Distribution of *Sclerotinia sclerotiorum* in western Canada as indicated by sclerotial levels in rapeseed unloaded in Vancouver, 1973-1981[1]

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The frequency and distribution of stem rot (*Sclerotinia sclerotiorum* (Lib.) de Bary) of rapeseed in western Canada is indicated by the levels of sclerotial infestation in railcar unloads in Vancouver from 1973 to 1981. Sclerotial infested rapeseed has been recorded from all of the major rapeseed growing areas of the four western provinces suggesting that stem rot is a very prevalent disease. Relatively high sclerotial levels were found in rapeseed originating in Alberta crop districts 4, 5 and 6, and low to moderate levels were recorded for Saskatchewan, Manitoba, southern Alberta, and the Peace River area.

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Le niveau d'infestation en sclérote de la graine de colza, mesuré lors de déchargement des wagons de train à Vancowver de 1973 à 1981, permet d'estimer la fréquence et la distribution de la pourriture sclérotique (*Sclérotinia sclérotiorum* (Lib.) de Bary) du colza dans l'ouest canadien. De la graine de colza infestée de sclérote a été signalée en provenance de toutes les regions des quatres provinces de l'ouest ou cette culture est importante, ce qui suggère que cette maladie est très répandue. Des niveaux relativement élevés de sclérotes ont été mesurés dans des chargements de graine de colza provenant des regions agricoles 4,5 et 6 de l'Alberta et des niveaux bas à modérés dans ceux en provenance de la Saskatchewan, du Manitoba, du sud de l'Alberta et de la region de la Peace River.

Introduction

Stem rot is a major disease of rapeseed in western Canada (Duczek & Morall 1971, Morrall et al. 1976, Platford & Bernier 1975, Morrall & Dueck 1982). Ascospore infection of stems usually occurs during petal fall and is dramatically affected by available moisture, temperature and the presence of dead flower parts (McLean 1958, Kruger 1975). Sclerotia are formed inside the hollow stems of infected plants which become brittle and shred easily at maturity. During threshing sclerotia are released from the stem and become mixed with the seed.

A large proportion of the rapeseed grown in western Canada is transported by rail to Vancouver, British Columbia for export. During the unloading of the railcars a 500 g sample is routinely analyzed for dockage; included in the dockage are the sclerotia of *Sclerotinia sclerotiorum* (Lib.) de Bary, which are common contaminants of harvested rapeseed (Dueck et al. 1981). The numbers of sclerotia per 500 g sample have been provided by the Canadian Grain Commission for the period 1973 to 1981. This study is based on records of 9707 samples for the 9-year period. The purpose of this paper is to infer the frequency and distribution of stem rot of rapeseed (*Brassica napus* L. and *B. campertris* L) in western Canada based on the level of sclerotial infestion and the origin of the sample. Although the sample records are only for rapeseed transported through Vancouver, the data are sufficient to permit identification of areas where stem rot can be expected to be a persistent problem.

Materials and methods

The data consisted of the number of sclerotia per 500 g seed, the arrival date in Vancouver and the grain elevator of origin. Rapeseed carloads arriving in Vancouver from September 1 to August 31 were assumed to have been grown during the previous growing season. From these data the average number of sclerotia per sample for each elevator were calculated on a yearly basis using a computer program. The average level for each elevator was then plotted on a map (Figure 1). The distribution of sclerotial levels was divided into three equal classes designated low, moderate, and high, corresponding to levels of 1.0 to 2.6, 2.7 to 6.2, and more than 6.2 sclerotia per 500 g seed, respectively.

Results and discussion

Disease distribution. The recorded levels of sclerotial infestation are summarized in Figure 1. Crop districts 4,5 and 6 of Alberta appear to have the highest frequency of stem rot for the period surveyed; elevator reports of sclerotial levels of more than 20 sclerotia per 500 g seed from these areas are common. Saskatchewan and the southern portions of the rapeseed growing areas of Alberta apparently have moderate to low frequencies of stem rot. The samples from Manitoba appear to be equally distributed among the three classes of sclerotial infestation. Carloads of rapeseed infested with sclerotia were recorded from all of the major rapeseed growing areas of western Canada suggesting that stem rot is a very prevalent disease.

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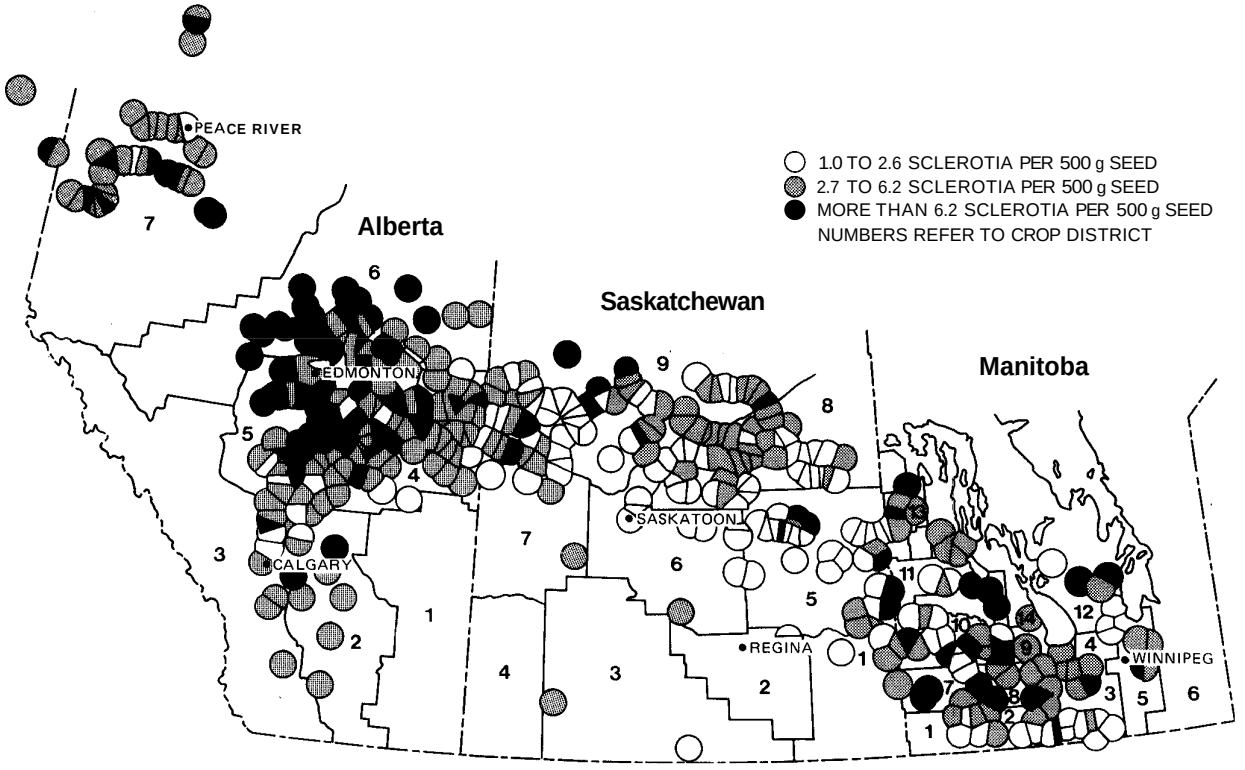

Figure 1. Sclerotial levels in rapeseed unloaded in Vancouver, 1973-1974.

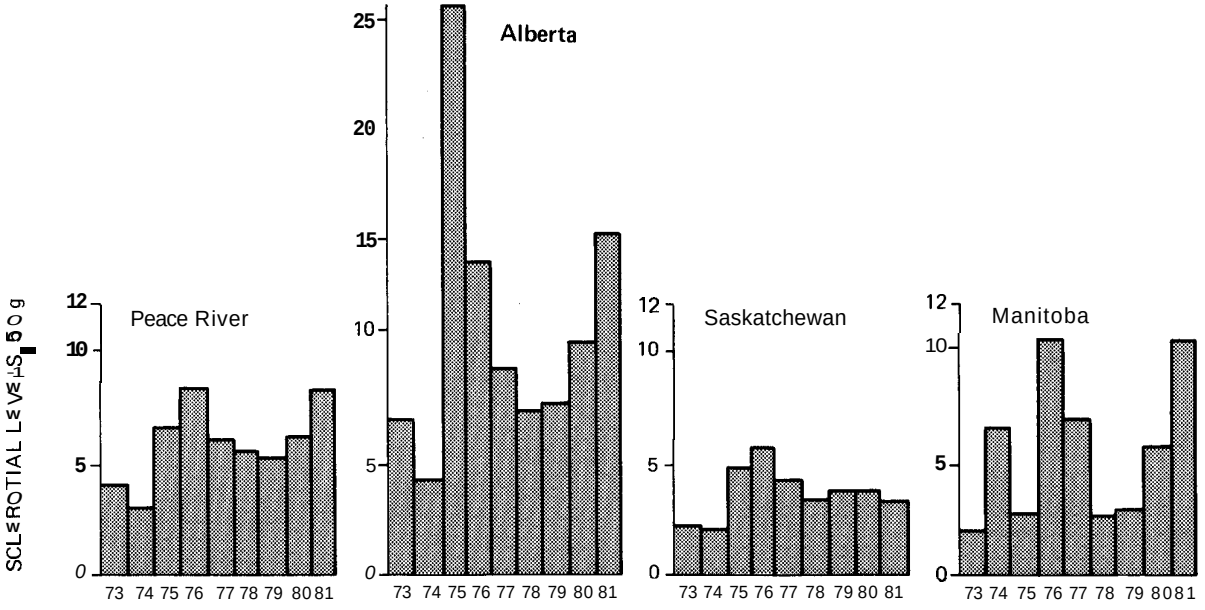

Figure 2. Variation in content of sclerotia of *Sclerotinia sclerotiorum* in samples of rapeseed from railcar unloads at Vancouver by year (1973-81) and area of origin.

Disease variability among years. The greatest contributing factor to the variability among years is probably the amount of available moisture during flowering, the time of ascospore infection. Moisture influences apothecial formation, ascospore dispersal and germination, and the suitability of the infection court (Kruger 1976, McLean 1958, Morrall and Dueck 1982). The absence of increasing trends in the sclerotial levels in seed samples suggest no net increase in the levels of stem rot

infestation in any of the four areas studied over the 9-year period (Figure 2). The frequency of stem rot, as implied by the sclerotial levels in the seed, fluctuates considerably among years in central Alberta and the Peace River area. Conversely, in Saskatchewan the frequency of stem rot appears to have remained relatively constant since 1975. The lower sclerotial levels in samples from Saskatchewan suggest stem rot has a lower frequency than in the other provinces. The lower disease frequency in Saskatchewan could be due to the drier conditions during the growing season.

Attempts to correlate the variability in the apparent disease frequency among years, with the amount of precipitation during the growing seasons, were not successful. The absence of good correlations suggest other parameters also have a major influence on sclerotial infestation levels in seed. In addition, the amounts of precipitation can vary dramatically over relatively small distances and hence the local environmental conditions which influence sclerotial production can also vary considerably (Morrall and Dueck 1982). The data did not identify field location with enough precision for this type of correlation.

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