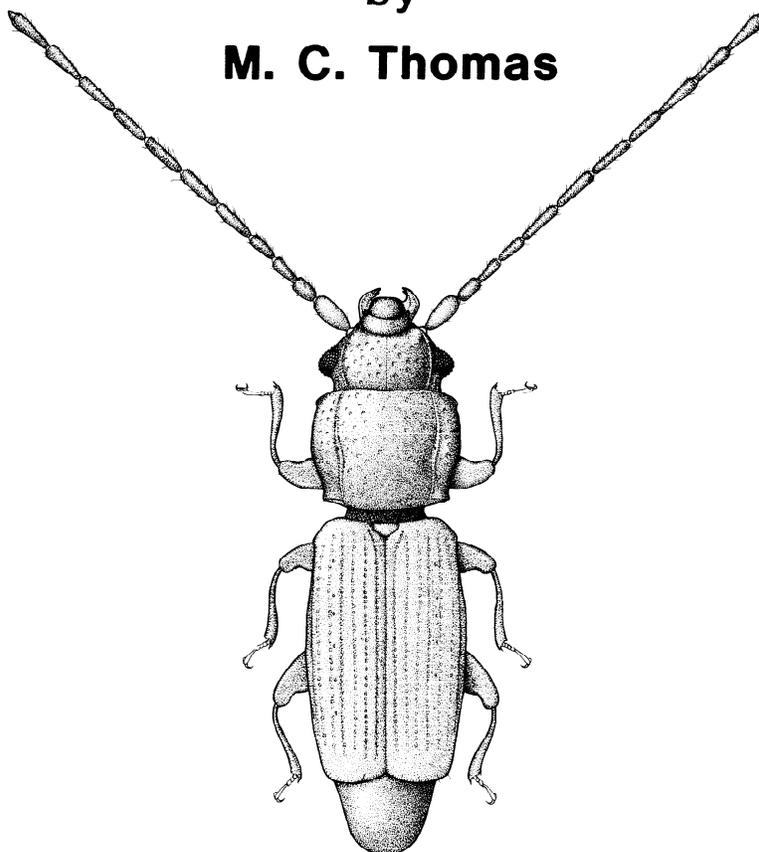


OCCASIONAL PAPERS
of the
FLORIDA STATE COLLECTION OF ARTHROPODS
Volume 3

A Revision of the New World
Species of *Placonotus* Macleay
(Coleoptera: Cucujidae: Laemophloeinae)

by

M. C. Thomas



FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
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Doyle Conner, Commissioner**

**DIVISION OF PLANT INDUSTRY
S. A. Alfieri, Jr., Director**

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Gainesville, Florida 32602

**A revision of the New World species of *Placonotus*
Macleay (Coleoptera: Cucujidae: Laemophloeinae)^{1,2}**

by M. C. Thomas³

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FOREWORD

The beetle family Cucujidae, in the broadest sense, is of considerable economic importance and taxonomic interest. Several of the most important stored products pests belong to this family, and their accurate identification is critical to applying effective control measures. Yet this family has been virtually ignored in the New World by taxonomists for more than 50 years, and most museum specimens are either incorrectly identified or not identified at all. Except for the stored products pests, the biology of these beetles is very poorly known. Many appear to be fungivorous, but some are reported to be predaceous on bark beetles and may be important in controlling the population levels of these forest pests.

Family relationships in the Cucujoidea are poorly known, but ascertaining the subfamily phylogenetic relationships of just one family, Cucujidae, promises to help unravel the relationships of a substantial part of the entire superfamily. The genus *Placonotus* Macleay is one of the largest and most widespread of cucujid genera. This revision is an important step in determining the role of cucujid beetles in the forest ecosystems of the New World.

Michael Charles Thomas was born in Miami, Florida, on 5 May 1948, son of Charles and June Thomas. In December 1970 he married Sheila McCuiston. They have 2 children, Andrea Lynn and Erin Juanita. Mike received his Associate of Arts (Fine Arts) degree from Miami-Dade Community College in April 1968, his Bachelor of Arts (Fine Arts) degree from the University of South Florida in December 1970, with major emphasis on intaglio printmaking. He received a Master of Science degree with a major in Entomology from the University of Florida in August 1981, writing his thesis on a "Revision of the New World species of

Placonotus Macleay (Coleoptera: Cucujidae)", and he is continuing with doctoral studies in Entomology at the University of Florida, working under the guidance of Dr. Robert E. Woodruff. His doctoral dissertation is entitled "Cucujidae (*sensu lato*) of Florida". This publication is a modification of his master's thesis.

Mr. Thomas served as a reporter/news editor for the *Punta Gorda Daily Herald-News*, in Punta Gorda, Florida, from January 1971 to July 1972, as a reporter/bureau chief of the *Orlando Sentinel Star*, Melbourne, Vero Beach, and Ocala from July 1972 to October 1977, and as Research Editor, Division of Information and Publications Services of the University of Florida, in Gainesville, from November 1977 to August 1983. From August 1983 to the present he has served as a graduate assistant in the Department of Entomology and Nematology of the University of Florida. His teaching experience includes laboratories of basic entomology, morphology, insect identification, and immature insects. He is a Research Associate of the Florida State Collection of Arthropods and assists in the curating of the Coleoptera and Orthoptera collections. He is a member of the Coleopterists Society, the Florida Entomological Society, and the Society of Systematic Zoology. In 1975 he received the *Orlando Sentinel Star's* best news story award, and he is author or coauthor of 11 scientific publications on Coleoptera.

Bureau of Entomology
Division of Plant Industry
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Agriculture and
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1 October 1984

Howard V. Weems, Jr.
Editor

ABSTRACT

The New World species belonging to *Placonotus* Macleay are revised and keys, illustrations, and descriptions are provided. Thirteen species are recorded from the New World, including 6 new species and 2 Old World species. A third Old World species is included also to permit its identification should it be discovered in the New World. The following new species are described: *Placonotus macrognathus* (U.S.A. and Cuba), *P. planifrons* (Lesser Antilles), *P. patruelis* (Guatemala), *P. arizonensis* (U.S.A.), *P. pseudomodestus* (South America), and *P. maya* (Guatemala and Mexico). *Laemophloeus zimmermanni* LeConte is revived from synonymy and transferred to *Placonotus*. Other new

combinations are: *P. pallentipennis* (Grouvelle), *P. modestus* (Say), and *P. infimus* (Sharp). The following names are synonymized: *Silvanophloeus apertus* Casey, *S. illustris* Casey, and *S. sobrinus* Casey (= *P. zimmermanni* (LeConte)); *Laemophloeus victus* Kessel and *L. commixtus* Grouvelle (= *P. politissimus* (Wollaston)); *Silvanophloeus liquidus* Casey and *Laemophloeus gundlachi* Grouvelle (= *P. modestus* (Say)). Lectotypes are designated where possible, and one neotype, for *Cucujus modestus* Say, is proposed. The structure of the adults, especially that of the male genitalia, is reviewed, species groups are characterized, and phylogenetic relationships are discussed.

INTRODUCTION

This study was undertaken when it proved impossible to identify North American *Placonotus* using the only available key (Casey, 1916). As more material was examined, especially from the extensive light trap collections of the Florida State Collection of Arthropods, the study was expanded to include the Neotropics as well. In all, more than 1,000 specimens of New World *Placonotus* were examined, plus several hundred specimens from other areas.

Because the original descriptions of most species are brief and superficial, examination of the types was crucial in establishing identities of the New World species. I was able to borrow type material of all the described species treated here, except those of *pallentipennis* and *modestus*, the types of which could not be found. The types of the Old World *testaceus* and *majus* were not examined; identification was through the literature and comparison with Old World specimens.

Identification through external characters is difficult because of the sexual dimorphism and marked heterogonic development exhibited by the adults of these beetles. The male genitalia offer excellent characters for identification and should be examined when identification based on external characters is uncertain.

Genitalia are examined by removing the abdomen after softening the specimen in hot water, separating the tergites from the sternites (the genitalia come away with the tergites) and then clearing in KOH. The genitalia should then be slide-mounted for detailed examination.

Specimen lengths are the sum of the following measurements: most anterior point of head capsule excluding mouthparts to anterior edge of pronotum (specimen in normal position) or basal transverse line of head (specimen extended); anterior edge of pronotum to posterior margin at midline, and base of elytra to most posterior point of elytra or last abdominal segment, whichever is longer.

Distribution records are based only on specimens

examined; because of much past misidentification, published distribution records are suspect at best.

The following species, originally described as belonging to *Silvanophloeus* Sharp (a synonym of *Placonotus*), are here excluded from *Placonotus* as restricted by Lefkovitch (1959, 1962): *Silvanophloeus fraudator* Sharp, *S. atomarius* Sharp, *S. cognatus* Sharp, *S. bembidium* Sharp, and *S. aemulus* Brethes. *S. fraudator* is the type species of the subgenus *Phloeipisius* Casey (1916), considered by Lefkovitch (1962) as meriting generic rank; the other species are, based on their descriptions, members of genera other than *Placonotus*.

Type material and other specimens were borrowed from the following institutions, and I would like to thank the curators for their help: British Museum (Natural History) (BMNH), R.D. Pope and R.J.W. Aldridge; Museum of Comparative Zoology, Harvard University (MCZ), Alfred Newton; United States National Museum (USNM), T.J. Spilman; California Academy of Science (CAS), D.H. Kavanaugh; Museum National d'Histoire Naturelle (MNHN), Nicole Berti; Polish Academy of Sciences (PAS), S. Slipinski; Museo La Plata (MLP), L. de Santis, and Florida State Collection of Arthropods (FSCA), R. E. Woodruff.

I would also like to thank the following individuals who have kindly made specimens available for this study or who have helped in other ways: Paul M. Choate, Gainesville, FL; D.G.H. Halstead (DGH), Slough, England; Julio Micheli (JM), Ponce, PR; Enrico Ratti (ER), Venice, Italy; Robert H. Turnbow (RHT), Enterprise, AL; Albert Allen, Twin Falls, ID, and H.D. Matern, Cologne, West Germany.

Financial support from the Thomas J. Dee Fund of the Field Museum of Natural History (FMNH) allowed me to examine that institution's extensive collection of Cucujidae and contributed greatly to this study.

Drs. Halstead, Woodruff, and J.H. Frank read and criticized the manuscript.

PLACONOTUS Macleay

Placonotus Macleay, 1871:168.
Silvanophloeus Sharp, 1899:537.

TYPE SPECIES: Of *Placonotus*, *P. longicornis* Macleay (by monotypy); of *Silvanophloeus*, *Laemophloeus testaceus* (Fabricius) (by original designation).

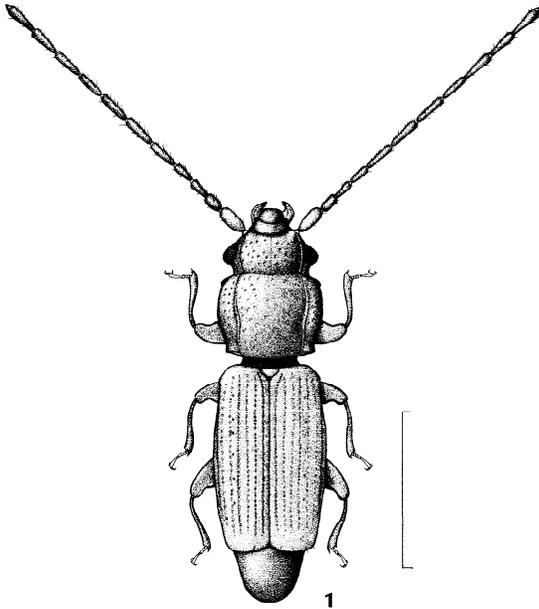


Fig. 1. *Placonotus modestus* (Say), male, dorsal view. Line = 1mm.

DIAGNOSIS: Adults of *Placonotus* can be distinguished from those of other laemophloeine genera by the following combination of characters: form elongate, dorsoventrally compressed; distinct transverse line separating frons from epistome, which is emarginate only over the labrum; labrum shallowly emarginate anteriorly; head and pronotum with lateral lines; anterior coxal cavities narrowly open posteriorly; metepisternum not contributing to mesocoxal cavities but mesepisternum and mesepimeron do; intercoxal process of first ventral abdominal segment often elongate exposed dorsally at least slightly beyond elytral apices; males with genital claspers. Tarsal formula 5-5-5 in females, 5-5-4 in males. Lefkovitch (1959, 1962) and Mukhopadhyay and Sengupta (1977) provided detailed redescriptions of this genus.

Lefkovitch (1962) coined the term "elytral cells" for the elongate depressed areas present in the adults of many laemophloeine genera. In New World *Placonotus*, traces of the elytral cells are found only in *politissimus* and members of the *testaceus* species group

DISCUSSION: Members of the genus *Placonotus* are usually easily recognized by their distinctive facies, although identification at the species level is much more difficult.

Lefkovitch (1959, 1962) revised the European and African species of *Placonotus*, and Iablokoff-Khnzorian (1977) dealt with the species found within the USSR.

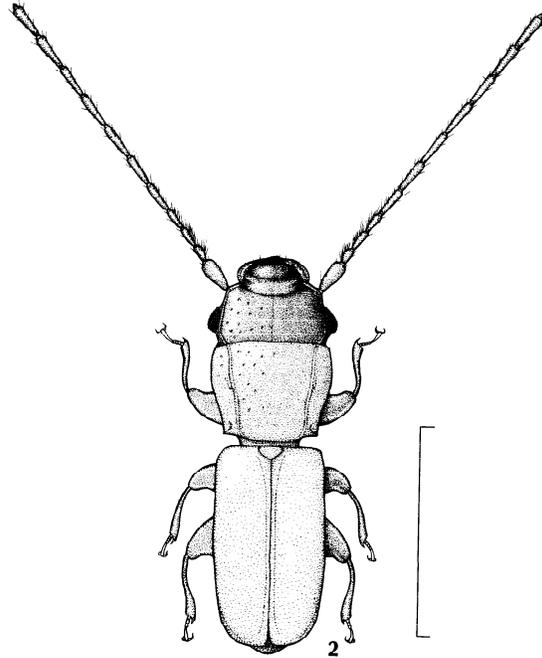


Fig. 2. *Placonotus macrognathus* Thomas, male holotype, dorsal view. Line = 1mm.

However, some of the species assigned to *Placonotus* by Iablokoff-Khnzorian (1977) do not appear to belong to this genus as presently defined. Mukhopadhyay and Sengupta (1977) revised the Indian species.

Casey (1916) revised the U.S. species, but all of the nominal species he described in that work are here considered synonyms of previously described species. Sharp (1899) had a broader definition of this group than is presently accepted.

DISTRIBUTION: Species of *Placonotus* are found throughout the world in forested areas. The genus apparently is absent in New Zealand and the oceanic islands of the Pacific. Recent revisionary studies have placed the number of species in Europe at 1 (Lefkovitch 1959); Africa, 13 (Lefkovitch 1962), and India, 6 (Mukhopadhyay and Sengupta 1977). In the New World, *Placonotus* species are found from southern Canada to Argentina and Uruguay. Iablokoff-Khnzorian (1977) listed 7 species from the Palaearctic, but only 1 appears actually to be referable to *Placonotus*. Lefkovitch (1959) mentioned "numerous" species in Australia but did not elaborate. I have ex-

amined material representing this genus from the additional following areas: Japan, Korea, Philippines, Java, New Guinea, and Australia.

BIOLOGY: Little is known of the life history of these beetles except that adults and larvae are found under the bark of dead trees, apparently almost exclusively that of

hardwoods, and sometimes in the galleries of xylophagous beetles. It has generally been accepted that they are predaceous, but Lawrence (1977) reported an association with an ascomycete fungus (*Daldinia simulans*) for a U.S. species. The larva of 1 species (*testaceus*) has been described (Perris 1877).

KEY TO THE ADULTS OF THE NEW WORLD SPECIES OF *PLACONOTUS* MACLEAY

- | | | | |
|--------|---|---------|--|
| 1 | First ventral abdominal segment with femoral lines; anterior angles of pronotum rounded, little or not produced; elytra truncate, base of third cell impressed; male genitalia as in fig. 27, 43, 57, 59, 60. Africa, Nearctic, Neotropical <i>politissimus</i> (Wollaston) | 6' | Dorsal surface of head smooth and shining, not microreticulate between punctures 8 |
| 1' | First ventral abdominal segment without femoral lines; anterior pronotal angles and elytral apices variable 2 | 7 (6) | Head impressed transversely posterior to frontoclypeal line; mandibles of males broadly explanate laterally; male genitalia as in fig. 22, 37, 51. Florida, Cuba <i>macrognathus</i> n. sp. |
| 2 (1') | Anterior angles of pronotum with prominent, anterolaterally directed tooth; elytra entire, evenly rounded to suture; elytral cells at least feebly indicated (<i>testaceus</i> species group) . . . 12 | 7' | Head not impressed transversely posterior to frontoclypeal line; mandibles of males not explanate laterally; male genitalia as in fig. 28, 38, 52. Grenada, St. Vincent <i>planifrons</i> n. sp. |
| 2' | Anterior angles of pronotum rounded, or declivous to small blunt tooth; elytra entire or truncate, elytral cells absent 3 | 8 (6') | Dorsal surface very flat, head not impressed transversely posterior to frontoclypeal line; puncturation of head and pronotum very fine and sparse; male genitalia as in fig. 29, 39, 53, 62. Central and South America <i>pallentipennis</i> (Grouvelle) |
| 3 (2') | Accessory basal line of pronotum crescent-shaped (<i>pallentipennis</i> species group) 4 | 8' | Dorsal surface slightly, but noticeably, convex, head impressed transversely posterior to frontoclypeal line; punctures of head and pronotum strongly impressed; male genitalia as in fig. 23, 36, 50. Guatemala <i>patruellis</i> n. sp. |
| 3' | Accessory basal line of pronotum straight (<i>modestus</i> species group) 9 | 9 (3') | Elytra subtruncate, apices individually rounded to suture; sutural angle opposite or slightly anterior to external apical angle; male genitalia as in fig. 12, 13, 14, 15. Eastern U.S. to Panama and Antilles <i>modestus</i> (Say) |
| 4 (3) | Elytra subtruncate, apices separately rounded to suture; anterior pronotal angles declivous to small blunt tooth (<i>nitens</i> subgroup) 5 | 9' | Elytra subtruncate or not, but sutural angle posterior to external apical angle 10 |
| 4' | Elytra entire; anterior pronotal angles rounded or with small tooth (<i>pallentipennis</i> subgroup) 6 | 10 (9') | Male genital claspers with peg-like setae; elytra subtruncate 11 |
| 5 (4) | Head and pronotum bright testaceous; disc of head very flat, not at all convex; male genitalia as in fig. 21, 34, 49. Arizona, California, Idaho, Texas <i>nitens</i> (LeConte) | 10' | Male genital claspers without peg-like setae; elytra entire; some specimens distinctly bicolored, male genitalia as in fig. 19, 33, 47. Guatemala, Mexico <i>maya</i> n. sp. |
| 5' | Head and pronotum dark, almost piceous; disc of head slightly, but obviously, convex; male genitalia as in fig. 20, 35, 48, 58. Mexico, Guatemala, Panama . <i>infimus</i> (Sharp) | | |
| 6 (4') | Dorsal surface of head distinctly microreticulate between punctures 7 | | |

- 11 (10) Male genitalia as in fig. 17, 32, 44. Ventral claspers short. Arizona
 *arizonensis* n. sp.
- 11' Male genitalia as in fig. 18, 30, 31, 45, 46. Ventral claspers elongate. Central and South America
 *pseudomodestus* n. sp.
- 12 (2) Clypeus distinctly emarginate; punctures of head and pronotum tending to form longitudinal furrows, especially laterally; apex of median lobe not elongate; male genitalia as in fig. 26, 42, 54. Africa, Neotropics
 *majus* Lefkovitch
- 12' Clypeus feebly emarginate, almost truncate; punctures of head and pronotum not forming longitudinal furrows; apex of median lobe elongate with truncate tip 13
- 13 (12') Disc of head and pronotum sparsely puncturate, punctures separated by 2-3 diameters laterally, more widely medially; surface between punctures lightly microreticulate; dorsal surface sparsely pubescent, setae erect, about length of puncture diameter, slightly longer laterally; male genitalia as in fig. 25, 40, 55, 61. Nearctic
 *zimmermanni* (LeConte)
- 13' Disc of head and pronotum coarsely punctate, punctures separated by 1-2 diameters; surface between punctures microreticulate laterally but not medially; dorsal surface more heavily pubescent, setae much longer than diameter of puncture; male genitalia as in fig. 24, 41, 56. Palaeartic
 *testaceus* (Fabricius)

- Cucujus testaceus* Fabricius, 1787:168.
Laemophloeus testaceus, Dejean, 1837:340.
Silvanophloeus testaceus, Sharp, 1899:537.
Placonotus testaceus, Lefkovitch, 1959:111.
Laemophloeus steppensis Motschulsky, 1845:91.
Laemophloeus suberis Lucas, 1849:479.
Laemophloeus notatithorax Obenberger, 1917:25.

TYPES: Of *testaceus*, location of type unknown (Lefkovitch 1959); TYPE LOCALITY, ?Central Europe (Iablokoff-Khnzorian 1977). Of *suberis*, location of type unknown; TYPE LOCALITY, Algeria. Of *notatithorax*, HOLOTYPE in National Museum, Prague (Lefkovitch 1959), not examined; TYPE LOCALITY, Elba. Of *steppensis*, types in Zoological Museum, Moscow University (Iablokoff-Khnzorian 1977); TYPE LOCALITY, "Kirgiz steppes - Durgangay" (Iablokoff-Khnzorian 1977).

DIAGNOSIS: Length, 1.6 mm -2.0 mm. Very similar to *zimmermanni*, differing in the denser puncturation and pubescence of the dorsal surface and the structure of the male genitalia (fig. 24, 41, 56).

DISCUSSION: Although recorded from North America many times, I doubt that this species occurs in the New World. I have seen no specimens from North America in the collections which I have examined, and I suspect the records were based on misidentifications of *zimmermanni*, individuals of which greatly resemble those of *testaceus* and with which they have long been confused. Even though LeConte (1854) and Casey (1916) recognized the distinctiveness of the North American species, such recent works as Dillon and Dillon (1962) continue to include *testaceus* in the North American fauna. I have included it in this paper to permit its identification should it appear in the New World.

P. testaceus and *zimmermanni* belong to a complex of primarily Palaeartic and Oriental species which resemble each other greatly in adult facies.

SPECIMENS EXAMINED: 7 (FSCA).

DISTRIBUTION: Iablokoff-Khnzorian (1977) listed the distribution of this species as "Mediterranean, practically the whole of W. Europe, the forest zone of USSR southward from Kazan, Georgia, Armenia (Kirants), Talysh, Soviet Central Asia (Samarkand, Iolatan'), Kazakhstan, Soviet Far East (Khabarovsk), Japan." I have seen specimens from Italy and France.

BIOLOGY: "A common forest species on linden, beech, hazelnut, oak, Ulmaceae (along with *Pteleobius*), in the passages of scolytids and other bark beetles" (Iablokoff-Khnzorian 1977). Lefkovitch (1959) recorded it from under the bark of lime, of beech; in the galleries of *Scolytus*; under chestnut bark with *Drycoetes capronatus*; under dead oak bark, and in the galleries of *Pteleobius vittatus* (F.) and *P. kraatzii* Eich. in elm.

SPECIES DESCRIPTIONS

P. testaceus species group

DIAGNOSIS: The following combination of character states serves to distinguish the members of this group: anterior angles of pronotum with prominent, anterolaterally directed teeth; elytra entire, cells at least feebly indicated; accessory basal line of pronotum straight. The only indigenous New World species included in this group is *zimmermanni*. The Palaeartic *testaceus* is the type species of the group; the African *majus* is tentatively included, and many African and Oriental species appear also to belong to this group.

Placonotus testaceus (Fabricius)

(fig. 24, 41, 56)

***Placonotus zimmermanni* (LeConte), n. comb**

(fig. 3, 25, 40, 55, 61)

Laemophloeus Zimmermanni LeConte, 1854:75.

Laemophloeus testaceus auctorum, not (Fabricus, 1787:168).

Silvanophloeus apertus Casey, 1916:128. n. syn.

Silvanophloeus illustris Casey, 1916:129. n. syn.

Silvanophloeus sobrinus Casey, 1916:129. n. syn.

TYPES: Of *zimmermanni*, LECTOTYPE, here selected, in MCZ (see below). Of *apertus*, LECTOTYPE, here selected, in USNM (see below). Of *illustris*, HOLOTYPE male, in USNM, with following data: "N. Braunfels Tex. June Wickham" / "CASEY bequest 1925" / "TYPE USNM 49171" / "illustris Csy" [Casey's mss.]. Of *sobrinus*, HOLOTYPE female, in USNM, with following data: "N.C." / "CASEY bequest 1925" / "TYPE USNM 49172" / "sobrinus Csy" [Casey's mss.].

DIAGNOSIS: Length, 1.5 mm - 1.9 mm. The following characters are distinctive for this species: Anterior pronotal angles with well developed tooth (fig. 3); dorsal surface of head and pronotum moderately punctate laterally, pronotum often nearly impunctate medially, surface between punctures weakly microreticulate but shining. The male genitalia (fig. 25, 40, 55, 61) also are distinctive.

DISCUSSION: Although LeConte (1854) recognized the distinctiveness of this species, it has long been confused with *testaceus*, a Palearctic species. Casey (1884) synonymized *zimmermanni* with *testaceus*, then later (1916) redescribed LeConte's species under several new names. I have seen no examples of *testaceus* from the New World.

LeConte described *zimmermanni* from an unspecified number of specimens from Pennsylvania, Maryland, and Illinois. Only one specimen remains in the MCZ according to curator Alfred Newton (in litt.). I here select as lectotype the specimen (female) bearing the following data: "[pink disc, indicating 'Middle States']" / "1257" [pencil on brown paper] / "Type 6789" / "L. Zimmermanni Lec." [LeConte's mss.].

Casey described *apertus* from an unspecified number of specimens from "Illinois, Indiana, New York (Catskill Mts.) and Pennsylvania (Philadelphia)." I have examined a single male syntype labelled: "Ind." / "CASEY bequest 1925" / "TYPE USNM 49170" / "apertus Csy" [Casey's mss.]. Since this specimen is a male and bears Casey's identification label, I select it as lectotype. It is conspecific with *zimmermanni*. I have also examined the holotypes of *illustris* and *sobrinus* and consider them to belong to *zimmermanni*.

In addition to the lectotype of *zimmermanni*, I have seen a series of 7 specimens of this species from Kansas (Topeka and Riley Co.) in the USNM identified as *zimmermanni* by LeConte.

BIOLOGY: Label data include: "under bark of *Quercus*" (Florida); "under bark of *Quercus* sp. log" (Florida), and "under chips on sugar maple stump" (Ohio).

SPECIMENS EXAMINED: 446 (BMNH, CAS, FMNH, FSCA, USNM, MCT, ER, RHT).

DISTRIBUTION: CANADA: ONTARIO: Kent Co., Tillbury; Lambton Co., Grand Bend; Prince Edward Co.; U.S.A.: ALABAMA: Jefferson Co., Rocky Ridge; Madison Co., Herrin Cave; DISTRICT OF COLUMBIA; FLORIDA: Alachua Co.; Duval Co.; Marion Co., Ocala; GEORGIA: Chatham Co., Savannah; Clarke Co., Whitehall Forest; ILLINOIS: Alexander Co., Olive Branch; Cook Co., Glen View, Riverside, Willow Spring; Sangamon Co., Springfield; Will Co., Joliet; "Wolo" (?); INDIANA: La Porte Co., Smith Station; Montgomery Co., Shades State Park; Marion Co., Indianapolis; Porter Co., Ogden Dunes; Posey Co., Mt. Vernon; Tippecanoe Co.; "Dune Park" (?) and "Smith" (?); KANSAS: Douglas Co.; Riley Co.; Shawnee Co., Topeka; KENTUCKY: Jefferson Co., Louisville; Knox Co., Barbourville; LOUISIANA: Ascension Par., Gonzalez; Calcasieu Par., Lake Charles; MARYLAND: Baltimore; Baltimore Co., Sparrows Point and "Gunpowder" (?Falls); Dorchester Co., Cambridge; Montgomery Co., Patuxent; Prince Georges Co., College Park; Plummer's Island; MICHIGAN: Macomb Co., Lakeside; Wayne Co., Detroit; MISSISSIPPI: Forrest Co., Hattiesburg; Jackson Co., 4 mi. E. Ocean Springs; MISSOURI: Boone Co., Columbia; St. Louis Co., St. Louis; NEBRASKA: Lancaster Co., Lincoln; NEW JERSEY: Essex Co., Montclair and "Orangeburg" (?Orange); Morris Co., Lincoln Park and Towaco; Warren Co., Phillipsburg; "Mountain View" (?); NEW YORK: Erie Co., Buffalo, Colden, Hamburg, Lancaster; Herkimer Co., Newport; Kings Co., Brooklyn; Nassau Co., Roslyn; Tompkins Co., Ithaca; Westchester Co., Pelham; "Cent." (?) and "Van Cortland Pk." (?); NORTH CAROLINA: Buncombe Co., Asheville and Black Mountain; Henderson Co., Hendersonville; Polk Co., Saluda and Tryon; OHIO: Delaware Co.; Noble Co.; OKLAHOMA: Caddo Co.; "Page" (?); OREGON: "Blue Mts." (?); PENNSYLVANIA: Northampton Co., Easton; Philadelphia Co., Philadelphia; "Twin Lakes" (?); TENNESSEE: Grange Co., Rutledge; Marion Co., Monteagle; Smith Co., Elmwood; TEXAS: Bexar Co., San Antonio; Cherokee Co., Jacksonville; Colorado Co., Columbus; Dallas Co., Dallas; Montgomery Co., Conroe; Travis Co., Austin; "Devil's River" (?) and "Montell" (?); VIRGINIA: Arlington Co., Rosslyn; Fauquier Co., Belvoir; WEST VIRGINIA: Greenbrier Co., White Sulphur; Kanawha Co., Kanawha Station; Ritchie Co., Cairo; WISCONSIN: Walworth Co., Delavan.

***Placonotus majus* Lefkovitch**

(fig. 26, 42, 54)

Placonotus majus Lefkovitch, 1962:179, fig. 8.

TYPES: In BMNH, not examined; **TYPE LOCALITY:** Rhodesia.

DIAGNOSIS: Length, 1.5 mm - 1.9 mm. Individuals of this species are similar to those of *testaceus* and *zimmermanni* in external appearance, differing from the former in the sparser pubescence and less dense puncturation medially on the pronotum; from the latter in the generally denser puncturation laterally on the disc of the pronotum and head and the tendency of the punctures to form longitudinal furrows. From both species they differ in the distinctly emarginate clypeus. The male genitalia (fig. 26, 42, 54) also are diagnostic. The base of the pronotum in large males of *majus* also is more strongly constricted than in either *testaceus* or *zimmermanni*.

DISCUSSION: I have compared New World specimens with African specimens from Nigeria and Southern Rhodesia, and I consider them to be conspecific. The ease with which species of this genus can be transported from one faunal area to another is illustrated by the fact that most of the New World specimens of *majus* that I have seen were intercepted at the port of New York. I have also seen several specimens taken from imported timber at the port of Venice, Italy.

BIOLOGY: The intercepted specimens in the USNM were taken from mahogany logs originating in Cuba and the Dominican Republic.

SPECIMENS EXAMINED: Africa, 69; New World, 17 (FMNH, FSCA, USNM, MCT, JM, DGH).

DISTRIBUTION: Lefkovitch (1962) listed the distribution of this species as "Rhodesia, Congo, Angola, West Africa." I have seen African specimens from Zimbabwe (Southern Rhodesia) and Nigeria, and New World specimens from: CUBA; JAMAICA: St. Thomas Parish: Trinity Ville; HAITI: Montrouis; DOMINICAN REPUBLIC; PUERTO RICO: Ponce, Las Delicias; COLOMBIA: Puente de los Clavos, 15 km. E. of Sierra Nevada de Santa Marta, el. 500 m.

P. politissimus species group

DIAGNOSIS: This monotypic species group can be distinguished by the following combination of character states: first ventral abdominal segment with femoral lines; anterior angles of pronotum rounded, little or not produced; base of third elytral cell impressed, elytral apices truncate.

Placonotus politissimus (Wollaston)

(fig. 7, 27, 43, 57, 59, 60)

Laemophloeus politissimus Wollaston, 1867:67.

Placonotus politissimus, Lefkovitch, 1962:183.

Laemophloeus (Silvanophloeus) mirus Grouvelle, 1905:142.

Laemophloeus commixtus Grouvelle, 1912:304. n. syn.

Laemophloeus victus Kessel, 1926:69. n. syn.

TYPES: Of *politissimus*, LECTOTYPE, selected by Lefkovitch (1962), in BMNH, not examined (see below); **TYPE LOCALITY**, Cape Verde Islands. Of *mirus*, LECTOTYPE, selected by Lefkovitch (1962), in MNHN, not examined; **TYPE LOCALITY**, Madagascar. Of *commixtus*, HOLOTYPE female, with following data: "Guadeloupe Dufau" [mss. black on green] / "Type" [black on orange] / "MUSEUM PARIS COL. A. GROUVELLE 1917" [black on green] / "L. commixtus ty. Grouv" [Grouvelle's mss. black on yellow] / "TYPE" [black on red], in MNHN, examined. Of *victus* type(s) presumably on PAS, but could not be found (see below); **TYPE LOCALITY**, Brazil.

DIAGNOSIS: Adults of this species can be distinguished from all other New World *Placonotus* by the following combination of characters: anterior pronotal angles rounded, not or little produced; third elytral cell distinctly impressed basally; first ventral abdominal segment with femoral lines. Length 1.2 mm - 2.0 mm. The male genitalia (fig. 27, 43, 57, 59, 60) are distinctive. A detailed redescription of this species was provided by Lefkovitch (1962).

DISCUSSION: This species is common and widespread in both Africa and the Neotropics, ranging into the Nearctic in Florida, and is 1 of 2 African species of *Placonotus* found in the New World during the present study. Because *politissimus* is of such wide distribution in both Africa and the New World, it is difficult to say in which region it originated. It does not seem to be closely related to species in either area.

I have examined 1 specimen of the type series of *politissimus* (Lefkovitch 1962:184) and consider the New World specimens to be conspecific. The holotype of *commixtus* is a female of *politissimus*, NEW SYNONYM. Grouvelle (1912:306) noted of this species: "One example mixed in with *S. pallidipennis* (sic, see discussion of this name under *macrogathus*) found under the bark of a freshly fallen *Cedrela odorata*." The type(s) of *victus* could not be found in Kessel's collection in the PAS. However, there were several specimens of *politissimus* among the unidentified material in Kessel's collection, and I have found no New World specimens agreeing with the key characters of *victus* which could not be referred to *politissimus*. Kessel (1926:69) described *victus* by key characters, separating his species from Grouvelle's on the basis of distribution only. I consider *victus* to be a junior synonym of *politissimus*, NEW SYNONYM.

Grouvelle (1905) considered *mirus* to be very similar to the New World *nitens*. In the BMNH is a specimen from Grenada identified as *nitens* by Grouvelle, but it is a *politissimus*.

SPECIMENS EXAMINED: New World, 178; Africa, 110 (FSCA, USNM, BMNH, FMNH, PAS, DGH, JM, MCT).

DISTRIBUTION: Lefkovitch (1962) recorded the distribution of *politissimus* as follows: "Atlantic islands off Africa, Congo, Ivory Coast, Madagascar, Seychelles." I have seen specimens from additional African localities in Zimbabwe (Southern Rhodesia) and Nigeria. U.S.A.: FLORIDA: Dade Co., Homestead; Hillsborough Co., MacDill Field; Highlands Co., Archbold Biol. Sta.; Indian River Co., S. of Vero Beach; Marion Co., Ocala; Monroe Co., Stock Island; Polk Co., Winter Haven; MEXICO: TAMAULIPAS: 2 mi. N. Ciudad Victoria; BRITISH HONDURAS: TOLEDO: Columbia Forest Station; COLOMBIA: VALLE: Finca Kuchman; BOLIVIA: SANTA CRUZ: San Esteban Province, Muyurina, 49 km. N. of Santa Cruz; Sara Province, 5 km. N. of Santa Rosa, Rio Palacios; Saavedra Agr. Exp. Sta.; PERU: LORETO: Yarina Cocha, Pucallpa; BRAZIL: MINAS GERAIS: Cordisburgo, Grutas de Maquine; SANTA CATHARINA: Alto Rio do Teste; Nova Teutonia; "Itoupavazinha"; CUBA: ORIENTE: Cayamas; Guantanamo Bay; JAMAICA: CLARENDON PARISH: Milk River Bath; ST. CATHERINE PARISH: Bog Walk and Worthy Park Estates; ST. ELIZABETH PARISH: Santa Cruz; ST. THOMAS PARISH: Trinity Ville; HAITI: Montrouis; PUERTO RICO: Ponce, Rd. 10, Km. 24; GRENADA: Soubise; TRINIDAD: Curepe and Simla.

P. modestus species group

DIAGNOSIS: The following combination of character states serves to distinguish the members of this group: anterior angles of pronotum declivous to blunt tooth, accessory basal line straight; elytral cells absent; flagellum coiled. New World species included in this group are: *modestus*, *pseudomodestus*, *arizonensis*, and *maya*.

Placonotus arizonensis Thomas, new species

(fig. 5, 17, 32, 44)

DIAGNOSIS: Adults of this species are very similar to those of *modestus* and *pseudomodestus*. From the former, adults can be distinguished by their entire elytral apices, and from the latter by the proportionally shorter elytra. From both, they can be distinguished by the structure of the male genitalia (fig. 17, 32, 44).

DESCRIPTION: Holotype male, in FSCA, with following data: "ARIZONA Santa Rita Mts. Madera Cyn. 26 July 1970 K. Stephan Coll."

FORM: Length, 1.7 mm. Elongate, narrow; testaceous, labrum, base of mandibles, elytra, and legs paler.

HEAD: Transverse, broader across eyes than long (1:1.7), disc slightly convex; lateral lines represented by a ridge bordered medially by a deep groove; fronto-clypeal line represented by a slight ridge bordered posteriorly by a deep groove; mandibles abruptly bent at midpoint and explanate as in *modestus*; punctures of disc larger than an eye facet, separated mostly by about

1 diameter, surface between punctures smooth and shining; antennal scape about 2.5 times longer than broad; pedicel about half as long as scape; third segment slightly longer than pedicel; fourth through eleventh segments gradually increasing in length, eleventh longest, segments 9-11 very slightly expanded at apices; antennae extending to apical fourth of elytra.

PRONOTUM: Slightly transverse (1:1.1), moderately constricted posteriorly; anterior angles declivous, obtusely toothed; posterior angles right; disc of pronotum punctured as head, almost impunctate medially, punctures smaller and more widely spaced exterior to lateral lines; lateral lines represented by a deep groove, not bordered by a ridge; groove slightly expanded at about midpoint to enclose black spot.

ELYTRA: Elongate (1.7:1), broadest at about midpoint; apices evenly rounded to sutural angle; disc of each elytron with 5 rows of shallow punctures, obsolescent apically; last visible abdominal tergite exposed behind apices.

Male genitalia as in fig. 17, 32, 44.

VARIATION: Length, 1.4 mm - 1.6 mm. In the females, the antennae are proportionally shorter and the pronotum less transverse.

PARATYPES: (5) as follows: 2, same data as holotype; 1, same except collection date is Aug. 31 1968 and no collector is mentioned; 1, "Arizona, Chiricahua Mts., 5500 ft. Oct. 6 1974 K. Stephan leg."; 1, "Arizona, Pima Co. Pena Blanca Aug. 12 1973 K. Stephan leg.", in FSCA and USNM. A female in the FSCA from "Mexico Sonora 9 mi. S. Cananea 16 Sept 1970 K. Stephan coll." appears referable to this species but is not included in the type series.

Placonotus pseudomodestus Thomas, new species

(fig. 4, 18, 30, 31, 45, 46)

DIAGNOSIS: Adults of this species are very similar to those of other species of the *modestus* group and can best be distinguished by the structure of the male genitalia (fig. 18, 30, 31, 45, 46).

DESCRIPTION: Holotype male, with following data: "BRASIL Sta. Catharina Nova Teutonia V:1934 leg. F. Plaumann" / "under bark" / "Field Mus. Nat. Hist. 1966 A. Bierig Colln. Acc. Z-13812"; in FMNH.

FORM: Length, 2.0 mm. Elongate, narrow; testaceous, labrum, legs, and elytra slightly paler.

HEAD: Transverse, broader across eyes than long (1:1.94); disc slightly convex; lateral lines represented by a ridge bordered medially by a deep groove; fronto-clypeal line represented by a groove; mandibles abruptly bent at midpoint, right more so than left, and laterally expanded as in *modestus*; punctures of disc about the diameter of an eye facet, separated mostly by 1 diameter; a few micropunctures scattered among larger punctures, surface otherwise smooth and shining; antennal scape twice as long as broad; almost twice as long as pedicel; third segment slightly longer than pedicel; fourth equal in length to third, segments 5-10

about equal in length to scape, 11 slightly longer; segments 9-11 not noticeably dilated; antennae almost attaining elytral apices.

PRONOTUM: Transverse (1:1.19), moderately constricted posteriorly, broadest just behind apex; anterior angles toothed, posterior obtuse; disc punctured as head; lateral lines represented by a deep groove, not bordered by a ridge; groove expanded just behind midpoint to enclose black spot.

ELYTRA: Elongate (1.82:1), almost parallel sided, broadest at about midpoint, then gradually narrowed; apices evenly rounded to suture, not truncate; most of last visible abdominal segment exposed dorsally; disc with 6 rows of punctures, obsolescent apically; not carinate laterally.

Male genitalia as in fig. 18, 31, 45.

VARIATION: Length, 1.5 mm - 2.0 mm. Individual variation in this species is expressed, as in other members of the genus, in the relative length of the antennae and elytra and the relative transverseness of the pronotum and development of the anterior pronotal angles. Although the Central American and northern South American specimens cannot be distinguished based on external characters from the southern South American specimens in the type series, there are differences in the male genitalia, especially in the robustness of the peg-like setae of the genital claspers (compare fig. 30 and fig. 31) which may reflect a specific difference between the 2 populations. In the absence of material from the intervening area of South America, the Central American specimens are included provisionally in *pseudomodestus*.

PARATYPES (295) as follows: 20, "BRASIL: Sta. Catharina Nova Teutonia V:1934 leg. F. Plaumann"; 54, same except "under bark"; 10, same except "under loose bark"; 1, same except "wild cane (?)"; 5, same except "VI:1934"; 38, same except "IV:1934"; 10, same except "1936"; 3, same except "X:1934"; 1, same except "X:1934" and "on bamboo"; 2, same except "I:6:1936" and "holzkammer = wood chamber? (storage?)"; 1, same except "XII:30:1935" and "holzkammer = wood chamber? (storage?)"; 1, "Blumenau Brasil"; 2, "PARAGUAY: (Itapua), Hohenau. VIII:11:1935 leg. H. Jacob"/"under bark" (the preceding specimens also have the following museum label: "Field Mus. Nat. Hist. 1966 A. Bierig Colln. Acc. Z-13812"); 9, "BRASIL: Rio de Janeiro; Parc. Nac. do Itatiaia, Hotel Simon. Elev. 1200m"/"III, 19-20, 1960. B. Malkin leg."; 3, same except "under bark"; 6, "Parque Nacional de Itatiaia, Rio de Jan., BRAZ. alt. 1200M. III:19-20:60. B. Malkin. 'under bark"; 1, "Nova Teutonia, Sta Catharina BRAZ. VI:1941"/"300-500m. alt. Fritz Plaumann leg." (FMNH); 1, "Tucuman Argentina H. E. Box. B.M. 1930-238."/ "Argentina Tucuman 1 Nov. 1929" / "H.E. Box Collector" / "Laemophloeus gundlachi Grouv. (det. Bruch)" / "3311"; 1, "Tucuman: Argentina. H.E. Box. B.M. 1930-238." / "H.E. Box Collector" / "Laemophloeus gundlachi Grouv. (det. Bruch)"; 1, "Argentina Tucuman 1 Nov. 1929" / "H.E. Box Collector" / "3308" / "Laemophloeus

gundlachi Grouv. (det. Bruch)" / "Silvanophloeus modestus (Say) det. L.P. Lefkovich 1957" (BMNH); 9, "B-1."; 2, same except illegible label; 10, same except 2 illegible labels; 22, "Rio do Sul St. Catharina Coll. Kessel"; 12, "Badenfurt Brasilien Coll. Kessel"; 5, "Badenfurt Coll. Kessel"; 55, "Itoupavazinha Coll. Kessel"; 1, "Typ. 34"; 4, no data (the preceding specimens also have the following museum label: "ex coll. Kessel Mus. Zool. Polonicus Warszawa 19/46"); 2, "Brasil. Fry." / "134" / "Mus. Zool. Polonicus Warszawa 12/45"; 1, "98" / "S. Catharina Luderwaldt" / "147" / "Mus. Zool. Polonicum Warszawa 12/45" (PAS, FSCA); 2, "URUGUAY: Dept. Rocha Rt. 13 Arroyo de la India Muerta, 3km. E. Velasquez, 29-II-80, under bark R.E. Woodruff" (FSCA).

Specimens, 19, from the following localities are considered to belong to *pseudomodestus*, but are excluded from the type series: MEXICO: SAN LUIS POTOSI: Tamazunchale; VERACRUZ: Tezonapa, Tierra Blanca; GUATEMALA: CHIMALTENANGO: Yepocapa; ESCUINTLA: El Zapote; ZACAPA: Jabali, S. slope of Sierra de las Minas (N. of Cabanas); PANAMA: CHIRIQUI: Volcan de Chiriqui; COLOMBIA: Villavicencio (BMNH and FMNH). A single female with the following data: MARYLAND: Baltimore Co., Sparrows Point (CAS), appears referable to this species. It may be mislabeled or perhaps was an introduction.

Placonotus modestus (Say), n. comb.

(fig. 1, 12, 13, 14, 15, 16)

Cucujus modestus Say, 1827:268.

Laemophloeus modestus, LeConte, 1854:75.

Silvanophloeus modestus, Casey, 1916:130.

Laemophloeus singularis Smith, 1851:7.

Laemophloeus Gundlachi Grouvelle, 1876:499, pl. 9, fig. 19. n. syn.

Silvanophloeus gundlachi, Sharp, 1899:538.

Silvanophloeus liquidus Casey, 1916:130. n. syn.

TYPES: Of *modestus*, types presumed lost with most of Say's collection; TYPE LOCALITY, "East Florida"; NEOTYPE, here selected (see below). Of *singularis*, LECTOTYPE, here selected, in BMNH (see below). Of *gundlachi*, LECTOTYPE, here selected in MNHN (see below). Of *liquidus*, LECTOTYPE, here selected (see below).

DIAGNOSIS: Length, 1.4 mm - 2.2 mm. The individually rounded elytral apices, giving the elytra a truncate appearance and exposing most of the last visible abdominal segment dorsally, and the male genitalia (fig. 12, 13, 14, 15) are distinctive for this species.

DESCRIPTION: Neotype male, in MCZ, with following data: "[orange disc, indicating 'Southern States']" / "L. modestus (Say)" [LeConte's mss.].

FORM: Length, 2.0 mm. Elongate, narrow; head and pronotum testaceous, elytra paler, punctures of head and pronotum shallow, about the diameter of an eye facet, separated by 1-2 diameters, surface smooth and shining between punctures; pubescence inconspicuous at 75X except for a few long setae at elytral apices.

HEAD: Wider across eyes than long (1:1.75), roughly triangular in shape; epistome with a few scattered punctures; labrum with scattered, smaller punctures; mandibles moderate for genus, right mandible abruptly bent inwards at about midpoint at almost right angle, with ventrolaterally located ridge running from base to bend, left mandible less abruptly bent, ridge less pronounced; antennae elongate, slender, about $\frac{3}{4}$ of body length, pubescent internally, scape robust, about twice as long as broad, segments 9-11 slightly expanded distally; frontoclypeal line represented by a ridge bordered posteriorly by a shallow groove, slightly more impressed anterior to antennal insertions; lateral lines also represented by ridge and groove; frons slightly depressed just behind frontoclypeal line, disc of head slightly convex, median line well-marked; eyes abruptly convex, very prominent.

PRONOTUM: Transverse (1:1.2), widest at anterior third, then sinuately constricted to prominent basal angle, lateral edges with small, irregularly placed tubercles; lateral lines represented by slight ridge bordered medially by deep groove which is slightly expanded at about midpoint, enclosing black spot just basad of midpoint; disc feebly convex, sides external to lateral lines strongly so, anterior angles sharply curved downward to ventrolaterally directed blunt tooth.

ELYTRA: Distinctly longer than head and pronotum (1.4:1), widest at about midpoint, gradually curved to exterior apical angle then suddenly curved inward to suture so that external and sutural angles are about opposite each other, apices broadly rounded; humeral carina absent, although elytra turned sharply downward laterally; disc of each elytron with 6 rows of large, very shallow punctures, elytral cells not evident, punctures obsolescent apically; last visible abdominal segment extending well beyond elytral apices, narrowly rounded, with scattered punctures and pubescence.

Male genitalia as in fig. 12, 13, 14, 15.

VARIATION: Length, 1.4 mm - 2.2 mm. Variation between males most noticeable in size and development of anterior pronotal angles. Larger males tend to have relatively longer antennae and more exposed last visible abdominal segment. Females differ from males primarily in their shorter antennae, which reach only to about midpoint of elytra, only slightly exposed last visible abdominal segment, less constricted pronotum basally, and relatively longer elytra. Mandibular modifications reach their greatest development in large males, but are present in large females to a lesser degree.

DISCUSSION: Because this is the most widespread species of *Placonotus* in the New World, ranging from the northern United States south at least to Panama, I feel it is necessary to fix its identity by designating a neotype. Say's (1827) description is brief, but does in-

clude "... elytra rather shorter than abdomen, ..." a salient character of *modestus*. In addition, LeConte was more familiar with Say's work than was anyone else, and I accept his concept of this species. There are 7 specimens identified correctly as *modestus* by Casey in the USNM.

There are 4 specimens of *liquidus* in the Casey Collection at the USNM. Casey (1916) described this species from an unstated number of specimens from "Texas (Houston)." The USNM specimens, which I accept as at least part of the type series, bear the following data: 1, "Tex." / "CASEY bequest 1925" / "TYPE USNM 49169" / "liquidus Csy" [Casey's mss.]; 3, "Tex." / "CASEY bequest 1925" / "liquidus PARATYPE USNM 49169". The type labels were applied by Buchanan (1935) and, as has been noted before (Lindroth 1975), these labels have no taxonomic standing because the selections were never published. I here select as lectotype the female specimen bearing Casey's determination label. All 4 specimens in the series are conspecific with *modestus*, NEW SYNONYM.

Grouvelle (1876) described *gundlachi* from an unstated number of specimens from "Amerique centrale. Collections Chevrolat, Grouvelle, Gundlach." I have examined a male from the Grouvelle collection in the MNHN with the following data: "Teapa Deyr." / "Type" / "MUSEUM PARIS Collection Grouvelle" [black on blue] / "TYPE" [black on red] / "Silvanophloeus gundlachi" [mss., but not Grouvelle's]. I accept this specimen as a syntype of *gundlachi* and here designate it as lectotype. It is conspecific with *modestus*, NEW SYNONYM.

I have examined a single syntype of *singularis*, described from "East Florida," in the BMNH with the following data: "SYN-TYPE" [blue-edged disc] / "U.S. AMERICA E. Florida E. Newman" / "Brit. Mus. 1843-15" / "Placonotus singularis Smith". All of the labels are modern. I here designate this specimen as lectotype. This name has correctly been synonymized with *modestus*.

BIOLOGY: Wheeler (1921) found only 2 references to the habits of this species, reporting adults from hemp seed and from "under bark and in siftings." Lawrence (1977) reported an association with fungus in Texas for a species he identified tentatively as *liquidus*. In Florida, adults sometimes are abundant under the bark of dead hardwoods, especially oak, and are attracted to ultraviolet light traps.

SPECIMENS EXAMINED: 344 (BMNH, CAS, FMNH, FSCA, USNM, RHT, JM, DGH, MCT).

DISTRIBUTION: This species has been recorded from much of eastern North America into Canada, but because of past confusion over the identities of the species of this genus, only the following localities, representing specimens I have examined, are reported: U.S.A.: ALABAMA: Jefferson Co., Birmingham; ARIZONA: Cochise Co., Chiricahua Mts., nr. Portal, Onion Saddle; FLORIDA: Alachua Co.; Dade Co.; Dixie Co., 3.5 mi. N. Old Town; Duval Co.; Indian River Co., S. of Vero Beach; Marion Co., Ocala; Put-

nam Co., Lake Como; Taylor Co.; Volusia Co., Enterprise and Ormond; ILLINOIS: Sangamon Co., Springfield; LOUISIANA: Ascension Par., Gonzalez; MARYLAND: Baltimore Co., Sparrows Point; MISSISSIPPI: Jackson Co., Ocean Springs (4 mi. E.); MISSOURI: "Meramee State Park" (?Meramec Forest, St. Louis Co.); NEW JERSEY: Bergen Co., Ramsey; Morris Co., Boonton; Warren Co., Phillipsburg; NEW YORK: Suffolk Co., S. Huntington and Wyandanch; SOUTH CAROLINA: Charleston Co., Charleston; TEXAS: Ft. Bend Co., Katy; Kerr Co., Kerrville; Montgomery Co., Conroe; Travis Co., Austin; Uvalde Co.; "Montell"; VIRGINIA: Arlington Co., Rosslyn; MEXICO: CAMPECHE: Campeche; NUEVO LEON: 20 mi. W. Linares; SAN LUIS POTOSI: Axtla, 8 mi. N. Huichihuayan, 26 mi. E. Ciudad del Maiz, 12 mi. S. Ciudad Mante, Tamazunchale, and Valles; TABASCO: Teapa; VERACRUZ: Atoyac, Cordoba, El Fortin, Matzorongo, Tejeira, Tezonapa, and Tierra Blanca; GUATEMALA: ALTA VERAPAZ: Gubilquit and San Juan; ESCUINTLA: El Zapote and Finca San Victor; SACATEPEQUEZ: Finca San Rafael and Yepocopa; ZACAPA: Jabal, S. slope of Sierra de las Minas N. of Cabanas. BELIZE: Belize City; TOLEDO: Columbia Forest Station; COSTA RICA: HEREDIA: La Selva Field Station, Puerto Viejo de Sarapiquí, Rio Puerto Viejo; LIMON: Guapiles and Hamburg Farm; PANAMA: BOCOS DEL TORO: Almirante; CHIRIQUI: Finca Polo Santa nr. Nueva California and Rovira; CUBA: Pinar Del Rio: San Vicente; ORIENTE: Cayamas; JAMAICA: CLARENDON PARISH: Milk River; ST. ELIZABETH PARISH: Santa Cruz; TRINIDAD: Balundra Bay and Mt. Harris. One additional specimen (CAS) is labeled simply "Fairmont."

***Placonotus maya* Thomas, new species**

(fig. 6, 19, 33, 47)

DIAGNOSIS: The elongate, slender facies, entire elytral apices, and structure of the male genitalia distinguish adults of this species from others in the *modestus* species group. The dark pronotum of some specimens also is distinctive.

DESCRIPTION: Holotype male, in BMNH, with following data: "Y [?] Mexico" [black on brown, oval card, writing almost effaced]/ "[Laem]ophloeus filicornis Pa[scoe]"/ "Pascoe Coll. 93-60" [upside down].

FORM: Length, 1.9 mm. Elongate, slender; testaceous.

HEAD: Transverse (1:1.72); slightly convex; lateral lines represented by a ridge bordered medially by a deep groove; frontoclypeal line represented by a slight ridge bordered posteriorly by a deep groove; mandibles moderately bent at about midpoint, but only slightly expanded laterally; punctures of disc larger than an eye facet, separated mostly by about 1 diameter; surface between punctures smooth and shining; antennal scape 2.5 times longer than broad; pedicel less than half length of scape; segments 3-11 gradually increasing in length, eleventh longest; segments 9-11 slightly expanded distally; antennae attaining elytral apices.

PRONOTUM: Slightly transverse (1:1.14); moderately constricted posteriorly; anterior angles declivous and obtusely toothed; posterior angles acute; disc punctured as head, almost impunctate exterior to lateral lines; lateral lines represented by a very weak ridge bordered medially by a deep groove, which is expanded at about midpoint to enclose black spot.

ELYTRA: Elongate (1.8:1), evenly rounded to sutural angle; disc of each elytron with 5 rows of shallow punctures, obsolescent apically; not carinate laterally, but very feebly costate; last visible abdominal segment slightly exposed beyond elytral apices.

Male genitalia as in fig. 19, 33, 47, except that ventral process of basal piece like that of *nitens* (fig. 49).

VARIATION: Length, 1.7 mm - 2.0 mm. Mexican and Guatemalan specimens differ in the structure of the ventral process of the basal piece; in the Mexican examples, the process is as in *nitens* (fig. 49), while the Guatemalan examples resemble fig. 47. I have been unable to discover any other constant differences between the 2 populations and the different forms of the ventral process may reflect the extremes of a cline. In some specimens, the dorsal surface is distinctly bicolored, with the head and pronotum much darker, almost piceous, than the elytra. The females are very similar to the males, but the antennae are proportionally shorter, attaining the apical third of the elytra.

PARATYPES (11) as follows: 1, "Balheu, Vera Paz, Champion"/"B.C.A., Col.,II,(1). Silvanophloeus Gundlachi."; 1, "Cordoba"/"Mexico, Salle Coll."/"2087"/"Laemophloeus Gundlachi Grouv apud Salle"/"Laemophloeus Gundlachi"/"B.C.A., Col.,II,(1). Silvanophloeus Gundlachi."; 1, "S. gundlachi var.??"/"Zapote, Guatemala, G.C. Champion"/"B.C.A., Col.,II,(1). Silvanophloeus Gundlachi." (mounted with a specimen of *modestus* and the holotype and a paratype of *patruelis*) (BMNH); 5, "Dept. Zacapa, VIII:9:48 GUAT Elev. 5500 ft."/"Santa Clara, in interior valley of Sierra de las Minas (N. of Cabanas)"/"under bark"/"CNHM Guatemala Zool. Exped. (1948) R.D. Mitchell leg." (1 slide mounted); 1, same data except collection date is VII:29:48; 2, "Finca San Rafael, Sacatepequez, VII:1:48 GUAT Elev. 6900 ft."/"CNHM Guatemala Zool. Exped. (1948) R.D. Mitchell leg."/"under bark" (FMNH).

***P. pallentipennis* species group**

DIAGNOSIS: The species assigned to this group can be distinguished from those belonging to other groups by the presence of a crescent shaped accessory basal line on the pronotum. The 6 species assigned to this species group are divided unequally into 2 subgroups, the *nitens* subgroup with 2 species, and the *pallentipennis* subgroup with 4 species.

***P. nitens* species subgroup**

DIAGNOSIS: The following combination of character

states serves to distinguish the members of this subgroup: elytra subtruncate, apices separately rounded to suture; anterior pronotal angles declivous to small, blunt tooth. This subgroup includes *nitens* and *infirmus*.

***Placonotus infirmus* (Sharp), n. comb.**

(fig. 20, 35, 48, 58)

Silvanophloeus infirmus Sharp, 1899:538, pl. 17, fig. 9.

TYPES: LECTOTYPE, here selected, in BMNH (see below).

DIAGNOSIS: Length, 1.6 mm. Adults of this species are very similar to those of *nitens*, differing from the latter in the slightly more convex dorsal surface, dark head and pronotum, and structure of the male genitalia (fig. 20, 35, 48, 58).

DISCUSSION: Sharp (1899) described this species from a series of 3 specimens collected by Champion in Zapote. I have examined the following specimens comprising the type series: “-ophloeus infirmus Types D.S. Zapote” [mss. on card with 2 specimens]/ “SYN-TYPE” [blue-edged disc]/ “Type” [orange-edged disc]/ “B.C.A., Col., II, (1). *Silvanophloeus*”, and “SYN-TYPE” [blue-edged disc]/ “sp. figured”/ “Zapote, Guatemala, G.C. Champion”/ “*Silvanophloeus infirmus*”/ “B.C.A., Col., II, (1). *Silvanophloeus*”. I here designate the male on the left of the double mount as lectotype.

SPECIMENS EXAMINED: In addition to type series, 5 (CAS, FMNH, FSCA).

DISTRIBUTION: In addition to the type locality, I have seen specimens from: MEXICO: OAXACA: Monte Alban; PANAMA: CHIRIQUI: W. of Finca Palo Santo nr. Nueva California.

***Placonotus nitens* (LeConte)**

(fig. 8, 21, 34, 49)

Laemophloeus nitens LeConte, 1854:75.

Silvanophloeus nitens, Sharp, 1899:537.

Placonotus nitens, Lefkovich, 1962:183.

Laemophloeus bullatus LeConte, 1854:75.

TYPES: Of *nitens*, LECTOTYPE, here selected (see below). Of *bullatus*, HOLOTYPE, in MCZ, with following data: “[gold disc, indicating California]” / “Type 6788” / “*L. bullatus* Col. Lec.” [LeConte’s mss.].

DIAGNOSIS: Length, 1.4 mm - 2.1 mm. Adults of this species are similar in external structure only to those of *infirmus*, and can be distinguished by the bright orange head and pronotum and lesser convexity of the dorsal

surface. The male genitalia (fig. 21, 34, 49) are distinctive.

DISCUSSION: LeConte (1854) reported that this species was “Abundant at the Colorado River, California.” In the MCZ are 5 specimens, only the first of which bears data as follows: “[gold disc, indicating California]” / “Type 6790” / “*L. nitens* Col. Lec.” [LeConte’s mss.]. I accept these specimens as syntypes and select the labeled specimen, a male, as lectotype. The lectotype had been damaged at some point and a single elytron and afterbody glued to the top of the point to which the forebody is attached. Because the specimen already was damaged, I dissected it for the genitalia. I have selected the damaged specimen as lectotype because it is the only specimen with data and it is in sufficient condition to permit future recognition of the species.

The female holotype of *bullatus* consists only of elytra and afterbody, but the elytra appear to be those of a normal specimen of *nitens*.

Neither Grouvelle nor Sharp apparently was familiar with LeConte’s species, since both misidentified specimens of other species as *nitens*. The single specimen mentioned by Sharp (1899) from Mexico actually is *modestus*; the Grenada specimen recorded by Champion (1898) and identified by Grouvelle is *politissimus*. This latter identification may have led Grouvelle (1905) to state that his *mirus* (synonymized by Lefkovich (1962) with *politissimus*) closely resembled *nitens*. Grouvelle (1905) also stated that *gundlachi* was the same species as *nitens*. I have also seen specimens of *zimmermanni* identified as *nitens*.

BIOLOGY: “under poplar bark” (Idaho); “under bark of dead cottonwood tree” (Idaho).

SPECIMENS EXAMINED: 74 (CAS, FMNH, FSCA, USNM, MCT).

DISTRIBUTION: Although this species has been recorded from the Antilles (Champion 1898) and by various authors from the eastern United States, I believe those records to be based on misidentifications and that *nitens* occurs only in the western U.S. and possibly northern Mexico. U.S.A.: ARIZONA: Cochise Co., St. David; Gila Co., Redington and Santa Catalina Mountains; Maricopa Co., 3 mi. S. Cave Creek; Pima Co., Tucson; Pinal Co., Mammoth; Santa Cruz Co., Patagonia; Yuma Co., Ft. Yuma and Tacna; “Charleston” (not located); San Pedro River; CALIFORNIA: Kern Co.; Riverside Co., Blythe; Tulare Co., Kaweah; IDAHO: Ada Co., 3 mi. E. Boise; Twin Falls Co., Shoshone Falls; TEXAS: Jeff Davis Co., Davis Mountains.

***P. pallentipennis* species subgroup**

DIAGNOSIS: The following combination of character states serves to distinguish the members of this subgroup: elytra entire; anterior pronotal angles rounded or with small tooth. The 4 species assigned to this subgroup

are: *macrognathus*, *planifrons*, *pallentipennis*, and *patruelis*.

***Placonotus macrognathus* Thomas, new species**

(fig. 2, 22, 37, 51)

DIAGNOSIS: The large, distinctly microreticulate head, laterally expanded mandibles in the male, and the male genitalia (fig. 22, 37, 51) distinguish adults of this species.

DESCRIPTION: Holotype male, in USNM, with following data: "FLA., Monroe County, Upper Key Largo, 3-IV-1976, M.C. Thomas & J.H. Frank" / "under bark of gumbo limbo log (*Bursera simaruba*)".

FORM: Length, 1.6 mm. Elongate, narrow; head testaceous, middle of labrum and tips of mandibles infuscate, pronotum and legs paler; elytra testaceous, almost transparent, more opaque along suture and margins; dorsal pubescence almost invisible at 75X except at oblique view, a few longer setae at elytral apices.

HEAD: Large, wider than pronotum, wider across eyes than long (1:1.75); frontoclypeal line represented by slight ridge bordered posteriorly by shallow groove; lateral lines by strong carinate ridge bordered internally by deep groove; disc of head strongly microreticulate, clypeus and labrum more so; disc of head with large, very shallow punctures separated by 1-2 diameters; eyes large, convex; labrum and mandibles large, taking up most of the area between antennal insertions, mandibles massive, evenly curved to tips, laterally expanded; antennae elongate, slender, nearly equal in length to body, pubescent internally, scape elongate, gradually clubbed, more than twice as long as broad.

PRONOTUM: Transverse (1:1.2), broadest just behind anterior angles, lateral margins slightly curved to about midpoint, thence almost straight to feebly developed basal angle, moderately constricted at base; anterior angles rounded inward to small, anteriorly directed tooth; lateral lines represented by shallow groove, not perceptively widened at midpoint; and with black spot just exterior to edge of groove at about midpoint; accessory basal line crescent shaped; disc inconspicuously punctured and heavily microreticulate as head; edges external to lateral groove with scattered shallow punctures.

ELYTRA: Just barely longer than length of head and pronotum combined (1:1.1), widest at about midpoint, then gradually narrowing to about apical fifth, from which point apices are broadly, evenly curved to suture, sutural angle obtuse; surface sculpture of elytra difficult to discern because of transparency, but appears to be serially punctate and distinctly microreticulate; last visible abdominal segment barely exposed dorsally beyond elytral apices.

Male genitalia as in fig. 22, 37, 51.

VARIATION: Length, 1.7 mm - 1.8 mm. Other than slight size variation, the males in the type series differ remarkably little. The single female paratype differs from the males as follows: mouthparts smaller than in male, mandibles barely expanded laterally; antennae

shorter, reaching to about midpoint of elytra; elytra longer than head and pronotum (1.45:1); length of female, 1.5 mm.

PARATYPES (4) as follows: 2, same data as holotype; 1, same data except collection date is 30-V-1976 and second label reads: "blacklight trap M.C. Thomas Collection"; 1, "Cuba" (black on green)/ "TYPE"/ "MUSEUM PARIS Collection Grouvelle" (black on blue)/ "TYPE" (black on red)/ "MUSEUM PARIS pallidipennis Grouv" (mss. on blue paper, not Grouvelle's). This latter specimen necessitates some discussion of the name "*pallidipennis*". It was used once by Grouvelle (1912:306) in the literature, but I have been unable to find a *pallidipennis* described by Grouvelle. There is a *pallidipennis* described by Reitter but it is in a different genus and would not be mistaken for a *Placonotus* by Grouvelle. This specimen may represent a manuscript name that was never published or a curatorial mistake. In addition to the paratypes listed above, there also is a specimen of this species in the USNM from Cayamas, Cuba. Paratypes are in the FSCA, MNHN, and the author's collection.

***Placonotus patruelis* Thomas, new species**

(fig. 9, 23, 36, 50)

DIAGNOSIS: From the other members of the *pallentipennis* species group, individuals of this species can be distinguished by the following combination of characters: head transversely impressed behind frontoclypeal line; dorsal surface of head and pronotum not microreticulate; mandibles expanded laterally. The male genitalia (fig. 23, 36, 50) are distinctive.

DESCRIPTION: Holotype male, in BMNH, with following data: "S. gundlachi. var." (on card mount)/ "Zapote, Guatemala, G.C. Champion"/ "B.C.A., Col.,II,(1). Silvanophloeus Gundlachi". The holotype is one of 4 specimens of *Placonotus* glued to the same card; from left to right they are: 1) *modestus*; 2) *maya* n. sp. (paratype with "var.?" written behind specimen); 3) *patruelis* n.sp. (paratype with "var." written behind specimen); 4) *patruelis* n.sp. (holotype).

FORM: Length, 1.4 mm. Elongate, narrow; testaceous, mouthparts, legs and elytra paler.

HEAD: Transverse (1:1.77), broader across eyes than long; lateral lines represented by a ridge bordered medially by a deep groove; frontoclypeal line represented by a groove, not bordered anteriorly by a ridge; disc of head slightly convex, frons depressed transversely behind frontoclypeal line; punctures on disc slightly larger than eye facet, separated by 1-2 diameters, with micropunctures sparsely interspersed; surface between punctures smooth and shining; mandibles evenly curved, relatively massive as in *macrognathus*, somewhat expanded laterally; antennae extending to apical fourth of elytra; scape elongate, slightly more than twice as long as broad; pedicel half length of scape; segment 3 equal in length to scape; segments 4-11 gradually increasing in length, segment 11 longest, as long as scape.

PRONOTUM: Transverse (1:1.2), widest just behind apical angles; apical angle declivous to small, blunt tooth; tooth deflected strongly ventrally; posterior angles obtuse; sublateral line a groove not bordered exteriorly by a ridge, very slightly expanded medially but not distinctly foveate, enclosing black spot; puncturation as disc of head, but punctures slightly more distant, almost impunctate exterior to sublateral lines.

ELYTRA: Elongate (1.68:1); sutural stria distinct; microreticulate but otherwise impunctate and non-striate; widest just behind midpoint; apices gradually, individually rounded to suture, not truncate.

Male genitalia as in fig. 23, 36, 50.

VARIATION: Length, 1.6 mm -1.8 mm. Females are very similar to the males, differing primarily in the slightly less narrowed pronotum basally.

PARATYPES (3) as follows: 1, mounted with holotype (see above); 1, "Zapote, Guatemala, G.C. Champion"/"B.C.A., Col.,II,(1). Silvanophloeus Gundlachi" (mounted with a specimen of *modestus*); 1, same data, except "P. gundlachi removed R.J.W. Aldridge 1980".

DISCUSSION: Grouvelle's misidentification of *planifrons* as *pallentipennis* (Champion 1898:404) led Sharp (1899) to include several specimens of *patruelis* in his series of *gundlachi*, noting: "Two of our specimens of *S. gundlachi* from Zapote approach rather closely to this West-Indian series, but do not agree satisfactorily."

***Placonotus pallentipennis* (Grouvelle), n. comb.**

(fig. 11, 29, 39, 53, 62)

Laemophloeus pallentipennis Grouvelle, 1876:500; pl. 9, fig. 20.

TYPES: Presumably in MNHN, but could not be found; **TYPE LOCALITY,** "Amerique centrale."

DIAGNOSIS: Length, 1.4 mm - 1.9 mm. From individuals of the other species in the *pallentipennis* subgroup, adults of this species can be distinguished by the following combination of characters: head not transversely impressed posterior to frontoclypeal line and dorsal surface not microreticulate; mandibles in male not noticeably expanded laterally, and male genitalia as in fig. 29, 39, 53, 62.

DISCUSSION: In the absence of a type specimen, the identity of this species must remain speculative. The original description and illustration are sufficient to establish its identity as a member of this subgroup. Unfortunately, the description and illustration apply nearly equally well to either of the 2 species found within the area cited as the type locality of *pallentipennis*. Grouvelle (1876:500) described the puncturation of this species as "...very fine and very far apart..." In the specimens to which I have applied this name the punctures of the head and pronotum are much finer than in *patruelis*. Also, I have seen quite large series of the

species which I am calling *pallentipennis*, compared to only 4 specimens of *patruelis*, which, if it reflects comparative abundance in nature, makes it more likely that this species was the 1 seen by Grouvelle.

SPECIMENS EXAMINED: 136 (CAS, FMNH, FSCA, PAS, MLP).

DISTRIBUTION: COSTA RICA: LIMON: Guapiles; Hamburg Farm; PANAMA: BOCAS DEL TORO: Almirante; COLOMBIA: ANTIOQUIA: Puerto Berrio; ECUADOR: PASTAZA: Cusuimi, Rio Cusuimi, 150 km. SE Puyo; Rio Morona, Ashuara village, Rio Macuma; PERU: HUANACO: Monson Valley, Tingo Maria; LORETO: Estiron, Rio Ampiyacu; Pucallpa; BRAZIL: MATO GROSSO: Varzea Grande Co., Cuiaba; SANTA CATHARINA: Alto Rio do Testa; Badenfurt; "Itoupavazinha"; Nova Teutonia. ARGENTINA: SALTA: Tabillas.

***Placonotus planifrons* Thomas, new species**

(fig. 10, 28, 38, 52)

DIAGNOSIS: The combination of the microreticulate head and pronotum, non-impressed frons posterior to frontoclypeal line, and unmodified mandibles in the male is distinctive for this species.

DESCRIPTION: Holotype male, in BMNH, with following data: "W. Indies. 99-37." / "Windward side St. Vincent, W.I.H.H. Smith. 151".

Adults of this species are very similar to those of *macrogathus*, differing as follows: Length, 1.4 mm. Head smaller, equal in width to pronotum, mandibles much smaller in male, occupying only about one-half of the space between antennal insertions, mandibles not expanded laterally; frontoclypeal line a shallow groove, somewhat deeper at corners, with no anterior ridge, area behind line not transversely impressed; antennal scape stouter, about twice as long as broad, more abruptly clubbed. Male genitalia as in fig. 28, 38, 52.

VARIATION: Length, 1.2 mm - 1.7 mm. The female is very similar to the male, differing primarily in its proportionally slightly shorter antennae.

PARATYPES (6) as follows: 1, "Windward side St. Vincent, W.I. H.H. Smith" / "W. Indies 99-37" [upside down] / "Laemophloeus pallentipennis Grouv" [Grouvelle's mss.]; 1, "Balthazar (Windward side) Grenada, W.I. H.H. Smith 130" / "W. Indies 99-37"; 2, "Kingstown, St. Vincent, W.I. H.H. Smith" / "W. Indies 99-37"; 2, "W. Indies, 99-37" / "Windward side St. Vincent, W.I. H.H. Smith 151"; in BMNH, MNHN, and USNM.

DISCUSSION: The type series was examined by Grouvelle and identified as *Laemophloeus pallentipennis* (Champion 1898).

MORPHOLOGY AND PHYLOGENY

The morphology of the Laemophloeinae has been reviewed by Lefkovich (1962) and Iablokoff-Khnzorian (1977). Lefkovich (1959, 1962) and Mukhopadhyay & Sengupta (1977) provided detailed generic redescriptions of *Placonotus*. The following morphology of this genus should be considered supplemental to the above works, and concentrates primarily on the structure of the male genitalia, which has been little explored previously. Wilson (1930:320; fig. 13-14) illustrated and described the aedeagus of a species he called "*Laemophloeus liquidus*." The organ illustrated appears to be that of *zimmermanni*. Lefkovich (1962:fig. 10-12) illustrated the male claspers of 3 African species, and Mukhopadhyay & Sengupta (1977:fig. 20-21) illustrated the tegmen of 2 Indian species.

The following discussion is based on examinations of the male genitalia of all 13 species of *Placonotus* found in the New World, plus species from Africa, Australia, India, Japan, New Guinea, and Indonesia. Whole-body slide mounts, with the mouthparts dissected out, were prepared of specimens of the following species, representing at least 1 species of each species group found in the New World: *testaceus*, *zimmermanni*, *majus*, *modestus*, *maya*, *nitens*, *politissimus*, and *pallentipennis*.

In general, the male genitalia of *Placonotus* are of the usual inverted "Clavicorn" type (Crowson 1955) with the parameres located on the ventral aspect of the median lobe (fig. 15) and a dorsal piece completely encircling the median lobe. The parameres are reduced to tooth-like processes (fig. 14) and are apparently fused to the basal piece. Paired, secondary structures are present in many species of *Placonotus* ventrad to the parameres and are here called ventral processes. The ventral processes appear to be derived from the basal piece, and occasionally exhibit asymmetrical development (fig. 44, 46, 50). The sac-like median lobe may contain complex sclerotizations (fig. 12), and the apex ranges from acutely to bluntly acuminate (fig. 12, 58, 60-62). A single median strut extends anteriorly from the base of the median lobe (fig. 12) and lies on the ventral aspect of the internal sac (fig. 15). Between the lateral arms of the dorsal piece, a partially sclerotized membrane is present (fig. 14). This membrane is not so complete as to mask the median lobe as it does in the Passandrinae (Wilson 1930:fig. 17).

The internal sac is complicated and difficult to describe. A flagellum is sometimes present (fig. 12, 17-19), and some other structures (e.g., fig. 21, 27-29) may be modifications of the flagellum. Males of *Laemophloeus* (s.str.) and related genera also possess a flagellum, as do many other genera in the Cucujinae and Passandrinae. The flagellum is coiled in males of the *modestus* group, (fig. 12, 17-19) a feature not seen in any other cucujid. An obvious flagellum is lacking in other New World species groups, but the elongate, fibrous structure found in some members of the *pallentipennis* group (fig. 27-29) is considered homologous with the flagellum in the *modestus* group. There are various micro- and macrospinose patches, as well as larger spines, also located in the internal sac.

The claspers of the male genitalia (fig. 13) apparently are modifications of the eighth sternite and tergite. Since the eighth tergite generally corresponds in shape to the seventh, only the sternal claspers have been illustrated for most of the species. They can be relatively simple structures, such as in *testaceus* (fig. 41) or *pallentipennis* (fig. 39), or very highly modified structures, as in most of the *modestus* species group. In some species, the claspers are armed with stout, peg setae; others may be spined or simply setose. Mating has not been observed in *Placonotus* so that the exact function of the claspers is not known, but they probably are used to grasp the female externally during copulation.

The mouthparts of *testaceus* and of species representing several other laemophloeine genera were illustrated by Lefkovich (1959). A dorsal view of the left mandible of *politissimus* is presented in fig. 59. The seta-bearing pit on the dorsal surface is a constant feature in all *Placonotus* species examined; Crowson & Ellis (1969) wrote that the structure, which occurs in many laemophloeine genera, represents the remnant of the mycangia found in such genera as *Dendrophagus* and *Telephanus*. Based on the location of the pit and the fact that none of the reported mycangia contains such a seta, I think it is unlikely that the 2 structures are homologous. The 3 circular structures on the dorsal surface of the mandible appear to be pores and are constant in the species examined. Lefkovich (1962:169) claimed that the lacinia within the Laemophloeinae is glabrous. However, representatives of all species of *Placonotus* examined, as well as *Laemophloeus* (s.str.) *floridanus* Casey, possess a single row of setae on the lacinia.

The sublateral line of the pronotum is represented by a simple groove, or by a groove bordered exteriorly by a ridge. It is foveate at about the midpoint in adults of some species. The fovea contains a black spot which represents the dorsal attachment of an internal, sclerotized strut (fig. 16) attached to the internal surface of the prosternum at the anterior edge of the coxa. In cleared specimens lacking a fovea the strut is seen to be present in the same location. This strut is present in individuals of all laemophloeine genera that I have examined, but in genera such as *Leptophloeus* Casey and *Dysmerus* Casey, which contain species with subcylindrical adults, the strut is fused to the side of the pronotum. The strut extends posteriorly and anteriorly from its point of attachment as a ridge along the internal surface of the pronotum. The sublateral line is the external manifestation of this ridge, which appears to be an invagination of the cuticle.

The anterior pronotal angle ranges from acute and parallel to the horizontal plane of the body in the *testaceus* group to blunt and deflected ventrally to a greater or lesser degree in most of the other groups. The angle in *politissimus* is rounded in dorsal view but not deflected ventrally at all. There is a subcarinate line, here called the basal accessory line, that in most groups extends in a straight line from the posterior angle to join with the sublateral line. However, in the *nitens* and *pallentipennis* groups this line is crescent-shaped and does not meet the sublateral line.

(The term "line" has been used previously by both Lefkovich and myself (Thomas 1982) for the linear

structures found within the Laemophloeinae. It is used in the sense of locating and defining, but not describing, the structures. Since these lines may be composed of grooves, carinae, or a combination of both, a simple descriptive term is difficult to contrive.)

Although the species of *Placonotus* can be grouped rather easily by general habitus, external characters, and male genitalia, ascertaining phylogenetic relationships is much more difficult. Part of this difficulty is in determining homologies, especially of genitalic structures, but much of it stems from the confusing distribution of character states within the genus and the apparent multiple convergence of some of the states. A formal phylogenetic reconstruction of the genus must await examination of many more species of *Placonotus* and a greater understanding of the distribution of character states within the subfamily, the Cucujidae, and the Cucujoidea as a whole. However, a phylogenetic discussion, even one as tentative as follows, seems appropriate at this point and may be of value in stimulating further interest in this group.

Several characters within *Placonotus* seem to be represented by transformation series: 1) sublateral line of the pronotum, which is foveate in the *modestus*, *politissimus*, and *testaceus* groups, barely foveate in the *nitens* subgroup of the *pallentipennis* group and not foveate in the *pallentipennis* subgroup; 2) armature of the male genital claspers, which is comprised of setae only in the *pallentipennis* subgroup, spined in the *nitens* subgroup, and composed of peg setae in the *modestus* and *politissimus* groups; 3) anterior angle of the pronotum, which is acute and not deflected ventrally in the *testaceus* group, blunt and deflected ventrally in the *modestus* group, and even more reduced in the *pallentipennis* group. The anterior pronotal angle of *politissimus*, which is produced laterally but not at all deflected, seems to represent one pole of a different transformation series than that seen in the other species of the genus.

Based on an examination of representatives of most of the described genera of the Laemophloeinae, the basic plan of the subfamily can at least be partially hypothesized as follows: sublateral line of pronotum represented by a groove; transverse groove separating frons from epistome absent; basal accessory line straight; elytra with 3 complete cells; elytral apices entire; eighth abdominal tergite and sternite simple; peg setae absent; median lobe without complex sclerotizations; flagellum present.

Unfortunately, within the Laemophloeinae there appears to have been much convergent evolution and character states represented by losses. Schlee (1969) remarked upon the unreliability of "loss" characters, which often occur polyphyletically.

If the transverse groove separating the epistome from the frons is homologous in both *Placonotus* and *Laemophloeus* (sens. str.) and related genera, it would define the 2 groups as sister taxa. The acuminate intercoxal process of the first abdominal segment in the *Laemophloeus* group of genera then is the derived character separating those genera from *Placonotus* and its group of associated genera, which may be linked by their reduced elytral cells.

The group of genera thus defined includes *Placonotus*, *Gannes* Lefkovitch, and probably *Parandrita* LeConte. The exact position of *Gannes* within this group cannot be stated with certainty, since Lefkovitch (1962) did not illustrate the male genitalia.

The relationship between *Placonotus* and *Parandrita* is supported by *Laemophloeus* (sens. lat.) *permixtus* Grouvelle, described from Guadeloupe, which appears to be a *Placonotus* of the *pallentipennis* subgroup but with the transverse epistomal groove lacking. However, the structure of the male genitalia suggests it properly belongs to *Parandrita*. Its relationship will be explored in a later paper.

Based on these apparent relationships and the hypothesized laemophloeine basic plan, the following character states are considered ancestral within *Placonotus* and represent a hypothesized basic plan for the genus: 1) sublateral line of pronotum foveate; 2) eighth abdominal segment highly modified to form claspers in male; 3) genital claspers with peg setae; 4) anterior angle of pronotum acute and not deflected ventrally; 5) basal accessory line straight; 6) third elytral cell present; 7) elytral apices entire; 8) median lobe with complex sclerotizations; 9) flagellum present, not coiled.

This basic plan implies that the *testaceus* group is closest to the ancestral *Placonotus*. However, some members of the *testaceus* group (i.e., *testaceus* and *zimmermanni*) possess the derived character states of median lobe without complex sclerotizations and flagellum absent. Other supposed members of this species group possess a flagellum and have simple claspers. The complex median lobe may have developed independently in *testaceus* and *zimmermanni*; this view is supported by the different shape of the sclerotizations in these 2 species (see Wilson 1930:320; fig. 13-14). These 2 species also share a bluntly acuminate median lobe (fig. 61) and probably are sister species.

The apparently introduced *majus* is included in the *testaceus* group but may be a member of a different, but closely related, group of African species, some of which possess highly modified claspers and peg setae. Three African species also have truncate elytral apices and were placed in a separate species group by Lefkovitch (1962). However, truncate elytral apices apparently have developed independently in at least 2 New World species groups and may not justify the erection of a separate species group.

The basic plan also implies that the *pallentipennis* group is the most highly derived group of the genus, although several species of the *nitens* subgroup retain the ancestral state of modified claspers. The *nitens* species subgroup clearly has a sister group relationship to the other species of the *pallentipennis* species subgroup. The 2 species assigned to the *nitens* subgroup both possess truncate elytral apices, a complex median lobe (fig. 58), and modified claspers armed with spines (fig. 34-35). The complex median lobe in the *nitens* group again seems to be independently derived because of its different shape (compare fig. 58 with fig. 12). The 4 species assigned to the *pallentipennis* subgroup fall into 2 species pairs, *macrognathus-patruelis*, which possess a bisetose ventral process (fig. 50-51) and laterally expanded mandibles, and *pallentipennis-*

planifrons, in which the frons is not depressed transversely behind the epistomal line.

The derived characters of *politissimus* are mostly autapomorphies and therefore offer no clue to relationships. The possession of a complex median lobe and flagellum (fig. 27), foveate sublateral lines, and traces of the third elytral cell, all primitive states, suggest this species branched off the ancestral stock very early. The highly modified claspers (fig. 43) could be an indication of a relationship to the *modestus* group or could be independently derived.

The *modestus* group seems to occupy an intermediate position between the *testaceus* and *pallentipennis* groups. The species *maya*, with its simple claspers (fig. 33) and narrow body form, may resemble the ancestral species of both the *modestus* and *pallentipennis* groups. Its loosely coiled flagellum (fig. 19) could be considered a precursor to the tightly coiled flagellum (fig. 12, 17-18) in the other species of the group. Note also that the flagellum, when present, in the *pallentipennis* group is curved back upon itself (fig. 29), suggesting the remnants of an intermediate state between an unmodified flagellum and one that is tightly coiled.

A cladogram reflecting the phylogenetic relationships discussed above is presented in fig. 63.

The distribution of the species groups is still too little known to permit a zoogeographical hypothesis, which, when possible, should shed some light on the

phylogenetic relationships also. At the current state of knowledge, the following can be stated: The *testaceus* group is of Holarctic distribution; it or related species groups extend south into Africa, tropical Asia, the islands near Australia, and possibly Australia itself, although I have seen little material from that area. The *modestus* group may be restricted to the New World, although the genitalia of *africanus* Lefkovitch (1962; fig. 12) is nearly identical to that of *modestus*. One or 2 Australian species I have seen also seem to have affinities with this group. The *pallentipennis* subgroup seems to be restricted to the Neotropical region, but the African *bolivari* (Grouvelle) may be a member of the *nitens* subgroup (I have not seen a male of that species) and I have seen representatives of a New Guinea species very similar to *nitens*.

The center of radiation for the genus appears to have been Gondwanaland. If representatives of the genus were already in existence in the late Cretaceous at the time Pangaea began to break up, the following relationships can be predicted: indigenous South American taxa will be more closely related to African taxa, and closer still to Australian taxa, than they are to Holarctic taxa; Nearctic taxa will be more closely related to Palaearctic taxa than to Neotropical taxa. This indeed seems to be the case with *zimmermanni*, which is the only indigenous New World species of the *testaceus* group. The remainder of the Nearctic species seem to have had Neotropical origins.

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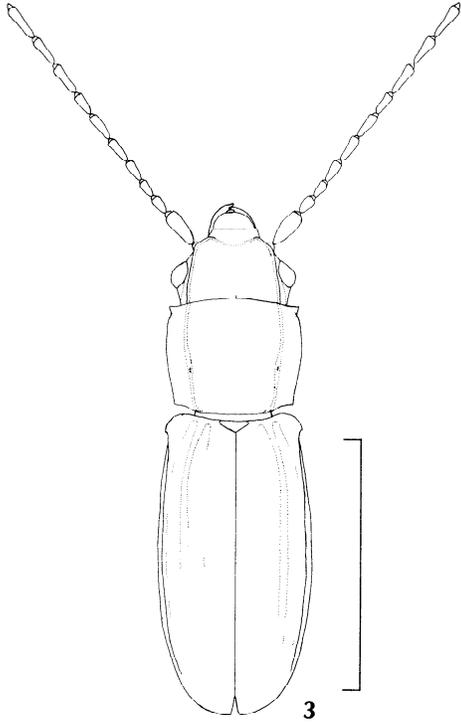


Fig. 3. *Placonotus zimmermanni* (LeConte), male, dorsal view. Line = 1mm.

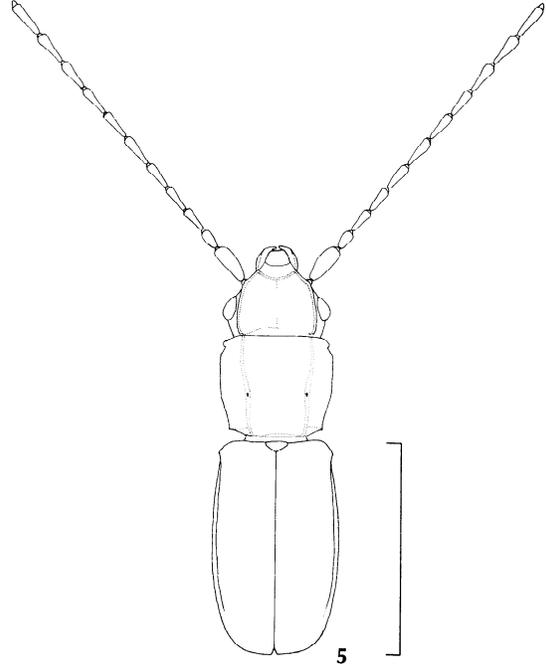


Fig. 5. *Placonotus arizonensis* Thomas, male holotype, dorsal view. Line = 1mm.

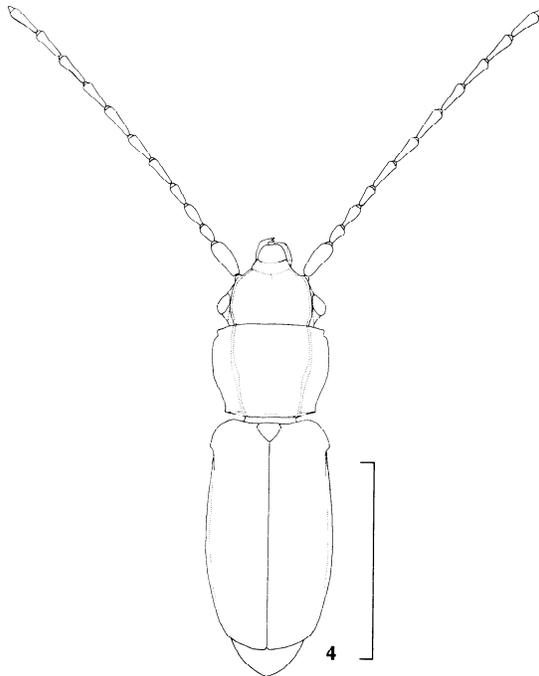


Fig. 4. *Placonotus pseudomodestus* Thomas, male holotype, dorsal view. Line = 1mm.



Fig. 6. *Placonotus maya* Thomas, male holotype, dorsal view. Line = 1mm.

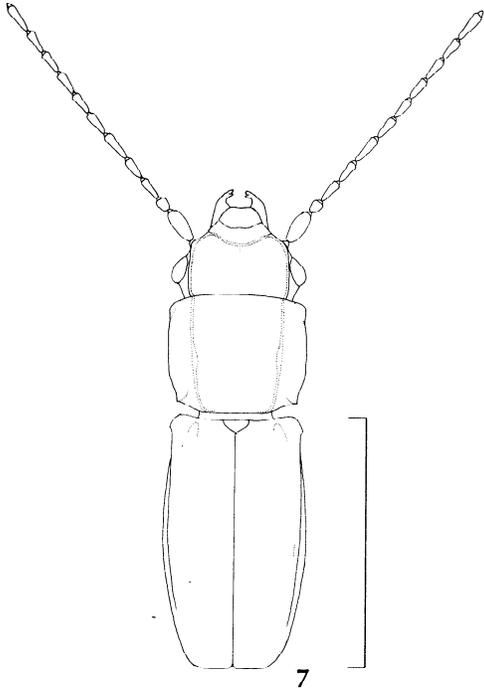


Fig. 7. *Placonotus politissimus* (Wollaston), male, dorsal view. Line = 1mm.

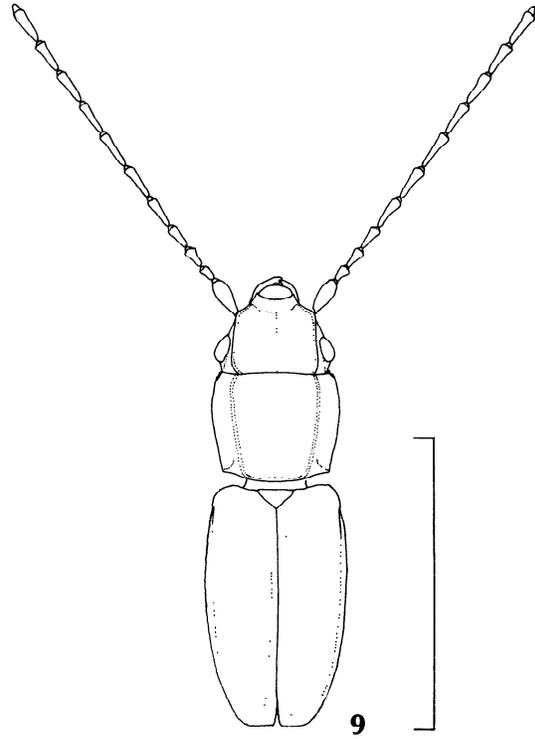


Fig. 9. *Placonotus patruelis* Thomas, male holotype, dorsal view. Line = 1mm.

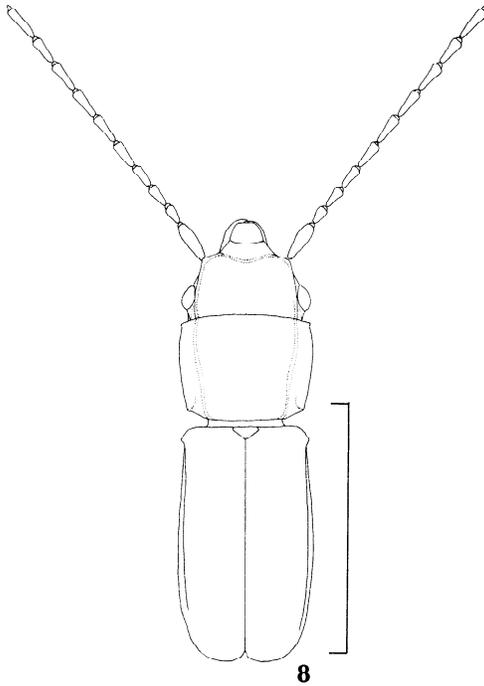


Fig. 8. *Placonotus nitens* (LeConte), male, dorsal view. Line = 1mm.

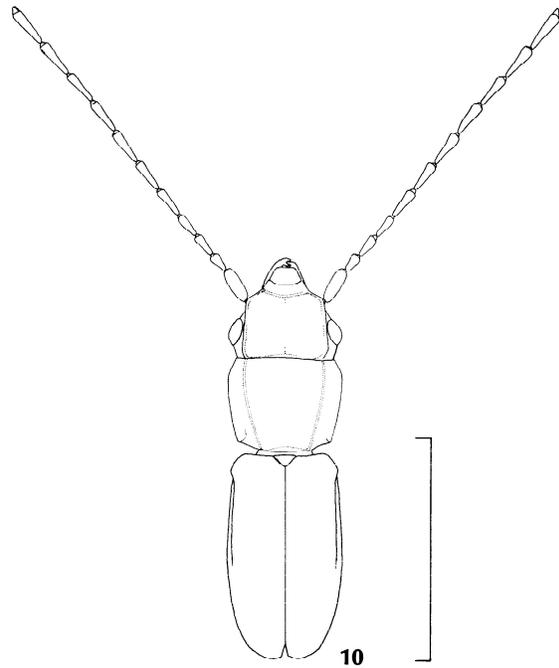


Fig. 10. *Placonotus planifrons* Thomas, male paratype, dorsal view. Line = 1mm.

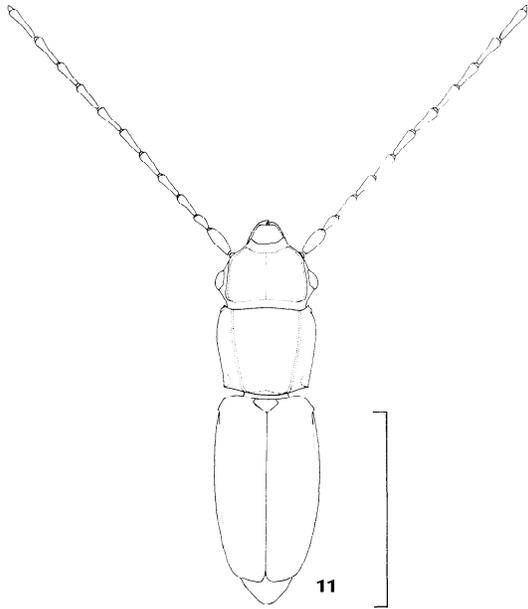


Fig. 11. *Placonotus pallentipennis* (Grouvelle), male, dorsal view. Line = 1mm.

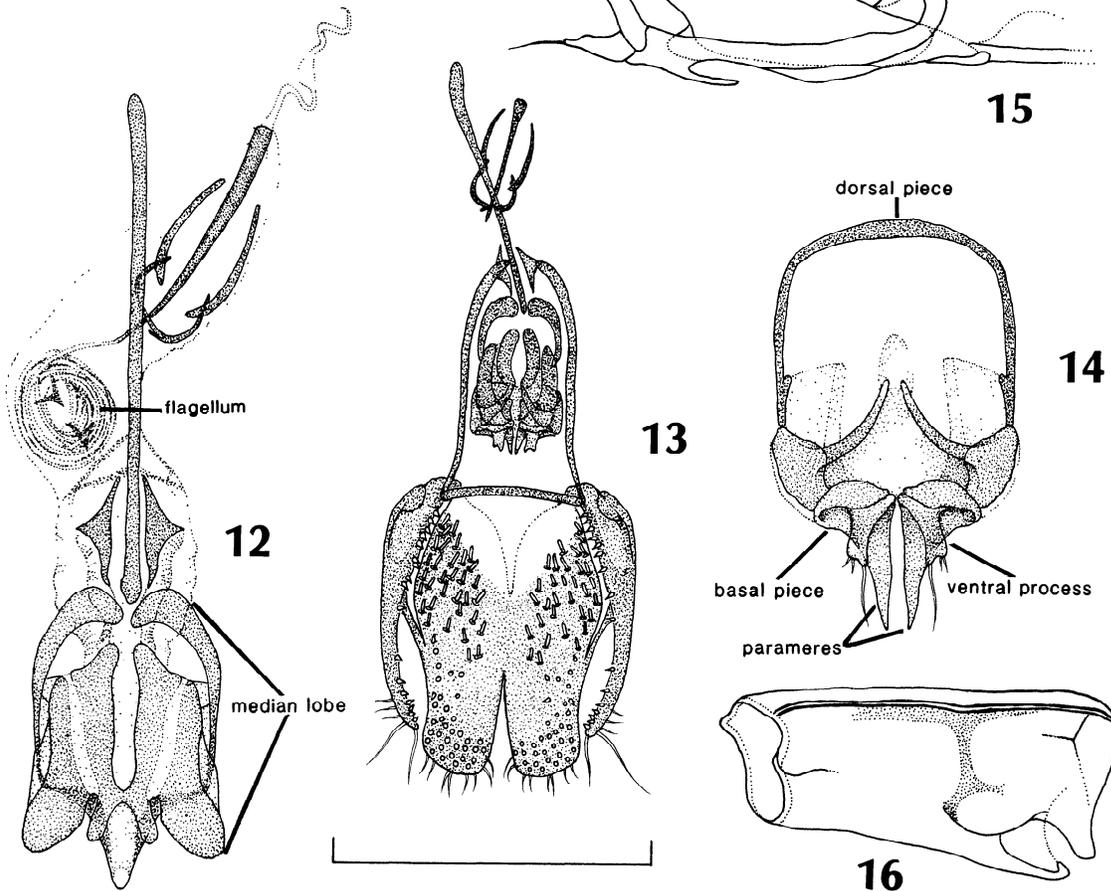


Fig. 12-16. *Placonotus modestus* (Say): 12) median lobe, ventral view; 13) tegmen, ventral view; 14) male genitalia, including claspers, ventral view; 15) median lobe and tegmen, lateral view, dorsal aspect toward top of page; 16) pronotum, lateral view, semidiagrammatic. Line = 0.25 mm for fig. 12, 14, 15; 0.5mm for fig. 13, 16.

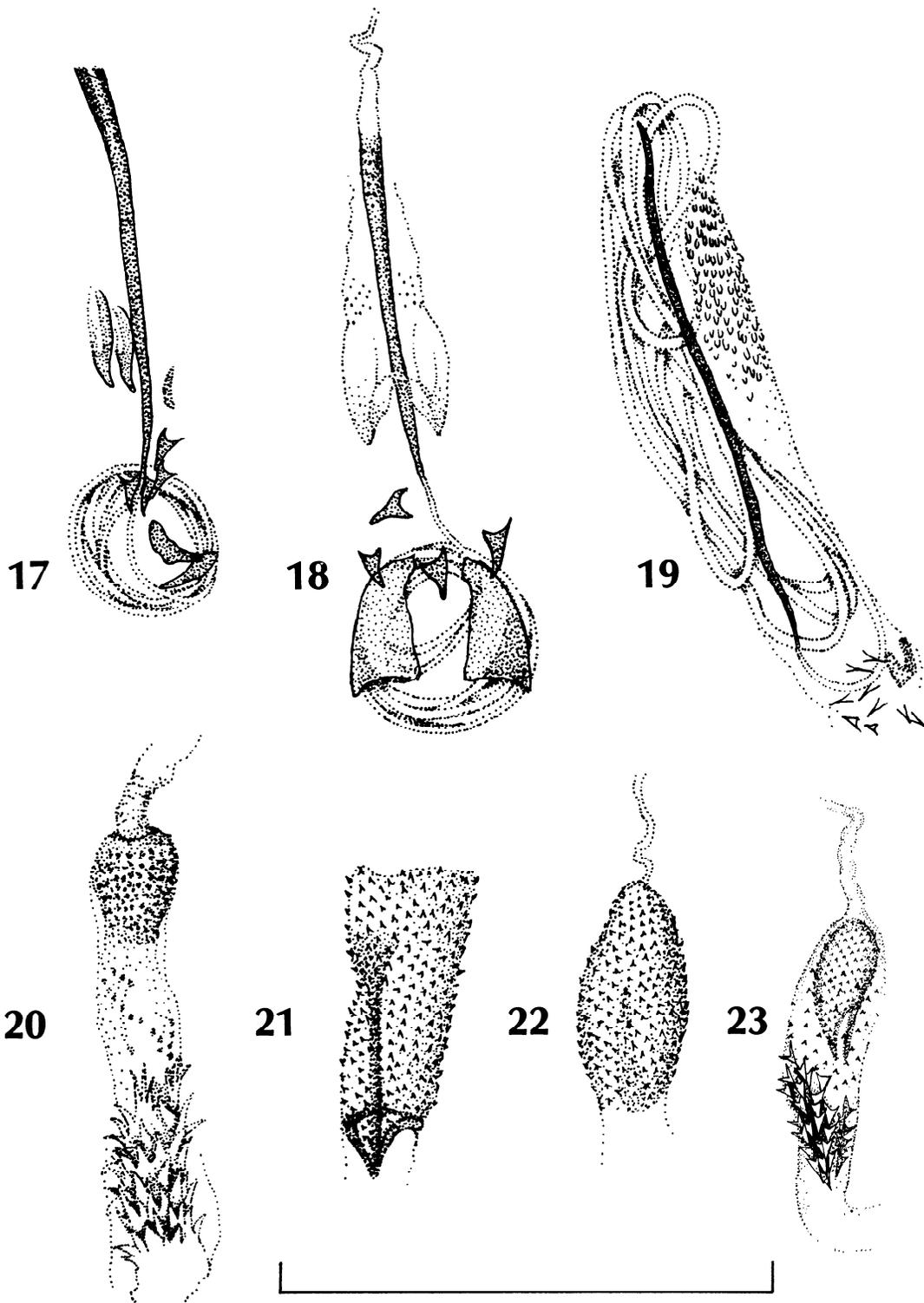


Fig. 17-23. *Placonotus* spp., sclerotizations of internal sac: 17) *arizonensis*; 18) *pseudomodestus*; 19) *maya*; 20) *infirmus*; 21) *nitens*; 22) *macrognathus*; 23) *patruelis*. Line = 0.25mm.

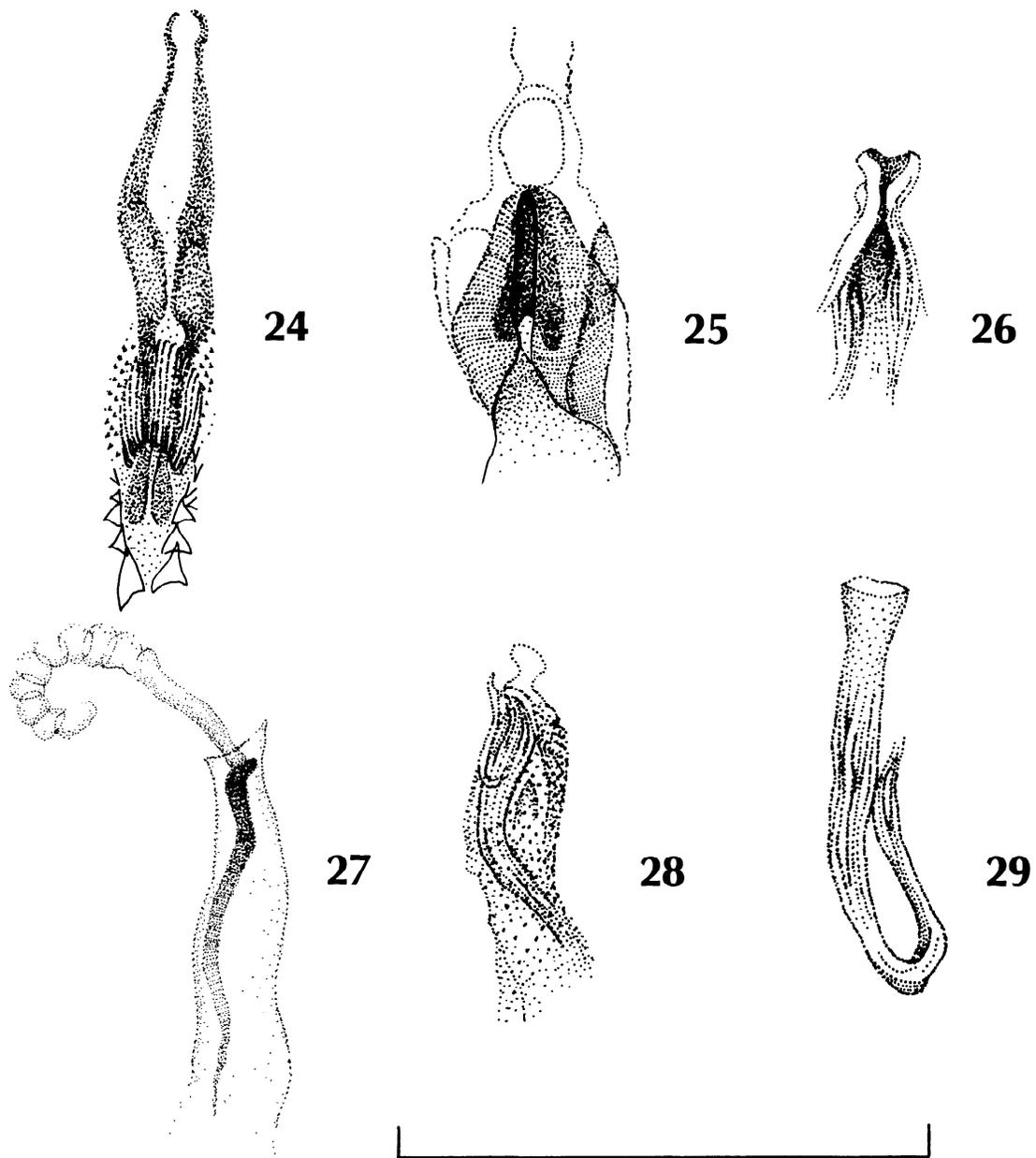


Fig. 24-29. *Placonotus* spp., sclerotizations of internal sac: 24) *testaceus*; 25) *zimmermanni*; 26) *majus*; 27) *politissimus*; 28) *planifrons*; 29) *pallentipennis*. Line = 0.25mm.

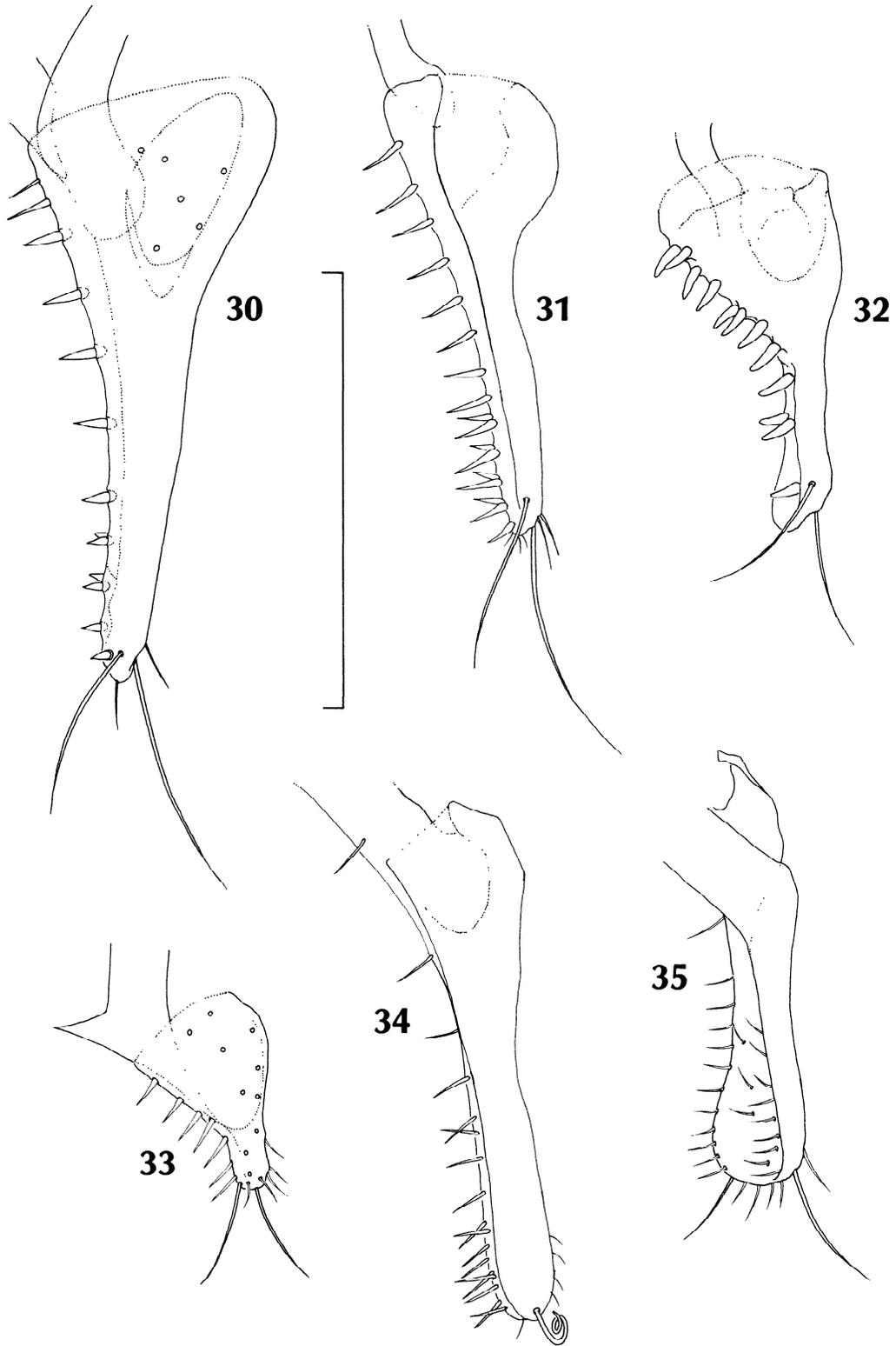


Fig. 30-35. *Placonotus* spp., left ventral clasper, ventral view: 30) *pseudomodestus*, Mexico; 31) *pseudomodestus*, paratype, Uruguay; 32) *arizonensis*, paratype; 33) *maya*, paratype; 34) *nitens*; 35) *infirmus*. Line = 0.125mm.

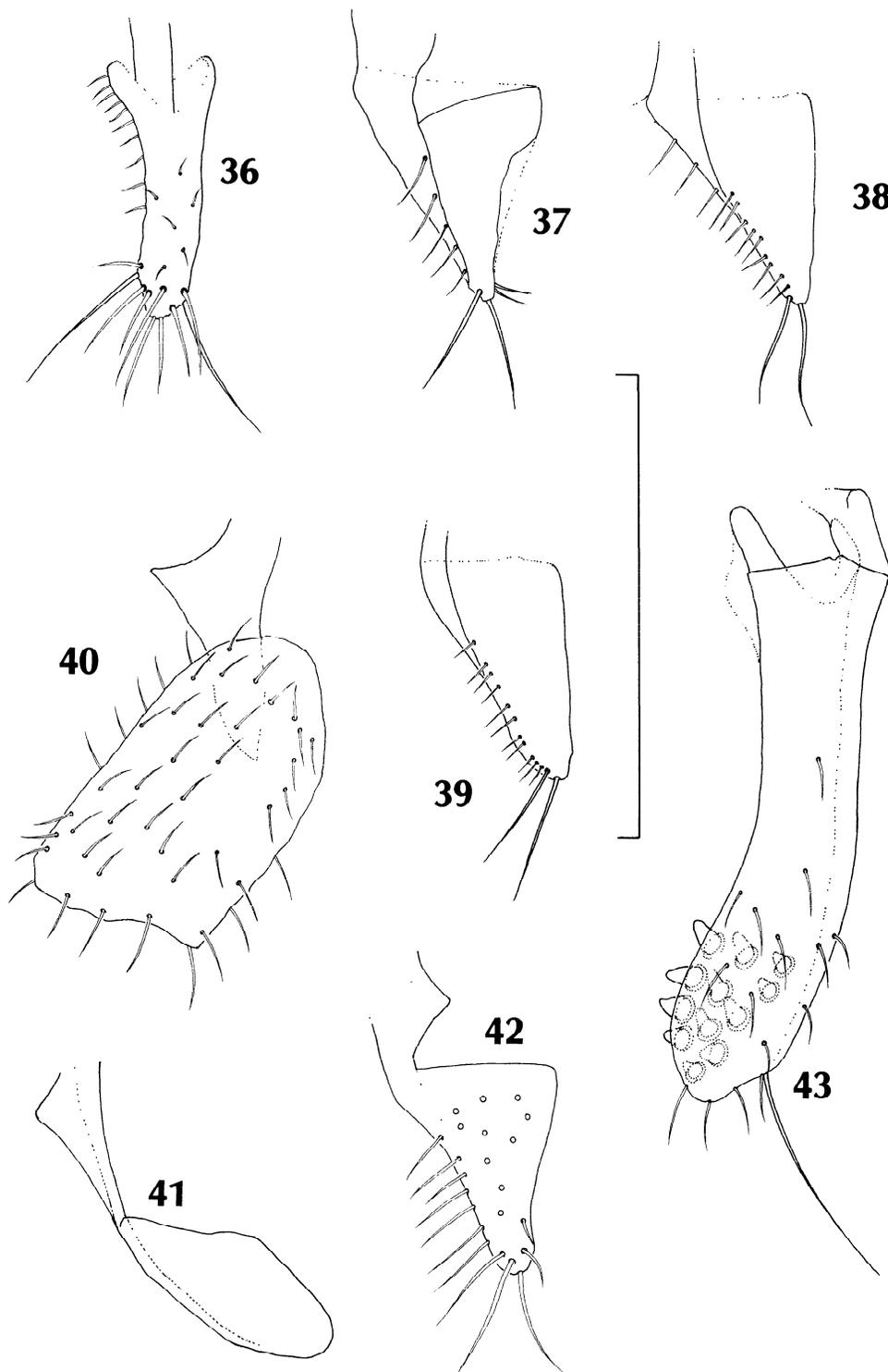


Fig. 36-43. *Placonotus* spp., left ventral clasper, ventral view: 36) *patruelis*, holotype; 37) *macrognathus*, paratype; 38) *planifrons*, paratype; 39) *pallentipennis*; 40) *zimmermanni*; 41) *testaceus*; 42) *majus*; 43) *politissimus*. Line = 0.125mm.

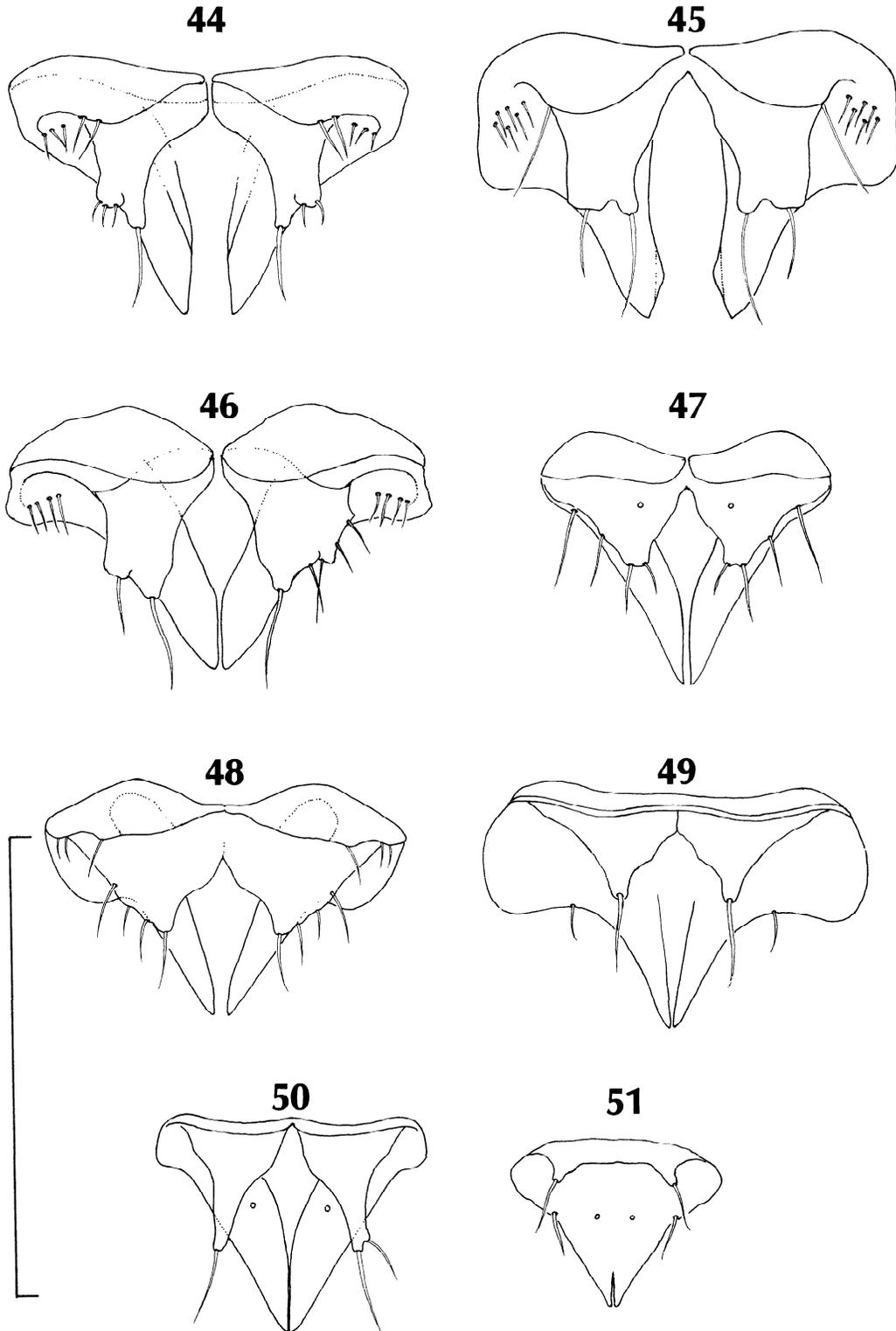


Fig. 44-51. *Placonotus* spp., basal piece and parameres, ventral view: 44) *arizonensis*, paratype; 45) *pseudomodestus*, Mexico; 46) *pseudomodestus*, paratype, Uruguay; 47) *maya*, paratype; 48) *infirmus*; 49) *nitens*; 50) *patruelis*, holotype; 51) *macrognathus*, paratype. Line = 0.125mm.

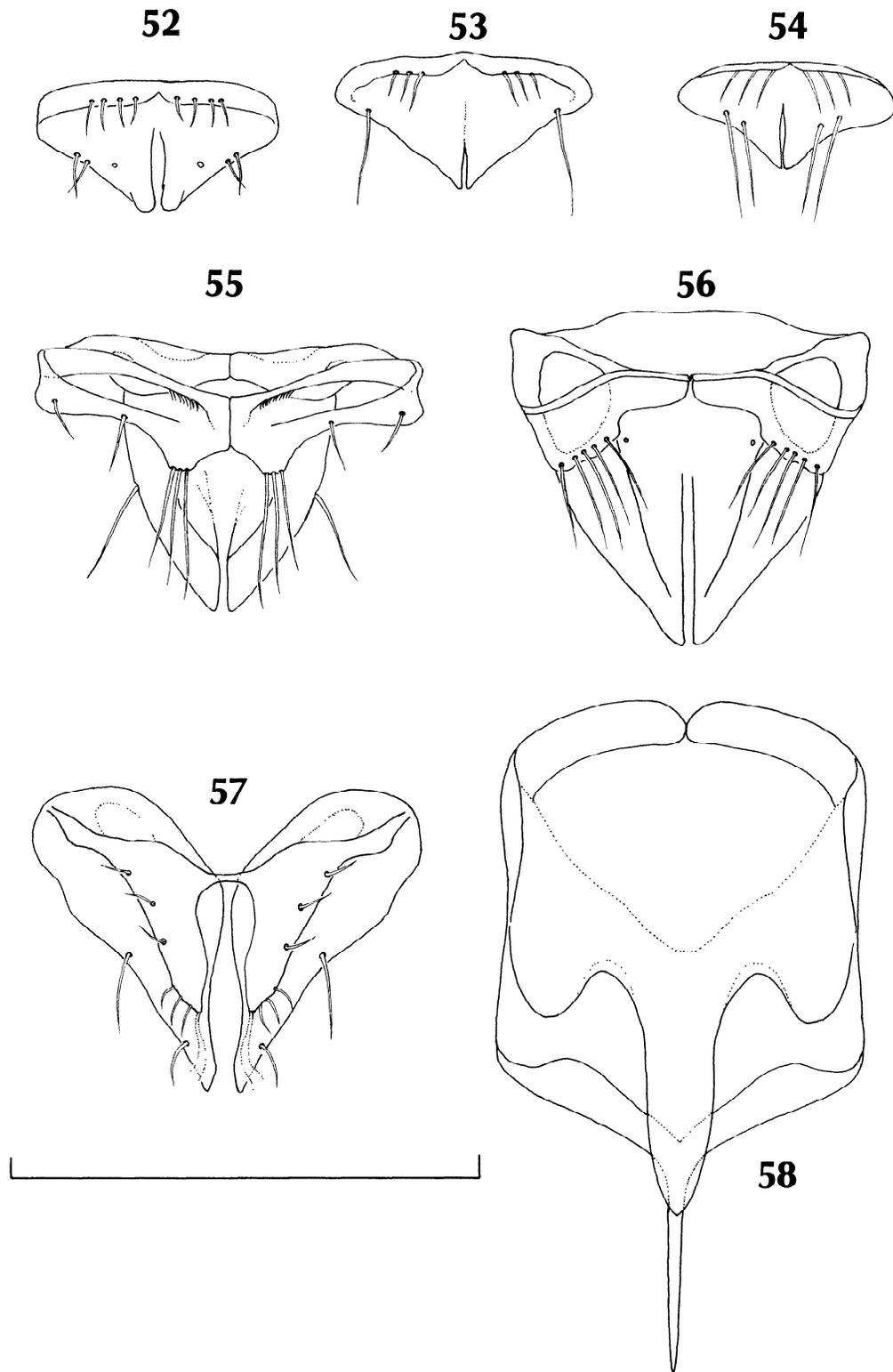


Fig. 52-58. *Placonotus* spp., basal piece and parameres, ventral view: 52) *planifrons*, paratype; 53) *pallentipennis*; 54) *majus*; 55) *zimmermanni*; 56) *testaceus*; 57) *politissimus*; 58) *infimus*. Line = 0.125mm.

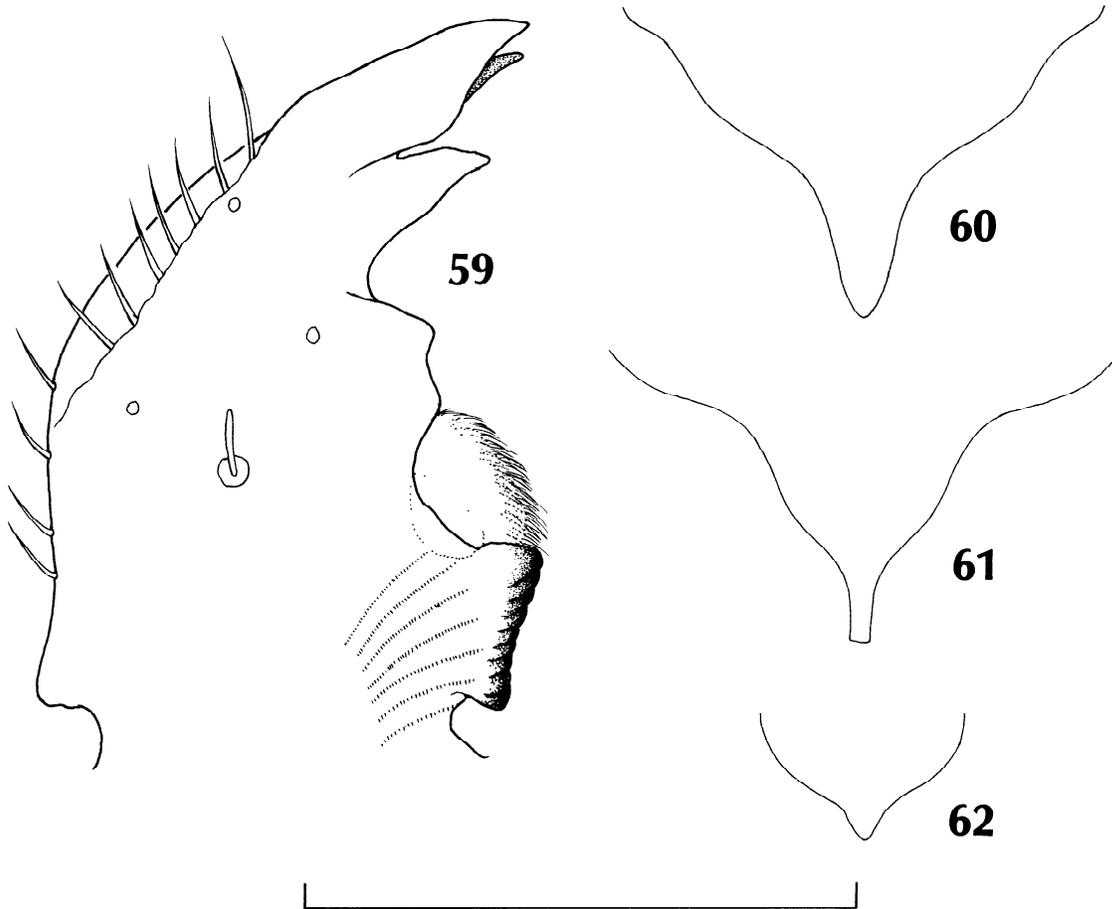


Fig. 59-62. *Placonotus* spp.: 59) left mandible, dorsal view, *politissimus*; 60-62) apex, median lobe; 60) *politissimus*; 61) *zimmermanni*; 62) *pallentipennis*. Line = 0.125mm.

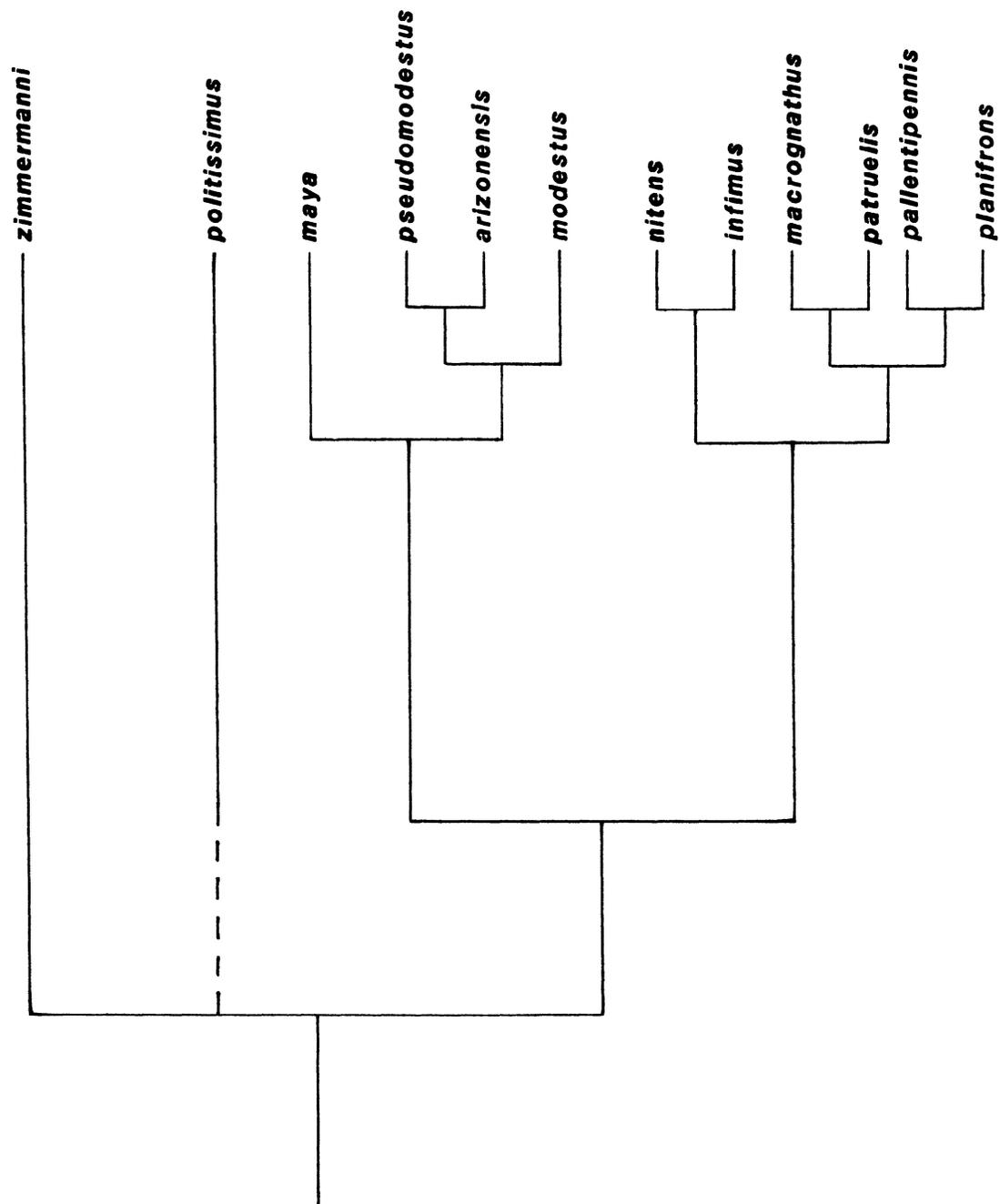


Fig. 63. Cladogram reflecting hypothesized phylogeny of New World species of *Placonotus* Macleay.

