Vegetables / Légumes

CROP: Potato

LOCATION: Southern Alberta

NAME AND AGENCY:

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TITLE: SURVEY OF SCLEROTINIA STEM BLIGHT OF SEED POTATO IN SOUTHERN ALBERTA, 1992-95

METHODS: Fields of seed potatoes in southern Alberta were surveyed for sclerotinia stem blight (*Sclerotinia sclerotiorum*) during July-August in 1992-95. Each field was inspected by selecting sample sites in a X- or V-shaped pattern depending on the size and shape of the field. Generally, there was one sample site per hectare or a minimum of 10 sample sites per field and 100 plants per site. The number of plants showing symptoms of stem blight with appearance of light brown stems and formation of young and mature sclerotia were recorded at each site. The percentage of diseased plants for the entire field was then calculated as the average of the total inspected sites.

RESULTS: In southern Alberta, sclerotinia stem blight of seed potato was found in 0.9%, 3.2%, 10.5% and 4.3% of the fields surveyed in 1992, 1993, 1994 and 1995, respectively (Table 1). The disease incidence was very light in these fields ranging from trace (less than 0.01% of infected plants) to 1%. Of the 21 diseased fields, nine were found near Vauxhall, nine near Taber, two near Enchant, and one near Hays. The diseased cultivars or lines were Shepody in five fields, Russet Burbank in four fields, Atlantic in three fields, Niska in three fields, Norkotah Russet in two fields, and one each for Rode Eerstling, FL 1207, FL 1291, and FL 1533.

TABLE 1. Sclerotinia stem blight of seed potato in southern Alberta, 1992-95.

	No. of fields		Diseased plants (%)	
Year	Surveyed	Diseased	Range	Average
1992	109	1	<0.01	<0.01
1993	95	3	0.01-0.08	0.03
1994	114	12	0.03-1.00	0.26
1995	115	5	0.01-0.50	0.16

DISCUSSION: The survey appears to be the first record of sclerotinia stem blight on seed potato in the Canadian prairies. Although *S. sclerotiorum* was reported to cause severe damage on potato in Florida and Washington (Purdy 1979), it only caused light infection on this crop in southern Alberta. In Florida, the annual loss of potato due to this disease was estimated to be $16 to 19 million in U.S. dollars (Purdy 1979). Huang et al.(1988a,b) reported that *S. sclerotiorum* was a major pathogen of dry beans and canola in southern Alberta. This suggests that despite the widespread occurrence of the pathogen in southern Alberta, the disease remains light on potato. Whether the low incidence of sclerotinia stem blight in potato is related to the prairie climates or potato cultivars warrants further investigation.

The survey results suggest that sclerotinia stem blight may not affect potato yield in southern Alberta because of low disease incidence. However, this disease is of paramount importance to potato seed producers because the disease may further spread from field to field through the planting of pathogen-infected or contaminated tubers.

REFERENCES:

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CROP: Potato, *Solanum tuberosum* L.

LOCATION: Prince Edward Island

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TITLE: SURVEY OF MATING TYPE AND SENSITIVITY TO METALAXYL OF ISOLATES OF *PHYTOPHTHORA INFESTANS* IN CANADA, 1994

METHODS: *Phytophthora infestans* (Mont.) de Bary, causal agent of late blight of potatoes, was isolated from diseased potato leaves and tubers collected from 7 Canadian provinces (New Brunswick, Prince Edward Island, Quebec, Ontario, Manitoba, Saskatchewan and Alberta) in 1994. Samples were collected from commercial fields and storages except for two samples collected from research trials in Prince Edward Island. Samples of infected potato leaves were sandwiched between healthy leaves, wrapped in newspaper, placed in plastic bags and then boxed for shipment to the Charlottetown Research Centre. Infected potato tubers were wrapped in paper, bagged and then boxed for shipment. Although surveys were extensive, the occurrence of hot, dry weather in the summer of 1994 significantly reduced the expression of disease and severely limited the availability of samples from Nova Scotia and Prince Edward Island.

Potato leaves and tuber slices with distinct lesions were placed in petri dishes containing moistened filter paper which in turn were placed into dew chambers at 15°C to encourage fungal sporulation. From each sporulating lesion, a single isolate was obtained for testing. Fungal isolates were cultured on clarified rye extract agar and grown in the dark at 15°C. Agar plugs of cultured isolates were transferred to plates of clarified rye extract agar containing a known mating type and the production of oospores was assessed after ten days. In addition, agar plugs of cultured isolates were transferred to plates of clarified rye extract agar amended with 0 and 100 µg metalaxyl/mL (metalaxyl is one of the active ingredients of the fungicide Ridomil/MZ, Ciba Geigy Ltd.). Colony diameter was measured after incubation for seven days in the dark at 15°C. Growth in the presence of 100 µg metalaxyl/mL was expressed as a percentage of growth in the absence of metalaxyl. Three categories of fungicide sensitivity were recognized: metalaxyl-sensitive = <10% growth, metalaxyl-intermediate = 10-60% growth and metalaxyl-resistant = >60% growth.

RESULTS: Variation in pathogen populations existed among provinces. The majority of isolates obtained from Ontario, Quebec and New Brunswick were of the A2 mating type while the A1 mating type predominated in samples from Manitoba and Alberta. Isolates from Saskatchewan and Prince Edward Island were of the A1 mating type. Samples collected in early summer from most provinces (except New Brunswick) yielded A1 mating types. Subsequent samples tended to yield A2 mating types. In only two instances were both mating types of *P. infestans* found in the same sample. Isolates displayed a wide range of response to metalaxyl.

Phytophthora infestans was isolated from 142 samples of leaf and tuber tissue. Of the 142 samples assessed, 62 (43.7%) contained isolates of the A1 mating type and 82 (57.7%) contained isolates of the A2 mating type. Metalaxyl sensitivity testing of the 142 samples determined that 93 (65.5%) contained isolates that were metalaxyl-sensitive, 85 (59.9%) contained isolates that were metalaxyl-intermediate and 18 (12.7%) contained isolates that were metalaxyl-insensitive or resistant.

Of the 555 isolates of *P. infestans* assessed, 209 (37.7%) were of the A1 mating type and 346 (62.3%) were of the A2 mating type. Metalaxyl sensitivity testing of the 555 isolates determined that 251 (45.2%) were metalaxyl-sensitive, 257 (46.3%) were metalaxyl-intermediate and 47 (8.5%) were metalaxyl-insensitive or resistant.

DISCUSSION: These results indicate that the A2 mating type and metalaxyl-insensitive forms of *P. infestans* are established in Canada. These new types of the pathogen may be spread to other areas by wind-borne inoculum or via infected plant material (particularly seed potatoes).

The presence of both the A1 and A2 mating types of *P. infestans* in Canada implies that sexual reproduction may be occurring. In fact oospores (sexual spores) were found in leaf tissue from New Brunswick (personal communication, Z. Punja, Simon Fraser University) and in tuber tissues from Quebec. Sexual reproduction may lead to an increase in genetic variability. This may allow the pathogen to more easily overcome host resistance and to develop tolerance to fungicides. Many of the new strains already show a range of sensitivity to metalaxyl. In addition, the production of oospores could add a new element to the disease cycle that must be considered in control schemes (eg.soil-borne inoculum). Studies are being undertaken to determine the survivability of oospores under different temperature regimes.

Such changes in the pathogen will increase the importance of non-chemical means for controlling late blight. Planting pathogen-free seed and destroying cull piles and volunteer plants are vital measures. Protectant fungicides will also continue to be important in conjunction with close monitoring of disease progress. Metalaxyl must be used with care to prevent the development and maintenance of a metalaxyl-resistant population of *P. infestans*. Crop rotations may have increased value if soils contaminated with oospores need to be considered.

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