Vegetables / Legumes

CROP: Corn, *Zea mays* L.

LOCATION: Southern Alberta

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TITLE: SEEDLING DISEASES OF CORN IN SOUTHERN ALBERTA IN 1993

METHODS: Sixty-three irrigated commercial corn fields in four districts (Fig. 1) were surveyed for seedling blight diseases from June 22-30. The districts included the County of Newell (Brooks-Rolling Hills), Municipal District of Taber (Taber-Barnwell-Purple Springs), County of Forty Mile (Bow Island-Burdett), and Municipal District of Cypress (Medicine Hat-Redcliff). Processing, fresh market, grain and silage corn fields were included in the survey. A sample of 30-60 plants was collected from each field. These samples were obtained by entering individual fields at one corner, walking 200 paces toward the center, then stopping at five equidistant points along an exit transect to the nearest edge of the field. All of the plants in a 2m section of row at each point were dug and returned to the laboratory where they were washed and rated for disease.

Seedling blight incidence was determined by counting the number of plants with symptoms of root rot, while severity was estimated visually on the same plants using the following five-point scale: clean (0) = no root rot, slight (1)= 1-25% of the roots rotted, moderate (2)= 26-50% root rot, severe (3)= 51-75% root rot, and very severe (4)= >75% root rot. Samples of diseased roots were surface sterilized and plated out onto acidified potato dextrose agar and onto cornmeal agar amended with penicillin, vancomycin and pimaricin to isolate potential fungal pathogens.

RESULTS: The age and size of the corn plants varied from field to field, but most were at the 5- to 8-leaf stage at the time of sampling. Seedling blight was found in all four corn types surveyed, but not in all fields (Table 1). Over 1735 ha were examined, with about 1695 ha (98%) being infected. The lowest incidence of seedling blight occurred in field corn (grain and silage) and the highest was in sweet corn (processing and fresh market). Overall, the disease severity was rated as slight (<25% roots rotted). Fungi isolated from the roots of affected seedlings collected during the survey included species of *Pythium, Fusarium, Penicillium, Trichoderma, Gliocladium, Rhizopus* and *Bipolaris*. Species identification and pathogenicity testing of these isolates are pending. Three- to five-leaf dieback, a seedling disease caused by *Penicillium* spp. and previously unreported in Alberta, was prevalent in some cultivars of Super Sweet corn in the Taber area.

COMMENTS: Although seedling blight was present in many corn fields in 1993, it was a relatively minor problem in most cases. Cool, wet soil conditions in May and June were unfavorable for germination and emergence of corn, and appeared to favor seedling blight in several of the fields surveyed.

Table 1. Number and area of corn fields surveyed for seedling blight, proportion of fields affected and blight incidence and severity in southern Alberta in June, 1993.

CORN TYPE	NO. FIELDS SURVEYED (HA)	AREA SURVEYED	% AREA SURVEYED WITH SEEDLING BLIGHT	AVG. BLIGHT INCIDENCE (% BLIGHTED SEEDLINGS)	AVG. BLIGHT SEVERITY (0-4)*
Processing	25	894	100	29.3	0.5
Fresh market	27	170	99	23.7	0.4
Grain	7	440	87	15.3	0.2
Silage	4	232	100	12.2	0.1
Total	63	1736			

* **Clean (0) = no root rot, slight (1) = 1-25% of the roots rotted, moderate (2) = 26-50% root rot, severe (3) = 51-75% root rot, and very severe (4) = >75% root rot.**

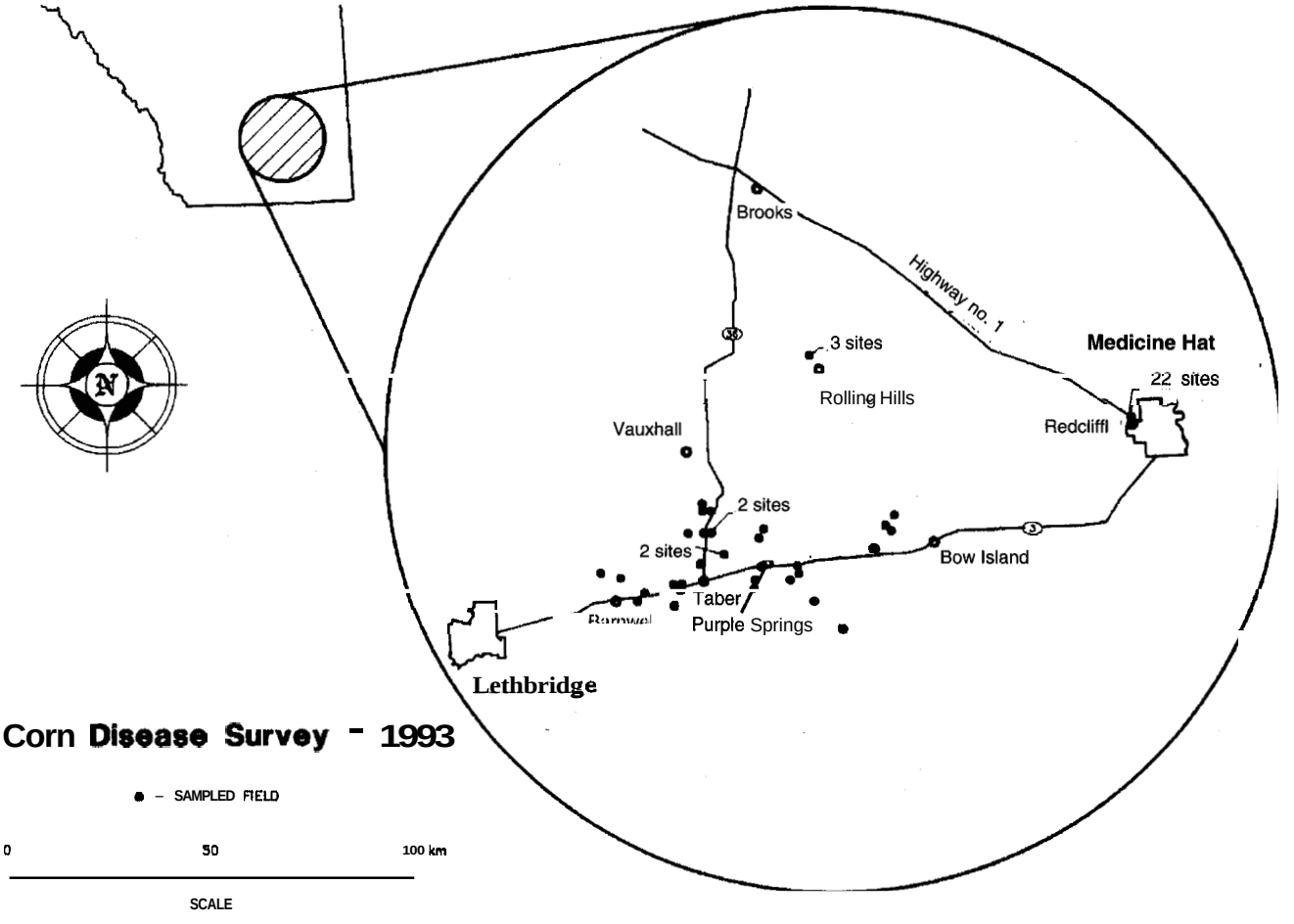

Figure 1. Location of corn fields surveyed for seedling blight in southern Alberta in 1993.

CROP: Cucumber

LOCATION: Central Alberta

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TITLE: PYTHIUM ROOT ROT OF FIELD GROWN CUCUMBERS IN CENTRAL ALBERTA IN 1993

INTRODUCTION: Commercial producers of field cucumber crops in central and northern Alberta, experienced above normal Pythium root rot disease in their fields in 1993. Due to cool wet spring weather, the disease quickly destroyed early cucumber plants. Later crop plantings were also affected but not as severely. Fields seeded for mid season markets were surveyed for the disease.

METHODS: Seven cucumber (pickling and slicing) fields were surveyed for Pythium root rot disease in areas surrounding Edmonton in July 1993. The survey procedure consisted of staking a "W" shaped pattern in each field. The areas of the field that lay on each of the five corners of the " W configuration were surveyed for root rot. Each of these areas measured 8 m in length and 10 row crop widths. The percentage of infected cucumber plants was recorded and averaged from each area and from each field. Soil samples were also collected at each location in the field and their populations of *Pythium* spp. determined on PVP medium.

RESULTS AND COMMENTS: Root rot of cucumber was found in all fields (Table 1). One hundred percent disease incidence occurred in some field depressions that had been previously flooded by prolonged rains. The amount of infection ranged from 0.9 to 29.9 percent among the fields. The high disease incidence this year can be attributed to unusually low temperatures and frequent rainy periods occurring in the spring and summer. Approximately 250 Pythium cultures were isolated from the diseased root samples. The average Pythium populations were low (30-230 propagules/g soil) and varied with locations in the same field.

Table 1. Disease incidence of Pythium root rot of field grown cucumber in central Alberta, 1993.

FIELD NO.	CULTIVAR	NO. PLANTS EXAMINED	INFECTION (%)	PYTHIUM POPULATION (PROPAGULE/G SOIL)
1	Fancipak	2,438	0.9	30
2	Comet	1,483	4.6	55
3	Calypso, Royal	2,321	7.8	188
4	Green Spear	3,305	9.8	125
5	Pioneer	1,945	21.8	230
6	Calypso	2,211	27.7	180
7	Victory, Spear-It, Pick-Rite	1,636	29.9	110

CROP: Potato, *Solanum tuberosum* L.

LOCATION: Prince Edward Island

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TITLE: SURVEY FOR THE PRESENCE OF A2 MATING TYPE AND METALAXYL-INSENSITIVE STRAINS OF THE CAUSAL AGENT OF POTATO LATE BLIGHT

METHODS: *Phytophthora infestans* (Mont.) de Bary, causal agent of late blight of potatoes and tomatoes, was isolated from diseased potato leaves (10-15) that were collected during August from 5-10 commercial fields across Prince Edward Island in 1992 and 1993. Fields were selected on the basis of late blight presence and previous use of metalaxyl (Ridomil MZ, Ciba Geigy Corp.). Fungal isolates cultured on rye grain agar at labs in P.E.I., Ottawa (G. White), Vancouver (Z. Punja), Maryland (K. Deahl), and New York (W. Fry and S. Goodwin). Agar blocks of cultured isolates were transferred to either plates amended with metalaxyl (0 and 1-100 ppm) or plates with a known mating type and examined for mycelial growth and oospore production, respectively.

RESULTS AND COMMENTS: In 1992 and 1993, all isolates of *Phytophthora infestans* collected from Prince Edward Island were of the traditional A1 mating type and were sensitive to metalaxyl. However, new mating types (A1 and A2) and metalaxyl-sensitive strains have been found in British Columbia, Florida, Kentucky, N. Carolina, Tennessee, New York, Maine, Michigan, and California. In addition, Florida, Oregon, and Washington have the A1 mating type and metalaxyl-insensitive strains. These changes to the pathogen populations in the various production areas require monitoring as European data suggests that the new genotypes are often more fit and aggressive. Furthermore, where sexual reproduction occurs, disease control will have to deal with (for the first time) the problem of infested materials as oospores may survive outside of host tissues.

While the immediate solution to these new late blight problems will be a greater adherence to the currently available disease management recommendations, the first issue to be addressed will involve the metalaxyl-insensitive strains. It is important to maintain access to metalaxyl as it is the only systemic fungicide registered for late blight of potatoes in Canada. Therefore, planting healthy seed and destroying culls and volunteer plants infected with these strains of the pathogen will be necessary to prevent introduction or spread of metalaxyl-insensitive strains. Similarly, proper use of the fungicide will be required to avoid development of insensitive strains during the growing season.

CROP: Tomato

LOCATION: Ontario

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TITLE: INCIDENCE OF *VERTICILLIUM DAHLIAE* INFECTION IN PROCESSING TOMATOES IN SOUTHERN ONTARIO

METHODS: The levels of *Verticillium dahliae* (Kleb.) in the soil and the incidence of infection of processing tomato plants, were assessed in five fields near Leamington, ON, in 1993. In May, soil cores were taken from each of 5 sites in approximately 100 m length sections of beds that had been prepared for planting. The soil samples were air dried and plated onto a semi-selective agar medium (SPT agar; soil extract agar containing 0.2% polygalacturonic acid and 0.05% Tergitol NP-10), using an Anderson sampler. On July 15 and on August 10, 60 plants were sampled at random from the same areas that the soil samples had been taken. Two leaves were taken from each plant, the petioles were surface sterilized and cross-sections were plated onto SPT agar. The plates were incubated at 24°C for 10 to 14 days and *V. dahliae* colonies were visualized microscopically. Pure cultures of the fungus were obtained from the soil plates, from trap plants cultivated in growth chambers in the field soil, and from the petiole sections. The isolates were tested for pathogenicity on a susceptible tomato variety (Bonny Best) and a race l-resistant variety (H1350).

RESULTS AND COMMENTS: The levels of *V. dahliae* in the soil and the incidence of infected plants in the five fields are summarized in Table 1. Disease incidence was not reliably predicted by soil inoculum levels. In fields number 1 and number 2, plants from both nonfumigated and fumigated soil showed essentially the same incidence of infection. Forty-seven *V. dahliae* isolates have so far been tested for pathogenicity. Forty-six have been typed as race 2, and only one as race 1, suggesting that race 2 (for which there are no resistant cultivars) has become prevalent in the field. Although race 2 isolates generally produced less severe disease symptoms than race 1 isolates, the pathogenicity tests indicated virulence differences between the race *2* isolates.

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Table 1. Incidence of *Verticillium dahliae* in Leamington soil and field-grown tomatoes.

FIELD	FUMIGATION	# *V. DAHLIAE*	% INFECTED PLANTS	
		COLONIES/G SOIL*	JULY	AUGUST
1		36	**42**	67
1	+	ND**	ND	57
2		16	47	62
2	+	9	ND	63
3		**4**	3	17
4		96***	20	**28**
5**		**4**	36	33
5		ND	15	**18**

* Values are the averages from the five sites sampled. 500 mg soil from each site was plated.

** ND, not determined.

*** Soil inoculum levels were determined in July, at the time the first plants were sampled.

**** In field number *5,* plants were sampled from two beds containing different cultivars.