

## Pinewood Nematode

### Introduction

The pinewood nematode (PWN), *Bursaphelenchus xylophilus*, is the cause of a severe wilt disease of pines in Japan and China. In North America the nematode is thought to be indigenous, but causes significant disease in only introduced pines in the Midwest. Even in these species, the disease only occurs when the mean temperature exceeds 20 degrees C (68° F) in July. The nematode has been reported in 40 states, 7 Canadian provinces, north-eastern Mexico, Taiwan, Korea and Portugal.

### Summary of Natural History and Biology

The PWN is associated with wood-boring beetles, mainly in the genus *Monochamus* (Cerambycidae), both in North America and Asia. These beetles carry the nematode from dead trees and transmit them to either healthy trees or to dead, dying or stressed trees. Emerging *Monochamus* spp. carry the nematode in their tracheae. The beetles then feed on the twigs of a healthy pine, causing wounds that nematodes may exploit by leaving the insect through its



Wilted pine killed by pinewood nematodes.



Male pinewood nematode.

spiracles and entering the feeding wound. In a susceptible host, the nematodes mature, mate and reproduce in the host where they feed on the parenchyma cells. The nematodes induce a wilt in the tree, which attracts the wood-boring beetles that will vector the next generation of nematodes to new trees. The beetles also transmit PWN to dead or dying trees during oviposition. These nematodes feed on the blue stain fungi that are carried by bark beetles and other wood-boring beetles. The PWN is widely distributed in North America and it is reasonable to assume that the nematode will be present in any conifer with blue stain.

### How to Sample and Identify the PWN

The pinewood nematode is less than 1 mm long (less than  $1/25$  of an inch), so it is difficult to identify without a microscope and knowledge of taxonomic features of the PWN. A recently wilted or killed pine can be sampled by removing a larger piece of sapwood from the trunk or branches with a hatchet.



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#### For more information, contact:

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The sample should be placed in a plastic bag and mailed to: Phil Marshall at Vallonia State Nursery, 2782 W. County Road, 540 South, Vallonia IN 47281 or to Purdue Plant and Pest Diagnostic Laboratory, 1155 LSPS, West Lafayette, IN 47907-1155. There is a small charge for the identification at the Purdue Lab. Remember, however, that even if the PWN is recovered from the sample it may or may not be the cause of the tree death.

### Quarantine Implications

The PWN has been intercepted in Europe in unprocessed wood imported from North America. As a result of this and other interceptions in Japan and other Asian countries, other countries are regulating



*Monochamus* adult<sup>1</sup>.

the importation of all conifer wood chips, sawn wood, and logs to protect their forests from the PWN. Even though the PWN may be detected in shipped materials it still needs the vector (*Monochamus*) to transmit it to a new host. The chance of this happening in wood chips or sawn wood would be remote. Unfortunately, other countries do not agree with the U.S. on the low risk of some products and require treatment of all conifer products being imported.

The European Union Communities has adopted emergency measures requiring the treatment and

marking of all new and used coniferous non-manufactured wood packing material from the United States and other known infested countries. The emergency measures allow three treatment options: heat treatment, fumigation or chemical pressure impregnation.<sup>2</sup> The Animal Plant Health Inspection Service recommends heat treatment since it is the only long-term measure listed in the draft standard.

<sup>1</sup>Lenhard, Gerald. Louisiana University. image UGA0013021. <http://forestryimages.org>.

<sup>2</sup>For more information on treatment details and certification go to: <http://www.aphis.usda.gov> or <http://www.palletenterprise.com>