CROP: Spruce

LOCATION: Manitoba

TITLE: Incidence of Plant Diseases on Spruce in Manitoba in 1987

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METHCDS Results are based on spruce samples submitted to the Plant Pathology Laboratory and field examinations.

RESULTS: Cytospora canker was found as a common problem on mature blue spruce.

Needle casts caused by Lirula sp. were detected from samples submitted from Eastern Manitoba. Rhizosphaera needle cast is commonly observed on spruce particularly from western Manitoba. This disease has caused considerable damage to spruce in International Peace Garden plantings.

Ornamentals

CROP: Ornamentals

LOCATION: Nanitoba

TITLE: Incidence of Plant Diseases in Ornamentals in Manitoba in 1987

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METHODS: Results based on 1,033 samples of ornamentals submitted to the Plant Pathology Laboratory and field examinations.

RESULTS: Common disease problems were: fireblight of cotoneaster; corm rot of gladioli caused by Penicillium spp; leaf spot anthracnose) of dogwood; silver leaf and fireblight of mountain ash; black spot, powdery mildew and rust of roses, Gymnosporangium sp. gall of junipers.

Cytospora sp. canker was a common problem on ornamental crabapples especially in the early spring. It is closely associated with winter damage. There were only a few samples of fireblight on crabapples received. Many of the samples showed evidence of environmental and nutritional disorders such as winter sunscald of crabapples, leaf scorch of dogwood related to spring drought conditions and iron chlorosis of spirea and roses.

CROP: Greenhouse crops

LOCATION: Manitoba

TITLE: Incidence of Plant Diseases in Greenhouse Crops in Manitoba in 1987

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METHODS: Results based on samples of greenhouse crops submitted to the Plant Pathology Laboratory and field examinations.

RESULTS: Pythium root rot and seedling blights were the major disease problems of greenhouse producers in Manitoba. Other problems detected were powdery mildew of begonias. Root rot of poinsettias was caused by complex of Pythium and Fusarium and occasionally Thielaviopsis. Nutrient and environmental disorders were observed in several greenhouses in the Winnipeg area. High soil and water conductivity was a common problem. Geranium diseases include ringspot virus disease, Pythium blackleg, Botrytis gray mould affecting new transplants, and oedema.

CROP: Cyclamen

LOCATION: Ontario

NAME AND AGENCY:
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TITLE: DISEASES OF CYCLAMEN IN ONTARIO FROM 1983 TO 1987

METHODS: Diseased cyclamen (Cyclamen persicum) were sent to the research station by growers, extension personnel, and by diagnostic laboratories for isolation of plant pathogens. Fungi were identified in plant tissues or in pure cultures from isolation. Soft rotting bacteria were identified only to the genus level (Schaad, 1980). Virus infection was detected using the methods of Allen and Matteoni (1988). All but one of the 40 samples were from Ontario.

RESULTS AND COMMENTS: Bacterial corm rot, caused by Erwinia spp. was the most prevalent disease (30% of all samples), but was associated with other diseases in 8 samples. Fusarium wilt, caused by Fusarium oxysporum f. sp. cyclaminis, affected almost 28% of the samples; cyclamen ringspot, caused by tomato spotted wilt virus was identified from at least 22%; and Botrytis blight, caused by B. cinerea, affected nearly 18% of the samples. Other diseases included cyclamen stunt, caused by Ramularia cyclaminicola (5%), and leaf spot caused by Gloeosporium cyclaminis (5%). Physiological factors such as high soluble salts in the potting medium, and pesticide phytotoxicity were implicated in 13% of the samples. Thielaviopsis, Cylindrocarpon, and Pythium were never isolated from affected plants.

Of the Fusarium cultures isolated, 18% showed some level of resistance to the fungicide benomyl in preliminary tests. This may substantiate reports from growers of reduced effectiveness of benomyl for the control of Fusarium wilt.

Although other viruses can infect cyclamen (McCain, 1985), on'ly tomato spotted wilt virus was isolated. The estimate of 22% of the samples may be conservative because the technology for enhancing detection of this virus in cyclamen was only recently developed.

REFERENCES: Allen, W.R., and J.A. Matteoni. 1988. Cyclamen ringspot: epidemics in Ontario greenhouses caused by the tomato spotted wilt virus. Canad. J. Plant Pathol. (in press).

McCain, A.H. 1985. Cyclamen. pp. 3-8 in: Chapter 18 Diseases of Floral Crops Vol. 2. D.L. Strider, ed. Praeger. Toronto. 579 pp.

Schaad, N.W., ed. 1980. Laboratory Guide for the Indentification of Plant Pathogenic Bacteria. American Phytopathol. Soc., St. Paul, MN. 72. pp.

CROP: Florists' Chrysanthemum

LOCATION: Ontario

NAME AND AGENCY:
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TITLE: DISEASES OF FLORISTS' CHRYSANTHEMUM IN ONTARIO FROM 1983 TO 1987

METHODS: Diseased chrysanthemums (Chrysanthemum morifolium) were sent to the research station by growers, extension personnel, and by diagnostic laboratories for isolation of plant pathogens. Bacteria isolated by dilution plating of macerated tissues, were identified by gram reaction (Suslow et al., 1980), and by several biochemical and pathological tests (Schaad, 1980). Fungi were identified in plant tissues or in pure culture from isolation. Viral infections were detected by bioassay with indicator plants, and viroid infection was diagnosed on the bases of grafting on idicator plants and symptoms. To distinguish between the physiological disorder, Marble fleck; the genetic disorder, chrysanthemum slow decline; and the disease associated with infection by mycoplasmalike organisms, phloem necrosis, graft transmissibility tests and epifluorescent microscopy with DNA-specific fluorochromes were used. Seventy four samples were diagnosed. Some plants were affected by more than one disease.

RESULTS AND COMMENTS: See Table 1. Bacteria were isolated from about 25% of the plants, with bacterial leaf spot and black stem necrosis caused by Pseudomonas cichorii the most frequent diagnosis (18% of the samples). P. cichorii is becoming less of a problem with improved control in large propagation greenhouses, but under conditions conducive to disease, losses have been significant.

Fusarium root and stem rot and Fusarium wilt were diagnosed in 20% of the samples. Approximately 75% and 15% of isolates of F. solani and F. oxysporum, respectively, were resistant to benomyl. Pythium root rot was present in 10% of the samples, primarily from growers who did not pasteurize soil media, or who neglected preventation fungicide drenches.

Chrysanthemums at five locations were infected with tomato spotted wilt virus. The virus has also been identified in cut chrysanthemums in British Columbia. Because of the presence of the vector, the western flower thrips (Frankliniella occidentalis), serious losses could occur the susceptible varieties.

REFERENCES: Schaad, N.W., Ed. 1980. Laboratory Guide for the Indentification of Plant Pathogenic Bacteria. American Phytopathol. Soc., St. Paul, MN. 72 pp.

Suslow, T.V., M.N. Schroth, and M. Isaka. 1982. Application of a rapid method for gram differentiation of plant pathogenic and saprophytic bacteria without staining. Phytopathol. 72:917-918.

Table 1. Diseases of florists' chrysanthemum in Ontario from 1983 to 1987.

Pathogen	Disease or Disorder	Frequency of Isolation (%)
Pseudomonas chichorii	Bacterial leaf spot and black stem necrosis	18
Fusarium solani	Fusarium root and stem rot	12
Pythium	Pythium root rot	10
Fusarium oxysporum*	Fusarium wilt	9
Erwinia	Bacterial soft rot	6
Viruses**	Various	6
Physiological	Marble fleck	6
Phytotoxicity	Pesticides or growth regulators	6
Rhizoctonia solani	Rhizoctonia root rot	6
Viroid	Chrysanthemum stunt	4
Micosphaerella ligululicola	Ascochyta ray blight	4
Physiological	Various	4
Sclerotinia sclerotiorum	Sclerotinia stem rot	3
Oidium chrysanthemi	Powdery mildew	3
Botrytis cinerea	Botrytis leaf and flower blight	1
Aphelenchoides	Foliar nematode	1
Genetic	Chrysanthemum slow decline	1
Mycoplasmalike organism	Chrysanthemum phloem necrosis	0
Total		100%

* The forma specialis was not determined, although isolates were pathogenic upon reinoculation

** Specific viruses are not reported, however, 5 samples were tomato spotted wilt virus

CROP: Florists' Geranium

LOCATION: Ontario

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TITLE: DISEASES OF FLORISTS' GERANIUM IN ONTARIO FROM 1983 TO 1987

METHODS: Diseased geraniums were sent to the research station by growers, extension personnel, and by diagnostic laboratories for isolation of plant pathogens. Bacteria isolated by dilution plating of macerated tissues, were identified by gram reaction (Suslow et al., 1982), and by several biochemical and pathological tests (Schaad, 1980) including fluorescence on King's B medium, oxidase reaction, growth on nutrient agar and YDC media, potato soft rot test, tobacco hypersensitivity tests, and reinoculation into Pelargonium X hortorum cv. Crimson Fire. Fungi were identified in plant tissues, or from pure cultures. Viral infections were detected by bioassay with indicator plants, but specific viruses were not identified. Over the four year period 118 samples were diagnosed, primarily florists' geranium (P. X hortorum), but also ivy geranium (P. peltatum), and regal geranium (P. X domesticum). Most samples were from Ontario.

RESULTS AND COMMENTS: Diagnoses included nonpathological problems of high salts in the potting medium, oedema, pesticide or growth regulator phytotoxicity (18% of total), Pythium blackleg (12%), viruses (7%), Botrytis (3%), fasciation caused by Corynebacterium fasciens (2%), southern bacterial wilt; caused by Pseudomonas solanacearum (2%), leaf spot caused by Pseudomonas cichorii (1%), cottony stem rot caused by Sclerotinia sclerotiorum (1%), and stem rot caused by Myrothecium roridum (1%). The most important disease of florists' geranium was bacterial blight caused by Xanthomonas campestris pv. pelargonii (57%). (Four samples were affected by both bacterial blight and another disease.)

From the majority (83%) of the questionnaires submitted with samples, the likely source of Xanthomonas infection was determined. Over half (55%) of the new infections were probably started from infected, prefinished pots sold for growing-on. Infected geranium cuttings imported from outside of Canada accounted for over 11% of the new infections, and 6% was from putatively culture-virus indexed plant material. Greater than 11% of the new infections was started from infected stock plants purchased at the end of the growing season. When major propagating greenhouses had infected geraniums, dissemination of the bacterium was great and accounted for over 80% of the new infections.

In situations conducive to development and spread of bacterial blight, estimates of infection rates were between 0.1 and 0.2% of the

plants per day, in spite of regular roguing of infected plant material. Losses for Ontario during 1986 were estimated at over $300,000 -- about 5% of the crop.

REFERENCES: Schaad, N.W., ed. 1980. Laboratory Guide for the Identification of Plant Pathogenic Bacteria. American Phytopathol. Soc., St. Paul, MN. 72 pp.

Suslow, T.M., M.N. Schroth, and M. Isaka. 1982. Application of a rapid method for gram differentiation of plant pathogenic and saprophytic bacteria without staining. Phytopathol. 72:917-918.

CROP: Geranium

LOCATION: British Columbia

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TITLE: SURVEY FOR BACTERIAL BLIGHT (*XANTHOMONAS CAMPESTRIS* PV. *PELARGONII*) OF GERANIUM IN BRITISH COLUMBIA

METHODS: In the spring of 1986 bacterial blight (*Xanthomonas campestris* pv. *pelargonii*) on zonal and ivy geraniums (*Pelargonium* x *hortorum* Bailey and *P. peltatum* L.) occurred in four greenhouses in the Lower Fraser Valley of British Columbia. Infections were confirmed in the plant diagnostic laboratory by tissue isolations onto nutrient agar or potato dextrose agar followed by tests for pigment formation and colony morphology on King's medium B and yeast-dextrose calcium carbonate agar as outlined by Schaad, 1980. An oxidase test was also performed. Koch's postulates were confirmed for two isolates.

Newsletters alerted growers to the bacterial blight problem and a survey of greenhouse geraniums was conducted in the spring of 1987. Wilted plants showing necrotic leaf spots, V-shaped lesions or darkened stems were sampled and tested in the laboratory for bacterial blight infection.

RESULTS AND COMMENTS: See Table 1 below. Xanthomonas bacterial blight was identified in 10/27 greenhouses or in twice as many greenhouses in 1987 compared to 1986. A special geranium workshop held in November and continued extension efforts will hopefully curb the spread of the disease. The origin of the pathogen is unknown but contaminated imported cuttings are suspected. *Pythium* blackleg is the second most common disease resulting in substantial losses where infected imported cuttings were used. 'Botrytis stem rot, *Rhizoctonia* root rot, *Fusarium* root rot and *Verticillium* wilt were of minor occurrence in geraniums.

REFERENCES: Schaad, N.W. 1980. Laboratory Guide for Identification of Plant Pathogenic Bacteria. American Phytopathol. Soc. St. Paul, MN. 72 pp.

Table 1. Number of greenhouses with geraniums affected by Xanthomonas bacterial blight, Pythium blackleg, Botrytis stem rot and Rhizoctonia and Fusarium root rots based on a 1986 and 1987 disease survey in British Columbia

Diseases	Number of Greenhouses* in Years	
	1986	1987
Xanthomonas bacterial blight	4	10
Pythium blackleg	1	8
Botrytis stem rot		5
Rhizoctonia root rot	1	2
Fusarium root rot		1
Verticillium wilt		1
Healthy plants		5

* Several greenhouses had more than one of the geranium disease problems listed.

CROP: Pears and junipers

LOCATION: Lower Mainland and Vancouver Island, British Columbia

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TITLE: PEAR TRELLIS RUST SURVEY IN SOUTH COASTAL BRITISH COLUMBIA

METHODS: In order to ship junipers or pear trees to the Okanagan or Eastern Canada, nurseries in the B.C. Coastal area must be certified free of pear trellis rust (Gymnosporangium fuscum). Beginning in 1989, this requirement also applies to junipers and pears destined for the prairie provinces.

To facilitate this, a survey of pear trees within 1 km or more of each juniper producing nursery is carried out annually. If infections are found on pear, the junipers in the vicinity are checked for infections the following spring and, if found to be diseased, they are destroyed. In 1987, two students carried out the work on the Lower Mainland while one student, aided by the local nurseries, worked on Vancouver Island, particularly the Saanich Peninsula, where the disease is well established.

RESULTS AND COMMENTS: See Table 1. As a result of the 1987 work, 28 nurseries out of 46 that applied, were certified to ship junipers and/or pears.

Table 1. Results of pear trellis rust survey in south coastal British Columbia.

Area	Number of Junipers Examined	Number of Junipers Removed	Pear Trees Examined	No. Pear Infections >5/tree	No. Pear Infections >50/tree
LOWER MAINLAND					
Abbotsford	14	1	102	30	21
Aldergrove	15	0	382	0	0
Bradner	1	0	210	6	2
Chilliwack	5	0	29,657*	13	8
Hatzic	18	17	40	39	31
Langley	0	0	1,171	40	3
Matsqui	0	0	131	11	1
Mission	226	73	97	24	9
Pitt Meadows	0	0	160	4	0
Richmond	303	265	370	58	15
Surrey	25	0	406	198	64
Yarrow	0	0	8,000*	0	0
VANCOUVER ISLAND					
Saanich Peninsula	1,337	315	1,321	497	212
Saltspring Isl.	400	0	76	0	0
Central Vancouver Island	0	0	197	0	0
TOTAL	2,344	617	42,320	920	366

* Includes one and two year old trees in nurseries