An Asian Ambrosia Beetle, *Xylosandrus amputatus* (Blandford) (Curculionidae: Scolytinae: Xyleborini), Discovered in Florida, U.S.A.

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Source: Coleopterists Bulletin, 65(1):43-45. 2011.
Published By: The Coleopterists Society
DOI: 10.1649/0010-065X-65.1.43
URL: http://www.bioone.org/doi/full/10.1649/0010-065X-65.1.43

The Coleopterists Bulletin, 65(1): 43–45. 2011.

SCIENTIFIC NOTE

An Asian Ambrosia Beetle, *Xylosandrus amputatus* (Blandford) (Curculionidae: Scolytinae: Xyleborini), Discovered in Florida, U.S.A.

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Scolytine bark and ambrosia beetles are ubiquitous inhabitants of world-wide forests and urban wildlands where they help decompose woody material (Wood 1982). They were the second most intercepted beetle family at US ports-of-entry during 1985–2000 (Haack 2001) and 58 non-native species have become established in the US in the past 32 years since Wood's (1977) initial list of introduced species; 22 of these are in the ambrosia beetle tribe Xyleborini (Wood 1982; Haack 2006; Rabaglia *et al*. 2006; Hoebeke and Rabaglia 2008; Rabaglia *et al.* 2009; Okins and Thomas 2010; Rabaglia *et al.* 2010). These established species generally have little impact on US forests, although the exceptions can be devastating to forest ecology. For example, *Xyleborus glabratus* Eichhoff is currently killing, through the transmission of a pathogenic fungus, thousands of redbay trees (*Persea borbonia* (L.) Spereng. [Lauraceae]) in the southeastern US and it threatens the avocado (*Persea americana* Mill.) industry in Florida and elsewhere as it spreads (Fraedrich *et al.* 2008). Hence, knowledge of the occurrence of these species within the US is needed to help address their potential effects on forest ecology and economy. Since 2001, the USDA Forest Service's Early Detection and Rapid Response (EDRR) project has surveyed urban and suburban forests for previously undetected non-native bark beetles (Scolytinae) (Rabaglia *et al.* 2008). These yearly surveys utilize funnel traps (Lindgren 1983) baited with a mixture of tree volatiles and beetle pheromones. Prior to the present publication, these surveys uncovered six bark and ambrosia beetles new to the US (Hoebeke and Acciavatti 2006; Rabaglia *et al.* 2006; Hoebeke and Rabaglia 2008; Rabaglia *et al.* 2010; LaBonte 2010).

In 2010, specimens of another non-native scolytine, *Xylosandrus amputatus* (Blandford) (Fig. 1A, B), were discovered for the first time in the continental US in three Florida counties separated by 200 km, by using ethanol (EtOH)- and alpha-pinene+ethanol (APE)-baited 12-unit funnel traps (number of specimens collected follows lure designation): Alachua County, Gainesville, Waldo Road & NE 31st Avenue (N 29.6829°, W −82.2952°), 2 August (EtOH- 2, APE- 4), 17 August (EtOH- 2, APE- 0); Duval County, Jacksonville, AFSO St Johns River Power Park in mixed *Quercus*/*Pinus* habitat (N 30.422°, W 81.504°), 14 July (EtOH- 1, APE- 0); Orange County, Wekiwa Springs State Park in *Quercus*/*Pinus* habitat (N 28.718°, W 81.479°), 18 May (EtOH- 1, APE- 2), 1 June (EtOH- 2, APE- 2), 18 June (EtOH- 8, APE- 6), 2 July (EtOH- 0, APE - 0), 13 July (EtOH- 3, APE -1), 29 July (EtOH- 3, APE- 0), 31 August(APE- 8), 21 September (APE- 4); and Orange Co., Orlando, Moss Park, (N 28.37970°,W 81.19303°), 25 June (EtOH- 1) (Cooperative Agricultural Pest Survey). Voucher

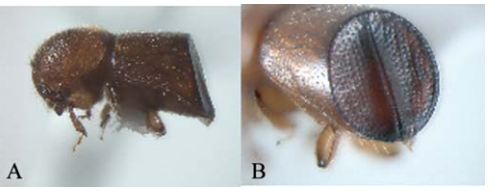

Fig. 1. *Xylosandrus amputatus*, habitus. A) Lateral view, ~2.8 mm from the apex of the pronotum to the base of the elytral declivity, B) Elytral declivity, oblique view.

specimens were deposited in the A. J. Cook Arthropod Research Collection, Michigan State University, East Lansing, Michigan, Florida State Collection of Arthropods, Gainesville, Florida, and the US National Museum, Washington D. C.

Given that specimens were collected at four locations throughout the summer, we believe that *X. amputatus* has established a breeding population in Florida. Potentially, this is a recent introduction because 2007 and 2008 EDRR surveys in similar habitat located in the same and several other Florida counties did not find *X. amputatus*. In addition, we sequenced 658 nucleotides of the 5′ portion of mitochondrial cytochrome oxidase I for 11 individuals from Orange Co., one from Duval Co., and six from Alachua Co. following the methods of Dole *et al.* (2010). One haplotype was found for all individuals (Genbank # HQ317870). Multiple haplotypes are typically observed for xyleborine species collected from native populations (Dole *et al.* 2010; Cognato *et al.* 2011). Thus, the lack of haplotypic variation suggests that the occurrence of *X. amputatus* in Florida was due to a single and likely small introduction.

Xylosandrus amputatus is a native of China, Japan, Korea, and Taiwan where specimens have been collected from several families of tree including Anacardiaceae, Ebenaceae, Geraniaceae, Lauraceae, Moraceae, Rhamnaceae, Sapindaceae, Styracaceae, and Theaceae (Beaver 2010; Dole and Cognato 2010; Murayama 1934, 1952, 1953; Yin *et al.* 1984). Species of these families occur in Florida (flame.fl-dof.com/apps/trees.php) and given the published host records, *X. amputatus* will likely use numerous angiosperm species as hosts. Host-use is currently unknown at the Florida locations, but *X. amputatus* specimens from Alachua Co. were caught with the *Celtis* (Cannabaceae, Judd *et al.* 2008)-feeding scolytines *Chramesus chapuisi* LeConte and *Scolytus muticus* Say.

Dole and Cognato (2010) revised the world species of *Xylosandrus* Reitter and provided an identification key. *Xylosandrus amputatus* closely resembles and is phylogenetically related to *Xylosandrus mancus* (Blandford), a species native to the Afrotropics and Oriental regions. Straight rows of relatively small strial punctures on the declivity distinguish *X. amputatus* from *X. mancus*. A nearly complete carinate declivital margin (Fig. 1B) distinguishes *X. amputatus* from the other *Xylosandrus* species occurring in the US.

Acknowledgments

We thank Roger Beaver for providing the host references, P. Lammardo, C. Moncrief, B. Saunders, and M. Weiss for the collection of Florida specimens, and Katherine Okins for the CAPS record. Nick Brac and Liu Yang helped sort the bulk Florida Lindgren trap samples. The USDA-FS EDRR program funded this study (# 07-DG-11420004-182 to AIC).

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(Received 15 October 2010; accepted 17 November 2010. Publication date 18 March 2011.)