

Xyleborini Ambrosia Beetles: An Identification Tool to the World Genera

A new Lucid[®] interactive identification tool by Jiri Hulcr and Sarah M. Smith

CPHST is pleased to announce the release of its latest identification tool, *Xyleborini Ambrosia Beetles: An Identification Tool to the World Genera*. Designed by a leading taxonomic expert on xyleborines, this is the first multi-media internet-based identification tool using the most recent world taxonomic classification of the tribe. *Xyleborini Ambrosia Beetles*, part of the upcoming *A Resource for Wood Boring Beetles of the World*, was created through collaboration among USDA/APHIS/PPQ Center for Plant Health Science and Technology (CPHST), Michigan State University, North Carolina State University, University of California, and University of Wisconsin. Xyleborini (Coleoptera, Curculionidae, Scolytinae) is the most important and species-rich tribe of ambrosia beetles. The tribe includes more invasive pests than all other ambrosia beetle groups combined and is one of the most frequently intercepted organisms at ports-of-entry.

A Resource for Wood Boring Beetles of the World, to be released in 2011, will provide a portal for a variety of websites related to the identification of the members of the nine beetle families collectively known as wood boring beetles. The resource focuses on those beetle taxa that are known to bore into and develop within sound wood. Many members of this group are serious pests that may be easily transported in wood or wood products used for packing and shipping. This resource will allow quick, efficient access to a number of Lucid tools with keys, images, and fact sheets to help support identification of this diverse, potentially destructive group of beetles.

The interactive key featured in *Xyleborini Ambrosia Beetles* was developed in Lucid version 3.4 software. The tool was uploaded to the Internet in December 2010 to support easy access by PPQ and cooperators. *Xyleborini Ambrosia Beetles* can be accessed at:

<http://itp.lucidcentral.org/id/wbb/xyleborini/>

Xyleborini Ambrosia Beetles is cross-platform and is compatible with all major operating systems, including Windows, Macintosh, and Unix. The interactive key requires that your computer has Java Runtime Environment version 1.4.2 or greater installed; Lucid software is not necessary.

A Resource for Wood Boring Beetles of the World

HOME IDENTIFY FAMILY TAXONOMIC TOOL SEARCH GEOGRAPHIC TOOL SEARCH SELECT TOOL ABOUT THE RESOURCE

Xyleborini ambrosia beetles

An identification tool to the World Genera

Jiri Hulcr • North Carolina State University & Sarah M. Smith • Michigan State University • 2010

Home Fact Sheets Key Characters Glossary References

Who are Xyleborini?

Xyleborini ambrosia beetle are a subtribe (tribe) of bark beetles (Scolytinae, Curculionidae), a hugely diverse miniature weevils, primarily inhabiting dying trees. Xyleborini are one of several clades that underwent a major evolutionary innovation - from feeding on host tree tissues to farming symbiotic fungi. Along with farming, Xyleborini also evolved extreme inbreeding (all females get fertilized by a single brother) and haplo-diploidy. Combination of these features gave them unprecedented reproductive capability, huge host range, and the ability of even a single female to establish a thriving population. For more information about Xyleborini or about the beetle-fungus symbiosis, see the **References** section.

About this tool

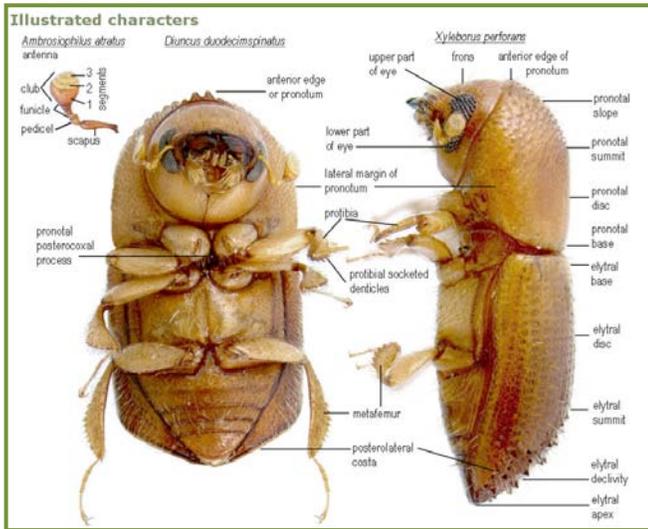
Xyleborini are the most rapidly diversifying ambrosia beetles, hugely abundant, and a constant source of devastating invasive species. Damage to timber, orchards, and forests ecosystems by these invasive species is skyrocketing. Yet, until recently the classification of their 1,200 species has been a mystery, identification resources were scarce, and usable only by specialists.

Here we present a comprehensive, user-friendly, illustrated set of information resources and a Lucid key to genera of Xyleborini of the World. The classification used here is up to date as of July 2010. It is based on a comprehensive review by Alonso-Zarazaga and Lyall (2009), and includes the most recent taxonomic changes by Hulcr & Cognato (2009, 2010).

Jiri Hulcr
(personal info)

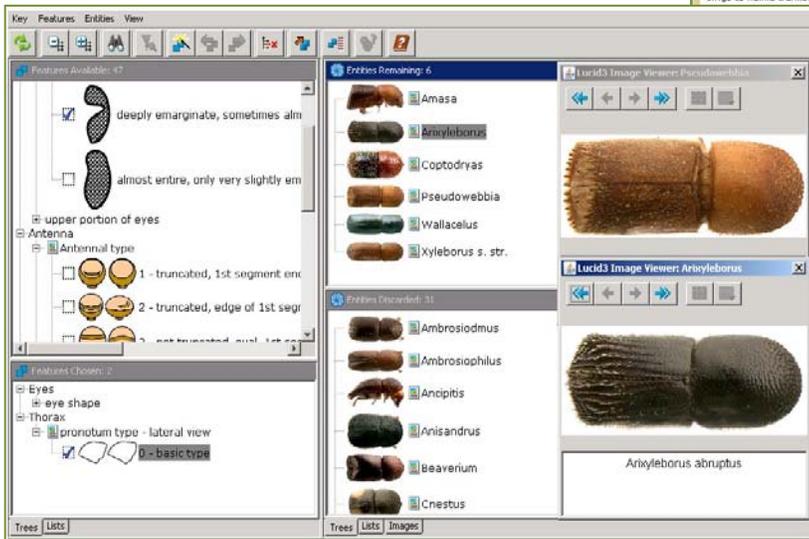
 <small>Xylosandrus crassiusculus, a dominant ambrosia beetle in the south-east US.</small>	 <small>azyangium in Xylosandrus gemmatus</small>	 <small>Sawdust stacks on a dead tree - typical sign of ambrosia beetles at work.</small>	 <small>Extreme sexual dimorphism in Diconus, haploid male on the right.</small>	 <small>Rafflesia lauricola staining a redbay tree; quick death delivered by Xyleborus glabratus.</small>	 <small>a parade of fancy xyleborines from tropical rainforests.</small>
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Home page of *Xyleborini Ambrosia Beetles* (foreground) provides links to major tool components as well as some background information. Each tool will be linked from the resource home page (background).

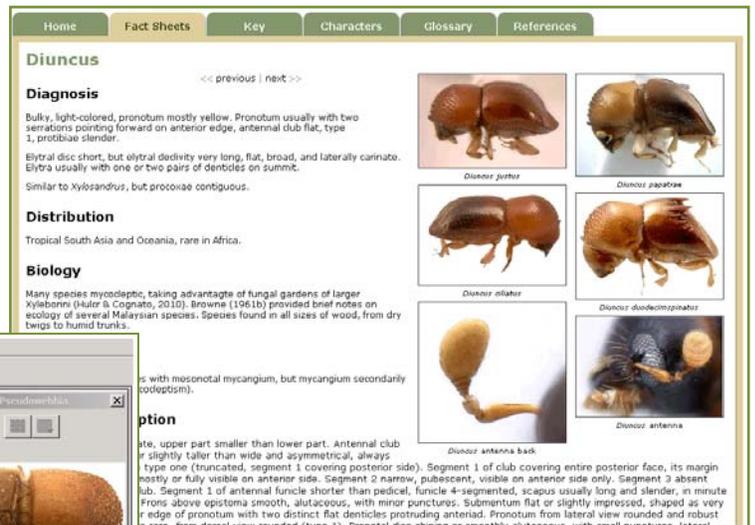


The tool features an illustrated overview of xyleborine characters to support less experienced users.

The matrix-based key (below) is fully illustrated and offers identification support for all 36 genera. Taxa within the tribe are minute, non-descript, and morphologically diverse. To increase the chance that even inexperienced users will arrive at a correct identification, all genera are distinguished by multiple characters, and character states account for a large degree of uncertainty.



Ambrosia beetles are one of the most successful and widespread examples of insect-fungus symbiosis. Their unparalleled ability to invade new bioregions is increasingly turning them into a major phytosanitary threat worldwide. Two recent examples of the alarming impact ambrosia beetles can have include the redbay beetle (*Xyleborus glabratus*) which is threatening the existence of the avocado industry in Florida and the Asian ambrosia beetle (*Xylosandrus crassiusculus*), which is replacing native fauna throughout the southeastern U.S. and causing damage to nurseries. Hundreds of other barely known species exist in tropical forests around the world, vectoring fungi about which we know literally nothing. Each of these species may pose a potential threat to naïve forests and nurseries.



Each genus has a detailed fact sheet (above), with a summary of diagnostic features, complete description of morphological characters, ecological and life history features, and geographical distribution, as well as multiple images selected to represent the diversity of the constituent species.

The authors of *Xyleborini Ambrosia Beetles* would appreciate receiving any comments about the value and usefulness of this tool and learning of any problems you encounter when accessing or using the tool. Please contact Jiri Hulcr (email jhulcr@ncsu.edu) with any comments or questions.

To learn more about Lucid software and Lucid tools, visit www.lucidcentral.org. For information concerning other CPHST developed tools for plant protection and quarantine, contact Amanda Redford (email amanda.j.redford@aphis.usda.gov).