ESTABLISHMENT OF *BEDDINGIA SIRICIDICOLA* FOR BIOLOGICAL CONTROL OF *SIREX NOCTILIO* IN THE UNITED STATES: QUESTIONS, ISSUES, AND CHALLENGES

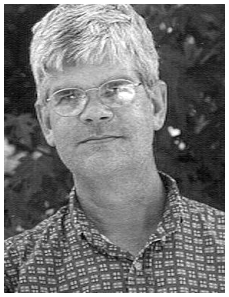
David Williams, Victor Mastro and Kelley Downer

USDA, APHIS, CPHST, Pest Survey, Detection & Exclusion Lab, Building 1398, Otis ANGB, MA 02542, USA
david.w.williams@aphis.usda.gov

Sirex noctilio was first identified in the United States in the spring of 2005. Rearing of adults from infested pine billets and dissection of larvae during 2005 and 2006 revealed that *S. noctilio* was already under attack by native parasitoids, including *Ibalia leucospoides* and *Rhyssa lineolata*. However, entomopathogenic nematodes rarely have been encountered in our surveys to date and have been identified only as *Beddingia* species. *Beddingia siricidicola*, in particular the Kamona strain from Australia, is highly pathogenic and density dependent in action and is considered the most effective natural enemy of *S. noctilio* in pine plantations of the southern hemisphere. Clearly, Australian *B. siricidicola* may be a very useful tool for managing *S. noctilio* populations in the United States. However, several questions and issues arise as we consider the establishment of *B. siricidicola* in the pine forests of North America.

Ecological questions include the effects of intra-tree competition by other boring insects, physiological differences between pine species, and diversity of forest habitats on nematode establishment and dispersal. Strain of *Amylostereum areolatum* is also important because the Australian and American strains have different growth characteristics, which in turn influence growth and reproduction rates of *B. siricidicola*. Climatic patterns are very different between Australia and the United States, particularly with respect to the length and severity of winter. Release strategies and prospects for establishment will depend upon these and other factors. In response to some of these questions, a controlled trial release was carried out in the fall of 2006 in New York State to test application techniques and evaluate nematode overwintering.

A critical issue in the decision to release nematodes is their potential effect on non-target boring insect species. Of particular concern are several native North American siricid species that feed on dead or dying pines. The possible susceptibility and vulnerability of those species to *B. siricidicola* are discussed.



David Williams is an entomologist with the USDA Animal and Plant Health Inspection Service (APHIS) on Cape Cod, Massachusetts. He completed an A.B. in Anthropology at Indiana University and an M.S. in Entomology at North Carolina State University. He earned a doctorate in Entomology in 1981 at the University of California at Berkeley. After a postdoctoral position with Texas A & M University investigating natural control of cotton boll weevil in Yucatan, Mexico, Dave returned to California where he worked for five years as a systems analyst and modeler with the UC Statewide IPM Project in Berkeley and Davis. Relocating East to Pennsylvania in 1987, he was a research entomologist with the USDA Agricultural Research Service and then the USDA Forest Service, carrying out research in diverse fields, including biological control, climate change, theoretical and spatial ecology, and invasive species. Dave joined APHIS in the summer of 2003. In addition to his work on *S. noctilio* biological control, he has carried out research on emerald ash borer, including the application of remote sensing technologies to its survey and foreign exploration for its natural enemies in South Korea.

NOTES