A new tribe, genus, and species of limnichid beetle, *Wooldridgeus perforatus,* from Malaysia (Coleoptera: Limnichidae: Wooldridgeini)

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Abstract.-A new tribe is established in the Limnichidae, Limnichinae, for a new genus and species, *Wooldridgeus perforatus,* from Sabah, Malaysia. Two autapomorphic characters distinguish Wooldridgeini from the two other tribes of the subfamily Limnichinae; 1) the mesotarsus and metatarsus join their respective tibia ventrally (medially) and preapically instead of the usual apical only connection and 2) a large pore, presumed to be an opening of a prothoracic gland, is present on each hypomeron. Distinguishing characters are illustrated by scanning electron micrographs and line drawings. A key to the three tribes included in the Limnichinae is provided.

Specimens of the new tribe, genus, and species described below were found among a variety of aquatic and terrestrial beetles collected for the National Museum of Natural History, Smithsonian Institution, by Gary F. Hevel and Warren E. Steiner in Sabah, northern Borneo in 1983.

Wooldridgeini Spangler, new tribe

Diagnosis.-Small, length less than 2 mm. Broadly ovate and convex dorsally (Figures 1, 2). This new taxon may be readily distinguished from all other described limnichid taxa by the ventral (medial) and preapical connection of the mesotarsus and metatarsus to their respective tibia (Figures 17, 18) instead of only an apical connection as found in other limnichid taxa. A large pore, not known in other taxa of the Limnichidae, is present on each hypomeron of this new taxon.

Wooldridgeus Spangler, new genus

Diagnosis.-Characters of the tribe and the following. Length, 1.90-2.00 mm. Venter with concavity for reception of legs (Figures 2, 16). Tarsal formula 5-5-5. Antenna, 11 segmented; with 3-segmented club. Hypomeron with pore of prothoracic gland opening near each lateral margin (Figures 14, 15); with an obliquely transverse ridge extending mediad from posterolateral concavity to lateral margins of prosternum. Epipleuron very broad opposite mesocoxae, wider than width of mesofemur; with oblique, deep, apicomedial concavity for reception of distal part of mesotibia in repose (Figures 16 18).

Description. Adult.-With characters of tribe and those given in diagnosis of genus and the following. Body broadly ovate; almost flat ventrally; moderately convex dorsally. Integument clothed with dense pubescence; pubescence comprised of setae of two types; one type slender, smooth, and aciculate; second type broad and longitudinally grooved (Figure 24).

Head hypognathous, usually retracted into pronotum. Mouthparts often retracted. Maxillary palpus, 4 segmented. Labial palpus, 3 segmented. Clypeus transversely rectangular with short oblique grooves laterally which extend onto head; labroclypeal suture deep, distinct (Figures 4, 6). Labrum subquadrate, apicolateral angles broadly rounded (Figures 5, 6).

Pronotum convex; widest across base (Figure 1); deeply emarginate for reception of head; margins narrowly rimmed; posterior margin sinuate. Elytron punctate and densely pubescent. Hind wing (Figure 10) with reduced venation; without a radial cross vein, cubito-anal vein, or anal cell; radial-medius indistinct; medius shortened, joined with cubitus distally; of anal veins, only anal vein 2 present. Prosternum long anterior to procoxae; rimmed anteriorly. Prosternal process convex, about as wide as profemur at its midlength; apex moderately rounded. Mesosternum short but widely transverse and bandlike,

moderately flat; anterior margin sinuate; posterior margin truncate. Metasternum moderately convex, wide, deeply grooved apicolaterally for reception of mesotibia. Antecoxal sclerite distinct. Metacoxa transversely elongate, grooved posteriorly for reception of metafemur. All tarsal claws simple, not toothed (Figure 22).

Abdomen with 5 visible segments. Segment 1 pubescent with exception of oblique glabrous concavity for reception of metafemur and metatibia. Segments 2-5 pubescent except subtriangular glabrous area on segments 2 and 3; glabrous area may be result of abrasion from lateral movements of metatarsi, which do not fit into concavities. Last segment emarginate apicomedially (Figure 25).

I consider the two unique and distinctive characters 1) the unique insertion of the mesotarsus and metatarsus to the tibia and 2) the large hypomeral pore to be autapomorphic

Type Species of the Genus. *Wooldridgeus perforatus* Spangler, by monotypy.

Etymology.-*Wooldridgeus,* a patronym dedicated to my colleague Dr. David P. Wooldridge, who has contributed extensively to the knowledge of the world's taxa included in the Limnichidae. The generic name is masculine.

Wooldridgeus perforatus Spangler, new species

Figures 1-32

Diagnosis.-The single species known in this genus may be recognized by the characters included in the diagnoses of the tribe and genus plus the following.

Holotype (Male).-Body Form and Size: Broadly ovate, moderately convex dorsally. Length, 1.90 mm; greatest width across basal fifth of elytra, 1.43 mm.

Color: Cuticle black; pubescence golden yellow.

Head: Pubescent. Subquadrangular, with eyes not visible from above (Figure 3). Sides flat, obliquely rimmed dorsally (Figures 4, 8). Apical margin on each side of clypeus with short, narrow groove (Figure 4). Clypeus sparsely pubescent; labrum densely pubescent (Figures 4, 5, 6). Antennae with segments 1, 2, and 9-11 longest and broadest; segments 3-8 cylindrical and narrow; segments 2-11 moderately densely pubescent; segments 9-11 become progressively broader and more densely pubescent (Figure 8). Maxilla with palpus pubescent; apical segment long, swollen, with sensilla on small apical protuberance (Figures 5, 12, 13). Galea and lacinia each with apical tuft of dense setae (Figure 9). Labial palpus with apical segment longest; apical segment cylindrical and sparsely pubescent (Figure 9), with sensilla on apex (Figure 11).

Thorax: Pronotum broadest and trisinuate across base. Hypomeron flat; microreticulate; without pubescence except sparsely along margins and in each prothoracic pore. Scutellum subtriangular (Figure 23). Elytron microreticulate; cuticle with 2 types of setae (Figures 23, 24). Epipleuron pubescent and very broad opposite metasternum and then widely rimmed along inner margin (Figures 16-18). Prosternum with cuticle microreticulate and moderately pubescent. Protarsi (male) with long spatulate setae on ventral surface (Figures 5, 16, 20, 21). Mesotibial apex with 5 stout spurs on truncate apex (Figures 18, 19). Mesotarsi and metatarsi arising subapically on ventral (medial) surface of mesotibial and metatibial apices respectively (Figures 17-19).

Abdomen: As described for genus.

Genitalia: As illustrated (Figures 26-29).

Female.-Externally similar to male. Genitalia as illustrated (Figures 30-32).

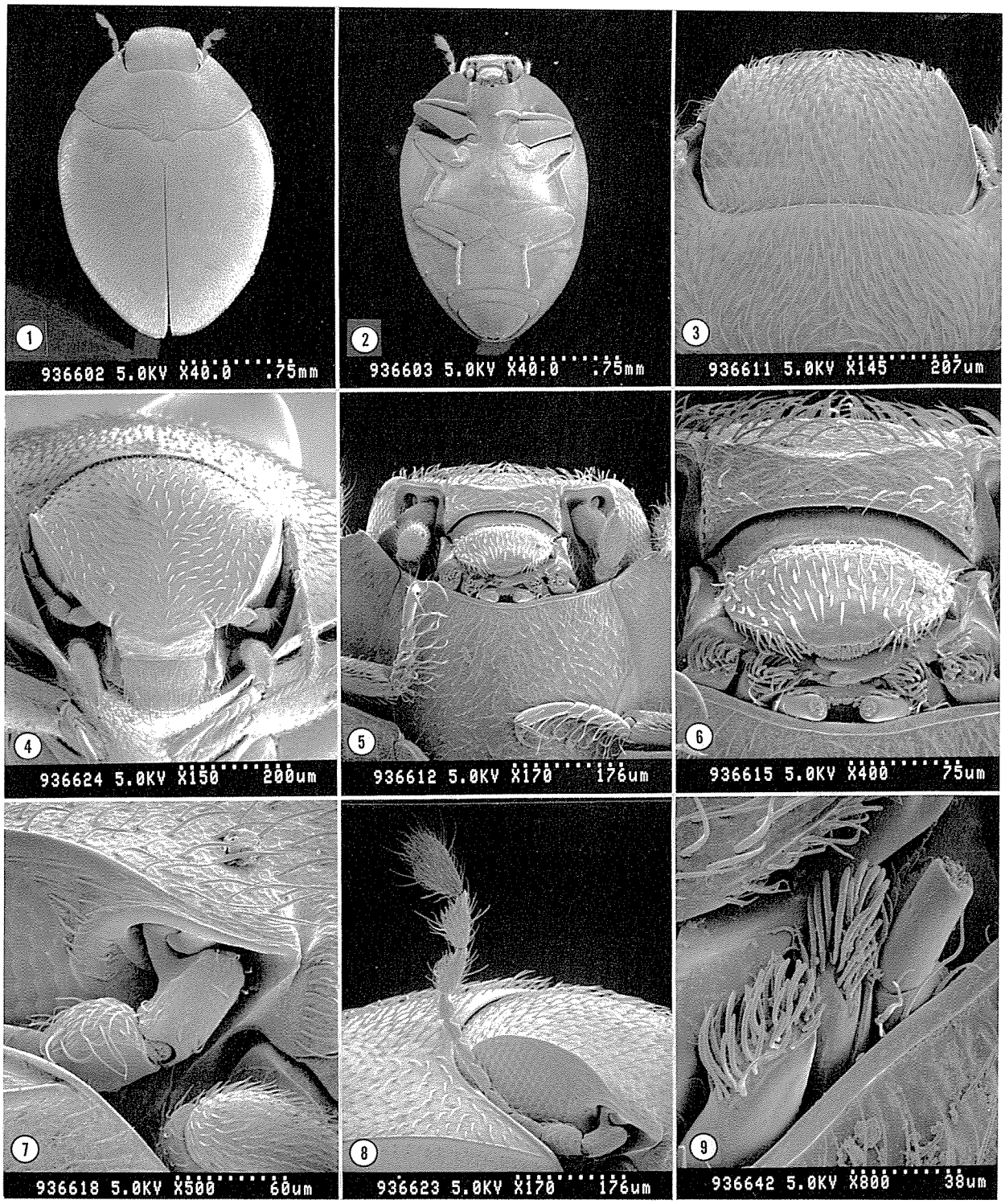
Variations.-The only variation noted among the 42 specimens is in size; lengths ranged from 1.86 to 2.08 mm; width ranged from 1.38 to 1.57 mm.

Type data.-Holotype, _: Malaysia: Sabah, Telupid (25 km E), 17 Aug 1983, at blacklight, G.F. Hevel & W.E. Steiner; deposited in the National Museum of Natural History, Smithsonian Institution. Allotype: Same data as holotype. Paratypes: Same data as holotype, 40 specimens.

Etymology.-Named *perforatus* because of the unusual subapical attachment of the mesotarsus and metatarsus, which perforates the side of the tibia (Figures 18, 19).

Habitat.-The specimens described above were collected along with other small aquatic beetles at blacklight at a logging area on a semi-forested hilltop, 25 kilometers east of Telupid. The site was not clear cut and some tall trees and old cut logs were present in the area.

Discussion.-In reviewing the literature in order to identify this new taxon, I consulted the most recent key by Wooldridge (1975); this included 3 subfamilies and 15 genera known to occur in the Western Hemisphere. In that key, the new genus traced to the subfamily Limnichinae and the genus *Limnichus* Latreille (1829).



Figures 1-9. *Wooldridgeus perforatus,* new genus, new species: 1, habitus, dorsal view, X40; 2, habitus, ventral view, X40; 3, head, dorsal view, X145; 4, head, aboral view, X150; 5, head, adoral view, X170; 6, mouthparts, X400; 7, antennal base, X500; 8, antenna and eye, X170; 9, lacinia and galea apices, last segment of labial palpus, X800.

However, the presence of the unique autapomorhic characters given in the tribal and generic diagnoses of the new genus readily distinguishes *Wooldridgeus* from *Lim-nichus* and all of the genera presently included in the Limnichinae of the New World.

In addition, although I checked Satô's key (1966) to the subfamilies and genera of Japanese Limnichidae, reviewed descriptions of other genera of the Old World, and examined taxa of Old World genera in the collections of National Museum of Natural History, I was unable to find any limnichid genus other than *Wooldridgeus* with the unique attachment of the mesotarsus and metatarsus to their respective tibia and the hypomeral pores.

Because *Wooldridgeus* is the only genus known in the Limnichidae with the two distinctive autapomorphic characters, I place the genus in a new tribe in the Limnichinae. A key to the three tribes recognized in the Limnichinae follows.

Key to tribes of the subfamily Limnichinae

1. Hypomeron each with a large pore (Figures 14, 15); mesotarsus and metatarsus connected ventrally (medially) and preapically to respective tibia (Figures 18, 19) .... Wooldridgeini Spangler, new tribe
   Hypomeron without a pore. Mesotarsus and metatarsus connected only to apex of respective tibia 2

2. Pronotum with deep concavity on each side for reception of antenna in repose; total length 0.8 1.2 mm ....Bothriophorini Mulsant & Rey, 1868
   Pronotum without concavity on each side; total length, variable, 1.2 4.5 mm .... Limnichini Erichson, 1877

Acknowledgments

For their assistance with this study, I thank the following individuals from the Smithsonian Institution: Gary F. Hevel, Museum Specialist, and Warren E. Steiner, Museum Specialist, who collected the specimens of this new limnichid genus along with many other aquatic and semiaquatic beetles for my research interests during their fieldwork in Sabah, Malaysia; Walter Brown, Manager, Scanning Electron Microscope Laboratory, for assistance in obtaining the micrographs; Young T. Sohn, Scientific Illustrator, for the line drawings and assistance with preparation of the plates; and G.F. Hevel, W.E. Steiner for reviewing the manuscript.

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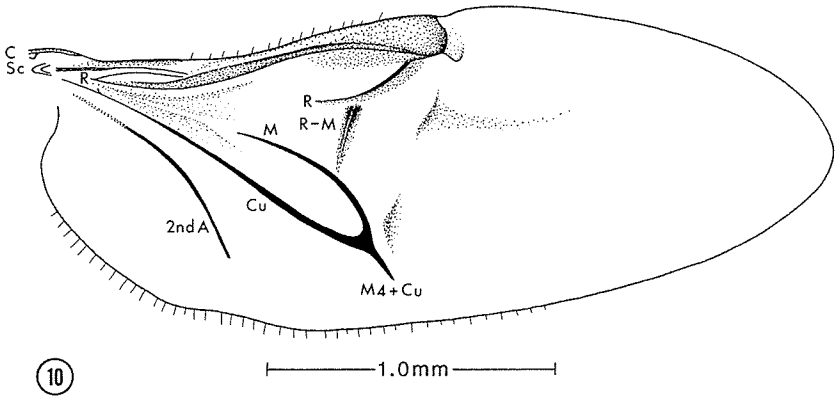
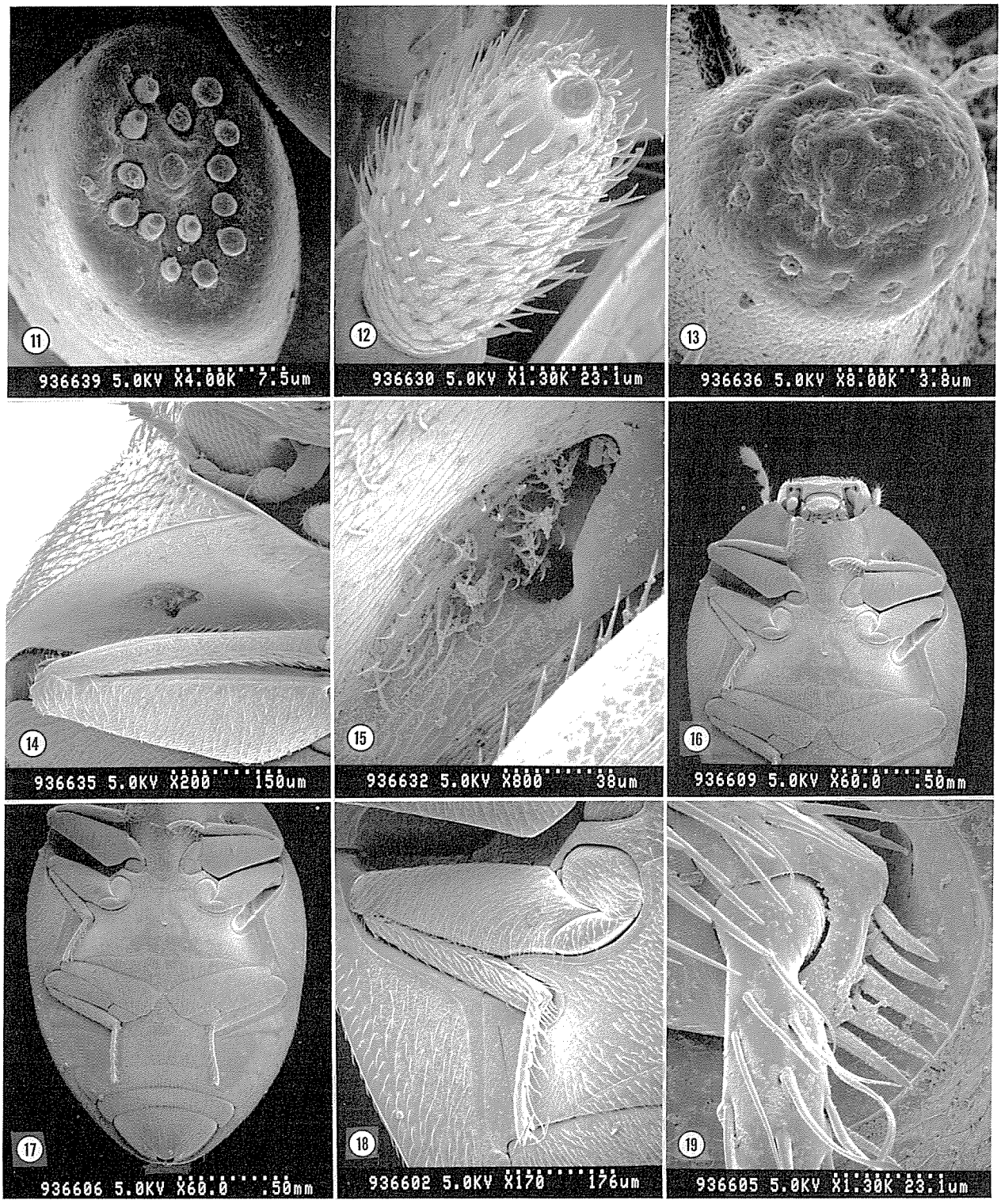
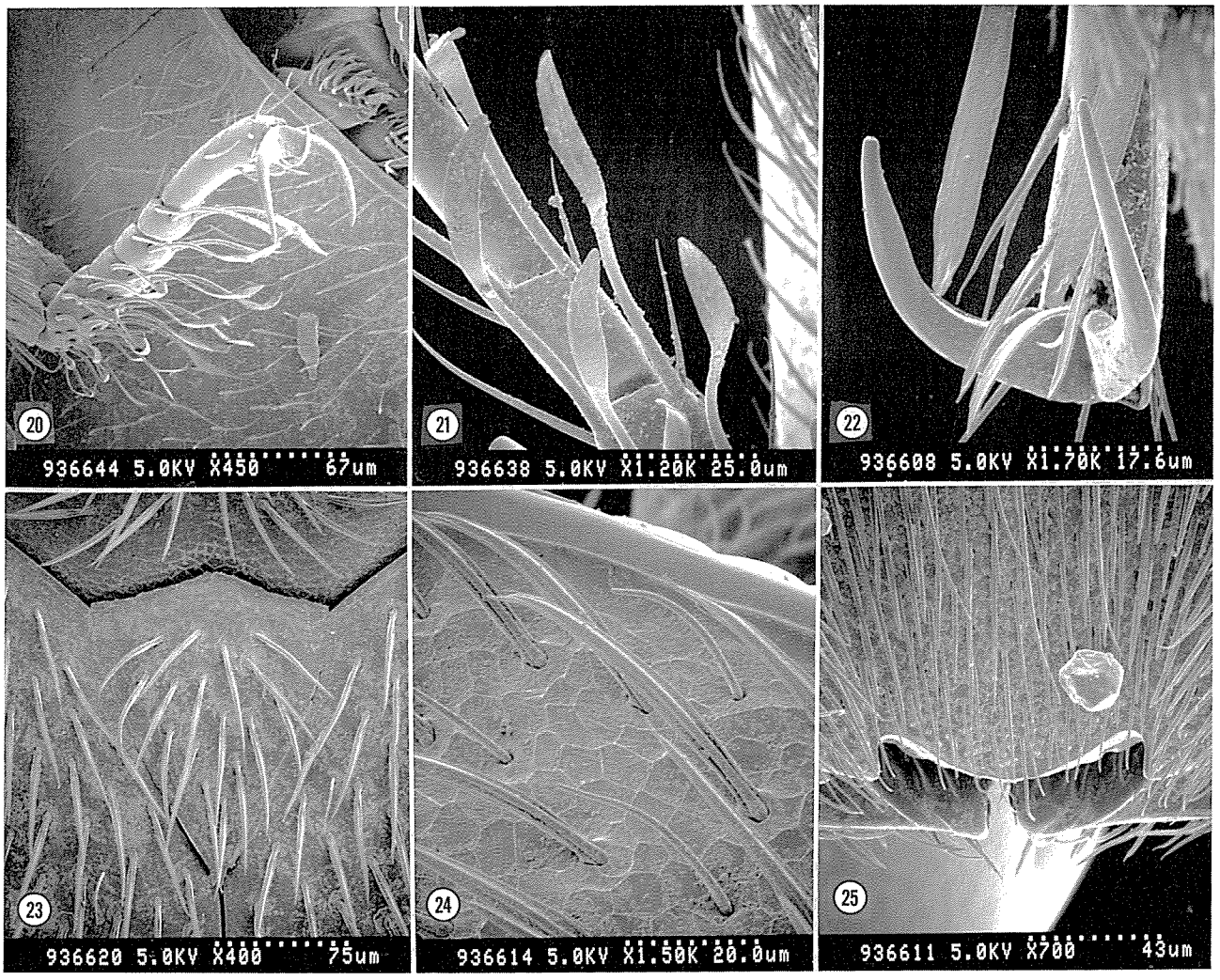


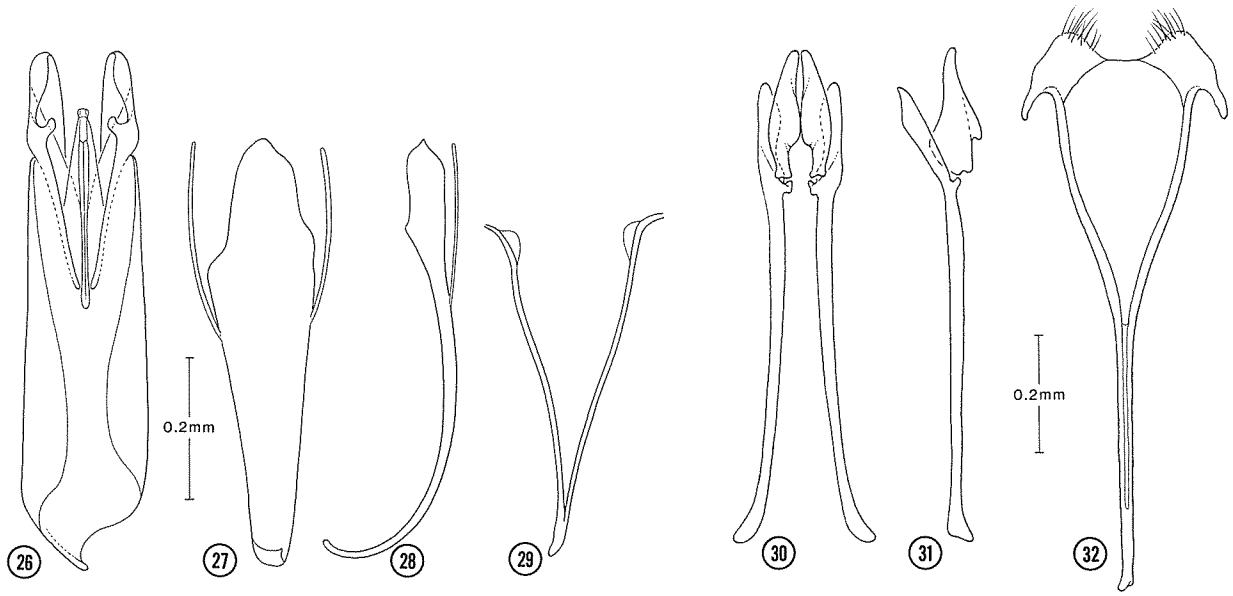
Figure 10. *Wooldridgeus perforatus,* new genus, new species; hind wing.



Figures 11-19. *Wooldridgeus perforatus,* new genus, new species: 11, sensilla, labial palpus, last segment, X4,000; 12, maxillary palpus, last segment, X1,300; 13, sensilla, maxillary palpus, last segment, X8,000; 14, Hypomeron and prothoracic gland pore, X200; 15, prothoracic gland pore, X800; 16, prosternum, mesosternum, and metasternum, X60; 17, middle and hind legs and abdomen, X60; 18, middle leg and metasternum, X170; 19, mesotibial and mesotarsal junction, X1,300.



Figures 20-25. *Wooldridgeus perforatus,* new genus, new species: 20, protarsus, X450; 21, protarsus, ventral setae, male, X1,200; 22, protarsal claws, X1,700; 23, scutellum, X400; 24, cuticular setal types, X1,500; 25, last abdominal segment emargination, X700.



Figures 26-32. *Wooldridgeus perforatus,* new genus, new species: Figures 26-29, male genitalia: 26, aedeagus, ventral view; 27, sternum 9, ventral view; 28, sternum 9, lateral view; 29, sternum 10, ventral view. Figures 30-32, female genitalia: 30, ovipositor, dorsal view; 31, ovipositor, lateral view; 32, sternum 9, ventral view.