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Forestry Canada - Maritimes Region

TECHNICAL NOTE

SURVEY OF EASTERN HEMLOCK FOR INSECTS AND PINEWOOD NEMATODE IN NEW BRUNSWICK AND NOVA SCOTIA

SUMMARY

Examination of 1766 hemlock logs at 20 mill sites in New Brunswick and Nova Scotia revealed a very low prevalence, less than 0.7%, of logs being infested by cerambicids, the group of wood-boring insects to which Monochamus belongs. The 0.7% frequency figure represents a worst case scenario, as Monochamus is only one of 13 cerambicid genera found in the Maritimes. The 6 cerambicid grub holes found in 420 pieces of sawn lumber represent a 1.4% frequency. No pinewood nematode was found during extraction of 247 samples from a variety of insect galleries in logs and lumber and from 'clear wood'. Secondary nematodes were common and often numerous in insect galleries and were also found occasionally in clear wood samples, 80% of the latter either at the top or the butt section of logs.

INTRODUCTION

Forestry Canada officials have been exploring the possibility of gaining exemption for certain Canadian lumber species from the inevitable ban in Europe of non-kiln-dried lumber, expected to come into effect in 1992. Exempted would be those species which are not common hosts for sawyer beetles (Monochamus sp.), insects perceived to pose a danger to European forests partly because of their reputation as major vectors in spreading pine-wilt disease, caused by pinewood nematode (PWN).

Hemlock (Tsuga sp.) is one of the export species that appear to be free (or almost free) of Monochamus attack. The Forest Insect and Disease Survey (FIDS) unit in the Maritimes Region has been requested to investigate the validity of the hypothesis that Monochamus does not regularly infest hemlock and, if proven, support the Forestry Canada argument in favor of exempting this species from the kiln-drying requirements.

This report deals with the study, carried out by FIDS of Forestry Canada-Maritimes Region in cooperation with the Maritime Lumber Bureau (MLB) and its members.

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OBJECTIVES

The objectives of the study were to: (1) determine the degree of association between sawyer beetles (Monochamus) and hemlock and (2) test insect galleries and clear wood from logs and lumber for the presence of pinewood nematode at mill sites in the Maritime Provinces.

METHODS

A list of lumber mills regularly dealing with hemlock was provided by MLB. The FIDS staff involved in the surveys were "calibrated" by visiting the first site together to work out details, procedures, and techniques of the investigation, in order to ensure standardization. Each mill was visited by a two-person FIDS team and assisted by mill staff during the inspection.

A general description of each mill was obtained, including information on general usage of hemlock, distance of mill yard from mature forest stands, the number of piles in the yard, etc. The following information was obtained for each log pile inspected: 1. source of hemlock logs; 2. date, or at least the season, of harvest; 3. storage period at harvest site; 4. storage period in mill yard; 5. composition of log pile (e.g. mixed with other species, hemlock logs of mixed age from cutting/location, etc.); 6. range of log size.

As a general rule, 100 logs from different piles were inspected at each mill site. Logs were selected randomly throughout the piles and were inspected primarily for signs of insect activity. Observations were recorded on the condition of each log, according to the following "check list": sound, rot (heart/sap)(top/bottom), insect activity (sawdust, galleries, emergence holes), insects (larvae, pupae, adults), other (specify). At each mill site, the bark was peeled back at both ends of 20-25 of the logs inspected to further enhance detection of insect activity.

Samples were collected from logs with signs of insect activity and submitted to the laboratory for identification. Wood samples were also collected for nematode extraction. Discs or disc sections of 5-15 cm thickness were obtained from the ends of 'suspect' logs and a wedge sample was collected from the areas where insects were found. Where possible, "grub holes" were included in the sample. "Clear wood" samples were collected from 10 logs at each mill site.

Where available, already cut lumber was also inspected. A minimum of 20 lumber pieces were examined at each site and samples taken of any sign of insect activity for identification and nematode extraction.

RESULTS AND DISCUSSION

Of the 22 sawmills with hemlock inventory. 16 in Nova Scotia and 6 in New Brunswick (Fig. 1), lumber was only available for inspection at two locations. Six of the 20 mills were in forest, 11 in rural, and three in urban settings, but in all cases, mature forest stands were well within a distance for logs to attract Monochamus adults. Logs at six sites were harvested during, or previous to, at least one period of Monochamus adult activity, while logs at the other sites were harvested during the fall and winter of 1989-1990. There were 1766 hemlock logs examined in 76 piles. Log diameters ranged from 12 to 86 cm.

Cerambicid wood borers were found in only 12 of the 1766 logs, a 0.7% frequency of infested logs. There are 13 genera of coniferous cerambicids known to occur in the Maritimes (Titus et al. 1985). Specimens of 9 of these genera were collected during a pinewood nematode vector survey in 1988 (Magasi, 1989). Monochamus is only one of the genera of the family Cerambicidae. In most cases, it was impossible to identify the galleries or the larvae of the cerambicid involved in affecting hemlock logs. Consequently, the 0.7% frequency represents a worst case scenario, assuming that all the cerambicids found were Monochamus.

Cerambicids were more than three times as common in the older (1.3%) than in freshly cut logs (0.4%) and accounted for 58% of all grub holes found. Some of these were found in association with heart decay and/or carpenter ant galleries. Also, to emphasize, cerambicids were not necessarily Monochamus.

Other insects found included flatheaded wood borers (Buprestidae) (2.1%) and a variety of bark beetles (1.1%). There was more than a five-fold difference between the frequency of Buprestids in older (4.7%) versus freshly cut logs (0.9%). Most of these insects were found either in the bark or created only superficial galleries in the cambial layer at the bark-wood interface. Some, mostly older, logs were infested by a combination of the three groups of insects.

Nematode extractions were carried out on samples of both "clear wood" and on a variety of insect galleries. **NO PINEWOOD NEMATODE** was found in any of the 167 samples of hemlock logs or of the 41 insect galleries found in logs. Secondary nematodes were commonly associated with insect galleries and were often present in great numbers. A few secondary nematodes, definitely not PWN, were found in 10 of the 167 clear wood samples (5.9%). Eight of these were either top or butt sections of logs; the other two originated from mills with older wood.

Lumber was also examined for signs of insect activity in 188 piles inspected. Twenty randomly selected boards were rated for "grub holes" at each mill site. Additional samples were also collected for extraction. The six grub holes found in the 420 boards represent a 1.4% frequency. This frequency figure is a great overestimate, as in some cases, hundreds of boards were examined in search of defects for extraction. Comments above, regarding cerambicids and Monochamus, also apply here.

Nematode extractions were carried out on the grub holes and on other samples of insect galleries found in already sawn lumber. Again, no PWN was found in any of the 28 samples but secondary nematodes were common in 15 of these.

IN CONCLUSION, SAWYER BEETLE IS VERY RARELY FOUND IN HEMLOCK AND PINEWOOD NEMATODE WAS NOT FOUND AT ALL DURING THE STUDY.

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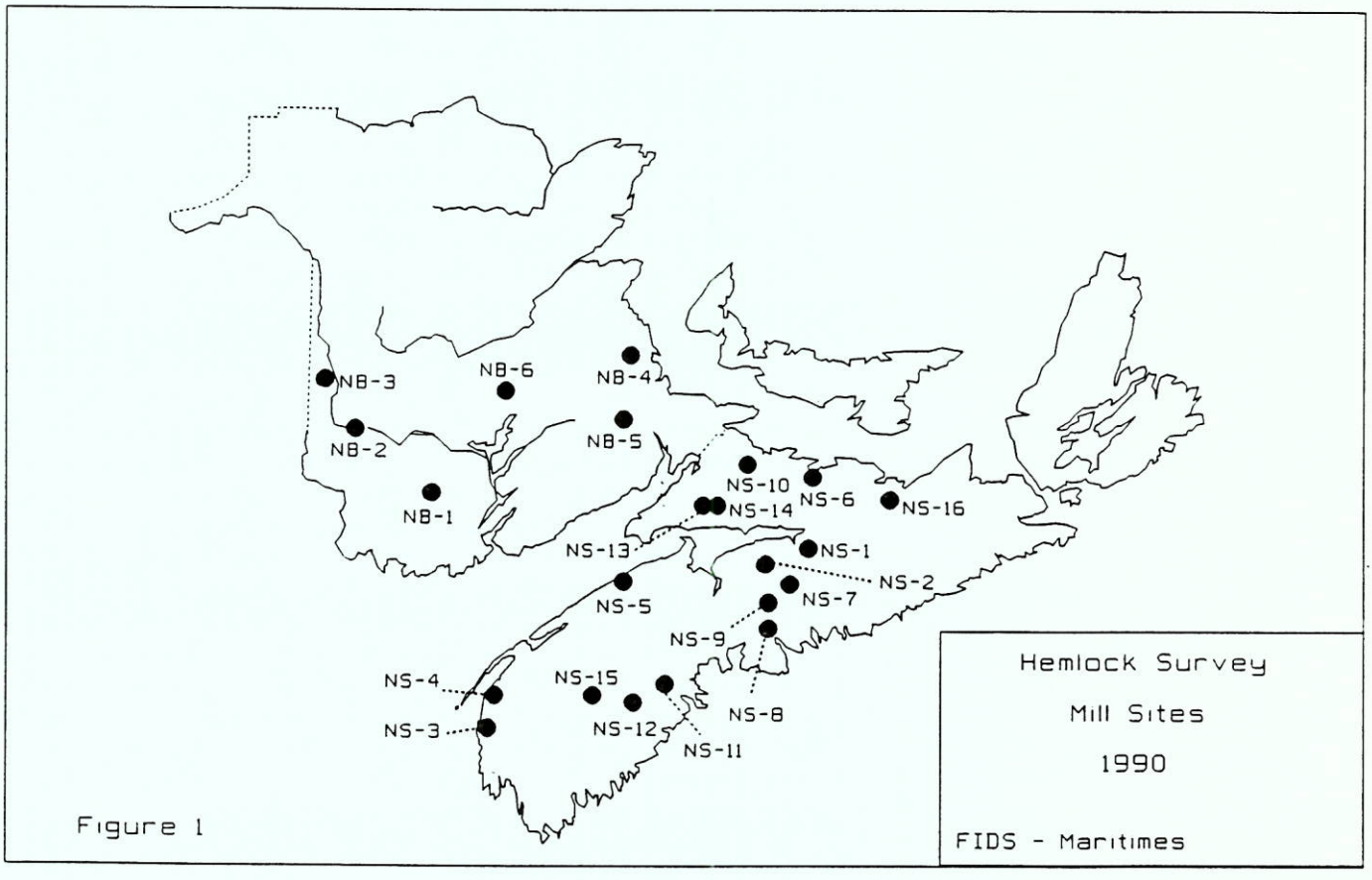

Figure 1

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