Forest trees / Arbres forestiers

Crop / Culture: Elm

Location/ Emplacement: Manitoba

Title / Titre: Incidence of Dutch Elm Disease in Manitoba in 1989

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METHODS: Results are based on 1,987 samples of American elm, Ulmus americana and 93 Siberian elm Ulmus pumila submitted to the Plant Pathology Laboratory from a survey conducted by the Manitoba Department of Natural Resources. Trees were selected for sampling and submission to the laboratory on the basis of presence of wilted brown leaves and internal brown staining of the cambium. All samples submitted were cultured on potato dextrose agar medium and incubated for 7 days at 20°C. Fungal identifications were done after 7 days.

Results: There were 2,080 elm trees showing symptoms of leaf wilt and vascular staining sampled in Manitoba in the 1989 survey, 1,987 American elm (Ulmus americana) and 93 Siberian elm (—— pumila). Branch samples were submitted to the Manitoba Agriculture Plant Pathology Laboratory for culturing. The results indicated that (1,828) 92% of American elms sampled were infected with Dutch Elm Disease (DED) caused by Ophiostoma ulmi (Ceratocystis ulmi) and 2% of Siberian elm. The results of the survey are presented in Table 1. Tree removals are also included as this indicates the real impact of DED in the areas sampled. In many areas where DED is prevalent, only a few samples are taken to confirm presence of DED, and surrounding elms with similar symptoms or trees with more than 50% of the crown dead are marked for removal. The sampling results do not give a full indication of the impact of DED in rural Manitoba as sampling and tree removals are concentrated in cities, towns and municipal parks in areas which have a cost sharing agreement with the Manitoba Department of Natural Resources.

There was a dramatic increase of DED in the Winnipeg area with 1,156 trees confirmed versus 811 in 1988, but more importantly, there were 10,860 trees marked for removal compared to 5,129 in 1988 for an increase of 112%. The areas that showed that greatest increase in numbers of diseased trees were in St. Boniface/ St. Vital with a 169% increase and Assiniboine Park/Fort Garry with a 146% increase. In both of these areas the majority of DED infected trees were along the Red River, and in Assiniboine/Fort Garry along the west side of the Red River and Assiniboine River. Once DED becomes established in native stands of elms along rivers it is very difficult to control. In contrast, the trees in Winnipeg Centre/Fort Rouge are primarily boulevard and private residential owner trees. In this area there has, over the past 10 years, been very little increase in the incidence of DED.

The disease control program has been very successful in planted urban areas as opposed to native stands of trees along streams and rivers. As in 1988 there were large numbers of elms removed in the buffer zones surrounding Winnipeg. In 1989, 3,830 trees were marked for removal in Ritchot municipality south of Winnipeg along the Red River, compared to 2,809 in 1988. However in 1987 there were 4,367 trees removed in Ritchot municipality, so there has not been a significant increase in tree removals, but the disease has remained at very high levels for the last five years. Other areas with high numbers of diseased and hazard trees are the RM of St. Francois Xavier: 1,191 (420 in 1988), and RM of Cartier: 809 (928 in 1988) both on the Assiniboine River just west of Winnipeg, and the RM's of West and East St. Paul along the Red River north of Winnipeg with a total of 1,063 trees marked for removal (1,340 in 1988). As is apparent from the tree removal numbers in the buffer zones, the incidence of DED remains very high in these river bank elm stands.

There was an increase of 42% in the tree removals in the Brandon area. There was no major expansion of the disease westward towards Saskatchewan. Dutch Elm Disease continues to be a problem in Portage, Carman and Morden in the Central area, Selkirk in the Interlake, St. Anne in the Eastern area and Souris and Brandon in Western Manitoba. Dutch Elm Disease was detected for the first time in Dauphin.

TABLE 1. INCIDENCE OF DUTCH ELM DISEASE IN MANITOBA IN 1989

AREA	TREES SAMPLED 88	89	TREES DISEASEDa 88	89	PERCENT INFECTED 88	89	TREES REMOVED 88	89	PERCENT CHANGE
Wpg. Centre/ Fort Rouge	72	95	60	80	83	84	213	266	25
Wpg. St. James/ Assiniboia	60	12	51	106	85	94	379	546	44
Wpg. Lord Selk./ West Kildonan	105	15	87	102	82	89	565	1164	106
Wpg. East Kildonan/ Transcona	231	87	211	71	91	82	692	517	-25
Wpg. St. Boniface/ St. Vital	206	370	186	351	90	95	1231	3313	169
Wpg. Assiniboine Pk/ Fort Garry	234	482	226	446	92	93	2048	5054	146
Winnipeg	908	1261	811	1156	89	92	5129	10860	112
Brandon	45	151	38	126	84	80	1817	2579	42
Interlake (1)	260	128	219	103	84	80	2149	863	60
Central (2)	475	418	428	346	89	83	6160	8932	45
Eastern (3)	58	32	53	20	91	63	432	429	-1
Western (4)	71	128	60	82	85	64	1961	1464	34

(a) Based on confirmation of presence of Ophiostoma ulmi (Ceratocystis ulmi) in laboratory cultures

(1) Interlake region includes the City of Selkirk and all areas north of Winnipeg between Lake Manitoba and Lake Winnipeg

(2) Central region includes the town of Portage la Prairie and the area south to the United States border and east to the Red River

(3) Eastern region includes all area east of the Red River to the Ontario border.

(4) Western region includes area west of Portage la Prairie to the Saskatchewan border excluding the City of Brandon.

Crop / Culture: Lodgepole pine

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Location / Emplacement: Cariboo Forest Region
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Title / Titre: Incidence of Gall Rust and Blister Rust on Young Lodgepole Pine.

Methods: In 1989, 31 sites of lodgepole pine (Pinus contorta var. latifolia) were surveyed for incidence of western gall rust (Endocronartium harknessii) and blister rust (stalactiform blister rust, Cronartium coleosporiodes, and comandra blister rust, C. comandrae). The sites included plantations of 10 to 20 years age, spaced stands, and natural stands scheduled to be spaced.

Within each stand parallel transects at 100m spacing were run, and circular plots (radius 3.99m) were established at 50m intervals. All pine trees within the plots were counted and examined.

Where trees were infected with western gall rust, the location on the tree and type of infection were noted. Stem galls were aged by counting the whorls from the top of the tree down to the gall. For trees infected with blister rust, the location and the size of the infected area were recorded.

Because of the similarity of stalactiform and comandra blister rust cankers, occurrences were recorded only as "blister rust".

Incidence (per cent trees infected) was compared for rust, for stand treatment, stand density, and biogeoclimatic zone. The age of stem galls in planted stands was compared to the overall age of the stand to estimate the incidence of gall rust on nursery stock.

The survey was undertaken as a Biology Co-operative program between Simon Fraser University and the Ministry of Fbrests.

Results: Incidence of western gall rust was highest on trees in planted stands at 14 per cent (%), followed by spaced stands (5.5%), and natural stands (4.5%). Branch galls occurred on 71%of trees in the spaced stands, 54%in planted stands, and 52%in natural stands.

Tree mortality associated with stem galls was 8.5% in 11 of the 31 stands surveyed. Fbr all stands, mortality caused by western gall rust was 3.75%. Mortality was greatest in natural stands (1.2%), followed by planted stands (0.75%). Incidence of gall rust appeared higher in moister, cooler biogeoclimatic zones than in the very dry to dry regions.

The overall incidence of blister rust was 0.51%. Incidence was highest in spaced stands (0.95%), followed by natural stands (0.47%), and planted stands (0.37%). In contrast to western gall rust, the majority of infections were on the bole. The average length of bole lesions was 0.24m.

Blister rust incidence appeared slightly higher in the dry to moist regions, but did not differ noticeably with differences in stand density.

Comments: The higher incidence (14%)of western gall rust stem infection in planted stands could be attributed to a variety of factors such as faster growth and more susceptible shoot tissue, or to planting of trees that are genetically more susceptible.

In the spaced, natural stands, gall rust incidence was similar to that in unspaced natural stands, but the fewer stem infections in the spaced stands indicated that the spacing had removed stem infected trees.

Although stem infection and tree mortality were noticeably greater in natural stands, the effects should be minimal because these stands have more stems per hectare, and losses probably will have little effect on stand yield at harvest time.

The low incidence of blister rust (0.51%) could be attributed to a low occurrence of the alternate hosts, Indian paintbrush (Castilleja spp.) and comandra (Comandra spp.).

Although the levels of blister rust were too low to discern any definite trends, the incidence was higher in spaced stands as reported previously by Navratil and Bella (USDA Forest Service, Gen. Tech. Rep. INT-243, 1988) and by van der Kamp and Spence (Forestry Chron. 63:334-339, 1987).

Crop / Culture: Spruce and Pine

Location/ Emplacement: Manitoba

Title / Titre: DISEASES OF SPRUCE AND PINE DETECTED IN SAMPLES SUBMITTED TO THE MANITOBA AGRICULTURE PLANT PATHOLOGY LABORATORY IN *1989.*

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Methods: One hundred and eighteen samples of spruce trees, and 20 samples of pine were examined for presence of disease.

Results:

Spruce: Cytospora canker (Cytospora sp.) was found in *14* samples, needle cast (Rhizosphaera kalkhoffii) in *8.* In *48* samples, environmental stress including drought and winter injury was the cause of damage as evident by browning of needles. In *8* samples nutrient deficiencies, iron and nitrogen, were the problem. In addition to damage caused by disease, insect injury was the problem diagnosed in *40* samples.

Pine: In 20 samples of pine, needle cast (Cyclaneusma spp.) was detected in *5* samples, and seedling damping off (Fusarium spp.) was detected in 1 sample. Apart from diseases, insect injury was the problem diagnosed in 3 samples. Environmental stress was the problem detected in *11* samples.

Crop / Culture: Shade Trees

Location/Emplacement: Manitoba

Title/Tltre: DISEASE OF SHADE TREES AND SHELTER BELT TREES DIAGNOSED IN SAMPLES SUBMITTED TO THE MANITOBA AGRICULTURE PLANT PATHOLOGY LABORATORY

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Methods: Twenty-two samples of ash, 15 basswood, 50 birch, *42* maple, *22* oak, *44* poplar, *4* russian olive submitted to the Plant Pathology Laboratory were examined for disease.

Results:

Ash: Of the *22* samples of ash, *2* were found to be affected by anthracnose (Gloeosporium aridum), 1 with cytospora canker (Cytospora chrysoperma) and 19 with environmental stress.

Basswood: In the *15* samples of basswood, 8 showed cytospora canker (Cytospora spp.), 1 root rot (Fusarium sp.) and *6* environmental stress.

Birch: In *50* samples of birch, *44* were diagnosed as being affected by birch dieback, a complex of drought, nutrient stress and bronze birch borer insect damage; *5* showed nutrient deficiency symptoms and 1 herbicide damage.

Maple: In *42* samples of maple, 9 showed cytospora canker (Cytospora spp.) and 33 environmental stress.

Oak: In *22* samples of Bur oak 9 showed oak decline caused by a complex of environmental stress and Armillaria root rot (Armillaria mellea), 3 showed anthracnose (Gnomonia quercina). In addition to disease, 5 samples showed herbicide drift injury and *5* insect damage.

Poplar: Of *44* samples of poplar 23 showed cytospora canker (Cytospora chrysosperma), 9 pollacia shoot blight (Venturia spp.), *4* septoria leaf spot (Septoria spp.), 1 leaf rust (Melampsora spp.), 1 hypoxylon canker (Hypoxylon mammatum), 1 slime flux (mechanical injury and bacterial fermentation), 1 powdery mildew (Uncinula adunca) and *4* were affected by herbicide drift.

Russian Olive: In *4* samples of Russian olive, 2 showed Phomopsis canker (Phomopsis arnoldiae), 1 verticillium wilt (Verticillium spp.) and 1 sample showed symptoms of environmental stress.