



# Fungi Associated with *Scolytus schevyrewi*



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## Introduction

Since the introduction of *Scolytus multistriatus* (European elm bark beetle) into North America in the 1900s, the population of *Ulmus americana* (American elm) has been at a high risk of contracting the vascular wilt disease known as Dutch Elm Disease (DED). *Ophiostoma novo-ulmi* is the fungus that causes DED. *Scolytus schevyrewi* (banded elm bark beetle), an exotic species recently reported in the United States, has been found to carry propagules of *O. novo-ulmi*. In this study, adult *S. schevyrewi* were collected from DED-positive American elm trees, and placed on selective agar-based media to determine what other fungi were associated with this species of beetle.

## Materials and Methods

- Adult *S. schevyrewi* were collected as they emerged from the caged stem segments of 4 American elm trees known to be infected with *O. novo-ulmi*.
- Each beetle was killed by crushing with forceps and then placed onto one of the following four media:
  - Half strength Potato Dextrose Agar (PDA) (1.95% powdered potato dextrose agar)
  - Half strength PDA plus Streptomycin (1.95% PDA and streptomycin sulfate)
  - Amended Elm Sapwood Agar (3.00% agar, 25 g ground elm sapwood, 100 ppm streptomycin sulfate, and 200 ppm cycloheximide)
  - Amended Malt Agar (1.50% malt extract, 2.00% agar, 100 ppm streptomycin sulfate, and 200 ppm cycloheximide)
- Fungi were transferred onto half strength PDA or half strength PDA plus streptomycin agar to aid in identification.
- Plates were then incubated at 5°C for 4 weeks.
- Fungi were identified based on morphological characteristics (primarily conidia and conidiophores).



*Penicillium*



*Alternaria*



*Trichothecium*



*Paecilomyces*



*Aspergillus*



Unknown



Unknown isolates



*Aspergillus* on 1/2 PDA



*Penicillium* on 1/2 PDA

## Literature Cited

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## Results

Twenty-five different phenotypic genera were isolated from plated beetles. Of the 170 isolates that were plated and examined, 39.4% were of the genera *Penicillium*, 6.0% were of the genera *Trichothecium*, 5.8% were of the genera *Alternaria*, 4.0% *Aspergillus*, 0.9 % *Paecilomyces*, 13.5% appear to be species of *Fusarium*, 14.7% were of unknown genera, and the remaining 15.7% of the isolates have yet to be examined.

## Discussion

*Penicillium* was the most common fungal genus associated with the *S. schevyrewi* in this study. This genus is common and prevalent in soil, and is often associated with dead plant material. There has been some documentation of *Penicillium* parasitizing *Aspergillus* species (Peberdy 1987). Members of *Alternaria* can be parasites of living plants or saprophytes on organic substrates. *Alternaria solani* and *A. alternata* can be vectored by insects, and attack several varieties of vegetables. There is not much documentation of *Alternaria* as an arbor pathogen, thus the *Alternaria* found on *S. schevyrewi* are probably not pathogens to the elm species on which the beetles feed. Species of *Trichothecium* can be either saprophytic or mildly parasitic on fleshy fungi found in most soils and dead plant debris around the U.S. (Doctor Fungus). It causes pink rot of apples but has not been found to cause disease in elms. Species of *Aspergillus* are ubiquitous soil microbes found on living and decaying plant matter. Aflatoxins produced by some species of *Aspergillus* can be harmful to animal species. There is no evidence that species of *Aspergillus* cause disease in elms (Desjardins A. E. 1997). *Paecilomyces* species inhabit soil, decaying plants and some species have been isolated from insects and arachnids; *P. farinosus* has been found associated with members of *lepidoptera*, *diptera*, *homoptera*, *coleoptera*, *hymenoptera*, and *arachnida*. *Paecilomyces farinosus* can actually inhibit some strains of the DED fungus (Gemma, J.N 1984). Species of *Fusarium* are commonly associated with the Scolytidae and Platypodidae groups of wood-inhabiting insects (Cooke 1977). *Fusarium* fungi are recognized to cause many diseases of plants including pitch cankers of pines.

## Preliminary Conclusion

Many species of fungi can be associated with *Scolytus schevyrewi*, however, the effectiveness of this species of bark beetle to vector tree pathogens remains to be determine.

## Future Research

Examine and identify remaining isolates; and conduct comparative analysis by PCR to try to identify unknown isolates.