Rhizoctonia disease on 'netted gem' potatoes in southern Manitoba in 1980[1]

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Four fields of the potato cultivar, 'Netted Gem', in the Morden-Winkler area of southern Manitoba, were surveyed for the incidence of Rhizoctonia disease on stems and stolons. The fields surveyed were planted to two-year rotations of potatoes with either corn, onions, barley or wheat. The least amount of Rhizoctonia was found in the potato-wheat rotation with levels increasing in the potato-barley and in the potato-onion and potato-corn rotations. Irrigation did not appear to affect the amount of Rhizoctonia disease in the potato-corn and potato-onion rotations.

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On a observe quatre champs du cultivar de pommes de terre «Nettled Gem, dans la region productrice Morden-Winkler du sud du Manitoba pour la presence de la rhizoctonie sur les tiges et les stolons. Les champs retenus ont ete cultives en rotations de deux ans de pomme de terre avec du ma'is. des oignons, de l'orge ou du blé. La plus basse frequence d'apparition de la maladie fut observée pour la rotation pomme de terre-ble, la frequence augmentant graduellement dans les rotations pomme de terre-orge, pomme de terre-oignons et pomme de terre-ma'is. L'irrigation n'a pas semble influer sur l'infectiosité de la maladie chez les rotations pomme de terre-maïs et pomme de terre-oignons.

Introduction

Rhizoctonia disease of potato (*Solanum tuberosum* L.), also known in the sclerotial form on the tuber as 'black scurf', is caused by the fungus *Rhizoctonia solani* Kuhn (perfect stage *Thannatephorus cucumeris* (Frank) Donk). It is endemic every year in Manitoba and has been cited as being capable of causing serious losses somewhere in Canada every year (2).

This disease, because of the nature of the pathogen, is difficult to control. The pathogen has a wide host range and can survive in the soil in plant debris for long periods of time. The debris, of various plants, possesses different capacities to support saprophytic growth of *R. solani,* and therefore supports different levels of the pathogen in the absence of its host. During the summer of **1980,** a survey to determine the incidence of *R. solani* on the potato cultivar 'Netted Gem' in rotation with several crops, was carried out with the cooperation of a potato grower in southern Manitoba. The results are presented in this paper.

Materials and methods

Four fields of the cultivar, 'Netted Gem', with the following 2-yr rotations were surveyed: potato-corn, potato-onion, potato-barley and potato-wheat. A second comparison, irrigation vs. non-irrigation, was made in the potato-corn and potato-onion rotations. The sample per field consisted of 5 consecutive plants from 4 widely separated areas giving a total sample of 20 plants. From each plant data were gathered on stems with cankers, stems girdled, stolons with cankers and stolons girdled. No yield data were obtained.

Results and discussions

All (100.0%) of the stems were cankered except in the potato-wheat rotation (86.0%). Girdling of the stems was most severe in the potato-corn rotation (57.0%), with a lesser amount occurring in the potato-onion and potato-barley rotations (32.0%) and the least amount in the potato-wheat rotation (15.0%), Table 1. The incidence of *R. solani* in the potato-corn and potato-onion rotations apparently was not affected by irrigation.

The incidence of cankers on and girdling of stolons also was high (Table 1). On the average the highest incidence of cankered and girdled stolons occurred in the potato-corn and potato-onion rotations, with a decrease in the potato-barley rotation and again the least amount occurred in the potato-wheat rotation.

Other rotation studies have shown that various crops possess different potentials to support saprophytic growth and disease of *R. solani* in soil. In the state of Maine, potato plants in soils under a 2-yr rotation with oats, had the lowest incidence of disease on the stems, roots and tubers of the cultivars Kennebec and Katahdin. On the more susceptible cultivar, Russet Burbank (Netted Gem), the 3-yr rotations of potato-oats-soybeans or potato-oats-millet provided the lowest incidence of disease (3). A report from Poland indicated that infection was lower when potatoes were planted after rye or wheat (16.3%). or rape (14.3%) and highest after potato (30.0%) (4). In Kazakhstan (USSR), incidence of *R. solani* was reduced considerably by crop rotation with sainfoin, pea-oats mixture and barley (1). Buckwheat residue provided one of the best substrates for *Rhizoctonia* colonization while oat and soybean were poor substrates (3).

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Table 1. Incidence of *Rhizoctonia solani* infection on the stems and stolons of 'Netted Gem' potato plants grown under various rotations*

Rotation	Irrigation	% *R. solani*			
		Stems		Stolons	
		Cankered	Girdled	Cankered	Girdled
Potato-Corn	+	100.0	56.7	74.4	39.4
Potato-Corn	–	100.0	57.0	80.8	46.1
Potato-Onion	+	100.0	33.0	73.2	45.0
Potato-Onion	–	100.0	25.0	69.3	38.5
Potato-Barley	–	100.0	38.0	51.5	31.6
Potato-Wheat	–	86.0	15.0	44.1	22.9

*Data given on a sample of *20* plants per field

Results of this limited survey tend to support previous work that barley and wheat supported lower levels of *R. solani* infection in potatoes. An important aspect of this information is that it was obtained from an area in Manitoba cropped rather intensively to potatoes and under grower production practices. Further studies on the effect of crop rotation and other production practices are needed to assess their effect on incidence *of R. solani* and more importantly their effect on yield.

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