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Page(s): Page 420, Page 421, Page 422, Page 423, Page 424

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AN ASIAN AMBROSIA BEETLE, *AMBROSIODMUS LEWISI*, NEW TO NORTH AMERICA (COLEOPTERA: SCOLYTIDAE)

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Abstract.—*Ambrosiodmus lewisi* (Blandford), an ambrosia beetle described from Japan and occurring in southeast Asia, is reported for the first time from North America, based on specimens from Pennsylvania. A redescription and diagnosis of the male and female, a revision to an existing key to North American xyleborine species to include this newly detected species, scanning electron micrographs and black and white photographs of the adult habitus (male and female), and other morphological features are presented.

Key Words: Asian immigrant, xyleborine ambrosia beetle, Scolytidae

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Preface.—To the memory of Dr. Donald R. Whitehead (1938–1990)—fellow coleopterist and systematist, scholar, colleague, and friend—this small work is humbly dedicated. As a research entomologist in the Agriculture Research Service (ARS) of the U.S. Department of Agriculture (from 1976 until the time of his death), Don occasionally worked and published in the general area of arthropod introductions. It was in this capacity that I first met Don. Eventually I had the opportunity to co-author a paper with him on an immigrant weevil in North America (Hoebeke and Whitehead 1980), and later we contemplated other publishable pursuits involving immigrant weevils. Unfortunately, these latter projects were never completed. It seems only fitting that the recent discovery of an Asian curculionoid in North America, a species of ambrosia beetle (Scolytidae), be the subject matter of this posthumous tribute to my friend Don Whitehead.

In this century, seven species of exotic xyleborine ambrosia beetles have been introduced into eastern North America from temperate eastern Asia: *Ambrosiodmus rubricollis* (Eichhoff), *Xylosandrus germanus* Blandford, *X. crassiusculus* (Motschulsky), *X. compactus* (Eichhoff), *Xyleborus validus* Eichhoff (Wood 1977), and *Xyleborus pelliculosus* Eichhoff and *X. atratus* Eichhoff (Atkinson et al. 1990). These scolytids all reproduce by arrhenotoky and are highly inbred (inbred polygyny); newly matured females mate with siblings before emerging from the brood host and are thus able to establish new populations from a single individual (Wood 1977, Atkinson et al. 1990). Atkinson et al. have suggested that this type of mating system, together with the similar moist, temperate environments shared by eastern Asia and eastern North America, and the increased trade between the United States, Canada, and the Far East facilitate the introduction and establishment of these ambrosia beetles.

The purpose of this paper is to report the discovery of an eighth species of exotic ambrosia beetle of Asian origin in eastern North America. In early August 1990 during rou-

tine pruning of dead and dying tree branches on the grounds of a private residence in the Philadelphia suburb of Oreland (Pennsylvania, Montgomery Co.), a local landscape contractor noted some insect damage and exit holes in the bark of some pruned, dead, upper lateral branches of an old (80–100 yrs.) black oak (*Quercus velutina* group) (T. McClelland, Jr., Oreland, PA, pers. comm.). He sent cut pieces of these pruned branches (approx. 3 in. diam.) to Dr. Warren T. Johnson (Cornell University) for pest diagnosis. Some time after receiving these samples (stored in sealed plastic bags), several beetles of the family Scolytidae emerged. These specimens were identified by the author as *Ambrosiodmus lewisi* (Blandford), an ambrosia beetle native to southeast Asia and previously not known from North America. A redescription, diagnosis, revised species key, and scanning electron micrographs of the adult habitus and other distinguishing features of this newly detected species are provided to facilitate recognition.

Ambrosiodmus lewisi (Blandford)

Xyleborus lewisi Blandford, 1894: 104.
Ambrosiodmus lewisi; Wood, 1986: 81, 83.

Female.—Body (Figs. 1, 5, 6) oblong, cylindrical, moderately pilose posteriorly with long setae. Mature color ranging from reddish to black individuals. Length 3.6–4.3 mm (ex literature); 3.6–4.0 mm (ex specimens examined, n = 14). Width 1.8 mm (ex literature); 1.5–1.7 mm (ex specimens examined, n = 14).

Frons broadly, irregularly convex; surface densely reticulate, glossy, with large, coarse, rugose punctures; epistoma with dense fringe of long setae over base of mandibles.

Pronotum (Figs. 2, 5, 6) transverse, nearly globose, with anterior and lateral margins equally arcuate, widest slightly beyond middle, posterior margin subsinuate with obtusely rounded angles; entire surface of disc closely, rather coarsely asperate to base, anterior asperities distinctly larger, asperities in posterior half oriented to form low, transverse ridges (Fig. 2), surface dull, faintly scabrous or reticulate between asperities.

Elytra as wide as base of pronotum, approximately 1.9× longer than pronotum, truncate at base, sides straight; strial punctures on disc moderately large, shallow, relatively close, spaced within row by slightly more than diameter of puncture, scarcely impressed, without setae; interstriae very broad, smooth to very weakly granulate, glossy, at least 4–5 times wider than striae, biseriately punctate-setose (Fig. 3), length of setae equal to width of interstriae, setae much longer posteriorly.

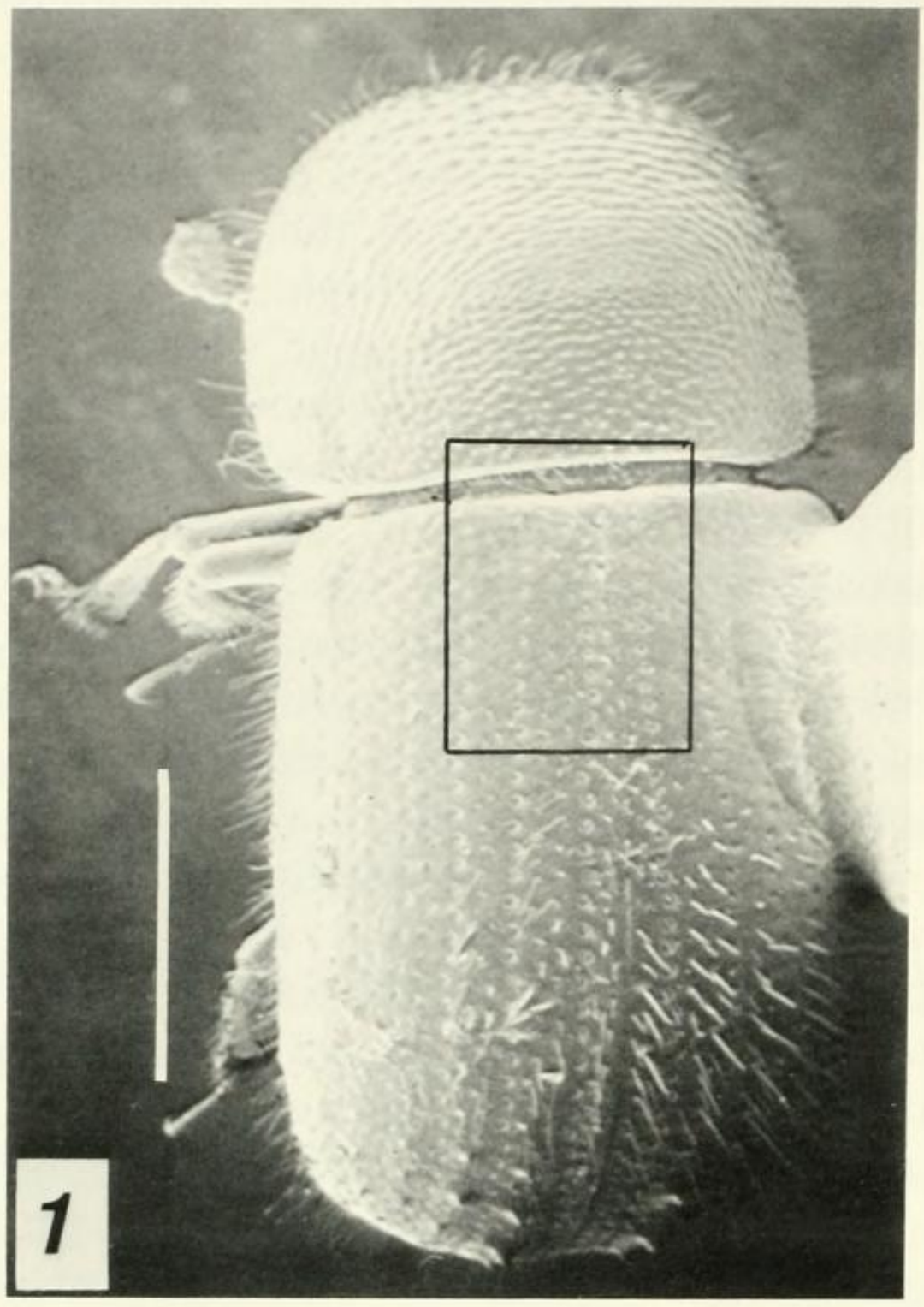
Declivity (Figs. 4, 6) broadly, evenly convex, with first interstriae widened, impressed and finely tuberculate, second interstriae very strongly tuberculate, remaining interstriae less strongly tuberculate.

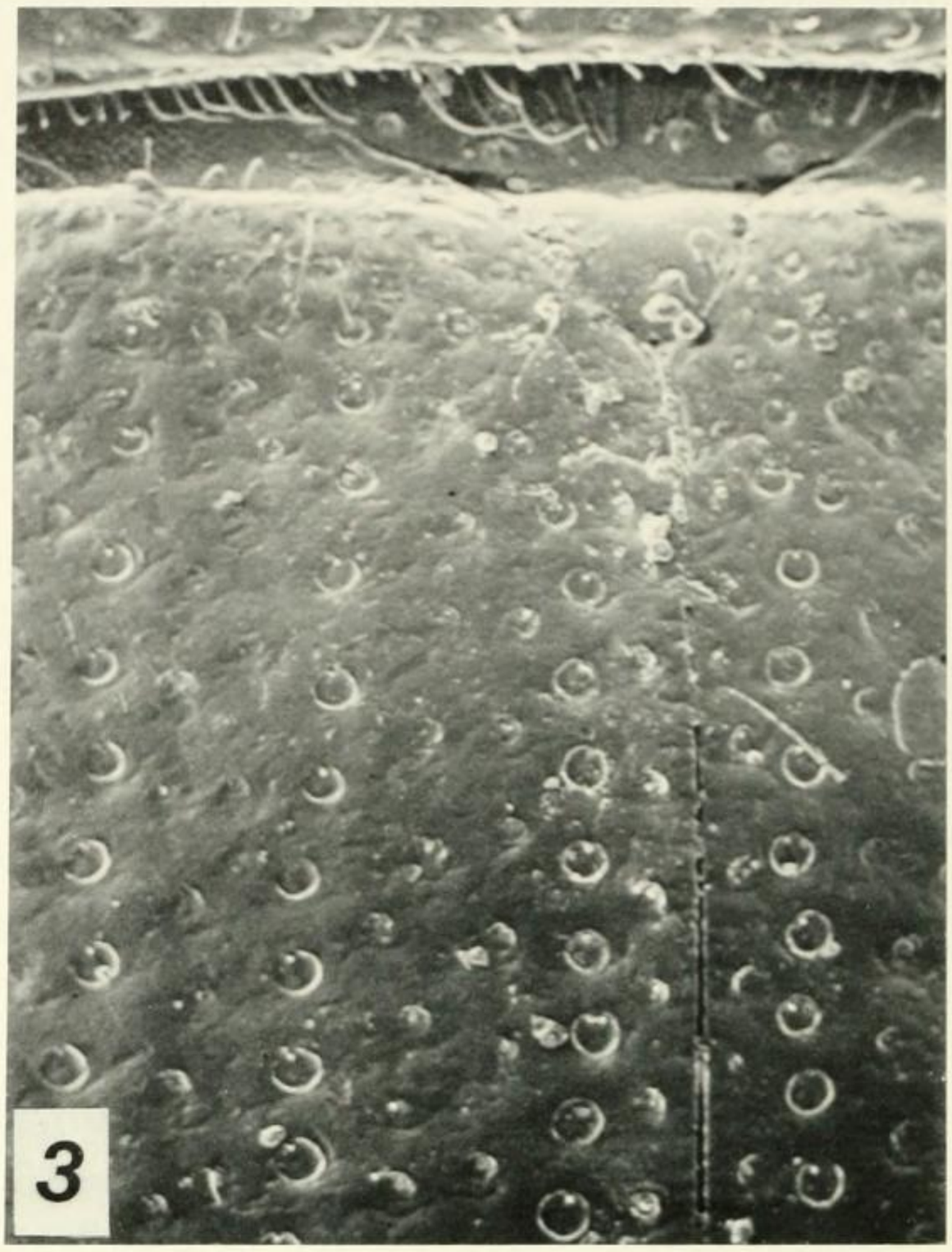
Male.—Body (Fig. 7) rather robust and globose; body surface strongly pilose with moderately long setae. Color reddish brown. Head strongly retracted into prothorax, barely visible dorsally. Length 1.8 mm (ex literature); 1.9 mm (ex specimen examined, n = 1). Width 1.5 mm (ex specimen examined, n = 1).

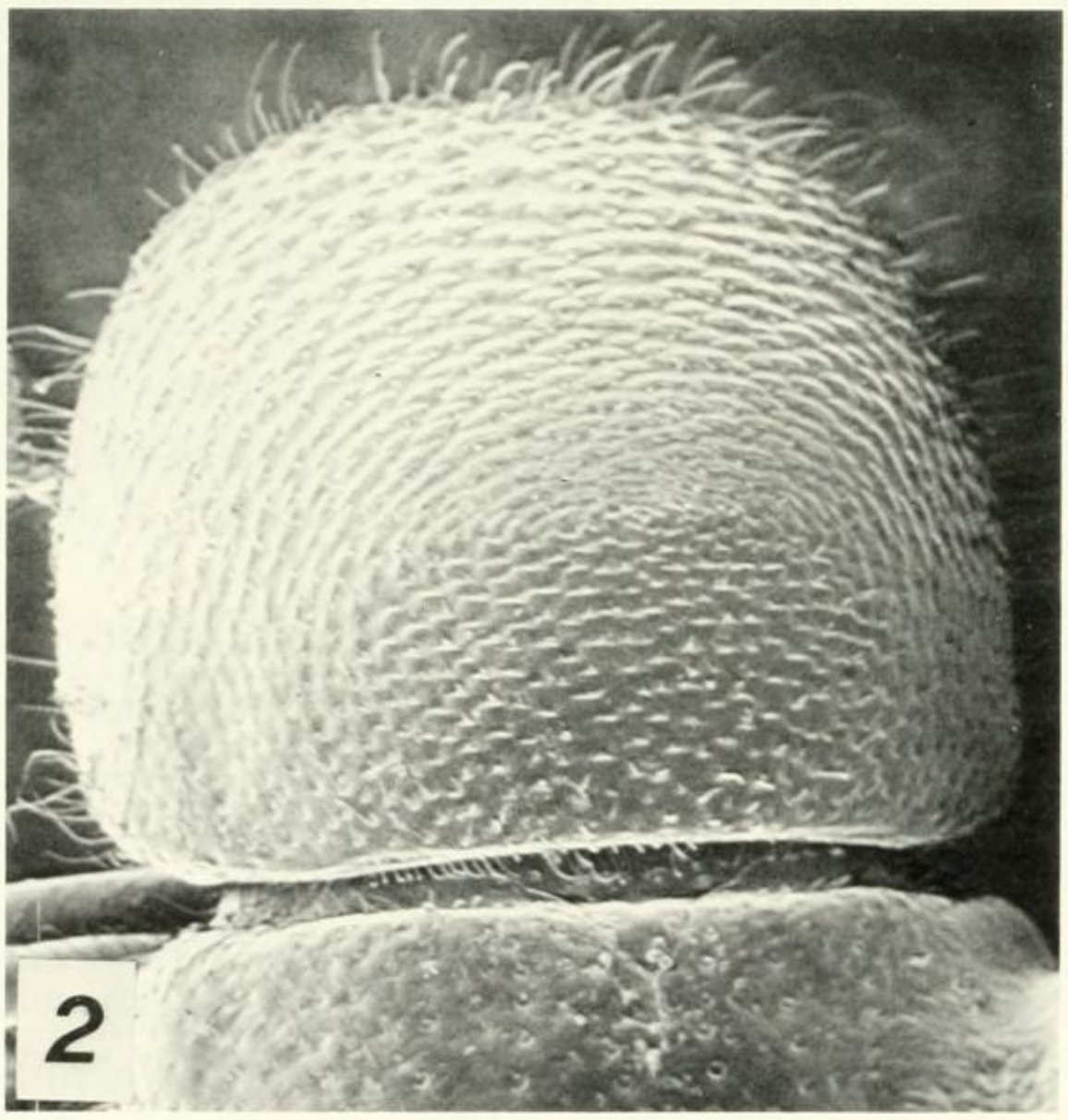
Frons irregularly convex to flattened; surface finely reticulate, glossy, moderately coarsely punctured, strongly pilose with long setae; epistoma with dense fringe of long setae over base of mandibles.

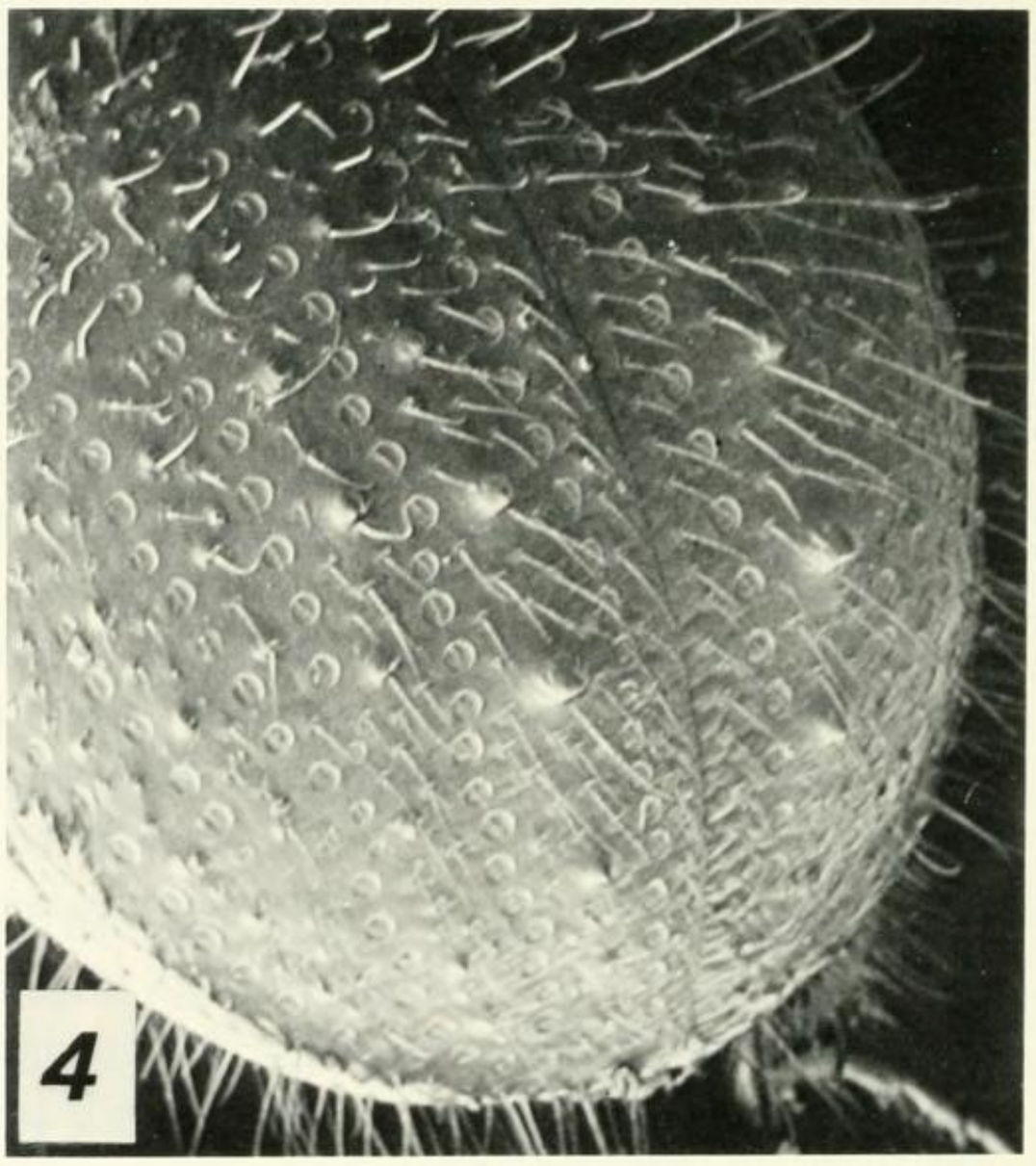
Pronotum broadly transverse, flattened, 1.6× wider than long, anterior margin truncate with slight emargination at middle, lateral and posterior margins broadly arcuate; surface of disc with evenly, but sparsely, spaced asperate punctures; surface between punctures faintly reticulate, but glossy.

Elytra slightly broader than base of pronotum, very strongly rounded in profile, broadest beyond middle, sides broadly arcuate; strial punctures on disc coarse, closely spaced, faintly impressed; interstriae relatively broad, at least 4–5 times wider than striae, smooth to weakly granulate, glossy, biseriately punctate-setose.

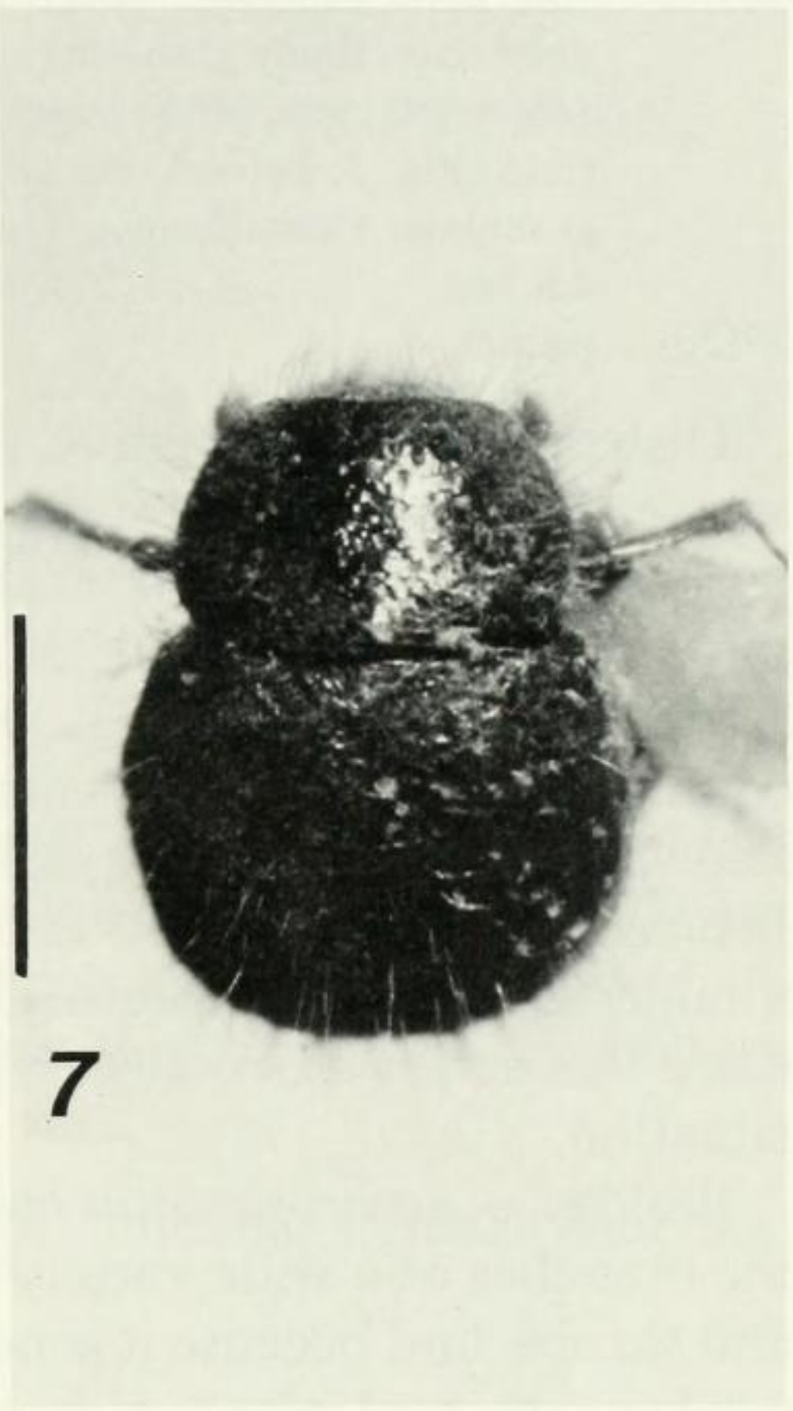








Figs. 1–4. Scanning electron micrographs, *Ambrosiodmus lewisi*. 1, female, dorsal aspect, 23.4× (highlighted area magnified in Fig. 3); scale line = 1.0 mm. 2, pronotum, 47.4×. 3, closeup of surface of left elytron (note irregular double row of fine punctures of interstriae 2 and 3), 117×. 4, declivity, 57×.



Figs. 5–7. *Ambrosiodmus lewisi*. 5, female, dorsal aspect. 6, female, lateral aspect. 7, male, dorsal aspect. (Figs. 5–7 photographed at same scale, scale line = 1.0 mm).

Declivity broadly, evenly rounded with apical interstriae very faintly tuberculate.

Specimens examined.—*UNITED STATES: Pennsylvania*: Montgomery Co., Oreland, 7-VIII-90, ex dead branches, *Quercus velutina* group, T. McClelland (15 ♀♀, 1 ♂). Specimens of the series were compared with identified Japanese specimens in the Canadian National Collection of Insects (CNCI, Ottawa) by D. E. Bright. Specimens are deposited in the Cornell University Insect Collection and the CNCI.

Diagnosis.—Among North American xyleborine ambrosia beetles, this species is most similar to the Asian immigrant *Ambrosiodmus rubricollis* (Eichhoff) in color and in the completely asperate pronotum, but can be readily distinguished by its much larger size (3.6–4.3 mm), and by the elytral interstriae with irregular double rows of fine punctures (Fig. 3).

The genus *Ambrosiodmus* Hopkins is composed of at least "11 species in North and Central America, about a dozen in South America, [and] numerous species (40 or more) in Asia and Africa" (Wood 1986). Several species previously included by Bright (1968) and Wood (1982) in the large and complex genus *Xyleborus* are now assigned to *Ambrosiodmus* (= "*Xyleborus*" of authors, having posterior portion of pronotum rugose).

In his key to species of North and Central American bark and ambrosia beetles, Wood (1982) treats *Ambrosiodmus* as a subgenus of *Xyleborus*. It is now considered a valid genus (Wood 1986). Wood's 1982 key is modified below to include *A. lewisi*, with modifications beginning in couplet #26 (p. 782) (alterations in **boldface**):

26(25). Posterior areas of pronotum weakly granulate; pronotum distinctly longer than wide; interstrial punctures on disc confused, not at all granulate; Costa Rica; 4.0–4.3 mm ..... 26. *scalaris* Schedl

– **Posterior areas of pronotum asperate; pronotum as wide as or wider than long** **26a**

26a(26). Interstrial punctures weakly confused to uniseriate, finely granulate 27

– Interstrial punctures irregularly biseriate (Fig. 3, herein), smooth to weakly granulate; Pennsylvania; *Quercus*; 3.6–4.0 mm ..... *lewisi* Blandford

27(26). (same)

Distribution.—The native range of this species includes Japan, Taiwan, Korea, Malaysia (Ezaki 1957, Nakane et al. 1963), Formosa (Murayama 1930, 1933), and India, Java, and Sumatra (D. E. Bright, pers. comm.). Although this Asian species is known only from a single locality in eastern Pennsylvania, I suspect it is established over a larger area in the eastern United States since this series was collected in a natural situation.

Biology.—*Ambrosiodmus lewisi* breeds in the branches of a wide variety of host trees and shrubs, and because it generally kills or weakens its host plant, it is of great economic concern in some areas of its native range. The extensive list of known hosts of this ambrosia beetle (Murayama 1930, 1933, Ezaki 1957) includes more than 30 broadleaf trees and shrubs, such as oak (*Quercus gilva* Blume and other *Quercus* spp.), cherry (*Prunus*), black alder (*Alnus glutinosa* Gaertn.), mulberry (*Morus*), angelica tree (*Aralia*), another araliaceous tree (*Kalopanax ricinifolius* Miq.), hornbeam (*Carpinus*), camphor-tree (*Cinnamomum camphora* Nees & Eberm.), Japanese maple (*Acer palmatum* Thunb.), and some coniferous hosts, such as Momi fir (*Abies infima* Sieb. & Zucc.).

Acknowledgments

The circumstances surrounding the discovery of this exotic ambrosia beetle were kindly related to me over the telephone by Thomas McClelland, Jr. (Oreland, PA), the landscape contractor who sent in dead branches infested with this scolytid; I appreciate his contribution and cooperation. I also thank Donald E. Bright (Biosystematics Research Centre, Agriculture Canada, Ottawa) for confirming my identification of *Ambrosiodmus lewisi,* and D. E. Bright, Joe Cavey (USDA, APHIS, PPQ, Baltimore, MD) and A. G. Wheeler, Jr. (Penn. Dept. Agric., Harrisburg, PA) for providing critical review of an earlier draft of the manuscript, and Renpei Hatano (Cornell University) for supplying valuable translation of portions of the Ezaki and Nakane et al. monographs.

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