 3. Diseases in the Napierville region.

CARROT	Alternaria leaf blight (Alternaria dauci)	2-tr./2 fields	2-tr./2 fields
	Cercospora leaf blight (Cercospora carotae)	2-tr./2 fields	
ONION	Leaf fleck (Botrytis cinerea)	3-tr./3 fields	1-sl./1 field
	Calcium deficiency	3-mod./3 fields	
POTATO	Rhizoctonia (Pellicularia filamentosa)	2-tr./2 fields	

Table 4. Diseases in the Sherrington region.

CROP	DISEASES	DISEASE INTENSITY 1963	1964
CARROT	Alternaria leaf blight (Alternaria dauci)	3-tr./3 fields	1-sl./2 fields
	Cercospora leaf blight (Cercospora carotae)	3-tr./3 fields	1-sl./2 fields
	Root-knot nematode (Meloidogyne hapla)	1-tr./3 fields	
	Aster yellows (callistephus virus 1)		1-tr./2 fields
CELERY	Late blight (Septoria apiicola)	2-tr./ 8 fields	
	Bacterial blight (Pseudomonas apii) (on Utah 10-B or 1611)	3-mod./8 fields	
LETTUCE	Aster yellows (callistephus virus 1)	1-tr./ 1 field	
ONION	Fusariurn basal rot (Fusarium oxysporum f. cepae)	4-tr./12 fields	
	Downy mildew (Peronospora destructor)	3-tr./12 fields	
	Leaf fleck (Botrytis cinerea)	3-mod./12 fields	
	Leaf blight (Botrytis squamosa)	3-tr./3 fields	
POTATO	Rhizoctonia (Pellicularia filamentosa)	1-sl./3 fields	
	Late blight (Phytophthora infestans)	2-sev./3 fields	
	Black heart (oxygen deficiency)		1-sl./1 field

Table 5. Diseases in the Farnham region.

CARROT	Alternaria leaf blight (Alternaria dauci)	1-sl./1 field	1-tr./2 fields
	Cercospora leaf blight (Cercospora carotae)	1-tr./1 field	1-sl./2 fields
	Root-knot nematode (Meloidogyne hapla)	1-tr./1 field	
LETTUCE	Downy mildew (Bremia lactucae)	1-tr./1 field	
	Aster yellows (callistephus virus 1)	1-tr./1 field	
	Mosaic (virus)	1-tr./1 field	
ONION	Leaf fleck (Botrytis cinerea)	3-tr./3 fields	
	Leaf blight (Botrytis squamosa)		1-mod.1-sev./2 fields

This seems to support the hypothesis of a correlationbetween June rainfall and inoculum build-up leading to the establishment of initial disease foci, put forward earlier (4).

Table 1 shows that the June rainfall in the years 1959-1961 was close to the 27-year average at Ste. Clotilde. 1961, with heavy rainfall in June, July and August, was characterized by a general spread and high intensity of foliar diseases on potato, onion and carrot. In 1961, early epidemics of potato late blight (P. infestans) on both early and late varieties, onion leaf blight (B. squamosa) and mildew (P. destructor) and carrot leaf blights (A. dauci and C. carotae) were observed (3). In 1959 and 1960, the June rainfall was high but latter parts of both seasons were dry, except in August 1959. Consequently, the foliar diseases mentioned above although generally observed, were at a low intensity (1, 2).

The years 1962-1964 were characterized by June rainfall notably lower than the 27-year average. During those three years, foliage diseases developed late; in mid-August of 1962 and 1963, and early in September of 1964. During this period, disease was most serious in 1962, when July and August rainfalls were higher than the 27-year average (4). During the six years under observation, disease development and intensity were the least serious in 1964, when rainfalls for June, July and August were below the 27-year average.

In summary, these results indicate that an early establishment of foliage disease may be expected and fungicide applications required in July, when the June rainfall is close to or above 3.50 inches, the 27-year average at Ste. Clotilde. Further spread and development of the diseases will depend on the July and August rainfalls.

A June rainfall much lower than the 27-year average indicates a late development of diseases and, therefore, fungicide sprays should not be required in July. Under these conditions, if fungicide sprays are applied in August in years when rainfall is high during July and/or August, no serious economic losses should be expected from foliage diseases.

Literature cited

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