CLIMATE AND DISEASE DEVELOPMENT ON MUCK-GROWN VEGETABLES SOUTH OF MONTREAL, QUEBEC, IN 1968[1]

T. Simard[2], *R. Crête*[3], *and L. Tartier*[2]

Abstract

In 1968, carrot and onion foliar diseases were observed early in July, and potato late blight developed severely in early plantings. A similar situation was observed in 1967. The prevalence of foliage diseases is attributed to the fact that in both years the amount of rainfall in June was close to the 31-year average for the district. These results corroborate our 1962 hypothesis on the relationship of rainfall to the development of foliage diseases of vegetables.

Résumé

En 1968, les maladies foliaires de la carotte et de l'oignon sont apparues tôt en juillet et le mildiou de la pomme de terre s'est développé à l'état grave dans les plantations précoces de cette culture. Une situation semblable a été observée en 1967. Cela est attribué au fait que la precipitation du mois de juin de ces deux années était sensiblement le même que la moyenne de 31 ans pour la région. Ces résultats confirment notre hypothkse en ce sens kmise en 1962.

Introduction

The aim of this annual survey, initiated in 1959, is to record the annual occurrence and severity of diseases of the main vegetable crops in the muck soil district south of Montreal and to note their relationship withannual climatic conditions, especially with the amount of rainfall in June (1, 2, 3.4). Early in the course of this work, the accumulated annual observations were also found very useful for the orientation of our research work and the improvement of our advice to growers regarding the timing of fungicide applications (8).

Methods

In 1968, most fields were examined in the middle of August, but as usual, some individual observations and visits were made at other times during the growing season. The disease ratings were based on the percentage of plants affected by viruses or soil-borne diseases and on the percentage of leaf area affected by leaf blights; the ratings were expressed as follows: trace (1-10%), slight (11-30%), moderate (31-60%)).severe (61-100%).

The pertinent meteorological data recorded at Ste. Clotilde (Table 1) were obtained from Mr. C. Peron, Research Station, St. Jean, Qué.

Results

The most striking observations (Table 2) included the general occurrence and relatively high intensity of carrot blights caused by Alternaria dauci (Kühn) Groves & Skolko and Cercospora carotae (Pass.) Solh. inallofthe 20 fields visited in August; the occurrence of onion leaf specks (Botrytis spp.) in all of the 18 fields surveyed and Alternaria porri (Ell.) Cif. in 11 of the fields; and the high intensity of late blight of potato caused by Phytophthora infestans (Mont.) de Bary in the 7 fields of the early crops surveyed in early August and its occurrence at a low level in the 7 fields of the fall crop visited later in August. It should also be noted that low temperatures and slow emergence favored the development of Rhizoctonia solani Kühn on potato, and the generally cool summer promoted the occurrence of white rot caused by Sclerotium cepivorum Berk. in a few onion fields. Onion mildew caused by Peronospora destructor (Berk.) Casp. develops only sporadically in this district and was observed in a few fields. The root knot nematode Meloidogyne hapla Chitwood caused severe damage in one carrot field at the Ste. Clotilde station, but only a trace infection was detectedinone of the commercial carrot fields surveyed.

Discussion

The amount of rainfall in June of both 1967 and 1968 was close to the 31-year average (Table 1), a

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1 Contribution no. 95, Research Service, Qukbec Department of Agriculture.

2 Plant Pathologists, Research Service, Québec Department of Agriculture, 201, Crkmazie Blvd. East, Montréal 354, Quk.

3 Plant Pathologist, Research Station, Canada Department of Agriculture, St. Jean, Qué.

Table 1. Total rainfall and mean temperatures for June, July, and August at Ste. Clotilde, Chateauguay Co., Québec

Year	June		July		August	
	Rainfall (inches)	Temp. (F)	Rainfall (inches)	Temp. (F)	Rainfall (inches)	Temp. (F)
1967	3.64	66.7	3.37	68.9	2.02	66.1
1968	3.30	61.4	5.14	68.3	2.38	63.2
31-year average	3.40	63.8	3.56	67.8	3.40	65.6

Table 2. Diseases in the muck soil area south of Montreal in 1968

Crop	No. fields examined	Disease	No. of fields and disease rating*
CARROT	20	Leaf blights (Alternaria dauci and/or Cercospora carotae)	5 tr, 8 sl, 5 mod, 2 sev
		Root knot (Meloidogyne hapla)	1 tr, 1 sev
CELERY	8	Blotch and crater rot (Erwina carotovora)	1 tr
		Pink rot (Sclerotinia sclerotiorum)	1 tr, 1 sl
		Aster. yellows (Callistephus virus 1)	2 tr
		Black heart (Improper water relations)	2 tr, 1 sl
		Manganese deficiency	3 tr
LETTUCE	4	Downy mildew (Bremia lactucae)	2 tr, 1 sl
		Basal rot (Rhizoctonia solani)	1 tr
		Drop (Sclerotinia sclerotiorum)	3 tr
		Aster yellows (Callistephus virus 1)	4 tr
		Mosaic	1 tr

Table 2. (continued)

Crop	No. fields estimated	Disease	No. of fields and disease rating*
ONION	18	Mildew (Peronospora destructor)	5 tr
		Purple blotch (Alternaria porri)	8 tr, 1 sl, 2 mod,
		Leaf flecks (Botrytis cinerea and/or B. squamosa)	14 tr, 3 sl, 1 mod
		Smut (Urocystis magica)	1 sl
		White rot (Sclerotium cepivorum)	2 tr, 1 mod
		Calcium deficiency	2 tr, 2 sl
POTATO	14	Black leg (Erwinia atroseptica)	2 tr
		Late blight (Phytophthora infestans)	
		Early crops (7 fields)	7 sev
		Late crops (7 fields)	7 tr
		Rhizoctonia (Thanatephorus cucumeris)	2 tr

* Disease ratings indicate the percentage of plants affected by viruses or soil-borne diseases or the percentage of leaf area affected by foliage blights; tr = 10%, sl = 11-30%, mod = 31-60%, sev = 61-100%.

condition that we have repeatedly found to favor the early establishment and epidemic development of foliar diseases (4, 7, 8, 9, 10, 11). In both 1967 and 1968, leaf blights of carrots and onions were noticed in early July, and growers were accordingly advised to start their spray applications earlier than usual. During July 1968, the higher than normal amount of rainfall favored the rapid spread of carrot blights. We noticed that, under these conditions, the control of carrot blights could be improved by measures to be further investigated.

As noticed in 1961, 1967, and again this year (5, 6, 11), a high amount of rainfall in June seems to favor the establishment and severe development of late blight in the early crops of potato grown in a few sections of the muck soil district. This greatly increases the inoculum and is a threat to the fall crops. The reason that the late blight fungus spreads rapidly in early plantings following favorable weather in June but appears only later on in fields of late varieties seems to be related to the stage of development of the potato plants and remains to be more fully investigated.

A last comment deals with onion leaf blight, caused by Botrytis squamosa Walker, a disease characterized first by the appearance of numerous flecks followed by a die-back or blight of the leaf. Similar leaf flecks without a blight phase are incited by Botrytis cinerea Pers. In both 1967 and 1968, numerous flecks appeared early in July and developed extensively. However, the blight phase developed extensively only in 1967. This suggests that B. squamosa prevailed in 1967 and B. cinerea in 1968, a year also characterized by an extensive development of gray mold in various crops. The alleged prevalence of B. squamosa in 1967 may be due to the fact that the higher than normal mean temperature in June 1967 was in accordance with the temperature requirements of the fungus. On the other hand, the mean temperature in June 1968 was lower than the 31-year average and presumably less favorable to B. squamosa.

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