VEGETABLE DISEASES IN MUCK SOILS SOUTH OF MONTREAL IN 1965 AND THEIR RELATIONSHIP TO CLIMATE[1]

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Abstract

The relationship between low rainfall in June and late occurrence of foliage diseases was again observed in 1965. This is interpreted as the influence of early season rainfall on inoculum build up. The effect of climatic conditions on plant "disease potential" as defined by Grainger is also referred to.

Résumé

On a observe de nouveau en 1965 une relation entre la basse précipitation de juin et l'apparition tardive des maladies foliaires. Cette relation est expliquée par l'influence de la précipitation sur la multiplication de l'inoculum en debut de saison. Il est également fait mention de l'effet des conditions climatiques sur la "réceptivité aux maladies" (disease potential) telle que définie par Grainger.

Introduction

This annual survey was initiated in 1959. Its main purpose is to follow the annual development of diseases occurring on the main vegetable crops grown in muck soils, viz., carrot, celery, lettuce, onion and potato. It also aims to relate the development of the more economically important foliage diseases to annual variations in climatic conditions, especially rainfall. The 1965 survey was carried out during August and early September by the general methods previously described (2). The results appear in Table 2. Diseases of crops of less importance are reported in the annual summary number of the Canadian Plant Disease Survey. Rainfall and temperature for the season along with the 28-year averages are summarized in Table 1.

Table 1. Total rainfall in inches and mean temperatures at Ste. Clotilde, Châteauguay, Québec.

	June		July	
	R	T	R	T
1965	0.78	63.8°	4.37	64.2°
28-year average	3.40	63.8°	3.54	67.8°
	August		September	
1965	6.00	64.8°	4.55	58.6°
28-year average	3.49	65.7°	3.27	57.1°

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General results

Table 2 shows that, in general, the same diseases previously reported were again observed in 1965. Some of them are of special interest. Bacterial blight of celery (Pseudomonas apii Jagger), observed since 1962 on muck soil, appears mainly on the varieties Utah 10-B and Utah 1611 in farmers' fields as well as in celery plots at the Ste. Clotilde station. On lettuce, a disease tentatively identified as marginal leaf blight (Pseudomonas marginalis (N. A. Brown) F. L. Stevens) was observed for the first time in the area. As expected from the low population of six-spotted leafhoppers, aster yellows did not develop to any extent on lettuce and other hosts. White rot of onion (Sclerotium cepivorum Berk.), first detected in the area in 1962 (3), was again observed this year in additional fields. It has not yet been possible to explain how soils became infested with the organism since onion sets are not planted in the district. Although weather conditions appeared to favor leaf blight of onion (Botrytis squamosa Walker), the disease did not develop to serious proportions. The same may apply to late blight of potato (Phytophthora infestans (Mont.) de Bary) and leaf blights of carrot (Alternaria dauci (Kühn) Groves and Skolko and Cercospora carotae (Pass.) Solh.). Detected for the first time in 1962 (3), downy mildew of radish (Peronospora parasitica (Pers. ex Fr.) Fr.) was again observed in 1965. This disease seems to be influenced by special environmental conditions and it develops only sporadically. No special effort was made to evaluate damage by the root-knot nematode (Meloidogyne hapla Chitwood). However, samples from a plot known to be heavily infested, at the Ste. Clotilde station, showed only slight damage to carrot, both in 1964 and 1965.

Relation between climate and disease development

In 1965, foliar diseases did not develop extensively and their intensity remainedat a low level, in spite of the fact that rainfall in both July and August were above normal as shown in Table 1, whereas the June rainfall was much lower than the 28-year aver-

Table 2. Diseases in the muck soil area south of Montréal, Québec in 1965.

CROP	DISEASES	DISEASE INTENSITY
CARROT	Alternaria leaf blight (Alternaria dauci)	6-tr./13 fields
	Cercospora leaf blight (Cercospora carotae)	5-tr./13 fields
CELERY	Bacterial blight (Pseudomonas apii)	3-tr./10 fields
	In experimental plots at Ste. Clotilde: sl. on Utah 10-B and Utah 1611; tr. on Utah D-5 and Utah 5270	On Utah 1611 and Utah D-5
	Pink rot (Sclerotinia sclerotiorum)	3-tr./10 fields
	Manganese deficiency	2-tr./10 fields
	In experimental plots at Ste. Clotilde: mod. on Utah 10-B and Utah 1611	
	Common mosaic (Marmor umbelliferarum)	2-tr./10 fields
	Aster yellows (callistephus virus 1)	1-tr./10 fields
LETTUCE	Aster yellows (callistephus virus 1)	4-tr./6 fields
	Downy mildew (Bremia lactucae)	3-tr. 1-sl./6 fields
	Mosaic (Marmor lactucae)	2-tr./6 fields
	Drop (Sclerotinia sclerotiorum)	3-tr./6 fields
	Bottom rot (Rhizoctonia solani)	4-tr./6 fields
	? Marginal leaf blight (Pseudomonas marginalis)	2-tr./6 fields
ONION	Leaf fleck (Botrytis cinerea)	2-tr./24 fields
	Leaf blight (Botrytis squamosa)	8-tr. 2-sl./24 fields
	Mechanical leaf damages (wind, hail, eto.)	5-mod./24 fields
	White rot (Sclerotium cepivorum)	2-tr. 4-sl. 3-mod./30 fields
	Purple blotch (Alternaria porri)	1-tr. 2-sl./24 fields
	Pink root (Pyrenochaeta terrestris)	1-tr. 1-sl./24 fields
	Smut (Urocystis magica)	1-tr. 1-sl./25 fields
POTATO	Black leg (Erwinia atroseptica)	4-tr./16 fields
	Early blight (Alternaria solani)	8-tr. 1-sl./16 fields
	Late blight (Phytophthora infestans)	1-tr./16 fields
	In experimental plots at Ste. Clotilde: tr. on Irish Cobbler and G. Mountain	
	Verticillium wilt (Verticillium albo-atrum)	1-tr./16 fields
RADISH	Bacterial leaf spot (Xanthomonas vesicatoria var. raphani)	1-tr. 2-sl./7 fields
	Downy mildew (Peronospora parasitica)	1-tr. 3-sl./7 fields

age. These observations seem to support our hypothesis on the influence of June rainfall on the time of appearance and severity of foliage diseases. The late occurrence of diseases and their low intensity in 1965 may again be explained, as in the previous years, by June rainfall being below the long range average, resulting in a delayed build up of inoculum and lack of early primary disease foci (3, 4).

Another effect of low rainfall at the beginning of the season is reflected in plant growth. In 1965, subnormal rainfall in both May and June delayed emergence to a great extent and growth was further slowed by a July mean temperature lower than normal. Under these conditions, the disease potential or receptivity to disease as defined by Grainger (1) may have remained low until late in season. This is supported by the results of a first-year experiment on the evolution of the disease potential of five varieties of potato. These results showed that potatoes remained non-receptive to disease until late in August. This may explain why only traces of late blight were detected while an epidemic was expected under the rainy conditions that prevailed late in the season based on the criteria of the two forecasting methods used. The same explanation may also apply to onion leaf blight (B. squamosa) of which only traces were observed even in unsprayed plots following periods of apparently favorable weather conditions.

The results of the 1965 survey also seem to indicate that the development of white rot of onion and downy mildew of radish appear to be dependent on restricted weather conditions. Both diseases develop sporadically and were observed only in 1962 and 1965, both years similarly characterized, in July, by higher rainfall and lower mean temperature than the 28-year average.

Conclusions

It is obvious that the complex relationships between plant diseases and climatic conditions cannot be elucidated by field surveys alone. However, it is felt that annual observations of this type may help research workers in the planning of their experiments as well as extension men in their recommendations for disease control.

literature cited

1. Grainger, John. 1962. The host plant in crop disease. World Review of Pest Control 1: 32-43.
2. Simard, Jacques, René Crete and Thomas Simard. 1961. Vegetable diseases on muck soils in the Montreal area in 1961. Can. Plant Dis. Surv. 41: 353-356.
3. Simard, Jacques, René Crete and Thomas Simard. 1962. Vegetable diseases on muck soils in the Montreal area in 1962. Can. Plant Dis. Surv. 42: 216-219.
4. Simard, Thomas, René Crete and Jacques Simard. 1965. Foliage diseases of vegetables in Quebec in 1963 and 1964 and their relationship to rainfall. Can. Plant Dis. Surv. 45: 96-99.