

BURSAPHELENCHUS ANTONIAE, A POTENTIAL THREAT TO NORTH AMERICAN PINUS SPECIES

Nolan Stamborski, Jasmine Linderle, and Robert Wick

Introduction:

Pine wilt is a devastating disease of many conifers, specifically pine trees (*Pinus spp.*) Pine wilt can destroy healthy trees in only a single year following infection. Younger trees are especially susceptible.

Pine wilt is caused by tracheal cavitation, where air pockets fill the xylem and symptomology manifests as a vascular wilt. A nematode is responsible for pine wilt, *Bursaphelenchus xylophilus*. When the nematode feeds on the epithelial cells which surround the resin ducts, resin seeps into the tracheids resulting in cavitation.

Susceptibility of eastern white pine, *Pinus strobus* was previously listed as low and infection, uncommon with *B. xylophilus*. However, *B. antoniae* could be changing the makeup of North Eastern forests by making eastern white pine a susceptible host for pine wilt.

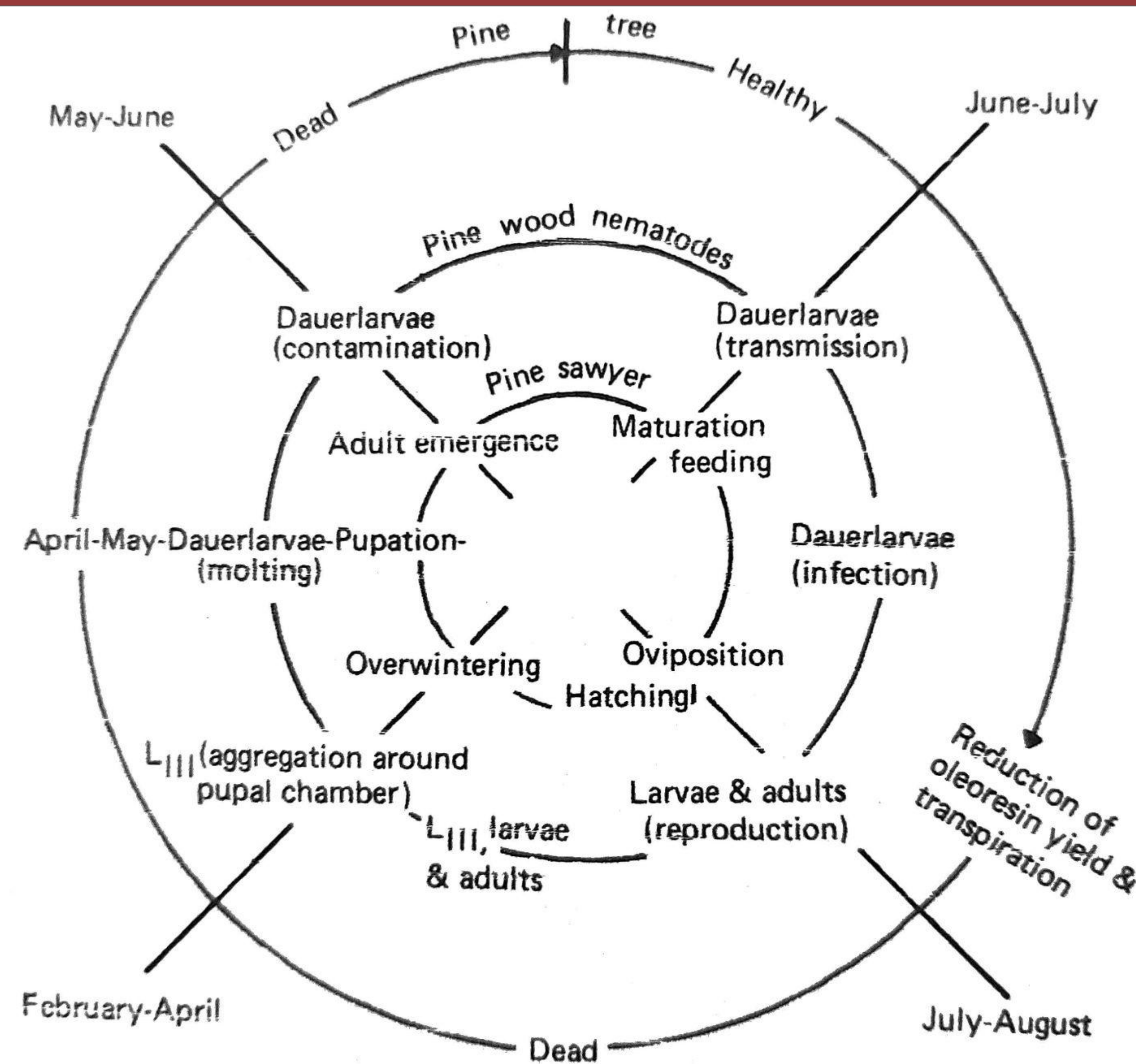


Figure 1: Biological relationship of *B. xylophilus*, a coleopteran, and pine.

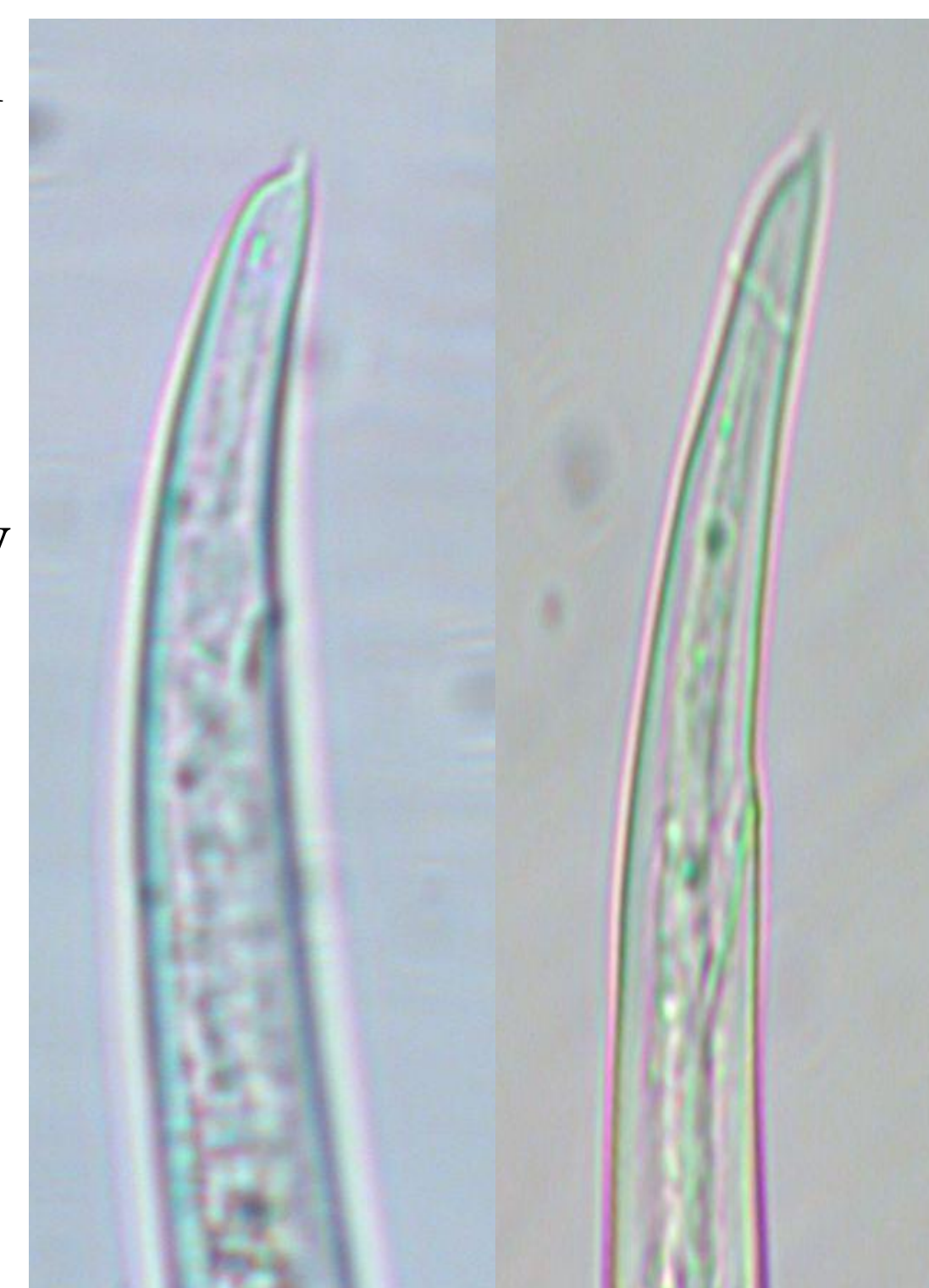


Figure 2: Posterior end of *B. xylophilus* (left) and *B. antoniae* (right.)



Figure 3: *Hylobius spp.* collected from a pine beetle lindgren funnel trap.

Further Research:

How *B. antoniae* first appeared is currently not known and needs investigation. *B. antoniae* has an unknown range and is vectored by at least one coleopteran genus, *Hylobius spp.*, a true weevil. A few hypotheses arise for which side of the Atlantic *B. antoniae* first emerged.

Most likely sources of explanation arise from *B. antoniae*'s ecological association with *Hylobius spp.* Either the nematode is endemic living in association with native North American *Hylobius pales* or it has been brought here by a native European *Hylobius spp.* which have been intercepted at the borders in North America. If *B. antoniae* was introduced into the U.S. from Europe, the nematode is potentially pathogenic to North American species of pine.

Wick and Linderme inoculated pitch pine, *Pinus rigida* with *B. antoniae* and found that the nematode was able to reproduce in living tissues but the plants were harvested before it could be determined if the nematode could kill the plants.

Eastern white pine, *Pinus strobus* was inoculated recently and the results are pending. Pathogenicity testing needs to be expanded to include more members of the *Pinus* genus to determine the scope of the problem facing North American forests.

References:

- Carta, Lynn K., and R. L. Wick. "First Report of *Bursaphelenchus Antoniae* from *Pinus Strobus* in the U.S." *Journal of Nematology*, vol. 50, no. 4, 2018, pp. 473–478., doi:10.21307/jofnem-2018-052.
- Donald, Patricia A., et al. "DisplaytitlePine Wilt." *Pine Wilt Disease*, 2016, www.apsnet.org/edcenter/disandpath/nematode/pdlessons/Pages/PineWilt.aspx.
- Ferris, H. *Nemaplex*, 2021, nemaplex.ucdavis.edu/.
- Nickle, William R. *Plant and Insect Nematodes*. M. Dekker, 1984.
- Penas, Ana Catarina, et al. "*Bursaphelenchus Antoniae* Sp. n. (Nematoda: Parasitaphelenchidae) Associated with *Hylobius* Sp. from *Pinus Pinaster* in Portugal." *Nematology*, vol. 8, no. 5, 2006, pp. 659–669., doi:10.1163/156854106778877947.



UMassAmherst

College of Natural Sciences

Center for Agriculture, Food, and the Environment

