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Phylogenetic Revision of *Xylosandrus* Reitter (Coleoptera: Curculionidae: Scolytinae: Xyleborina)

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A phylogenetic revision of the xyleborine genus *Xylosandrus* Reitter based on morphological and molecular data sets is presented. The monophyly of the genus was tested using a 43 character morphological data set analyzed separately and in combination with a molecular data set comprised of five independent gene loci: 28S rDNA; the mitochondrial gene cytochrome oxidase I (COI); and the nuclear protein-coding genes arginine kinase (ArgK), CAD (rudimentary), and elongation factor 1-α (EF-1α). *Xylosandrus* was recovered as polyphyletic with the present classification containing species from four other genera: *Amasa* Lea, *Anisandrus* Ferrari, *Cnestus* Sampson, *Euwallacea* Hopkins, as well as *Xylosandrus*. A taxonomic revision of *Xylosandrus* is presented based on these results. The following new combinations are given: *Amasa cylindrotomicus* (Schedl), *A. omissus* (Schedl), *A. oralis* (Schedl), *Anisandrus butamali* (Beeson), *A. ursa* (Eggers), *A. ursinus* (Hagedorn), *A. ursulus* (Eggers), *Cnestus ater* (Eggers), *C. fijianus* (Schedl), *C. gravidus* (Blandford), *C. improcerus* (Sampson), *C. laticeps* (Wood), *C. mutilatus* (Blandford), *C. orbiculatus* (Schedl), *C. peruanus* (Wood), *C. retifer* (Wood), *C. retusus* (Eichhoff), *C. testudo* (Eggers), *Cyclorhipidion squamulatum* (Beaver and Löyttyniemi) all listed in *Xylosandrus* by Wood and Bright (1992); *Xylosandrus amputatus* (Blandford) and *X. mixtus* (Schedl) are transferred from *Amasa*, *X. russulus* (Schedel) from *Euwallacea*, and *X. rotundicollis* (Browne) from *Xyleborus* Eichhoff. Two new species of *Xylosandrus* are described: *X. borneensis* and *X. hulcri*. An illustrated key to species of *Xylosandrus* worldwide is provided.

Keywords: Biogeography, host plants, diagnosis, and images are presented for each species.

The scolytine subtribe Xyleborina contains approximately 1,300 described species and constitutes one of the largest radiations of ambrosia beetles (Wood and Bright 1992; Jordal 2002). The xyleborine mating system, which includes haplodiploidy and extreme inbreeding, is believed to be the cause of this dramatic radiation (Normark et al. 1999). Xyleborina are absent from the Dominican amber fossil record, suggesting that their radiation began in the Miocene (Bright and Poinar 1994; Jordal et al. 2000). Ambrosia beetles bore into the xylem of host trees and feed on symbiotic fungus, which grows on the walls of their galleries. This ambrosial feeding habit has evolved multiple times within the Scolytinae and also in the related weevil subfamily Platypodinae (Jordal et al. 2000; Farrell et al. 2001). Ambrosia beetles tend to be less host-specific than their bark beetle counterparts because adaptation to host secondary chemistry has not likely influenced their radiation (Beaver 1979). This lack of host specificity, along with their haplodiploidy mating system and inbreeding, make Xyleborina beetles particularly suited for the invasion of new habitats and establishment as introduced exotic species (Haack 2006; Rabaglia et al. 2006). In theory, a single female beetle could establish an invasive population of beetles. Furthermore, low host specificity means that invasive beetles do not need to locate a specific host and can infest multiple species. The economic importance of invasive xyleborines, along with their interesting biology and ecology, has prompted much research interest in the subtribe. Recently, the classification of the Xyleborina has been studied within a phylogenetic context to update their classification within an evolutionary framework (Jordal et al. 2000; Jordal 2002; Hulcr et al. 2007).

Xylosandrus Reitter (1913) is a large genus of xyleborine ambrosia beetles with a widespread distribution primarily in tropical but also in temperate regions throughout the world. In their worldwide catalog of the Scolytinae, Wood and Bright (1992) list 52 species of *Xylosandrus*. Subsequent descriptions, new synonymies, and new combinations have brought the present number to 54 species (Bright and Skidmore 1997, 2002; Saha et al. 1992; Wood 2007; Dole and Beaver 2008). Several *Xylosandrus* species cause economic losses in nursery and agricultural settings in their native and introduced ranges. In Brazil, *X. compactus* (Eichhoff) causes losses in several economically important host species, including avocado, cacao, coffee, and mango (Oliveira 2008). *Xylosandrus crassiusculus* (Motschulsky) may potentially impact native tropical fauna, as the species is present as an invasive in Costa Rican primary forests (Kirkendall and Ødegaard 2007). Five *Xylosandrus* species currently occur in North America and of these, only one is native, *X. curtulus* (Eichhoff). The other four, *X. compactus, X. germanus* (Blandford), *X. crassiusculus*, and *X. multilatus* (Blandford) have been introduced from the Old World tropics (Rabaglia 2002; Rabaglia et al. 2006). In North America, three *Xylosandrus* species (*X. compactus*, *X. crassiusculus*, and *X. germanus*) have caused "considerable economic damage" since their introductions (Oliver and Mannion 2001). It is difficult to get exact figures on the economic losses attributed to *Xylosandrus* species, since these numbers are often grouped with damage caused by other xyleborines. As an example, nursery managers in Maryland reported individual loses of \$3,650–\$8,400 in nursery stock to *Xylosandrus* species in the spring of 2008 alone (R. J. Rabaglia, pers. com.).

The current classification of *Xylosandrus* contains species with highly variable morphologies, several of which are similar to those of other xyleborine genera (Hulcr et al. 2007; Dole and Beaver 2008). Recent phylogenetic analyses of molecular data have also suggested that *Xylosandrus* is polyphyletic (Jordal 2002; Dole et al. 2010). Given the apparent taxonomic ambiguities and the economic importance of this group (Dole and Beaver 2008; Dole et al. 2010), a revised classification based on morphological and molecular evidence is needed. Furthermore, clear diagnostic characters and a key to worldwide species are necessary for the classification to be a predictive and useful tool in identification and control of invasive *Xylosandrus* species.

In this study, we define 43 morphological characters in an effort to resolve taxonomic ambiguities among *Xylosandrus* species and related genera. We conduct a combined phylogenetic analysis of these taxa using these morphological characters and molecular data in order to guide a revision of *Xylosandrus*.

Systematics

Xylosandrus was established as a monotypic genus by Reitter in 1913, with the type species *Xyleborus morigerus* Blandford. The genus remained monotypic for many years until Hoffmann (1941) transferred *Xyleborus germanus* into *Xylosandrus*. Following this, Nunberg (1959) transferred *Xyleborus compactus* into *Xylosandrus* and scolytine taxonomists began to take notice of the genus. Schedl (1963a) disagreed with the designation of the genus and listed *Xylosandrus* as a synonym of *Xyleborus* Eichhoff. Browne (1963) noted character differences that he felt justified the genus, chiefly the "broad, obtuse prosternal process separating the front coxae," and transferred 14 species from *Xyleborus* to *Xylosandrus*. Schedl (1964) agreed with Browne's assessment and transferred 8 more species from *Xyleborus* to *Xylosandrus*. Later, Schedl (1971) for the first time described two species in *Xylosandrus*, rather than transferring them from *Xyleborus*: *X. adherescens* and *X. assequens*.

In 1982, Wood began transferring species into *Xylosandrus*, chiefly from *Xyleborus*, and within a decade the genus grew to include 52 species (Wood 1982, 1984; Wood and Bright 1992). At this point in its taxonomic history, the generic limits and defining characters of *Xylosandrus* were blurred. Many species transferred to *Xylosandrus* by Wood and Bright (1992) have subcontiguous or contiguous procoxae, along with many other characters that set them apart from the species originally included in the genus. Since Wood and Bright gave no discussion of characters supporting their new combinations, it is difficult to ascertain their reasoning. Since 1992, additional species have been described in or transferred to *Xylosandrus*, only some of which fit the characters that originally defined the genus (Beaver 1998; Saha et al. 1992; Wood 2007; Dole and Beaver 2008).

The incorrect placement of many species within *Xylosandrus* has created some taxonomic confusion between *Xylosandrus* and the genera *Amasa* Lea (1893) and *Cnestus* Sampson (1911). In addition to this, the recent resurrection of the genus *Anisandrus* Ferrari (1867) has highlighted similarities between it and several species of *Xylosandrus* (Hulcr et al. 2007). In their review of the Australian species of *Xylosandrus*, Dole and Beaver (2008) made tentative steps toward correcting the taxonomy of *Xylosandrus* by defining characters that separate *Xylosandrus* (*sensu stricto*) from *Cnestus* and transferring two species, *Cnestus pseudosolidus* (Schedl) and *C. solidus* (Eichhoff), from *Xylosandrus* to *Cnestus*.

Xylosandrus sensu stricto can be distinguished from other xyleborine genera by the following combination of characters: stout body, usually about twice as long as wide, widely separated procoxae, flat scutellum that is flush with the surface of elytra, and obliquely truncate antennal club with the first segment forming a circular costa and dense pubescence on the oblique portion of the club (Reitter 1913; Browne 1963; Bright 1968; Wood 1986; Hulcr et al. 2007; Dole and Beaver 2008).

Amasa can best be distinguished from *Xylosandrus* by its antennal club, which is oval, not truncate, with prominent 1st and 2nd segments, separated by sutures that are either visible on both the anterior and posterior face or entirely covered by pubescence (Lea 1893; Wood 1986; Hulcr et al. 2007). In all *Xylosandrus*, the antennal club is obliquely truncate, with the first segment forming a circular costa, lacking sutures posteriorly and with segment 1 covering the entire posterior face. *Amasa* also have contiguous procoxae (Lea 1893; Wood 1986; Hulcr et al. 2007). In all *Xylosandrus* (*sensu stricto*), the procoxae are separated by an intercoxal piece that is at least half the width of the coxae.

Anisandrus can be distinguished from *Xylosandrus* by the contiguous procoxae (Hulcr et al. 2007). The lateral margins of the protibae of *Anisandrus* are armed with six or seven socketed teeth. In *Xylosandrus* (*sensu stricto*) there are always only four or five socketed teeth on the lateral margin of the protibiae. *Anisandrus* species also have pronotal lateral margins that are rounded, a character which separates them from *Cnestus*, which has carinate lateral margins (Hulcr et al. 2007). *Xylosandrus* (*sensu stricto*) contains species with both rounded and carinate lateral margins of the pronotum.

Cnestus can be distinguished from *Xylosandrus* by the subcontiguous procoxae (Sampson 1911; Hulcr et al. 2007). *Cnestus* also have antennae with four funicular segments, whereas *Xylosandrus* species have five. Additionally, in *Cnestus* the anterior margin of the pronotum bears

4 or fewer asperities, with a pair of coarse asperities medially, and the pronotum is often produced anteriorly. In *Xylosandrus* the anterior margin of the pronotum bears six or more smaller asperities of approximately equal size and is never produced anteriorly. Many species of *Cnestus* have elytra that are wider than they are long, a character which is never observed in *Xylosandrus sensu stricto*.

Recent taxonomic work has examined the classification of xyleborine genera within a phylogenetic context (Jordal et al. 2000; Jordal 2002; Hulcr et al. 2007; Dole et al. 2010). A cladistic review of the generic taxonomic characters of Xyleborina recovered a monophyletic *Xylosandrus*, but it is important to note that this study did not include species with morphologies that deviate from the *sensu stricto* concept of the genus (Hulcr et al. 2007). Dole and Beaver (2008) were the first to treat the classification of problematic *Xylosandrus* species by defining characters that distinguish *Xylosandrus* from *Cnestus*. Phylogenetic analyses of DNA sequence data have also recovered a non-monophyletic *Xylosandrus*. Jordal (2002) used the nuclear gene Elongation Factor -1α (EF-1 α) to test the monophyly of the Xyleborina and, while the subtribe was recovered as monophyletic, *Xylosandrus* was found to be paraphyletic with respect to *Cnestus*. Phylogenetic reconstruction of a subset of *Xylosandrus* taxa using data from mitochondrial and nuclear genes recovered a polyphyletic *Xylosandrus* with the placement of *Anisandrus* and *Cnestus* among *Xylosandrus* species (Dole et al. 2010). In addition, several *Xylosandrus* species were placed within the "*Anisandrus*" and "*Cnestus*" clades with strong support (e.g., 100% bootstrap support), further indicating the need for a taxonomic revision of *Xylosandrus*.

Biogeography

Xylosandrus is widely distributed in primarily tropical, but also in temperate regions worldwide. Whereas the inclusion of the problematic species discussed above does not change the overall distribution in terms of biogeographical regions, the biogeography discussed herein will pertain to *Xylosandrus* as it is defined in this taxonomic revision (Table 1). Three species of *Xylosandrus* have almost circumtropical distributions: *X. compactus*, *X. crassiusculus*, and *X. morigerus*. A fourth species, *Xylosandrus germanus* is less widely distributed, occurring in the Nearctic Region, Oceania, the Oriental Region, and the Palearctic Region. These four species were all introduced as exotic invasive species into temperate regions of the world. Apart from these species, *Xylosandrus* has a high level of regional endemism, with 71% of species occurring in only one biogeographical region. The Oriental Region is the most species rich, with 76% of *Xylosandrus* species present and a high occurrence of endemic species. The next richest is the Australian Region, with 29% of *Xylosandrus* species present. The Afrotropical Region and Oceania each contain 13%, and the Palearctic Region contains 16% of *Xylosandrus* species. Contrary to its tendency towards remarkable levels of scolytine species diversity, the Neotropical Region contains the same number of *Xylosandrus* species as the Nearctic (where the vast majority of species are introduced). This is congruent with the biogeography of the rest of Xyleborina, which tend to have their highest levels of diversity in the Old World Tropics (Beaver 1979; Wood and Bright 1992).

Natural History

As is typical of ambrosial feeding scolytines, *Xylosandrus* beetles are usually not host specific (Beaver 1979). Known host plants are listed for each species herein. All xyleborine beetles are haplodiploid, inbreeding and sexually dimorphic (Figs. 33 and 34). The haploid males are dwarfed, flightless and bear little resemblance to their female counterparts. All *Xylosandrus* species are xylomycetophagous. The female carries ambrosial fungi within a mycangium between the pronotum and mesonotum. Colonization of a host tree begins when a female beetle locates a suitable host and initiates gallery construction. As she bores into the tree, the female inoculates the woody tissue lining the gallery tunnels with a suite of microorganisms, including the ambrosial fungi. Once the fungi have begun to grow along the walls of the gallery, the female beetle lays eggs in small clusters at the end of the main tunnel. *Xylosandrus* larvae and adults feed exclusively on the ambrosial fungi. If the establishing female was unmated, she will produce only male offspring. In this case, as soon as they have pupated into adults, the flightless and dwarfed males (Fig. 34) may mate with their mother to produce female offspring. If the establishing female had mated prior to gallery construction, she will produce both male and female offspring, but with a highly skewed sex ratio (Kirkendall 1993). In Xyleborina beetles, the female to male sex ratio has been observed to be as high as 30:1 (Bright 1968; Kirkendall 1993). When both male and female offspring have been produced, the males will mate with their sisters to produce the next generation of beetles (Kirkendall 1993).

TABLE 1: Biogeographic distribution of *Xylosandrus* species: ● = present; ▲ = present as introduced species.

Species	Afrotropical Region	Australian Region	Nearctic Region	Neotropical Region	Oceania	Oriental Region	Palearctic Region
X. abruptulus		●					
X. adherescens						●	
X. amputatus n. comb.						●	
X. arquatus						●	
X. assequens						●	
X. beesoni						●	
X. borealis						●	●
X. boreensis n. sp.						●	
X. brevis						●	●
X. compactus	●		▲	▲	●	●	
X. corthyloides						●	
X. crassiusculus	●	●	▲	▲	●	●	▲
X. curtulus			●	●			
X. derupteterminatus						●	
X. deruptulus						●	
X. discolor		●			●	●	
X. diversepilosus						●	
X. eupatorii						●	
X. ferinus						●	
X. germanus			▲		●	●	▲
X. hirsutipennis	●						
X. hulcri n. sp.		●					
X. jaintianus						●	●
X. mancus	●					●	
X. mediocris						●	
X. mesuae		●				●	
X. metagermanus						●	
X. mixtus n. comb.		●					
X. monteithi		●					
X. morigerus	●	●		▲	●	●	▲
X. nanus					●		
X. pusillus						●	
X. pygmeaus						●	
X. queenslandi		●					
X. rotundicollis n. comb.		●					
X. russulus n. comb.		●					
X. subsimiliformis						●	
X. subsimilis						●	
X. terminatus						●	
X. woodi		●					

Materials and Methods

Approximately 1,300 specimens were studied from entomological collections. The following acronyms are used for collections referenced in the text:

AMNH American Museum of Natural History, New York, New York, USA.
BMNH The Natural History Museum, London, United Kingdom.
BPBM Bernice P. Bishop Museum, Honolulu, Hawaii, USA.
CAS California Academy of Sciences, San Francisco, California, USA.
CSCA California State Collection of Arthropods, Sacramento, California, USA.
FICB Forest Research Centre, Lae, Papua New Guinea.
FMNH Field Museum of Natural History, Chicago, Illinois, USA.
FRCS Forest Research Centre, Sabah, Sandakan, Malaysia.
FRI Indian Forest Research Institute, Dehra Dun, Uttar Pradesh, India.
IRSNB Institut Royal des Sciences Naturelles de Belgique, Belgium, Brussels.
IZM Institute of Zoology, Moscow, Russia.
MNB Museum fur Naturkunde der Humbolt University, Berlin, Germany.
MRCB Musee Royal de l'Afrique Centrale, Tervuren, Belgium.
MSUC Michigan State University Collection, East Lansing, Michigan, USA.
MTD Museum für Tierkunde, Dresden, Germany.
MZLU Lund University, Lund, Sweden.
MZUSP Museum de Zoologia, Universidade de Sao Paulo, Sao Paulo, Brazil.
NHMW Naturhistorisches Museum Wien, Wien, Austria.
NHR Naturhistorisk Riksmuseet, Stockholm, Sweden.
NZSI Zoological Survey of India, National Zoological Collection, Calcutta, India.
RAB Roger A. Beaver, personal collection, Chiang Mai, Thailand.
UCDC R.M. Bohart Museum of Entomology, University of California, Davis, California, USA.
USNM National Museum of Natural History, Washington, D.C., USA (Including Stephen L. Wood Collection).
ZFMK Zoologische Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany.
ZMAN Universiteit van Amsterdam, Instituut voor Taxonomische Zoologie, Zoologisch Museum, Amsterdam, Netherlands.

Specimen label data are given verbatim. The biogeographical regions used in the species distributions are based on Wallace's maps with the following modifications: The Philippines are listed as part of the Oriental Region, instead of the Australian Region; the southern limit of the Palearctic Region in Africa is delimited by the Sahara Desert, instead of the Tropic of Cancer; and the entire Arabian Peninsula is listed as part of the Palearctic. Plant host species were compiled from the following publications: Bright and Skidmore (1997, 2002), Cibrián et al. (1995), Ohno (1990), Schedl (1963a), Wood and Bright (1992). Hosts recorded since the publication of Bright and Skidmore (2002) were collected from the literature by the authors and provided by Dr. Don Bright (pers. com.). Plant author names, when missing, were added using the International Plant Names Index (www.ipni.org).

Morphological Characters

A total of 43 external morphological characters (24 binary, 19 multistate) was coded and used in the phylogenetic analysis. Morphological characters were scored for females only, since the morphological classification of Xyleborina beetles is based entirely on females and males are rare or unknown for many species. Characters were scored for the 52 species of *Xylosandrus* sensu Wood and Bright (1992) (Appendix 1). In order to test the generic limits of *Xylosandrus*, a diversity of taxa were included in the morphological analysis: three *Anisandrus*, nine *Amasa*, three

Cnestus, one *Coccotrypes* and three *Xyleborus* species (Appendix 1). Characters coded were distributed as follows: two habitus characters (5 states), five head characters (14 states), 14 pronotal characters (35 states), two elytral characters (5 states), and 20 elytral declivity characters (51 states). Characters that were ambiguous or difficult to see on the specimen(s) examined were coded as "?" and treated as missing data. Inapplicable characters were coded as "?" and treated as missing data. All characters were treated as non-additive and unweighted in the phylogenetic analysis.

The following morphological characters and character states were used in the phylogenetic analysis. The character data matrix (Appendix 1) was prepared and coded using the program MX (Yoder et al. 2006-Present).

Habitus

1. *Body ratio*
   - 0 = less than 2.0 times longer than wide
   - 1 = more than 2.0 times longer than wide
2. *Pronotal to elytra color*
   - 0 = roughly the same color
   - 1 = elytra distinctly darker than pronotum
   - 2 = overall, same color, but elytra with testaceous patches

Head

3. *Frons sculpture*
   - 0 = punctate
   - 1 = finely granulate
   - 2 = reticulate or rugose
   - ? = ambiguous or difficult to see
4. *Frons median keel*
   - 0 = absent
   - 1 = present
   - ? = ambiguous or difficult to see
5. *Antennal funicular segment count*
   - 0 = 4-segmented
   - 1 = 5-segmented
   - 2 = 6-segmented
   - ? = ambiguous or difficult to see
6. *Antennal club type*
   - 0 = anntenal club without first segment forming a circular costa
   - 1 = anntenal club with first segment forming a circular costa that is closed anteriad
   - 2 = anntenal club with first segment forming a circular costa that is closed posteriad
   - ? = ambiguous or difficult to see
7. *Segments visible on posterior face of antennal club*
   - 0 = segments 2 and 3 not visible, segment 1 covering whole face
   - 1 = segment 2 visible, segment 1 covering most of face
   - 2 = segments 1, 2, and 3 visible on face
   - ? = ambiguous or difficult to see

Pronotum

8. *Pronotum ratio*
   - 0 = ratio of pronotal length to width ≤ 0.9
   - 1 = ratio of pronotal length to width = 1.0
   - 2 = ratio of pronotal length to width ≥ 1.1
9. *Pronotal type dorsal*
   - 0 = rounded (type 1, Hulcr et al. 2007)
   - 1 = basic (type 2, Hulcr et al. 2007)

10. *Pronotal type laterally*
    0 = basic (type 0, Hulcr et al. 2007)
    1 = rounded (type 1, Hulcr et al. 2007)
    2 = prolonged anteriorly (type 9, Hulcr et al. 2007)
    3 = prolonged posteriorly (type 8, Hulcr et al. 2007)
11. *Pronotal vestiture*
    0 = erect, hair-like setae
    1 = semi-appressed, hair-like setae
12. *Pronotal basal setae*
    0 = glabrous, without setae (except for mycangium, when present)
    1 = moderately setose, with basal setae being less dense than anterior
    2 = densely setose, with basal setae being at least as dense as anterior
13. *Pronotal mycangial setae*
    0 = absent
    1 = present
    ? = ambiguous
14. *Pronotal basal sculpture*
    0 = punctate
    1 = asperate-granulate
15. *Pronotal basal sculpture density*
    0 = moderate sculpture, punctures or granules separated by a distance greater than their size
    1 = dense sculpture, punctures or granules separted by a distance equal to or less than their size
16. *Pronotal anterior serrations count*
    0 = 4 or fewer serrations
    1 = 6 or more serrations
17. *Coarse median pair of serrations on anterior pronotum*
    0 = absent
    1 = present
    ? = only two anterior serrations present
18. *Pronotal anterior margin produced*
    0 = not produced
    1 = produced
19. *Pronotal lateral carina*
    0 = absent
    1 = present
20. *Procoxal separation*
    0 = widely separated, intercoxal piece at least ⅓ the width of coxae
    1 = narrowly separated to subcontiguous
    2 = contiguous
    ? = procoxae not visible
21. *Protibial teeth*
    0 = 4 or 5 socketed teeth
    1 = 6 socketed teeth
    2 = 7 socketed teeth
    3 = 8 socketed teeth
    ? = ambiguous or difficult to see

Elytra

22. *Elytral ratio*
    0 = ratio of elytral length to width ≥ 1.1
    1 = ratio of elytral length to width = 1.0
    2 = ratio of elytral length to width ≤ 0.9

23. *Discal interstrial sculpture distribution*
 0 = uniseriate
 1 = multiseriate, including biseriate

Elytral Declivity
24. *Declivital origin*
 0 = declivity originating less than ⅓ the length of elytra from base
 1 = declivity originating ≥ ½ the length of elytra from base
25. *Decilivital slope*
 0 = elytral disc gradually curving into declivity
 1 = declivital face abrupt and steeply separated from disc
26. *Declivital shape*
 0 = not circular: oval or oblong
 1 = circular
27. *Declivital surface*
 0 = convex
 1= flattened
 2 = concave, at least in part
28. *Posterolateral declivital margin*
 0 = absent, rounded
 1 = granulate
 2 = carinate
 3 = serrate
29. *Declivital carina length*
 0 = carina not extending beyond 7th interstriae
 1 = carina extending beyond 7th interstriae, forming a circumdeclivital ring
 ? = absent
30. *Declivital striae count*
 0 = 2 striae visible on declivity
 1 = 3 striae visible on declivity
 2 = 4 striae visible on declivity
 3 = 5 striae visible on declivity
 4 = 6 striae visible on declivity
 ? = ambiguous
31. *Declivital strial impression*
 0 = not impressed
 1 = impressed
32. *Declivital strial sculpture*
 0 = punctate
 1 = granulate
33. *Declivital strial sculpture distribution*
 0 = seriate
 1 = confused
34. *Declivital strial setae type*
 0 = absent
 1 = hair-like
 2 = scale-like
 ? = ambiguous
35. *Declivital strial setae length*
 0 = length less than or equal to the width of second declivital interstriae
 1 = length greater than the width of second declivital interstriae
 2 = length at least 2 times the width of second declivital interstriae

? = absent or ambiguous

36. *Declivital strial setae profile*
    0 = appressed or semi-appressed
    1 = erect
    ? = absent or ambiguous
37. *Declivital interstrial sculpture*
    0 = punctate
    1 = coarsely granulate
    2 = finely granulate
38. *Declivital interstrial sculpture distribution*
    0 = uniseriate
    1 = multiseriate, including biseriate
39. *Declivital interstrial setae type*
    0 = absent
    1 = hair-like
    2 = scale-like
    ? = ambiguous
40. *Declivital interstrial setae length*
    0 = length less than or equal to the width of second declivital interstriae
    1 = length greater than the width of second declivital interstriae
    2 = Length at least twice the width of second declivital interstriae
    ? = absent or ambiguous
41. *Declivital interstrial setae profile*
    0 = appressed or semi-appressed
    1 = erect
    ? = absent, ambiguous
42. *First interstriae elevated at apex of elytra*
    0 = not elevated
    1 = elevated
43. *Granules or tubercles near apex of first interstriae*
    0 = absent
    1 = present

Molecular Characters

The molecular data set used herein (Dole et al. 2010) is comprised of multiple gene loci, chosen for their complementary phylogenetic signals at varying nodal depths: 28S rDNA; the mitochondrial gene cytochrome oxidase I (COI); and the nuclear protein-coding genes argenine kinase (ArgK), CAD (rudimentary), and Elongation Factor -1α (EF-1α). For extraction, sequencing and alignment protocols see Dole et al. (in review). For our combined analysis, we used the molecular data set aligned manually with reference to a scolytine-specific secondary structure model (Jordal et al. 2008). The resulting combined data set included only taxa for which both morphological and molecular data were available (Table 3). This combined data set includes 27 taxa, representing 15 *Xylosandrus* species, 12 species belonging to the genera *Amasa*, *Anisandrus*, *Cnestus*, *Xyleborus*, and the oustgroup genus *Coccotrypes* (Table 3).

Phylogenetic Analysis

Phylogenetic analysis of the morphological data set was conducted with the software TNT (Goloboff et al. 2003). A new technology driven search was employed for the parsimony analysis with all search modules employed: sectorial search (RSS and CSS), ratchet, drift, and tree fusing.

Default TNT setting were used, with the following exceptions: tree fusion was conducted globally after every hit and the search was set to end after the minimal tree length was found 10 times. Traditional (heuristic) search methods were then used to conduct tree bisection and reconnection branch swapping on the 51 most parsimonious trees found in the new technology search. Maximum trees being held by TNT was set to 10,000. Bootstrap support values were calculated by performing 1,000 pseudo-replicates with simple sequence addition in the program Winclada (Nixon 1999).

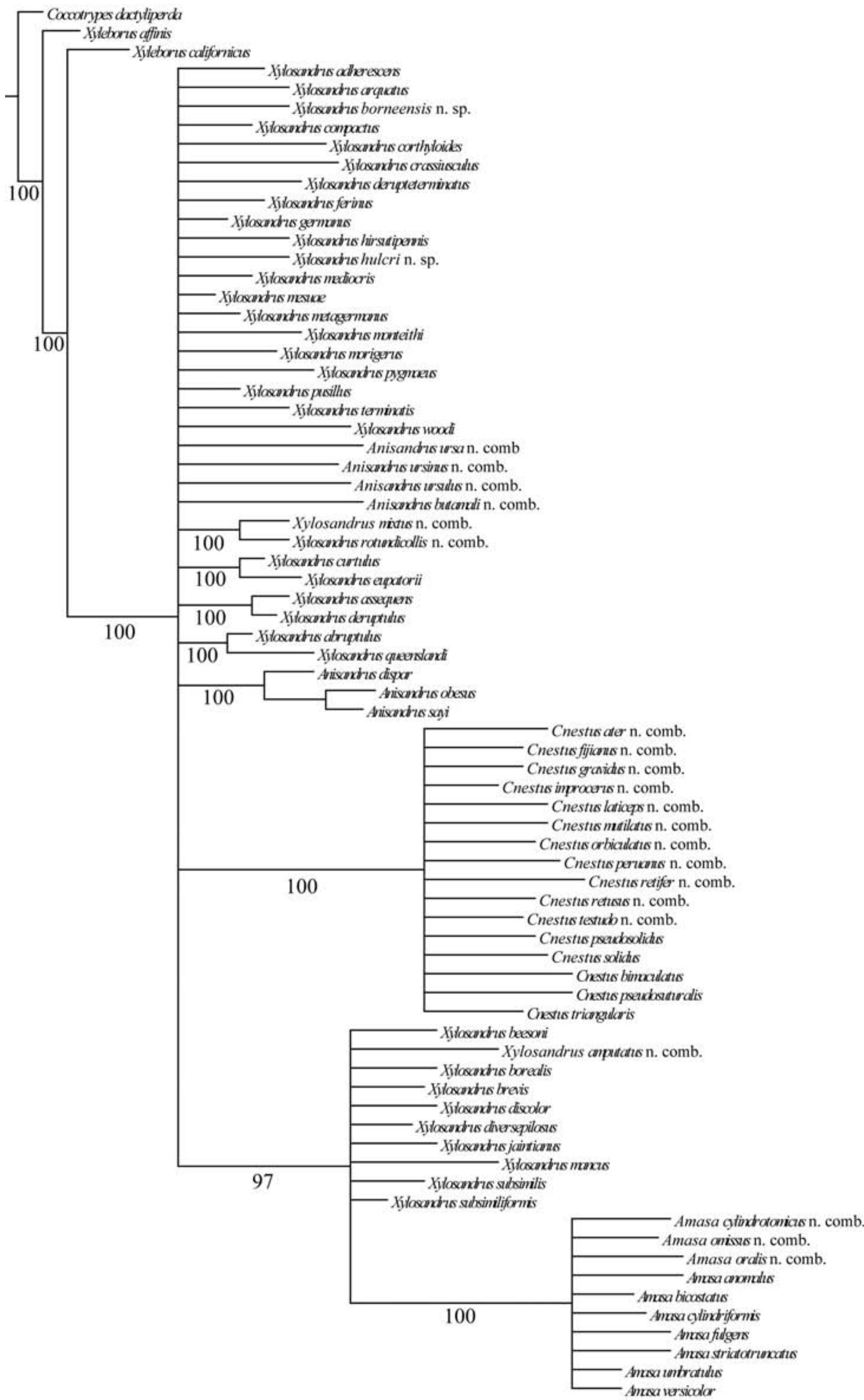
Phylogenetic analysis of the combined data set was conducted with the software PAUP* (Swofford 2002). A heuristic search was employed with 300 random stepwise addition replicates using PAUP* default settings. Gaps were treated as missing data in the analysis. Bootstrap values were calculated by performing 1,000 pseudo-replicates with simple addition sequence in PAUP*. Bremer support values for each data partition were calculated by constructing a constraint tree with the software TreeRot (Sorensen 1996) followed by subsequent analysis with PAUP*.

Results

Xylosandrus was recovered as polyphyletic by analyses of both the morphological and the combined data set. Phylogenetic analysis of the morphological data set produced 10,000+ equally parsimonious trees of 306 steps (max trees in TNT set to 10,000) (Fig 1). The strict consensus tree was mostly unresolved, but recovered several clades with high support values. The monophyly of the clade containing *Amasa*, *Anisandrus*, *Cnestus*, and *Xylosandrus* with respect to the genus *Xyleborus* was recovered with 100% bootstrap support. The unresolved placement of the "*Amasa*", *Anisandrus*, and "*Cnestus*" clades, as well as the placement of several species of *Xylosandrus* within these clades, was responsible for rendering *Xylosandrus* paraphyletic. While morphology did not resolve their phylogenetic placement, the data did support the monophyly of the "*Amasa*" and "*Cnestus*" clades and the inclusion of several *Xylosandrus* species within them. These clades were both recovered with 100% bootstrap support. *Anisandrus* was recovered as monophyletic with 100% bootstrap support. The Consistency Index (CI) indicates that the occurrence of homoplasy is high in the morphological data set (CI = 0.190). Furthermore, the Retention Index (RI) indicates that character state changes are occurring predominantly on the internal nodes (RI = 0.671).

Phylogenetic analysis of the combined data set recovered a single most parsimonious tree of 4524 steps (Fig. 2). This tree was well resolved, with high support values (e.g. ≥ 90% boostrap support) toward the terminal nodes and poorer support (e.g. ≤ 74 % bootstrap support) for the deeper relationships among the clades. The placement of the "*Anisandrus*", and "*Cnestus*" clades, the inclusion of several *Xylosandrus* species within these clades, as well as the placement of *Xylosandrus mancus* and *X. discolor* in a clade with *Amasa* and *Xyleborus*, rendered *Xylosandrus* polyphyletic. The low support for deeper nodes made it impossible to determine the phylogenetic relationships among *Xylosandrus*, *Amasa*, *Anisandrus*, *Cnestus*, and *Xyleborus*. However, the placement of several species of *Xylosandrus* within the "*Anisandrus*" and "*Cnestus*" clades had very strong support (e.g., 100% bootstrap support). The genus *Amasa* and a *Xylosandrus sensu stricto* clade (containing the type species *X. morigerus*) were also recovered with 100% bootstrap support.

Homoplasy as measured by CI and RI indicated that homoplasy was lowest for the 28S data partition (Table 2). The nuclear protein-coding genes ArgK, CAD, and EF-1α had similar CI's (0.474–0.522) and RI's (0.460–0.600). The mitochondrial gene COI had the highest level of homoplasy (CI = 0.265, RI = 0.246). The low RI value for COI indicates that the character state changes for this gene largely occurred towards the terminal nodes of the tree. The morphological data demonstrated lower levels of homoplasy in the combined analysis (CI = 0.346) than it did when analyzed alone (CI = 0.200). However, the RI observed for the morphological data was lower in


Cocotrypes dactyliperda
Xyleborus affinis
Xyleborus californicus
Xylosandrus adherescens
Xylosandrus arquatus
Xylosandrus borneensis n. sp.
Xylosandrus compactus
Xylosandrus corthyloides
Xylosandrus crassiusculus
Xylosandrus derupteterminatus
Xylosandrus ferinus
Xylosandrus germanus
Xylosandrus hirsutipennis
Xylosandrus hulcri n. sp.
Xylosandrus mediocris
Xylosandrus mesuae
Xylosandrus metagermanus
Xylosandrus monteithi
Xylosandrus morigerus
Xylosandrus pygmaeus
Xylosandrus pusillus
Xylosandrus terminatis
Xylosandrus woodi
Anisandrus ursa n. comb
Anisandrus ursinus n. comb.
Anisandrus ursulus n. comb.
Anisandrus butamali n. comb.
Xylosandrus mixtus n. comb.
Xylosandrus rotundicollis n. comb.
Xylosandrus curtulus
Xylosandrus eupatorii
Xylosandrus assequens
Xylosandrus deruptulus
Xylosandrus abruptulus
Xylosandrus queenslandi
Anisandrus dispar
Anisandrus obesus
Anisandrus sayi
Cnestus ater n. comb.
Cnestus fijianus n. comb.
Cnestus gravidus n. comb.
Cnestus improcerus n. comb.
Cnestus laticeps n. comb.
Cnestus mutilatus n. comb.
Cnestus orbiculatus n. comb.
Cnestus peruanus n. comb.
Cnestus retifer n. comb.
Cnestus retusus n. comb.
Cnestus testudo n. comb.
Cnestus pseudosolidus
Cnestus solidus
Cnestus bimaculatus
Cnestus pseudosuturalis
Cnestus triangularis
Xylosandrus beesoni
Xylosandrus amputatus n. comb.
Xylosandrus borealis
Xylosandrus brevis
Xylosandrus discolor
Xylosandrus diversepilosus
Xylosandrus jaintianus
Xylosandrus mancus
Xylosandrus subsimilis
Xylosandrus subsimiliformis
Amasa cylindrotomicus n. comb.
Amasa omissus n. comb.
Amasa oralis n. comb.
Amasa anomalus
Amasa bicostatus
Amasa cylindriformis
Amasa fulgens
Amasa striatotruncatus
Amasa umbratulus
Amasa versicolor
100
100
100
100
100
100
100
100
100
97
100

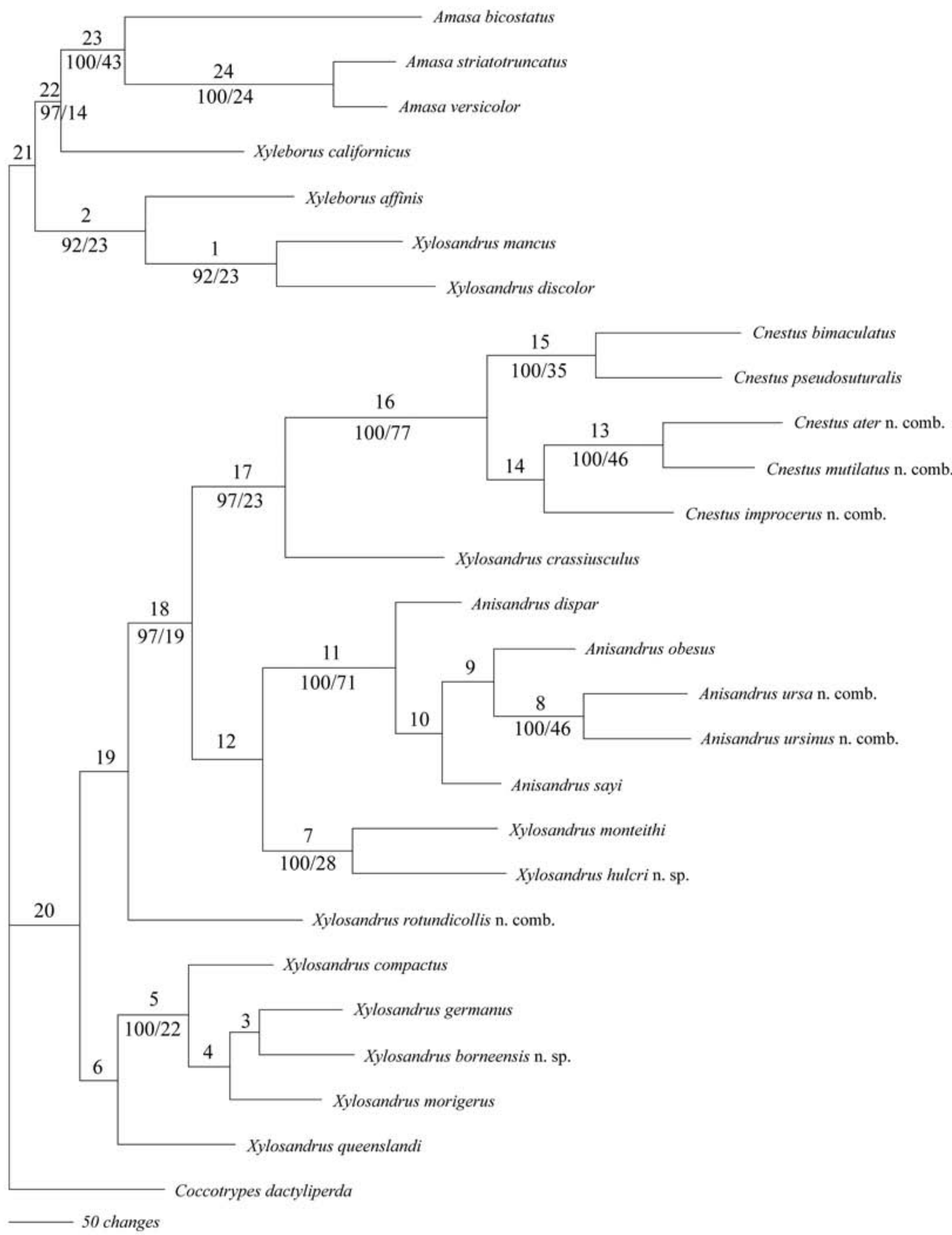


FIGURE 1 (left). Strict consensus of 10,000 most parsimonious trees found in parsimony analysis of the morphological data martrix. Bootstrap values are given below the nodes for clades with support ≥ 90%.

FIGURE 2 (above). Most parsimonious tree found in the analysis of the combined data matrix. Node numbers given above branches and bootstrap support/Bremer support values given below.

TABLE 2: Contribution of data partitions to the data matrix and to the resolution of the most parsimonious tree found in the analysis of the combined data set.

	Matrix Size	Variable Sites	Informative Sites	Gaps	Contribution to Tree Length	Consistency Index (CI)	Retention Index (RI)	Mean Branch Length
EF-1α	555	151	102	N/A	371	0.493	0.46	7.98
COI	585	247	219	N/A	1549	0.265	0.246	31.39
ArgK	594	195	153	N/A	529	0.522	0.6	11.04
CAD	714	226	172	N/A	607	0.474	0.527	12.72
28S	1048	463	335	473	1283	0.631	0.759	26.29
Morphology	43	43	40	N/A	185	0.346	0.492	3.94
Combined	3539	1325	1021	473	4524	0.449	0.536	93.37

the combined analysis (RI = 0.492), indicating that the occurrence of character state changes shifted more toward the terminal nodes when the data were combined with molecular data. Overall, 28S gave the highest Bremer support values, with CAD having the next highest values (Table 3). Interestingly, the overall Bremer support values for COI and morphology were similar.

DISCUSSION

All analyses conducted herein recovered a polyphyletic *Xylosandrus*, with the present classification of the genus containing species from at least five different genera: *Xylosandrus*, *Amasa*, *Anisandrus*, *Cnestus*, and *Euwallacea*. These findings are consistent with those of other studies of *Xylosandrus* (Jordal 2002; Dole and Beaver 2008; Dole et al. 2010). Separate and combined analyses of morphological and molecular data sets have recovered the following clades with high support values: "*Anisandrus*", "*Amasa*", "*Cnestus*" and "*Xylosandrus sensu sticto*" (Dole et al. 2010). However, even a data set combining morphology and five gene partitions was not sufficient to resolve the relationships among these genera (Fig. 2). Despite this, these trees provide a valuable framework with which to revise the present classification of *Xylosandrus*.

Amasa Clade

The "*Amasa*" clade has been consistently recovered by all parsimony analyses (Bayesian and POY analyses of molecular data recovered an unresolved or polyphyletic *Amasa*, with respect to *Xyleborus*) (Dole et al. 2010) (Figs. 1 and 2). The genus is rendered monophyletic by the inclusion of three *Xylosandrus* species: *X. cylindrotomicus*, *X. omissus*, and *X. oralis* (Fig. 1). The placement of these species within *Amasa* is supported by morphological characters (Fig. 3). Similarly, the species *A. mixtus* and *A. amputatus* were included among *Xylosandrus* species, rather than *Amasa*, by the analysis of the morphological data set. The transfer of these species into *Xylosandrus* is consistent with the characters defining *Xylosandrus sensu stricto*. The combined phylogenetic analyses have indicated that *Amasa* is more closely related to *Xyleborus* than it is to *Anisandrus*, *Cnestus*, and *Xylosandrus*. Thus, it appears that confusion between *Xylosandrus* and *Amasa* was simply the result of taxonomic error and not an indication of close phylogenetic relationship.

TABLE 3: Partition branch support for the most parsimonious tree found by the analysis of the combined data set. Node numbers refer to Figure 2.

	Gene Partition						
	Ef-1α	**COI**	**ArgK**	**CAD**	**28S**	**Morphology**	**Combined**
node							
1	3.00	2.00	5.00	8.00	0.00	5.00	23
2	3.00	2.00	5.00	8.00	0.00	5.00	23
3	1.00	4.00	2.00	0.00	1.00	-1.00	7
4	0.00	-2.00	2.00	4.00	-2.00	0.00	2
5	8.00	-1.50	7.50	11.00	-1.00	-2.00	22.00
6	3.00	0.00	-1.00	0.00	4.00	0.00	6.00
7	2.00	0.00	-4.00	-2.00	36.00	-4.00	28.00
8	0.00	5.00	0.00	11.00	25.00	5.00	46.00
9	0.00	2.00	-3.00	-4.00	15.00	-4.00	6.00
10	0.00	2.00	-3.00	-4.00	15.00	-4.00	6.00
11	5.00	6.00	2.00	-1.00	63.00	-4.00	71.00
12	2.00	-1.00	-1.00	-1.00	2.00	0.00	1.00
13	5.00	0.00	15.00	10.00	11.00	5.00	46.00
14	3.00	-2.00	1.00	-2.00	2.00	1.00	3.00
15	0.00	1.00	10.00	15.00	8.00	1.00	35.00
16	13.00	5.67	29.67	13.33	8.33	7.00	77.00
17	3.00	2.00	5.00	8.00	0.00	5.00	23.00
18	-1.00	-3.00	-3.00	0.00	26.00	0.00	19.00
19	2.00	0.00	1.00	0.00	5.00	1.00	9.00
20	0.00	-0.50	4.00	5.00	2.00	2.50	13.00
21	2.00	-2.00	-1.00	2.00	5.00	0.00	6.00
22	3.00	-2.00	0.00	10.00	3.00	0.00	14.00
23	8.50	2.50	-0.50	18.50	3.00	11.00	43.00
24	0.00	11.00	7.00	7.00	2.00	-3.00	24.00
Total	**65.50**	**31.17**	**79.67**	**116.83**	**233.33**	**26.50**	**442.00**

Anisandrus Clade

The “*Anisandrus*” clade has been recovered by all analyses that included molecular data (Dole et al. 2010) (Fig. 2). The only analysis that did not recover this clade was that of morphological data alone (Fig. 1). However, the membership of species included in this clade is consistent with characters that support the separation of *Anisandrus* from other Xyleborina genera (Hulcr et al. 2007) (Fig. 4). All other analyses recovered the “*Anisandrus*” clade with high support (100% boostrap support, Bayesian posterior probability of 100, and Bremer supports ranging from 22-67) (Dole et al. 2010) (Fig. 2; Table 3). The genus *Anisandrus* is rendered monophyletic by the inclusion of three *Xylosandrus* species: *X. ursa*, *X. ursinus*, *X. ursulus*. Transfer of these species to *Anisandrus* is also supported by the morphological characters that distinguish the genus (Hulcr et al. 2007). *Xylosandrus butamali* is a fourth species with the morphological characteristics of *Anisandrus* rather than those of *Xylosandrus*. This species was not available for DNA sequencing and was only included in the morphological analysis. This analysis placed *X. butamali* in a larger clade with the “*Anisandrus*” and “*Cnestus*” clades with 93% bootstrap support, but the relationships within this clade were unresolved in the strict consensus tree. Based on this phylogenetic evidence, in combination with the morphological characters that distinguish *Anisandrus*, we transfer *X. butamali* to *Anisandrus*.

Cnestus Clade

The "*Cnestus*" clade has been recovered by all phylogenetic analyses (Dole et al. 2010) (Figs. 1 and 2). The genus is rendered monophyletic by the inclusion of 11 *Xylosandrus* species: *X. ater*, *X. fijianus*, *X. gravidus*, *X. improcerus*, *X. laticeps*, *X. mutilatus*, *X. orbiculatus*, *X. peruanus*, *X. retifer*, *X. retusus*, and *X. testudo*. These are in addition to two species already transferred from *Xylosandrus* to *Cnestus* by Dole and Beaver (2008): *X. pseudosolidus* and *X. solidus*. The inclusion of these species in *Cnestus* is also supported by morphological characters used to distinguish the genus (Hulcr et al. 2007; Dole and Beaver 2008) (Fig. 5). Support values for the "*Cnestus*" clade were very high (100% bootstrap support, Bayesian posterior probability of 100, and Bremer supports ranging from 53-120).

The transfer of the above species from *Xylosandrus* to *Cnestus* is of some importance to scolytine control, considering the establishment of *X. mutilatus* as an invasive species in North America. The inclusion of *X. mutilatus* in *Cnestus* constitutes a new generic record for North America (Rabaglia et al. 2006). Likewise, the transfer of several South American species (*X. laticeps*, *X. peruanus*, *X. retifer*, *X. retusus*) to *Cnestus* establishes, for the first time, the presence of the genus in the Neotropics (Wood 2007).

Xylosandrus (*sensu stricto*) Clade

The "*Xylosandrus sensu stricto*" clade was consistently recovered by all analyses that included molecular data (Dole et al. 2010) (Fig. 2). The analysis of morphological data did not recover this clade, but the resolution for all *Xylosandrus* species not placed in clades with other genera was poor (Fig. 1). The "*Xylosandrus sensu stricto*" clade is comprised of (((*X. germanus* + *X. borneensis* n. sp.) *X. morigerus*) *X. compactus*). Given that it contains *X. morigerus*, the type species of *Xylosandrus*, this clade is the highest supported grouping of species belonging to *Xylosandrus* (*sensu stricto*) found by phylogenetic analyses of the genus. Support values for this clade were very high (100% bootstrap support, Bayesian posterior probabilities of 100, Bremer supports ranging from 21-28). The species included in this clade are morphologically consistent with the strict definition of the genus. This clade also contains three economically important species of *Xylosandrus*: *X. compactus*, *X. germanus*, and *X. morigerus*.

Xylosandrus (*sensu lato*)

The phylogenetic placement of the remaining *Xylosandrus* species was largely unresolved by these analyses. However, two clades were recovered by the combined data analysis with high support (≥ 92 % bootstrap support): *X. hulcri* n. sp. + *X. moteithi* and *X. discolor* + *X. mancus* (Fig. 2). The placement of a few species calls into question the monophyly of *Xylosandrus*, even after this revision. The placement of *X. crassiusculus* as sister to *Cnestus*, which has been recovered by multiple analyses with high support (≥ 97 % bootstrap support, Bayesian posterior probabilities of 100), would render the genus paraphyletic (Dole et al. 2010) (Fig. 2). Because of the wide distribution and economic importance of the species any taxonomic changes to *X. crassiusculus* should be made with strong phylogenetic support. A study of the species' relationship to other Xyleborina genera not considered in this analysis should be made before it is hastily established as a monotypic genus. Furthermore, *Xylosandrus crassiusculus* forms a morphologically distinct group with *X. hirsutipennis* and any analysis of its phylogenetic placement should consider this species as well. A phylogenetic study of Xyleborina genera is presently being completed and may shed more light on this taxonomic issue (Cognato et al., in prep.).

Several *Xylosandrus* species groups may require further consideration as the phylogenetics of Xyleborina genera is resolved. The species *X. amputatus, X. beesoni*, *X. borealis*, *X. brevis*, *X. discolor*, *X. diversepilosus*, *X. jaintianus*, *X. mancus*, *X. squamulatus*, *X. subsimilis*, and *X. subsimiliformis* all form a distinct morphological group with declivital faces that are steep and abruptly separated from the elytral disc. This grouping was recovered in a clade with *Amasa* by the analysis of morphological data with 97% bootstrap support. Phylogenetic analysis of the combined data set recovered a subset of these species (*X. discolor* + *X. mancus*) as more closely related to *Xyleborus affinis* (92% bootstrap support) and to a clade containing *Amasa* + *Xyleborus californicus* (64 % bootstrap support) than to *Xylosandrus*. Within this species group, *X. amputatus*, *X. mancus*, and *X. squamulatus* form perhaps the most distinct group of *Xylosandrus* species. These three species have lateral declivital margins with a carina or a raised rim of granules that extends beyond the 7th declivital interstriae, forming a circumdeclivital ring, a character often observed in *Amasa*. However, these species have *Xylosandrus*-type antennae and pronotal-mesonotal mycangia, two characters that are never observed in *Amasa*. Future work on the phylogenetics of *Xylosandrus* and the generic classification of Xyleborina should address these issues with more thorough taxon sampling and the expansion of DNA data sets.

Key to the Females of the Species of *Xylosandrus*

1 Margin of elytral declivity carinate or with a raised rim of granules 2
Margin of elytral declivity rounded, tuberculate, or serrate but without a continuous carina or rim 32

2 Margin of elytral declivity carinate to 7th interstriae 3
Margin of elytral declivity with carina extending beyond 7 th interstriae, forming a circum declivital ring 38

3 (2) Declivital face of elytra steep and abruptly separated from disc. 4
Elytral disc gradually curving into declivity 16

4 (3) Declivital striae punctate. Five or six striae visible on declivity. 5
Declivital striae granulate. Four or five striae visible on declivity 9

5 (4) Declivital striae impressed 6
Declivital striae not impressed. 7

6 (5) Elytral declivity with deeply impressed striae, giving the appearance of six distinct ridges on face. Six striae visible on declivity. Declivital striae with very appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae very finely granulate, giving the declivity a matte appearance, with erect, hair-like setae, shorter than the width of second declivital interstriae. Pronotum with a lateral costa, but not carinate. 1.5–1.6 mm long. Oriental Region . . . . ***X. borneensis* sp. nov.** (Fig. 12)
Elytral declivity with striae less impressed. Five striae visible on declivity. Declivital striae with erect or semi-erect, hair-like setae, longer than the width of second declivital interstriae. Interstiae more coarsely granulate, declivity shining. Pronotum with a lateral costa and carina. 1.3–1.5 mm long. Oriental Region. . . . . ***X. pygmaeus* (Eggers)** (Fig. 38)

7 (5) Elytral declivity flattened. Five striae visible on declivity 8
Elytral declivity convex. Six striae visible on declivity. Declivital striae with setae. Interstriae

uniseriate punctate, with erect, hair-like setae, longer than twice the width of second declivital interstriae. 1.2–1.8 mm long. Afrotropical Region, Australian Region, Neotropical Region, Oceania, Oriental Region, Palearctic Region . . . . ***X. morigerus*** **(Blandford)** (Fig. 35)

8 (7) Interstriae uniseriate granulate, with erect, hair-like setae, less than the width of second declivital interstriae. Larger species, 2.0–2.3 mm long. Oriental Region. . . . . ***X. derupteterminatus*** **(Schedl)** (Fig. 18)

Interstriae uniseriate punctate, with erect, hair-like setae, longer than the width of second declivital interstriae. Smaller species, 1.5–1.9 mm long. Oriental Region . . . . ***X. terminatus*** **(Eggers)** (Fig. 43)

9 (4) Declivity covered with a dense vestiture of appressed, flattened, scale-like setae. Striae and interstriae granulate. Pronotum granulate and pubescent basally. Lateral pronotum costate and carinate. Frons rugose. 2.6 mm long. Oriental Region. . . . . ***X. subsimilis*** **(Eggers)** (Fig. 42)

Declivital setae hair-like, not flattened 10

10 (9) Lateral pronotum costate and carinate 11

Lateral pronotum costate, but without a carina 14

11 (10) Pronotum uniformly convex dorsally. Declivital face convex. Smaller species, 1.5–2.0 mm long. Australian Region, Oceania, Oriental Region . . . . ***X. discolor*** **(Blandford)** (Fig. 20)

Pronotum with conspicuous summit on basal third. Declivital face flattened, convex, or depressed in areas. Larger species, 2.8–3.0 mm long 12

12 (11) Four striae visible on elytral declivity. Declivital interstriae without a row of longer, erect setae, bearing only a vestiture of short, appressed setae 13

Five striae visible on elytral declivity, with striae 4 and 5 forming a loop. Declivital interstriae with a single row of long, erect, hair-like setae, along with a dense vestiture of shorter appressed setae. 2.8–2.9 mm long. Oriental Region. . . . . ***X. beesoni*** **Saha, Maiti, and Chakraborti** (Illustrated in Saha et al. 1992)

13 (12) First and second declivital interstriae elevated toward apex, with depressed areas on each side of raised interstriae. Frons rugose, with a distinct median keel. 3.0 mm long. Oriental Region, Palearctic Region . . . . ***X. jaintianus*** **(Schedl)** (Fig. 27)

Declivital face flattened, without interstriae elevated toward apex. Frons punctate, without a distinct median keel. 2.8 mm long. Oriental Region . . . . ***X. subsimiliformis*** **(Eggers)** (Fig. 41)

14 (10) Declivital striae and interstriae granulate with appressed, hair-like setae. Interstriae in some species with a row of long, erect, hair-like setae in addition to appressed background vestiture. 15

Declivital striae coarsely granulate, without setae. Interstriae granulate, with erect, hair-like setae, longer than twice the width of second declivital interstriae. 1.8–2.3 mm long. Oriental Region. . . . . ***X. diversepilosus*** **(Eggers)** (Fig. 21)

15(14) Granules on interstriae dense and closely placed, giving the declivity a matte appearance. Smaller species, 2.0–2.1 mm long. Oriental Region. Palearctic Region . . . . ***X. borealis*** **Nobuchi** (Fig. 11)

Granules on interstriae less densely and closely placed, giving the declivity a shining apprearance. Larger species, 2.5–2.8 mm long. Oriental Region, Palearctic Region . . . . ***X. brevis*** **(Eichhoff)** (Fig. 13)

16 (3) Declivital striae and interstriae densely, finely, and confusedly granulate. Pronotum of equal length and width. 17

Declivital striae and interstriae not densely, finely, and confusedly granulate. Striae punctate. Pronotum wider than long 18

17 (16) Pronotum with a lateral costa, but without a carina. Elytral disc multiseriate punctate. Six

striae visible on elytral declivity. Striae with erect, hair-like setae, shorter than the width of second declivital interstriae. Interstriae with semi-appressed, hair-like setae, longer than the width of second declivital interstriae. Frons rugose. 1.7–2.9 mm long. Afrotropical Region, Australian Region, Nearctic Region, Neotropical Region, Palearctic Region, Oceania, Oriental Region . . . . ***X. crassiusculus* (Motschulsky)** (Fig. 16)

Pronotum with a lateral costa and carina. Elytral disc uniseriate punctate. Five striae visible on elytral declivity. Striae and interstriae with semi-appressed, hair-like setae, longer than the width of second declivital interstriae. Frons punctate. 1.9–2.2 mm long. Afrotropical Region . . . . ***X. hirsutipennis* (Schedl)** (Fig. 25)

18 (16) Pronotum with a lateral costa and carina 19

Pronotum with a lateral costa, but without a carina 27

19 (18) At least first interstria on elytral disc multiseriate punctate 20

All interstriae on elytral disc uniseriate punctate. 21

20 (19) Elytral disc with interstriae densely punctured. Declivital interstriae multiseriate granulate. Declivital surface matte in appearance. Stouter species, 2.0 times longer than wide; elytra of equal length and width. 1.6–2.3 mm long. Oriental Region . . . . . ***X. assequens* Schedl** (Fig. 10)

Elytral disc with interstriae more sparely punctured, multiseriate only on first interstria. Declivital interstriae uniseriate granulate. Declivital surface shining. More elongate species, 2.2 times longer than wide; elytra 1.4 times longer than wide. 1.8 mm long. Oriental Region . . . . ***X. deruptulus* (Schedl)** (Fig. 19)

21 (19) Declivital striae with semi-appressed, hair-like setae, shorter than the width of second declivital interstriae 22

Declivital striae without setae 24

22 (21) Pronotal disc glabrous, except for a dense patch of short, erect setae basally, indicating the presence of a pronotal-mesonotal mycangium. Elytra strongly arched from base to middle of declivity. 1.3–1.5 mm long. Nearctic Region, Neotropical Region . . . . ***X. curtulus* (Eichhoff)** (Fig. 17)

Pronotal disc more evenly pubescent, with a dense patch of short, erect setae basally, indicating the presence of a pronotal-mesonotal mycangium. Elytra more evenly arched from middle of disc to apex 23

23 (22) Body very stout, 1.9 times as long as wide. 1.5–1.7 mm long. Oriental Region . . . . ***X. pusillus* (Schedl)** (Fig. 36)

Body less stout, 2.3 times longer than wide. 1.4–1.9 mm long. Afrotropical Region, Nearctic Region, Neotropical Region, Oceania, Oriental Region. . . . . ***X. compactus* (Eichhoff)** (Fig. 14)

24 (21) Smaller species, 1.4 mm long. Pronotum of equal length and width. Declivital interstriae uniseriate granulate, with erect, hair-like setae, longer than the width of second declivital interstriae. Oriental Region . . . . ***X. mediocris* (Schedl)** (Fig. 29)

Larger species, 1.8–2.5 mm long 25

25 (24) Pronotum wider than long or of equal length and width. Pronotal disc glabrous, except for a dense patch of short, erect setae basally, indicating the presence of a pronotal-mesonotal mycangium 26

Pronotum 1.1 times longer than wide. Pronotal disc more evenly pubescent, with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. 1.9–2.5 mm long. Nearctic Region, Oceania, Oriental Region, Palearctic Region . . . . ***X. germanus* (Blandford)** (Fig. 24)

26 (25) Pronotum wider than long. Declivital interstriae uniseriate granulate, with semi-appressed, hair-like setae, longer than the width of second declivital interstria. 2.0 mm long. Oriental

Region . . . . **X. adherescens Schedl** (Fig. 7)
Pronotum of equal length and width. Declivital interstriae uniseriate granulate, with erect, hair-like setae, longer than twice the width of second declivital interstria. 1.8–2.1 mm long. Oriental Region . . . . **X. eupatorii (Eggers)** (Fig. 22)

27 (18) Body bicolored, with pronotum distinctly lighter than elytra or with a testaceous patch on elytra basally and laterally 28
Body uniformly colored, light to dark brown 31

28 (27) Pronotum and elytral apices dark brown, elytra with a testaceous patch basally and laterally. Elytral disc with interstriae multiseriate. Declivital interstriae multiseriate punctate, with erect, hair-like setae, longer than twice the width of second declivital interstriae. 2.4–2.7 mm long. Australian Region . . . . **X. hulcri sp. nov.** (Fig. 26)
Pronotum distinctly lighter than elytra; elytra without a testaceous patch 29

29 (28) Smaller species, 1.1–1.3 mm long. Declivital striae with setae. Interstriae with erect, hair-like setae, longer than the width of second declivital interstriae. Australian Region, Oriental Region . . . . **X. mesuae (Eggers)** (Fig. 30)
Larger species, 1.6–2.5 mm long. Other characters varied 30

30 (29) Six striae visible on elytral declivity. Declivital striae with erect, hair-like setae, longer than the width of second declivital interstriae. Interstriae punctate. Body 2.3 times longer than wide. Larger species, 2.3–2.5 mm long. Oriental Region . . . . **X. arquatus (Sampson)** (Fig. 9)
Five striae visible on elytral declivity. Declivital striae without setae. Interstriae granulate. Smaller species, 1.6–1.8 mm long. Oriental Region . . . . **X. ferinus (Schedl)** (Fig. 23)

31 (27) Five striae visible on elytral declivity. Declivital striae with semi-appressed, hair-like setae. Interstriae multiseriate. Larger species, 2.6–2.7 mm long. Australian Region . . . . **X. mixtus (Schedl)** (Fig. 32)
Six striae visible on elytral declivity. Declivital striae without setae. Interstriae uniseriate. Smaller species, 1.8 mm long. Oriental Region . . . . **X. metagermanus (Schedl)** (Fig. 31)

32 (1) Margin of elytral declivity rounded or with a discontinuous row of small tubercules. Elytral disc with multiseriate interstrial punctures 33
Margin of elytral declivity serrate. Elytral disc with uniseriate interstrial punctures 36

33 (32) Margin of elytral declivity with a discontinuous row of small tubercles. Five striae visible on declivity. Smaller species, 2.3–2.4 mm long. Australian Region . . . . **X. woodi Dole and Beaver** (Fig. 44)
Margin of elytral declivity rounded. Six striae visible on declivity. Larger species 2.5–4.1 mm long 34

34 (33) Basal pronotum lacking a dense patch of setae. Declivital striae with semi-appressed, hair-like setae, longer than the width of second declivital interstriae. Interstriae multiseriate granulate, with semi-appressed, hair-like setae, longer than the width of second declivital interstriae. 3.0–3.4 mm long. Australian Region . . . . **X. monteithi Dole and Beaver** (Fig. 33)
Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Declivital striae with semi-appressed, hair-like setae, shorter than the width of second declivital interstriae. 2.5–4.2 mm long 35

35 (34) Elytral surface shining. Prosternal intercoxal process shorter. Protibiae broadened toward apex, armed with 6 socketed teeth. Smaller species, 2.5–3.2 mm long. Australian Region . . . . **X. rotundicollis (Browne) n. comb.** (Fig. 39)
Elytral surface duller. Prosternal intercoxal process taller, more pointed. Protibiae narrow; armed with 7 socketed teeth. Larger species, 3.5–4.2 mm long. Australian Region . . . . **X. russulus (Schedl) n. comb.** (Fig. 40)

36 (32) Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Body unicolorous. Six striae visible on elytral declivity. Striae granulate. Smaller species, 1.6–2.1 mm long 37
Basal pronotum lacking a dense patch of setae. Body bicolored, pronotum distinctly darker than elytra. Five striae visible on elytral declivity. Striae punctate, with erect, hair-like setae, longer than the width of second declivital interstriae. Interstriae multiseriate granulate, with erect, hair-like setae, longer than the width of second declivital interstriae. Larger species, 2.7–3.0 mm long. Oriental Region . . . . ***X. corthyloides* (Schedl)** (Fig. 15)

37 (36) Elytral disc gradually curving into declivity. Declivity shining. Declivital striae with appressed, hair-like setae, shorter than the width of second declivital interstriae. 1.9–2.1 mm long. Australian Region . . . . ***X. abruptulus* (Schedl)** (Fig. 6)
Declivital face steep and abruptly separated from disc. Declivity matte. Declivital striae with erect, acutely tapering, hair-like setae, shorter than the width of second declivital interstriae. 1.6–1.9 mm long. Australian Region . . . . ***X. queenslandi* Dole and Beaver** (Fig. 38)

38 (2) Declivital striae with a row of large, shallow punctures, arranged in a somewhat wavy line. Declivital interstriae shining, not densely granulate. Stouter species, 1.2–1.4 times as long as wide. Larger species, 2.9–3.3 mm long. Afrotropical Region and Oriental Region . . . . ***X. mancus* (Blandford)** (Fig. 28)
Declivital striae with smaller punctures arranged in perfectly straight rows. Declivital interstriae densely and finely granulate-punctate, giving the declivity a matte appearance. More elongate species, 2.5 times as long as wide. Smaller species, 2.7–2.9 mm long. Oriental Region . . . . ***X. amputatus* (Blandford) n. comb.** (Fig. 8)

Taxonomy

Genus *Xylosandrus* Reitter

Xylosandrus Reitter 1913:80, 83. Type-species: *Xylosandrus morigerus* Blandford.
Apoxyleborus Wood 1980:90. Type-species: *Xyleborus mancus* Blandford, original designation. Synonymy: Wood 1984:229.

Diagnosis.— *Xylosandrus sensu stricto* can be distinguished from other xyleborine genera by the following combination of characters: the stout body, usually about twice as long as wide, widely separated procoxae, flat scutellum that is flush with the surface of elytra, and obliquely truncate antennal club with the first segment forming a circular costa and dense pubescence on the oblique portion of the club.

Xylosandrus abruptulus (Schedl)
Figure 6.

Xyleborus abruptulus Schedl, 1953:81. Lectotype ♀: Australia, Wongabel, 2 May 1941, A. R. Brimblecombe, from *Loranthus* sp.; NHMW; designated by Schedl, 1979a:9.
Xylosandrus abruptulus (Schedl): Schedl, 1964:213.

Notes.— Schedl (1953) failed to designate a holotype in his original description of *X. abruptulus* and subsequently designated a lectotype (Schedl 1979a).

Diagnosis.— Female 1.9–2.1 mm long; 2.1 times longer than wide. Body brown; antennae and legs same color as body. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment 1 covering entire posterior face. Pronotum 0.7 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al.

2007). Pronotal vestiture of semi-appressed hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presense of a pornotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; meso- and metatibiae with seven or eight socketed teeth. Elytra 1.3 times longer than wide; 1.7 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margin with coarse serrations. Six straie visible on declivity. Striae granulate, with appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is one of three *Xylosandrus* with lateral declivital margins that are marked by coarse serrations: *X. abruptulus*, *X. corthyloides* (Fig. 15), and *X. queenslandi* (Fig. 38). *Xylosandrus abruptulus* can be distinguished from these species by the following characters: body unicolorous; basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium; elytral disc gradually curving into declivity; six striae visible on elytral declivity; and declivital striae punctate with appressed, hair-like setae, shorter than the width of second declivital interstriae.

Distribution.— **Australian Region:** Australia (Queensland).

Hosts. — *Loranthus* L. sp.

Specimens examined.— (12 ♀; 0 ♂) Type material: Lectotype *Xyleborus abruptulus* (♀; NHMW). Syntype: Australia, Wongabel, 2 May 1941, A.R. Brimblecombe, from *Loranthus* sp. (♀; BMNH).

Other material: **Australian Region:** Queensland: N. Qld., Mt Finnigan Summit via Helenvale, 28-30 Nov 1985, G. Monteith and D. Cook, Pitfall traps, rainforest (1 ♀; RAB); N. QLD, Wallaman Falls Rd, 600 m, 14 Dec 1986–2 Jan 1987, Monteith, Thompson, and Hamlet, RF, Flight intercept trap (1 ♀; RAB); N. Qld., Mossman Bluff Track, 5-10 km W Mossman, Site 9, 1260 m, 1-17 Jan 1989, Monteith, Thompson, and ANZSES, flt. intercept (2 ♀; RAB); N. Qld., Mossman Bluff Track, 5-10 km W Mossman, Site 7, 7100 m, 20 Dec 1989–15 Jan 1990, Monteith, Thompson, and ANZSES, flt. intercept (1 ♀; RAB); N.E. QLD, Cardwell Range, Upper Broadwater Ck Valley, 750 m, 17-20 Dec 1986, Monteith, Thompson, and Hamlet, Flight intercept trap (1 ♀; RAB); NEQ: 17º26′S, 145º42′E, Hughes Road, Topaz, 650 m, 6 Dec 1993–25 Feb 1994, Monteith, Cook, Janetzki, RF Pitfalls (1 ♀; RAB); NEQ: 16º24′S x 145º17′E, Upper High Falls Ck., 1000 m, 25 Jan–12 Feb 1996, R. Wertz, Flight intercept trap (1 ♀; RAB); N. E. Qld, Kirrama Range, (Douglass Ck Rd, 800 m), 10 Dec 1986–11 Jan 1987, Monteith, Thompson, and Hamlet, RF, Flight intercept trap (2 ♀; RAB).

Xylosandrus adherescens Schedl

Figure 7.

Xylosandrus adherescens Schedl, 1971:375. Holotype ♀: Hui (?), Chuo Chan [Vietnam], Nov. 03; NHMW.

Diagnosis.— Female 2.0 mm long; 2.0 times longer than wide. Body light brown to brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately puncatate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; meso- and metatibial teeth not visible on specimen examined with. Elytra 1.3 times longer than wide; 1.5 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity.

Declivity convex, lateral margin carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with semi-appressed, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. eupatorii* (Fig. 22) and *X. germanus* (Fig. 24). These three species share the following characters: elytral disc gradually curving into declivity; pronotum with a lateral carina; interstriae on elytral disc uniseriate punctate; and declivital striae with semi-appressed, hair-like setae, shorter than the width of the second declivital interstriae. *Xylosandrus adherescens* can be distinguished from these species by the following characters: pronotum wider than long; pronotal disc glabrous, except for a dense patch of short, erect setae basally, indicating the presence of a pronotal-mesonotal mycangium; and declivital interstriae with semi-appressed, hair-like setae, longer than the width of second declivital interstriae.

Distribution.— **Oriental Region:** Vietnam.

Hosts.— Unknown.

Specimens examined.— (1 ♀; 0 ♂) Type material: Holotype *Xylosandrus adherescens* (♀; NHMW).

Xylosandrus amputatus (Blandford), new combination

Figure 8.

Xyleborus amputatus Blandford, 1894b:575. Holotype ♀: Japan: Higo; BMNH.
Amasa amputatus (Blandford): Wood and Bright, 1992:682.

Notes.— This species was first included in *Amasa* by Wood and Bright (1992), but the authors did not indicate it as a “new combination” or cite any characters justifying its transfer.

Diagnosis.— Female 2.7–2.9 mm long; 2.5 times longer than wide. Body light brown to brown; declivity distinctly darker than rest of elytra; legs and antennae the same color as body. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc densely punctate, with punctures separated by a distance less than or equal to their size. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separted. Protibiae with 5 socketed teeth on lateral margin; meso- and metatibiae with 11 socketed teeth. Elytra 1.3 times longer than wide; 2.3–2.4 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity concave, lateral margins carinate, with carina extending beyond 7th interstriae, forming a circumdeclivital ring. Four striae visible on declivity. Striae punctate, without setae. Interstriae finely granulate-punctate, without setae.

This species is one of two *Xylosandrus* with the margin of the elytral declivity with a carina that extends beyond the 7th interstriae, forming a circumdeclivital ring: *X. amputatus* and *X. mancus* (Fig. 28). *Xylosandrus amputatus* can be distinguished from *X. mancus* by the following characters: 2.5 times as long as wide; declivity without setae; declivital striae with smaller punctures arranged in perfectly straight rows; and declivital interstriae densely and finely granulate-punctate, giving the declivity a matte appearance.

Distribution.— **Oriental Region:** China, Japan, Taiwan.

Hosts.— *Acer* L. sp., *Cinnamomum mairei* H. Lév., *Cinnamomum* L. sp., *Machilus* Nees sp., *Pelargonium hortorum* L. H. Bailey, *Ziziphus jujuba* Lam.

Specimens examined.— (3 ♀; 0 ♂) Type material: Unable to examine type material.

Other material: **Oriental Region:** China Gang-keu, SW. Fukien, S, China, VII-26-36, L. Gressit Collection (1 Homotype ♀; USNM); Japan: Okinawa Id, June 23, 1945, F.N. Young, No 54 (1 ♀; USNM); Japan: Kagoshima Pref., Tarumizu Oonohara, Broadleaf forest, 425 m, 14 Aug 2000, Yoshikazu Sato Coll., Ex; ETOH-baited trap (1 ♀; USNM).

Xylosandrus arquatus (Sampson)

Figure 9.

Xyleborus arquatus Sampson, 1912:246. Holotype ♀: Ceylon [Sri Lanka]; BMNH.
Xylosandrus arquatus (Sampson): Schedl, 1964:213.

Diagnosis.— Female 2.3–2.5 mm long; 2.3 times longer than wide. Pronotum distinctly lighter than elytra; pronotum light brown and elytra black; antennae and legs light brown. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum basic (type 2, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Base of pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately granulate. Pronotum moderately punctate basally. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 8 socketed teeth; metatibiae with 8 socketed teeth. Elytra 1.4 times longer than wide; 1.5 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, with erect, hair-like setae, longer than the width of second declivital interstriae. Interstriae punctate, uniseriate, with erect, hair-like setae, shorter than the width of second declivital interstriae.

This species is one of four bicolored *Xylosandrus* with the pronotum distinctly lighter than the elytra: *X. arquatus*, *X. discolor* (Fig. 20), *X. ferinus* (Fig. 23), and *X. mesuae* (Fig. 30). *Xylosandrus arquatus* can be distinguished from *X. discolor* by the following characters: elytral disc gradually curving into declivity. *Xylosandrus arquatus* can be distinguished from *X. ferinus* and *X. mesuae* by the following characters: 2.3–2.5 mm long; pronotum light brown and elytra black; six striae visible on elytral declivity; declivital striae with erect, hair-like setae; and declivital interstriae punctate.

Distribution.— **Oriental Region:** Sri Lanka.

Hosts.— *Cinnamomum* L. spp., "*Kududavula* sp." (Sri Lanka), *Symplocos loha* Buch.-Ham. ex D. Don.

Specimens examined.— (29 ♀; 0 ♂) Type material: Unable to examine type material.

Other material: **Oriental Region:** Sri Lanka: Ceylon [Sri Lanka] (1 ♀; NHMW); Sri Lanka: Bad. Dist., Pattopola, 200 mtrs., 3 June 1975, S.L. Wood, *Kududavula* sp. (2 ♀; USNM); Sri Lanka: Mat. Dist., Enselwatte, 800 mtrs., 25 May 1975. S.L. Wood, misc. hosts (1 ♀; USNM); Sri Lanka: N. E. Dist., 11 km SE Nuara Eliya, 1 June 1975, 2000 m. S.L. Wood, collected from branches (1 ♀; USNM); Sri Lanka: N. E. Dist., 11 km SE Nuara Eliya, 1 June 1975, 2000 m. S.L. Wood. Host: *Symplocos loha* (18 ♀; USNM); Sri Lanka: N.E. Dist., 11 km SE Nuara Eliya, 1 June 1975, 2000 m. S.L. Wood, collected from twigs (6 ♀; USNM).

Xylosandrus assequens Schedl

Figure 10.

Xylosandrus assequens Schedl, 1971:376. Holotype ♀: Malaya, Kelantan, Bukit Kabong, 14.ii.1947, in *Xanthophyllum* sp., F.G. Browne.; BMNH.

Diagnosis.— Female 1.6–2.3 mm long; 2.0 times longer than wide. Body brown to dark brown; antennae and legs light brown. Frons rugose. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.7 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Pronotum punctate basally; lacking a dense patch of setae. Pronotal disc densely punctate, with punctures separated by a distance less than or equal to their size. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 9 socketed teeth; metatibiae with 10 socketed teeth. Elytra 1.3 times longer than wide; 1.7 times longer than pronotum. Discal striae punctate; interstriae multiseriate puncate; striae and interstriae confused on disc. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, with erect, hair-like setae, longer than the width of second declivital interstriae. Interstriae granulate, multiseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. deruptulus* (Fig. 19). *Xylosandrus assequens* can be distinguished from *X. deruptulus* by the following characters: 2.0 times longer than wide; elytra of equal length and width; elytral disc with interstriae densely punctured; declivital interstriae multiseriate; and declivital surface matte in appearance.

Distribution.— **Oriental Region:** Brunei, Malaysia.

Hosts.— *Xanthophyllum* Roxb. sp.

Specimens examined.— (2♀; 0 ♂) Type material: Holotype *Xylosandrus assequens* (♀; BMNH).

Other material: **Oriental Region:** Malaysia: Malaysia: Sabah Sipitang, Mendolong, T6/R, 31.iii.1989, leg. S. Abdebratt (1 ♀; RAB).

Xylosandrus beesoni Saha, Maiti, and Chakraborti

Illustrated in Saha et al. 1992.

Xylosandrus beesoni Saha, Maiti, and Chakraborti, 1992:11. Holotype ♀: India: Rangirum (1846 m), Darjiling Dist., coll. J.C.M. Gardner, 8.ix.1929, ex. "*Symplocos theaefolia*" [*Symplocos theifolia*].

Diagnosis.— Female 2.8–2.9 mm long; 2.0 times as long as wide. Body yellowish brown. Frons reticulate. Antennae with 5 funicular segements. Antennal club obliquely truncate; frist segment forming a circular costa; segment one covering entire posterior face. Pronotum wider than long. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc densely setose, setae as dense as on anterior pronotum. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc densely asperate-granulate, with sculpture separated by a distance less than or equal to their size. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 5 socketed teeth on lateral margin; meso- and metatibiae with 8 socketed teeth. Elytra longer than wide; 1.4 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face of elytral steep and abruptly separated from disc. Declivity convex, lateral margins carinate to 7th interstriae. Five striae visible on declivity with striae 4 and 5 forming a loop. Striae granulate, with semi-appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, multiseriate, with a single row of long hair-like setae along with a dense vestiture of shorter appressed setae.

This species is morphologically similar to *X. discolor* (Fig. 20), *X. jaintianus* (Fig. 27), and

X. subsimiliformis (Fig. 41). *Xylosandrus beesoni* can be distinguished from these species by the following characters: declivital face covex, five striae visible on declivity with striae 4 and 5 forming a loop, and declivital interstriae with a single row of long, erect, hair-like setae, along with a dense vestiture of shorter appressed setae.

DISTRIBUTION.— **Oriental Region:** India.

HOSTS.— *Symplocos theifolia* D. Don.

SPECIMENS EXAMINED.— (0 ♀; 0 ♂) TYPE MATERIAL: Unable to examine type material.

DISCUSSION.— This species was described by Saha, Maiti, and Chakraborti (1992) from four female specimens from a single collecting event. All specimens are deposited in collections in India (FRI and ZSI) and were not available for examination as part of this revision. However, based on the original species description and corresponding images, *X. beesoni* is clearly a member of the *Xylosandrus senso stricto* group. The species description was also detailed enough to be used to score morophological characters for the phylogenetic analysis.

***Xylosandrus borealis* Nobuchi**

Figure 11.

Xylosandrus borealis Nobuchi, 1981:34. Holotype ♀: Honshu, Kyushu (Japan); Nobuchi Collection, Ibaraki, Japan.

DIAGNOSIS.— Female 2.0–2.1 mm long; 1.8–1.9 times as long as wide. Body yellowish brown to light brown; antennae and legs the same color as body. Frons rugose with a distinct median keel. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 1.1 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc densely setose, setae as dense as on anterior pronotum. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc densely asperate-granulate, with sculpture separated by a distance less than or equal to their size. Lateral aspect of pronotum prolonged anteriorly (type 9, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; meso- and metatibiae with 8 socketed teeth. Elytra 1.0–1.3 times longer than wide; 1.1 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face of elytral steep and abruptly separated from disc. Declivity flattened, lateral margins carinate to 7th interstriae. Four striae visible on declivity. Striae granulate, with appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, multiseriate, with a vestiture of appressed, hair-like setae, shorter than the width of second declivital interstriae with an interspersed row of long, erect, hair-like setae.

This species is morpholocially similar to *X. brevis* (Fig. 13). *Xylosandrus borealis* can be distinguished from *X. brevis* by the matte appearance of its elytral declivity, due to dense and closely placed interstrial granules, and by its smaller size of 2.0–2.1 mm.

DISTRIBUTION.— **Oriental Region:** Japan. **Palearctic Region:** Korea.

HOSTS.— *Camellia sasanqua* Thunb., *Styrax obassia* Siebold and Zucc.

SPECIMENS EXAMINED.— (4 ♀; 0 ♂) TYPE MATERIAL: Unable to examine type material.

OTHER MATERIAL: **Oriental Region**: Japan: Okusa, Japan, 20.VII.1935, Coll. K. Baba (4 ♀; USNM).

Xylosandrus borneensis Dole and Cognato, sp. nov.

Figure 12.

Description.— Female (Fig. 12): 1.5–1.6 mm long, 2.1 times longer than wide, with pronotum yellowish brown, slightly darker toward apex, elytra brown, ventral side and appendages yellowish brown. Frons convex, shining, coriaceous, punctate between eyes, with deep, vertically elongate punctures, a single hair-like seta originating from each puncture. Epistoma with row of short hair-like setae along lower margin. Eyes emarginate. Antennal funicle 5-segmented, scape and funicle with sparse, short, hair-like setae; club obliquely truncate, first segment sclerotized, forming a circular costa (type 1, Hulcr et al. 2007), circular costa closed anteriad, oblique part of club densely pubescent, second segment not corneous; posterior face of club covered entirely by first segment (type 1, Hulcr et al. 2007). Pronotum 0.9 times longer than wide, basic shape dorsally (type 2, Hulcr et al. 2007), widest about two-thirds pronotal length from base, anterior third broadly rounded toward apex, basal angles rounded, anterior margin with 8-10 asperities; anterior slope asperate, asperities smallest at summit and increasing in size toward anterior margin; disc moderately punctate, patch of denser punctures medially at base, hair-like setae originating from punctures, background sculpture finely granulate; lateral aspect of pronotum basic (type 0, Hulcr et al. 2007), lateral costa extending two-thirds pronotal length, lateral carina present only in basal ¼ of prontum; pronotal vestiture of short, semi-appressed, hair-like setae. Scutellum triangular, flush with surface of elytra. Elytra 1.1 times longer than wide, 1.1 times as long as pronotum, parallel-sided on basal two-thirds and then broadly rounded toward apex; disc shining; declivity matte in appearance. Striae impressed beginning slightly before declivital origin and becoming more deeply impressed on declivity, shallowly and regularly punctate, punctures becoming less distinct on declivity, with very short, appressed setae originating from punctures. Interstriae equal the width of striae, finely granulate, giving a matte appearance, short (less than or equal to width of interstria), erect, hair-like setae in uniseriate rows; interstriae 4–6 not reaching apex of the declivity. Declivity commencing behind mid-point of elytra, abruptly and steeply separated from disc; lateral margins carinate to 7th interstriae. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 7–8 socketed teeth; metatibiae with 8–9 socketed teeth. Abdominal ventrites evenly punctured, punctures with short and long, moderately appressed, hair-like setae.

Specimens examined.— (11 ♀; 0 ♂) Type material: Holotype ♀: Malaysia, Sabah, Danum Valley, 120 m asl. July 2006 Hulcr coll. Burseraceae, twig. Vial 1694. In MSU. *Paratypes* ♀: Malaysia, Sabah, Danum Valley, 120 m asl. July 2006 Hulcr coll. Burseraceae, twig. Vial 1694. One paratype in FRCS. Nine paratypes in MSU. One paratype female was used for DNA extraction and its remains are vouchered in MSU. Brunei [Darussalam]: Temburong: nr. K[uala] Belalong Field Stud[ies]. Centre, 4°33′N 115°09′E, 150m, 21.ii.1992 (R.A.Beaver). One paratype in RAB. Malaysia: Sabah, Sipitang, Mendolong, 11.v.1988 (2); 10.iii.1989 (1); 14.iii.1989 (2) (S.Adebratt).Three paratypes in MZLU; two in RAB.

Male: Unknown

Etymology.— This species is named *borneensis* after the type locality.

Diagnosis.— This species can be distinguished from all other known *Xylosandrus* by the deeply impressed declivital striae, which form six distinct ridges on the declivity. It is morphologically similar to *X. pygmaeus* (Fig. 38). *Xylosandrus borneensis* can be distinguished from *X. pygmaeus* by the following characters: pronotum without lateral carina; declivital striae more deeply impressed; six striae visible on elytral declivity; declivital striae without setae; and declivital interstriae finely granulate, giving the declivital face a matte appearance, with erect, hair-like setae, shorter than the width of second declivital interstriae.

Distribution.— **Oriental Region:** Malaysia (Sabah).

Hosts.— Burseraceae.

Discussion.— This species was found in association with the mycocleptic species *Diuncus mucronatulus* (Eggers) (Hulcr 2009).

Xylosandrus brevis (Eichhoff)

Figure 13.

Xyleborus brevis Eichhoff, 1877:121. Syntypes ♀: Nipon (Hagi Hiller) and Nipon Insula Asiatica; IRSNB.
Xylosandrus brevis (Eichhoff): Browne, 1965:204.
Xyleborus cucullatus Blandford, 1894c:121. Syntypes ♀: Kurigahara, and Konose in Higo, Japan; BMNH. Synonymy: Murayama, 1954:176.

Diagnosis.— Female 2.5–2.8 mm long; 2.1 times longer than wide. Body dark brown; antennae and legs light brown. Frons rugose, with distinct median keel between eyes. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of dense, semi-appressed, hair-like setae; pronotal disc densely setose, setae as dense as on anterior pronotum. Basal pronotum with a dense patch of short, erect setae, indicating the presense of a pronotal-mesonotal mycangium. Pronotal disc densely asperate-granulate, with sculpture separated by a distance less than or equal to their size. Lateral aspect of pronotum prolonged anteriorly (type 9, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; meso- and metatibiae with 10–11 socketed teeth. Elytra 1.1 times longer than wide; 1.2 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity convex, lateral margins carinate to 7th interstriae. Four striae visible on declivity. Striae coarsely granulate, with appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, multiseriate, with appressed, hair-like setae, shorter than the width of second declivital interstriae.

This species is morphologically similar to *X. borealis* (Fig. 11). *Xylosandrus brevis* can be distinguished from *X. borealis* by the shining appearance of its elytral declivity and by its larger size of 2.5–2.8 mm.

Distribution.— **Oriental Region:** Japan, Taiwan, Thailand. **Palearctic Region:** China (Xizang [Tibet]), Korea, Nepal.

Hosts.— *Berberis* L. sp., *Camellia japonica* L., *C. sasanqua* Thunb., *Cinnamomum japonicum* Siebold, *Diospyros kaki* Thunb., *Fagus crenata* Blume, *Grevillea* Knight sp., *Hamamelis* L. sp., *Lindera* Thumb. spp., *Machilus japonica* Siebold and Zucc., *Machilus thunbergii* Siebold and Zucc., *Maesa tenera* Mez, *Meliosma cuneifolia* Franch., *Parabenzoin praecox* Nakai, *Quercus* L. spp., *Smilax china* L., *Styrax obassia* Siebold and Zucc., *Viburnum* L. sp., *Weigela hortensis* C. A. Mey.

Specimens examined.— (25 ♀; 0 ♂) Type material: Unable to examine type material.

Other material: **Oriental Region:** Japan: Japan: Kagoshima Pref., Tarumizu Oonohara, Broadleaf forest, 425 m, 14 May 2001, Yoshikazu Sato Coll. Ex; ETOH-baited trap (4 ♀; MSU); Japan, Ookusa, 20.VI.1933. Coll. K. Baba (3 ♀; USNM); Japan: Ryukyus, Mt. Yonaha-dake, Okinawa-honto Is., 5.VI.1997, H. Goto leg., Host tree: *Machilus japonica* Sieb. & Zucc. (4 ♀; RAB); Japan, Tamagowa, 29.VII.1980, *Fagus crenatus* (3 ♀; USNM); Japan, Tokyo, Takao, VII.31.1957, Coll. A. Nobuchi (4 ♀; USNM). Taiwan: Taiwan: Taichung, Hsien: Shei-Pa N.P., 10.5.2004, J-T. Yang, Pitfall (5 ♀; RAB). **Palearctic Region:** Nepal: Nepal: Sikha 83º40′E, 28º26′N, 8000 ft. 24–26.v.1954. K.H. Hyatt. Litter in oak forest (2 ♀; BMNH).

Xylosandrus compactus (Eichhoff)

Figure 14.

Xyleborus compactus Eichhoff, 1875:201. Syntypes 2 ♀, 1 ♂: Japan; NHMW (syntypes in Hamburg Museum lost).
Xylosandrus compactus (Eichhoff): Nunberg, 1959:434.
Xyleborus morstatti Hagedorn, 1912:37. Syntypes ♀: Amani, Deutsch-Ostafrika; Hamburg Museum, lost.
Xylosandrus morstatti (Hagedorn): Browne, 1963:55. Synonymy: Murayama and Kalshoven, 1962:247.

Diagnosis.— Female 1.4–1.9 mm long; 2.3 times longer than wide. Body brown to dark brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum of equal length and width. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed hair-like setae; setae less dense on disc. Basal pronotun with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate basally. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 7 socketed teeth; metatibiae with 8 socketed teeth. Elytra 1.3 times longer than wide; 1.3 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, with semi-appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae punctate-granulate, uniseriate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

This species is morphologically similar to *X. curtulus* (Fig. 17) and *X. pusillus* (Fig. 36). It can be distinguished from *X. curtulus* by a pronotal disc that is evenly pubescent, rather than mostly glabrous. *Xylosandrus compactus* is nearly morphologically identical to *X. pusillus*. The only character distinguishing the two species is the degree of body stoutness, with *X. compactus* being 2.3 times as long as wide and *X. pusillus* being 1.9 times as long as wide. However, this is too large a disparity to warrant synonymizing the two species without further investigation.

Distribution.— **Afrotropical Region:** Cameroon, Cameroon Islands (Grande Comoro), Equatorial Guinea, Fernando Poo, Gabon, Ghana, Ivory Coast, Liberia, Madagascar, Mauritania, Nigeria, Reunion Islands, Senegal, Seychelles Islands, Sierra Leone, South Africa, Tanzania, Uganda. **Nearctic Region (Introduced)** United States (Alabama, Florida, Louisiana, Mississippi North Carolina, East Texas). **Neotropical Region:** Brazil, Cuba, Peru, Peutro Rico, Virgin Islands. **Oceania:** Hawaiian Islands (Hawaii, Kauai, Lanai, Maui, Molokai, Oahu), Samoan Islands. **Oriental Region:** China (Guangdong), India (Tamil Nadu), Indonesia (Java), Japan (Mainland, Bonin Islands, Ryukyu Islands), Malaysian Peninsula, Malaysia (Sabah), Philippines, Sri Lanka, Taiwan, Thailand, Vietnam.

Hosts.— *Acacia mangium* Willd., *Acalypha* L. sp., *Acer* L. sp., *Acrocarpus fraxinifolius* Wight and Arn., *Adenanthera pavonina* L., *Albizia chinensis* Merr., *A. lebbeck* Benth., *A. zygia* (DC.) Macbride, *Ardisia paniculata* Roxb., *Aucoumea klaineana* Pierre, "Bamboo Orchid" (Hawaii), *Bauhinia* L. sp., *B. tomentosa* L., *Bombax malabaricum* DC., *Cajanus cajan* (L.) Millsp., *Camellia sinensis* Kuntze, *Cassia hirta* Wild., *C. mutijuga* Rich., *C. siamea* Lam., *C. tora* L., *Cattleya* Lindl. sp., *Cinnamomum camphora* (L.) J. Presl, *C. iners* Reinw., *C. zeylanicum* Broyn., *Clerodendron* Burm. sp., *Coffea* L. sp., *C. arabica* L., *C. bukobensis* Zimmermann, *C. canephora* Pierre., *C. liberica* Bull., *C. quillon* Wester, *C. robusta* L. Lind., *C. stenophylla* G. Don., *Cola nitida* (Vent.) Schott and End., *Crotalaria* L. sp., *Cryptocarya* Gay sp., *Dendrobium* Sw. sp., *D. pha-*

laenopsis Fitz., *D. veratrifolium* Lindl., *Desmodium ovalifolium* Guill., *Drypetes phyllanthoides* (Rock) Sherff, *Elaeis guineensis* Jacq., "Elderberry" (Singapore), *Entandrophragma utile* Sprague, *Erythroxylon novagranatense* Hieron., *Eupatorium pallescens* DC., *Eusideroxylon zwageri* Teijsm., *Ficus aurea* Nutt., *F. soroceoides* Bar., *Gossypium* L. sp., *Haasia* Nees. sp., *Hopea parviflora* Bedd., *Ichthyomethia communis* S. F. Blake, *Indigofera suffruticosa* Mill., *Jacobinia* Moric. sp., *Khaya grandifoliola* C. DC., *K. senegalensis* A. Juss., *Leucaena glauca* Benth., *Litsea cassiaefolia* Blume, *Mangifera indica* L., *M. odorata* Griff., *Melia azedarach* L., *Muntingia calabura* L., *Myrciaria dubia* (H. B. and K.) McVaugh, *Nectandra angustifolia* Nees. and Mart., *Olea europaea* L., *Persea* Mill. sp., *Persea americana* Miller, *P. gratissima* Gaertn., *P. indica* Sprang., "*Prosopis nudiflora*" (Java: Schedl 1963a), Quercus *myrsinaefolia* Blume, *Rhizophora* L. sp., *Sambucus* L. sp., *S. canadensis* L., *S. javanica* Reinw., *Shorea* Roxb. ex. C. F. Gaertn. sp., *S. sumatrana* (Slooten) Desch., *Spathodea campanulata* P. Beauv., *Swietenia macrophylla* King, *S. mahagoni* Jack., *Tephrosia maxima* Pres., *Thea sinensis* L., *Theobroma cacao* L., *Toona sureni* Merr., *Turraeanthus africana* Pellegr., *Vanda coerula* Griff., *V. teres* Lindl., *V. tricolor* Lindl., *Vitex* L. sp., "Wild Grape" (Florida).

Specimens examined.— (123 ♀; 8 ♂) Type material: Syntypes *Xyleborus compactus* (2 ♀, 1 ♂; NHMW).

Other material: **Afrotropical Region:** Ghana: Ghana: Kumasi, 12.9.61 (6 ♀, 1 ♂; USNM). Madagascar: Madagascar: Prov. Flanarantsoa, 7 km W Ranomafana, 1100 m, 1-7 November 1988, W. E. Steiner (1 ♀; USNM). **Nearctic Region:** United States: Florida: Dade Co. Coral Gables, Matheson Hammock Pk., 27 June 1980, O'Brien and Wibmer (1 ♀; CAS); Florida: Key Largo, 6.25.1951, Price Beamers–Wood, *Ichthyomethia communis* (1 ♀; USNM); Florida: Key Largo, 6.25.1951, Price Beamers–Wood (4 ♀, 1 ♂; USNM); Florida: Key Largo, 6.25.1951, Price Beamers–Wood, taken on wild grape (7 ♀; USNM); Florida: Key Largo, 6.25.1951, Price Beamers–Wood, *Ardisia paniculata* (4 ♀; USNM); Florida: Key Largo, 6.25.1951, Price Beamers–Wood, *Cajanus cajan* (6 ♀; USNM); Florida: Key Largo, 6.25.1951, Price Beamers–Wood, taken on *Ficus aurea* (1 ♀; USNM); Florida: Tallahassee, Fall, 1979, C. W. O'Brien, reared ex dogwood flags, emer. Sum 1980 (23 ♀; CAS); Florida, W. Palm Beach, I.27.61 (6♀; USNM). **Neotropical Region:** Peru: Perou-Loreto, Iquitos, Juin 1990, G. Couturier Col., Plante–Hôte, *Myrciaria dubia* (1 ♀; USNM). Puerto Rico: Puerto Rico: Carite St. For., VII.28.1999, C.W.O'Brien, P. Kovarik (1 ♀; CAS). **Oceania:** Hawaiian Islands: Hawaii: Mt. Puu Puae, Waianae Mts., Cahu 425 m., in twigs of *Drypetes phyllanthrides*, 1.VII.1970. W.C. Gagne Collector (1 ♀; NHMW); Hawaii: Oahu, Kailua, I. 1962, Ex *Vitex* sp. (10 ♀; CAS); Hawaii: Oahu, Kailua, I.2.62., ex. *Vitex* sp. Roy Hirata Coll. (2 ♀, 3 ♂; USNM); Hawaii: Oahu, Nuuanu, May 8, 1931, H.L. Lyon, Elderberry stems imported from Singapore (1♀; USNM); USA: HI: O'ahu I., N. Halawa Valley, NW of Honolulu, 390 m, 21°25′N, 157°51′W, 11-29.VI.1991, FMHD#91-4, Met. Polym.-Psidium-Hibiscus mixed nat./exotic forest, A. Newton and M. Thayer, #869, window trap (4 ♀; FMNH); Quarantine from Hawaii at Carpenteria, California, VI.20.2001, Ex. Bamboo Orchid (2 ♀; CSCA). **Oriental Region:** India: India: Coffee Research Station, Chilemagalur dist., Mysore, 2.I.1966 (7 ♀; CAS); South India: Nilgiri Hills, Devala, 3200 ft., XI.60, P. S. Nathan (23 ♀; 2 ♂; USNM). Indonesia: Java: Boger, VIII.1964, N.L.H. Krauss, Coffee (1 ♀; USNM); E. Java, Ma Lang, 10.1951, Planta nutrix, Coffea (4 ♀; USNM). Sri Lanka: Sri Lanka: Col. Dist., Labugama, 23 June 1975, S.L. Wood, collected from branches (1 ♀; USNM).

Xylosandrus corthyloides (Schedl)

Figure 15.

Xyleborus corthyloides Schedl, 1934:86. Lectotype ♀: Java, Mount Gede, 800 m, ex Zingiberaceae; NHMW; designated by Schedl, 1979a:66.

Xylosandrus corthyloides (Schedl): Wood and Bright, 1992:790.

Xyleborus percorthyloides Schedl, 1957:85. Lectotype ♀: Java, Mount Gede, 800 m; NHMW; designated by Schedl, 1979a:66. Synonymy: Wood and Bright, 1992:790.

NOTES.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors failed to indicate it as a "new combination." *Xyleborus percorthyloides* was also listed as a synonym (an "unneeded replacement of *corthyloides*") by Wood and Bright (1992), but was not indicated as a "new synonymy."

DIAGNOSIS.— Female 2.7–3.0 mm long; 2.1 times longer than wide. Body bicolored, pronotum distinctly darker than elytra; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Lacking a dense patch of setae at base of pronotum. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibial teeth not visible on specimens examined; metatibiae with 10 socketed teeth. Elytra 1.1 times longer than wide; 1.2 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity flattened, lateral margins with small serrations. Five striae visible on declivity. Striae punctate, with erect, hair-like setae, longer than the width of second declivital interstriae. Interstriae granulate, multiseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is one of three *Xylosandrus* with lateral declivital margins that are marked by coarse serrations: *X. abruptulus* (Fig. 6), *X. corthyloides*, and *X. queenslandi* (Fig. 38). *Xylosandrus corthyloides* can be distinguished from these species by the following characters: 2.7–3.0 mm long; basal pronotum lacking a dense patch of setae; body bicolored, pronotum distinctly darker than elytra; five striae visible on elytral declivity; and declivital striae punctate.

DISTRIBUTION.— **Oriental Region:** Indonesia (Java).

HOSTS.— Zingiberaceae.

SPECIMENS EXAMINED.— (2 ♀; 1 ♂) TYPE MATERIAL: Holotype *Xyleborus corthyloides* (♀; NHMW). Paratype *Xyleborus percorthyloides* Java: Mt. Gede, 14-IX-1922, 800 m, L.G.E. Kalshoven, Zingiberaceae (♀; NHMW). Allotype *Xyleborus percorthyloides* Java: Mt. Gede, 14-IX-1922, 800 m, L.G.E. Kalshoven , Zingiberaceae (♂; NHMW).

Xylosandrus crassiusculus (Motschulsky)

Figure 16.

Phlaeotrogus crassiusculus Motschulsky, 1866:403. Syntypes ♀: published as Des Montagnes de Nura-Ellia, Ceylon types labeled India Occidentale; IZM.

Xylosandrus crassiusculus (Motschulsky): Wood, 1982:766.

Xyleborus semiopacus Eichhoff, 1878:334. Syntypes ♀: Nipon insula Japonica; Hamburg Museum, lost. Synonymy: Wood, 1969:119.

Xyleborus semigranosus Blandford, 18 96a:211. Holotype ♀: Sumatra; BMNH. Synonymy: Schedl 1959:496.

Xyleborus ebriosus Niisima, 1909:154. Holotype ♀: Sapporo, Japan; Nobuchi Collection, Ibaraki. Synonymy: Choo, 1983:98.

Dryocoetes bengalensis Stebbing, 1908:12. Syntypes ♀: Goalpara, Assam; FRI. Synonymy: Beeson, 1915:297.

Xyleborus mascarenus Hagedorn, 1908:379. Syntypes ♀: Mauritius, and Bomole et Amani in Deutsch-Ostafrika; NHMW (syntypes in Hamburg Museum lost). Synonymy: Eggers, 1923:130.

Xyleborus okoumeensis Schedl, 1935:271. Syntypes ♀: imported Okoume logs, Carlshafen, Hessen-Nassau [Germany]; NHMW. Synonymy: Schedl, 1959:496.

Xyleborus declivigranulatus Schedl, 1936:30. Lectotype ♀: Selangor, Malay Peninsula; NHMW; designated by Schedl, 1979a:76. Synonymy: Schedl, 1959:496.

Diagnosis.— Female 1.7–2.9 mm long; 2.2 times longer than wide. Body light to dark brown; antennae and legs yellowish brown. Frons rugose. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum of equal length and width. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc densely setose, setae as dense as on anterior pronotum. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc densely punctate, with punctures separated by a distance less than or equal to their size. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated, though less so than in most *Xylosandrus* species. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 11 socketed teeth; metatibiae with 14–16 socketed teeth. Elytra 1.2 times longer than wide; 1.2 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, carinate to 7th interstriae. Six striae visible on declivity. Striae granulate, with erect, hair-like setae, shorter than twice the width of second declivital interstriae. Interstriae granulate, multiseriate, with semi-appressed, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. hirsutipennis* (Fig. 25). Both species have a declivital face that is matte in appearance due to densely, finely, and confusedly granulate striae and interstriae. *Xylosandrus crassiusculus* can be distinguished from *X. hirsutipennis* by the following characters: frons rugose; pronotum without a lateral carina; elytral disc multiseriate punctate; six striae visible on the elytral declivity; declivital striae with erect, hair-like setae shorter than the width of second declivtial interstriae; and declivital interstriae with semi-appressed, hair-like setae, longer than the width of second declivital interstriae.

Distribution.— **Afrotropical Region:** Cameroon, Congo, Equatorial Guinea, Fernando Poo, Gabon, Ghana, Ivory Coast, Kenya, Madagascar, Mauritania, Nigeria, Sierra Leone, Seychelles Islands, Tanzania, Zaire. **Australian Region:** New Guinea. **Nearctic Region (Introduced):** United States (Alabama, Delaware, Florida, Georgia, Kansas, Louisiana, Maryland, Mississippi, North Carolina, Oregon, South Carolina, Tennessee, Texas). **Neotropical Region:** Costa Rica, Panama. **Oceania:** Hawaiian Islands (Hawaii, Kauai, Maui, Oahu), Micronesia (Palau Islands), New Caledonia, Samoan Islands. **Oriental Region:** Burma, Hong Kong (Fujian), China (Hunan, Sichuan), India (Andaman Islands, Assam, Bengal, Himachal Pradesh, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh), Indonesia (Borneo, Celebes, Java, Sumatra), Japan (Mainland, Bonin Islands), Malaysian Peninsula (Sabah, Sarawak), Philippines, Sri Lanka, Taiwan, Thailand, Vietnam. **Palearctic Region:** Bhutan, China (Xizang [Tibet]), Germany [Imported], Korea, Nepal.

Hosts.— *Acacia* Mill. sp., *A. decurrens* Willd., *A. mangium* Willd., *Acrocarpus* J.R. Forst and G. Forst spp., *Adina rubescens* Hemsl., *Adinandra dumosa* Jack., *Adinobotrys atropurpureus* Dunn., *Afzelia bipindensis* Harms, *Agathis* Salisb. sp., *Albizia* Durazz. sp., *A. chinensis* Merr., *A. ferruginea* Benth., *A. gummifera* (Gmel.) C.A. Sm., *A. lebbek* L., *A. moluccana* Miq., *A. stipilata* Boivin, *A. zygia* (DC.) Macbride, *Alnus* Mill. sp., *Alstonia* R. Br. sp., *Altingia excelsa* Nor., *Amoora* Roxb. sp., *Angylocalyx pynaertii* De Wild., *Anisoptera* Korth. sp., *Anthonota fragrans* Baker, *Antiaris africana* Engl., *Antrocaryon micraster* A. Chev. and Guill., *Artocarpus* J.R. Forst. and G. Forst. sp., *A. chaplasha* Roxb., *Aucoumea klaineana* Pierre, *Barteria nigritiana* Hook., *Bauhinia tomentosa* L., *Bischofia javanica* Blume, *Buchanania arborescens* Blume, *B. sessilifolia* Blume, *Cacao* Mill. sp., *Calamus* L. sp., *Calophyllum tetrapterum* Miq., *Camellia sinensis* (L.) O. Kuntze., *C. thea* Link., *Canarium* L. sp., *Cannabis sativa* L., *Carapa procera* DC., *Carica papaya* L., *Carya illinoinensis* (Wangenh.) Koch, *Caryota* L. sp., *Castanea argentea* Bl., *C. javanica* Blume, *Castanopsis* (D. Don) Spach spp., *Castilla elastica* Cerv., *Casuarina equisetifolia* L., *Cecropia* L. leaf petiole, *Cedrela toona* Roxb. ex Rottler and Willd., *Ceiba pentandra* Gaertn., *C. thonningii* A. Chev., *Celtis brownii* Rendl., *C. luzonicus* Warb., *C. mildbraedii* Engl., *C. zenkeri* Engl., *Chlorophora excelsa* Benth, and Hook., *Chloroxylon swietenia* DC., *Chrysophyllum* L. sp., *Cinchona* L. sp., *Cinnamomum camphora* (L.) J. Presl, *Cinnamomum* L. sp., *Cistanthera* K. Schum. sp., *Cleistopholis patens* Benth., *Coelocaryon preussii* Warb., *Coffea* L. sp., *C. robusta* L. Linden, *Cylicodiscus gabunensis* Harms, *Cynometra hankie* Harms, *Dacryodes pubescens* (Vermoesen) H.J. Lam., *Dactylocladus stenostachya* Oliv., *Dalbergia latifolia* Roxb., *D. sissoo* Roxb., *Dialium corbisieri* Staner, *D. pachyphyllum* Harms, *Dillenia pentagyna* Roxb., *Dimocarpus longan* Lour., *Dipterocarpus* C.F. Gaertn. spp., *D. baudii* Korth., *Distemonanthus benthamianus* Baill., *Doona zeylanica* Thwaites., *Dryobalanops* C.F. Gaertn. sp., *Drypetes leonensis* Pax. Var. *glabra* J. Léonard, *Elaeis guineensis* Jacq. (leafstalks), *Elaeocarpus sericeus* Stapf., "*Elaeocarpus tetrapterum*" (Wood and Bright 1992), *E. tuberculatus* Roxb., *Entandrophragma angolense* C. DC., *E. cylindricum* Sprague, *E. utile* Sprague, *Erythrina* L. spp., *E. lithosperma* Miq. var. *inermis* Kds. and Val., *Erythrophleum guineense* G. Don, *Eucalyptus deglupta* Blume, *Eucalyptus* L'Hér. sp., *E. robusta* Sm., *Eugenia caryophylla* St. Lag., *E. jambolana* Lam., *Eupatorium pallescens* DC., *Fagara macrophylla* (Oliv.) Engl., *Fagus crenata* Blume, *Ficus* L. spp., *Garcinia polyantha* Oliv., *G. punctata* Oliv., *Gliricidia maculate* H.B. and K., *Gluta tourtour* Marchand, *G. travancorica* Bedd., *Gmelina arborea* Roxb., *Gossweilerondendron balsamiferum* Harms, *Grevillea* Knight sp., *G. robusta* A. Cunn., *Guarea cedrata* A. Chev., *G. laurentii* De Wild., *Hannoa klaineana* Pierre, *Haronga paniculata* (Pert.) Lodd., *Hevea brasiliensis* (Willd. ex A. Juss) Müll. Arq., *Holigarna arnottiana* Hook., *Hopea beccariana* Burck, *H. ferrea* Heim, *H. odorata* Roxb., *H. parviflora* Bedd., *H. wightiana* Wall., "*Ilteocafus baudii*" [?] (China), *Julbernardia sereti* (De Wild.), *Khaya ivorensis* A. Chev., *Kayea floribunda* Wall., *Koompassia malaccensis* Maingay, *Lagerstroemia flos-reginae* Retz., *L. speciosa* Pres., *Lannea grandis* Enql., *Lasiococca* Hook. sp., Lauraceae sp., *Lecanodiscus cupanoides* Planch., *Leea crispa* L., *L. sambucina* (L.) Willd., "Liana" [woody vine] (Sri Lanka), *Lithocarpus wallichiana* Rehder, *Lophira procera* A. Chev., *Lovoa klaineana* Pierre, *L. trichiliodes* Harms, *Luffa* Mill. sp., *Macaranga monandra* Müll.-Arg., *Machilus odoratissima* Nees., *Macrolobium* Schreb. sp., *M. macrophyllum* Harms, *Malus pumila* Mill., *Mangifera indica* L., *Mansonia altissima* A. Chev., *Melanorrhoea* Wall. sp., *Melochia umbellata* Stapf., *Microcos coriacea* (Mast.) Burret, *M. pinnatifida* (Mast.) Burret, *Mitragyna stipulosa* O. Ktze. Rev., *Murraya koenigii* Spreng., *Musanga cecropopdes* R. Br., *Myrianthus arboreus* P. Beauv., *Myristica* L. sp., *Myristica dactyloides* Wall., *Napoleana imperialis* P. Beauv., *Nauclea* (*Sarcocephalus*) *diderichii* De Wild., "Nayabu" (Sri Lanka), *Ochthocosmus africanus* Hook., "*Octomeles sumatrana*" (Ohno 1990), *Ongokea gore* Engl., *Pachylobus deliciosus* Pellegr., *Palaquium gutta* Burck., *Pancovia laurentii* De Wild., *Parinari kerstingii* Engl., *Parishia* Hook. f. sp., *Parkia bicolor* A. Chev., *Pithecellobium lobatum* Benth., *Piptadenia africana* Hook, *Piptadeniastrum africanum* Benth., *Protium pittieri* Engl., *Pycnanthus angolensis* (Welw.) Exell., *Quercus* L. sp., *Q. serrata* Roxb., *Randia congolana* De Wild. and Th. Dur., *Ricinodendron heudelotii* (Baill.) Pierre, *Saccharum officinarum* L., *Sagraea laurina* Dalz., *Sandoricum* Cav. sp., *Sapium* P. Browne sp., Sapotaceae sp., *Scorodophloeus zenkeri* Harms, *Shorea* Roxb. ex. C.F. Gaertn. sp., *S. guiso* (Blanco) Blume, *S. macroptera* Dyer, *S. robusta* Gaertn., *Sindora* Miq. sp., *Sorindeia lameirei* De Wild., *Staudtia stipitata* Warb., *Sterculia macrophylla* Vent., *S. oblonga* Mater, *S. villosa* Roxb., *Strombosia glaucesens* Engl., *Strombosiopsis tetrandra* Engl., *Styrax benzoin* Dryand., *Swietenia macrophylla* King., *Synsepalum subcordatum* De Wild., *Tarieta utilis* Sprague, *Tectona grandis* L., *Terminalia ivorensis* A. Chev., *T. superba* Engl., *T. tomentosa* W. and A., *Tessmannia africana* Harms, *T. anomala* Harms, *Tetrapleura* (Thonn.) Taub., *Thalia geniculata* L., *Thea sinensis* L., *Theobroma cacao* L., *Topobea maurofernandeziana* Cogn., *Trichilia heudelotii* Planch., *T. prieureana*

Juss., *Triplochiton scleroxylon* K. Schum., *Turraeanthus africana* Benth., *Vernonia arborea* Ham., *V. conferta* Benth., *Vitis* L. sp., *Vochysia ferruginea* Mart., *Xanthophyllum affine* Korth.

Specimens examined.— (104 ♀; 2 ♂) Type material: Lectotype *Xyleborus declivigranulatus* (♀; NHMW). Holotype *Xyleborus mascarenus* (♀; NHMW). Lectotype *Xyleborus okoumeensis*: In Okumé (♀; NHMW). Paratype *Xyleborus okoumeensis*: W. Africa: Gabun-vinde (♀; NHMW). Allotype *Xyleborus okoumeensis*: Germany: Carlshafen, Hess. Nassau, 17.8.28 (♂; NHMW).

Other material: **Afrotropical Region:** Congo: Yangambi, 1952, C. Donis, z. 1345, Coll. R. Mayne, Com. Ét Bois Congo, R. 2598 (1 ♀; USNM). **Neotropical Region:** United States: Alabama: Baldwin Co., Mobile–Apr 88, C. Kouskelekas (2 ♀; USNM); Quarentine from Florida at Costa Mesa, California, IX.5.2000, Ex. *Dimocarpus longan* (1 ♀; CSCA); Mississippi: Harrison Co., Gulfport, 29 March 1985, John Davis, ex peach (healthy) (1 ♀; USNM); Mississippi: Stone Co. 29 March 1985, G. Weaver, ex plum (healthy) (1 ♀; USNM); Mississippi: Stoneville, Amer. Elm, 6-23-86, J.D. Solomon (2 ♀; USNM). **Oceania:** Hawaiian Islands: Hawaii, Hilo, Hav. Fern Wood, V-16-'53, Working in cut wood, C.J. Davis (1 ♀; USNM); Hawaii, Hilo, X-17-62, ex *Eucalyptus robusta*, R. Nelson (1 ♀; USNM); Oahu, Haleauau Val., 7-54, E.J. Ford Collector (1 ♀; USNM); Oahu: Waianae Mts., 2-55, Ford (3 ♀; CAS); USA: HI: O'ahu I., N. Halawa Valley, NW of Honolulu, 390 m, 21°25′N, 157°51′W, 11-29.VI.1991, FMHD#91-4, Met. Polym.-Psidium-Hibiscus mixed nat./exotic forest, A. Newton and M. Thayer, #869, window trap (6 ♀; FMNH). Micronesia: Koror I., Palau Islds., Limestone ridge N. of inlet, 16 Jan. 1948 (1 ♀; USNM). **Oriental Region:** Burma: Burma: Mogaung, X.4.44, Cpt. L.C. Kuitert (1 ♀; USNM). China: China: Suisapa, 1000 m., Lichuan Distr., W. Hupah, VIII.21.48 (1 ♀; CAS); Salango, Kafang, 3.X.1949., F.G. Browne, ex *Ilteoeafus baudii* [?] (1 ♀; USNM). India: India: Dehra Dun. U.P., C.F.C. Beeson, 25.X.1915, ex *Cinnamaum cambhora* (1 ♀; USNM); S. India: Animalia Hills, April 1956, Cichona 3500 ft., P.S. Nathan (2 ♀; USNM); South India: Animalia Hills, Cincohona, V-60, 3500 ft., P.S. Nathan (1 ♀; USNM); S. India: Cinchona, Anamalai Hills, 3500 ft., V.1959, P. S. Nathan (1 ♀; NHMW); S. India: Coffee Re. Sta., 12-29 '59, *Coffea robusta* Lot 60-13752 (1 ♀; USNM); S. India: Madras, Coimbatore, IV-1956 1400 ft., P. S. Nathan (4♀; USNM); South India: Nilgiri Hills, Devala, 3200 ft., X-60, P. S. Nathan (2 ♀; USNM). Indonesia: Java, Leg. Kalshoven (2 ♀; USNM); Java, Bantam, Leg. Kalshoven, Planta nutrix Hena (10 ♀; USNM). Japan: Japan: Matskawa, 27-VII-1980, S.L. Wood (1 ♀; USNM); Okinawa: ID, Nov 16, 1945, F. N. Young (2 ♀; USNM); Japan: Tamagowa, 29-VII-1980, S.L. Wood *Fagus crenatus* (7 ♀; USNM); Japan: Tokyo, Takao, VIII.31.1957, Coll. Akira Nobuchi (2 ♀; USNM). Philippine Islands: Philippines, Mindanao, 1965, Krauss, Cacao trunk (1 ♀, 1 ♂; USNM). Taiwan: Taiwan: Raisya, 24.XI.1934, S. Issiki (1 ♀; NHMW). Formosa, Akau, 1-10.XII.1907, Hans Sauter leg., vend. 23.IV.1908 (♀; NHMW). Thailand: Thailand: Chiengmai Prov., E. Fk. Mae Ping, 56 km N. Chiengmai, 1300', 24-Xi-1964, W.L. and J.G. Peters, at light (1 ♀; CAS). Sri Lanka: Sri Lanka: Col Dist., Labugama, 23 June 1975, S.L. Wood, Collected from branches (10 ♀; USNM); Sri Lanka: Col Dist., Labugama, 23 June 1975, S.L. Wood, Collected from twigs (2 ♀; USNM); Sri Lanka: Col. Dist., Labugama, 23 June 1975, S.L. Wood, Collected from *Liana* (1 ♀; USNM); Sri Lanka: Col Dist., Labugama 23 June 1975, S.L. Wood, Misc. hosts (1 ♀; USNM); Sri Lanka: Gal. Dist., Ugugama, Kanneliya Jungle, 400 ft., 6-12-X-1973, at black light, K.V. Krombein, P. E. Karunarante, P. Fernando, J. Fernando (1 ♀; USNM); Sri Lanka: Kal. Dist., Morapitiya, 250 mtrs., 27 May 1975, S.L. Wood, Misc. hosts (3 ♀; USNM); Sri Lanka: Ceylon: Kan. Dist., Kandy, 1-15 March 1971, Piyadasa and Sompala (1 ♀; USNM); Sri Lanka: Keg. Dis., Kitulgala, 200 m, 30 May 1975, S.L. Wood, Host: Nayabu (1 ♀; USNM); Sri Lanka: Keg. Dist., Kitulgala, 250 m., 27 May 1975, S.L. Wood, Collected from pole (1 ♀; USNM); Sri Lanka: Keg. Dist., Kitulgala, 200 m., 30 May 1975, S.L. Wood, Host: *Doona* sp. (2 ♀; USNM); Sri Lanka: Mat. Dist., Enselwatte, 800 mtrs. 25 May 1975, S.L. Wood, Misc. hosts (7 ♀; USNM); Sri Lanka: Rat, Dist., Gilimale, 17 May 1975, S.L. Wood, Host: *Myristica dactyloides* (3 ♀; USNM); Sri Lanka: Rat. Dist. Gilimale, 17 May 1975, S.L. Wood, Collected from pole (1 ♀; USNM). **Palearctic Region:** Germany: Germany: Carlshafen, Hess. Nassau, 17.8.28 (3 ♀; NHMW).

Xylosandrus curtulus (Eichhoff)

Figure 17.

Xyleborus curtulus Eichhoff, 1869:281. Holotype ♀: Brazil: Patria; IRSNB.
Xylosandrus curtulus (Eichhoff): Wood, 1982:770.

Xyleborus curtuloides Eggers, 1941a:102. Holotype ♀: Guadeloupe (Gourbeyre); Eggers Collection (not listed by Anderson and Anderson, 1971 or Schedl, 1979a). Synonymy: Wood, 1982:770.

Xyleborus biseriatus Schedl, 1963b:226. Holotype ♀: Nova Teutonia, Santa Catarina, Brazil; NHMW. Synonymy: Wood, 1973:187.

Xylosandrus strumosus Schedl, 1972:73. Holotype ♀: Brasilien, Corcovado, Guanabara; NHMW. Synonymy: Wood and Bright, 1992:793.

Anisandrus zimmermanni Hopkins, 1915:67. Holotype ♀: Biscayne, Florida; USNM. Synonymy: Wood, 2007: 467.

Xylosandrus zimmermanni (Hopkins): Wood, 1962:79.

Notes.— Wood and Bright (1992) first list *Xylosandrus strumosus* as a synonym of *Xylosandrus curtulus*. The synonymy is referenced as "Wood 1992: (in press)", but the synonymy did not appear in another publication.

Diagnosis.— Female 1.3–1.5 mm long; 2.1 times longer than wide. Body brown to dark brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; meso- and metatibiae with 7 socketed teeth. Elytra 1.3 times longer than wide; 1.5 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, with semi-appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. compactus* (Fig. 14) and *X. pusillus* (Fig. 36). *Xylosandrus curtulus* can be distinguished from these species by the following characters: pronotal disc glabrous, except for a dense patch of short, erect, hair-like setae basally, indicating the presence of a pronotal-mesonotal mycangium; and elytra strongly arched from base to middle of declivity.

Distribution.— **Nearctic Region (Introduced):** United States (Florida). **Neotropical Region:** Antilles Islands (Guadeloupe), Brazil, Colombia, Costa Rica, Guatemala, Honduras, Mexico (Chiapas, Colima, Hidalgo, Nayarit, Oaxaca, San Luis Potosi, Varacruz), Venezuela.

Hosts.— *Acer rubrum* L., "*Anonillo*" (Guatemala), *Ardisia* Gaertn. sp., *Byrsonima cotinifolia* H. B. and K., *Calliandra confusa* Sparque and Riley, *Cedrela odorata* L., *Chrysobalanus* L. sp., *Coffea canephora* var. *robusta* (Linden) A. Chev., *Cupania guatemalensis* Radlk., *Dodonaea viscose* Jacq., *Ficus* L. spp., *Inga* Scop. sp., *Nectandra* Roll. ex Rottb. sp., *Ocotea catesbyana* Sarq., *Phoradendron robustissimum* Eichler, *Phoradendron* Nutt. spp., *Rheedia edulis* Planch. and Triana., *Serjania* Mill. sp., *Spondias mombin* L., *Tabebuia* Gomes ex. DC. sp.

Specimens examined.— (86 ♀; 3 ♂) Type material: Holotype *Xyleborus biseriatus*; (♀; NHMW). Holotype *Xylosandrus strumosus* (♀; NHMW). Holotype *Anisandrus zimmermanni* (♀; USNM).

Other material: **Nearctic Region:** United States: Florida: Sebring, 6-20-1951, Price Beamers–Wood (1 ♀; USNM); Florida: Sebring, 6-20-1951, Price Beamers–Wood, *Ardisia* (7 ♀, 1 ♂: USNM); Florida: Sebring, 6-20-1951, Price Beamers–Wood, *Ocotea catsibiana* (1 ♀USNM); Florida: Sebring, 6-20-1951, Price Beamers–Wood, Red Maple (2 ♀, 1 ♂; USNM). **Neotropical Region:** Colombia: Colombia: Caicedonia near Sevilla, Aug. 1959, Coffee branches, Leg. Duque (1 ♀; USNM); Colombia: El Bosque, Caicedonia

(V.), Junio 1959, J. Restrepo, en Café (11 ♀, 1 ♂; USNM); Colombia: 1959, leg. Beteem (1 ♀; USNM). Costa Rica: Costa Rica: Guapiles, Lim. 300 ft., VIII-22-'66, S. L. Wood, unknown vine (2 ♀; USNM); Costa Rica: Santa Ana, S.J., 4000 ft., VII-1-1963, S.L. Wood, Coffee (1 ♀; USNM); Costa Rica: Santa Ana, S.J., 4000 ft., VIII-30-1963, S.L. Wood, *Rheedia edulis* (1 ♀; USNM); Costa Rica: Santa Ana, S.J., 4000 ft., VIII-30-1963, S.L. Wood, unknown sapling (3 ♀; USNM); Costa Rica: Santa Ana, S.J., 400 ft., VIII-1-1963, S.L. Wood, *Cupania guatemalensis* (9 ♀; USNM); Costa Rica: San Ignacio, S.J., 4700 ft., VIII-5-1963, S. L. Wood, unknown sapling (1 ♀; USNM); Costa Rica: Pandora, Lim., 150 ft., VIII-23-1963, S. L. Wood, unknown shrub (4 ♀; USNM); Costa Rica: Tapnti Cart., 400 ft., VIII-17-1963, S.L. Wood, *Calliandra confusa* (1 ♀; USNM). Guatemala: Guatemala: Palin, Esquintla, 100 ft., V-19-1964, S.L. Wood, *Anonillo* (1 ♀; USNM); Guatemala: Rodeo Esquintla, 500 ft., VI-4-1964, S. L. Wood, Unknown vine (1 ♀; USNM); Guatemala: Volcan de Agua, 3000 ft., V-19-1964, S.L. Wood, unknown twigs (1 ♀; USNM); Guatemala: Volcan de Agua, 3000 ft., V-19-1964, S.L. Wood, unknown broken branch (1 ♀; USNM). Honduras: Honduras: Zamorano, Moraz, 2200 ft., IV-18-1964, S.L. Wood, *Phoradendron robustissimum* (1 ♀USNM); Honduras: Zamorano, Moraz, 2200 ft., Serjania (1 ♀; USNM). Mexico: Mexico: 2 mi W Armeria, Col., VI-28-1965, 200 ft., S.L. Wood, *Phoradendron* (2 ♀; USNM); Mexico: El Salto, S.L.P., VI-19-53, taken on *Ficus* (1 ♀; USNM); Mexico: Morelos, Ruinas de Xochicalco, S-322, 22E 82, 1200 ms n m, Col Atkinson and Equihua, Hosp. *Dodonaea viscosa* (1 ♀; USNM); Mexico: Laguna Sta. Maria N., VII-6-1965, 3000 ft., S.L. Wood, unknown vine (1 ♀; USNM); Mexico: Romero 12 mi S, VI-24-1967, OAX, S.L. Wood, *Phoradendron* (1 ♀; USNM); Mexico: 5 mi N Rosamorada N., VII-15-1965, 300 ft., S.L. Wood, unknown broken branch (2 ♀; USNM); Mexico: Romeo, 23 mi N VC, 300 ft., S.L. Wood, unknown branch (1 ♀; USNM); Mexico: Tapachula Chis, 21 VIII 82, Col. A. B. Celis, *Coffea conephora* var. *robusta* (1 ♀; USNM); Mexico: Vera Cruz, 16 mi S Tecolutla, VI-26.53 (8♀; USNM). Venezuela: Venezuela: S. of Barrancas, Barinas, 150 m., XI-5-69, S.L. Wood, *Spondias mombin* (1 ♀; USNM); Venezuela: 9 km S. of Barrancas, Barinas, 150 m., XI-15-69, S.L. Wood, *Inga* (1 ♀; USNM); Venezuela 40 km, E. Canton-Barinas, III-8-1970, 70 m., S. L. Wood, unknown vine (1 ♀; USNM); Venezuela: 20 km SW El Vigia, Merida, XII-10 69, el. 50 m., S.L. Wood (1 ♀; USNM); Venezuela: Rancho Grande, Aragua, 1100 m., IV-9-1970, S.L. Wood, *Tabebuia* (3 ♀; USNM); Venezuela: Rancho Grande, Aragua, 1100 m., IV-9-1970, S.L. Wood, *Nectandra* sp. (5 ♀; USNM); Venezuela: 40 km SE Socopo, Barinas, I-25-1970, 150 m., S.L. Wood, Bejuco Blanco (1 ♀; USNM).

Xylosandrus derupteterminatus (Schedl)

Figure 18.

Xyleborus derupteterminatus Schedl, 1951:64. Holotype ♀: Java, Mount Gede IX.1932L. G.E. Kalshoven Coll., NHMW.
Xylosandrus derupteterminatus (Schedl): Schedl, 1964:213.

Diagnosis.— Female 2.0–2.3 mm long; 2.0 times longer than wide. Body dark brown to black; antennae and legs same color as body. Frons punctate, with distinct median keel between eyes. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with dense patch of short, erect setae indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate basally. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 11 socketed teeth; metatibiae with 13 socketed teeth. Elytra 1.2 times longer than wide; 1.4 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Declivital face of elytra steep, abruptly separated from disc. Declivity flattened, lateral margin carinate to 7th interstriae. Five striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with erect, hair-like setae, shorter than the width of second declivital interstriae.

This species is morphologically similar to *X. morigerus* (Fig. 35) and X. *terminatus* (Fig. 43). *Xylosandrus derupteterminatus* can be distinguished from *X. morigerus* by the following characters: face of elytral declivity flattened; and 5 striae visible on declivity. *Xylosandrus derupteterminatus* can be distinguished from *X. terminatus* by the following characters: larger species, 2.0–2.3 mm long; interstrial setae shorter than the width of second declivital interstriae; and declivital interstriae uniseriate granulate.

DISTRIBUTION.— **Oriental Region:** Indonesia (Java, Moluccas, Sulawesi).

HOSTS.— Unknown.

SPECIMENS EXAMINED.— (10 ♀; 0 ♂) TYPE MATERIAL: Holotype *Xyleborus derupteterminatus* (♀;NHMW).

OTHER MATERIAL: **Oriental Region:** Indonesia: Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Plot A, ca 200 m Lowland forest, May-85, Flight intercept trap (4 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Plot A, ca 200 m Lowland forest, Dec. 1985, suspended carrion (1 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Plot C, ca 400 m lowland forest, Apr-85, Flight intercept trap (2 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Plot C, ca 400 m lowland forest, Feb-85, Flight intercept trap (1 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., G.Mogogonipa summit, 1008 m., 22-24.x.85, yellow plate (1 ♀; RAB).

Xylosandrus deruptulus (Schedl)

Figure 19.

Xyleborus deruptulus Schedl**,** 1942b:37. Lectotype ♀: Java, Mount Dede, 800 m, VIII-1923, Nr 54, Kalshoven; NHMW; designated by Schedl, 1979a:78.
Xylosandrus deruptulus (Schedl): Schedl, 1964:213.

DIAGNOSIS.— Female 1.8 mm long; 2.2 times longer than wide. Body brown; antennae and legs light brown. Frons rugose. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of appressed, hair-like setae; setae less dense on disc. Specimen examined too damaged to determine whether pronotal mycangial setae are present. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Pro-, meso- and metatibial teeth not visible on specimen examined. Elytra 1.4 times longer than wide; 1.6 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate. Interstriae granulate, uniseriate. Specimen examined too damaged to determine states of declivital setae and setae not mentioned in original description (Schedl 1942b).

This species is morphologically similar to *X. assequens* (Fig. 10). *Xylosandrus deruptulus* can be distinguished from *X. assequens* by the following characters: more elongate, 2.2 times longer than wide; elytral disc with interstriae more sparsely punctured, multiseriate only on first interstriae; declivital interstriae uniseriate granulate; and declivital surface shining, not matte.

DISTRIBUTION.— **Oriental Region:** Indonesia (Java).

HOSTS.— Unknown.

SPECIMENS EXAMINED.— (1 ♀; 0 ♂) TYPE MATERIAL: Lectotype *Xyleborus deruptulus* (♀; NHMW).

Xylosandrus discolor (Blandford)

Figure 20.

Xyleborus discolor Blandford, 1898:429. Holotype ♀: Ceylon, E.E. Green; BMNH.
Xylosandrus discolor (Blandford): Browne, 1963:55.
Xyleborus posticestriatus Eggers, 1939b:119. Lectotype ♀: Formosa (Taihoku); USNM; designated by Anderson and Anderson, 1971:26. Synonymy: Schedl, 1958:149.
Xylosandrus posticestriatus (Eggers): Nunberg, 1959:434.

Notes.— Wood and Bright (1992) list *Xylosandrus posticestriatus* Eggers as a separate species. However, we agreed with Schedl (1958) and consider it a synonym of *X. discolor*.

Diagnosis.— Female 1.8–2.0 mm long; 1.8 times longer than wide. Body bicolored; pronotum distinctly lighter than elytra; pronotum light brown and elytra dark brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of erect, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presense of a pronotal-mesonotal mycangium. Pronotal disc densely asperate-punctate, with sculpture separated by distance less than or equal to their size. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4–5 socketed teeth on lateral margin; meso- and metatibiae with 8–9 socketed teeth. Elytra of equal length and width; 1.2 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity flattened, lateral margins carinate to 7th interstriae. Four striae visible on declivity. Striae coarsely granulate, with appressed hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, multiseriate, with appressed, hair-like setae, shorter than the width of second declivital interstriae.

This species is one of four bicolored *Xylosandrus* with the pronotum distinctly lighter than the elytra: *X. arquatus* (Fig. 9), *X. discolor*, *X. ferinus* (Fig. 23), and *X. mesuae* (Fig. 30). *Xylosandrus discolor* can be distinguished from these species by the following characters: elytral declivity steep and abruptly separated from disc, and declivital striae and interstriae with a dense vestiture of appressed setae.

Distribution.— **Australian Region:** Australia (Queensland). **Oceania:** Micronesia. **Oriental Region:** Burma, China (Fujian, Guangdong, Sichuan, Yunnan), India (Andaman Islands, Assam, Tamil Nadu, Uttar Pradesh), Indonesia (Java), Malaysia, Sri Lanka, Taiwan, Thailand.

Hosts.— *Ailanthus altissima* (Mill.) Swingle, *Albizia* Benth. sp., “Avocado” (Java), *Bauhinia variegata* L., *Camellia sinensis* Kuntze, *Cassia multijuga* Rich., *Castanopsis fargesii* Franch., *Cedrela toona* Roxb. ex Rottler and Willd., *Chloroxylon swietenia* DC., *Coffea* L. spp., *Coffea arabica* L., *C. robusta* L. Linden, *Cinnamomum camphora* (L.) J. Presl., *Eupatorium* L. sp., *Grevillea robusta* A. Cunn., *Hevea brasiliensis* (Willd. ex A. Juss) Műll. Arq., “*Igall* sp.” (Thailand), *Juglans nigra* L., “Liana” [woody vine] (Sri Lanka) sp., *Machilus indica* Kurz., “Mango” (Thailand), *Pterospermum acerifolium* Willd., “Rukaththana” (Sri Lanka), *Rhus chinensis* Mill., *Sophora japonica* L., *Swietenia mahagoni* (L.) Jacq., *Tephrosia candida* DC., *Terminalia myriocarpa* Van Heurck and Műll. Arq., *T. procera* Roxb., *Theobroma cacao* L., *Vitis vinifera* L.

Specimens examined.— (61 ♀; 4 ♂) Type material: Lectotype *Xyleborus posticestriatus*: Formosa: Taihoku, 10.VII.1934, Col. M. Chujo (♀; NHMW). Paralectotype *Xyleborus posticestriatus*: XI.1926 (locality unreadable) (♂; NHMW).

Other material: **Australian Region:** Australia (Queensland): Australia: N. QLD, Iron Range, 26-31.X.1991, Wood, Dunn, and Hasenpusch (3 ♀; RAB); NE.Q: 16º54′S x 145º42′E, Whitefield Range, 550 m,

FIGURE 3. Lateral habitus of *Amasa cylindrotomicus* n. comb., female (A) and *Amasa bicostatus*, female (B).

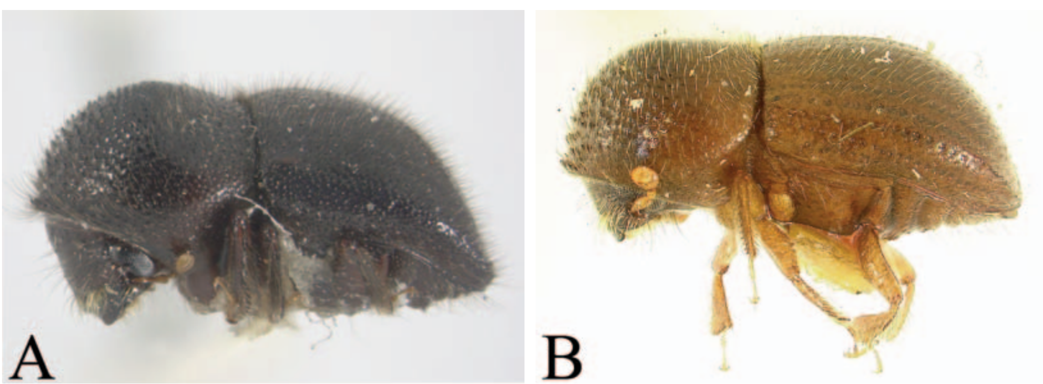


FIGURE 4. Lateral habitus of *Anisandrus ursulus* n. comb., female (A) and *Anisandrus sayi*, female (B).

FIGURE 5. Lateral habitus of *Cnestus improcerus* n. comb., female (A) and *Cnestus pseudosuturalis*, female (B).

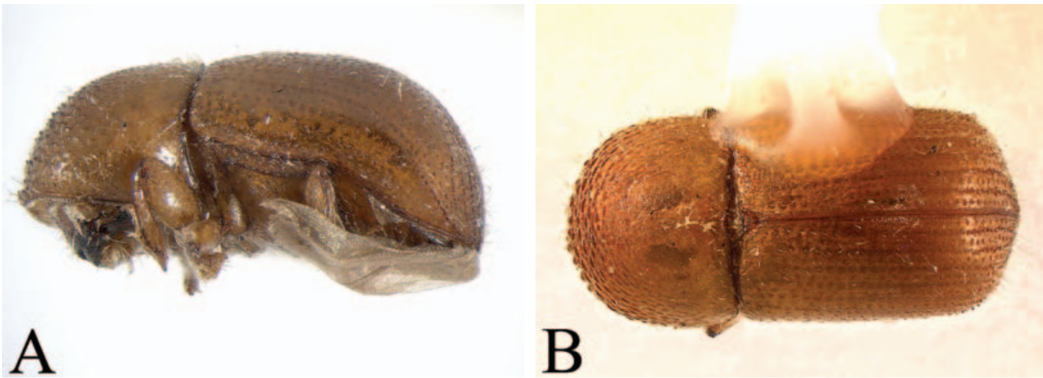


FIGURE 6. Lateral (A) and dorsal (B) views of *Xylosandrus abruptulus*, 1.9–2.1 mm, female lectotype.

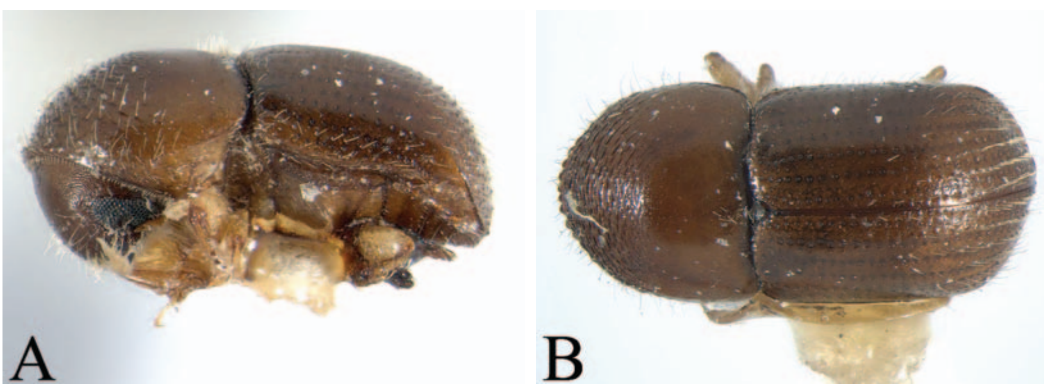


FIGURE 7. Lateral (A) and dorsal (B) views of *Xylosandrus adherescens*, 2.0 mm, female holotype.

FIGURE 8. Lateral (A) and dorsal (B) views of *Xylosandrus amputatus* n. comb., 2.7–2.9 mm, female.

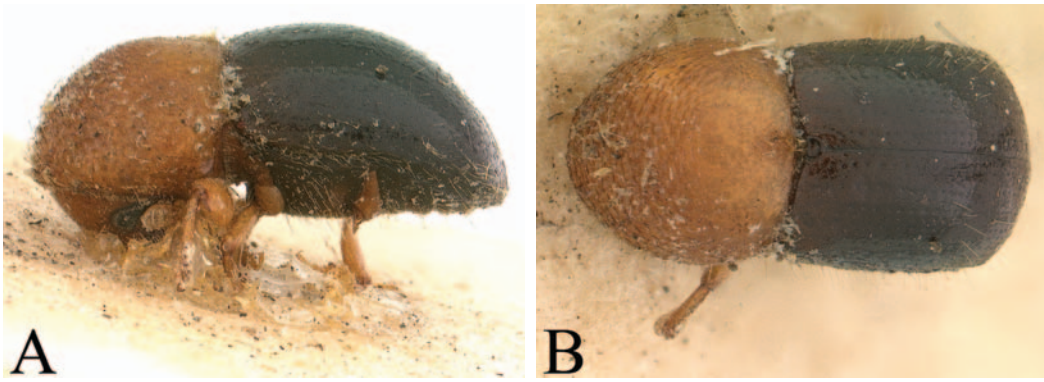


FIGURE 9. Lateral (A) and dorsal (B) views of *Xylosandrus arquatus*, 2.3–2.5 mm, female.

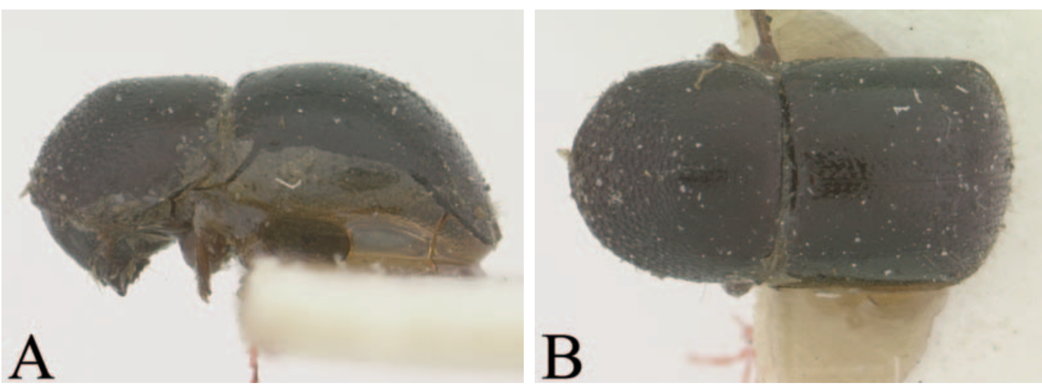


FIGURE 10. Lateral (A) and dorsal (B) views of *Xylosandrus assequens*, 1.6–2.3 mm, female, holotype.

FIGURE 11. Lateral (A) and dorsal (B) views of *Xylosandrus borealis*, 2.0–2.1 mm, female.

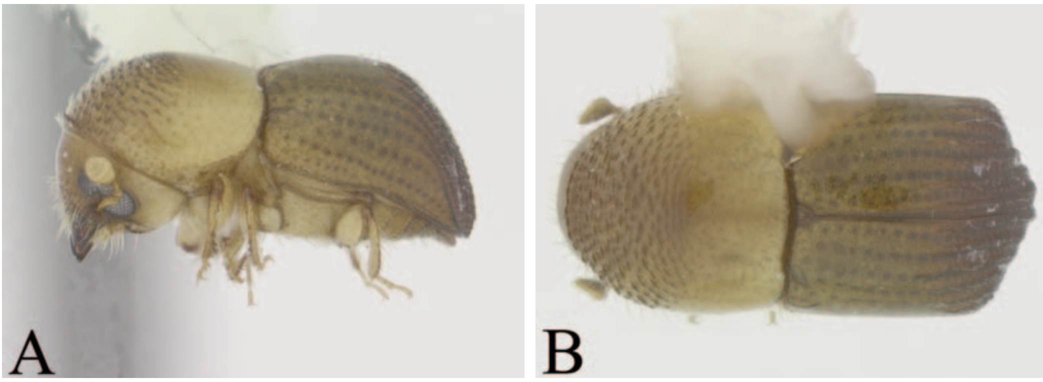


FIGURE 12. Lateral (A) and dorsal (B) views of *Xylosandrus borneensis* n. sp., 1.5–1.6 mm, female holotype.

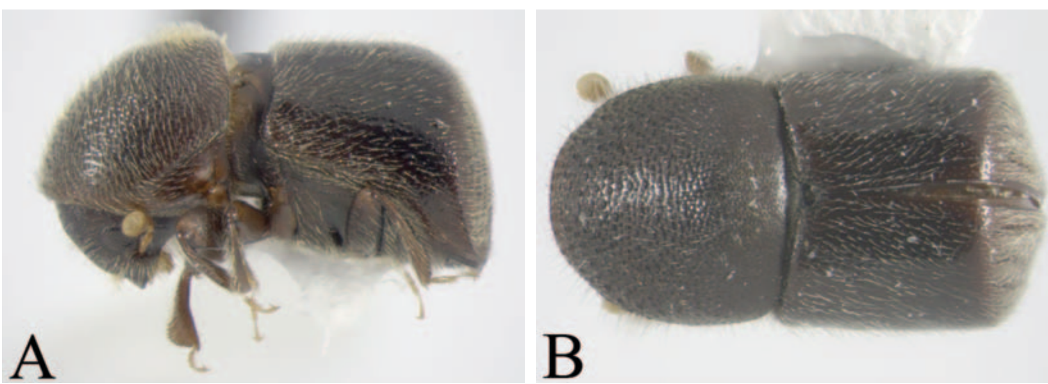


FIGURE 13. Lateral (A) and dorsal (B) views of *Xylosandrus brevis*, 2.5–2.8 mm, female.

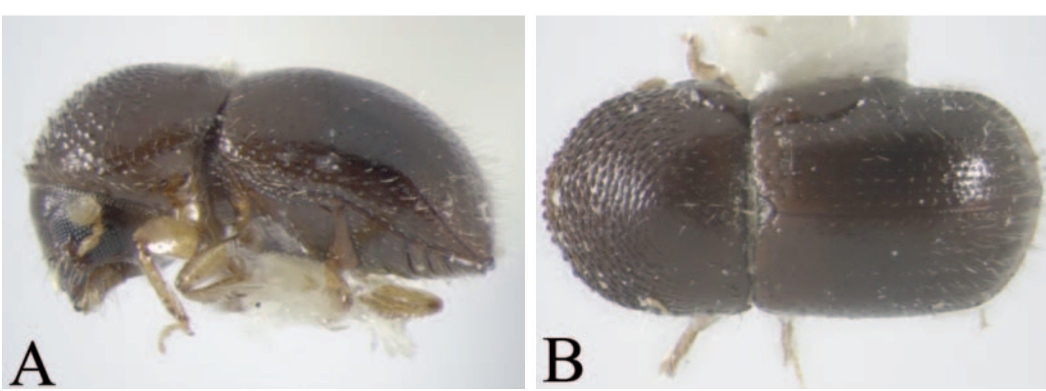


FIGURE 14. Lateral (A) and dorsal (B) views of *Xylosandrus compactus*, 1.4–1.9 mm, female.

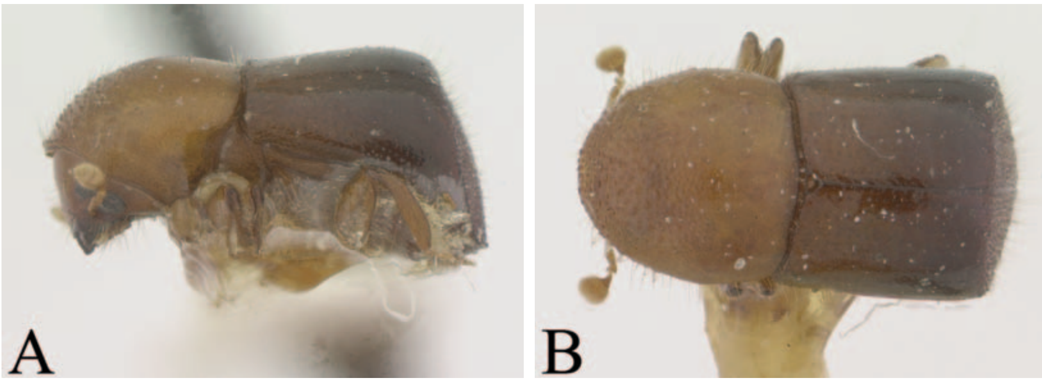


FIGURE 15. Lateral (A) and dorsal (B) views of *Xylosandrus corthyloides*, 2.7–3.0 mm, female lectotype.

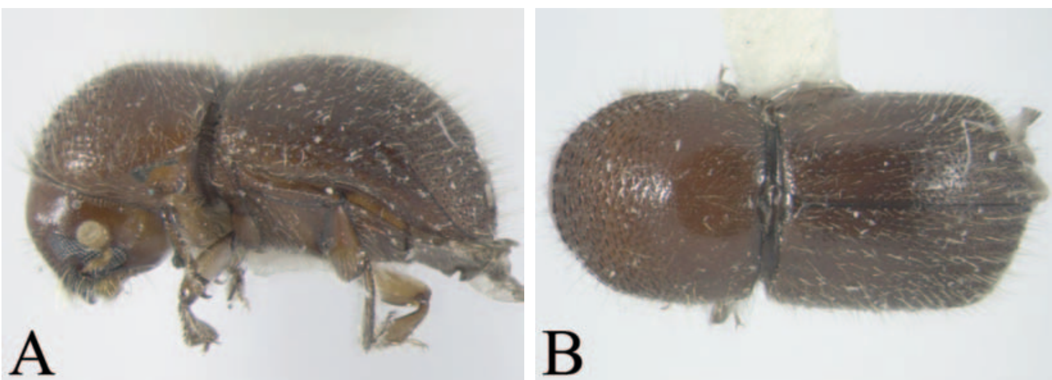


FIGURE 16. Lateral (A) and dorsal (B) views of *Xylosandrus crassiusculus*, 1.7–2.9 mm, female

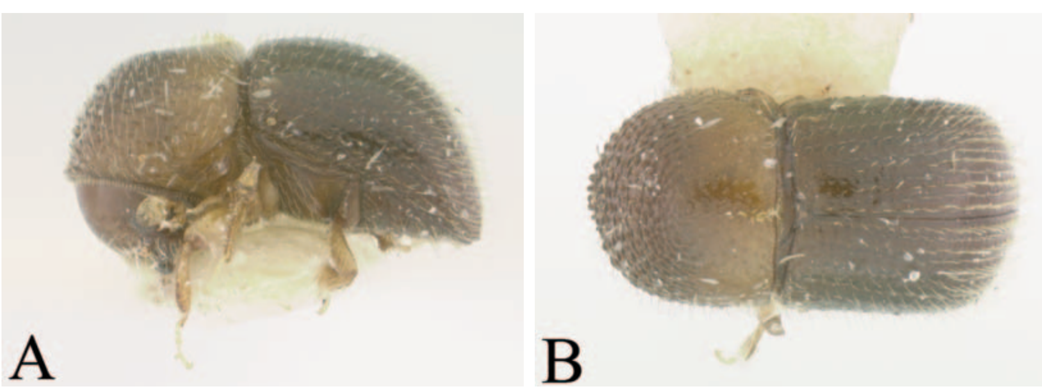


FIGURE 17. Lateral (A) and dorsal (B) views of *Xylosandrus curtulus*, 1.3–1.5 mm, female holotype of synonym *X. biseriatus*.

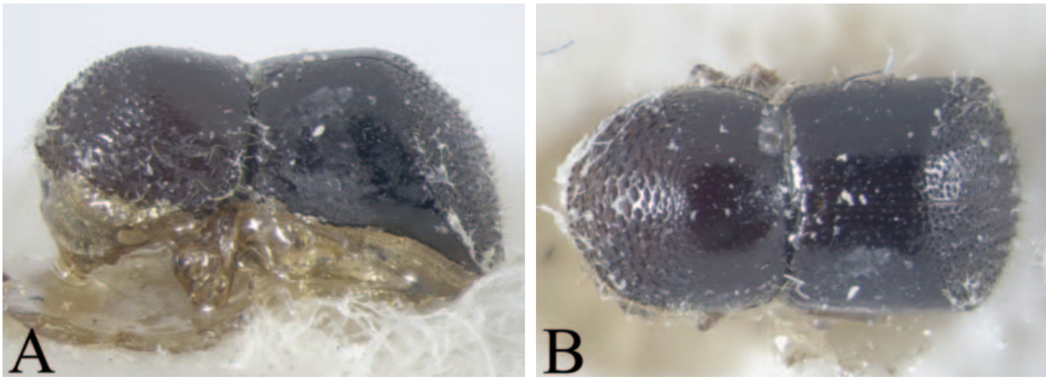


FIGURE 18. Lateral (A) and dorsal (B) views of *Xylosandrus derupteterminatus*, 2.0–2.3 mm, female holotype.

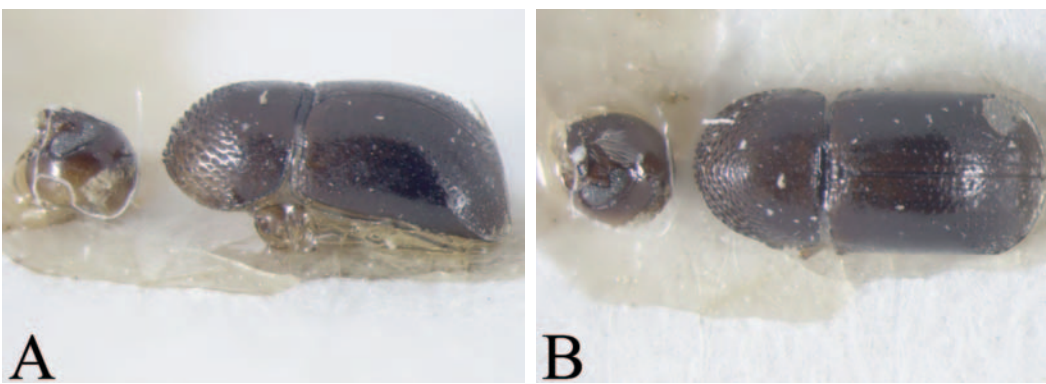


FIGURE 19. Lateral (A) and dorsal (B) views of *Xylosandrus deruptulus*, 1.8 mm, female lectotype.

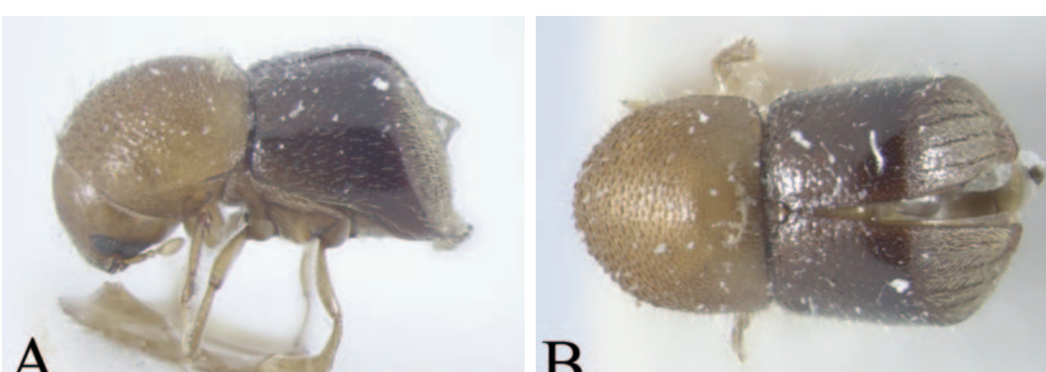


FIGURE 20. Lateral (A) and dorsal (B) views of *Xylosandrus discolor*, 1.8–2.0 mm, female.

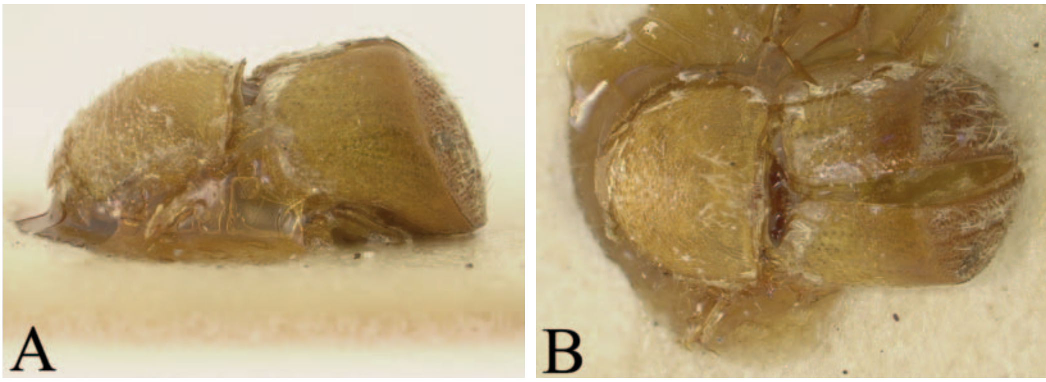


FIGURE 21. Lateral (A) and dorsal (B) views of *Xylosandrus diversepilosus*, 1.8–2.3 mm, female holotype.

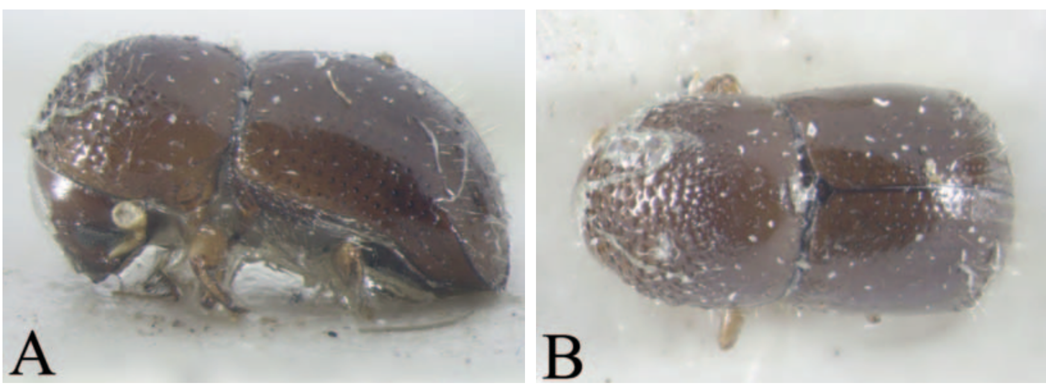


FIGURE 22. Lateral (A) and dorsal (B) views of *Xylosandrus eupatorii*, 1.8–2.1 mm, female cotype.

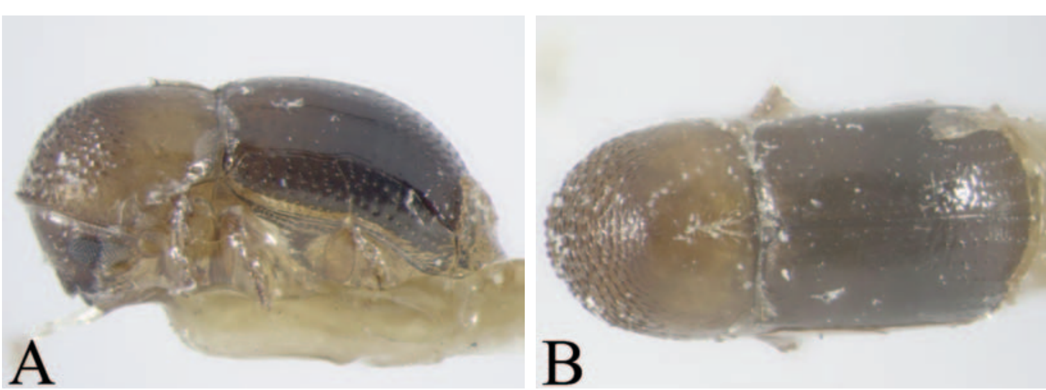


FIGURE 23. Lateral (A) and dorsal (B) views of *Xylosandrus ferinus*, 1.6–1.8 mm, female lectotype.

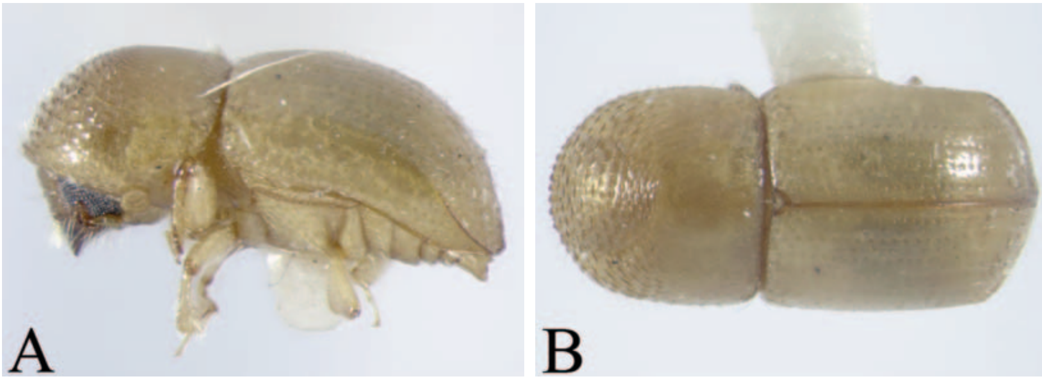


FIGURE 24. Lateral (A) and dorsal (B) views of *Xylosandrus germanus*, 1.9–2.5 mm, female.

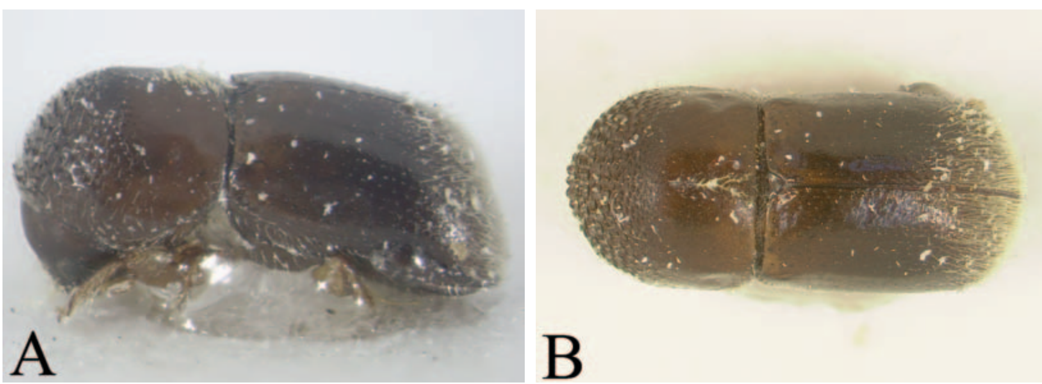


FIGURE 25. Lateral (A) and dorsal (B) views of *Xylosandrus hirsutipennis*, 1.9–2.2 mm, female paratype.

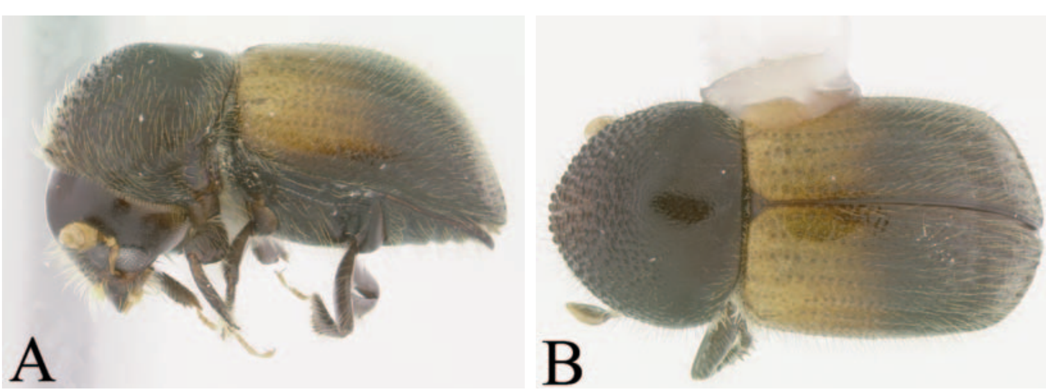


FIGURE 26. Lateral (A) and dorsal (B) views of *Xylosandrus hulcri* n. sp., 2.4–2.7mm, female holotype.

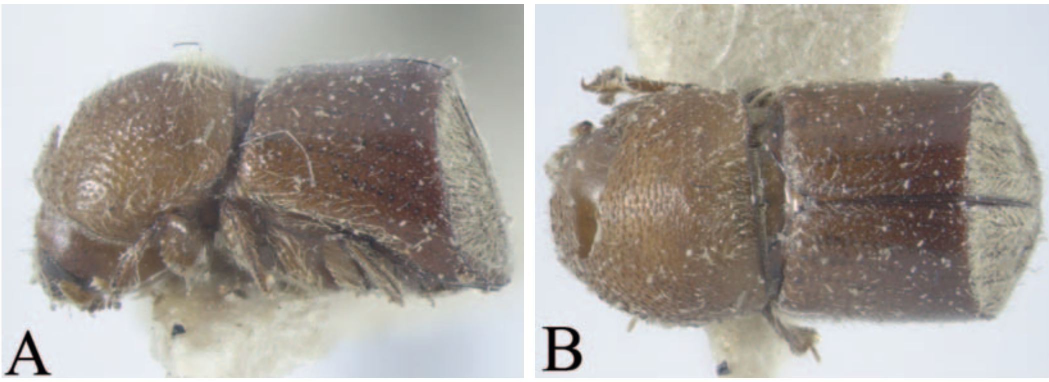


FIGURE 27. Lateral (A) and dorsal (B) views of *Xylosandrus jaintianus*, 3.0 mm, female holotype.

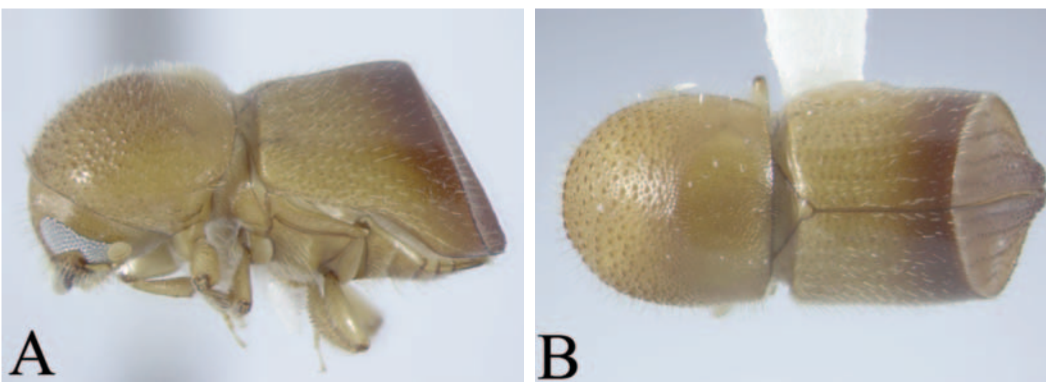


FIGURE 28. Lateral (A) and dorsal (B) views of *Xylosandrus mancus*, 2.9–3.3 mm, female.

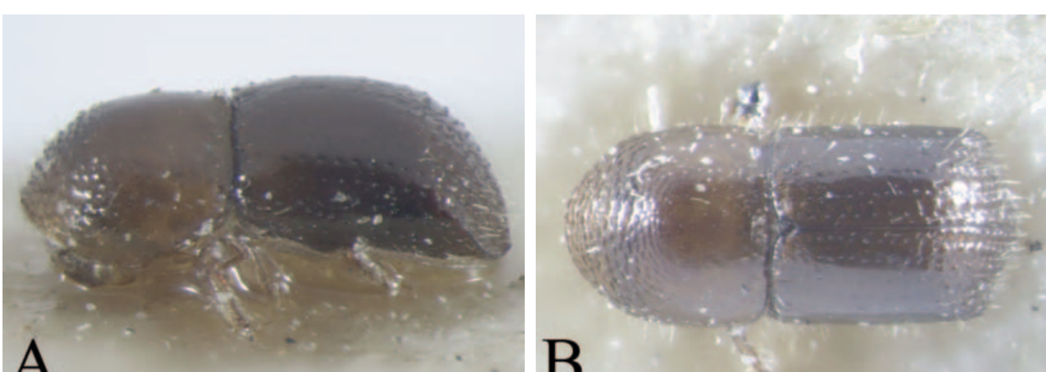


FIGURE 29. Lateral (A) and dorsal (B) views of *Xylosandrus mediocris*, 1.4 mm, female.

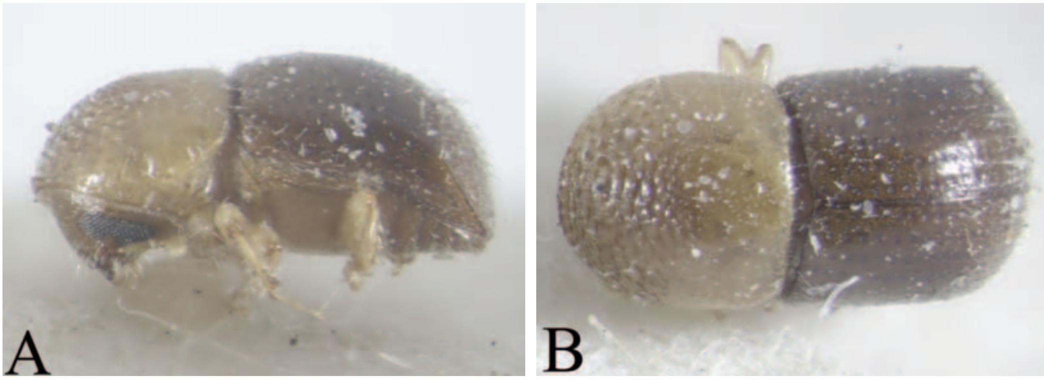


FIGURE 30. Lateral (A) and dorsal (B) views of *Xylosandrus mesuae*, 1.1–1.3 mm, female.

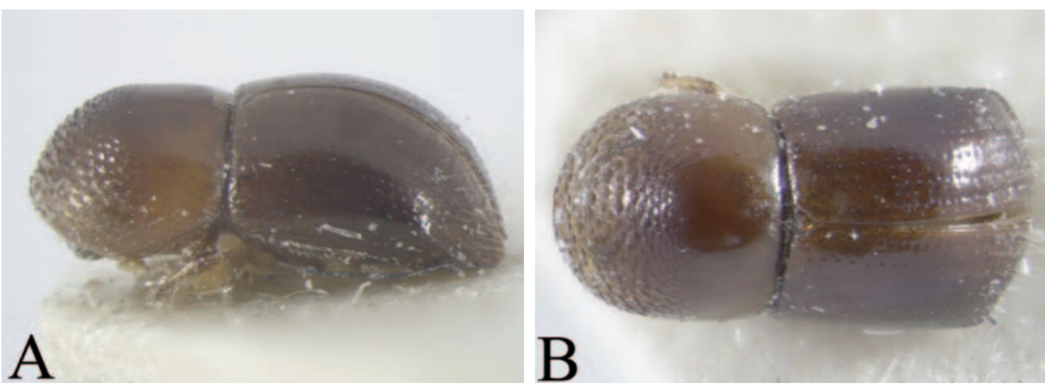


FIGURE 31. Lateral (A) and dorsal (B) views of *Xylosandrus metagermanus*, 1.8 mm, female holotype.

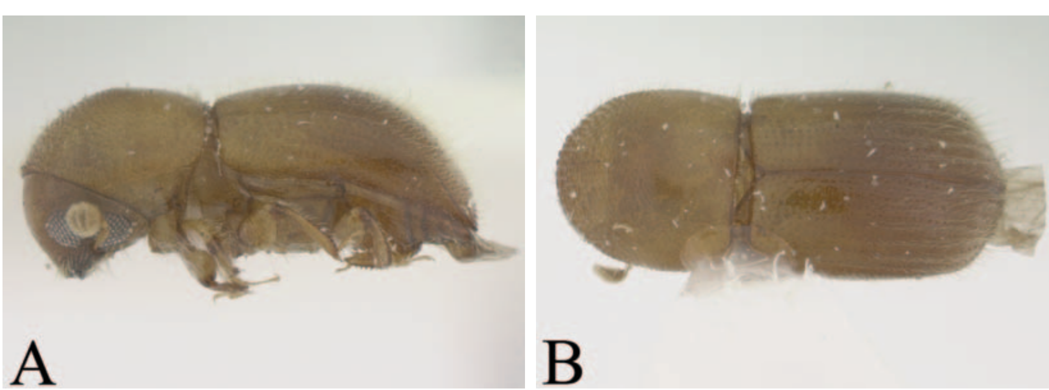


FIGURE 32. Lateral (A) and dorsal (B) views of *Xylosandrus mixtus* n. comb., 2.6–2.7 mm, female holotype.

FIGURE 33. Lateral (A) and dorsal (B) views of *Xylosandrus monteithi*, 3.0–3.4 mm, female paratype.

FIGURE 34. Lateral (C) and dorsal (D) views of *Xylosandrus monteithi*, 2.5 mm, male allotype.

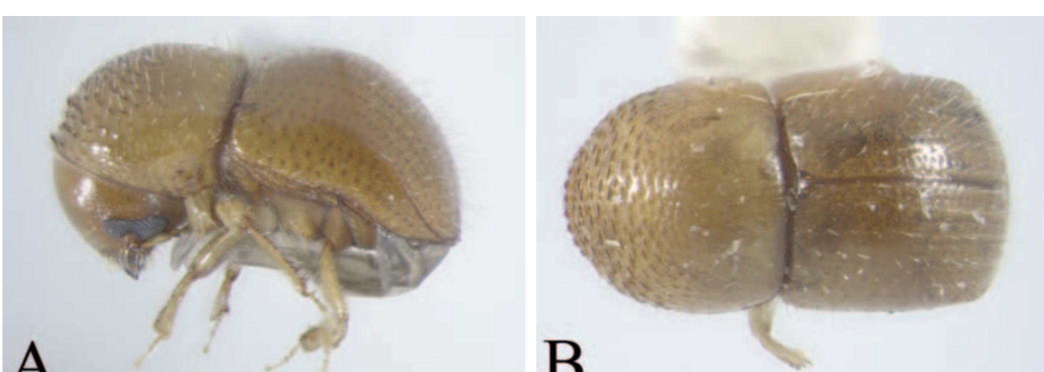


FIGURE 35. Lateral (A) and dorsal (B) views of *Xylosandrus morigerus*, 1.5–2.0 mm, female.

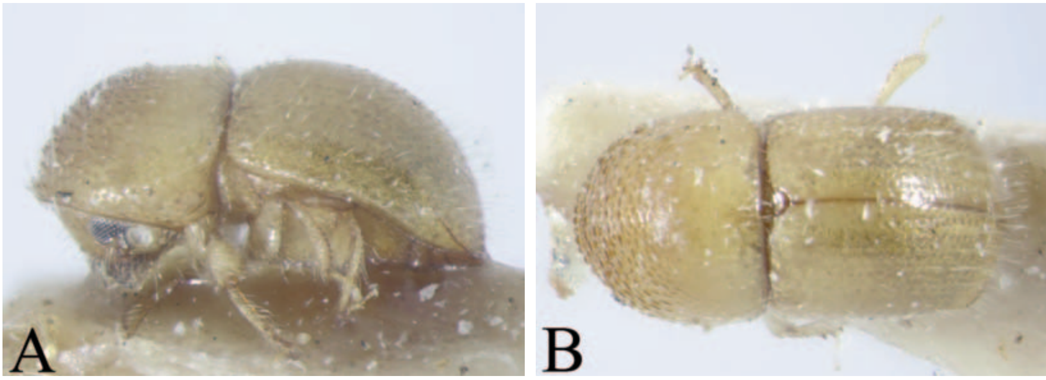


FIGURE 36. Lateral (A) and dorsal (B) views of *Xylosandrus pusillus*, 1.5–1.7 mm, female holotype.

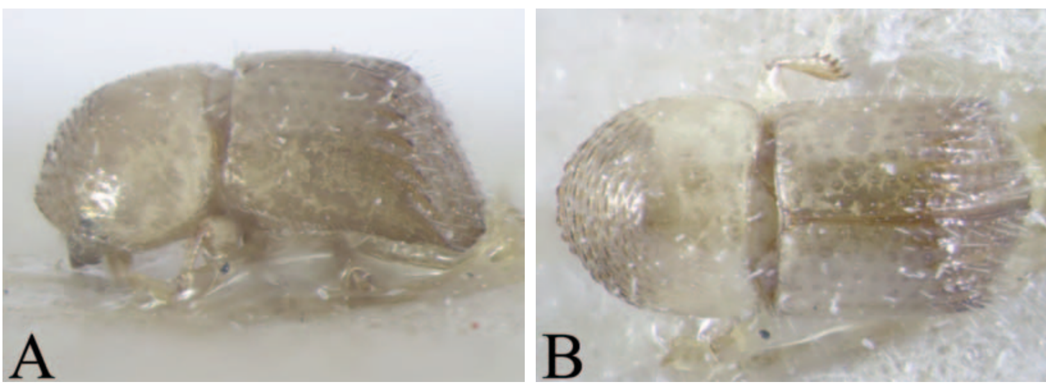


FIGURE 37. Lateral (A) and dorsal (B) views of *Xylosandrus pygmaeus*, 1.3–1.4 mm, female holotype.

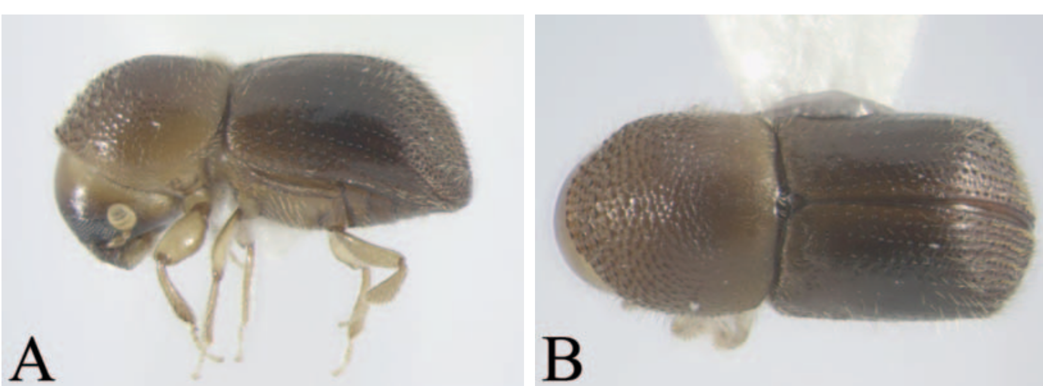


FIGURE 38. Lateral (A) and dorsal (B) views of *Xylosandrus queenslandi*, 1.6–1.9 mm, female paratype.

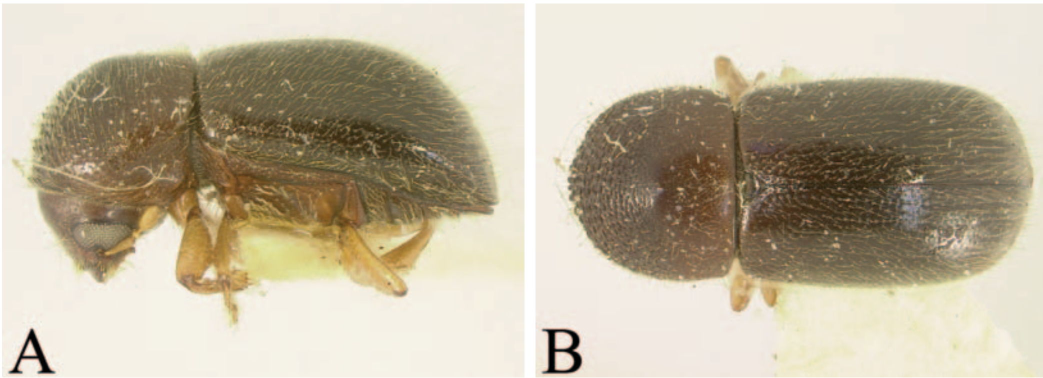


FIGURE 39. Lateral (A) and dorsal (B) views of *Xylosandrus rotundicollis* n. comb., 2.5 mm, female holotype.

FIGURE 40. Lateral (A) and dorsal (B) views of *Xylosandrus russulus* n. comb., 3.4–4.2 mm, female.

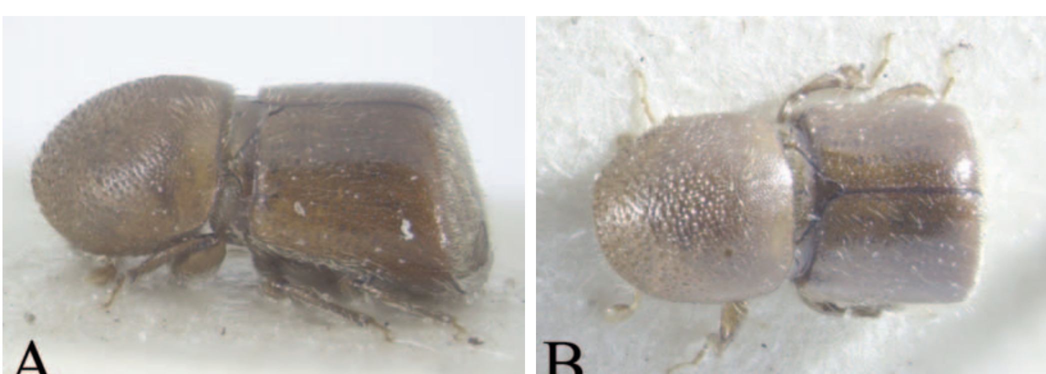


FIGURE 41. Lateral (A) and dorsal (B) views of *Xylosandrus subsimiliformis*, 2.8 mm, female paratype.

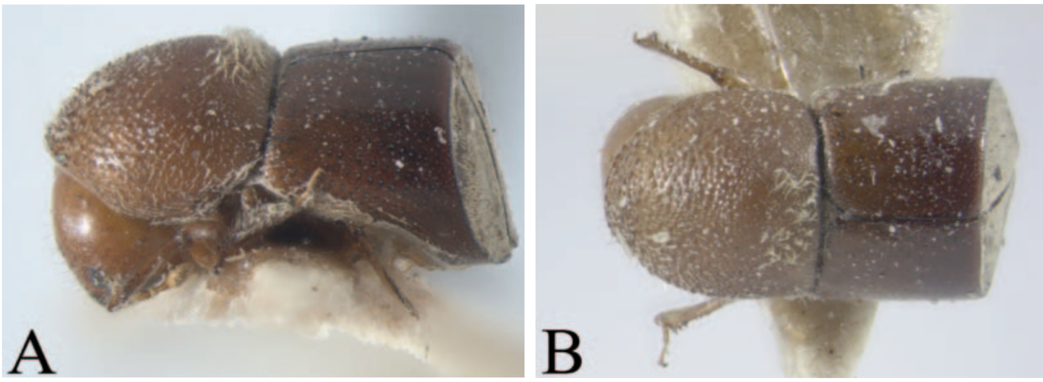


FIGURE 42. Lateral (A) and dorsal (B) views of *Xylosandrus subsimilis*, 2.6 mm, female paratype.

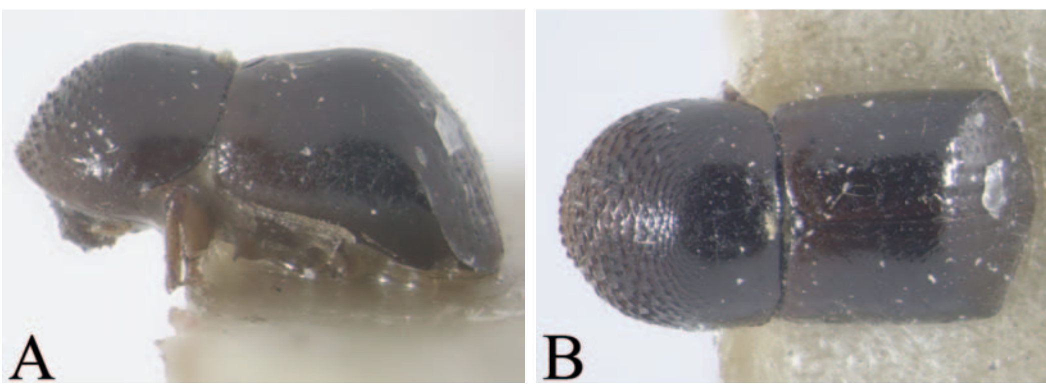


FIGURE 43. Lateral (A) and dorsal (B) views of *Xylosandrus terminatus*, 1.5–1.9 mm, female paratype.

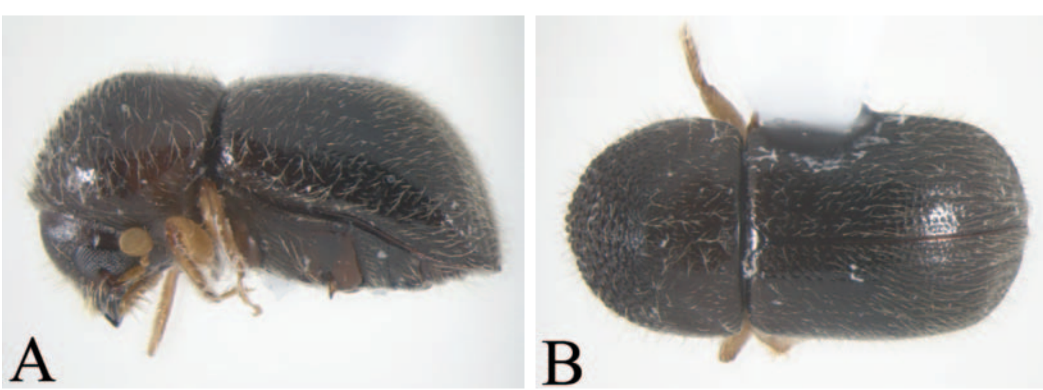


FIGURE 44. Lateral (A) and dorsal (B) views of *Xylosandrus woodi*, 2.3–2.4 mm, female paratype.

28 Aug–19 Oct 1991, Monteith and Janetzki, Pitfall and Intercept traps (1 ♀; RAB). **Oriental Region:** Indonesia: Java, 565 m., Bandjar, VII.32, L. G. E. Kalshoven (1 ♀; NHMW); Java, Boger, VIII-1964, N.L.H. Krauss, avocado branch (4 ♀; USNM); W. Java: 800 m Mount Gedeh, 7.1933, Leg. Kalshoven, Planta nutrix, *Eupartorium* (1 ♀; USNM). Malaysia: Koror, Palau Is. Apr 1953, J. W. Beardsley (1 ♀; USNM). Sri Lanka: Ceylon [Sri Lanka], Hantane, XII.1962, Dr. D. Calnaido (1 ♀; NHMW); Ceylon [Sri Lanka]: Perdadeiya, 11.VII.1914, A. Rutherford (2 ♀; USNM); Ceylon [Sri Lanka], Sabargamuva, 12.XI.1950, E. Judenko (1 ♀; NHMW); Sri Lanka: Col. Dist., Labugama, 23 June 1975, S.L. Wood, Misc. hosts (4 ♀; USNM); Sri Lanka: Col. Dist., Labugama, 23 June 1975, S.L. Wood, collected from twigs (1 ♀; USNM); Sri Lanka: Mate. Dist., 48 km N Naula, 200 mtrs., 14 June 1975, S.L. Wood, Host: Rukaththana (1 ♀; USNM); Sri Lanka: Matte. Dist., 48 km, N Naula, 200 mtrs., 14 June 1975, S.L. Wood, collected from log (1 ♀; USNM); Sri Lanka: Mon. Dist., 8 km NW Bibile, 50 mtrs, 7 June 1975, S.L. Wood, collected from tree seedling (13 ♀; USNM); Sri Lanka: Mon. Dist., 8 km NW Bibile, 50 mtrs, 7 June 1975, S.L. Wood, collected from pole (2 ♀; USNM); Sri Lanka: Mon Dist. 8 km NW Bibile, 50 mtrs, 7 June 1975, S.L. Wood, collected from *Liana* (2 ♀; USNM); Sri Lanka: Rat. Dist., Ratnapura, Resthouse, 200-300 ft., 24-X-1976, black light, Collected by: G. F. Hevel, R.E. Dietz, W. S. Karunaratne, D. W. Balasooriya (1 ♀; USNM). Thailand: Thailand: Chiang Mai, 2.vii.72, R.A. Beaver, ex *Bauhinia variegata* (1 ♀; RAB); Thailand: Chiang Mai: Doi Inthanon, 5.viii.02, R.A. Beaver and K. Koivisto (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 13-14.iv.00, R. A. Beaver (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 12.x.93, R. A. Beaver, At light (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 1-3.I.2000, R.A. Beaver, M.T. (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 5.v.94, R.A. Beaver, At light (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 29–31.x.95, R.A. Beaver, M.T. (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 28.xi.02, R. A. Beaver, FIT (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 9.x.96, R.A. Beaver, ex mango twig (2 ♀; RAB); Thailand: Chiang Mai: Maerim, 5.x.96, R. A. Beaver, ex mango twig (1 ♀, 1 ♂; RAB); Thailand: Chiang Mai: Maerim, 21.ix.96, R. A. Beaver, ex mango twig (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 3.xii.96, R.A. Beaver, ex mango twig (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 16.x.96, R. A. Beaver, ex mango twig (1 ♂; RAB); Thailand: Chiang Mai: Maerim, 26.viii.99, R.A. Beaver, ex *Igall* sp. (1 ♀, 1 ♂; RAB); Thailand: Chiang Mai: Maerim, 23.vii.03, R.A. Beaver, FIT (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 10.xii.02, R. A. Beaver, FIT (1 ♀; RAB); Thailand: Chiang Mai: Maerim, 18.xi.03, R.A. Beaver, FIT (1 ♀; RAB); Thailand: Chiang Mai 300 m, Maerim, 16.I.92, R.A. Beaver (1 ♀; RAB); Thailand: Chiang Mai 300 m, Maerim, 15.I.92, R.A. Beaver (1 ♀; RAB).

Xylosandrus diversepilosus (Eggers)

Figure 21.

Xyleborus diversepilosus Eggers, 1941b:224. Holotype ♀: China, Prov. Fukien (Kuatun, 2300 m), 1.5.1938, L.J. Klapperich; ZMFK.
Xylosandrus diversepilosus (Eggers): Browne, 1963:55.

Diagnosis.— Female 1.8–2.3 mm long; 2.1 times longer than wide. Body light brown; antennae and legs yellowish brown. Frons not visible on specimen examined. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotal disc densely asperate-granulate, with sculpture separated by distance less than or equal to their size. Pronotum with lateral costa, carinate. Procoxae not visible on specimen examined. Pro-, meso- and metatibial teeth not visible on specimen examined. Elytra 1.2 times longer than wide; 1.3 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face steep and abruptly separated from disc. Declivity flattened, lateral margins carinate to 7th interstriae. Four striae visible on declivity. Striae coarsely granulate, without setae. Interstriae granulate, biseriate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

This species is morphologically similar to *X. borealis* (Fig. 11) and *X. brevis* (Fig. 13). *Xylosandrus. diversepilosus* can be distinguished from these species by the following characters: declivital striae coarsely granulate, without setae; and interstriae granulate, with erect, hair-like setae, longer than twice the width of second declivital interstria.

Distribution.— **Oriental Region:** China (Fujian).

Hosts.— Unknown.

Specimens examined.— (1 ♀; 0 ♂) Type material: Holotype *Xyleborus diversepilosus* (♀; ZMFK).

Xylosandrus eupatorii (Eggers)

Figure 22.

Xyleborus eupatorii Eggers, 1940:140. Holotype ♀: Java (Tjibodas, G. Gedeh); Kalshoven Collection.
Xylosandrus eupatorii (Eggers): Schedl, 1964:213.

Diagnosis.— Female 1.8–2.1 mm long; 2.2 times longer than wide. Body brown to dark brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum of equal length and width. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; meso- and metatibial teeth not visible on specimen examined. Elytra 1.2 times longer than wide; 1.2 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

This species is morphologically similar to *X. adherescens* (Fig. 7) and *X. germanus* (Fig. 24). *Xylosandrus eupatorii* can be distinguished from these species by the following characters: pronotum of equal length and width; pronotal disc glabrous, except for mycangial setae; and declivital interstriae uniseriate granulate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

Distribution.— **Oriental Region**: Indonesia (Java).

Hosts.— "*Eupatorium tjibeureum*" (Java).

Specimens examined.— (1 ♀; 0 ♂) Type material: Cotype *Xyleborus eupatorii*: Java: Gedeh, 1700 M., VI.32, leg. H.R.A. Muller, *Eupatorium tjibeureum* (♀; NHMW).

Xylosandrus ferinus (Schedl)

Figure 23.

Xyleborus ferinus Schedl, 1936:31. Lectotype ♀: India: Travancore Mt. Estate, Tamil Nadu, VII.1934, S. A. Ran, on red gum; NHMW; designated by Schedl, 1979a:96.
Xylosandrus ferinus (Schedl): Browne, 1963:55.

Notes.— Schedl (1936) failed to designate a holotype in his original description of *X. ferinus* and subsequently designated a lectotype (Schedl 1979a).

Diagnosis.— Female 1.6–1.8 mm long; 2.2 times longer than wide. Body bicolored, pronotum distinctly lighter than elytra; pronotum light brown and elytra brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 5 socketed teeth on lateral margin; mesotibiae with 8 socketed teeth; metatibial teeth not visible on specimens examined. Elytra 1.4 times longer than wide; 1.6 times longer than pronotum. Discal striae punctate; insterstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Five striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with erect, hair-like setae, shorter than the width of second declivital interstriae.

This species is one of four bicolored *Xylosandrus* with the pronotum distinctly lighter than the elytra: *X. arquatus* (Fig. 9), *X. discolor* (Fig. 20), *X. ferinus*, and *X. mesuae* (Fig. 30). *Xylosandrus ferinus* can be distinguished from *X. discolor* by the following characters: elytral disc gradually curving into declivity. *Xylosandrus ferinus* can be distinguished from *X. mesuae* by the following characters: larger species, 1.6–1.8 mm long; declivital striae without setae; and interstrial setae shorter than the width of second declivital interstriae. *Xylosandrus ferinus* can be distinguished from *X. arquatus* by the following characters: five striae visible on the elytral declivity; declivital striae without setae; and lighter color, with pronotum light brown and elytra brown.

Distribution.— **Oriental Region:** India (Tamil Nadu).

Hosts.— ‘Red gum.’

Specimens examined.— (2 ♀; 0 ♂) Type material: Lectotype *Xyleborus ferinus* (♀; NHMW). Syntype *Xyleborus ferinus*: India: Travancore Mt. Estate, Tamil Nadu, VII.1934, S.A. Ran, on red gum (♀; NHMW).

Xylosandrus germanus (Blandford)

Figure 24.

Xyleborus germanus Blandford, 1894c:106. Syntypes ♀: Oyayama, Nikko, Subashiri, Kiga, Miyanashita: BMNH.

Xylosandrus germanus (Blandford): Hoffmann, 1941:38.

Xyleborus orbatus Blandford, 1894c:123. Holotype ♀: Kurigahara, Japan; BMNH. Synonymy: Choo, 1983:100.

Notes.— Browne (1963) wrongly lists *X. germanus* as the type species for *Xylosandrus*.

Diagnosis.— Female 1.9–2.5 mm long; 2.3 times longer than wide. Body brown to dark brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 5 socketed teeth on lateral margin; mesotibiae with 11–12 socketed teeth; metatibiae with 12–13 socketed teeth. Elytra 1.1 times longer than wide; 1.1 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. adherescens* (Fig. 7) and *X. eupatorii* (Fig. 22). *Xylosandrus germanus* can be distinguished from these species by the following characters: pronotum longer than wide; and pronotal disc evenly pubescent, not glabrous.

Distribution.— **Nearctic Region (Introduced):** Canada (British Columbia, Ontario, Quebec), United States (Connecticut, Delaware, Florida, Illinois, Indiana, Kentucky, Maine, Massachusets, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Virginia, West Virginia). **Oceania (Introduced):** Hawaiian Islands. **Oriental Region:** China (Anhui, Fujian, Shanxi, Xizang [Tibet], Yunnan), Japan, Ryukyu Islands, Taiwan, Vietnam. **Palearctic Region:** Austria (Introduced), Belgium (Introduced), France (Introduced), Germany (Introduced), Italy (Introduced), Korea, Switzerland (Introduced), Yugoslavia (Introduced).

Hosts.— *Abies fabric* (Masters) Craib, *A. pectinata* Poir., *Acer* L. spp., *A. platanoides* L., *A. pseudoplatanus* Falk., *Alnus glutinosa* (L.) Gaertn., *Alnus* Mill. sp, , *Betula verrucosa* Ehrh., *Carpinus betulus* L., *C. laxiflora* (Siebold and Zucc.) Blume, *Carya* Nutt. sp., *Cassia siamea* Lam., *Castanea crenata* Siebold and Zucc., *Castanopsis* (D. Don) Spach sp., *Celtis tenuifolia* Nutt., *Chamaecyparis obtuse* Siebold and Zucc., *Cleyera japonica* Siebold and Zucc., *Cornus florida* L., *Diospyros kaki* Thunb., *Fagus crenata* Blume, *Fagus multinervis* Nakai, *F. sylvatica* L., *Fraxinus* L. spp., *Juglans regia* L., *Juglans* L. sp., *Myrica carolinensis* Mill., *Myrica* L. sp., *Lindera erythrocarpa* Makino, *Liriodendron tulipifera* L., *Machilus* Nees sp., *Morus* L. spp., *Nyssa aquatica* L., *Picea abies* (L.) K. Harst., *P. excelsa* Link, *Pinus densiflora* Siebold and Zucc., *P. pentaphylla* Carrière, *P. strobes* L., *Pinus* L. sp., *Prunus avium* (L.) L., *P. cerasus* L., *Prunus scrotina Ehrh.*, *Prunus* L. spp., *Pyrus serotina* Rehder, *Pyrus* L. sp., *Rhus chinensis* Mill., *Quercus rubra* L., *Q. sessiliflora* Salisb., *Quercus* L. spp., *Robinia pseudoacacia* L., *Schima superba* Gardn. and Champ., *Styrax obassia* Siebold and Zucc., *S. japonicus* Siebold and Zucc., *Taxodium distichum* Rich., *Ulmus effuse* Willd., *Ulmus* L. spp., *Vitis* L. sp., “young chestnut” (Japan), *Ziziphus jujuba* Mill.

Specimens examined.— (66 ♀; 6 ♂) Other material: **Nearctic Region:** United States: Indiana: Turkey Run St. Park, VI-10-1967, L. and C.W.O'Brien (1 ♀; USNM); Indiana: W. Lafayette, McCormick Woods, V.26-1968, Collectors L. and C.W. O'Brien (1 ♀;USNM); IND., W. Lafayette, Tippercanoe Co., 12 Apr. 1981, M. and N. Deyrup, in pan trap below Malaise trap (2 ♀; RAB); Maryland: Takoma Park, Montgomery Co., 17-IV-1969, W.H. Tyson (1 ♀; USNM); North Carolina: McDowell Co., 10.20.1976, B.C. Weber collector (1 ♂; USNM); North Carolina: McDowell Co., 7-21 1977, B. C. Weber collector (1 ♀, 1 ♂; USNM); North Carolina: McDowell Co., 10-19 1976, B.C. Weber collector (2 ♀; USNM); North Carolina: McDowell Co., 10.20.1976, B.C. Weber collector (9 ♀; USNM); North Carolina: Raleigh, 25.6.63, *Prunus scrotina* (1 ♀; NHMW); New Jersey: Norwood, Apl 11 1944, Schott, from branches of *Myrica carol* (6 ♀; USNM); New Jersey: Princeton, 2 June 1971, R.J. Gouger, *Fagus sylvatica* (4 ♀; USNM); New York: Kingston, Jun 8, 1939, Esselbaugh, H.R. Dodge Collection (1 ♀; USNM); New York: New Rochelle, IV.20.1932, L. Lacey collector (3 ♀; USNM); Ohio: Chillicothe, 28-VI-50, *Liriodendron tulipifera* (3 ♀; USNM); Ohio: Moreland Hills, 3.VIII.1981, W.V. Miller (1 ♀; CAS); Virginia: Albemarle Co., Ivy ex *Vitis*, cane tunnels, 29 Apr 1983, D.G. Pfeiffer coll. (2 ♀; USNM). **Oriental Region:** China: S. China: Fukien, Shaowu, Tachulan, V.14.1942, T. Maa (2 ♀; CAS). Japan: Japan: III-1917, Van Dyke Collection, in trunk of young chestnut (1 ♀; CAS); Japan, Hokkaido, Gamushi, VI.9.1956, Akira Nobuchi (2 ♀; USNM); Japan: Honshu, Higashiaraya, Kushibiki-machi, Yamagata Pref., 13.Vi.1996, K. Domon leg., Host tree: *Pyrus serotina* Rehder (1 ♀, 2 ♂; RAB); Japan: Kyushu, Shiiya-touge Pass, Miyazaki-Kumamoto Pref., 25.Vi.1994, H. Goto leg. (1 ♀; RAB); Japan: Matsukawa, 27-VII-1980, S.L. Wood (1 ♀; USNM); Japan: Tamagowa, 29-VII-1980, S.L. Wood, *Fagus* *cranatus* (6 ♀; USNM); Japan: Tokyo, Mt. Takao, IX.22.1950, Akira Nobuchi (2 ♀; USNM). Thailand: Thailand: Chiang Mai: Doi Suthep, 7.viii.02, R.A. Beaver, K. Koivisto (2 ♀; RAB). **Palearctic Region:** Germany: Germania (Hessen) 28.8.52, Darmst-Kranichst, Geishecke, leg. F. Groschike, *Quercus* (1 ♂; NHMW, 1 ♂; BMNH); IGB–Sengscheid, SAAR, Wald, 18.6.90, leg. Mosbacher (4 ♀; RAB). Switzerland: Helvetia, Arlesheim, 1988, In traps (2 ♀; RAB). **Oceania:** Hawaiian Islands: USA: HI: O'ahu I., N. Halawa Valley, NW of Honolulu, 390 m, 21º25′N, 157º51′W, 11-29.VI.1991, FMHD#91-4, Met. Polym.-Psidium-Hibiscus mixed nat./exotic forest, A. Newton and M. Thayer, #869, window trap (4 ♀; FMNH).

Xylosandrus hirsutipennis (Schedl)

Figure 25.

Xyleborus hirsutipennis Schedl, 1961b:144. Holotype ♀: Madagascar, Perinet, Montagne d'Ambre, Antanid-itra: IRSM.

Xylosandrus hirsutipennis (Schedl): Wood and Bright, 1992:796.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors failed to indicate it as a "new combination."

Diagnosis.— Female 1.9–2.2 mm long; 2.3 times longer than wide. Body brown to dark brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum of equal length and width. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 5 socketed teeth on lateral margin; mesotibiae with 7 socketed teeth; metatibiae with 7 socketed teeth. Elytra 1.3 times longer than wide; 1.3 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Five striae visible on declivity. Striae granulate, with semi-appressed, hair-like setae, longer than the width of second declivital interstriae. Interstriae granulate, multiseriate, with semi-appressed, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. crassiusculus* (Fig. 16). Both species have a declivital face that is matte in appearance due to densely, finely, and confusedly granulate striae and interstriae. *Xylosandrus hirsutipennis* can be distinguished from *X. crassiusculus* by the following characters: frons punctate; pronotum with a lateral carina; pronotal disc glabrous, except for mycangial setae; elytral disc uniseriate punctate; five striae visible on elytral declivity; and declivital striae and interstriae with semi-appressed, hair-like setae, longer than the width of second declivital interstriae.

Distribution.— **Afrotropical Region:** Madagascar.

Hosts.— *Cassipourea* Aubl. sp., *Ficus soroceoides* Baker var. *macrophlebia* H. Perrier, *Harungana madagascariensis* Poir., *Psychotria* L. sp., *Urophyllum lyallii* Baker, *Vernonia* Schreb. sp.

Specimens examined.— (3 ♀; 1 ♂) Type material: Paratypes *Xyleborus hirsutipennis*: Madagascar, Perinet, 21.XI.1952, Dr. K.E. Schedl (2 ♀; NHMW); Madagascar, Montagne d'Ambre, 7.XII.1952, Dr. K.E. Schedl (1 ♂; NHMW); Madagascar, Montagne d'Ambre, 5.XII.1952, Dr. K. E. Schedl (1 ♀; NHMW).

Xylosandrus hulcri Dole and Cognato, sp. nov.
Figure 26.

DESCRIPTION.— Female (Fig. 26): Body oval, 2.4–2.7 mm long, 2.0 times longer than wide, bicolored, with pronotum and elytral apices dark brown, dorsal ⅓ and lateral ⅔ of elytra yellowish brown, ventral side and appendages dark brown. Frons convex, coriaceous, sparsely punctate between eyes, long erect hair-like setae originating from punctures, weak ridge at middle of frons just above epistoma. Epistoma with dense row of long and short hair-like setae along lower margin. Eyes emarginate. Antennal funicle 5-segmented, scape and funicle with spare, short, hair-like setae; club obliquely truncate, first segment sclerotized, forming a circular costa (type 1, Hulcr et al. 2007), circular costa closed posteriad, oblique part of club densely pubescent, second segment not corneous; posterior face of club covered entirely by first segment (type 1, Hulcr et al. 2007). Pronotum 0.9 times longer than wide, rounded dorsally (type 1, Hulcr et al. 2007), widest about one-half pronotal length from base, anterior half broadly rounded and then tapering slightly toward apex, basal angles rounded, anterior margin with 4–6 asperities; anterior slope densely asperate, asperities smallest at summit and increasing in size toward anterior margin; disc moderately punctate, lacking a patch of denser punctures medially at base, background sculpture finely granulate; lateral aspect of pronotum rounded (type 1, Hulcr et al. 2007), lateral costa extending approximately two-thirds pronotal length, lateral carina absent; pronotal vestiture of long and short, moderately appressed, hair-like setae. Scutellum triangular, yellowish-brown to dark brown, flush with surface of elytra. Elytra 1.2 times longer than wide, 1.4 times as long as pronotum, shining, parallel-sided on basal two-thirds and then broadly rounded toward apex. Striae not impressed, shallowly and regularly punctate, long erect hair-like setae originating from punctures. Interstriae twice the width of striae, finely punctate, confused, long (1.5–2 times width of interstria) and short (less than width of interstria) erect hair-like setae originating from punctures. Declivity commencing behind mid-point of elytra, gradually separating from disc; lateral margins carinate to 7th interstriae. Procoxae widely separated. Protibiae with 5 socketed teeth on lateral margin; mesotibiae with 7–8 socketed teeth; metatibiae with 8 socketed teeth. Abdominal ventrites evenly punctured, punctures with long, erect, hair-like setae.

SPECIMENS EXAMINED.— (4 ♀; 0 ♂) TYPE MATERIAL: Holotype ♀: Papua New Guinea, Chimbu, Mu Village, March 2006, 1600 m asl. Hulcr and Coganto coll. *Ficus mollior*. Vila 1462. In MSU. Paratypes ♀: Papua New Guinea, Chimbu, Mu Village, March 2006, 1600 m asl. Hulcr and Coganto coll. *Ficus mollior*. Vila 1462. One paratype in FICB. Three paratypes in MSU. One paratype female was used for DNA extraction, and remains are vouchered at MSU.

Male: Unknown.

ETYMOLOGY.— This species is named for Jiri Hulcr (Michigan State University), who collected the type series and whose collecting efforts have contributed greatly to our knowledge of the tropical scolytine fauna.

DIAGNOSIS.— This species can be readily distinguished from all other known *Xylosandrus* species by its distinct color pattern, with testaceous patches on the elytra basally and laterally.

DISTRIBUTION.— **Australian Region:** Papua New Guinea.

HOSTS.— *Ficus mollior* Benth.

DISCUSSION.— This species is known from a single collecting event. Specimens were collected at the same locality, but from galleries in several host trees. This species is mycocleptic and has been found in association with and stealing ambrosial fungus from *Xylosandrus rotundicollis*. Phylogenetic analysis places it as sister to the Australian species, *X. queenslandi*.

Xylosandrus jaintianus **(Schedl)**

Figure 27.

Xyleborus jaintianus Schedl, 1967:161. Holotype ♀: Shillong, Assam, C.F.C. Beeson, 22.V.1925; NHMW.
Xylosandrus jaintianus (Schedl): Wood and Bright, 1992:796.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors failed to indicate it as a "new combination."

Diagnosis.— Female 3.0 mm long; 2.0 times longer than wide. Body brown; antennae and legs same color as body. Frons rugose, with distinct median keel between eyes. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presense of a pronotal-mestonotal mycangium. Pronotal disc densely asperate-granulate, with sculpture separated by distance less than or equal to their width. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 5 socketed teeth on lateral margin; mesotibiae with 11 socketed teeth; metatibiae with 11–12 socketed teeth. Elytra 1.1 times longer than wide; 1.1 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity with depressed areas on each side of raised interstriae, lateral margins carinate to 7th interstriae. Four striae visible on declivity. Striae coarsely granulate, with appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, multiseriate, with appressed, hair-like setae, shorter than the width of second declivital interstriae.

This species is morphologically similar to *X. beesoni* (Illustrated in Saha et al. 1992), *X. discolor* (Fig. 20), and *X. subsimiliformis* (Fig. 41). *Xylosandrus jaintianus* can be distinguished from these species by the following characters: first and second declivital interstriae elevated toward apex, with depressed areas on each side of raised interstriae; frons rugose with a distinct median keel.

Distribution.— **Oriental Region:** Burma, India (Assam). **Palearctic Region:** Nepal.

Hosts.— Unknown.

Specimens examined.— (4 ♀; 0 ♂) Type material: Holotype *Xyleborus jaintianus* (♀; NHMW). Paratype *Xyleborus jaintinaus*: N.E. Burma: Kambaiti, 7000ft., 23/5/1934, R. Malaise (♀; BMNH).

Other material: **Palearctic Region:** Nepal: Nepal-Himalaya: Annapurna mts. N-Pokhara, Madi-Khola-Tal, 1850m, 2.v.1996, leg. O. Jäger (1 ♀; RAB); Nepal, Kali Gandaki Tai 2 km SO Narcheng oberth. Rele Khola, HO-Hang, 2300 m, N28º30'40", E83º41'33", 25.v.2001, leg. O. Jäger (1 ♀; RAB).

Xylosandrus mancus **(Blandford)**

Figure 28.

Xyleborus mancus Blandford, 1898:428. Holotype ♀: Ceylon, E. E. Green; BMNH.
Apoxyleborus mancus (Blandford): Wood 1980:90.
Xylosandrus mancus (Blandford): Wood 1984:229.
Xyleborus abruptus Sampson, 1914:388. Syntypes ♀: Seychelles, Mahe: high forest of Morne Blanc, and Cascade Estate; BMNH. Synonymy: Schedl, 1951:51.
Xyleborus mancus formosanus Eggers, 1930:186. Holotype ♀: Formosa: Taihoku; FRI. Synonymy: Schedl, 1952:61.

Notes.— This species was first included in *Xylosandrus* when Wood (1984) synonymized *Apoxyleborus* with *Xylosandrus*.

Diagnosis. Female 2.9–3.3 mm long; 1.2–1.4 times longer than wide. Body yellowish brown to brown; elytra darker brown at apex and declivity; legs and antennae the same color as body. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming circular costa; segment one covering entire posterior face. Of approximately equal length and width. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 5 socketed teeth on lateral margin; mesotibiae with 11 socketed teeth; metatibiae with 12 socketed teeth. Elytra 1.2 times longer than wide; 1.2 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity flattened, lateral margins carinate, with carina extending beyond 7th interstriae, forming a circumdeclivital ring. Four striae visible on declivity. Striae punctate, without setae. Interstriae granulate, without setae.

This species is one of two *Xylosandrus* with the margin of the elytral declivity with a carina or rim of granules that extends beyond the 7th interstriae, forming a circumdeclivital ring: *X. amputatus* (Fig. 8) and *X. mancus*. *Xylosandrus mancus* can be distinguished from *X. amputatus* by the following characters: 2.9–3.3 mm long; 1.2–1.4 times as long as wide; declivtial striae with a row of large, shallow punctures, arranged in a somewhat wavy line; and declivital interstriae shining, not densely granulate.

Distribution.— **Afrotropical Region:** Madagascar, Mauritania, Seychelles Islands, Tanzania. **Oriental Region:** China (Gansu, Xizang [Tibet]), India (Maharashtra, Tamil Nadu), Indonesia (Java, Sumatra), Japan, Malaysian Peninsula, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam.

Hosts.— *Adenanthera pavonina* L., *Albizia* Benth. sp., *Anacardium occidentale* L., *Aphanamixis rohituka* Pierre, *Artocarpus dadah* Miq., *Brackenridgea hookeri* (Planch.) A. Gray, *Buchanania lanzan* Spreng., *B. latifolia* Roxb., *Butea frondosa* Wall., *Calophyllum inophyllum* L., *Cassia fistula* L., *Cordia dichotoma* G. Forst., *Cordia myxa* L., *Dalbergia latifolia* Roxb., *Dryobalanops aromatica* Gaertn., *D. oblongifolia* Dyer, *Gomphia serrata* (Gaertn.) Kanis, *Grewia paniculata* Roxb., *Hibiscus macrophyllus* Roxb., *Hopea beccariana* Burck, *H. ferrea* Heim, *Hullettia dumosa* King, *Khaya senegalensis* Juss., *Litsea megacarpa* Gamble, *Mangifera indica* L., *Melanorrhoea* Wall. sp., *Nephelium lappaceum* L., *Palaquium gutta* Burk., *Pometia pinnata* J. R. Forst. and G. Forst., *Quercus* L. sp., *Shorea bracteolata* Dyer, *S. leprosula* Miq., *S. macroptera* Dyer, *S. sumatrana* (Slooten) Desch, *Styrax benzoin* Dryand., *Swietenia macrophylla* King, *S. mahagoni* (L.) Jacq., *Tectona grandis* L., *Theobroma cacao* L., *Toona sureni* Merrill., *Tristania whiteana* Griff., *Vateria copallifera* (Retz.) Alston, *Vitex pubescens* Vahl.

Specimens examined.— (69 ♀; 2 ♂) Type material: Holotype *Xyleborus mancus* (♀; BMNH).

Other material: **Afrotropical Region:** D.O. Africa (1 ♀; NHMW). Madagascar: Madagascar, Ambila, 28.XI.1952, K.E. Schedl (1 ♀, 1 ♂; NHMW). Seychelles: Seychelles: P.R. Dupont, 1915, attacking Cashew (3 ♀; BMNH). **Oriental Region:** Indonesia: Java: Kediri Forest, II.1925, L.G.E. Kalshoven (2 ♀; USNM); Java: Kediri, III.1925, L.G.E Kalshoven (1 ♀; NHMW). Japan: Japan: Kagoshima Pref., Tarumizuy, Oonohara, Broadleaf forest, 425 m, 14 May 2001, Yoshikazu Sato coll., ex. ETOH-baited trap (2 ♀; MSU); Japan: Kagoshima Pref., Tarumizuy, Oonohara, Broadleaf forest, 425 m, 3 July 2001, Yoshikazu Sato coll., ex. ETOH-baited trap (1 ♀; MSU). Malaysia: Sarawak, Bako National Park, 29 Oct–2 Nov 1998, 50 m, B. Jordal coll. (1 ♀; MSU); Malaya, Selangor, Kepong, 8.IV.1934, Selangor Mus., ex. *Styrax benzoin* (1 ♀; NHMW); Selagor, Kajang, ex *Clenderai* [*Clerodendron*?], 5. XII.1948, F.G. Browne (3 ♀; USNM). Philippine Islands: Manila, Philippine Islands, Colln PC, McGregow (1 ♀; USNM); Philippine Islands: Puerto Princesa. Palawan Is., sea level, 2nd growth forest, IV.29.47, H. Hoogstraal leg. (1 ♀; FMNH). Singapore: Singapore, Bukit Timah, 50 m, 25–27 Oct 1998, B.H. Jordal coll., *Cinnamomum* (1 ♀; MSU). Sri Lanka: Sri Lanka: Bad. Dist., Buttala, 5 June 1975, S.L. Wood, collected from liana (5 ♀; USNM); Sri Lanka: Bad. Dist., Butatala, 5 June 1975, S.L. Wood, collected from pole (8 ♀, 1 ♂; USNM); Sri Lanka: Bat. Dist., Unnichchai, 9 June 1975, S.L. Wood, collected from liana (2 ♀; USNM); Ceylon [Sri Lanka]: Col. Dist. Tunmodera, 200 ft, 17-XI-1970, O.S. Flint, Jr. (2 ♀; UISNM); Sri Lanka: Gal. Dist., Kanneliya, 250 mtrs., 23 May 1975, S.L. Wood, Collected from pole (9 ♀; USNM); Ceylon [Sri Lanka]: Hantane, XII.1962, D. Calnaido (1 ♀; NHMW); Ceylon [Sri Lanka]: Kan. Dist., Kandy, 1-15 March 1971, Piyadasa and Somapala (4 ♀; USNM); Ceylon [Sri Lanka]: Kan. Dist., 5 mi NW Mahiyangana, 30 Mar-9 Apr 1971, P. and P. Spangler (2 ♀; USNM); Sri Lanka: Keg. Dist., Kitulgala, 200 m, 30 May 1975, S.L. Wood, host: *Osbeckia aspera* (1 ♀; USNM); Sri Lanka: Matte. Dist., 5 km SE Naula, 200 mtrs, 14 June 1975, S.L. Wood, misc. hosts (4 ♀; USNM); Sri Lanka: Matte. Dist., 5 km SE Naula, 200 mtrs, 14 June 1975, S.L. Wood, collected from *Liana* (1 ♀; USNM); Sri Lanka: Mon. Dist. 8 km NW Bibile, 50 mtrs, 7 June 1975, S.L. Wood, collected from pole (5 ♀; USNM); Sri Lanka: Mon. Dist., Buttala, 50 mtrs, 6 June 1975, S.L. Wood, collected from pole (1 ♀; USNM); Sri Lanka: Pol. Dist. 32 km N Polonnaruwa, 11 June 1975, S.L. Wood, collected from pole (1 ♀; USNM); Sri Lanka: Rat. Dist. Gilimale, 17 May 1975, S.L. Wood, host: *Myristica dactyloides* (1 ♀; USNM); Ceylon [Sri Lanka]: Rat. Dist., Uggaalkaltota 350 ft., irrigation bungalow, 31 Jan–8 Feb 1970, Davis and Rowe (1 ♀; USNM); Ceylon [Sri Lanka], Sabagamuva, Millawitiya Est., 3-10.Vii.1956, E. Judenko (1 ♀; NHMW).

Xylosandrus mediocris **(Schedl)**

Figure 29.

Xyleborus mediocris Schedl, 1942a:185. Lectotype ♀: Malaya, N.S. Pasoh Forest Reserve, 12-II-1938, ex *Shorea dasyphylla*; NHMW.
Xylosandrus mediocris (Schedl): Browne, 1963:55.

Diagnosis.— Female 1.4 mm long; 2.3 times longer than wide. Body brown; antennae and legs yellowish brown. Frons not visible on specimen examined. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum of equal length and width. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae not visible on specimen examined. Pro-, meso- and metatibial teeth not visible on specimen examined. Elytra 1.3 times longer than wide; 1.3 times longer than pronotum. Discal striae punctate; interstriae uniseritae punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. adherescens* (Fig. 7), *X. eupatorii* (Fig. 22), and *X. germanus* (Fig. 24). *Xylosandrus mediocris* can be distinguished from these species by the following characters: 1.4 mm long; pronotum of equal length and width; and declivital interstriae uniseriate granulate, with erect, hair-like setae, longer than the width of second declivital interstriae.

Distribution.— **Oriental Region:** Malaysia.

Hosts.— *Dipterocarpus cornutus* Dyer, *Shorea dasyphylla* Foxw.

Specimens examined.— (1 ♀; 0 ♂) Type material: Lectotype *Xyleborus mediocris* (♀; NHMW).

Xylosandrus mesuae (Eggers)

Figure 30.

Xyleborus mesuae Eggers, 1930:182. Holotype ♀: Bengal (Kalimpong), Aug. 1910 on *Mesua ferra*; FRI.
Xylosandrus mesuae (Eggers): Browne, 1963:55.

Diagnosis.— Female 1.1–1.3 mm long; 2.2 times longer than wide. Body bicolored, pronotum distinctly lighter than elytra; pronotum light brown and elytra dark brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 6 socketed teeth; metatibiae with 8 socketed teeth. Elytra 1.3 times longer than wide; 1.6 times longer than pronotum. Discal striae punctate; interstriae uniseriate, very finely punctate. Elytral disc gradually curving into declivity. Declivity convex, carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is one of four bicolored *Xylosandrus* with the pronotum distinctly lighter than the elytra: *X. arquatus* (Fig. 9), *X. discolor* (Fig. 20), *X. ferinus* (Fig. 23), and *X. mesuae*. *Xylosandrus mesuae* can be distinguished from *X. discolor* by the following characters: elytral disc gradually curving into declivity. *Xylosandrus mesuae* can be distinguished from *X. arquatus* and *X. ferinus* by the following characters: 1.1–1.3 mm long; declivital striae with setae; declivital interstriae with erect, hair-like setae, longer than the width of second declivital interstriae.

Distribution.— **Australian Region:** Papua New Guinea. **Oriental Region:** India (Bengal, Uttar Pradesh), Sri Lanka.

Hosts.— *Dipterocarpus zeylanicus* Thwaites., *Macaranga* Thou. sp., *Mesua ferrea* L., *Osbeckia aspera* Benth., *Shorea robusta* Roth.

Specimens examined.— (102 ♀; 1 ♂) Type material: Paratype *Xyleborus mesuae*: Bengal, Kalimpong on *Mesua ferrea* (♀; NHMW).

Other material: **Australian Region:** Papua New Guinea: Papua New Guinea, Lae, 15 km S Lae, 100 m, 13.2.2003, B. Jordal and A. Sequeira leg. ex *Macaranga* petoles (3 ♀; RAB). **Oriental Region:** Sri Lanka: Ceylon [Sri Lanka]: 10-16.VII.1956, Sabargamuva, Millawitiya Est., E. Judenko (1 ♀; NHMW); Sri Lanka: Col Dist. Labugama, 23 June 1975, S.L. Wood, collected from legume tree (2 ♀; USNM); Sri Lanka: Col. Dist. Labugama, 23 June 1975, S.L. Wood, collected from twigs (64 ♀; USNM); Sri Lanka: Col. Dist. Labugama, 23 June 1975, S.L. Wood, host: *Dipterocarpus zeylanicus* (25 ♀, 1 ♂; USNM); Sri Lanka: Keg. Dis. Kitulgala, 200 m, 30 May 1975, S.L. Wood, host: *Osbeckia aspera* (6 ♀; USNM).

Xylosandrus metagermanus (Schedl)

Figure 31.

Xyleborus metagermanus (Schedl), 1951: 58. Holotype ♀: U. Dihing Res., Lakhimpur Assam, 6. VIII. 1931, ex *Gmelina arborea*, C. F. C. Beeson; NHMW.
Xylosandrus metagermanus (Schedl): Browne, 1963: 55.

Diagnosis.— Female 1.8 mm long; 2.0 times longer than wide. Body light brown to brown; antennae and legs same color as body. Frons rugose. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 5 socketed teeth on lateral margin; meso- and metatibial teeth not visible on specimen examined. Elytra 1.1 times longer than wide; 1.2 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. mixtus* (Fig. 32). *Xylosandrus metagermanus* can be distinguished from *X. mixtus* by the following characters: 1.8 mm long; six striae visible on declivity; declivital striae without setae; declivital interstriae uniseriate granulate.

Distribution.— **Oriental Region:** India (Assam).

Hosts.— *Gmelina arborea* Roxb**.**

Specimens examined.— (1 ♀; 0 ♂) Type material: Holotype *Xyleborus metagermanus* (♀; NHMW).

Xylosandrus mixtus (Schedl), new combination

Figure 32.

Xyleborus mixtus Schedl, 1979b:108. Holotype ♀: Papua, Butolo, Morobe Distr., Upper Monki, L.A., 16.3.1973, sticky trap Nr. 1604, F.R. Wylie and P. Shanahan; NHMW.
Amasa mixtus (Schedl): Wood and Bright, 1992:683.

Notes.— This species was first included in *Amasa* by Wood and Bright (1992), but the authors failed to indicate it as a “new combination.”

Diagnosis.— Female 2.6–2.7 mm long; 2.4 times longer than wide. Body light brown; antennae and legs same color as body. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae narrowly, but completely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 9 socketed teeth; metatibiae with 10 socketed teeth. Elytra 1.4 times longer than wide; 1.6 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, carinate to 7th interstriae. Five striae visible on declivity. Striae punctate, with semi-appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, multiseriate, with erect, hair-like setae, more than twice as long as width of second declivital interstriae.

This species is morphologically similar to *X. metagermanus* (Fig. 31). *Xylosandrus mixtus* can be distinguished from *X. metagermanus* by the following characters: 2.6–2.7 mm long; five striae visible on elytral declivity; declivital striae with semi-appressed, hair-like setae; declivital interstriae multiseriate granulate.

Distribution.— **Australian Region:** New Guinea.

Hosts.— Unknown.

Specimens Examined.— (1 ♀; 0 ♂) Type material: Holotype *Xyleborus mixtus* (♀; NHMW).

Xylosandrus monteithi Dole and Beaver

Figures 33–34.

Xylosandrus monteithi Dole and Beaver, 2008. Holotype ♀: AUSTRALIA, Queensland, Palmerston, Henrietta Cr., 550m, ex unknown tree, 22.1.2000 (B. Jordal). In QMB (Accession # T144402).

Diagnosis.— Female 3.0–3.4 mm long; 2.1 times longer than wide. Body dark brown or blackish, base of pronotum and elytra lighter brown, ventral side and appendages yellowish brown. Frons reticulate with coarse punctures. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of erect and semi-appresssed long hair-like setae; pronotal disc densely setose, setae as dense as on anterior pronotum. Pronotum lacking a dense patch of setae at base of pronotum. Pronotal disc moderately punctate. Lateral aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin, meso- and metatibiae with 7–9 socketed teeth. Elytra 1.2 times longer than wide; 1.6 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate, becoming granulate toward declivity. Elytral disc gradually curving into declivity. Declivity convex, lateral margins rounded, without a carina or a row of tubercles or serrations. Six striae visible on declivity. Striae punctate, with semi-appressed, hair-like setae, longer than the width of second declivital interstriae. Interstriae granulate, multiseriate, with semi-appressed, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. rotundicollis* and *X. russulus*. *Xylosandrus monteithi* can be distiniguished from these two species by the following characters: Basal pronotum lacking a dense patch of setae; declivital striae with semi-appressed, hair-like setae, longer than the width of second declivital interstriae. *Xylosandrus monteithi* may also be confused with *X. woodi*, but the later species has small tubercles marking the lateral declivital margin.

Distribution.— **Australian Region:** Australia (Queensland).

Hosts.— Unknown.

Specimens examined.— (1 ♀; 1 ♂) Type material: Paratype *Xylosandrus monteithi*: Australia, Queensland, Palmerston, Watchua Falls, Jan. 2000, 550 m, ex unknown tree, 24.1 B. Jordal leg (♀; MSU). Allotype *Xylosandrus monteithi*: Australia, Queensland, Palmerston, Watchua Falls, Jan. 2000, 550 m, ex unknown tree, 24.1 B. Jordal leg. (♂; MSU).

Xylosandrus morigerus (Blandford)

Figure 35.

Xyleborus morigerus Blandford, 1894a:264. Syntypes ♀: probably New Guinea; BMNH.
Xylosandrus morigerus (Blandford): Reitter, 1913:83.
Xyleborus coffeae Wurth, 1908:199. Syntypes ♀: Java; type location unknown. Synonymy: Strohmeyer, 1910:86.
Xyleborus luzonicus Eggers, 1923:174. Lectotype ♀: Mt. Makiling, Insel Luzon, Philippinen; USNM.
Xylosandrus luzonicus (Eggers): Browne, 1963:55. Synonymy: Wood, 1974:287.
Xyleborus difficilis Eggers, 1923:174. Lectotype ♀: Java, Hagedorn coll., 1915; USNM.
Xylosandrus difficilis (Eggers): Browne, 1963:55. Synonymy: Synonymy Bright and Skidmore 1997:4, 169.

Xyleborus abruptoides Schedl, 1955:298. Holotype ♀: Fiji: Viti Levu, Navai Mill, near Nandarivatu, 2500 ft., 15.IX.1938, beating shrubbery; BPBM.
Xylosandrus abruptoides (Schedl): Browne, 1963:55. Synonymy (= *Xylosandrus difficilis*) Beaver 1995:17.

Diagnosis.— Female 1.5–2.0 mm long; 2.1 times longer than wide. Body light to dark brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate basally. Lateral aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotum with a lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 8–10 socketed teeth; metatibiae with 10 socketed teeth. Elytra 1.2 times longer than wide; 1.4 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Declivital face steep and abruptly separated from disc. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, with erect hair-like setae, shorter than the width of second declivital interstriae. Interstriae punctate, uniseriate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

This species is morphologically similar to *X. derupteterminatus* (Fig. 18) and *X. terminatus* (Fig. 43). *Xylosandrus morigerus* can be distinguished from these species by the following characters: elytral declivity convex; six striae visible on declivity; declivital striae with setae; and declivital interstriae uniseriate punctate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

Distribution.— **Afrotropical Region:** Gabon, Madagascar, Mauritius Islands, Zaire. **Australian Region:** Australia (Queensland), New Britain Island, New Guinea, Solomon Islands. **Neotropical Region:** Brazil, Colombia, Costa Rica, Ecuador (Santa Cruz in Galapagos Islands), Honduras, Mexico (Campeche, Chiapas, Oaxaca, Tabasco, Varacruz), Panama, Puerto Rico, Tobago, Venezuela. **Oceania:** Fiji Islands, Hawaiian Islands, Micronesia, Samoan Islands, Tonga (Vava'u). **Oriental Region:** India (Bengal, Tamil Nadu), Indonesia (Borneo, Celebes, Java, Sumatra, Timor), Malaysia (Sarawak), Philippines, Sri Lanka, Taiwan, Vietnam. **Palearctic Region (Introduced):** Austria, Czechoslovakia, United Kingdom, France, Italy, Jordan, Lebanon.

Hosts.— *Acacia gaumeri* S.F. Blake, *Acalypha* L. sp., *Actinophora fragrans* Wall., *Adenanthera pavonina* L., *Albizia falcate* (L.) Backer, *A. glauca* Benth., *A. procera* Benth, *Albizia* Durazz. sp., *Alseis yucatanensis* Standl., *Altingia excelsa* Noronha, *Arthrophyllum diversifolium* Blume, *Amomum* L. sp., *Aspidosperma* Mart and Zucc. sp., *Astronium graveolens* Jacq., *Bixa orellana* L., *Boehmeria* Jacq. sp., *Bridelia* Willd. sp., *Brosimum alicastrum* Sw., *Bursera simaruba* (L.) Sarq., *Butea monosperma* Kuntze, *Calamus* L. sp., *C. caesius* Blume, *Calophyllum brasiliense* Camb., *Camellia sinensis* Kuntze, *C. thea* Link., *C. theifera* Dyer, *Cassia multijuga* Rich., *Castanea argentea* Blume, *Castanopsis* (D. Don.) Sprach. sp., *Cattleya* Lind. sp., *Cedrela odorata* L., *Cedrela* P. Browne sp., *Cecropia obtusifolia* Bertol., *Ceiba pentandra* (L.) Gaertn., *Centrosema plumieri* Benth., *Cecropia* Loefl. sp., *Chrysophyllum cainito* L., *Cinchona* L. sp., *Claoxylon polot* Merr., *Clidemia hirta* Don., *Cocos nucifera* L., *Coffea arabica* L., *Coffea excelsa* Cheval., "*C. hybrida*" (Java: Schedl 1963a) , *C. liberica* Bull. ex Schum., *C. robusta* L. Linden, *Cola acuminate* Schott and Endl., *Cordia dodecandra* DC., *Crotalaria* L. sp., *C. anagyroides* Kunth, *C. usaramoensis* Baker, *Dalbergia latifolia* Roxb., *Dendrobium* Sw. sp., *D. phalaenopsis* Fitzq., *D. superbum* Rchb., *D. veratrifolium* Lindl., *Derris microphylla* (Miq.) B.D. Jacks, *Didymopanax*

Decne. and Planch. sp., *Dryobalanops oblongifolia* Dyer, *Endospermum malaccense* Muell.-Arg., *Epidendrum stamfordianum* Bateman , *Erythrina lithosperma* Miq. Var, *inermis* Kds. and Val., *Erythroxylon novogranatense* Hieron., *Esenbeckia pentaphylla* Griseb., *Eugenia polyantha* Phil., *Eupatorium pallescens* DC., *Eusideroxylon zwageri* Teijsm. and Binn., *Ficus* L. sp., *Ficus ampelas* Burm., *Fissistigma elegans* Merr., *Flemingia strobilifera* (L.) W.T. Aiton, *Freycinetia hombroni* Martelli, *Fuchsia* L. sp., *Glochidion* J.R. Forst. and G. Forst. sp., *Grewia laevigata* Vahl, *Gynotroches onillaris* Blume, *Hevea brasiliensis* Muell.-Arg., *Intsia palembanica* Miq., "Laurel roja" (Venezuela), *Lecythis* Loefl. sp., *Leucaena glauca* Benth., *Licania hypoleuca* Benth., *Lonicera caprifolium* L., *Macaranga* Thou. sp., *Machaerium cirrhiferum* Pittier, *Marumia muscosa* Blume, *Melia azedarach* L., *Miconia trinervia* Coqn., *Ochroma lagopus* Sw., "Palito negro" (Venezuela), *Persea gratissima* Gaertn., *Phalaenopsis* Blume sp., *Pometia pinnata* Forst., *Pouteria sapota* (Jacq.) H.E. Moore and Stearn, *Quararibea* Aubl. sp., *Renathera storiei* Rchb., *Sambucus javanica* Reinw. ex Blume, *Schizolobium parahyba* (Vell.) Blake, *Schleichera oleosa* Merr., *Serjania* Mill. sp., *Shorea* Roxb. ex C.F. Gaertn sp., *S. leprosula* Mil., *Spondias mombin* L., *Swietenia macrophylla* King, *S. mahagoni* (L.) Jacq., *Tabebuia rosea* DC., *Tarenna incerta* Koord. and Valeton, *Tectona grandis* L., *Tephrosia* Pers. sp., *T. maxima* Pers., *T. vogelii* Hook, *Thea sinensis* L., *Theobroma cacao* L., *Terminalia amazonica* (J.F. Gmel.) Exell, *Trema micrantha* (L.) Blume, *T. orientale* Blume, *Vanda* Jones ex. R.Br. sp., *V. coerulea* Griff. ex Lindl., *V. teres* Lindl., *V. tricolor* Lindl., *Vitis* L. sp.

Specimens examined.— (197 ♀; 13 ♂) Type material: Lectotype *Xyleborus difficilis* (♀; USNM). Allotype *Xylosandrus difficilis*: Java, Bnadya, VII-33, L.G.E. Kalshoven (♂; NHMW). Cotype *Xyleborus difficilis*: Java: Coll. Hagedorn, 1915 (♀; NHMW). Lectotype *Xyleborus luzonicus*: Mt. Makiling, Luzon, Baker, Eggers collection 1948 (♀; USNM). Paratype *Xyleborus abruptoides*: Fiji: Viti Levu, Navai Mill, Nr. Nandarivatu, 2500 ft., 15.IX.1938, beating shrubbery (♀; NHMW).

Other material: **Australian Region:** Australia: In *Phalaenopsis* sp. VI-17-35 (17 ♀, 1 ♂; USNM); Australia, on *Vanda coerulea*, VI-25-1938 (3 ♀; USNM); Australia: In *Vanda coerulea*, VII-7-36 (9 ♀, 3 ♂; USNM); Australia, Fullaway, Nov. 26 1934, *Dendrobium phalaenopsis* (1 ♀; USNM); Australia: Brisbane, S. F., 3/1/49. In Quar., *Dendrobium phalenopsis* host, collector Art Retan (4 ♀, 1 ♂; CAS). Solomon Islands: Solomon Islands: Guadalcanal, Mt. Austin. 11 Jan 1984, M. Bigger, boring in *Pometia pinnata* midrib (1 ♀; BMNH). **Nearctic Region:** United States: New Jersey, Bound Brook, Aug 14/16, B. Weiss Harry colr., *Cattleya* (6 ♀, 3 ♂; USNM). **Neotropical Region:** Colombia: Colombia: 24 km E Barbosa, VII-18-70, Antioquia, el. 1200 m, S.L. Wood, Lauraceae (1 ♀; USNM); Colombia: 24 km E Barbosa, VII-18-70, Antioquia, el. 1200 m, S.L. Wood, *Xylopia* sp. (2 ♀; USNM); Colombia: 8 km S Colonia V. de Cauca, VII-9-70, el. 30 m, S.L. Wood, *Aspidosperma* sp. (5 ♀; USNM); Colombia: 8 km S Colonia V. de Cauca, VII-9-70, el. 30 m, S.L. Wood, *Lecythis* sp. (1 ♀; USNM); Colombia: 8 km S Colonia V. de Cauca, VII-9-70, el. 30 m, S.L. Wood, *Chrysophyllum catmito* (1 ♀; USNM). Costa Rica: Costa Rica: Pandora lim., 150 ft., VIII-23-1963, S.L. Wood, *Cecropia* sp. leaf petioles (1 ♀; USNM); Costa Rica: San Jose, Santa Ana, 4000 ft., X 4–1963, S.L. Wood, unknown limb (1 ♀; USNM). Ecuador: Ecuador: Galap: St. Cruz, 1.7 km N St, Rosa, 1-30.V.91, 550 m, Scalesia, mal-FIT, S. and J. Peck (2 ♀; CAS); Ecuador, Napo Prov., Rees. Ethnica Waorani, 1 km S. Onkone Gare Camp, Trans. Ent. 00º39′10″S, 076º26′W, 220 m. elev., July 1995, T. L. Erwin, et al collectors (1 ♀; USNM); Ecuador, Napo Prov., Rees. Ethnica Waorani, 1 km S. Onkone Gare Camp, Trans. Ent. 00º39′10″S, 076º26′W, 220 m. elev., January 1996, T. L. Erwin, et al collectors (1 ♀; USNM); Ecuador, Napo Prov., Rees. Ethnica Waorani, 1 km S. Onkone Gare Camp, Trans. Ent. 00º39′10″S, 076º26′W, 220 m. elev., July 1996, T. L. Erwin, et al collectors (3 ♀; USNM); Ecuador, Napo Prov., Tiputini Biodiversity Station, 220-250 m, October 1998, 00º37′55″S, 076º08′39″W, T. L. Erwin, et al collectors (3 ♀; USNM). Honduras: Honduras, at Tampa, 28-III-1968, J. Jordan, in orchid plnt. stem (1 ♀; USNM); Honduras: Zamorano, Moraz, 2200 ft., IV-18-1946, S.L. Wood, *Serjania* (2 ♀; USNM). Mexico: OAX, Romero 18 mi N, 400 ft, VI-29-1967, S.L. Wood, unknown twig (1 ♀; USNM); Mexico: OAX, Romero 18 mi N, 400 ft, VI-29-1967, S.L. Wood, unknown branch (1 ♀; USNM); Mexico: OAX, Romero 23 mi N, VI-29-1967, 300 ft., S.L. Wood, unknown branch (1 ♀; USNM); Mexico: VC, Coatzocoalcos, 18 mi E, VI-26-1967, el. 100ft., S.L. Wood, unknown log

(2 ♀; USNM); Mexico, Vera Cruz, and Oaxaca, 24-VIII-66, Cool. G. Schwenke, Orchids and bromeliads (8 ♀; USNM). Nicaragua: Finca San Pedro, Matagalpa, 10-IV-81, en tallo de Cacao, Coll. J.A. Estrada (4 ♀; USNM). Panama: Ancon, C.I., 18.VII-45, *Epidendrum stamfordianum* Broelle (1 ♀; USNM), Barro Colorado, CZ Panama, 16, 19, 21/5 1986, Henk Wolda (2 ♀; UCDC); Barro Colorado, CZ Panama, 25, 28, 30. IV.1986, Henk Wolda (2 ♀; UCDC); Barro Colorado, CZ Panama, 22, 24, 26. IX. 1986, Henk Wolda (6 ♀; UCDC); Barro Colorado, CZ Panama, 28, 31/3. 2/4. 1986, Henk Wolda (2 ♀; UCDC); Barro Colorado, CZ Panama, 20-24.X.1986, Henk Wolda (4 ♀; UCDC); Barro Colorado, CZ Panama, 25-29.V.1987, Henk Wolda (2 ♀; UCDC); Barro Colorado, CZ Panama, 1-5.VI.1987, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 1-5.XII.1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 23-27.II.1987, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 15, 17, 19. IX.1986, Henk Wolda (3 ♀; UCDC); Barro Colorado, CZ Panama, 4, 8, 9. IV. 1986, Henk Wolda (2 ♀; UCDC); Barro Colorado, CZ Panama, 14, 17, 19, .III. 1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 9, 12, 14. V. 1986, Henk Wolda (2 ♀; UCDC); Barro Colorado, CZ Panama, 1, 3, 5.IX.1986, Henk Wolda (13 ♀; UCDC); Barro Colorado, CZ Panama, 25, 27. VIII. 1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 18, 21, 23. IV. 1986, Henk Wolda (2 ♀; UCDC); Barro Colorado, CZ Panama, 29.IX/1,3.X.1986, Henk Wolda (6 ♀; UCDC); Barro Colorado, CZ Panama, 8-12.XII.1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 11, 14, 16/4.1986, Henk Wolda (3 ♀; UCDC); Barro Colorado, CZ Panama, 2, 5, 7/5. 1986, Henk Wolda (2 ♀; UCDC); Barro Colorado, CZ Panama, 31-I/3-II.1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 6, 9, 11.VI.1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 7, 9, 11.VII.1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 18, 20, 22.VIII. 1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 13, 15, 17.X.1986, Henk Wolda (1 ♀; UCDC); Barro Colorado, CZ Panama, 21, 23, 25.VII.1986, Henk Wolda (1 ♀; UCDC); Panama: Barro Colo Is. OZ, I-II-45, J. Zetek (3 ♀; USNM); Barro Colo. Is., CZ, Mar. Apr. 49, Zetek (1 ♀; USNM); Barro Colorado Isl., CZ, XII-46-II-47 J Zetek collector (1 ♀; USNM); Panama: Barro Colorado Island, CZ, VII-23-1966, S.L. Wood, unknown log (1 ♀; USNM); CZ Panama, Lion Hill, VI 21 1982, R.B. Kimsey Col. (1 ♀; UCDC); Panama: CZ, Ft Amador, VII-27-66, S.L. Wood, unknown twigs (4 ♀; USNM); Panama: CZ, Gatun Dam, 40 ft., XII-31-1963, S.L. Wood, *Cecropia* sp. leaf petioles (2 ♀; USNM); Panama: Panama Prov., 6-8 km N El Llano on El Llano-Carti Road, VI-6-1994, F. Andrews and A. Gilbert (1 ♀; CSCA); Panama: Panama Prov. 9 km N El Llano, V-21-1993, F. Andrews and A. Gilbert (1 ♀; CSCA). Venezuela: Venezuela 9 km S of Barrancas, Barinas, 150 m, XI-5-69, S.L. Wood, *Spondias mombin* (2 ♀; USNM); Venezuela: 9 km S of Barrancas, Barinas, 150 m, XI-5-69, S.L. Wood, *Inga* (1 ♀; USNM); Venezuela: 8 km SW Bumbum, Barinas, II-11-1970, 150 m, S.L. Wood, Cucurbitaceae (1 ♀; USNM); Venezuela: 20 km SE El Vigia Merida, XII-10 69, el. 50 m, S.L. Wood, unknown vine (1 ♀; USNM); Venezuela: Finca Monasterios, Cacaugua, Mir., 1971, *Theobroma cacao* (1 ♀; USNM). Sanat Domingo, 25-I-1980, Coffee, J. Esenbar (1 ♀; USNM); Venezuela: 40km SE Socopo, Barinas, I-25-1970, 150 m, S.L. Wood, Palito negro (1 ♀; USNM); Venezuela: 40 km SE Socopo, Barinas, I-25-1970, 150 m, S.L. Wood, Laurel roja (1 ♀; USNM). **Oceania:** Fiji Islands: Fiji, Viti Levu, Nadarivatu, VIII.1955, B.A. O'Connor, young mahogany (2 ♀; NHMW). Samoan Islands: Samoa: Afiamalu, Upolu, VII-10-40, beating dead branches, E. C. Zimmerman collector (1 ♀; NHMW). **Oriental Region:** Indonesia: Java, Bnadya, VII-33, L. G.E. Kalshoven (2 ♀; NHMW). India: Coffee Res Sub-station, Chethalli, Karnataka, Sp. 70. on *Coffea robusta* (1 ♀; BMNH); Java: W Bandjar, 1933, leg. Kalshoven, *Tectona* (2 ♀; USNM). La Reunion, Saint Pierre, 17.X.1989, Orchidee, S. Quilici (3 ♀; USNM). Malaysia: Malaya: Kelantan, I:VII:1947, F.G. Browne (3 ♂; BMNH). Philippine Islands: Philippines, X-23-63, E. Shiroma and E. Davidson, in orchid sp. (1 ♀; USNM); Philippine Is., Apr. 2, 1940, In *Renanthera storiei* (1 ♀; USNM); Philippine Is., *Dendrobium superbum*, E. Arbios, Sept.19.1933 (1 ♀; USNM). Sri Lanka: Ceylon [Sri Lanka]: Peradeniya, 29.VII.1914, A. Rutherford (1 ♀; NHMW); Sri Lanka: Kal. Dist., Morapitiya, 250 mtrs., 27 May 1975, S.L. Wood (1 ♀; USNM). **Palearctic Region:** United Kingdom: England, St. Albans, *Dendrobium phalenopsis*, IV-25-30, E. Rannells, intercepted Washington D.C. (3 ♀, 4 ♂; USNM).

Xylosandrus nanus (Blandford), nomen dubium

Xyleborus nanus Blandford, 1896b:242. Holotype ♀: Noumea (Delauney); Location of holotype unknown.
Xylosandrus nanus (Blandford): Browne, 1963:55.

Notes.— *Xylosandrus nanus* was described from a single specimen by Blandford in 1896. When Browne (1963) transferred the species to *Xylosandrus*, he noted that it was "probably at most a variation of *X. morigerus*." Furthermore, Wood and Bright (1992) incorrectly cite the holotype as housed in the BMNH. Since Blandford did not indicate where the holotype was deposited in his original description, the location of the holotype is unknown. Therefore, the authors were unable to examine any specimens of *X. nanus*. Blandford distinguished it from *X. morigerus* by the characters of minute granules and setae on the elytral declivity. Among several hundred specimens examined from New Caledonia, not one corresponded to *X. nanus* (Beaver pers. comm). Given that after over 100 years *X. nanus* is still only known from the holotype, the validity of this species is doubtful.

Distribution.— **Oceania:** New Caledonia.

Hosts.— Unknown.

Specimens examined.— Unable to examine any specimens (see notes above).

Xylosandrus pusillus (Schedl)

Figure 36.

Xyleborus pusillus Schedl, 1961a: 91. Holotype ♀: Luzon, Rizal, Mt. Irid; NHMW.
Xylosandrus pusillus (Schedl): Schedl, 1964:213.

Diagnosis.— Female 1.5–1.7 mm long; 1.9 times longer than wide. Body light brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.7 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with a lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibial teeth not visible on specimen examined; metatibiae with 10 socketed teeth. Elytra 1.2 times longer than wide; 1.4 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins carinate to 7th interstriae. Six striae visible on declivity. Striae punctate, with semi-appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

This species is morphologically similar to *X. compactus* (Fig. 14) and *X. curtulus* (Fig. 17). It can be distinguished from *X. curtulus* by a pronotal disc that is evenly pubescent, rather than mostly glabrous. *Xylosandrus pusillus* is nearly morphologically identical to *X. compactus*. The only character distinguishing the two species is the degree of body stoutness, with *X. pusillus* being 1.9 times as long as wide and *X. compactus* being 2.3 times as long as wide. However, this is too large a disparity to warrant synonymizing the two species without further investigation.

Distribution.— **Oriental Region:** Philippines (Luzon).

Hosts.— Unknown.

Specimens examined.— (1 ♀; 0 ♂) Type material: Holotype *Xyleborus pusillus* (♀; NHMW).

Xylosandrus pygmaeus (Eggers)

Figure 37.

Xyleborus pygmaeus Eggers, 1940: 142. Holotype ♀: Ost-Java (Alas Tbedek) leg. Bedemann; NHMW.
Xylosandrus pygmaeus (Eggers): Browne, 1963: 55.

Diagnosis.— Female 1.3–1.4 mm long; 2.3 times longer than wide. Body light brown to brown; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum of equal length and width. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate basally. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 6 socketed teeth; metatibiae with 5 socketed teeth. Elytra times 1.2 longer than wide; 1.4 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Declivital face steep and abruptly separated from disc. Declivity flattened, lateral margins carinate to 7th interstriae. Five striae visible on declivity. Striae punctate, without setae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. borneensis* (Fig. 12). *Xylosandrus pygmaeus* can be distinguished from *X. borneensis* by the following characters: elyral declivity with striae less impressed; five striae visible on declivity; declivital striae with erect or semi-erect, hair-like setae, longer than the width of the second declivital interstriae; and pronotum with a lateral costa, but not carinate.

Distribution.— **Oriental Region:** Indonesia (Java), Malaysia, Sri Lanka.

Hosts.— *Litsea amara* Blume, *Vitex pubescens* Vahl.

Specimens examined.— (11 ♀; 0 ♂) Type material: Holotype *Xyleborus pygmaeus* (1 ♀; NHMW).

Other material: **Oriental Region:** Indonesia: E. Java: Bangelan, 14.5.1932 (1 ♀; USNM); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Plot B, ca 300 m Lowland Forest, Mar-85, Flight intercept trap (1 ♀; RAB). Malaysia: Brunei: Temburong: Nr. K. Belalong Field, Study Centre 150 m, 4°33′N 115°09′E, 21.ii.1992, R.A. Beaver, RGS/UBD Exped. (1 ♀; RAB); Malaysia: Sabah Sipitang, Mendolong, T6/R, 14.iii.1989, leg. S. Abdebratt (1 ♀; RAB); Malaysia: Sabah Sipitang, Mendolong, T5/R, 10.iii.1989, leg. S. Abdebratt (1 ♀; RAB); Malaysia: Sabah Sipitang, Mendolong, T6/R, 14.iii.1989, leg. S. Abdebratt (1 ♀; RAB); Malaysia: Sabah Sipitang, Mendolong, T6/R, 11.v.1988, leg. S. Abdebratt (1 ♀; RAB); Malaysia: Sabah Sipitang: Mendolong, T5/R, 28.iv.1988, leg. S. Abdebratt, comps. Sp'm det. F. G. Browne (1 ♀; RAB); Selegor, Kejang, 25. 1. 1949, F.G. Browne, ex *Vitex pubescens* (1 ♀; BMNH). Sri Lanka**:** Ceylon [Sri Lanka]: W. Prov., Labugama, 24 miles ESE Colombo, 21.I.62, in sweep net (1 ♀; NHMW).

Xylosandrus queenslandi Dole and Beaver

Figure 38.

Xylosandrus queenslandi Dole and Beaver, 2008. Holotype ♀: AUSTRALIA, Queensland, Bunya Mountain NP, 1100m, ex Leguminosae tree, 19.i.2000 (B. Jordal and A. Sequeira); QMB.

Diagnosis.— Female 1.6–1.9 mm long; 2.2 times longer than wide. Body light brown to brown; elytra slightly darker than pronotum; antennae and appendages light brown. Frons retilculate and sparsely punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9

times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presense of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin, meso- and metatibiae with 7–9 socketed teeth. Elytra 1.2 times longer than wide; 1.4 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity flattened, lateral margin marked by a row of coarse, closely placed serrations. Six striae visible on declivity. Striae coarsely granulate, with erect, tapered hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is one of three *Xylosandrus* with lateral declivital margins that are marked by coarse serrations: *X. abruptulus* (Fig. 6), *X. corthyloides* (Fig. 15), and *X. queenslandi*. *Xylosandrus queenslandi* can be distinguished from *X. corthyloides* by the presence of a dense patch of mycangial setae on the basal pronotum. *Xylosandrus queenslandi* can be distinguished from *X. abruptulus* by the following characters: declivital face steep and abruptly separated from disc; declivity matte; and declivital striae with erect, acutely tapering, hair-like setae, shorter than the width of the second declivital interstriae.

Distribution.— **Australian Region:** Australia (Queensland).

Hosts.— *Argyrodendron actinophyllum* (Bailey) Edlin.

Specimens examined.— (2 ♀; 0 ♂) Type material: Paratypes *Xylosandrus queenslandi*: Australia: Queensland, Bunya mountains National Park, Jan. 2000, 1100 m, ex. Leguminosae tree, 19.1 B. Jordal and A. Sequeira leg. (2 ♀; MSU).

Xylosandrus rotundicollis (Browne), new combination

Figure 39.

Xyleborus rotundicollis Browne, 1984:73. Holotype ♀: New Guinea: Morobe District, Mount Kaindi, 2350 m, 4.XI.1972; BMNH.

Diagnosis.— Female 2.5–3.2 mm long; 2.1 times longer than wide. Body dark brown; antennae and legs light brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.7 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae narrowly, but completely separated. Protibiae with 6 socketed teeth on lateral margin; mesotibiae with 9–10 socketed teeth; metatibiae with 9–11 socketed teeth. Elytra 1.4 times longer than wide; 2.1 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins rounded, without a carina or a row of tubercles or serrations. Six striae visible on declivity. Striae punctate, with semi-appresssed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

Xylosandrus rotundicollis was recovered as sister species to *X. russulus* in a molecular phylogeny containing many *Xylosandrus* spp. (Dole et al., in review). However, the two taxa are separated by appreciable molecular distance and can be distinguished by several morphological characters.

This species is morphologically similar to *X. monteithi* (Fig. 33) and *X. russulus* (Fig. 40). *Xylosandrus rotundicollis* can be distinguished from *X. monteithi* by the following characters: 2.5 mm long; basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium; declivital striae with semi-appressed, hair-like setae, shorter than the width of the second declivital interstriae; and declivital interstriae uniseriate granulate, with erect, hair-like setae, longer than twice the width of the second declivital interstriae. *Xylosandrus rotundicollis* can be distinguished from *X. russulus* by the following characters: 2.5–3.2 mm long; elytral surface shining; prosternal posterocoxal process less pointed; protibiae broadened toward apex, armed with 6 socketed teeth.

Distribution.— **Australian Region:** Papua New Guinea.

Hosts.— *Ficus* L. sp., *F. mollior* Benth., *Gordonia* Ellis sp., *Meliosma* Blume sp., *Schefflera* sp. J. R. Forst and G. Forst.

Specimens examined.— (5 ♀; 0 ♂) Type material: Holotype *Xyleborus rotundicollis* (♀; BMNH).

Other material: **Australian Region:** Papua New Guinea: Papua New Guinea, Mu village, March 2006, 1600 m asl, Hulcr and Cognato coll. (4 ♀; MSU).

Xylosandrus russulus (Schedl), new combination

Figure 40.

Xyleborus russulus Schedl, 1942c:187. Holotype ♀: Neu-Guinea; NHMW.
Euwallacea russulus (Schedl): Wood and Bright, 1992:693.

Notes.— This species was first included in *Euwallaca* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Diagnosis.— Female 3.5–4.2 mm long; 2.1 times longer than wide. Body dark brown; antennae and legs light brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.7 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae narrowly, but completely separated. Protibiae with 7 socketed teeth on lateral margin; mesotibiae with 10 socketed teeth; metatibiae with 11 socketed teeth. Elytra 1.4 times longer than wide; 3.4 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margins rounded, without a carina or a row of tubercles or serrations. Six striae visible on declivity. Striae punctate, with semi-appresssed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, uniseriate, with erect, hair-like setae, longer than twice the width of second declivital interstriae.

Xylosandrus russulus was recovered as sister species to *X. rotundicollis* in a molecular phylogeny containing many *Xylosandrus* spp. (Dole et al., in review). However, the two taxa are are divided by appreciable molecular distance and can be distinguished by several morphological characters.

This species is morphologically similar to *X. monteithi* (Fig. 33) and *X. rotundicollis* (Fig. 39). *Xylosandrus russulus* can be distinguished from *X. monteithi* by the following characters: basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium; declivital striae with semi-appressed, hair-like setae, shorter than the width of the second declivital interstriae; and declivital interstriae uniseriate granulate, with erect, hair-like setae, longer than twice the width of the second declivital interstriae. *Xylosandrus russulus* can be distinguished from *X. rotundicollis* by the following characters: 3.5–4.2 mm long; elytral surface not duller, lacking opalescence; prosternal posterocoxal taller, pointed; protibiae narrow toward apex, armed with 7 socketed teeth.

DISTRIBUTION.— **Australian Region**: Papua New Guinea.

HOSTS.— Unknown.

SPECIMENS EXAMINED.— (52 ♀; 0 ♂) TYPE MATERIAL: Holotype *Xyleborus russulus*: Papua New Guinea (NHMW).

OTHER MATERIAL: **Australian Region:**Papua New Guinea, Kupa Range, Morobe, 2000 m., glue trap, Roberts coll. (1 ♀; FICB). Papua New Guinea: Chimbu Prov, J. Hulcr 2002-2006 (50 ♀; MSU).

Xylosandrus subsimiliformis (Eggers)

Figure 41.

Xyleborus subsimiliformis Eggers, 1939a:11. Holotype ♀: Nordostbirma (Kaim, 7000 Fuss) 17.V.1934; NHR (Eggers Paratype in NHMW).
Xylosandrus subsimiliformis (Eggers): Wood and Bright, 1992:800.

NOTES.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors failed to indicate it as a “new combination.”

DIAGNOSIS.— Female 2.8 mm long; 2.1 times longer than wide. Body brown; antennae and legs same color as body. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture or semi-appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc densely asperate-granulate, with sculpture separated by distance less than or equal to their width. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; mesotibiae with 10 socketed teeth; metatibiae with 10 socketed teeth. Elytra 1.2 times longer than wide; 1.3 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity flattened, lateral margins carinate to 7th interstriae. Four striae visible on declivity. Striae granulate, with appressed, hair-like setae, shorter than the width of second declivital interstriae. Interstriae finely granulate, multiseriate, with appressed, hair-like setae, shorter than the width of second declivital interstriae.

This species is morphologically similar to *X. beesoni* (Illustrated in Saha et al. 1992), *X. discolor* (Fig. 20), and *X. jaintianus* (Fig.27). *X. subsimiliformis* can be distinguished from these species by the following characters: declivity flattened; pronotum with a conspicuous summit on basal third; four striae visible on elytral declivity; and frons punctate, without a distinct median keel.

DISTRIBUTION.— **Oriental Region:** Burma, Thailand.

HOSTS.— Unknown.

SPECIMENS EXAMINED.— (4 ♀; 1 ♂) TYPE MATERIAL: Paratype *Xyleborus subsimiliformis*: N.E. Burma, Kambaiti, 7000 ft., 12.5.1924, R. Malaise (♀; NHMW).

OTHER MATERIAL: **Oriental Region:** Thailand: Chiang Mai: Doi Pui, 16.I.05, R. A. Beaver (1 ♀; RAB); Thailand: Chiang Mai, Doi Suthep**,** c.1400m**,** 18.x.04**,** R. A. Beaver (2 ♀, 1 ♂; RAB).

Xylosandrus subsimilis (Eggers)

Figure 42.

Xyleborus subsimilis Eggers, 1930:186. Holotype ♀: Assam (Shillong, 6000 ft); FRI.
Xylosandrus subsimilis (Eggers): Wood and Bright, 1992:800.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors failed to indicate it as a "new combination."

Diagnosis.— Female 2.6 mm long; 2.0 times longer than wide. Body brown; antennae and legs same color as body. Frons rugose. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.9 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi- appressed, hair-like setae; setae less dense on disc. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pronotal-mesonotal mycangium. Pronotal disc densely asperate-granulate, with sculpture separated by distance less than or equal to their width. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4–5 socketed teeth on lateral margin; mesotibiae with 9–11 socketed teeth; metatibiae with 10 socketed teeth. Elytra 1.1 times longer than wide; 1.2 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Declivital face steep and abruptly separated from disc. Declivity flattened, lateral margins carinate to 7th interstriae. Four striae visible on declivity. Striae coarsely granulate, with appressed, scale-like setae, shorter than the width of second declivital interstriae. Interstriae granulate, multiseriate, with appressed, scale-like setae shorter than the width of second declivital interstriae.

This species is morphologically similar to *X. beesoni* (Illustrated in Saha et al. 1992), *X. discolor* (Fig. 20), *X. jaintianus* (Fig. 27), and *X. subsimiliformis* (Fig. 41). However, *X. subsimilis* can easily be distinguished from these species by its declivital vestiture of dense, flattened, scale-like setae.

Distribution.— **Oriental Region:** China, India (Assam, Bengal), Thailand.

Hosts.— *Cinnamomum obtusifolium* Nees., *Tectona grandis* L., *Terminalia myriocarpa* Van Heurck and Műll. Arq.

Specimens examined.— (5 ♀; 0 ♂) Type material: Paratype *Xyleborus subsimilis*: Shillong, 6000 ft, C. F. C. Beeson, 14.V.1925, ex. unknown wood (1 ♀; NHMW).

Other material: **Oriental Region:** China: China, 1962.VII (2 ♀; USNM). India: Samsingh 1800, Kalimpong, Bengal, 4.X.33, C. F. C. Beeson. ex. *Cinnamomum obtusifolium* branches (2 ♀; USNM).

Xylosandrus terminatus (Eggers)

Figure 43.

Xyleborus terminatus Eggers, 1930:182. Holotype ♀: Coorg (Virojapet, Sidapur); FRI.
Xylosandrus terminatus (Eggers): Browne, 1963:55.

Diagnosis.— Female 1.5–1.9 mm long; 2.1 times longer than wide. Body dark brown to black; antennae and legs yellowish brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed, hair-like setae; pronotal disc glabrous, except for mycangial setae. Basal pronotum with a dense patch of short, erect setae, indicating the presence of a pornotal-mesonotal mycangium. Pronotal disc moderately punctate. Lateral aspect of pronotum basic (type 0, Hulcr et al. 2007). Pronotum with lateral costa and carina. Procoxae widely separated. Protibiae with 4 socketed teeth on lateral margin; meso- and metatibial teeth not visible on specimens examined. Elytra 1.2 times longer than wide; 1.4 times longer than pronotum. Discal striae punctate; interstriae uniseriate punctate. Declivital face of elytra steep and abruptly separated from disc. Declivity flattened, lateral margins carinate to 7th interstriae. Striae punctate, without setae. Interstriae punctate, uniseriate, with erect, hair-like setae, longer than the width of second declivital interstriae.

This species is morphologically similar to *X. derupteterminatus* (Fig. 18) and *X. morigerus* (Fig. 35). *Xylosandrus terminatus* can be distinguished from *X. morigerus* by the following characters: elytral declivity flattened; and five striae visible on declivity. *Xylosandrus terminatus* can be distinguished from *X. derupteterminatus* by the following characters: smaller species, 1.5–1.9 mm long; interstrial setae longer than the width of second declivital interstriae; and declivital interstriae uniseriate punctate.

Distribution.— **Oriental Region:** India (Karnataka, Maharashtra, Tamil Nadu).

Hosts.— *Holigarna arnottiana* Hook, *Lantana* L. sp., *Swietenia macrophylla* King.

Specimens examined.— (3 ♀; 0 ♂) Type material: Paratype *Xyleborus terminatis*: Coorg, Virojapet, Sidapur, Y. R. Rao coll., 9. XI.1917, boring into twigs of Lantana (♀; NHMW).

Other material: **Oriental Region:** India: Chandanthode, Wynadd, Madras. Research Forester., 8.XII.1938, ex *Swietenia macrophylla* stump (2 ♀; USNM).

Xylosandrus woodi Dole and Beaver

Figure 44.

Xylosandrus woodi Dole and Beaver, 2008. Holotype ♀: [Australia], NEQ[ueensland], 16°30′S x 145°19′E, Mt Demi summit, 1100 m, flight intercept, 17.xii.1995-22.i.1996 (Monteith, Thompson and Ford). In QMB (Accession # T144404).

Diagnosis.— Female 2.3–2.4 mm long; 2.1 times longer than wide. Body dark brown; antennae and legs light brown. Frons punctate. Antennae with 5 funicular segments. Antennal club obliquely truncate; first segment forming a circular costa; segment one covering entire posterior face. Pronotum 0.8 times longer than wide. Dorsal aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotal vestiture of semi-appressed hair-like setae; pronotal disc densely setose, with setae as dense as on anterior pronotum. Lacking a dense patch of setae at base of pronotum. Pronotal disc densely asperate-granulate. Lateral aspect of pronotum rounded (type 1, Hulcr et al. 2007). Pronotum with lateral costa, not carinate. Procoxae widely separated. Protibiae with 4–5 socketed teeth on lateral margin; meso- and metatibiae with 7-8 socketed teeth. Elytra 1.3 times longer than wide; 1.6 times longer than pronotum. Discal striae punctate; interstriae multiseriate punctate. Elytral disc gradually curving into declivity. Declivity convex, lateral margin with discontinuous row of small tubercles, some of these towards apex with carinate tip. Five striae visible on declivity. Striae punctate, with appressed, hair-like setae, longer than the width of second declivital interstriae. Interstriae granulate, multiseriate, with appressed hair-like setae, longer than the width of second declivital interstriae.

This species can be distinguished from all other known *Xylosandrus* by its lateral declivital margin which is marked by a discontinuous row of small tubercles. *Xylosandrus woodi* may be confused with *X. monteithi* (Fig. 33) and *X. rotundicollis* (Fig. 39), but these two species have lateral declivital margins that are rounded and without a row of tubercles.

Distribution.— **Australian Region:** Australia (Queensland).

Hosts.— Unknown.

Specimens examined.— (1 ♀; 0 ♂) Type material: Paratype *Xylosandrus woodi*: Australia: NEQ, 19°07′S, 146°23′E, Mt Halifax summit, 1050m, heath, rainforest, pitfalls, 19-21.iii.1991, G. Monteith and D. Cook (1 ♀; MSU).

New Combinations, *Amasa*

Amasa cylindrotomicus (Schedl), new combination

Pseudoxyleborus cylindrotomicus Schedl, 1939:40. Lectotype ♀: Sumatra, Benkoelen, 23-6-31, leg. Shuller; NHMW; designated by Schedl, 1979a:74.
Xylosandrus cylindrotomicus (Schedl): Wood and Bright, 1992:793.
Xyleborus semitruncatus Schedl, 1942b:35. Lectotype ♂: Sumatra, Manna, 15-IX-34: NHMW; designated by Schedl, 1979a:224. Synonymy: Wood, 1989:177.
Xyleborus truncatellus Schedl, 1951:79. Lectotype ♀: Z. Sumatra, Poelau Pisang, and Manna; NHMW; designated by Schedl 1979a:256. Synonymy: Kalshoven, 1959:95.
Xyleborus jucundus Schedl, 1954:138. Lectotype ♀: Z. Sumatra, Poelau Pisang, and Manna; NHMW; designated by Schedl, 1979a:256. Synonymy: Kalshoven, 1959:95.
Xyleborus ramulorum Schedl, 1957:115. Holotype ♀: Congo Belge: Yangambi; MRCB. Synonymy: Wood, 1989:177.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Afrotropical Region:** Zaire. **Oriental Region:** Indonesia (Sumatra).

Specimens examined.— (4 ♀; 1 ♂) Type material: Lectotype *Pseudoxyleborus cylindrotomicus* (♀; NHMW). Lectotype *Xyleborus semitruncatus* (♂; NHMW). Lectotype *Xyleborus truncatellus* (♀; NHMW). Allotype *Xyleborus truncatellus*: Sumatra, Manna, 25-IX-1934 (♂; NHMW).

Other material: **Oriental Region:** Indonesia: Sumatra, Benkoelen, 23-6-31, leg. Shuller (1 ♀; NHMW).

Discussion.— Based on the contiguous procoxae, antennal club with three segments visible on the anterior and posterior face, elytral declivital face that is steep and abruptly separated from the disc and the circular costa forming a complete circumdeclivital ring, this species is here transferred to *Amasa*.

Amasa omissus (Schedl), new combination

Xyleborus omissus Schedl, 1961b: 153. Holotype ♀: Madagascar, Antaniditra pres Perinet, 18 November 1952, K.E. Schedl; IRSM.
Xylosandrus omissus (Schedl): Wood and Bright, 1992: 799.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Afrotropical Region:** Madagascar.

Specimens examined.— (2 ♀; 0 ♂) Type material: Paratypes *Xyleborus omissus*: Madagascar, Perinet, 17.XI.1952, K. E. Schedl (2 ♀; NHMW)

Discussion.— Based on the contiguous procoxae, antennal club with three segments visible on the anterior and posterior face, elytral declivital face that is steep and abruptly separated from the disc and the circular costa forming a complete circumdeclivital ring, this species is here transferred to *Amasa*.

Amasa oralis (Schedl), new combination

Xyleborus oralis Schedl, 1961b:154. Holotype ♀: Madagascar, Antaniditra pres Perinet, 18 November 1952, K. E. Schedl; IRSM.
Xylosandrus oralis (Schedl): Wood and Bright, 1992:799.

NOTES.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a “new combination” or cite any characters justifying its transfer.

DISTRIBUTION.— **Afrotropical Region:** Madagascar.

SPECIMENS EXAMINED.— (1 ♀; 0 ♂) TYPE MATERIAL: Paratype *Xyleborus oralis*: Madagascar, Perinet, 17.XI.1952, K. E. Schedl (♀; NHMW).

DISCUSSION.— Based on the contiguous procoxae, antennal club with three segments visible on the anterior and posterior face, and elytral declivital face that is steep and abruptly separated from the disc, this species is here transferred to *Amasa*.

New Combinations, *Anisandrus*

Anisandrus butamali (Beeson), new combination

Xyleborus butamali Beeson, 1930:40. Syntypes ♀: Bombay: Agsur, South Kanara, and Dandeli, North Kanara, B. M. Bhatia, Nov.; FRI.
Xylosandrus butamali (Beeson): Wood and Bright, 1992:788.

NOTES.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a “new combination” or cite any characters justifying its transfer.

DISTRIBUTION.— **Oriental Region:** India (Maharaashtra, Tamil Nadu).

SPECIMENS EXAMINED.— (7 ♀; 0 ♂) TYPE MATERIAL: Paratypes *Xyleborus butamali*: Bombay, Agsur, S. Kanara Div., 13.XI.29, B.M. Bhatia, ex. *Dillenia pentagyna* (2 ♀; NHMW).

OTHER MATERIAL: **Oriental Region:** India: S. India: Anamalis Hills, Cinohona, 3500 ft, April 1956, P.S. Nathan (1 ♀; USNM); Kattiyur, Wynaad, Madras, F.R.J. Project, 25.12.1945 (3 ♀; USNM); Manantoddy, N. Malabar, G. C. Robinson, 8.XI.1930, ex *Tectona grandis* (1 ♀; USNM).

DISCUSSION.— Based on the contiguous procoxae, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering the entire posterior face, protibiae with six socketed teeth, and rounded lateral pronotal margins, this species is here transferred to *Anisandrus*.

Anisandrus ursa (Eggers), new combination

Xyleborus ursa Eggers, 1923:172. Lectotype ♀: Haveri, N. Guinea, S. E., Havari, Loria, VII-XI-93; USNM; designated by Anderson and Anderson, 1971:35.
Xylosandrus ursa (Eggers): Wood and Bright, 1992:801.

NOTES.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a “new combination” or cite any characters justifying its transfer.

DISTRIBUTION.— **Australian Region:** New Guinea, Solomon Islands.**Oriental Region:** Malaysia, Indonesia (Celebes, Sumatra), Philippines (Luzon).

SPECIMENS EXAMINED.— (8 ♀; 0 ♂) TYPE MATERIAL: Lectotype *Xyleborus ursa* (♀; USNM).

OTHER MATERIAL: **Oriental Region:** Indonesia: Indonesia. *Irian Jaya:* PT., Freeport Concession Wapoga, camp. 03.14°S 136.57°E, 3600 ft., 19-29 April 1998, R. R. Snelling, Malaise trap montane primary rainforest (1 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., 1008 m G. mogongonipa summit, Aug-85, Malaise Trap (1 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P.G.Mogogonipa summit, 1008 m., Sep-85, Pitfall trap (1 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P.G.Mogogonipa summit, 1008 m., May-85, Malaise Trap (2 ♀; RAB). Philippine Islands: Luzon, P. I. Baguio Mt. Sto, Tomas W. Schultze (2 ♀; NHMW).

Discussion.— Based on the contiguous procoxae, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering the entire posterior face, protibiae with seven socketed teeth, and rounded lateral pronotal margins, this species is here transferred to *Anisandrus*.

Anisandrus ursinus (Hagedorn), new combination

Xyleborus ursinus Hagedorn, 1908:381. Holotype ♀: Sumatra, Si-Rambe; MNB.
Xylosandrus ursinus (Hagedorn): Wood and Bright, 1992:801.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Oriental Region:** Indonesia (Borneo, Soemba Island, Sumatra), Philippines (Mindoro).

Specimens examined.— (9 ♀; 0 ♂) Type material: Unable to examine type material.

Other material: **Oriental Region:** Indonesia: Dammerman, N.O. Soemba, Kambera, III.1925 (1 ♀; NHMW); Sumatra: Solok, Coll. F. Schneider, 1911 (1 ♀; MTD). Philippine Islands: Philippine Islands: Glog Riv., Mt. Apo, Mindanao, IX.29,30, Altitude 6000 ft., Coll. by C.F. Clagg (2 ♀; FMNH); Philippine Islands: La Lun Mts. Davao Prov., Mindanao, I.1.31, Coll. by C.F. Clagg, at light (1 ♀; FMNH); Mindoro, Port Galera, Mc Gregor (2 ♀; USNM); Mt. Makiling, Laguna P. I., 7-21-22, F. C. Hagedorn Collection (1 ♀; USNM); Philippine Islands: Seliban Riv., Mt. Apo, Mindanao, VII.30.30, Altitude 6000 ft., Coll. by C.F. Clagg (1 ♀; FMNH).

Discussion.— Based on the contiguous procoxae, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering the entire posterior face, protibiae with seven socketed teeth, and rounded lateral pronotal margins, this species is here transferred to *Anisandrus*.

Anisandrus ursulus (Eggers), new combination

Xyleborus ursulus Eggers, 1923:173. Holotype ♀: Ost Bali, Kintamani, E. Sundainseln, 1913; MTD.
Xylosandrus ursulus (Eggers): Wood and Bright, 1992:801.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Oriental Region:** China (Fujian), India (Bengal, Nicobar Islands), Malaysia, Thailand, Indonesia (Bali, Borneo, Java, Sumatra), Philippines (Luzon).

Specimens examined.— (29 ♀; 1 ♂) Type material: Holotype *Xyleborus ursulus* (♀; MTD). Cotype *Xyleborus ursulus*: Java: Batoerranden, G. Slamet, F.C. Drescher, 19.VII.1930 (♂; NHMW).

Other material: **Oriental Region:** India: Samasingh, Kalimpong, Bengal, III.1934, Mohal Lall. (3 ♀; USNM); Kamsingh, 1800, Kalimpong, Bengal, 22.III.34, C.F.C. Beeson, ex *Sterculia colorata* or *Sapium eugeniaefolium* (2 ♀; USNM). Indonesia: Java: Batoerraden, G. Slamet, F. C. Drescher, 22.III.1930 (5 ♀; USNM); Java: Batoerranden, G. Slamet, F.C. Drescher, 10.IV.1930 (2 ♀; NHMW); Java: Mount Gede, 1900 m, XI-1932, L.G.E. Kalshoven (1 ♀; USNM); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Plot B, ca 300 m Lowland Forest, Apr-85. Flight intercept trap (2 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., G.Mogogonipa summit, 1008 m, May-85, Malaise Trap (1 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Oct-85 (1 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Plot C, ca 400 m lowland forest, Apr-85, Flight intercept trap (2 ♀; RAB); Indonesia: Sulawesi Utara, Dumoga-Bone N.P., Plot C, ca 400 m lowland forest, May-85, Flight intercept trap (1 ♀; RAB). Malaysia: Malaya: Pahang: Pulau Tioman:

Kampong Tekek, to Kampong Juara, 20.iii.1962, K. J. Kuncheria Collector Bishop, In Jungle (1 ♀; RAB); Malay Penin: Pahang. F.M.S., Faser's Hill, 4200 ft, 28-6-1931 (1 ♀; NHMW); Malaysia: Penang, Penang Hill. 1701, 10.viii.77, R.A. Beaver, Ex. Pitfall trap (1 ♀; RAB); SABAH: Poring Spring, Xanthophyllum affine, Lower montane, 650 m, Mixed dipterocarp Fst., 20. Vi. 1992, A. Floren, Fog Za4/F1 (1 ♀; RAB). Thailand: Thailand: Chiang Mai, Doi Chiang Dao, 12-13.vii.02, A. Cognato, ex ETOH trap on dead tree (1 ♀; RAB); Thailand: Kanchanaburi, 14.70N 98.87E, 17.vii.02, A. Cognato (3 ♀; RAB).

Discussion.— Based on the contiguous procoxae, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering the entire posterior face, protibiae with seven socketed teeth, and rounded lateral pronotal margins, this species is here transferred to *Anisandrus*.

New Combinations, *Cnestus*

Cnestus ater (Eggers), new combination

Xyleborus ater Eggers, 1923:210. Holotype ♀: Batoe Insel (Tanah Masa); ZMAN.
Xylosandrus ater (Eggers): Wood and Bright, 1992:787.
Xyleborus retusiformis Schedl, 1936:31. Holotype ♀: Borneo; NHMW. Synonymy: Wood, 1989:177.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Oriental Region:** China (Fujian), Malaysia, Indonesia (Batoe Island, Borneo).

Specimens examined.— (6 ♀; 0 ♂) Type material: Holotype *Xyleborus retusiformis* (♀; NHMW).

Other material: **Oriental Region:** Brunei: Brunei: Temburong: Nr. K. Belalong Field, Study Centre 300m, 4°33′N 115°09′E, 10.ii.1992, R.A. Beaver, RGS/UBD Exped. Ex. Rattan Calamus Daeninorops (2 ♀; RAB); Brunei: Temburong: Nr. K. Belalong Field, Study Centre 300m, 4°33′N 115°09′E, 10.ii.1992, R.A. Beaver, RGS/UBD Exped. Ex. Calamus Daeninorops sp. (2 ♀; RAB). Indonesia: Padang, ex. Ljengkeh [?], 14.Xii.35, Kalshoven (1 ♀; NHMW).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering most of the posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, the protibiae with six socketed teeth, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus fijianus (Schedl), new combination

Xyleborus fijianus Schedl, 1938:50. Lectotype ♀: Fiji Islands, Taveuni Quilai, 800 feet, October 18, 1924, H.S. Evans; NHMW.
Xylosandrus fijianus (Schedl): Wood and Bright, 1992:794-795.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Oceania:** Fiji Islands.

Specimens examined.— (9 ♀; 2 ♂) Type material: Lectotype *Xyleborus fijianus* (♀; NHMW).

Other material: **Oceania:** Fiji: Fiji, Lami Quarry, Nr. Suva, VII-24-38, E.C. Zimmerman collector, beating shrubs, 10′, 250′ (1 ♀; NHMW)l Fiji. Viti Levu, Suva, 22.xi.88, R. A. Beaver, ex *Swietenia macrophylla* (1 ♀; RAB); FIJI, Viti Levu, Savura Creek, 29.iii.83, R.A. Beaver, ex *Serianthea melanesica* (1 ♀; RAB); Fiji, Viti Levu, Namosi 10km, 19-20. V. 85, R.A. Beaver (2 ♀; RAB); FIJI, Viti Levu, Savura Creek, 19.iii.83, R.A. Beaver, ex *Canarium vitiense* (2 ♀; RAB)l; Fiji, Viti Levu, Savura Creek, v.83, R.A. Beaver, ex *Canarium vitiense* (1 ♂; RAB); Fiji, Suva, ex. *Swietenia macrophylla* (1 ♂; BMNH). Fiji, Colo-I-Suva, Static Trap 71, Mahogany plantation, Cpt 23, 10/10/2006, K. Wotherspoon.

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering most of the posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, the protibiae with seven socketed teeth, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus gravidus (Blandford), new combination

Xyleborus gravidus Blandford, 1898:427. Holotype ♀: Chittagong Hills [Bangladesh]; BMNH.
Xylosandrus gravidus (Blandford): Wood and Bright, 1992:796.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Oriental Region:** Bangladesh, Burma, India (Assam, Bengal), Laos, Sri Lanka, Thailand, Vietnam. **Palearctic Region:** China (Xizang [Tibet]).

Specimens examined.— (2 ♀; 0 ♂) Type material: Unable to examine type material.

Other material: **Oriental Region:** Vietnam: Nord Vietman, L. Thainguyen, VII.1969, leg. Le. Van. Nong (1 ♀; NHMW); Phovi, S 07 (1 ♀; NHMW).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering most of the posterior face, the presence of a coarse median pair of asperities on the anterior margin of the pronotum, the protibiae with seven socketed teeth, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus improcerus (Sampson), new combination

Xyleborus improcerus Sampson, 1921:33. Holotype ♀: Siam; BMNH.
Xylosandrus improcerus (Sampson): Beaver, 1998:183.

Distribution.— **Oriental Region:** Brunei, India, Indonesia (Borneo), Malaysia, Thailand.

Specimens examined.— (7 ♀; 0 ♂) Type material: Unable to examine type material.

Other material: **Oriental Region:** Brunei. Brunei: Temburong: Nr. K. Belalong Field, Study Centre 250 m, 4°33′N 115°09′E, 7.ii.1992, R.A. Beaver, RGS/UBD Exped. (3 ♀; RAB); Brunei: Temburong: Nr. K. Belalong Field, Study Centre 250 m, 4°33′N 115°09′E, 21.ii.1992, R.A. Beaver, RGS/UBD Exped. (1 ♀; RAB); Lagleari [?] BC. Sarak, 20:X:1948, F. G. Browne (1 ♀; USNM); Malaysia, Kelantan, E.G.B., 6.10.1946 (1 ♀; USNM); Malaya, Terengganu, Besut Dist., V-1958, R. Traub, 400 ft. (1 ♀; USNM).

Discussion.— Based on the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering the entire posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, the protibiae with six socketed teeth, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus laticeps (Wood), new combination

Xyleborus laticeps Wood, 1977:219. Holotype ♀: 20 km SW El Vigia, Merida, Venezuela; USNM.
Xylosandrus laticeps (Wood): Wood and Bright, 1992:796.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Neotropical Region:** Venezuela.

Specimens examined.— (51 ♀; 12 ♂) Type material: *Xyleborus laticeps* (♀; USNM).

Other material: **Neotropical Region:** Venezuela: Venezuela: 9 km S Barrancas, 150 m, X-1-69, S.L. Wood, *Protium tenuifolium* (13 ♀; USNM); Venezuela: 9 km S of Barrancas, Barinas, 150 m, X-5-69, S.L. Wood (2 ♀; USNM); Venezuela: 9 km S. of Barrancas, Barinas, 150 m, XI-5-69, S.L. Wood, *Spondias mombin* (5 ♀; USNM); Venezuela: 9 km S. of Barrancas, Barinas, 150 m, XI-5-69, S.L. Wood, *Dendropanax arboreum* (1 ♀; USNM); Venezuela: 9 km S Barrancas, Barinas, XII-2-69, el. 150 m, S.L. Wood, *Melicoccous bijugata* (1 ♀; USNM); Venezuela: 8 km SW Bumbum, Barinas, II-11-1970, 150 m, S.L. Wood, *Tartaguito* sp. (2 ♀; USNM); Venezuela: 40 km, E Canton, Barinas, III-8-1970, 70 m, S.L. Wood, *Protium tenuifolium* (1 ♀; USNM); Venezuela: 40 km E Canton, Barinas, III-8-1970, 70 m, S.L. Wood, *Palito negro* (1 ♀; USNM); Venezuela: 40 km E Canton, Barinas, III-8-1970, 70 m, S.L. Wood, tree seedling (1 ♀; USNM); Venezuela: 40 km E Canton, Barinas, III-8-1970, 70 m, S.L. Wood, *Pouteria anibaefolia* (1 ♀; USNM); Venezuela: 5 km W El Pino, 10 m, Zulia, X-20-69, S.L. Wood, unknown tree (2 ♀; USNM); Venezuela: 20 km SW El Vigio, Merida, XI-21-69, el. 50 m, S.L. Wood, *Jacaranda* sp. (10 ♀; USNM); Venezuela: Merida, 1700 m, IX-22-69, S.L. Wood (4 ♀, 12 ♂; USNM); Venezuela: 40 km SE Socopo, Barinas, I-25-1970, 150 m, S.L. Wood, *Protium* sp. (1 ♀; USNM); Venezuela: 17 km SE of Miri, Barinas, XII-17-69, 150 m, S.L. Wood, *Protium* sp. (1 ♀; USNM); Venezuela: 10 km SE of Miri, Barinas, II-8-1970, 150 m, S.L. Wood, *Inga* sp. (1 ♀; USNM); Venezuela: 7 km NW Socopo, Barinas, II-13-1970, 200 m, S.L. Wood, *Protium* sp. (1 ♀; USNM); Venezuela: Valle de Choroni, IV-3-1964, J.L. Saunders, *Theobroma cacao* (3 ♀; USNM).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering the entire posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, the protibiae with six socketed teeth, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus mutilatus (Blandford), new combination

Xyleborus mutilatus Blandford, 1894c:103. Holotype ♀: Japan; BMNH.
Xylosandrus mutilatus (Blandford): Wood and Bright, 1992:799.
Xyleborus sampsoni Eggers, 1930:184. Holotype ♀: Assam (Haflong, Cachar); FRI. Synonymy: Wood, 1989:177.
Xyleborus banjoewangi Schedl, 1939:41. Lectotype ♀: Banjoewangi, 270 m, Tjoerahlele, 25-II-36; NHMW. Synonymy: Kalshoven, 1960:63.
Xyleborus taitonus Eggers 1939b:118. Holotype ♀: Formosa, Taito; Chujo Collection. Synonmy: Wood and Bright, 1992:799.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a “new combination” or cite any characters justifying its transfer. *Xyleborus taitonus* was also listed as a synonym by Wood and Bright (1992), but was not indicated as a “new synonymy.” Wood and Bright (1992) indicate that “Specimens in the FRI, Dehra Dun labeled by Eggers as *taitonus* are *mutilatus*; synonymy needs confirmation”, but we were unable to examine the specimens referred to.

Distribution.— **Australian Region:** New Guinea. **Nearctic Region:** United States (Florida, Mississippi, Texas). **Oriental Region:** Burma, China (Anhui, Sichuan, Yunnan, Zhejiang), India (Andaman Islands, Assam), Indonesia (Batoe Island, Borneo, Java, Sumatra), Japan, Malaysia, Sri Lanka, Taiwan, Thailand. **Palearctic Region:** Korea.

Specimens examined.— (34 ♀; 3 ♂) Type material: Paratype *Xyleborus mutilatus*: Malaya, Selangor, 16:XI:1948, F.G. Browne ex wood of Adenanthera tauonina (♂; BMNH). Lectotype *Xyleborus banjoewangi* (♀; NHMW). Allotype *Xyleborus banjoewangi*: Banjoewangi, II-1936, leg. Baschwesen [?] (1 ♂; NHMW).

Other material: **Oriental Region:** Japan: JAPAN: Okinawa I., Mt. Oppadake, 20.vi.95, H. Goto, ex

Rhus succedanea (2 ♀, 1 ♂; RAB); Japan: Ryukyus, Mt. Oppadake, Okinawa Is., emerged from the logs, 19.vii.1995, H. Goto leg., Host tree: *Rhus succedanea* L. (1 ♀, 1 ♂; RAB). **Nearctic Region:** United States: Mississippi, Oktibbeha Co., 3 mi W. of Adaton, 33°29′00″N 88°58′13″W, 23-26 April 2004, T.L. Schiefer coll (39 ♀; MSU); Miss., Oktibbeha Co., 3 mi W. of Adaton, 33°29′00″N 88°58′13″W, 17-19 April 2002, T.L. Schiefer, in Lindgren funnel trap (1 ♀; MSU).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering most of the posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, the protibiae with seven socketed teeth, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus orbiculatus (Schedl), new combination

Xyleborus orbiculatus Schedl, 1942a:186. Holotype ♀: Borneo; NHMW.
Xylosandrus orbiculatus (Schedl): Wood and Bright, 1992:800.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Oriental Region:** Indonesia (Borneo).

Specimens examined.— (2 ♀; 0 ♂) Type material: Holotype *Xyleborus orbiculatus* (♀; NHMW).

Other material: **Oriental Region:** Borneo: British N. Borneo, Tenompok, 15.II.1959, T. C. Maa Collector (1 ♀; RAB).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering most the entire posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus peruanus (Wood), new combination

Xylosandrus peruanus Wood, 2007:468. Holotype ♀: Satipo [Junin], Peru, V-VI.1942, Paprzycki; USNM.

Distribution.— **Neotropical Region:** Peru (Junin).

Specimens examined.— (1 ♀; 0 ♂) Type material: Holotype *Xylosandrus peruanus* (♀; USNM).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering most the entire posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, and the protibiae with six socketed teeth, this species is here transferred to *Cnestus*.

Cnestus retifer (Wood), new combination

Xylosandrus retifer Wood, 2007:468. Holotype ♀: Fazende Laminit, Intinga do Maranhio, Brazil; MZUSP.

Distribution.— **Neotropical Region:** Brazil.

Specimens examined.— (1 ♀; 0 ♂) Type material: Paratype *Xylosandrus retifer* BR-MA-Itinga do Maranhao, Fazenda Laminit, 6-yr old *Schizolobium nicum* stand, ethanol baited FIT, Ataide, J.A. col. VII/2002 (♀; USNM).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering the entire posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus retusus (Eichhoff), new combination

Xyleborus retusus Eichhoff, 1868:151. Syntypes ♀: N. Freiburg [Brazil]; Hamburg Museum, lost.
Xylosandrus retusus (Eichhoff): Wood and Bright, 1992:800.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Neotropical Region:** Argentina, Brazil.

Specimens examined.— (120 ♀; 0 ♂) Type material: Unable to examine type specimens.

Other material: **Neotropical Region:** Brazil: Nova Teutonia, Sta. Cat., X-56, Plaumann (19 ♀; USNM); Brazil: Nova Teutonia, 27°11′8″S 52°23′1″W, F. Plaumann, 300-500 m, XI.1956 (1 ♀; USNM); Brazil: Nova Teutonia, 27°11′8″S 52°23′1″W, F. Plaumann, 300-500 m, I-1.1957 (1 ♀; USNM); Brazil: Nova Teutonia, 1944, F. Plaumann coll. (5 ♀; USNM); Brasil, Nova Teutonia, Santa Catarina, IX-18-1944, 27°11′S, 52°23′W, Fritz Plaumann collector (1 ♀; AMNH); Brazilen: Nova Teutonia, 28 Oct 1951, F. Plaumann coll. (10 ♀; FMNH); Brazilen: Nova Teutonia, 25 Oct 1951, F. Plaumann coll. (7 ♀; FMNH); Brazilien, Nova Teutonia, 27°11′S 52°23′W, 500m, XI.1947, Fritz Plaumann (8 ♀; FMNH); Brazil, Nova Teutonia, Sta. Catharina, VII.14.1944 (1 ♀; FMNH); Brasilien: Nova Teutonia, 1944, F. Plaumann coll. (3 ♀; NHMW); Brasil, Rio Claro-S. Paulo, Mat no. 5, III-947 [?] (1 ♀; USNM)l Brasil, Rio Claro-S. Paulo, Mat no. 2 III-946[?] (1 ♀; USNM); Brazil: Santa Catharina, Nova Teutonia, 300-500 m, 27°11′S 52°23′W, XI-1947, leg. F. Plaumann (60 ♀; FMNH); Brasil, Varginha, M Gerais, M. Alvarenga leg., III.1972 (1 ♀; NHMW); RS/RGS Exp. Brazil, 12°49′S 51°46′W, 29.xi.1968, R. A. Beaver (1 ♀; RAB).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering the entire posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, the protibiae with six socketed teeth, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

Cnestus testudo (Eggers), new combination

Xyleborus testudo Eggers, 1939b:116. Lectotype ♀: Formosa, Taichu, XI.1930., col. T. Mitono; USNM; designated by Anderson and Anderson, 1971:34.
Xylosandrus testudo (Eggers): Wood and Bright, 1992: 801.

Notes.— This species was first included in *Xylosandrus* by Wood and Bright (1992), but the authors did not indicate it as a "new combination" or cite any characters justifying its transfer.

Distribution.— **Oriental Region:** Taiwan, Thailand, Vietnam.

Specimens examined.— (3 ♀; 0 ♂) Type material: Lectotype *Xyleborus testudo* (♀; USNM).

Other material: **Oriental Region:** Thailand: Thailand: Chiang Mai 600 m, Fang., 17.iii.74, R.A. Beaver, comp. Paralectotypes ex. TARI. (1 ♀; RAB). Vietnam: Tonkin, Reg De Moa binn, A. De Looman, 1929 (1♀; NHMW).

Discussion.— Based on the subcontiguous procoxae, the four-segmented antennal funicle, obliquely truncate antennal club with first segment forming a circular costa and segment 1 covering most of the posterior face, the presence of a coarse median pair of asperities on the produced anterior margin of the pronotum, the protibiae with seven socketed teeth, and the elytra that are wider than long, this species is here transferred to *Cnestus*.

New Combinations, *Cyclorhipidion*

Cyclorhipidion squamulatum (Beaver and Löyttyniemi), new combination

Apoxyleborus squamulatus Beaver and Löyttyniemi, 1985:69. Holotype ♀: Zambia: Lusaka, 21.i.1980, light trap. R.A. Beaver coll; BMNH.
Xylosandrus squamulatus (Beaver and Löyttyniemi): Wood, 1984:229.

NOTES.— Beaver and Löyttyniemi (1985) described this species in the genus *Apoxyleborus*. However, Wood (1984) had synonymized *Apoxyleborus* with *Xylosandrus*. The species was listed in *Xylosandrus* by Wood and Bright (1992).

DISTRIBUTION.— **Afrotropical Region:** Zambia.

HOSTS.— Unknown.

SPECIMENS EXAMINED.— (2 ♀; 0 ♂) TYPE MATERIAL: Holotype *Apoxyleborus squamulatus* (♀; BMNH). Paratype *Apoxyleborus squamulatus*: Zambia, Lusaka, 2052, 8-9.v.80, R.A. Beaver, trap light (♀; RAB).

DISCUSSION.— Based on the contiguous procoxae, antennal club with segment 1 not forming a circular costa (type 3, Hulcr et al. 2007), and arched protibiae with eight socketed teeth, this species is herein transferred to *Cyclorhipidion*. This species was compared with the holotype of the type species of *Cyclorhipidion*: *C. pelliculosum*. The inclusion of this species, along with *Cyclorhipidion pelliculosum* Hagedorn, in the phylogenetic analysis of morphological data caused the strict consensus tree to become completely unresolved. Because *Cyclorhipidion* has not been confused historically with *Xylosandrus*, the genus was not included in the phylogenetic analysis.

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Appendicies

Appendix 1

Morphological character matrix of 43 characters for 75 species. Characters are their scores described in Materials and Methods.

	Characters																								
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Amasa anomalus	1	0	0	0	1	0	2	1	0	3	1	0	0	0	0	2	0	0	0	?	1	0	1	1	1
A. bicostatus	1	0	1	0	1	0	2	2	0	3	1	0	0	0	0	2	0	0	1	2	1	0	1	1	1
A. cylindriformis	1	0	1	0	?	?	?	2	0	3	1	0	0	0	0	2	0	0	0	2	?	0	1	1	1
A. cylindrotomicus	1	0	0	0	1	0	2	0	0	0	1	0	0	0	0	2	0	0	0	2	0	0	0	1	1
A. fulgens	1	0	1	0	?	0	2	2	0	3	1	0	0	0	0	2	0	0	0	?	?	0	0	1	1
A. omissus	1	0	0	0	?	0	2	2	0	3	1	0	0	0	0	2	0	0	0	2	?	0	1	1	1
A. oralis	1	0	2	0	1	0	2	2	0	3	1	0	0	0	0	2	0	0	1	?	0	0	1	1	1
A. striatotruncatus	1	0	1	0	1	0	2	1	0	0	1	0	0	0	0	2	0	0	0	1	2	0	1	1	1
A. umbratulus	1	0	1	0	1	0	2	0	0	3	1	0	0	0	0	2	0	0	0	?	1	0	1	1	1
A. versicolor	1	1	1	0	1	0	2	2	0	3	1	0	0	0	0	2	0	0	0	2	1	0	1	1	1

	Characters																	
Species	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Amasa anomalus	1	1	2	1	2	0	0	0	2	0	0	2	1	2	0	0	0	0
A. bicostatus	1	1	2	1	1	0	0	0	0	?	?	0	1	0	?	?	1	1
A. cylindriformis	1	2	2	1	0	0	0	0	0	?	?	2	1	0	?	?	1	1
A. cylindrotomicus	1	1	2	1	1	0	0	0	0	?	?	1	1	0	?	?	0	0
A. fulgens	1	1	2	1	1	0	0	0	1	0	0	2	1	1	1	0	1	1
A. omissus	1	1	2	1	3	0	0	0	0	?	?	1	1	1	0	1	0	0
A. oralis	1	1	2	0	?	0	0	1	?	?	?	1	1	1	0	0	1	1
A. striatotruncatus	1	1	2	1	1	0	0	0	0	?	?	0	1	0	?	?	0	0
A. umbratulus	1	1	2	1	1	0	0	0	0	?	?	2	1	0	?	?	0	1
A. versicolor	1	1	2	1	1	0	0	0	0	?	?	2	1	0	?	?	0	1

	Characters																								
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Anisandrus butamali	0	0	0	0	1	1	0	2	0	1	0	1	1	1	0	2	1	0	0	2	1	2	1	1	0
A. dispar	1	0	0	0	1	1	0	0	0	1	1	2	1	0	0	1	0	0	0	2	1	0	0	1	0
A. obesus	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	1	0	0	0	1	2	0	1	1	0
A. sayi	1	0	0	0	1	1	0	0	0	1	1	1	1	0	0	1	0	0	0	2	2	0	1	1	0
A. ursa	1	0	0	0	2	1	0	0	0	1	0	2	1	0	1	2	1	0	0	2	1	0	1	1	0
A. ursinus	1	0	0	0	2	1	0	0	0	1	1	1	1	0	1	2	1	0	0	2	1	0	1	1	0
A. ursulus	1	0	0	0	2	1	0	0	0	1	1	2	1	0	1	2	1	0	0	2	1	0	1	1	0

	Characters																	
Species	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Anisandrus butamali	1	2	1	1	0	0	0	0	?	4	0	0	0	0	?	?	1	1
A. dispar	1	0	0	1	0	0	0	1	?	4	0	0	0	1	0	1	1	1
A. obesus	2	0	1	1	0	0	0	3	?	4	1	0	0	1	0	1	1	0
A. sayi	2	0	1	1	0	0	0	1	?	4	1	0	0	0	?	?	1	0
A. ursa	1	0	1	1	0	0	0	0	?	3	0	0	0	0	?	?	1	1
A. ursinus	1	0	1	1	0	0	0	0	?	3	0	0	0	0	?	?	1	1
A. ursulus	1	0	1	1	0	0	0	0	?	3	0	0	0	0	?	?	1	1

Appendix 1 (continued)

Morphological character matrix of 43 characters for 75 species.
Characters are their scores described in Materials and Methods.

	Characters																								
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Cnestus ater	0	0	0	0	0	2	1	0	0	1	1	1	1	0	1	1	1	1	1	1	3	2	1	0	1
C. bimaculatus	0	2	0	0	0	1	0	1	0	1	1	0	1	0	1	1	1	0	1	1	0	2	1	1	0
C. fijianus	0	0	0	0	0	2	1	0	0	1	1	2	1	0	1	1	1	1	1	1	2	2	1	0	1
C. gravidus	0	0	0	0	0	2	1	0	0	1	1	0	1	0	0	1	1	0	1	1	0	2	1	1	1
C. improcerus	0	2	0	0	0	1	0	0	0	1	1	1	1	0	1	1	1	1	1	0	1	2	1	0	1
C. laticeps	0	0	0	0	0	1	0	0	0	1	1	0	1	0	1	1	1	1	0	1	1	2	1	0	1
C. mutilatus	0	0	2	1	0	2	1	0	0	1	1	2	1	0	1	1	1	1	1	1	2	2	1	0	1
C. orbiculatus	0	0	0	0	0	2	0	1	0	1	1	0	1	0	0	1	1	1	1	1	?	2	1	0	1
C. peruanus	1	0	0	0	0	1	0	0	0	1	1	2	1	0	1	1	1	1	0	1	1	0	1	1	0
C. pseudosolidus	0	0	0	0	0	2	0	1	0	1	1	1	1	0	0	1	1	0	0	1	0	2	1	1	1
C. pseudosuturalis	1	2	0	0	0	2	0	1	0	1	1	1	1	0	0	1	1	1	1	1	?	0	1	1	0
C. retifer	0	0	0	0	0	1	0	2	0	1	1	0	1	0	0	1	1	1	0	1	?	2	1	1	1
C. retusus	0	0	0	0	0	1	0	0	0	1	1	1	1	0	1	1	1	1	0	1	1	2	1	1	1
C. solidus	0	1	0	0	0	2	0	0	0	1	1	2	1	0	1	1	1	0	0	1	1	2	1	1	1
C. testudo	0	0	2	0	0	2	1	0	0	1	1	1	1	0	1	1	1	1	1	1	2	2	1	0	1
C. triangularis	1	0	0	0	0	2	0	2	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
Coccotrypes dactyliperda	1	0	2	0	0	2	1	2	1	0	1	2	0	1	1	0	?	0	0	2	0	0	0	1	0
Xyleborus affinis	1	0	0	0	1	2	1	2	0	0	1	1	0	0	0	0	?	0	0	2	0	0	0	1	0
X. californicus	1	0	0	0	1	2	1	2	0	0	1	1	0	0	0	0	?	0	0	2	2	0	0	1	0

	Characters																	
Species	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Cnestus ater	1	0	2	0	3	0	1	1	1	0	0	1	1	1	0	0	0	0
C. bimaculatus	0	0	2	0	3	0	0	0	0	?	?	0	1	0	?	?	0	0
C. fijianus	0	0	2	0	?	0	1	1	1	1	0	1	1	1	1	0	0	0
C. gravidus	0	0	2	0	3	0	0	0	1	1	0	1	1	1	1	0	1	0
C. improcerus	0	0	2	0	?	0	0	0	1	1	0	1	1	1	1	0	0	0
C. laticeps	0	0	2	1	?	0	0	1	0	?	?	1	1	0	?	?	0	0
C. mutilatus	1	0	2	0	?	0	0	1	1	1	0	1	1	1	1	0	0	0
C. orbiculatus	0	0	2	0	3	1	0	0	0	?	?	1	1	0	?	?	0	0
C. peruanus	0	0	2	0	3	0	0	0	1	1	1	1	1	1	1	1	1	0
C. pseudosolidus	0	0	2	0	4	1	0	0	1	?	0	1	1	1	1	0	0	0
C. pseudosuturalis	0	0	2	0	3	0	0	0	0	?	?	0	0	1	1	1	0	0
C. retifer	0	0	2	0	?	0	0	1	0	?	?	0	1	0	?	?	1	1
C. retusus	1	0	2	0	?	0	1	1	0	?	?	1	1	0	?	?	0	0
C. solidus	0	0	2	0	4	1	0	0	1	0	1	1	1	1	1	0	0	0
C. testudo	1	0	2	0	3	0	0	0	1	0	0	1	1	1	1	0	0	0
C. triangularis	0	0	2	0	3	0	0	0	?	?	?	1	0	1	1	1	0	0
Coccotrypes dactyliperda	0	0	0	?	?	0	0	0	1	0	0	1	0	1	1	1	0	0
Xyleborus affinis	0	0	1	?	4	0	0	0	0	?	?	1	0	1	1	1	0	0
X. californicus	0	0	0	?	4	0	0	0	1	0	1	1	1	1	1	1	0	0

Appendix 1 (continued)

Morphological character matrix of 43 characters for 75 species.
Characters are their scores described in Materials and Methods.

	Characters																								
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Xylosandrus adherescens	1	0	0	0	1	1	0	0	0	0	1	0	1	0	0	2	0	0	1	0	0	0	0	1	0
X. amputatus	1	0	0	1	1	1	0	0	0	0	1	1	1	0	1	2	0	0	0	0	0	0	1	1	1
X. arquatus	1	1	?	0	?	1	0	0	1	0	1	1	1	1	0	2	0	0	0	0	0	0	0	1	0
X. assequens	1	0	2	0	1	1	0	0	0	0	1	1	0	0	1	2	0	0	1	0	0	0	1	1	0
X. beesoni	1	0	2	0	1	1	0	0	0	0	1	2	1	1	1	2	0	0	1	0	0	0	1	1	1
X. borealis	1	0	2	1	1	1	0	2	0	2	1	2	1	1	1	2	0	0	0	0	0	0	1	1	1
X. borneensis	1	0	0	0	1	1	0	0	0	0	1	0	1	0	0	2	0	0	1	0	0	0	0	1	1
X. brevis	1	0	2	1	1	1	0	0	0	0	1	2	1	1	1	2	0	0	0	0	0	0	1	1	1
X. compactus	1	0	0	0	1	1	0	1	0	0	1	1	1	0	0	2	0	0	1	0	0	0	0	1	0
X. corthyloides	1	1	0	0	1	1	0	0	0	0	1	1	0	0	0	2	0	0	0	0	0	0	0	1	1
X. crassiusculus	1	0	2	0	1	1	0	1	0	0	1	2	1	0	1	2	0	0	0	1	0	0	1	1	0
X. curtulus	1	0	0	0	1	1	0	0	0	1	1	0	1	0	0	2	0	0	1	0	0	0	0	1	0
X. derupteterminatus	1	0	0	1	1	1	0	0	0	0	1	0	1	0	0	2	0	0	1	0	0	0	0	1	1
X. deruptulus	1	0	2	0	?	?	?	0	0	0	1	1	?	0	1	2	0	0	1	0	?	0	1	1	0

	Characters																	
Species	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Xylosandrus adherescens	0	0	2	0	4	1	0	0	0	?	?	1	0	1	1	0	0	0
X. amputatus	1	2	2	1	2	0	0	0	0	?	?	2	1	0	?	?	1	0
X. arquatus	0	0	2	0	4	0	0	0	1	1	1	0	0	1	0	1	0	0
X. assequens	0	0	2	0	4	0	0	0	1	1	1	1	1	1	1	1	0	0
X. beesoni	1	0	2	0	3	0	1	0	1	0	0	1	1	1	?	?	0	0
X. borealis	1	1	2	0	2	0	1	0	1	0	0	1	1	1	0	0	0	0
X. borneensis	0	0	2	0	4	1	0	0	1	0	0	1	1	1	0	1	1	0
X. brevis	1	0	2	0	2	0	1	0	1	0	0	1	1	1	0	0	0	0
X. compactus	0	0	2	0	4	0	0	0	1	0	0	0	0	1	3	1	0	0
X. corthyloides	1	1	3	?	3	0	0	0	1	1	1	1	1	1	1	1	0	0
X. crassiusculus	0	0	2	0	4	0	1	0	1	2	1	1	1	1	1	0	0	0
X. curtulus	0	0	2	0	4	0	0	0	1	0	0	1	0	1	1	1	0	0
X. derupteterminatus	0	1	2	0	3	0	0	0	0	?	?	1	0	1	0	1	0	0
X. deruptulus	0	0	2	0	4	0	0	0	?	?	?	1	0	?	?	?	0	0

Appendix 1 (continued)

Morphological character matrix of 43 characters for 75 species.
Characters are their scores described in Materials and Methods.

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
X. discolor	0	1	0	0	1	1	0	0	0	0	1	1	1	1	1	2	0	0	1	0	0	1	1	1	1
X. diversepilosus	1	0	?	?	?	?	?	0	0	0	1	1	1	1	1	2	0	0	0	?	?	0	1	1	1
X. eupatorii	1	0	0	0	1	1	0	1	0	1	1	0	1	0	0	2	0	0	1	0	0	0	0	1	0
X. ferinus	1	1	0	0	1	1	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0	0	0	1	0
X. germanus	1	0	0	0	1	1	0	0	0	0	1	1	1	0	0	2	0	0	1	0	0	0	0	1	0
X. hirsutipennis	1	0	0	0	1	1	0	1	0	0	1	0	1	0	0	2	0	0	0	0	0	0	0	1	0
X. hulcri	1	2	0	0	1	1	0	0	0	1	1	1	0	0	0	2	0	0	0	0	0	0	1	1	0
X. jaintianus	1	0	2	1	1	1	0	0	0	0	1	1	1	1	1	2	0	0	1	0	0	0	1	1	1
X. mancus	1	3	0	0	1	1	0	1	0	0	1	1	1	0	0	2	0	0	0	0	0	0	1	1	1
X. mediocris	1	0	?	0	?	?	?	1	0	0	1	1	1	0	0	2	0	0	1	?	?	0	0	1	0
X. mesuae	1	1	0	0	1	1	0	0	0	0	1	1	1	0	0	2	0	0	0	0	0	0	0	1	0
X. metagermanus	1	0	2	0	?	1	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0	0	0	1	0
X. mixtus	1	0	0	0	1	1	0	0	0	0	1	1	1	0	0	2	0	0	0	1	0	0	1	1	0
X. monteithi	1	0	0	0	1	1	0	0	0	1	1	2	0	0	0	2	0	0	0	0	0	0	1	1	0

Species	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
X. discolor	1	1	2	0	2	0	1	0	1	0	0	1	1	1	0	0	0	0
X. diversepilosus	1	1	2	0	2	0	1	0	0	?	?	1	1	1	3	1	0	0
X. eupatorii	0	0	2	0	4	0	0	0	0	?	?	1	0	1	3	1	0	0
X. ferinus	0	0	2	0	3	0	0	0	0	?	?	1	0	1	0	1	0	0
X. germanus	0	0	2	0	4	0	0	0	0	?	?	1	0	1	1	1	0	0
X. hirsutipennis	0	0	2	0	3	0	1	0	1	1	0	1	1	1	1	0	0	0
X. hulcri	0	0	2	0	3	0	0	0	1	0	1	1	1	1	1	1	0	0
X. jaintianus	1	2	2	0	2	0	1	0	1	0	0	1	1	1	0	0	1	0
X. mancus	1	1	2	1	2	0	0	0	0	?	?	1	1	0	?	?	1	0
X. mediocris	0	0	2	0	4	1	0	0	0	?	?	1	0	1	1	1	0	0
X. mesuae	0	0	2	0	4	0	0	0	1	0	0	1	0	1	1	1	0	0
X. metagermanus	0	0	2	0	4	0	0	0	0	?	?	1	0	1	1	1	0	0
X. mixtus	0	0	2	0	3	0	0	0	1	0	0	1	1	1	3	1	0	0
X. monteithi	0	0	0	?	4	0	0	0	1	1	0	1	1	1	1	0	0	0

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
X. morigerus	1	0	0	0	1	1	0	0	0	1	1	1	1	0	0	2	0	0	1	0	0	0	0	1	1
X. pusillus	0	0	0	0	1	1	0	0	0	0	1	1	1	0	0	2	0	0	1	0	0	0	0	1	0
X. pygmaeus	0	0	0	0	1	1	0	1	0	0	1	0	1	0	0	2	0	0	1	0	0	0	0	1	1
X. queenslandi	1	0	2	0	1	1	0	0	0	1	1	1	1	0	0	2	0	0	0	0	0	0	0	1	1
X. rotundicollis	1	0	0	0	1	1	0	0	0	0	1	1	1	0	0	2	0	0	0	1	1	0	1	1	0
X. russulus	1	0	0	0	1	1	0	0	0	0	1	1	1	0	0	2	0	0	0	1	2	0	1	1	0
X. subsimilis	1	0	2	0	1	1	0	0	0	0	1	1	1	1	1	2	0	0	1	0	0	0	1	1	1
X. subsimiliformis	1	0	0	0	1	1	0	0	0	0	1	1	1	1	1	2	0	0	0	0	0	0	1	1	1
X. terminatis	1	0	0	0	1	1	0	0	0	0	1	0	1	0	0	2	0	0	1	0	0	0	0	1	1
X. woodi	1	0	0	0	1	1	0	0	0	1	1	2	0	1	1	2	0	0	0	0	0	0	1	1	0

Species	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
X. morigerus	0	0	2	0	4	0	0	0	1	0	1	0	0	1	3	1	0	0
X. pusillus	0	0	2	0	4	0	0	0	1	0	0	1	0	1	3	1	0	0
X. pygmaeus	0	1	2	0	3	1	0	0	0	?	?	1	0	1	1	1	0	0
X. queenslandi	0	1	3	?	4	0	1	0	1	0	1	1	0	1	1	1	0	0
X. rotundicollis	0	0	0	?	4	0	0	0	1	0	0	1	0	1	3	1	0	0
X. russulus	0	0	0	?	4	0	0	0	1	0	0	1	0	1	3	1	0	0
X. subsimilis	1	1	2	0	2	0	1	0	2	0	0	1	1	2	0	0	0	0
X. subsimiliformis	1	1	2	0	2	0	1	0	1	0	0	1	1	1	0	0	0	0
X. terminatis	0	1	2	0	3	0	0	0	0	?	?	0	0	1	1	1	0	0
X. woodi	0	0	1	?	3	1	0	0	1	1	0	1	1	1	1	0	0	0

Appendix 2

Species data for morphological and molecular characters martricies
(● = data avaiable for species).

Species	Morphology	28S	COI	ArgK	CAD	EF-1α
Amasa anomalus (Schedl)	●					
Amasa bicostatus (Sampson)	●	●	●	●	●	●
Amasa cylindriformis (Schedl)	●					
Amasa cylindrotomicus (Schedl) n. comb.	●					
Amasa fulgens(Schedl)	●					
Amasa omissus (Schedl)	●					
Amasa oralis (Schedl)	●					
Amasa striatotruncatus (Schedl)	●	●	●	●	●	
Amasa umbratulus (Schedl)	●					
Amasa versicolor (Sampson)	●	●	●	●	●	●
Anisandrus butamali (Beeson) n. comb.	●					
Anisandrus dispar (Fabricius)	●	●	●	●	●	●
Anisandrus obesus(LeConte)	●	●	●	●	●	
Anisandrus sayi (Hopkins)	●	●	●	●	●	●
Anisandrus ursa (Eggers) n. comb.	●	●	●	●	●	●
Anisandrus ursinus (Hagedorn) n. comb.	●	●	●	●	●	●
Anisandrus ursulus (Eggers) n. comb.	●					

Species	Morphology	28S	COI	ArgK	CAD	EF-1α
Cnestus ater (Eggers), n. comb.	●	●	●	●	●	●
Cnestus bimaculatus (Eggers)	●	●	●	●	●	
Cnestus fijianus (Schedl) n. comb.	●					
Cnestus gravidus (Blandford) n. comb.	●					
Cnestus improcerus (Sampson) n. comb.	●	●	●	●	●	●
Cnestus laticeps (Wood) n. comb.	●					
Cnestus mutilatus (Blandford) n. comb.	●	●	●	●	●	●
Cnestus orbiculatus (Schedl) n. comb.	●					
Cnestus peruanus (Wood) n. comb.	●					
Cnestus pseudosolidus (Schedl)	●					
Cnestus pseudosuturalis Schedl	●	●	●	●	●	●
Cnestus retifer (Wood) n. comb.	●					
Cnestus retusus (Eichhoff) n. comb.	●					
Cnestus solidus (Eichhoff)	●					
Cnestus testudo (Eggers) n. comb.	●					
Cnestus triangularis (Schedl)	●					
Coccotrypes dactyliperda (Fabricius)	●	●	●	●	●	●
Xyleborus affinis Eichhoff	●	●	●	●	●	●
Xyleborus californicus Wood	●	●	●	●	●	●

Appendix 2 (continued)

Species data for morphological and molecular characters martricies
(● = data avaiable for species).

Species	Morphology	28S	COI	ArgK	CAD	EF-1α
Xylosandrus abruptulus (Schedl)	●					
Xylosandrus adherescens Schedl	●					
Xylosandrus amputatus (Blandford) n. comb.	●					
Xylosandrus arquatus (Sampson)	●					
Xylosandrus assequens Schedl	●					
Xylosandrus beesoni Saha, Maiti, & Chakraborti	●					
Xylosandrus borealis Nobuchi	●					
Xylosandrus borneensis n. sp.	●	●	●	●	●	●
Xylosandrus brevis (Eichhoff)	●					
Xylosandrus compactus (Eichhoff)	●	●	●	●	●	●
Xylosandrus corthyloides (Schedl)	●					
Xylosandrus crassiusculus (Motschulsky)	●	●	●	●	●	●
Xylosandrus curtulus (Eichhoff)	●					
Xylosandrus derupteterminatus (Schedl)	●					
Xylosandrus deruptulus (Schedl)	●					
Xylosandrus discolor (Blandford)	●	●	●	●	●	●
Xylosandrus diversepilosus (Eggers)	●					
Xylosandrus eupatorii (Eggers)	●					
Xylosandrus ferinus (Schedl)	●					
Xylosandrus germanus (Blandford)	●	●	●	●	●	●
Xylosandrus hirsutipennis (Schedl)	●					
Xylosandrus hulcr n. sp.	●	●	●	●	●	●
Xylosandrus jaintianus (Schedl)	●					
Xylosandrus mancus (Blandford)	●		●	●	●	●
Xylosandrus mediocris(Schedl)	●					
Xylosandrus mesuae (Eggers)	●					
Xylosandrus metagermanus (Schedl)	●					
Xylosandrus mixtus (Schedl) n. comb.	●					
Xylosandrus monteithi Dole & Beaver	●	●	●	●	●	●
Xylosandrus morigerus (Blandford)	●	●	●	●	●	●
Xylosandrus pusillus (Schedl)	●					
Xylosandrus pygmaeus (Eggers)	●					
Xylosandrus queenslandi Dole & Beaver	●	●	●	●	●	●
Xylosandrus rotundicollis (Browne) n. comb.	●	●	●	●	●	●
Xylosandrus russulus (Schedl) n. comb.	●	●	●			●
Xylosandrus subsimiliformis (Eggers)	●					
Xylosandrus subsimilis (Eggers)	●					
Xylosandrus terminatus (Eggers)	●					
Xylosandrus woodi Dole & Beaver	●					