MICROBIAL CONTROL OF ASIAN LONGHORNED BEETLES—WHAT ARE FUNGAL BANDS?

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ABSTRACT

In Japan, the entomopathogenic fungus *Beauveria brongniartii* is grown in nonwoven fiber bands that are placed around trunks of orchard trees for control of numerous cerambycid pests, including *Anoplophora chinensis* (= *A. malasiaca*). The Japanese company producing bands, Nitto Denko in Osaka, markets bands produced from wood pulp. Our program has emphasized developing a method for biological control of Asian longhorned beetle (*Anoplophora glabripennis*) in the United States using similar fungal bands. Highlights in our studies on use of bands containing entomopathogenic fungi for control of adults of Asian longhorned beetle include:

A. Methods for rearing ALB in the quarantine and for differentiating male from female adults.

B. Searching for pathogens in China, finding that entomopathogenic fungi were most common pathogens of *A. glabripennis* in the field. In addition, there were more records of fungal pathogens infecting cerambycids than any other pathogen group.

C. Conducting bioassays with 28 isolates of five species of entomopathogenic fungi (*Beauveria brongniartii*, *Metarhizium anisopliae*, *Paecilomyces farinosus*, *Paecilomyces fumosoroseus* and *Beauveria bassiana*) using larvae and adults.

D. Conducting caged studies with three fungal species in bands in Anhui, China in 2000 and 2001.

E. Conducting noncaged studies with fungal bands in China in 2001, which were repeated with increased replication in 2002.

F. Studying persistence of activity of fungal bands in Queens, NY, using five different fungal isolates from 2001-2004.

G. Presently, studying the effects of fungal infection on fecundity of adult females and contamination of males by inoculated females.

Bands are made using synthetic material that is produced like felt (since it is not woven) but is not compacted, so that ample surface area within the material is available to support fungal growth. We searched for an appropriate substitute for the nonwoven wood pulp material used in Japan because this is not available in the United States and we are using polyester quilt batting for bands. Fungal cells are grown in media on shakers and band material is dipped into mature cultures. Bands are then placed on racks at 100 percent RH for 7-11 days, during which time the fungus grows throughout the bands and produces spores (conidia) on the band surfaces. Bands are placed around tree trunks or branches and adult beetles inoculate themselves when walking. *A. glabripennis* adults are reluctant fliers and frequently walk on tree trunks and branches, especially during the prematurational period when they feed after emergence but before oviposition begins. *A. glabripennis* can become infected after only walking across fungal bands; fungal spores will adhere to the beetle cuticle and entomopathogenic fungi then infect by penetrating through the external cuticle.