

## Disease Notes

### **First Report of *Amylostereum areolatum* in Pines in the United States**

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The wood decay fungus *Amylostereum areolatum* (Fr.) Boidin, native to Eurasia and North Africa (4), is the mycosymbiont of several siricid woodwasps including *Sirex noctilio* Fabricius, a major pest of pines in New Zealand, Australia, South America, and South Africa where it has been introduced. Adult females of *S. noctilio* are effective vectors of arthrospores (hyphal fragments) of the fungus, stored internally within mycangia in the abdomen, which are injected with the eggs and a phytotoxic mucus into the outer sapwood of coniferous tree hosts during oviposition. The toxin is translocated upward into the foliage causing needle wilting, necrosis, and crown dieback. The fungus decays the wood (white rot) and provides food for hatching larvae that form borer galleries. Extensive damage to the host via wood decay, galleries, and toxin effects cause mortality in heavily infested trees. *S. noctilio* adults have been intercepted from several locations in North America prior to 2003, but there has been no evidence of an established population in any native forests until recently. In September 2004, a single adult female was collected from a funnel-trap at the edge of a forest stand in Fulton, NY (Oswego County) and identified in February 2005 (3). A local survey in May 2005 revealed red pines and Scotch pines infested with siricid larvae on the SUNY Oswego campus and in Rice Creek Nature Preserve, 3 km from campus. All larvae from infested trees were identified as *S. noctilio* using the DNA barcode method (2). Bole sections of infested red pines were sent to the USDA-ARS quarantine facility in Stoneville, MS. Wood samples, taken from areas of incipient decay adjacent to larval galleries, were plated onto 4.5% potato dextrose agar. Fungal colonies in pure cultures arising from wood pieces were appressed and exhibited microscopic characters typical of *A. areolatum*. Molecular

confirmation of identifications for nine isolates was achieved by PCR amplification and sequencing of the rDNA internal transcribed spacer (ITS) region using ITS1 and ITS4 universal primer pairs. BLAST program analyses of these sequences compared against the NCBI GenBank database revealed the isolates were identical (GenBank Accession No. FJ040860) and had 98.8 to 99.8% sequence homology with five *A. areolatum* GenBank sequences (AF454428, AY781245, AF218389, EU249343, and EU249344) from Germany, Sweden, Japan, and Canada. To our knowledge, this represents the first confirmed isolation of *A. areolatum* from a native pine stand in the United States and confirms the first incidence of infections of North American pines, 16 months prior to isolations in Ontario (1). This insect vector-decay fungus complex, native to Eurasia, has a very high-risk rating and threatens many pine (*Pinus*) species in North America, particularly southern U.S. species that have been severely attacked and killed where introduced in the Southern Hemisphere. The lack of complete sequence homology between New York and Ontario, Canada strains of *A. areolatum* suggests that these recent incidences probably resulted from multiple woodwasp introductions rather than from vector (*S. noctilio* female) movement after one introduction.

*References:* (1) M. J. Bergeron et al. *Plant Dis.* 92:1138, 2008. (2) P. D. N. Hebert et al. *Proc. R. Soc. Lond. B* 270:313, 2003. (3) E. R. Hoebeke et al. *Newsl. Mich. Entomol. Soc.* 50:24, 2005. (4) J. P. Spradbery and A. A. Kirk. *Bull. Entomol. Res.* 68:341, 1978.