



PEST REPORT

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FIDS Pest Report 93-22

September 1993

PINEWOOD NEMATODE AND ITS WOOD BORER VECTOR IN WESTERN HEMLOCK

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Pinewood nematode (PWN), *Bursaphelenchus xylophilus*, is a serious pest of some pines in Japan. Although it is widely distributed in North America, it is mainly associated with individual, predisposed, dead or dying trees. The possibility that PWN, occasionally found in low-grade wood from Canada, could be transported to Europe prompted the European Community to ban green lumber from North America. Studies were initiated in Canada to obtain additional information on the occurrence of the nematode and its likely vectors (*Monochamus* spp. longhorned wood borers) in different species of conifers. In 1992, log bolt exposure trials were conducted at various locations in British Columbia to determine if western hemlock is attacked by *Monochamus*. Results of preliminary inspections of insect galleries and nematode extractions were reported previously (FIDS Pest Report 92-39). This report provides additional information based on rearing insects from the more heavily attacked bolts and identification of the mature adults, followed by dissection of the galleries.

Pines, spruces, and Douglas-fir are most frequently listed in the world literature as the hosts of *Monochamus* wood borers. A search of five major data bases (CAB, Biosis, Agricola, Life Science, and Zoological records) covering 1969 to 1992 found no records of *Monochamus* wood borers in hemlock or cedars. Only an earlier, general report (Morgan 1948), without supporting data, mentions possible feeding as adults on western hemlock, and in trials where a choice of hosts was provided oviposition only occurred on white pine logs.

Within the regional FIDS Infobase, which includes more than 12 000 collection records from coniferous stems since 1949, there are more than 500 records of *Monochamus*, but none of these are from cedar and only 0.05% of these are from hemlock. Within British Columbia and Yukon, *M. scutellatus* is the most common long horned wood borer, followed by *M. clamator* with much fewer *M. notatus* and very few *M. obtusus*.

Additional sampling in 1990 and 1992 focused on western hemlock in dry land sort yards, but only one *Monochamus* adult was recovered from more than 2800 hemlock examined. No PWN were found in 309 hemlock logs sampled for nematodes (FIDS Pest Reports 91-1-1 and 92-39). To further test the susceptibility of western hemlock, bait log trials were established in 1992 at 11 sites known to have high *Monochamus* populations from recent fire-killed or decked logs. Several test sites were beyond the natural range of hemlock. In such cases the hemlock bolts were brought to these very different ecozones.

Results from insect gallery inspections and nematode isolations were reported earlier (FIDS Pest Report 92-39). In summary, more than half (53%) of the 275 lodgepole pine bolts were attacked by *Monochamus*, often heavily, whereas only 12% of the western hemlock were lightly attacked. No PWN was extracted from any of the 120 hemlock log bolts sampled, while 13% of the bait-log pine contained PWN.

To determine if the larvae were able to complete their life cycle, 16 heavily attacked lodgepole pine bolts and 12 hemlock bolts were caged and placed in a controlled environment rearing room from November 1992 through February 1993, after which galleries were dissected.

Monochamus borers emerged from 69% of the lodgepole pine bolts (*M. clamator* and *M. scutellatus*), but none successfully completed development in the western hemlock. Of the 108 emerged *Monochamus*, 44 were extracted using the Baerman funnel technique. Although PWN were recovered from the bolts placed in rearing, none was recovered from the adult borers. Other cerambycids, mainly *Xylotrechus longitarsis* and *Pygoleptura nigrella*, were recovered from the hemlock. Dissection of 62 galleries in hemlock indicated an average depth of only 3.8 cm and found only 3 moribund and 12 dead *Monochamus* larvae. Other galleries were incomplete and free of frass or wood shavings, indicating that the larvae had died during early development or had vacated the galleries. The mean moisture content of both hemlock and pine bolts was 60 to 80%, indicating that moisture content was neither different nor limiting for development.

CONCLUSIONS

Monochamus wood borers are only very rarely recovered from western hemlock, and PWN was not recovered from any western hemlock samples. Although *Monochamus* did attack 12% of the hemlock bolts placed in areas with high populations, attack density by all cerambycids was less than one quarter of that in similarly exposed lodgepole pine. While *Monochamus* adults successfully emerged from 69% of the pine bolts, none completed development in hemlock. Other borers (*Xylotrechus* and *Pygoleptura*) were more common in hemlock than pine. These wood borers have not been implicated as vectors of PWN. It should be noted that these results were obtained under conditions which maximized the chance of attack in hemlock. Western hemlock, largely confined to the coastal and interior wet belt of British Columbia, is not usually exposed to such high populations of *Monochamus*. Such populations may be found in the much drier pine stands of interior British Columbia.
