Forest trees / Arbres forestiers

Crop / Culture: Conifer Wood Chips

Location / Emplacement: British Columbia

Name and Agency / Nom et Organisation:
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Title / Titre:
SURVEY FOR PINEWOOD NEMATODE IN BRITISH COLUMBIA.

METHODS: Fresh wood chip samples were collected by B.C. Ministry of Forests field staff from approximately 10 sawmills in each of the six B.C. forest regions during 1986 and 1987. Mills were chosen so as to cover as much of each region as possible. Chips were also collected from rail cars and from chip piles.

Nematode extraction and identification were carried out by Plant Health's Ottawa Lab. Identification of pinewood nematode (Bursaphylenchus xylophilus) specimens was confirmed by Dr. Roger Anderson of the Ottawa Biosystematics Lab.

Except as noted, chip samples were pure pine or a mixture of pine, spruce, and/or subalpine fir.

RESULTS AND COMMENTS: Pinewood nematode (PWN) was found in samples from all B.C. forest regions except Kamloops (table). The much higher recovery of PWN from the Fiberco samples was expected since chips from various interior B.C. sources are bulked when rail cars are loaded at the mills, and bulked again when piled at the Fiberco premises. Also, population levels of PWN in such piles appear to increase over time.

This project was part of a national PWN survey. Actual and threatened embargoes on Canadian softwood products by European importers concerned about PWN made it imperative to determine the distribution of PWN in Canada. Two PWN forms, the "r" (round-tailed) and the "m" (mucronate-tailed), occur in North America. The two are closely related, although the exact nature of the relationship has not been determined. The devastating pine wilt epidemic in Japan is caused by the "r" form. In North America the "m" form is generally found in non-pine hosts, where it appears to cause little damage.

There survey results indicate that the "r" form is widely distributed in B.C.

Actual population levels of PWN in B.C. cannot be estimated from such a limited number of samples. However, in the light of current information, it would not be possible to declare any part of B.C. free of either the "r" or the "m" form. The condition of the trees from which the chips were made cannot be determined, but there is no evidence that either the "r" or the "m" form of PWN causes significant damage in B.C. forests.

Table. Rerults of PWN Chip Sampling Survey 1986-87

Forest Region	Samples: Type	No.	Samples Positive for PWN No. and Origin	Form
Cariboo	Mill	12	1 100 Mile House	r
	Rail car	6	5	m, r
Kamloops	Mill	9	0	
Nelson	Mill	9	1 Kinbasket	r
Prince George	Mill	16	1 Fort St. John	r
	Rail car	3	1 Fort Nelson	r
Prince Rupert	Mill	8	2 Kispiox Dist.	m
			Burns Lake	m
Vancouver	Mill	4	1 Campbell River	r
	Chip piles	6*	0	r
	Fiberco	4	3 Interior B.C.	r

*Of six chip piles sampled in the Vancouver Forest Region, two were pure Douglas-fir, two hemlock, and two cedar species not considered hosts of PWN.

Crop/Culture: Plantations of Douglas-fir, interior spruce, lodgepole pine, western larch
Location/Emplacement: Southern Interior, British Columbia

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Title/Titre:
RHIZINA ROOT DISEASE IN NEW CONIFER PLANTATIONS.

METHODS: In the Nelson Forest Region in September-November 1988, 80 newly planted cutblocks were examined for rhizina root disease, caused by the fungus Rhizina undulata. Infected seedlings were identified by the occurrence of Rhizina sporocarps. Blocks were burned in 1987 and planted in 1988. In Tree Farm License (TFL) 23, an additional 13 blocks that were burned in 1986 and planted in 1987 were also examined. In the Golden and Revelstoke Timber Supply Area (TSA) and in TFL 23, walk-through surveys were made to estimate disease occurrence. In Cranbrook, Boundary, and Kootenay Lake TSA, 10 to 20 standard regeneration survey plots were placed in each block in a zig-zag pattern, and infected seedlings were recorded.

RESULTS AND COMMENTS: Of the 93 blocks examined, 39 had evidence of rhizina root disease (Table A), and on 29 of these blocks, mortality from the root disease was 30% or more, thus necessitating replanting to achieve the target 1200 seedlings per hectare. Based on a regional total of 305 blocks (3500 ha) burned in 1987 and planted in 1988, losses from rhizina root disease in 1988 were estimated at $1,000,000 for the Nelson Region.

Tree mortality was generally evenly distributed in groups of 1, 2 or 3-5 trees. Up to 70% of trees were killed by the disease in some areas. Douglas-fir, interior spruce (engelmann x glauca), lodgepole pine, and western larch were infected. Prior to the survey, mortality of seedlings was attributed to poor stock or poor handling.

Occurrence of rhizina root disease was associated with the intensity of burning. Generally most infection occurred on blocks that were moderately burned (as judged by the amount of the soil litter layer removed), and very little on blocks or portion of blocks that were rated as a low or high intensity of burn. Potentially the rhizina root disease could be prevented by burning under suitable conditions for either hot or cool, but not moderate burns.

Examination of 13 blocks burned in 1986 and planted in 1987, indicated that five had 35 to 50% of the tree seedlings killed by Rhizina, and eight did not have the root disease. Apparently recent burning history, not climatic changes, have led to the current outbreak of the root disease. Areas surveyed will be re-examined in future years to determine if disease losses will subside, as expected. Further work is needed to determine the characteristics of forest sites and intensity of prescribed burning that result in disease outbreaks.

Table A. Occurrence of rhizina root disease in Nelson Forest Region, 1988

Timber Supply Area	Number Examined	Rhizina occurrence High	moderate	low	nil
Golden	21	2	5	2	12
Revelstoke	21	5	3	3	10
TFL 23 (87 burn)	6	2			4
TFL 23 (86 burn)	13	5			8
Cranbrook	11	2			9
Boundary	5	1	1		3
Kootenay Lake	16	3		5	8

Crop/Culture: Elm

Location/Emplacement: Manitoba

Title/Titre: INCIDENCE OF DUTCH ELM DISEASE IN MANITOBA IN *1988*

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METHODS: Results are based on *1799* samples of American elm, Ulmus americana and *75* 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 *1874* elm trees sampled in Manitoba in the *1988* survey, *1799* American elm (Ulmus americana) and *75* Siberian elm (Ulmus pumila). Branch samples were taken to the Manitoba Agriculture Plant Pathology Laboratory and from *1799* samples of American elms *1633 (90.8%)* were found to be infected with Dutch Elm Disease (DED) (Ophiostoma ulmi, Ceratocystis ulmi). DED was not detected in any of the samples of Siberian elm.

Dothiorella wilt, (Dothiorella ulmi) was found in 1% of sampled trees. One hundred and five samples or *12%* were found to be negative for any elm pathogens. The survey results are presented in Table 1. Tree removals are also included as these data indicate the real impact of DED in the area 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 the disease in Manitoba, as sampling and tree removals are concentrated in cities, towns and municipal parks–areas which have agreed to a cost–sharing agreement with the Manitoba Department of Natural Resources. The number of trees confirmed with DED in Winnipeg was less than in *1987:* 911(1988) vs. *1643* in *1987.* However, a total of *5129* trees were marked for removal including trees along the Red, Assiniboine and Seine River banks. There was no major expansion of DED into residential areas within the centre of the city. In *1987* there were *117* trees found to have DED in the Winnipeg Centre/Fort Rouge area and in *1988* only *60* trees were found to be affected by DED. The City of Winnipeg control program of infected tree removal, pruning and basal spraying of living elms with chlorpyrifos for elm bark beetle control has kept the loss from DED to less than *2%* based on *273,000* elm trees within the City of Winnipeg boundary. There are still large numbers of trees being removed in the buffer zone around Winnipeg. In *1988, 2809* trees were designated for removal in the rural municipality (RM) of Richot which is adjacent to the Red River south of Winnipeg. This compared to *4367* elm trees marked for removal in the same municipality in 1987. Other areas with high numbers of trees marked in *1988* for removal were the RM of St. Francois Xavier with *420,* RM of Cartier-927, both on the Assiniboine River just west of Winnipeg and the RMs of West and East St. Paul along the Red River North of Winnipeg, with a total of *1340* trees.

The results of the survey in the regions of Southern Manitoba are also presented in Table 1. The largest concentrations of diseased trees are in the Central region with *428* trees identified having DED and *6160* trees marked for removal, of which *2809* were in Richot municipality. The Interlake region had *219* trees identified as having DED and *2149* identified for removal; about *1300* of the removal total are trees within the Winnipeg buffer zone. Dutch elm disease was also a problem in the Interlake area in locations where it has occurred over the past 10 years, such as in the town of Selkirk, and the municipalities adjacent to Lake Winnipeg. The infected tree numbers *(53)* and tree removals (432) in the Eastern region do not reflect the severity of the disease in this area because mainly trees within towns were sampled. There are many more infected trees in wild areas along rivers and streams that are not within the control zones. The major concentration of hazard and diseased trees designated for removal was near the town of St. Anne and the surrounding municipality of Tache, which is situated on the Seine River about 50 km east of Winnipeg. These trees accounted for *78%* of the trees marked for removal in the Eastern region. In the Western region there were *128* trees identified as having DED and *1464* trees marked for removal. The majority of the trees identified as having DED and trees marked for removal were near Souris with *29* trees found to have DED and *736* marked for removal. There was no major westward expansion of DED toward Saskatchewan. One tree was found to have DED in the town of Virden which is about *40* km east of the Saskatchewan border. Separate survey totals were kept for Brandon. The number of trees identified with DED was *38* and 1817 trees were marked for removal. The majority of the marked trees were on the outskirts of Brandon along the Assiniboine River.

DED continues to be a problem in Manitoba, however in areas where a control program is being undertaken the losses are relatively low and there is no immediate threat of all the elms disappearing.

Table 1. Dutch Elm Disease Survey for Manitoba

AREA	TREES SAMPLED	TREES DISEASED[a]	PERCENT INFECTED	TREES REMOVED
Wpg. Centre/ Fort Rouge	72	60	83	213
Wpg. St. James/ Assiniboia	60	51	85	379
Wpg. Lord Selk./ West Kildonan	105	87	a2	565
Wpg. East Kildonan/ Transcona	231	211	91	692
Wpg. St. Boniface/ St. Vital	206	186	90	1232
Wpg. Assiniboine Pk./ Fort Garry	234	216	92	2048
Brandon	45	38	a4	1817
Interlake[1]	260	219	84	2149
Central[2]	475	428	a9	6160
Eastern[3]	58	53	91	432
Western[4]	128	82	64	1464

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

[1] Interlake region includes the City of Selkirk and all area 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.