Incidence and severity of diseases caused by *Botrytis cinerea, Pythium tracheiphilum,* and *Sclerotinia* spp. on lettuce in Quebec, 1985-1986.

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Disease surveys were carried out in Quebec muck soils in 1985 and 1986 to determine losses caused on lettuce by ***Sclerotinia*** spp., ***Pythium tracheiphilum,*** and ***Botrytis cinerea.*** Losses due to ***B. cinerea*** (gray mold) averaged 4.6% in 1985 and 3.9% in 1986. Pythium wilt (stunt) resulted in losses of 0.7% in 1985 and 2.4% in 1986. Losses due to ***Sclerotinia sclerotiorum*** were 0.3% in 1985 and 1.7% in 1986. ***S. minor*** was found in three fields in 1985 and losses in these fields ranged from 1.7 — 9.5%. Losses in transplanted crops were consistently higher than in seeded crops.

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Des enquêtes ont été effectuées au Quebec en 1985 et 1986 afin de determiner les pertes causées par ***Sclerotinia*** spp., ***Pythium tracheiphilum*** et ***Botrytis cinerea*** sur la laitue cultivee en sol organique. Les pertes dûes à ***B. cinerea*** (moisissure grise) Btaient en moyenne de 4.6% en 1985 et de 3.9% en 1986. Le nanisme cause par ***Pythium*** spp., a été responsable de pertes de l'ordre de 0.7% en 1985 et de 2.4% en 1986. Les pertes dûes a ***Sclerotinia sclerotiorum*** Btaient de 0.3% en 1985 et de 1.7% en 1986. ***S. minor*** était present dans trois champs en 1985 et les pertes dans ces champs variaient de 1.7 a 9.5%. Les pertes dans les laitues transplantees Btaient régulièrement plus élevées que dans celles semées.

Introduction

Lettuce in Quebec is grown primarily on organic (muck) soils and is either direct-seeded or transplanted. Diseases such as downy mildew and gray mold are common and broad-spectrum fungicides are applied regularly by most growers to reduce the severity of these diseases. Observations that some growers were applying additional fungicides aimed at control of lettuce drop, caused by ***Sclerotinia sclerotiorum*** L., led to surveys in 1985 and 1986 to ascertain the severity and incidence of this and other diseases in Quebec muck soils.

Methods

Commercial lettuce fields located near St-Patrice-de-Sherrington, St-Clotilde, and St-Remi, Quebec, were selected to represent the muck soil region. Twenty-five fields were surveyed in 1985 and ten in 1986. Four sampling sites were selected at random within each field. An individual site consisted of 80 m of row. Plants within each site were assessed weekly and rated for incidence of lettuce drop and stunt ***(Pythium tracheiphilum*** Matta), and incidence and severity of gray mold ***(Botrytis cinerea*** Pers.).

Severity of gray mold was rated on a scale of 1 — 5, where 1 = presence of dark brown spots, 3 — 15 mm in length, on basal leaves, but with no conidiophores present; 2 = presence of conidiophores in dark brown spots on basal leaves; 3 = conidiophores in basal leaf spots and lesions but no conidiophores on second level of leaves; 4 = conidiophores visible on lesions on second level of leaves; 5 = widespread rotting of the head. Field observations indicated that plants rated as 4 or 5 in the week prior to harvest were rejected at harvest and, therefore, plants rated at this level of severity one week before harvest were considered as being lost from production. Severity values were not assigned to plants infected by ***Pythium tracheiphilum*** or ***Sclerotinia*** spp. since these infections normally resulted in death of the plant. Mean values of incidence and severity for each field were obtained by averaging values from the four sites. Incidence and severity values represent the maximum levels found in each field during a given growing season.

Results and discussion

Loss data for 1985 and 1986 for all diseases are given in Table 1. Incidence values for ***Sclerotinia sclerotiorum*** were generally quite low in both years. Since infection by S. ***sclerotiorum*** normally resulted in death of the plant, the losses indicated here represent, to a large degree, the proportion of plants infected. These low values would not justify the cost of a fungicide application aimed specifically at ***Sclerotinia sclerotiorum*** for most fields. S. ***minor*** was found in only three fields but, where present, caused considerable losses, up to 9.5% in 1985. It is unclear whether S. ***minor*** has been recently introduced or has been restricted in distribution in this area for some reason. The spread of this species would have a major impact on lettuce production in the muck soil region.

Of the diseases studied, gray mold caused the greatest losses, despite the application of broad spectrum fungicides on a regular schedule by most growers. Currently, captan and zineb are recommended in Quebec for use on lettuce. Growers generally apply fungicides on a 5 — 7 day schedule, depending upon weather conditions. Improved fungicide application techniques or alternative fungicides would be useful for control of *Botrytis*. Losses in transplanted crops were consistently higher tihan in seeded crops (Table 1).

Stunt (or wilt) caused by ***P. tracheiphilum*** was generally more important than Sclerotinia diseases, and in some fields was

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Table 1. Losses in Quebec lettuce fields due to ***Pythium tracheiphilum, Sclerotinia*** spp., and ***Botrytis cinerea,*** 1985 – 1986.

Pathogen	Disease	1985 Loss (%)		1986 Loss (%)	
		Mean	Range	Mean	Range
P. tracheiphilum	wilt or stunt	0.7	0 – 6	2.4	0 – 24
Sclerotinia sclerotiorum	drop	***0.3***	0 – 1	1.7	0 – 4
Sclerotinia minor	drop	***3.7***	1.7 – 9.5	–*	–
Botrytis cinerea	gray mold				
	all fields	4.6	0 – 49	3.9	0 – 20
	seeded fields	0.4	0 – 2.3	0	–
	transplanted fields	13.0	0 – 49	6.2	0 – 20

*Fields with *S. minor* were not included in the 1986 survey. 1985 values for S. *minor* are from three fields only, out of 25 fields surveyed.

the limiting factor in production. It appears that some growers may have been confusing these two diseases due to a superficial similarity of symptoms. They can however be readily separated by examining the vascular tissue, which is discolored in the case of ***P. tracheiphilum,*** or by the characteristic soft rotting of the crown, which is typical of infection by ***Sclerotinia*** spp. In addition, plants attacked by ***P. tracheiphilum*** tend to be killed prior to the mid-way point in the growing season, whereas symptoms of invasion by *S. sclerotiorum* tend to occur later in the season. P. ***tracheiphilum*** is rarely reported as a pathogen of lettuce (2,3) although ***Pythium*** spp. have often been reported as causal agents of root rot and stunt (1). ***P. tracheiphilum*** is probably much more common than is generally recognized and, on the basis of the results reported here, more studies on the control and biology of this species appear warranted.

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