# Exotic scolytids of the Great Lakes region

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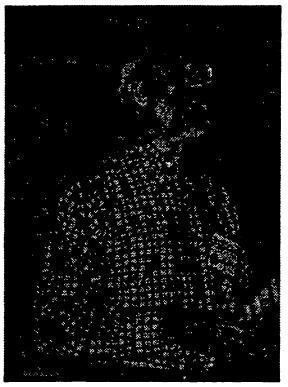

There are at least 44 exotic species of Scolytidae established in North America north of Mexico, of which 16 species can be found in the Great Lakes region (see Table). Scolytids occupy many niches, but the two most common groups are the true bark beetles and the ambrosia beetles (Poland and Haack 1998). Adult bark beetles, as their name implies, construct galleries under the bark of woody plants. Eggs are laid in niches along the gallery walls. The larvae feed primarily on the inner bark (phloem) tissue, then pupate, and emerge as adults. Ambrosia beetles typically tunnel into the wood (xylem), and construct simple to many-branched galleries. Larvae develop in the galleries and feed on fungi ("ambrosia") that grows along the gallery walls. Other species of Scolytidae construct galleries and lay eggs in seeds, cones, twigs, and roots.

Of the 44 exotic scolytids in North America, 16 are ambrosia beetles, 11 are pith-feeders in the twigs of hardwoods, 7 are seed-feeders of hardwood trees and palms, 6 are true bark beetles of conifers, 3 are true bark beetles of hardwood trees, and 1 colonizes the roots of clover (Table 1). Six of the 16 exotic ambrosia beetles are known to be present in the Great Lakes region, and likewise, all 9 true bark beetles and the clover root borer are present. None of the exotic pith-feeding or seed-feeding scolytids are known to occur in the Great Lakes region.

As might be expected, there is not complete agreement over which scolytids species are exotic and which are not. For example, *Xyleborinus saxeseni* is considered by Atkinson and Peck (1994) to be exotic, but others consider it to be a holarctic species whose native range includes Asia, Europe, and North America (Wood and Bright 1992). Similarly, *Xyleborus affinis* is considered a native species by Atkinson and Peck (1994) and Wood and Bright (1992), while others list it as exotic in North America (Solomon 1995). Another possible exotic species is *Coccotrypes rhizophorae*, which breeds in prop-roots and fruit of red mangrove. Given that mangrove fruit and seedlings can float long distances in salt water, it is possible that *C. rhizophorae* reached North America inside infested host material rather than through human intervention (Atkinson and Peck 1994).

Some of the exotic scolytids have been present in North America for tens of decades (e.g., *Scolytus rugulosus* was first recorded in 1878, and *Scolytus multistriatus*, the smaller European elm bark beetle, in 1909), while others are more recent arrivals (e.g., breeding populations of *Hylastes opacus* were first detected in 1989, *Tomicus piniperda* in 1992, and *Hylurgus ligniperda* in 2000).

*Hylurgus ligniperda* was found near Rochester, NY, in November 2000 (Hoebeke 2001), and based on USDA APHIS surveys conducted in early 2001, this new pine-infesting scolytid is present in at least 3 counties in New York State. In 2001, we (Robert Haack, Toby Petrice, and Therese Poland) conducted studies in New York to evaluate the effectiveness of various traps and lures in capturing *H. ligniperda* adults, and to gather baseline information on the seasonal flight pattern of this new exotic.

In 2001, USDA APHIS and USDA Forest Service, along with many state and university cooperators, initiated a pilot test for detecting exotic scolytids and lymantriids at US ports. Several species of scolytids were targeted and traps were placed at 3 southeastern ports (Alexandria, LA; Baton Rouge, LA; and Houston, TX), 3 northeastern ports (Erie, PA; Oswego, NY; and Toledo, OH), and 3 western ports (Oakland, CA; Portland, OR; and Seattle, WA). Insects are still being sorted, but a new pine-infesting scolytid has already been detected in Erie, PA: *Hylurgops palliatus* (ER Hoebeke, Cornell University, pers. comm.). It is not yet known if *H. palliatus* is established, but given that it was collected in an urban forest several miles from the port itself, suggests that it is established. Perhaps other new exotics will be discovered this year through this cooperative effort.

**TABLE.** Exotic species of Scolytidae known to be established in North America north of Mexico.

**Ambrosia beetles**

*Ambrosiodmus lewisi* (GLR)*
*Ambrosiodmus rubricollis* (GLR)
*Dryoxylon onoharaensis*
*Euwallacea validus* (GLR)
*Hypocryphalus mangiferae*
*Premnobius cavipennis*
*Trypodendron domesticum*
*Xyleborinus alni*
*Xyleborus atratus*
*Xyleborus californicus*
*Xyleborus dispar* (GLR)
*Xyleborus pelliculosus* (GLR)
*Xyleborus pfeili*
*Xylosandrus compactus*
*Xylosandrus crassiusculus*
*Xylosandrus germanus* (GLR)

**Pith feeders in hardwoods**

*Hypothenemus africanus*
*Hypothenemus areccae*
*Hypothenemus birmanus*
*Hypothenemus brunneus*
*Hypothenemus californicus*
*Hypothenemus columbi*
*Hypothenemus crudiae*
*Hypothenemus erectus*
*Hypothenemus javanus*
*Hypothenemus obscurus*
*Hypothenemus setosus*

**Seeds feeders of hardwoods and palms**

*Coccotrypes advena*
*Coccotrypes carpophagus*
*Coccotrypes cyperi*
*Coccotrypes dactyliperda*
*Coccotrypes distinctus*
*Coccotrypes robustus*
*Coccotrypes vulgaris*

Haack, Robert A. 2001. Exotic scolytids of the Great Lakes region. Newsletter of the Michigan Entomological Society. 46(3): 6-7.

**True bark beetles of conifers**

*Crypturgus pusillus*(GLR)
*Hylastes opacus* (GLR)
*Hylurgops palliatus* (GLR)
*Hylurgus ligniperda* (GLR)
*Pityogenes bidentatus* (GLR)
*Tomicus piniperda* (GLR)

**True bark beetles of hardwoods**

*Scolytus mali* (GLR)
*Scolytus multistriatus* (GLR)
*Scolytus rugulosus* (GLR)

**Clover root borer**

*Hylastinus obscurus* (GLR)

*(GLR) = Found within the Great Lakes region.

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## *A survey of* Boloria frigga *in northern Michigan sphagnum heath bogs*


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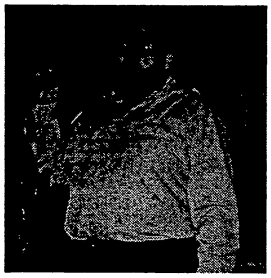

The presentation described Michigan Lepidoptera Survey (MLS) research on two special concern bog obligate butterflies, *Boloria frieja* and *B. frigga saga* (Lepidoptera: Nymphalidae), from 1998 through 2001. Degree day models for predicting the timing of adult occurrence of both species were developed using historical data from the MLS listed species database. All historical Michigan populations of both species are situated on two soil types, Greenwood and Dawson peat. County soil surveys were analyzed to produce maps showing the location of these soils in 11 of 15 Upper Peninsula counties. These maps were used to prioritize potential sampling sites. Where possible, detailed composite maps of high priority sites were constructed from digital aerial photographs and topographic maps. Field surveys were timed using degree day forecasts from the Michigan State University Agricultural Weather Office. Over a dozen lepidopterists participated in field surveys. The core survey team consisted of Martin Andree, George Balogh, Terry Herig, Harry King, Robert Kriegel, Mogens Nielsen and Owen Perkins.

At the beginning of the study each of the two species were known in Michigan from eight locations. So far we have discovered four previously unknown populations of each species, and several historical locations have been more thoroughly surveyed. Over thirty northern sphagnum heath bogs were surveyed during this study. New locations were also discovered for other special concern species, most notably *Erebia discoidalis* (Lepidoptera: Satyridae) and *Proserpinus flavofasciata* (Lepidoptera: Sphingidae). Sixteen of the 18 known localities containing populations of either or both *Boloria* species are situated in two ecoregions: Winegar Moraine or Seney Sand Lake Plain. Many known localities in the eastern Upper Peninsula are associated with specific Pleistocene glacial landscapes including heads of outwash, river deltas and relict dunes. Most of these landforms were deposited during the glacial Lake Algonquin phase 10,000 to 11,000 years ago. However, recent peat cores taken near one of our localities in Chippewa County (R. Schaetzl, pers. comm.) indicate that bog formation in the eastern Upper Peninsula did not begin until 6,000 years ago. These findings raise interesting questions about how and when these butterflies colonized Upper Peninsula bogs. This survey was funded, in part, by a Natural Heritage grant from the Michigan Nongame Wildlife Fund.