

THE BLISSINAE OF THAILAND AND INDOCHINA (Hemiptera : Lygaeidae)¹

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Abstract: The blissine fauna of Thailand and Indochina is analyzed and related to faunas of other zoogeographic areas. Eleven genera and 37 species are keyed, described, and discussed, of which one genus and 15 species are described as new. Two genera and 4 species are synonymized. Nymphs of 5 species are described. The members of the genus *Macropes* are segregated into 4 complexes. Notes are given on host plants, habitats, and occurrence at lights. Fifty-five figures and 2 photographs are included.

The blissine fauna of SE Asia is rich and diverse but has been little studied by modern workers. In this paper, we have attempted to treat all of the species at present known from Thailand, Laos, Cambodia, and Viet Nam. Eleven genera and 37 species are treated, of which 1 genus and 15 species are described as new. The impetus to undertake this work has come from the extensive recent collections of the Bishop Museum, but we have been able to supplement this material with additional accessions from major museums throughout the world.

As might be expected, the Thailand and Indochina fauna is composed entirely of typically Oriental elements. Perhaps the most striking feature of the fauna is the abundance and diversity of the genus *Macropes* and the paucity and anomalous nature of the representatives of the genus *Ischnodemus*. This condition is the most characteristic feature of the Oriental Blissinae. *Macropes* is centered in the Orient, with a few species reaching northeastern Australia and representatives of the *punctatus* complex widely distributed in Africa. There is only one really "typical" species of *Ischnodemus* in the entire Oriental Region (*noctulus* Distant), and it has also been taken in Rhodesia. The other species that we include in *Ischnodemus* may ultimately prove to deserve generic status and are quite unlike the extensive *Ischnodemus* fauna that is the dominant element of the subfamily in the Ethiopian and Neotropical faunal regions.

Of the other genera present in Thailand and Indochina, *Bochrus*, *Cavelerius*, *Extaramorphus*, and *Spalacocoris* are entirely restricted to the Oriental Region. *Iphicrates*, *Rhabdomorphus*, and *Pirkimerus* are largely Oriental in distribution but reach the Australian region at least to New Guinea, and in the case of *Iphicrates*, south to Tasmania. *Geoblissus* extends through the Ethiopian Region and into the steppe of the Palearctic; *Dimor-*

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phopterus is widespread in the Palearctic and Ethiopian regions.

The biology of most species is very poorly known, but several are serious pests of rice, sugar cane, and bamboo.

Abbreviations used for names of institutions where specimens are being deposited are: BERLIN-HUMBOLDT (Zoologisches Museum der Humboldt-Universität zu Berlin); BISHOP (B. P. Bishop Museum, Honolulu, Hawaii); BMNH (British Museum (Nat. Hist.), London, England); BUDAPEST (Hungarian National Museum, Budapest); CAS (California Academy of Sciences, San Francisco); DEI (Deutsche Entomologische Institut, Eberswalde); HELSINKI (University of Helsinki, Finland); KYUSHU (Kyushu University, Fukuoka); LEIDEN (Rijksmuseum, Leiden); PARIS (Mus. Nat. Hist. Nat., Paris); STOCKHOLM (Naturhistoriska Riksmuseet); THAILAND (Bankheng, Bangkok); USNM (U. S. National Museum, Washington D. C.); VIENNA (Naturhistorisches Museum, Vienna).

KEY TO GENERA OF THAILAND AND INDOCHINA BLISSINAE

1. Jugs elevated and projecting forward as cone-like points; antenniferous tubercles hooked; ♂ with strongly produced bucculae **Iphicrates** Distant
- Jugs and antenniferous tubercles unmodified; ♂ bucculae not strongly produced 2
- 2(1). Fore coxal cavities open 3
- Fore coxal cavities closed 4
- 3(2). Fore tibiae fossorial, flattened and expanded at apex, with a row of short, stout spines along entire ventral face of shaft (fig. 29) **Geoblissus** Hidaka
- Fore tibiae not fossorial, at most slightly thickened at apex, lacking a row of spines on ventral surface of shaft (fig. 24-25) **Dimorphopterus** Stål
- 4(2). Abdominal connexiva 7 with sharp, posteriorly directed spines (fig. 17b); hind tibiae extremely short and stout, barely longer than swollen tarsal segment 1 **Extaramorphus** n. gen.
- Abdominal connexiva 7 lacking blunt points and spines; hind tibiae not extremely short and stout 5
- 5(4). Hind femora of ♂♂ larger than fore femora; body large, wide, and extremely flattened (fig. 18). **Bochrus** Stål
- Hind femora of ♂♂ not larger than fore femora; body not extremely flattened 6
- 6(5). Anterior 1/2 of pronotum shining, posterior half dull pruinose **Cavelerius** Distant
- Pronotum all shining or all dull pruinose 7
- 7(6). Fore femora usually mutic with at most 2 small, divergent spines 8
- Fore femora multispinose 9
- 8(7). Hind femora spinose **Pirkimerus** Distant
- Hind femora mutic **Ischnodemus** Fieber
- 9(7). Body shape cylindrical, ocelli very large; lateral half of corium shining; fore tibiae fossorial; claspers block-shaped; ♀ valvifers not splitting abdominal sternum 7 **Spalacocoris** Stål
- Body shape less cylindrical, often flat or subflattened; ocelli relatively small; lateral 1/2 of corium not shining; fore tibiae not fossorial; claspers not block-shaped; ♀ valvifers splitting abdominal tergum 7 10
- 10(9). Body very elongate, slender, total length more than 6 times pronotal width **Rhabdomorphus** Bergroth
- Body less elongate and slender, total length less than 5.5 × pronotal width **Macropes** Motschulsky

Genus **Macropes** Motschulsky

This is a large genus, its members comprising one of the dominant blissine stocks in the Oriental Region. The species are diverse and several groups are evident within the genus. Some of these groups may prove to be distinct enough eventually to merit generic status. Nevertheless, there are intergrading characters between each of the group of species, and for the present it seems desirable to retain *Macropes* as a single generic entity. The genus may be characterized as follows :

Head and pronotum shining, non-pruinose; fore femora strongly incrassate, armed below with numerous sharp spines; prothorax below deeply concave anteriorly to receive fore femora; fore coxal cavities closed; apical corial margin straight; antennae terete or slightly clavate.

Little is known of the biology of the various species, but some are associated with bamboo.

Macropes is most diverse and abundant in the Oriental Region, but represented by several species in Africa and in Palearctic areas adjacent to the Oriental center.

The Thailand and Indochina species can be segregated into 4 complexes of closely related species.

I. The *Macropes raja* complex.

This complex may be recognized by its distinctive pronotal shape, with rounded lateral margins that curve and narrow convexly to a very narrow anterior margin (fig. 1), and a deep median furrow running through the anterior lobe between the calli. The metathoracic scent gland auricle curves strongly forward in a crescentic arc. In all species of the complex except *dilutus* Distant, the middle and hind femora as well as the fore femora are provided with numerous spines.

To this complex belong *dilutus*, *raja* Distant, *philippinensis* Distant, *major* Matsumura, *comosus* n. sp. and *minor* n. sp. All species are confined to the Oriental Region. The various species may be separated by the following key.

KEY TO SPECIES OF THE MACROPES RAJA COMPLEX

1. Middle and hind femora mutic **dilutus** Distant
Middle and hind femora spinose 2
2. Middle and hind tibiae light yellow to testaceous, strongly contrasting with dark femora;
clavus pale, at least on basal 1/3, with exception of median veins. **raja** Distant
All tibiae dark brown to black, unicolorous or nearly so with dark femora; basal 1/3
of clavus black 3
3. Membrane with a large, round, dark spot not attaining lateral margins and separated
from basal dark area by a broad, transverse, pale, lunate vitta adjacent to apex of
corium (fig. 3b) **philippinensis** Distant
Membrane lacking a distinct, black, round spot, entire basal 2/3 of membrane black or
with at most a small, light area at extreme base and a small, diffuse, light area in
center of disc; dark membranal area broadly in contact with lateral margins (fig. 3c-d)... 4
4. Antennae relatively short, length of segment 2 equal to or barely exceeding interocular
distance. **comosus** n. sp.

- Antennae relatively long, length of segment 2 at least $1.33 \times$ interocular distance 5
5. Large, robust species (8.28-10.92 mm); pronotum noticeably wider across area of calli than across humeral angles; length of pronotum subequal to basal width; metathoracic scent gland auricle short, broad, very slightly curving anteriorly (fig. 4a) **major** Matsumura
- Smaller, less robust species (7.56 mm); distance across pronotal calli subequal to width across humeral angles; length of pronotum greater than basal width; scent gland auricle narrow, linear, strongly curving anteriorly (fig. 4b) **minor** n. sp.

II. The *Macropes punctatus* complex.

This complex is composed of elongate, slender species with the posterolateral pronotal lobes strongly produced caudally to form a deeply concave posterior margin. The metathoracic scent gland auricle is very short, ovoid, and lobate. All femora are multi-spinose, although in some species the spines on the middle and hind femora are obsolete and barely discernible. The lateral areas of the corium are usually shining and contrast strongly with the dull mesal portion of the corium.

To this complex belong the Oriental species *punctatus* (Walker), *lobatus* n. sp., and most of the *Macropes* known from the Ethiopian Region such as *bacillus* Gerstaecker, *albosignatus* Distant, *nigrolineatus* Distant, and *sultanus* Distant. The two Oriental species may be distinguished as discussed following the description of *lobatus*.

III. The *Macropes femoralis* complex.

This complex is composed of very small, parallel-sided blissines with a uniformly pale testaceous corium and clavus, a hyaline or transparent membrane without color markings, a short labium that usually extends onto the anterior portion of the mesosternum, non-spinose middle and hind femora and an elongate, slender bar-like metathoracic scent gland auricle.

All of the known species are confined to the Oriental Region, where they form a cluster of very similar, closely related species. Included in the complex are *femoralis* Distant, *subauratus* Distant, *uniformis* Distant, *obnubilus* Distant, *pilosus* n. sp., *harringtonae* n. sp., and *pseudofemoralis* n. sp.

The complex is closely related to such larger, more robust species as *rufipes* Distant, *consimilis* Distant, *hoberlandti* Slater & Ahmad, and *privus* Distant.

The members of the complex may be separated by the following key.

KEY TO SPECIES OF THE MACROPES FEMORALIS COMPLEX

1. Apical 1/4 of corium dark fuscous, strongly contrasting with pale testaceous proximal area; ♂♂ with a prominent "button-like" protrusion mesally on abdominal sternum 3; membrane of fore wing not transparent hyaline **obnubilus** Distant
Entire corium uniformly light testaceous, lacking dark fuscous coloration apically; ♂♂ lacking a median sternal protrusion; membrane transparent 2
2. Pronotum relatively short and broad (fig. 10c), ratio of pronotal length to width never greater than 0.85 **pilosus** n. sp.
Pronotum relatively more slender and elongate (fig. 10a-b, 11a, c); ratio of pronotal length to width never less than 0.90 3

3. Scutellum with a broad, shining area covering greater part of surface, pruinose areas confined to basal strip and narrow sub-basal lateral areas (fig. 12b) **uniformis** Distant
 Scutellum with shining non-pruinose area confined to a narrow, elevated mesal strip (fig. 12a) 4
4. Body very elongate, total length of body always more than $7 \times$ length of hind tibia; legs generally uniformly bright yellow **subauratus** Distant
 Body somewhat less elongate, total length of body less than $7 \times$ length of hind tibia; femora generally fuscous to a very dark brown 5
5. Pronotum with mesal length as great or greater than humeral width; lateral pronotal margins nearly parallel-sided from humeral angles to area of calli (fig. 11a, c); ratio of head width to pronotal width 0.55 or greater 6
 Pronotum with humeral width greater than median length; lateral pronotal margins evenly and distinctly tapering from humeral angles to anterior margin (fig. 10a); ratio of head width to pronotal width less than 0.55 **pseudofemoralis** n. sp.
6. Antennal segment 4, $2 \times$ or more than $2 \times$ the length of antennal segment 2; pronotum appearing to taper gradually from humeral angles to area of calli (fig. 11a); clasper as in fig. 12c **femoralis** Distant
 Antennal segment 4 less than $2 \times$ the length of antennal segment 2; pronotum appearing nearly parallel-sided from humeral angles to area of calli (fig. 11c); clasper as in fig. 12d **harringtonae** n. sp.

IV. The *Macropes spinimanus* complex.

The members of this complex consist of a group of brightly colored species with dark and variegated color patterns on the hemelytra. The corium usually has a pale basal 1/2 contrasting with a dark brown distal 1/2. The membrane is usually dark basally between the coria and on distal 1/2, with a broad, often interrupted, pale, lunate, white or testaceous area between. The basal 2 or 3 antennal segments are usually pale, contrasting with the dark 4th and sometimes 3rd segment. The metathoracic scent gland auricle is usually slender and strap-like, and often curves anteriorly. The middle and hind femora are often mutic, although in some species the hind femora are provided with sharp spines and are usually enlarged, at least in the males. To this complex belong *spinimanus* Motschulsky, *varipennis* (Walker), *simoni* Distant, *lacertosus* Bergroth, and *yoshimotoi* n. sp. The complex is confined to the Oriental Region. The species may be separated by the following key.

KEY TO SPECIES OF THE MACROPES SPINIMANUS COMPLEX

1. Labium very short, remote from fore coxae; ♂♂ with extremely elongate, curving spines distally below on hind femora (fig. 15a) **varipennis** (Walker)
 Labium extending caudad to or beyond fore coxae; hind femoral spines, if present, very short and stout 2
2. Scutellum with anterolateral angles produced into upward-tipped, shining tubercles (fig. 13a); antennae with at least segments 1 and 2 pale yellow 3
 Scutellum lacking lateral tubercles; all antennal segments red-brown to black 4
3. Small species, under 6.25 mm (range 4.23-6.24, mean 4.93 mm); ♂♂ with a swollen protrusion midway along ventral margin of hind femur (fig. 13b); legs usually chocolate to yellowish brown **spinimanus** Motschulsky
 Larger species, over 6.5 mm (range 6.60-6.90, mean 6.69 mm); ♂♂ lacking swollen protrusion on hind femur; legs usually bright yellow **yoshimotoi** n. sp.

4. Labium exceeding fore coxae; ♂♂ with hind femora mutic; clavus uniformly brown **simoni** Distant
 Labium not extending caudad of fore coxae; ♂♂ with a series of spines on hind femora;
 clavus with distal 1/2 pale **lacertosus** Bergroth

Also present in the material available for study is a single specimen of *Macropes* from Tonkin, Viet Nam, which undoubtedly represents a new species. However, this species does not belong in any of the complexes discussed above. It appears to be closely related to an undescribed species from Kambaita, NE Burma, and we prefer to consider the species in a later paper covering the Oriental Blissinae.

The *Macropes raja* complex

Macropes raja Distant

Fig. 1-2, 3a, 9a.

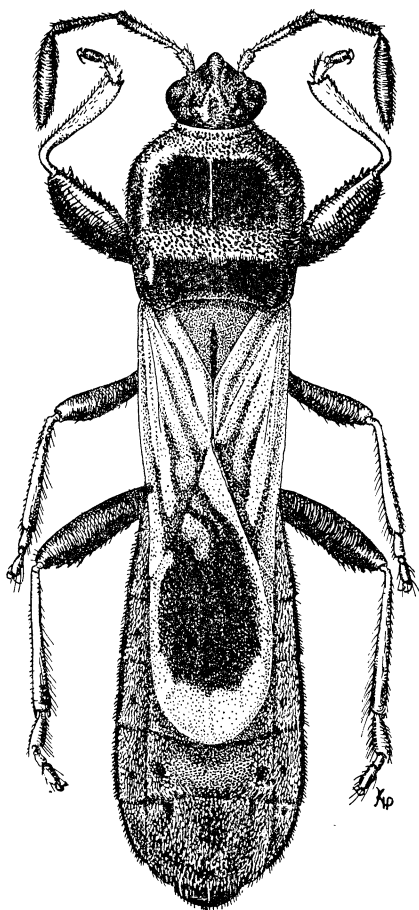


Fig. 1. *Macropes raja* Distant, dorsal view.

Macropes raja Dist., 1909, *Ann. Mag. Nat. Hist. ser. 8*, 3: 323.

This appears to be the commonest member of the complex in Thailand and Indochina. Fortunately, good series of *raja* and the closely related *major* have been available for study. The color pattern may be used judiciously to separate these 2 species. In *raja*, as in *philippinensis*, the membrane possesses a large, dark, round-to-oval spot near the center which leaves the lateral margins pale. However, in *raja* this spot often appears diffuse because the membranal veins leading anteriorly to the dark apical corial membrane are usually dark, with the corium and basal portion of the membrane pale throughout with the exception of the veins (fig. 3a). In *philippinensis*, by contrast, the basal 1/3 of the membrane and the adjacent distal 1/4 of the corium are dark, while the veins leading from the oval dark spot to the darkened basal area are unicolorous with the pale membranal surface, forming a lunate pale vitta across the membrane adjacent to the apex of the corium (fig. 3b). In *dilutus*, *major*, and *minor*, the basal 2/3 of the membrane (except the extreme base) is uniformly dark and in contact with the lateral membranal margins for most of their lengths (fig. 3c-d, 6).

Raja is also a smaller, more delicate species than either *philippinensis* or *major*. The males have very strongly swollen, almost bulbously developed fore tibiae, whereas other species in the complex have rather conventionally enlarged fore tibiae. The scent gland auricle is relatively narrow, little curved, and broadened at the distal end.

M. raja was originally described from Calcutta, India. It seems to be widely distributed in SE Asia.

MATERIAL EXAMINED. LAOS : 8 ♂♂, 17 ♀♀, 12 nymphs, Pakse, Sedone Prov., 21. V.1965, 3 ♂♂, 4 ♀♀, 1 nymph, 23. V.1965, 1 ♀, 15. V.1965, at base of bunch grass along Mekong R., 1 nymph, 16. V.1965, on bunch grass, bank of Mekong R., P. D. Ashlock. THAILAND : 3 ♂♂, 3 ♀♀, Chiangmai Prov., Mae Klang, 340 m, 11. VI.1965, Ashlock; 1 ♂, 1 nymph, same data but 337 m; 2 ♀♀, Chiangmai, 1100-1500 m, 1966, J. Sedlacek; 2 specimens, Bangkok, H. Hillman; 1 ♀, Maejo, Chiangmai Prov., 330 m, 17. I.1936, C. Tongyai; 4 nymphs, Doi Suthep, Chiangmai Prov., 1300 m, VI. 1965, Ashlock. ANNAM : 11 specimens, Phuc-Son, 10. XII.1901, H. Fruhstorfer. JAVA : 3 ♂♂, Mt. Gedeh, Tijipanas, 1000 m, 15-19. XII.1953, J. v. d. Vecht. In BISHOP, BMNH, VIENNA, LEIDEN, BUDAPEST, THAILAND, DEI, Scudder, Ashlock, and Slater coll'n.

There is one specimen of what we take to be a 4th instar nymph of this species from Pakse, in Laos, collected by P. D. Ashlock, 23. V. 1965 (fig. 2).

4th instar nymph : Head becoming darker posteriorly, pronotum and scutellum black, wing pads testaceous or nearly white on basal 1/2, black distad; abdomen varicolored, yellow on anterolateral portion of each segment, dull red on posterior portions, dull gray-black

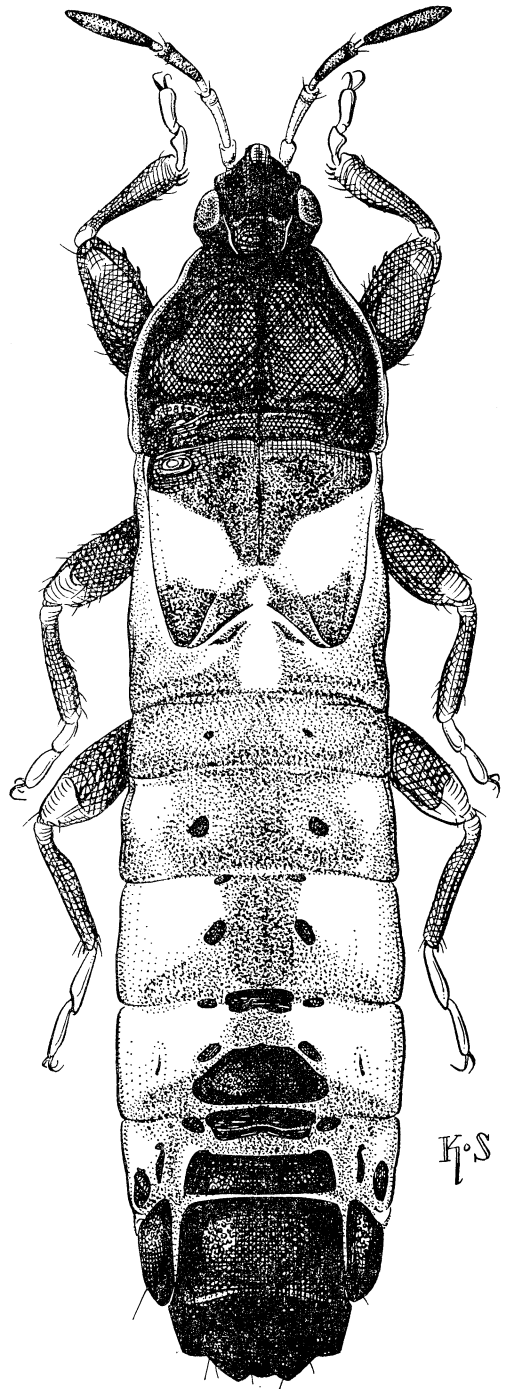


Fig. 2. *Macropes raja* Distant, dorsal view, 4th instar nymph.

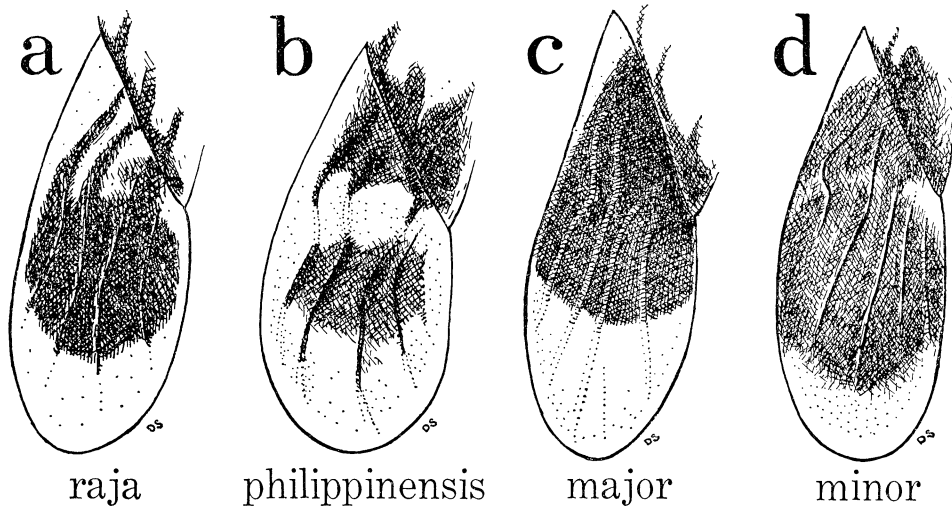


Fig. 3. Hemelytral membranes of the named species of *Macropes*.

broadly along mesal area of anterior 4 segments, a very narrow black ovoid patch around scent gland orifice between terga 4 and 5; tergum 5 with a very large elliptical shining black patch mesally on ventral 1/2, tergum 6 narrowly black anteriorly around scent gland orifice with a very large, black, shining mesal patch on posterior 1/2 and a small oval black spot at caudolateral corners, remaining posterior terga uniformly shining black; sterna 7, 8, and 9 black mesally, tapering anteriorly, sternum 7 with a small, posteriorly directed, triangular black patch adjacent to anterior end of median black area; legs and antennal segments 3 and 4 black, apices of femora and 1st 2 antennal segments pale, antennal segment 2 becoming suffused distad; all tibiae somewhat swollen and inflated as in adult; fore femora incrassate, armed below with several spines but less numerous than in adult; no spines present on middle and hind femora; labium reaching mesosternum but remote from mesocoxae.

3rd instar nymph (pinned): Differing from 4th instar in having sclerotized plate of abdominal tergum 5 evenly, transversely elliptical, caused by pair of small ovoid spots (located antero-laterad of central plate in later instars) unseparated as yet from median plate; dark spots at caudolateral angles of tergum 6 rounded rather than elongately elliptical.

5th instar nymph (pinned): Form and color as in 4th instar; wing pads extending caudad onto anterior portion of abdominal tergum 3; sclerotized plate on tergum 5 produced more prominently cephalad to form a narrower, more sharply sloping anterior margin.

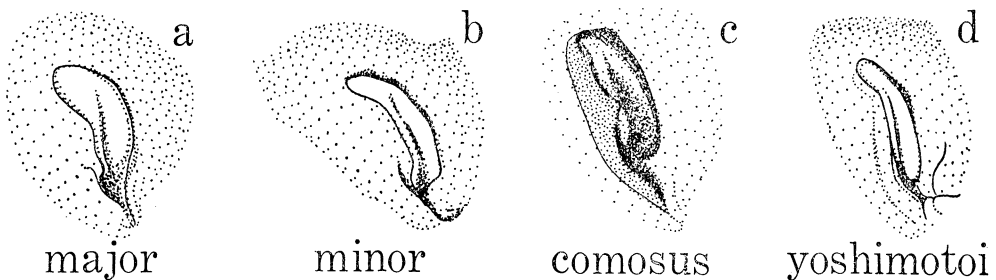


Fig. 4. Scent gland auricles of the named species of *Macropes*.

Although nymphs of most of the Oriental Blissinae are unknown, it is likely that they will ultimately be of considerable phylogenetic importance. Nymphs of *M. raja* resemble nymphs of the New Guinea genus *Dentisblissus* Slater.

Macropes minor Slater, Ashlock and Wilcox, new species Fig. 3d, 4b, 5.

Head and pronotum black, becoming dark tan on apex of tylus and posterior pronotal lobe; entire scutellum, apical 1/4 of corium, basal 1/3 and all margins of clavus, apical corial margin, cubital vein, distal 1/2 of radial vein and a narrow stripe through distal 1/2 of central area of corium, greater portion of membrane except extreme base, 1 or 2 suffused spots at level of corial apices, and broadly at apex, dark chocolate brown to black; remaining areas of fore wing white; legs dark chocolate brown, shining, becoming testaceous on middle and hind tibiae and tarsi; head, pronotum, and a narrow stripe along radial vein strongly shining; very sparsely clothed with decumbent silvery hairs, area of calli and most of posterior pronotal lobe glabrous; head with scattered punctures; anterior "collar" area of pronotum bearing numerous fine punctures, broad transverse pronotal impression with coarse, rugose punctures.

Head small, non-declivent, moderately convex across vertex, tylus attaining distal 1/3 of antennal segment 1, eyes small, little protrudent, set well away from anterolateral pronotal angles, head length 0.68 mm, width 0.73 mm, interocular space 0.45 mm; pronotum typical of group, with a deep median longitudinal groove on anterior lobe, broadly rounded lateral margins strongly tapering anteriorly on anterior lobe, a broad, shallow, complete transverse impression, concave posterior margin, pronotal length 1.52 mm, width 1.48 mm; scutellum mutilated; hemelytra with nearly straight lateral corial margins, slightly tapering posteriorly, membrane attaining anterior portion of abdominal tergum 7, distance apex clavus-apex corium 1.22 mm, distance apex corium-apex abdomen 2.58 mm; metathoracic scent gland auricle strongly anteriorly curving as a crescent, rounded at apex (fig. 4b); fore femora very strongly incrassate, broadest on basal 1/3 and angulate, armed below with numerous short sharp spines, fore tibia short and thick with sharp terminal curved spines; middle and hind femora with several small acute spines below; labium attaining or slightly exceeding posterior margin of prosternum, length labial segments I 0.38 mm, II 0.38 mm, III 0.34 mm, IV 0.38 mm; length antennal segments I 0.19 mm, II 0.57 mm, segments III and IV missing; total length 7.56 mm.

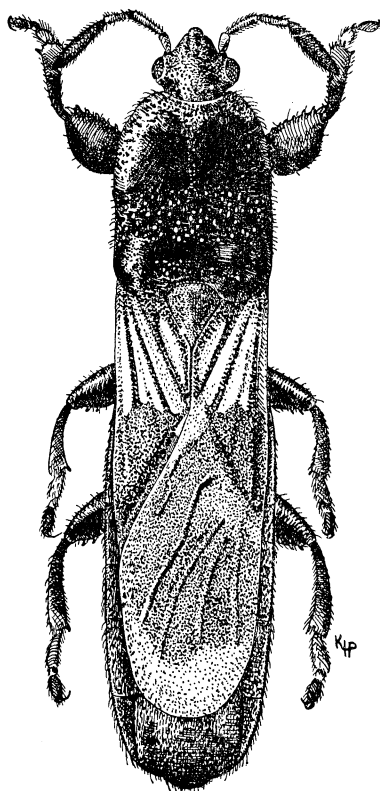


Fig. 5. *Macropes minor*, n. sp., dorsal view.

Holotype ♂ (BISHOP 8795), Viet Nam: Dalat, 1550 m, 11. IX. 1960, J. L. Gressitt.

This species resembles *M. dilutus* Distant very closely in size, color and general habitus. Although we have only a few specimens, the number of basic morphological differences indicate that these cannot be variations of a single species. *M. minor* has distinct ventral spines on the middle and hind femora that are absent in *dilutus*; the fore femora are strongly incrassate and sharply angulate at the dorsoproximal angle, whereas in *dilutus* they are nearly evenly elliptical and much smaller relative to body size. The 1st 2 antennal segments of *minor* are relatively heavier than are those of *dilutus*. In the latter, the apex of the tylus attains the distal end of the 1st antennal segment, whereas in *minor* it is remote from the end of the antennal segment. The 2 species are very similar in coloration. The following differences may not hold true when adequate series are available for study, but in the present material *minor* has a darkened distal 1/2 of the radial and medial veins as well as a dark cubital vein, whereas in *dilutus* only the cubital vein is darkened. In *minor* the 2nd antennal segment is black; in *dilutus* both the 1st and 2nd segments are pale brown. This species is actually more closely related to *comosus* n. sp., from which it may be distinguished by characters given in the key and under the discussion of the latter species.

Macropes comosus Slater, Ashlock and Wilcox, new species Fig. 4c.

Elongate, parallel-sided; head and pronotum shining, polished black to extremely dark chocolate brown, apical 1/4 of corium, most of membrane with exception of narrow basal strip, area about apex of corium, and curving apical portion dark brown; scutellum dark pruinose with narrow, polished, median elevated area; clavus completely dark brown; legs nearly uniformly dark chocolate brown, the middle and hind tibiae and tarsi becoming reddish brown, but never strongly contrasting with femora; antennae black to dark chocolate brown, segment I strongly contrasting pale testaceous; abdomen red-brown; hairs on dorsal surface prominent, upstanding, and slightly recurved apically, most conspicuous on hemelytra and along lateral margins of pronotum.

Head small, non-declivent, vertex moderately convex, tylus reaching distal 1/3 of antennal segment I, head length 0.59 mm, width 0.68 mm, interocular space 0.46 mm; pronotum conventionally shaped with broadly arcuate anterior lobe and deep median furrow, transverse impression broad, shallow, complete, posterior margin strongly concave, pronotal length 1.29 mm, width 1.29 mm; scutellum with prominently raised median elevation, deeply punctate and impressed laterad, scutellar length 0.46 mm, width 0.61 mm; hemelytra with lateral corial margins parallel, slightly concave at level of claval commissure, distance apex clavus-apex corium 0.95 mm, distance apex corium-apex abdomen 2.54 mm; fore femora strongly incrassate, short and stout, middle and hind femora armed on distal 1/3 with 3 to 4 short, stout, acute spines; metathoracic scent gland auricle rounded, elongately lobate, not strongly lunately curving anteriorly (fig. 4c); labium extended to base of prosternum or very slightly onto anterior margin of mesosternum, length labial segments I 0.48 mm, II 0.38 mm, III 0.38 mm, IV 0.34 mm; antennae short, terete, but with apices of antennal segments 2 and 3 somewhat enlarged, length antennal segments I 0.21 mm, II 0.50 mm, III 0.46 mm, IV 0.70 mm; total length 6.54 mm.

Holotype ♂ (BISHOP 8796), Cambodia, Kiri Rom, 700 m, 31. III-7. IV. 1961, N. R. Spencer. Paratopotype: 1 ♀, same data as holotype. In J. A. Slater collection.

Macropes comosus is closely related to both *dilutus* and *minor*, resembling them closely in size and habitus. From *dilutus* it may be separated by the presence of spines on the hind femora, completely dark clavus, and much shorter antennae. These same features will distinguish *comosus* from *minor*, but in addition the metathoracic scent gland auricles

of both are of a completely different shape, that of *minor* being lunate and strongly curved anteriorly (fig. 4b), whereas in *comosus* it is ovoid and not curved noticeably forward (fig. 4c). Furthermore, the hairs on the dorsal surface of the body, particularly on the hemelytra and lateral pronotal margins, are much longer, more up-standing and conspicuous in this species than in either *dilutus* or *minor*.

Macropes dilutus Distant Fig. 6.

Macropes dilutus Dist., 1901, *Ann. Mag. Nat. Hist.* ser. 7, 8: 467.

Elongate, robust, parallel-sided; head and pronotum black, shining, with apex of tylus flavescent, posterior pronotal lobe becoming dark red-brown, scutellum dull gray pruinose except median elevation shining red-brown; hemelytra creamy white marked with dark brown as follows: basal 1/4 and along inner and outer margins of clavus, radial vein, and apical 1/3 of corium, a large diffuse spot on disc of membrane reaching lateral margins but leaving pale bands at base and apex, and diffuse pale spots in center and adjacent to apex of corium; abdomen, antennae, and legs dark red-brown with tarsi, antennal segment 1 and base of segment 2 flavescent; head and pronotal collar area with a few scattered punctures, coarse irregular punctures present on pronotal transverse impression and on scutellum laterad of median elevation; sparsely clothed with decumbent and semi-decumbent silvery hairs.

Head small, non-declivent, moderately convex across vertex, tylus extending nearly to distal end of antennal segment 1, eyes ovoid, set well away from anterolateral pronotal angles, head length 0.65 mm, width 0.65 mm, interocular space 0.42 mm; pronotum with lateral margins nearly parallel from humeral angles to area of calli, then evenly arcuately narrowing to anterior margin, anterior lobe

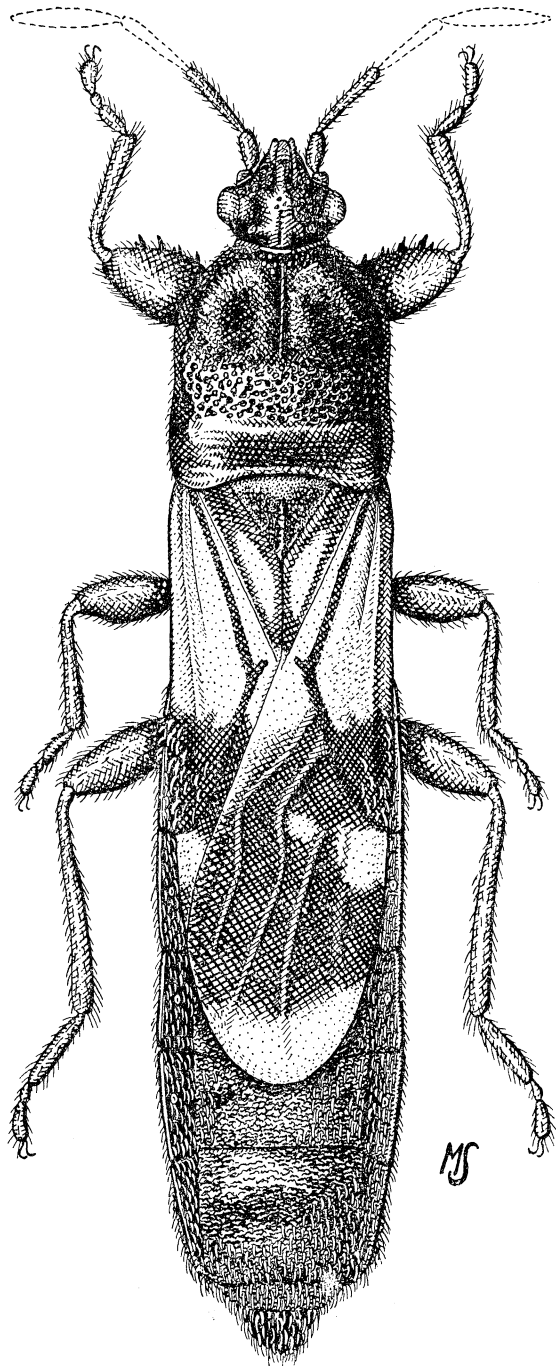


Fig. 6. *Macropes dilutus* Distant, dorsal view.

with a distinct median longitudinal groove, transverse impression broad, shallow, complete, posterior margin very shallowly concave, lacking prominently produced lobes laterad of scutellum, pronotal length 1.06 mm, width 1.12 mm; scutellum lacking lateral spines, scutellar length 0.42 mm, width 0.52 mm; hemelytra with lateral corial margins nearly parallel, evenly tapering from base to rounded apex, leaving connexivum well exposed, membrane reaching posterior 1/2 of abdominal tergum 6, distance apex clavus—apex corium 0.87 mm, distance apex corium—apex abdomen 1.22 mm; metathoracic scent gland auricle strongly curving anteriorly, rounded at apex; fore femora very strongly incrassate, armed below with numerous short sharp spines, fore tibiae thick, clavate, with apical spines, middle and hind femora mutic; labium reaching beyond fore coxae but not attaining posterior margin of prosternum, length labial segments I 0.38 mm, II 0.34 mm, III 0.29 mm, IV 0.40 mm; antennae slender, segments 2 and 3 moderately clavate, 4 narrowly fusiform, length antennal segments I 0.16 mm, II 0.38 mm, III 0.38 mm, IV 0.65 mm, total length 5.66 mm. Description taken from the ♂ from Ceylon.

MATERIAL EXAMINED. CEYLON: 1 ♂, Kanthaley, Ceylon Horn, Breddin. THAILAND: 4 ♀♀, Nakornnayok, 15. IX. 1953, K. Panyanong. VIET NAM: 1 ♀, Nha Trang, 17-26. XI. 1960, C. M. Yoshimoto. In THAILAND, BISHOP and Slater coll'n.

This species was originally described from North India and reported from Burma and Ceylon. It is the only known member of the complex that lacks small spines below on the middle and hind femora. It may be separated from *minor* n. sp. and *comosus* n. sp., to which it is closely related, not only by its lack of spines but by the characters mentioned under the discussion of the latter two species.

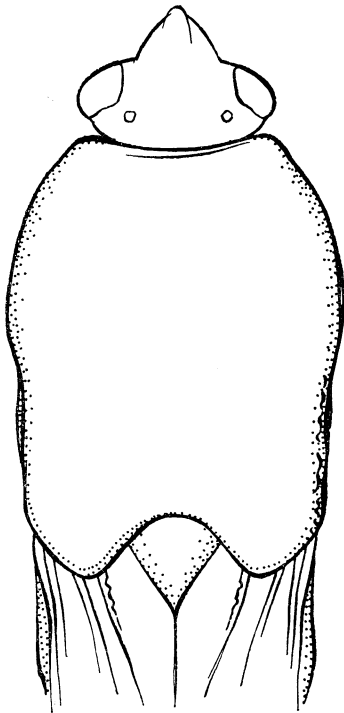


Fig. 7. *Macropes lobatus*, n. sp., head and pronotum, dorsal view.

The *Macropes punctatus* complex

Macropes lobatus Slater, Ashlock and Wilcox, new species Fig. 7.

Elongate, slender, parallel-sided; head and pronotum black, strongly shining; scutellum dull pruinose gray; antennae, femora, tibiae and abdomen above and below dark red-brown, tarsi flavescent; hemelytra with clavus and corium white to dull testaceous, producing a striped effect by virtue of the dark chocolate-to-black areas as follows: claval veins, inner claval margin and claval commissure, entire cubital vein, lateral corial margin to mesad of radial vein, entire apical corial margin and complete distal 1/3 of corium; membrane pale translucent, a large ovoid black patch in center beginning just beyond apices of coria, broadly in contact with lateral margins and reaching to distal 1/3 of membrane; radial corial vein and adjacent lateral margin strongly shining on basal 2/3; head irregularly and conspicuously punctate, pronotum coarsely and regularly punctate along anterior margin, narrowly along midline of anterior lobe, broadly, deeply, rugosely punctate across transverse impression, sparsely in sub-basal area; scutellum deeply punctate laterad of median elevation; very sparsely clothed with semidecumbent sericeous hairs, nearly glabrous above on

pronotum and head.

Head non-declivent, convex across vertex, tylus broad, extending to or slightly beyond distal end of antennal segment 1, eyes large, ovoid, set slightly away from anterolateral pronotal angles on short head extensions, head length 0.61 mm, width 0.76 mm, interocular space 0.46 mm; pronotum elongately elliptical, considerably longer than wide, lateral margins nearly straight from humeral angles to calli, then sharply angulately narrowing anteriorly, the anterolateral margin angular rather than evenly curved (fig. 7), caudolateral lobes very strongly produced, bluntly pointed, with posterior margin extremely deeply concave, transverse impression broad, shallow, complete, median groove on anterior lobe obsolete, reduced to a narrow line of punctures, pronotal length at median line 1.41 mm, at lobe 1.73 mm, width 1.22 mm; scutellum with a broad shallow "T"-shaped elevation, scutellar length 0.38 mm, width 0.47 mm; hemelytra with lateral margins nearly parallel, very slightly constricted opposite claval commissure, membrane evenly rounded apically, reaching onto anterior 1/4 of abdominal tergum 7, distance apex clavus - apex corium 0.95 mm, distance apex corium - apex abdomen 2.02 mm; fore femora strongly incrassate, armed below with 2 irregular rows of numerous sharp stubby spines and a large bifid spine on apical 1/3, middle and hind femora with a row of tiny spines on ventral surface, fore tibiae robust, clavate, with hooked spines at apex and tubercles along shaft; metathoracic scent gland auricle rounded, broad and short, curving slightly caudad; labium reaching posterior margin of prosternum, segment I barely reaching base of head, length labial segments I 0.44 mm, II 0.42 mm, III 0.34 mm, IV 0.38 mm; antennae short, segments 2 and 3 slightly clavate, 4 narrowly fusiform, length antennal segments I 0.15 mm, II 0.32 mm, III 0.30 mm, IV 0.58 mm; total length 6.0 mm.

Holotype ♂ (BISHOP 8797), Hong Kong: N. T. (New Territories), Taipokau, 3-4. VII. 1964, W. J. Voss & Wai Ming Hui. Paratypes: THAILAND: 1 ♂, Chiangmai Prov., Doi Pui, 17. VI. 1965, K. Morimoto; 1 ♀, Chiangmai Prov., Tang Keo, 10. VI. 1965, K. Morimoto; 1 ♂, Chiangmai, 1000 m, 21. VI. 1936, C. Tongyai. SUMATRA: 1 ♀, Medan?, V-VIII. 1921. VIET NAM: 1 ♂, Dalat, 1500 m, 26-27. IX. 1960, C. M. Yoshimoto; 1 ♂, 4 km SW of Dalat, 1500 m, 12. IX. 1960, "grasses", B. Feinstein; 1 ♂, 20 km S of Dalat, 1300 m, 12. IX. 1960, J. L. Gressitt; 2 ♂♂, Fyan, 900-1000 m, 11. VII-9. VIII. 1961, N. R. Spencer. HONG KONG: 1 ♀, N. T., Taipokau, 3-4. VII. 1964, Voss & Hui; 3 ♀♀, same data but 1. VI. 1964; 1 ♂, same data but, J. L. Gressitt; 1 ♀, same data but 15. VI. 1964, Voss & Hui. In VIENNA, THAILAND, BISHOP and Slater coll'n.

This species is quite similar to the much larger *Macropes punctatus* (Walker), both having black shining heads and pronota, elongate elliptical pronota with strongly produced posterior lobes, multi-spinose femora, rounded scent gland auricles, and the same general coloration. However, *lobatus* may easily be recognized by its smaller size (6.0-7.68 mm, *punctatus* 10.08-10.20 mm), and its relatively much shorter antennae. In *punctatus* the interocular space is subequal to the length of the 2nd antennal segment (0.65 mm, 0.68 mm, ♀), whereas in *lobatus* the 2nd segment is relatively shorter (0.51 mm, 0.38 mm, ♀; 0.53 mm, 0.42 mm, ♂). Also, the posterior pronotal lobes are relatively broader in *lobatus* with the mesal concavity narrow and deep (ratio length lobe/length pronotum at midline: *lobatus* 5.93, *punctatus* 6.30; ratio length lobe/length pronotum at lobe: *lobatus* 7.59, *punctatus* 7.73).

Viet Nam specimens have the caudolateral pronotal lobes somewhat less strongly produced backwards and have somewhat longer labia than do specimens from Hong Kong. Also in the Viet Nam material the dark stripes along the veins on the basal 1/2

of the corium are often lacking. However, these differences do not appear to warrant specific separation.

The *Macropes femoralis* complex

Macropes pseudofemoralis Slater, Ashlock and Wilcox, new species Fig. 10a.

Short, moderately robust; head, pronotum and scutellum black, pronotum becoming bright tan basally across humeral angles; hemelytra uniformly bright testaceous yellow, membrane hyaline; abdomen and apex of tylus bright reddish brown, connexival margins narrowly black; all legs dark brown with tibiae pale testaceous; antennae light tan, distal 1/2 of antennal segment 4 and extreme apex of segment 3 dark brown to black; scutellum pruinose with median elevation shining; head and pronotum coarsely punctate, area across transverse pronotal impression very coarsely and rugosely punctate; clothed above with rather prominent, elongate, upright to decumbent sericeous hairs.

Head non-declivent, slightly exceeding distal end of antennal segment 1, moderately convex across vertex, eyes slightly produced away from anterolateral pronotal angles, head length 0.42 mm, width 0.51 mm, interocular space 0.30 mm; pronotum elongate, slightly convex dorsally, evenly narrowing from humeral angles to anterolateral margins, area across calli not as wide as that across humeral angles, anterior margin relatively shallowly concave, posterior margin evenly and deeply concave, pronotal length 0.95 mm, width 0.99 mm; scutellum with a prominent, shining, median longitudinal elevation broadening and becoming diffuse to base; scutellar length 0.34 mm, width 0.42 mm; hemelytra with lateral corial margins very slightly sinuate, moderately tapering posteriorly, membrane reaching midway over abdominal tergum 7, abdominal connexivum moderately exposed laterad, distance apex clavus - apex corium 0.72 mm, distance apex corium - apex abdomen 1.10 mm; metathoracic scent gland auricle elongate, slender, slightly widened at distal end, perpendicular to long axis of body; fore femora strongly incrassate, armed below with numerous stout, acute spines; mesosternum lacking a deep furrow but with a faint median longitudinal impression; fore tibiae stout, fossorially toothed at distal end, length hind tibia 0.61 mm; labium extending onto mesosternum, remote from mesocoxae, length labial segments I 0.33 mm, II 0.29 mm, III 0.24 mm, IV 0.27 mm; antennae short, stout, segments 2 and 3 slightly clavate, 4 narrowly fusiform, length antennal segments I 0.11 mm, II 0.20 mm, III 0.21 mm, IV 0.42 mm; total length 3.81 mm.

Holotype ♂ (USNM #69320), Thailand: Chiangmai, IV-V. 1958, light trap, V. Notanando. Paratypes: total of 17 ♂♂, 14 ♀♀, from following localities: THAILAND: same data as holotype; Fang, Chiangmai Prov., 17. IV. 1958, P. Phloboen; without specific locality, 1958, H. Ikoma; Chiangmai, 21. IV. 1958, H. Ikoma; Chiangmai, 420 m, 28. III. 1958, T. C. Maa; LAOS: Vientiane, 2-4. VI. 1960, light trap, S. & L. Quate; Sayaboury Prov., Sayaboury, 25. III. 1966, Malaise trap, native collector. In BISHOP, USNM, THAILAND, H. Hasegawa, and J. A. Slater coll'n.

This species is readily distinguishable by its relatively elongate, evenly tapering pronotum (fig. 10a) which appears more strongly shining than in *obnubilus* and *pilosus*. Also the surface hairs appear to be more elongate and less flattened against the pronotal surface, giving a much less matted, pilose, and more shining appearance to the pronotal surface. Like *uniformis*, it frequently comes to light, and we have seen it only in the macropterous condition. From *femoralis*, to which it is most closely related, it may be separated by characters given in the preceding key.

Macropes pilosus Slater, Ashlock and Wilcox, new species Fig. 10c.

Small, very robust; head, pronotum and scutellum black, pronotum pale yellowish brown in area of humeri and narrowly across posterior margin; clavus and corium nearly uniformly testaceous yellow, membrane hyaline; abdomen reddish brown, connexiva yellowish with a narrow black lateral margin; venter of head and thorax uniformly black; abdomen reddish brown; legs nearly uniformly bright red-brown, tarsi testaceous; antennae with segments 1-3 dark chocolate brown, segment 4 black; head, pronotum and scutellum with numerous discrete distinct punctures, those broadly in area of transverse impression very large, rugose, but still individually distinct; thickly clothed above with moderately elongate decumbent and semi-upright sericeous hairs.

Head rather broad, non-declivent, tylus slightly exceeding antennal segment 1, moderately convex across vertex, eyes very slightly set away from anterolateral pronotal angles, head length 0.39 mm, width 0.57 mm, interocular space 0.34 mm; pronotum broad, robust, transverse impression obsolete, delineated primarily by the broad area of coarse rugose punctures, lateral margins slightly sinuate, nearly straight from humeral angles to anterior area of calli, then strongly, convexly curving anteromesad, posterior margin nearly straight before base of scutellum with moderately developed caudolateral lobes (fig. 10c), dorsal surface very slightly convex, pronotal length 0.91 mm, width 1.14 mm; scutellum with a low, shining, longitudinal median elevation, prominently punctate laterad, scutellar length 0.33 mm, width 0.49 mm; hemelytra with lateral corial margins sinuate, slightly narrowing posterior to line across apex of claval commissure leaving abdominal connexiva prominently exposed, membrane extending over basal 1/3 of abdominal tergum 7, distance apex corium - apex abdomen 1.18 mm; metathoracic scent gland auricle slender, nearly straight, slightly broadening distally, curving very slightly caudad to perpendicular of longitudinal axis; labium extending onto anterior portion of mesosternum, remote from mesocoxae, mesosternum lacking a distinct median furrow but with a slight impression, length labial segments I 0.32 mm, II 0.28 mm, III 0.23 mm, IV 0.30 mm; antennae short, stout, segments 2 and 3 moderately clavate, 4 broadly fusiform, length antennal segments I 0.11 mm, II 0.19 mm, III 0.20 mm, IV 0.46 mm; total length 3.84 mm.

Holotype ♀ (BISHOP 8798), Thailand (N): Pangmakampon (Pankampawng), nr Fang, 450 m, 15-16. XI. 1957, J. L. Gressitt. Paratypes: LAOS: 2 ♀♀, Luang Prabang, 300 m, 4-5. VI. 1960, light trap, S. & L. Quate. THAILAND: 1 ♀, Chiangmai Prov., Doi Suthep, 28-31. III. 1958, T. C. Maa. In BISHOP and Slater coll'n.

This species, as indicated in the key, is relatively short and robust with dark antennae and a broader less elongate pronotum than any of the other species (fig. 10a, b, 11a-c), with the vestiture of the pronotum thicker, with many decumbent "matted" hairs, giving the surface a rather dull appearance somewhat resembling that of the more elongate *obnubilus* but having many of the hairs upstanding. (Care should be taken with greasy specimens, as grease obscures the hairs and gives a more shining appearance to the pronotal surface.)

Macropes uniformis Distant Fig. 8, 10b, 12b.

Macropes uniformis Dist., 1909, *Ann. Mag. Nat. Hist.* ser. 8, 3: 324-25.

Body very stout, short, robust; head, pronotum, and scutellum black, pronotum becoming bright chestnut brown at humeral angles, head and thorax above and below black, shining; hemelytra nearly uniformly testaceous yellow, becoming semitranslucent in central area of corium, membrane hyaline; abdomen reddish brown, lateral connexival margins very narrowly black; fore femora black to dark chocolate brown, middle and hind femora and all tibiae dark red-brown, tarsi somewhat lighter; antennae dark, varying from nearly uniformly black through dark brown

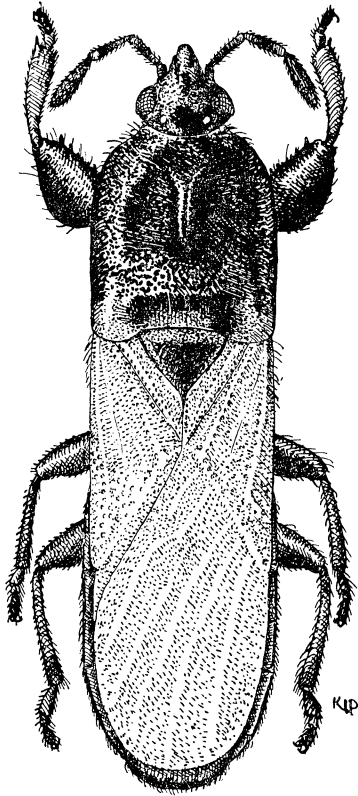


Fig. 8. *Macropes uniformis* Distant, dorsal view.

on basal 1/3-2/3 of segments 2 and 3; head, pronotum, and scutellum punctate, pronotum with very coarse, rugose, anastomosing punctures across transverse impression; dorsal surface appearing nearly glabrous, shining, with a scattering of extremely short, inconspicuous, decumbent hairs irregularly dispersed over surface.

Head at most very slightly declivent, moderately acuminate, tylus exceeding distal end of antennal segment 1, moderately convex across vertex, eyes in contact or almost in contact with anterolateral pronotal margins, head length 0.42 mm, width 0.61 mm, interocular space 0.38 mm; pronotum robust, transverse impression located very far posteriorly, thus posterior lobe only 1/4-1/5 length of anterior lobe, lateral margins sinuate, strongly convexly curved on anterior lobe, width across calli noticeably broader than that across humeral angles, anterior pronotal margin very deeply concave, posterior margin nearly straight before base of scutellum with well developed caudolateral lobes (fig. 10b), pronotal length 1.10 mm, width 1.14 mm; scutellum chiefly shining with only very narrow basal and lateral pruinose areas (fig. 12b), scutellar length 0.37 mm, width 0.53 mm; hemelytra with lateral corial margins slightly sinuate, narrowing from base to apex, radial vein prominently raised into a sharp elevated ridge, membrane extending to posterior 1/4 of abdominal tergum 7, leaving abdominal connexiva broadly exposed laterad, distance apex clavus - apex corium 0.72 mm, distance apex corium - apex abdomen 1.22 mm; metathoracic scent gland auricle elongate, linear, straight, lying perpendicular to longitudinal axis of body, slightly broadened to distal end; fore femora extremely incrassate, prothorax anterior to coxae deeply excavated to

receive swollen fore femora, fore tibiae stout, strongly fossorially spinose at apex, mesosternum with a faint median longitudinal impression but lacking a distinct deep furrow; labium extending well onto mesosternum, not attaining mesocoxae, length labial segments I 0.38 mm, II 0.34 mm, III 0.34 mm, IV 0.30 mm; antennae short, stout, segments 2 and 3 clavate, segment 4 fusiform with a noticeably narrow stalk-like basal 1/3, length antennal segments I 0.11 mm, II 0.21 mm, III 0.23 mm, IV 0.49 mm; total length 4.14 mm.

MATERIAL EXAMINED. LAOS: 29 ♂♂, 14 ♀♀, Vientiane, 9. V. 1965, at light, P. D. Ashlock; 2 ♂♂, 1 ♀, same data but 8. V. 1965; 1 ♂, same data but 28. V. 1965; 1 ♂, Vientiane, 29. V. 1965, sand bar, Mekong R., Ashlock. In BISHOP, Ashlock, and Slater coll'n.

This species closely resembles *pilosus*, *pseudofemoralis*, and *femoralis* in size and general habitus, but is almost completely glabrous on the pronotal surface, with only a very few extremely short, inconspicuous hairs present. The pronotum is also of a distinct shape, being sinuate laterally and having the appearance of being slightly broader anterior to the transverse impression than across the humeral angles (fig. 10b). The prominently elevated and "down-stepped" essentially shining scutellum (fig. 12b) is also diagnostic, the other closely related species having the shining area of the scutellum confined to a narrow median strip (fig. 12a). The anterolateral pronotal angles are much more acute

and forward-projecting in *uniformis* than in the related species. This is presumably a modification to accommodate the greatly incrassate fore femora, which are much larger proportionately than in any other species in the complex. Like *pseudofemoralis*, it frequently comes to light. *Uniformis* was originally described from India and previously known only from there.

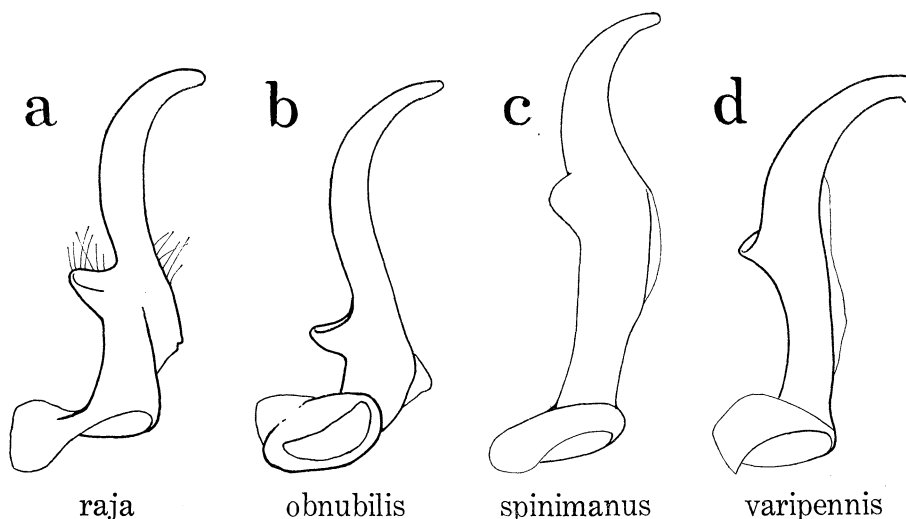


Fig. 9. Parameres, left, dorsal or inner view of the named species of *Macropes*.

Macropes subauratus Distant

Macropes subauratus Dist., 1904, *Fauna Brit. India Rhynch.* 2: 26.

This is the most elongate, slender, parallel-sided species of the *Macropes femoralis* complex. In the macropterous form the pronotum is nearly parallel sided, only moderately tapering midway on the anterior 1/3; but in the brachypterous form the pronotum is considerably swollen anterior to the transverse impression, which in both wing conditions is located well back of the center of the pronotum. The head, pronotum, and scutellum are black-shining becoming light tan to testaceous on the apex of the tylus, across the humeral area of the pronotum, and on the extreme apex of the scutellum. The clavus and corium are nearly uniformly testaceous. The membrane is uniformly translucent, sometimes slightly smoky gray, the veins relatively indistinct. The legs are entirely bright yellow; the antennae has the 1st segment and proximal portion of the 2nd yellowish, but becomes dark chocolate brown beyond this point; the labium extends onto the anterior portion of mesosternum; and the pubescence of the pronotum is rather prominent and more upstanding than in most members of the genus *Macropes*.

One of the Viet Nam specimens available for study is remarkable in that the left femur has only a single spine whereas the right femur has 2 rows of short but thick and acute spines as in all other members of the genus *Macropes*. Obviously the left femur is abnormal in this particular specimen, although it is as strongly incrassate as the right femur.

This is the only species of the *femorialis* group that exhibits strong wing brachyptery. Two of the specimens before us have the membrane extending only to the anterior margin of the 4th abdominal tergum. The clavus and corium, however, are not fused and are completely developed.

Subauratus was originally described and previously known only from Burma.

MATERIAL EXAMINED. Total of 7 specimens from the following localities: VIET NAM (S): 6 km SW of Dalat, 1550 m, 11. IX. 1960, J. L. Gressitt; same data but 12. IX. 1960, "on grasses"; 20 km N of Pleiku, 650 m, 9. V. 1960, S. Quate; Hoa Binh, A. de Cooman, MALAYA: Pa Hang, Mt. Brinchang, "on bamboo", L. W. Quate. INDIA: W. Almora, Kumson (H. G. L.). In BISHOP, BMNH and Slater coll'n.

Macropes femoralis Distant Fig. 11a, 12c.

Macropes femoralis Dist., 1918, *Fauna Brit. India, Rhynch.* ser. 7, 8: 186.

This species was originally described from South India. We have not seen material from the area covered by the present paper, but have examined 2 specimens from Sibolangit, Sumatra. Thus the species is likely to occur here, and we have placed it in the preceding key. It is very close to *pseudofemoralis* but has a very large, elongate, nearly parallel-sided pronotum with the pronotal humeral area proportionately broader (fig. 11a)

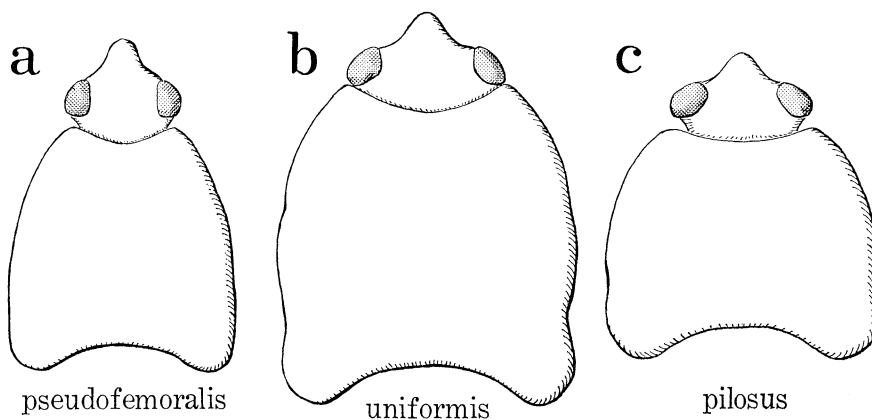


Fig. 10. Head and pronotum of the named species of *Macropes*.

Macropes harringtonae Slater, Ashlock and Wilcox, new species Fig. 11c, 12a, 12d.

Body slender, elongate, parallel-sided; head, pronotum, and scutellum black shining; pronotum posteriorly between humeri, apex of tylus, and scutellum bright reddish tan; clavus and corium unicolorous pale testaceous, membrane subhyaline; abdomen, acetabula, metathoracic scent gland auricle, legs, 1st 3 segments and basal 1/3 of antennal segment 4 dark red-brown; distal 2/3 of antennal segment 4 black; sparsely clothed with inconspicuous upright and semidecumbent sericeous hairs; head, pronotum, and scutellum punctate, more coarsely so in area of transverse impression, area of calli smooth, glabrous, and polished.

Head non-declivent, moderately convex across vertex, tylus reaching distal end of antennal segment 1, head length 0.49 mm, width 0.61 mm, interocular space 0.34 mm; pronotum elongate,

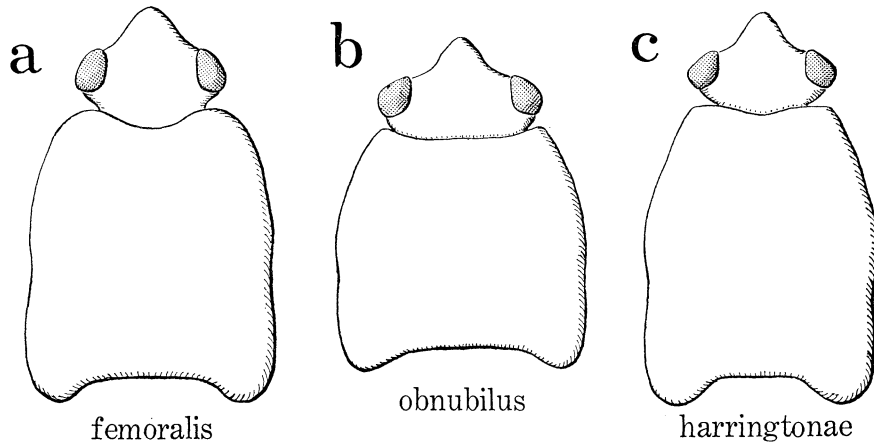


Fig. 11. Head and pronotum of the named species of *Macropes*.

slender, lateral margins straight from humeral angles to middle of calli, then evenly tapering to anterior margin, transverse impression set well behind middle of dorsal surface, broad and shallow, posterior margin evenly concave (fig. 11c), pronotal length 0.95 mm, width 0.84 mm; scutellum small with a narrow, shining median elevation, the lateral and basal areas broadly pruinose (fig. 12a), scutellar length 0.34 mm, width 0.42 mm; hemelytra slender, lateral corial margins straight, membrane extending posteriorly midway over abdominal tergum 7, distance apex clavus - apex corium 0.65 mm, distance apex corium - apex abdomen 1.29 mm; fore femora strongly incrassate, fore tibiae short and thickened, distally armed near apex with stout, sharp spines, length hind tibiae 0.68 mm; labium reaching anterior area of mesosternum, remote from mesocoxae, length labial segments I 0.30 mm, II 0.27 mm, III 0.27 mm, IV 0.27 mm; antennae short, segments 2 and 3 clavate, length antennal segments I 0.11 mm, II 0.27 mm, III 0.27 mm, IV 0.49 mm; total length 3.80 mm.

Holotype ♀ (CAS), China: Nanking, 4. V. 1923, E. C. Van Dyke. Paratypes: CHINA: 7 ♂♂, 2 ♀♀, same data as holotype; 1 ♂, 2 ♀♀, Chekiang, 9. IV. 1919, E. Suenson; 1 ♂, Mokansan, Chekiang Prov., 22. IX. 1927, Mrs Dora E. Wright; 1 ♂, 2 ♀♀, in quarantine from China at Berkeley, California, 24. IX. 1936, "from bamboo seeds", G. B. Laing; 1 ♂, Tamaon I. (Walker collection 92-196). TAIWAN: 2 ♂♂, 4 ♀♀, Keelung, 100 m, 4-8. X. 1957, T. C. Maa. In CAS, BISHOP, BMNH and Slater coll'n.

This is a very narrow, elongate, parallel-sided species. The pronotum appears completely straight from the humeral angles to the level of the calli (fig. 11c) in contrast to *femorialis*, where the lateral margins are sinuate and the pronotum somewhat broader (fig. 11a). The antennal proportions differ in the 2 species as indicated in the preceding key. In general body shape, *harringtonae* resembles *subauratus*, but is smaller with a relatively shorter pronotum (see key), and has dark red-brown rather than pale yellow legs.

M. harringtonae may also be separated from *femorialis* by the shape of the ♂ clasper. The claspers are very similar in the two species, and, as in most other *Macropes*, have the lateral knob located far from the base of the shaft. In *harringtonae* (fig. 12d), the juncture of the posterior knob with the distal portion of the shaft occurs at a very acute

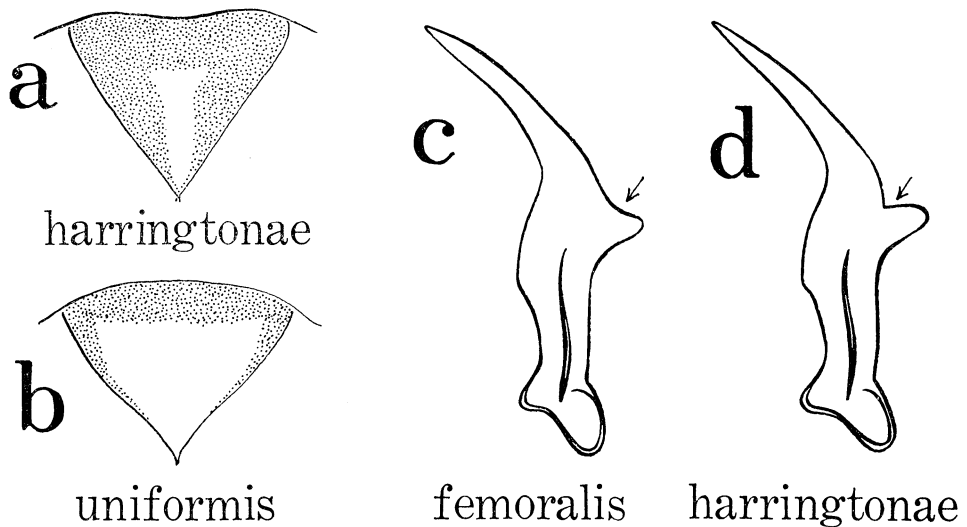


Fig. 12. Scutellum (a-b) and parameres (c-d) of the named species of *Macropes*.

right angle, whereas in *femoralis* (fig. 12c) this juncture is more rounded and shallow, and the 2 regions flow together in a gentle arc rather than at acute right angles.

This species has not yet been taken in Thailand or Indochina, but is included for the sake of completeness and to separate it from the several closely related species of the *femoralis* complex which are known from the area.

Nymphal skins associated with the specimens intercepted at Berkeley, California, have only small yellow evaporative plates around the abdominal scent gland openings, the 8th tergum completely dark sclerotized, the 7th tergum almost completely so with separated lateral plates and the anterior margin of the broad central plate incised laterally. The anterior margin of 7th tergum also has a narrow median strip that broadens into a pair of triangular spots at its lateral extremity. The 6th tergum bears a narrow transverse sclerotized bar mesally slightly posterior to the center of the segment. Ventrally the posterior segments are completely sclerotized, the sclerotized areas being reduced to progressively smaller median plates on sterna five and six.

This species is named for Mrs Jane Harrington for the assistance she has given in the preparation of the present manuscript and the analysis of the *femoralis* complex.

Macropes obnubilus (Distant) Fig. 9b, 11a.

Ischnodemus obnubilus Dist., 1883, *Trans. R. Ent. Soc. London*, p. 431.

Macropes hedini Lindberg, 1936, *Arkiv Zool.* 27: 24.

Macropes obnubilus: Slater & Miyamoto, 1963, *Mushi* 37 (14): 140. - Slater & Ahmad, 1967, *Acta Ent. Mus. Nat. Prague* 37: 259.

This species was originally described and previously known only from Japan. It is related to the *femoralis* complex, and while common in Japan, is apparently rare in Thailand and Indochina—we have seen only a single ♀ specimen. Unlike other members

of the complex, *obnubilus* has the apical angle of the corium darkened, and a peculiar "button-like" projection on the 3rd abdominal sternum of the ♂. Both of these features are lacking in the other members of the complex. The pronotum is very coarsely and closely punctate over the entire surface, and thus it has a much less polished appearance than do more typical members of the complex. The pronotum is shaped as in fig. 11b.

This species was collected breeding on a dwarf bamboo, *Arundinaria simoni* A. and C. Riviere, at Hikosan, Kyushu, Japan. Dr S. Asahina of Tokyo has informed us of some interesting features of this species. It feeds upon a commercial species of bamboo, and the feeding punctures become surrounded by dark rings. Because of the decorative effect produced, such bamboo commands a higher price than bamboo not so marked. This is the only known case of a member of the subfamily being economically beneficial. Dr. Asahina also states that he has heard *obnubilus* producing sounds. However, dissection of the material failed to locate any stridulatory apparatus. As previously noted, the species does possess a peculiar raised pale area on the male venter. It is difficult to see, however, how this structure can be in any way involved in the production of sound.

MATERIAL EXAMINED. VIET NAM (N.): 1 ♀, Tonkin, "*Trigonius* (sp.?) *tonkenensis*." From outside Thailand and Indochina: JAPAN: 1 ♀, no locality (Malaise); 6 ♂♂, 4 ♀♀, 44 nymphs, Kyushu, Hikosan, bamboo, 10. IX. 1966, P. D. Ashlock; 1 ♀, Mimasaka, VII. 1912, J. C. Thompson; 1 ♂, 1 ♀, Kobe, V. 1928, 4. V. 1928, D. T. Fullaway; 1 ♂, Shikoku, Taneriaki, Tosa, "*Th. heuru* (sp. ?) ded." 27. VII. 1897; 2 ♀♀, Chi ba Nihama, 25. VIII. 1952, P. W. Oman; 4 ♂♂, 2 ♀♀, Hakone, IV. 1895, Koebele; 1 ♂, 1 ♀, Wakasugi, Fukuoka, 19. X. 1954, T. Hidaka; 1 ♂, Inunaki, Fukuoka, 5. V. 1954, Hidaka; 1 ♀, Hikosan, Fukuoka, 9. V. 1957, Hidaka; 1 ♀, Tachibana, Fukuoka, 12. X. 1954, Hidaka; 1 ♂, Kobe, Baker; 1 ♂ Kyoto, 8. V. 1953, P. W. Oman; 1 ♀, Mt. Rokko, nr Kobe, 12. X. 1952, E. Nakanishi; 1 ♀, Jozankei, Sapporo, Hokkaido, 7. VIII. 1952. GUAM: 1 ♀, Pt. Oca, V. 1945, G. E. Bohart & J. L. Gressitt. BONIN IS.: 1 ♀, Chichi Jima, Miyanojima, "Jack Wm's beach," 12. V-9. VI. 1958, P. M. Snyder; 1 ♂, 1 ♀, Omura "camp beach," 5. V-9. VI. 1958, Snyder; 1 ♂, 1 ♀, same data, 2. IV. 1958. In BERLIN-HUMBOLDT, HELSINKI, STOCKHOLM, CAS, BISHOP, USNM, Scudder, Ashlock, and Slater coll'n.

5th instar nymph (alcohol): Head, pronotum, and scutellum very dark brown, becoming almost black on head, wing-pads dark brown but noticeably lighter than head and pronotum, abdomen almost uniformly light sordid yellow-brown, completely lacking red, white, and dark bands and stripes; sclerotized area about scent gland orifices light tan and of nearly equal width both anterior and posterior to the gland opening; abdominal tergum 7 with a transverse black band along anterior margin extending midway from meson to lateral margin and enlarged laterad to form a somewhat dumbbell-shaped marking; median sclerotized plate of tergum 7 broad and anteriorly convexly rounded, lateral plates well separated from mesal plate, elongately elliptical, segments 3-6 with a pair of blackish spots midway between meson and lateral margin, the usual additional row of spots near the lateral margin completely absent, segment 2 with a single spot in line with those on succeeding segments; sclerotized plates on abdominal sternum deeply sclerotized; plate on sternal segment 7 broadly, truncately in contact with anterior margin of plate on segment 6; prominently triangular; all leg and antennal segments very dark chocolate brown to nearly black with apices of femora and tarsal segment 1 conspicuously, contrastingly pale.

4th instar nymph: Colored as in 5th instar.

These nymphs of *obnubilus* from Hikosan, Japan, collected on bamboo, are very different from the nymphs of *Macropes raja* and *Macropes yoshimotoi*. They differ from *raja* in lacking the strongly sclerotized plate on the tergum of abdominal segment five and from *yoshimotoi* in having the abdomen uniformly yellowish brown in color rather than conspicuously striped with light yellow and red. It will be necessary to study nymphs of other species to ascertain whether or not these differences are characteristic of the complex to which *obnubilus* belongs.

The *Macropes spinimanus* complex

Macropes spinimanus Motschulsky Fig. 9c, 13.

Macropes spinimanus Mots., 1859, *Etud. Ent.* 8: 108.

Ischnodemus centralis Walker, 1872, *Cat. Hem. Het. B. M.* 5: 132.

Macropes singularis Distant, 1909, *Ann. Mag. Nat. Hist. ser. 8, 3*: 323-24. **New Synonymy.**

Body elongate, slender, parallel-sided; head and pronotum black, strongly shining, apex of tylus ochraceous, scutellum dull pruinose gray with median elevation black, shining; femora dark brown, becoming yellowish brown distally, tibiae and tarsi flavescent; antennal segments 1-3 pale yellow, 4 dark reddish brown to black; hemelytra strongly variegated, marked, with dark chocolate brown as follows: entire clavus, a broad quadrate transverse band entirely across hemelytra and embracing posterior 1/2 of corium and basal 1/3 of membrane beginning at line of apex of claval commissure and terminating at line of apex of corium, posterior 2/3 of membrane comprising a large ovoid spot over most of surface, not attaining membranal margins and very narrowly connected by a dark band to basal dark area; remainder of hemelytra pale flavescent; head and anterior pronotal collar finely punctate, a series of small punctures arranged along median line of anterior lobe, remainder of anterior lobe smooth, polished, glabrous, somewhat transversely striate laterad, area of transverse impression broadly marked with deep, anastomosing, rugose punctures, narrow posterior transverse area smooth or with fine striae; abdomen red-brown, with moderately thick decumbent sericeous hairs; remainder of body glabrous above with a very few scattered semi-decumbent hairs laterad.

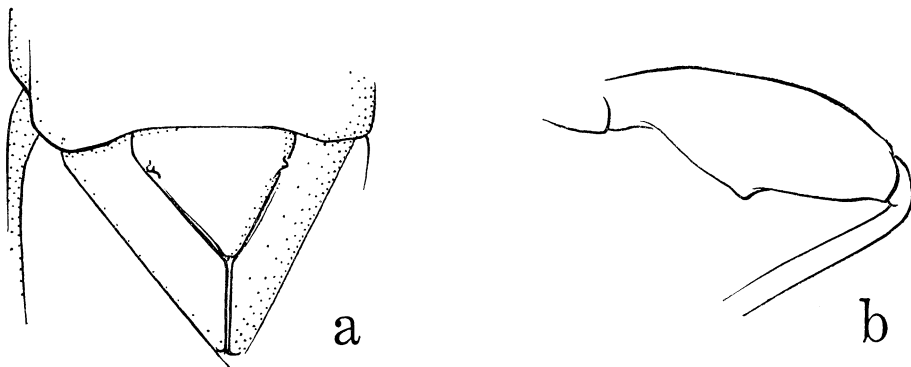


Fig. 13. *Macropes spinimanus* Motschulsky: a, scutellar area to show scutellar spines; b, hind femur.

Head non-declivent, slightly convex across vertex, eyes large, ovoid, set slightly away from anterolateral pronotal margins, head length 0.45 mm, width 0.57 mm, interocular space 0.32 mm; pronotum longer than wide, subrectangular, lateral margins sinuate, broader across area just posterior to calli than across humeral angles, transverse impression broad, shallow, complete, anterior lobe elongate, approximately 2× length of posterior lobe, median longitudinal impression on anterior lobe very faint, shallow, posterior margin shallowly and evenly concave, pronotal length 1.10 mm, width 0.87 mm; scutellum with prominent elevation on distal 2/3, anterolateral angles produced into small, shining, upward-tipped tubercles (fig. 13a), scutellar length 0.38 mm, width 0.38 mm; hemelytra with lateral margins nearly parallel, very little narrowed posteriorly, membrane evenly rounded, reaching anterior margin of abdominal tergum 7, distance apex clavus - apex corium 0.76 mm; distance apex corium - apex abdomen 1.60 mm; fore femora strongly incrassate, fore tibiae clavate, middle and hind femora mutic, hind femora with a swollen protrusion midway along ventral margin (fig. 13b); metathoracic scent gland auricle narrow, linear, curving slightly cephalad; labium reaching between fore coxae, segment I not surpassing base of head, length labial segments I 0.30 mm, II .21 mm, III 0.23 mm, IV 0.23 mm (?); antennal segments 2 and 3 very slightly clavate, 4 narrowly fusiform, length antennal segments I 0.12 mm, II 0.23 mm, III 0.27 mm, IV 0.53 mm; total length 4.52 mm.

MATERIAL EXAMINED. VIET NAM: 1 ♂, 15-35 km NW Phan Rang, 8-16. XI. 1960, C. M. Yoshimoto; 1 ♂, same data but 55 km NW; 1 ♂, Phang Rang (*sic*), 34 km N, 9. IX. 1960, Yoshimoto; 1 ♂, Pleiku, 700 m, 8-14. V. 1960. THAILAND: 1 ♂, Tang Keo, Chiangmai Prov., 10. VI. 1965, Ashlock; 1 ♀, Mae Klang, Chiangmai Prov., 11. VI. 1965, Ashlock; 1 ♀, Chachaingrao, 3. V. 1933, Pholboen. CAMBODIA: 1 ♀, Kiri Rom, 700 m, 31. III-1. VII. 1961, N. R. Spencer. In BISHOP, Ashlock, and Slater coll'n.

Material from Ceylon and India has also been examined.

We have examined one of the type specimens of *spinimanus* Motschulsky. In the Helsinki Museum collection is a specimen bearing the following labels: 1) "Type HL," 2) a yellow label "*Macropes spinimanus* Motsch. T. or Ceyl. Mt. N.E.," 3) a pink label "Syntype *Macropes spinimanus* Motsch." This third label was certainly added long after the other two. This specimen definitely appears to be a part of a syntype series, but is too damaged by dermestid beetles to serve as an effective lectotype. Only a lateral rim is left of the dorsal surface of the pronotum, and the hemelytra are completely absent. From the remaining parts, however, it is certain that this is the same species as *centralis* Walker, the type of which we have examined in the British Museum.

We have also examined the type of *Macropes singularis* Distant and believe that it represents the macropterous form of *spinimanus*; therefore, the two species are synonymized.

M. spinimanus belongs to the group of variegated species that contains *lacertosus* Bergroth, *simoni* Distant, *yoshimotoi* n. sp., and *varipennis* (Walker). The peculiar hind femora with a median ventral protrusion (fig. 13b) will separate *spinimanus* from any of the other species. The expression of this feature is, however, somewhat variable and reduced in very small specimens. There is some color variation in the study series: an occasional specimen has yellowish legs, a brown 3rd as well as 4th antennal segment, and variation in the extent of dark membranous and corial markings.

This is the smallest species of the complex and the only one showing such extreme brachyptery. In many specimens the corium is reduced and the membrane very small and lobate, reaching only onto the 3rd or 4th abdominal tergum.

In size and color, *spinimanus* closely resembles *lacertosus* and *simoni* from the Philippines. The latter two species, however, have shorter, broader, more auricular scent gland auricles than does *spinimanus*.

Males of *lacertosus* have a series of 4 to 6 short spines on the hind femora; 2 of 8 ♀♀ possess a short hind femoral spine, the others having this leg mutic. *Simoni* lacks hind femoral spines, possesses a longer labium that exceeds the posterior margin of the fore coxae, and has a completely dark brown clavus; whereas in *lacertosus* the distal 1/2 of the clavus is pale in contrast to the dark basal portion.

Actually, the *lacertosus* situation is a complex one. Specimens from Mt. Macquiling and Los Banos run considerably darker on the hemelytron than do specimens from Baguio and St. Thomas, and the males of the latter tend to have the pronotum more strongly swollen with a deeper transverse impression and median longitudinal groove.

Bergroth described *lacertosus* from specimens taken at Laguna, Los Banos, and Mt. Macquiling. We have before us specimens which certainly represent the type series from the last two localities. However, the only male is in poor condition, and we have taken the opportunity to designate a ♀ from "Mt. Makiling Luzon, Baker" as lectotype, to which an appropriate label is attached. Two females from the same locality and one male from Los Banos become paralectotypes.

Macropes yoshimotoi Slater, Ashlock and Wilcox, new species Fig. 4d.

Body elongate, slender; head and pronotum black, shining, polished, becoming reddish brown across humeral area and on apex of tylus; scutellum gray pruinose with narrow median elevated ridge shining red-brown; hemelytra variegated, marked with dark brown as follows: entire clavus except for a narrow yellow line along claval commissure, posterior 1/2 of corium caudad of end of claval commissure and a complete dark stripe along cubital vein, membrane between coria and on distal 1/2, these areas separated by a broad, pale, lunate vitta, veins completely dark brown, basal 1/2 of corium pale testaceous, somewhat suffused laterally and near extreme base; legs uniformly bright yellow; 1st 3 antennal segments light yellow, strongly contrasting with dark chocolate brown segment 4; a few short, scattered, inconspicuous hairs on head, hemelytra, and laterally on pronotum; punctate along anterior pronotal margin and on scutellum, with coarse punctures in area of transverse impression [of pronotum, anterior pronotal lobe smooth and polished.

Head small, non-declivent, eyes large, occupying most of lateral head surface, set slightly away from anterolateral pronotal angles, tylus attaining distal end of antennal segment 1, vertex very slightly convex, head length 0.57 mm, width 0.74 mm, interocular space 0.44 mm; pronotum with anterior lobe approximately 3× length of posterior lobe, convex, swollen, and elliptical, its maximum width greater than width across humeri, a prominent median punctate impression present, transverse impression broad, shallow, complete, posterior margin deeply concave, pronotal length 1.33 mm, width 1.29 mm; scutellum with a prominent, elevated, shining median ridge, anterolateral angles produced into small shining upward-pointing tubercles, scutellar length 0.53 mm, width 0.57 mm; hemelytra and abdomen elongate and slender, lateral margins sinuate, membrane extending over basal 1/3 of abdominal tergum 7, distance apex clavus-apex corium 1.22 mm, distance apex corium-apex abdomen 2.40 mm; metathoracic scent gland auricle flattened, elongate, sharply angled anteriorly on distal 1/3, apex bluntly rounded (fig. 4d); fore femora strongly incrassate, middle and hind femora mutic, hind tibiae with a row of short blunt tubercles along inner face; labium short, extending between but not beyond fore coxae, segment 1 not attaining base of head, length labial segments I 0.36 mm, II 0.32 mm, III 0.32 mm, IV 0.28 mm (?); antennae terete, segment 4 narrowly fusiform, right antenna oligomerous with

3 segments only, length antennal segments I 0.15 mm, II 0.38, III 0.42, IV 0.76 mm; total length 6.60 mm.

Holotype ♀ (BISHOP 8799), Vietnam(S) : Dailang, N of Nha Trang, 30.XI-5.XII.1960, C. M. Yoshimoto. Paratypes : Vietnam (S) : 3 ♀♀, same data as holotype ; 1 ♂, Mt. Lang Bian, 1500-2000 m, 19.V-8.VI.1961, N. R. Spencer. THAILAND : 1 ♀, Chiangmai, Ban-tin-doi, 350 m, 13. XI. 1957, J. L. Gressitt ; 1 ♀, Phrae, 7. VIII. 1938, S. Narkmani. Laos : 1 ♀, Muong Sing, NE Luang Prabang, 650 m, 6-10. VI. 1960, S. & L. Quate. In BISHOP, THAILAND and Slater coll'n.

Female specimens have a less elongate and less swollen anterior pronotal lobe with width across the calli about equal to that across the humeri. In some members of the type series the 3rd antennal segment is dark brown, there is a dark stripe on the proximal 1/2 of the corium along the radial vein, and the pale central membranous vitta is interrupted by dark markings that narrowly connect the basal and apical dark areas. Several of these specimens, including females from the type locality, have a more slender, less angulate scent gland auricle.

There is a single elongate female in the Bishop Museum (Viet Nam : Mt. Lang Bian, 1500-2000 m, 19. V-8. VI. 1961, N. R. Spencer) that appears to be conspecific but which has the clavus pale with only the post cubital vein darkened, the dark distal portion of the corium reduced and remote from the level of the apex of the claval commissure, the fore femora darkened on the proximal 2/3, the posterior pronotal margins more acutely concave, and the shining median area of the scutellum more extensively developed.

M. yoshimotoi is very closely related to *spinimanus* but is a much larger species. Males differ in lacking the swollen protrusion midway along the ventral margin of the hind femur, and in the possession of a prominent row of tubercles on the inner face of the hind tibiae. Females of the two species are very similar but can usually be distinguished by size difference and by the bright yellow legs in *yoshimotoi*; in *spinimanus* the legs are usually chocolate to reddish or yellowish brown. The scent gland auricle in *spinimanus* is usually straight and strap-like rather than curved anteriorly (fig. 4d), although this is somewhat variable in both species.

This species is named for the collector of the majority of the type series, C. M. Yoshimoto.

5th instar nymph (pinned): Head and anterior pronotal lobe dark red-brown, posterior lobe, scutellum and basal 2/3 of mesothoracic wing-pads bright yellow, wing-pads posteriorly becoming dark suffused brown, abdomen variegated, anterior 1/2 of segments 1-5 bright yellow, posterior 1/2 of these segments a strongly contrasting red, ground color of segment 6 completely bright red; sclerotized evaporative area about abdominal scent glands large and ovoid, that on gland opening between terga 5 and 6 nearly 2 × the size of that between 4 and 5; sclerotized plate present mesally along posterior margin of tergum 6 very elongate, elliptical, narrow, sclerotized plate on segment 7 broadly reaching anterior margin over most of segment, lateral plates nearly attaining anterior margins, large and broadly elliptical; sternal plates rather conventional, that on sternum 6 evenly and narrowly tapering from caudolateral margin to anterior end of segment; legs with proximal 4/5 of femora very dark brown, nearly black, apices of all femora whitish-yellow, tibiae and tarsi pale sordid yellow; antennal segments 1 and 2 white, the base of segment 1 slightly suffused with darker coloration, segment 3 brown, segment 4 very dark brown to nearly black, the light coloration of segments 1 and 2 strongly contrasting with that

of distal segments; mesothoracic wing-pads elongate, slender, little convex laterally, reaching onto anterior portion of abdominal tergum 3, nearly parallel sided and non-divergent.

MATERIAL EXAMINED. VIET NAM: 1 nymph, Mt. Lang Bian, 1500-2000 m, 19.V-7.VI. 1961, N. R. Spencer.

The nymph of *yoshimotoi* completely lacks the large median sclerotized plate on the 5th abdominal tergum that is characteristic of *Macropes raja*, and is a more conventional looking species. It is readily distinguishable from *raja* by its strongly banded abdominal pattern. It will be interesting to know if the differences between these nymphs are characteristic of the different species complexes to which *yoshimotoi* and *raja* belong.

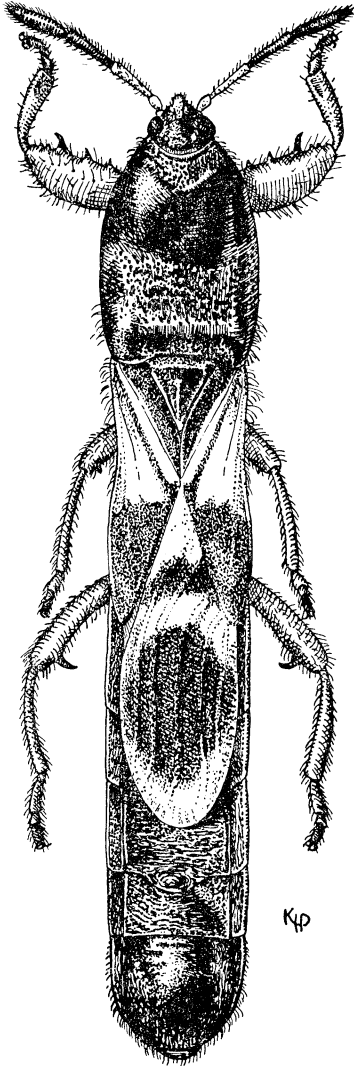


Fig. 14. *Macropes varipennis*
Distant, dorsal view.

Macropes varipennis (Walker) Fig. 9d, 14, 15a-c.

Ischnodemus varipennis Walker, 1872, *Cat. Hem. Het. B. M.* 5: 131.

Macropes varipennis: Distant, 1901, *Ann. Mag. Nat. Hist.* ser. 7, 8: 466.

This is a striking elongate species known at present only from Thailand and Indochina. *Varipennis* shows pronounced sexual dimorphism in the fore femora, males being provided ventrally on both posterior and anterior surfaces with a formidable array of strong elongate spines (fig. 15b). Females, while possessing spinose, incassate fore femora, have the number and size of the spines considerably reduced (fig. 15c). The posterior femoral margin possesses only 3 spines, all located on the distal 1/3. The ♀ anterior face possesses a heavy, bifid spine, surprisingly similar to and in an obvious convergent condition with *Patritodemus* n. sp. Slater & Ahmad (in press), and species of *Aradademus* from Madagascar.

Varipennis is also unique in possessing well-developed scutellar "spines," the anterolateral angles projecting upward and anteriorly. Only one other species in the complex (*spinimanus*) has such a scutellar modification.

Perhaps the greatest importance of *varipennis* is the strong likelihood of its representing a transitional form between *Macropes* species on the one hand and *Pirkimerus* and *Spalacocoris* on the other. The multispinose fore femora, conventional hemelytra, lacinate ovipositor, "hooked" claspers (fig. 9b), small ocelli, somewhat generalized scent gland auricle, and posteriorly placed transverse pronotal impression all re-

late *varipennis* to the *Macropes spinimanus* complex. There are a number of features, however, that suggest that *varipennis* may represent the prototype or something similar to the prototype from which *Pirkimerus* evolved. The body shape of *varipennis* is elongate and approaches the distinctive cylindrical habitus of *Pirkimerus* and *Spalacocoris*. The labium is very short, thick, and heavy—indeed, very similar to the *Pirkimerus* type. The hind femora (fig. 15a) possess spines ventrally as do most *Pirkimerus*. The scent gland auricle, although somewhat elongate, is shortened and it would not take much modification to produce the oval auricle of *Pirkimerus*. Most of these resemblances could be convergence phenomena, it is true, and until much more is known about the bionomics of these insects, the problem cannot be resolved. It seems most productive for future evaluation to consider *Macropes* as a central group in the Orient with *varipennis* representing a line leading to *Pirkimerus* and *Spalacocoris*, and the *raja* complex leading to *Chelochirus*.

The present short series is quite constant in coloration. The 3rd segment of the antennae is pale in some specimens, but usually the 1st 2 segments are pale and contrast strikingly with the usually black 3rd and 4th segments. The spines of the fore femora are quite constant except for the sexual dimorphism, but the spines on the other femora are somewhat variable. Occasionally, the large spine that is usually present distally on the hind femora is absent (in 1 specimen present on 1 side, absent on the other). One ♂ from Thailand has a large bifid spine on 1 hind femora (other leg missing). The spines on the middle femora vary from 1 to 3.

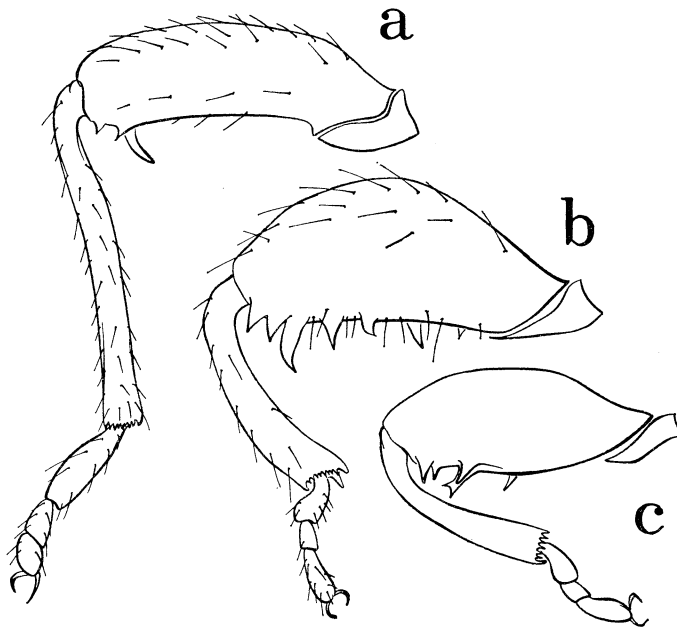


Fig. 15. *Macropes varipennis* (Walker): a, ♂ hind leg, anterior view; b, ♂ fore leg, posterior view; c, ♀ fore leg, posterior view.

The ♂ and ♀ from Hué run considerably smaller than the remainder of the series, but do not differ structurally from the larger individuals.

MATERIAL EXAMINED. VIET NAM: 1 ♂, 30 km NE of Dilinh, 27. IV. 1960, L. W. & S. Quate; 1 nymph, Dalat, 6 km S, 1400–1500 m, 9. VI–7. VII. 1961, N. R. Spencer; 2 ♂♂, 3

nymphs, Tonkin, Cho-Gahn, L. Duport; 1 ♂, 1 ♀, Hué; 1 ♂, teneral, Annam, Phuc-son, XI-XII, H. Fruhstorfer; 1 ♀, "Annam, Laos." THAILAND: 1 ♀, Chiang Dao, Chiangmai Prov., 15. VI. 1965, P. D. Ashlock; 1 ♂, Mae Sa, Chiangmai Prov., 16. VI. 1965; 1 ♂, 1 ♀, Chan Thaburi, 1. III. 1938, P. Pholboen; 1 ♂, Chan Thaburi, 23. VII. 1936, P. Penchit, LAOS: 1 ♂, Muong Sing, NW of Luang Prabang, 650 m, 6-10. VI. 1960, L. W. Quate. 1 ♂, no locality. In BISHOP, PARIS, THAILAND, HELSINKI, and Slater coll'n.

Genus *Rhabdomorphus* Bergroth

This small genus of very elongate, slender, parallel-sided blissines with a shining dorsal surface and multispinose fore femora is closely related to *Macropes*, in fact, perhaps as closely as some complexes of *Macropes* species are related to one another. Until the *Macropes* situation is clarified, we prefer to retain *Rhabdomorphus* as a distinct genus.

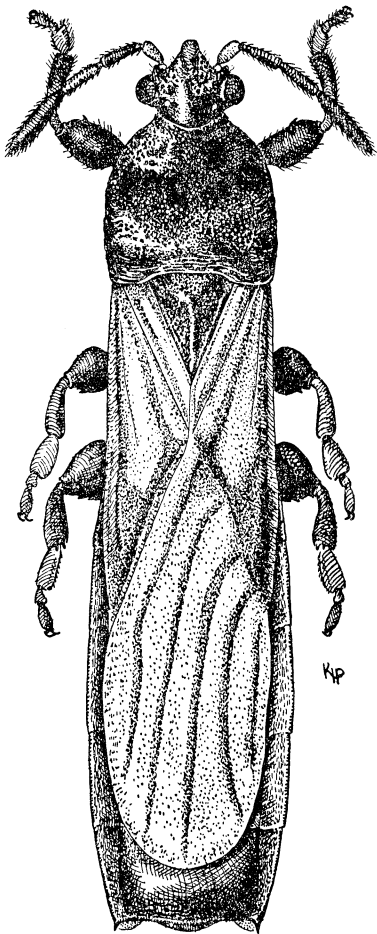


Fig. 16. *Extaramorphus magnatar-sus*, n. g., n. sp., dorsal view.

Rhabdomorphus australis (Distant)

Ischnodemus australis Dist., 1901, *Ann. Mag. Nat. Hist. ser.* 7, 8: 468.

Rhabdomorphus longurio Bergroth, 1918, *Phil. J. Sci.* 13, (2) D: 69.

Rhabdomorphus australis; Slater & Ahmad, 1964, *Proc. R. Soc. Queensland* 75 (3): 20-24.

This species has previously been reported from Australia, the Philippines, Malaya, and Taiwan, and is here reported from Viet Nam for the first time. We have also examined material from New Guinea and Flores Island.

MATERIAL EXAMINED. VIET NAM: 1 ♀, 6 km S of Dalat, 1400-1500 m, 9. VI-7. VII. 1961, N. R. Spencer; 1 ♀, 15 km NE of Dalat, 1850 m, 5. V. 1960, L. W. Quate. In BISHOP and Slater coll'n.

Genus *Extaramorphus* Slater, Ashlock and Wilcox, new genus Fig. 16, 17.

Elongate, linear, extremely flattened dorso-ventrally; fore coxal cavities closed; apical corial margin straight; fore femora strongly incrassate and multispinose below, hind leg unique, the femur enlarged, with a series of sub-basal spines below, large ventral median spines, and a few minute distal spines, hind tibia extremely short and stout, scarcely longer than the greatly swollen and enlarged tarsal segment 1 (fig. 17a); head, pronotum, and scutellum completely black, shining, no dull pruinose areas present; corium and membrane strongly differentiated in texture, the latter with 5 veins arising from apical corial margin and running parallel to one another for entire length; eyes slightly produced laterally, ocelli small and incon-

spicuous; antenniferous tubercles produced bluntly anterolaterally; bucculae very small and lobate; metathoracic scent gland auricle strongly bent anteriorly and "L" shaped; abdomen linear, apically truncate, connexiva 7 posteriorly produced into blunt points with additional sharp tooth-like spines dorsally along posterior margin (fig. 16, 17b); clasper with outer "knob" placed far distant from base as in *Rhabdomorphus* and *Macropes* (fig. 9, 17e-f); sperm reservoir possessing a dorsal sclerotized plate and a pair of prominent "wing-like" projections (fig. 17c-d).

Type species: Extaramorphus magnatarsus n. sp.

This remarkable genus differs strikingly from most other blissine genera. *Extaramorphus* is most closely related to *Rhabdomorphus* Bergroth, which in turn shows close relationship to *Macropes* (see Slater and Ahmad 1964). *Extaramorphus* and *Rhabdomorphus* possess the same elongate, parallel-sided body with five parallel veins in the membrane, the shining head and pronotum, multispined fore femora, closed fore coxal cavities, straight apical corial margin, and terete antennae. Most of these characters are, of course, found in other taxa of Blissinae. However, *Extaramorphus* also agrees with *Rhabdomorphus* in having claspers with the "outer knob" placed far from the base (fig. 17e, f) and similar sperm reservoirs with a dorsal sclerotized plate and a pair of sclerotized wing-like projections (fig. 17c, d). Furthermore, and of considerable significance, there are sharp spines and projections on the truncated terminal segments of nymphs of *Rhabdomorphus* (although not in the adults) and on the adults of *Extaramorphus* (nymphs unknown). This indicates to us a close evolutionary relationship between *Extaramorphus* and *Rhabdomorphus*. Nevertheless, the differences between the two taxa preclude their being put in a single genus. *Extaramorphus* can readily be distinguished from *Rhabdomorphus* by the spines and projections on the 7th abdominal segment, the extremely short broadened tibiae, enlarged 1st tarsal segment, incrassate and spined middle and hind femora, angulate rather than straight scent gland auricle, tumidly produced mesosterna laterally, and the much more strongly flattened body and laterally produced eyes.

***Extaramorphus magnatarsus* Slater, Ashlock and Wilcox, new species** Fig. 16, 17.

Head, pronotum, thoracic pleura and sterna and scutellum black, shining, becoming bright tan to red-brown on apex of tylus, humeral angles, and median scutellar carina; hemelytra dull white, becoming yellowish to light brown on claval and corial veins, with apical corial margins, apical triangle, and veins of membrane dark chocolate brown; abdomen bright red-brown with a tiny black spot at caudolateral angle of each abdominal tergum; antennae black, basal segment dark brown; legs bright red-brown to castaneous, coxae and tarsi becoming testaceous; dorsal surface bearing irregular, often obscure, rugulose, little-separated punctures; clothed especially on pronotum and scutellum with inconspicuous decumbent sericeous hairs.

Head broad, nearly flat, non-declivent, tylus extending anteriorly onto distal 1/2 of antennal segment 1, eyes large, rounded, set on very short, broad, lateral head extensions, ocelli large and prominent, head length 0.65 mm, width 0.84 mm, interocular space 0.53 mm, pronotum very slightly and evenly convex, transverse impression obsolete, humeri not prominent, broadest just anterior to transverse impression giving quadrate appearance to pronotum, posterior margin shallowly concave, pronotal length 1.10 mm, width 1.18 mm; scutellum elongate, strongly tapering with a very prominent median carina on distal 1/2, basal 1/2 evenly convex but lacking a definite sub-basal transverse ridge, scutellar length 0.80 mm, width 0.61 mm; hemelytra elongate, parallel-sided, membrane extending midway onto abdominal tergum 7, corium with very prominent, raised, shining radial vein extending from base to apical corial margin, distance apex

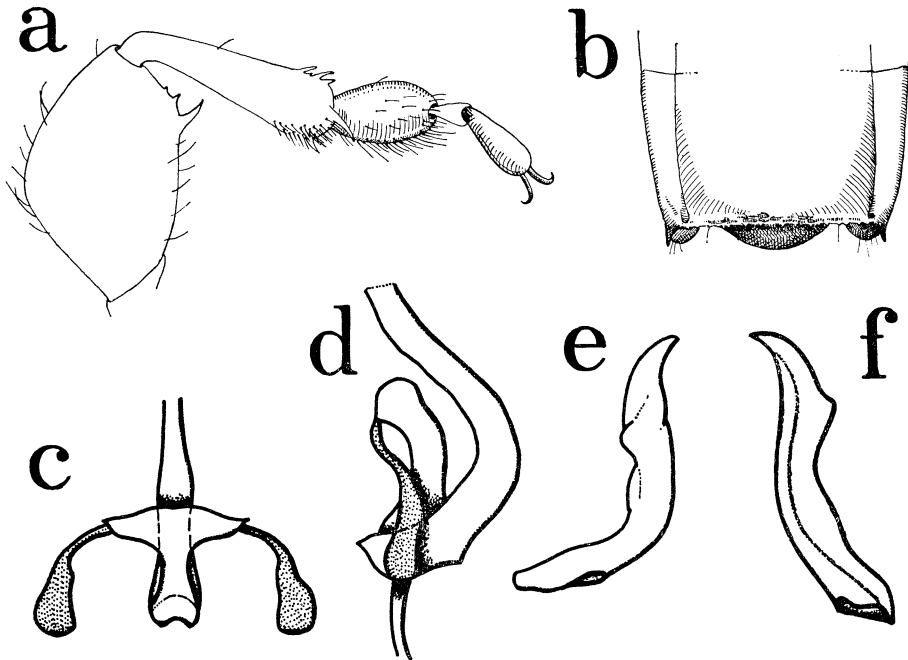


Fig. 17. *Extaramorphus magnatarsus*, n. g., n. sp. a, hind leg; b, apex of abdomen, dorsal view; c, sperm reservoir, dorsal view; d, sperm reservoir, side view; e, paramere, posterior or outer view; f, paramere, anterior or inner view.

clavus-apex corium 1.33 mm, distance apex corium-apex abdomen 1.79 mm; abdomen slender, parallel-sided, sharply truncate at apex, sternum 7 terminating laterally on either side of genital capsule in a thick blunt projection, an acute spine present along posterior margin of sternum 7 midway between meson and lateral projection (fig. 17b); metathoracic scent gland auricle elongate, reaching almost to lateral margin and sharply angled anteriorly to form an "L"-shaped structure; mesosternum not furrowed but strongly, tumidly swollen laterally; labium attaining or almost attaining base of prosternum, considerably exceeding fore coxae, length labial segments I 0.42 mm, II 0.46 mm, III 0.49? mm, IV 0.23 mm; all femora strongly incrassate, armed below with a series of sharp spines, tibiae extremely short, thick and heavy, at most only slightly longer than tarsal segment 1, the latter much enlarged, flattened and densely clothed with a thick mat of hairs below (fig. 17a), middle and hind legs nearly as thickened and shortened as fore legs; antennae conventionally terete, segment 4 very narrowly fusiform, length antennal segments I 0.19 mm, II 0.38 mm, III 0.42 mm, IV 0.65 mm; claspers and sperm reservoir as in fig. 17c-f; total length 6.96 mm.

Holotype ♂ (BISHOP 8800), Viet Nam: 20 km S of Dalat, 1300 m, 12. IX. 1960, J. L. Gressitt.

Genus *Bochrus* Stål

This is a genus of very large and greatly flattened blissines with the fore femora slender and the hind femora enlarged and multispinose. The male hind femur is much

more incrassate than that of the female. The habitus resembles that of *Riggiella* Kormilev, a Neotropical genus, and *Ramadademus* Slater from Madagascar. Only two species are currently recognized, both restricted in distribution to the Oriental Region.

***Bochrus foveatus* Distant** Fig. 18.

Bochrus foveatus Dist., 1879, *Ann. Mag. Nat. Hist.* ser. 5, 3: 131.

Bochrus hoabinhensis Dist., 1918, *Entomologist* 51: 241.

Bochrus tonkinensis Dist., 1918, *Entomologist* 51: 242.

This species was previously known from India, Assam, Burma, and Viet Nam. The types of *hoabinhensis* and *tonkinensis* were taken at Hoa-Binh in January, 1917, by R. V. Salvaza, and are in the British Museum (Natural History).

MATERIAL EXAMINED. LAOS: 1 ♂, Wapikhamthong Prov., Khong Sedone, 17. VII. 1965, native collector. (In BISHOP).

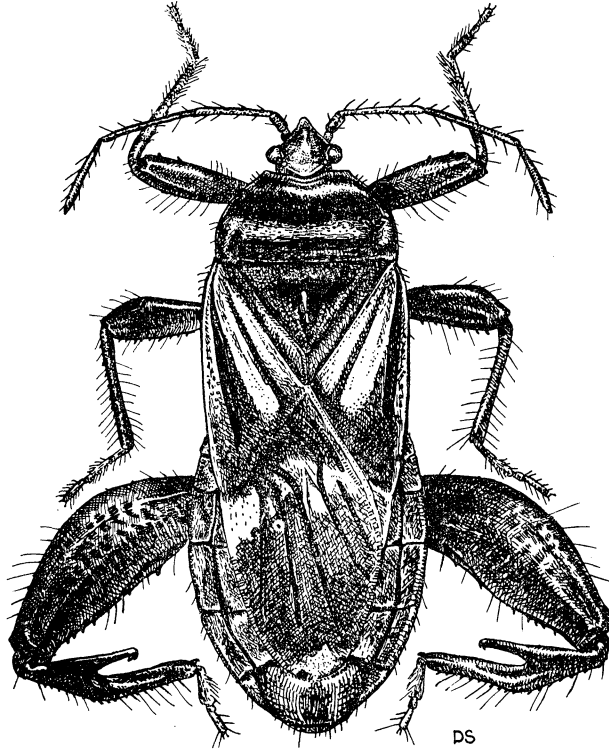


Fig. 18. *Bochrus foveatus* Distant, ♂ dorsal view.

Genus ***Pirkimerus*** Distant

This small genus is nearly restricted to the Oriental Region, where it is widespread. The species are generally subcylindrical, medium-sized to very minute insects with unique

ovoid scent gland auricles, spinose hind femora, very large ocelli, unitextured hemelytra and, in many species, sexually dimorphic eyes.

KEY TO THE THAILAND AND INDOCHINA SPECIES OF *PIRKIMERUS*

1. Corium dull over entire surface, lacking a polished longitudinal stripe laterally; hind tibiae elongate and slender, at most armed with a few tiny, inconspicuous tubercles; eyes not dimorphic **japonicus** (Hidaka)
 Corium laterally with a narrow glabrous longitudinal stripe at least on basal 1/2; hind tibiae short and thickened, bearing numerous series of prominent spines and tubercles; eyes strongly dimorphic 2
2. Length of antennal segment 2 appreciably less than interocular distance; length not exceeding 5.5 mm **ocellatus** Slater & Ahmad
 Length of antennal segment 2 subequal to or greater than interocular distance; size larger, exceeding 6.5 mm **sesquipedalis** Distant

Pirkimerus ocellatus Slater and Ahmad

Pirkimerus ocellatus Slater & Ahmad, 1965, *Trans. R. Ent. Soc. London* **117** (10): 317.

This species was originally described from a single ♀ from "Tonkin: Reg. de Hoa-binh" in the Paris Museum. We have examined a single ♂ in the British Museum from "Siam (W. R. S. Ladell)" without additional locality data, which we take to be the hitherto unknown ♂ of *ocellatus*. It is slightly under 5 mm in length, and has much smaller eyes than the ♀ holotype, as is usual in most species of *Pirkimerus*.

Pirkimerus japonicus (Hidaka)

Ischnomorphus japonicus Hidaka, 1961, *Kontyû* **29**: 256.

Pirkimerus japonicus: Slater & Ahmad, 1965, *Trans. R. Ent. Soc. London* **117** (10): 324.—Slater, 1968, *Pacif. Ins.* **10** (2): 277.

Pirkimerus davidi Slater & Ahmad, 1965, *Trans. R. Ent. Soc. London* **117** (10): 324.

This species is reported by Slater & Ahmad (1965) in SE Asia from "Tonkin: Reg. de Hoa Binh." It also is known from China and Japan. Apparently, it feeds on bamboo.

Pirkimerus sesquipedalis Distant Fig. 19.

Pirkimerus sesquipedalis Dist., 1904, *Fauna Brit. India, Rhynch.* **2**: 22.

Originally described from Burma, this species has also been reported from Borneo and India.

MATERIAL EXAMINED. THAILAND: 8 ♀♀, Kanohanaburi, 31. V. 1962, P. Pholboen; same data but, Ch, Rasapon; same data but, A, Samvuatkit. In THAILAND and Slater coll'n.

Genus ***Spalacocoris*** Stål

This is a small genus of bizarre, large-sized Blissinae which are very distinctive in possessing a nearly cylindrical body, very large ocelli, fossorial fore legs, and a shining lateral lobe on the corium. The genus is found in Indonesia, the Philippines, and continental SE Asia.

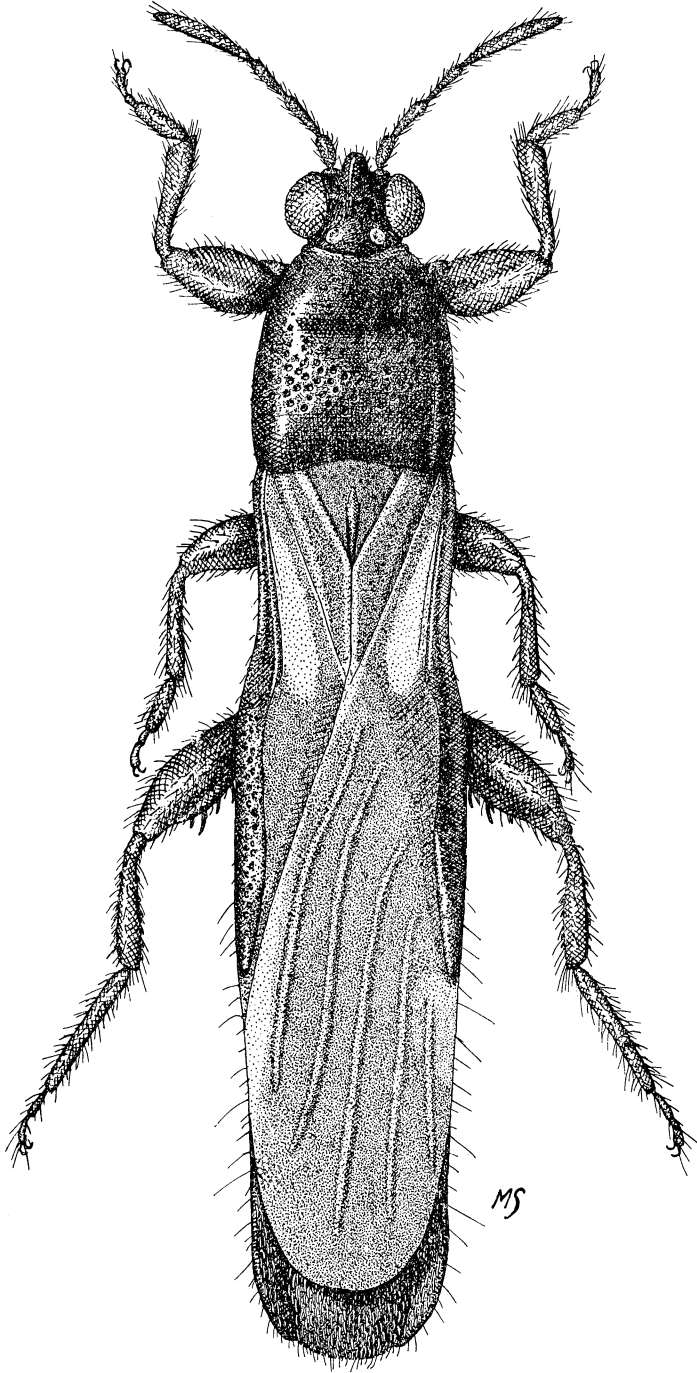


Fig. 19. *Pirkimerus sesquipedalis* Distant, ♀ dorsal view.

Spalacocoris sulcatus (Walker)

Ischnodemus sulcatus Walker, 1872, *Cat. Hem. Het. B. M.* 5: 133.

Spalacocoris sulcatus: Distant, 1901, *Ann. Mag. Nat. Hist. ser. 7*, 8: 466.

This species was reported from Fyan and Dilinh (Djiring), Viet Nam, by Slater & Ahmad (1964). It is also known from Java and Borneo.

MATERIAL EXAMINED. THAILAND (S): 1 ♂, Banna, Chawang nr Nabon, 70 m, 5.IX. 1958, J.L. Gressitt. VIET NAM: 1 ♂, Fyan, 900-1,000 m, 11.VII-9. VIII. 1961, N. R. Spencer. In BISHOP.

Genus **Iphicrates** Distant

This is a very distinctive genus in the blissine fauna, most readily recognized by the produced ♂ bucculae and frequently acute, elevated juga, but also recognizable by the hooked antenniferous tubercles, lack of a transverse pronotal impression, peculiar dull subgranulose dorsal surface and frequently spinose femora. The genus ranges through much of the Oriental Region north into Japan, and is very diversely represented in New Guinea, the Solomons, and adjacent regions.

Iphicrates malayensis Slater

Iphicrates malayensis Slater, 1961, *Pacif. Ins.* 3: 512-13.

This species was described from Malaya and Sumatra, and we have subsequently seen material from Sabah (North Borneo) and the Philippines. It is included in the present work on the basis of a ♀ and a single "submale" (see Slater 1961) very similar to the specimen described in the original discussion of this species.

MATERIAL EXAMINED. VIET NAM: 1 ♂, Kontum, N of Pleiku, 550 m, 13.V. 1960, L. W. Quate. THAILAND: 1 ♀, Nakhon Nayok Prov., Khao Yai Nat. Park, 6.VI. 1965, K. Morimoto. In BISHOP.

Genus **Cavelerius** Distant

A small genus confined to the Oriental Region, where it is widely distributed, *Cavelerius* is readily recognized by the dark shining anterior 1/2 of the pronotum, which contrasts strongly with the dull pruinose posterior 1/2, by the mutic fore femora, and closed fore coxal cavities. Some of these species are important pests of sugar cane in Formosa, Japan, and India.

Cavelerius minor Slater and Miyamoto

Cavelerius minor Sl. & Mym., 1963, *Mushi* 37 (14): 151.

MATERIAL EXAMINED. THAILAND: 3 ♂♂, 7 ♀♀, Chiangmai Prov., Doi Pui, 1685 m, 17. VI. 1965, P. D. Ashlock; 1 ♀, Doi Suthep, Chiangmai Prov., 1300 m, VI. 1965, Ashlock. In BISHOP and Slater coll'n.

Cavelerius illustris Distant Fig. 20

Cavelerius illustris Dist., 1903, *Ann. Soc. Ent. Belg.* 47: 44.

This, the type species of *Cavelerius*, was originally described from Burma and has subsequently been reported from Malaya. *C. illustris* is readily separable by the strongly produced caudolateral pronotal lobes (somewhat variable, see Slater & Miyamoto 1963 : 146-47), dark 2nd antennal segment, non-tapering hemelytral membrane, and the usually yellow-orange femora.

C. illustris has previously been known only in the macropterous condition. The present series from Thailand is of particular interest and importance, for not only is the brachypterous form strongly represented but some clues to its food habits and interspecific relationships are now available. Ashlock took both *C. illustris* and *C. minor* together at Doi Pui and Doi Suthep in Chiangmai Province, Thailand. All ♀♀ of *illustris* were brachypterous (41), all ♂♂ macropterous (6). In 10 specimens of *minor* taken sympatrically all (7 ♀♀, 3 ♂♂) were macropterous. It was not realized when the series was collected that 2 species were involved. It is probable, however, that *minor* and *illustris* were collected on different grass hosts at Doi Pui. Ashlock is aware of the fact that on one group of grass plants he was taking only long-winged forms and on another obtaining mostly short-winged forms with an occasional macropter. Unfortunately, the series were not kept separate so there is no way of knowing whether all of the macropters taken with the short-winged forms were *illustris*. However, this is very likely the case. It appears that while *minor* and *illustris* are certainly sympatric, they probably are ecologically isolated on different host plants.

In habitus, brachypterous specimens of *illustris* resemble *mishmiensis* Slater & Miyamoto, the only other member of the genus that has a strongly brachypterous development of the forewing.

MATERIAL EXAMINED. THAILAND : 6 ♂♂, 26 ♀♀, Chiangmai Prov., Doi Pui, 1685 m, 17. VI. 1965, P. D. Ashlock ; 1 ♂, same data but 2. IV. 1958, T. C. Maa ; 13 ♀♀, Doi Suthep, Chiangmai Prov., 1300 m, VI. 1965, Ashlock ; 1 ♀, Nakorn Savan, 16. IV. 1966, J. H. Sedlacek. In BISHOP and Slater coll'n.

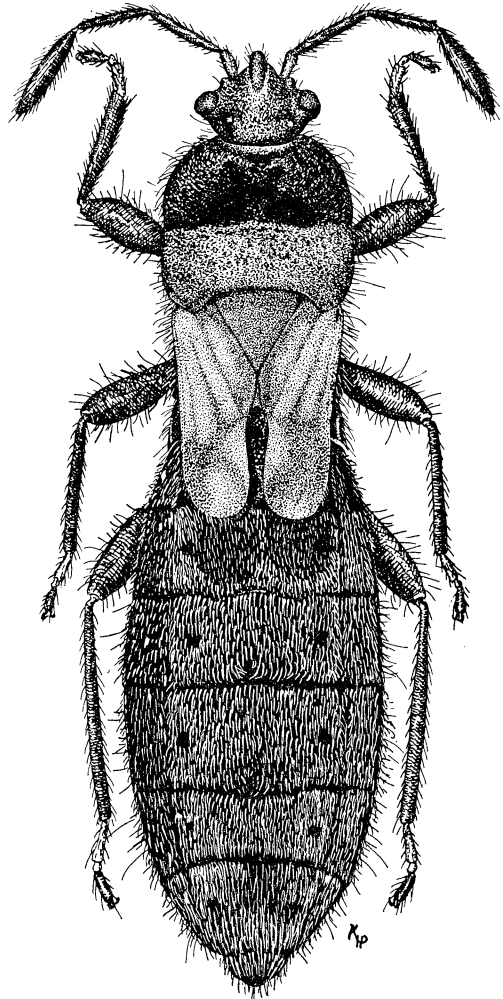


Fig. 20. *Cavelerius illustris* Distant, dorsal view, brachypterous adult.

Genus *Ischnodemus* Fieber

This genus is very large, diverse, and widely distributed. It is represented by a number of species-groups in Africa with extensions into the Palearctic and is also very diverse in the Neotropical and Nearctic regions. As noted in the introductory discussion, *Ischnodemus* is surprisingly poorly represented in the Oriental fauna. Of the six species here placed in *Ischnodemus*, only 1 is a typical member of the genus in a restricted sense. This species, *noctulus*, also occurs in Africa and has presumably spread to the Orient from an Ethiopian center. The other 5 species are here placed in *Ischnodemus* for the time being, although they differ greatly from the type species and from most other representatives of this genus. We have adopted this course because the generic limits of *Ischnodemus* are still poorly understood, and we prefer not to erect a distinct genus for these species until a more comprehensive study of the world fauna, at present underway, has been completed. It should be understood, however, that these species are so distinct from the more typical members of *Ischnodemus* that they will probably merit a distinct generic entity when the systematic relationships of the great complex are more completely understood.

KEY TO THAILAND AND INDOCHINA SPECIES OF ISCHNODEMUS

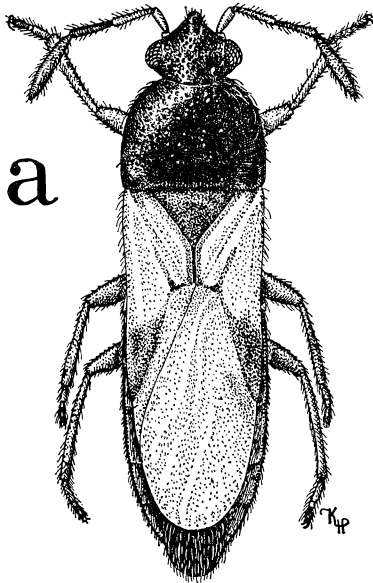
1. Head and pronotum completely dull pruinose **noctulus** Distant
Head and pronotum completely shining above 2
2. Fore femora with a bifid spine below on distal 1/3 **sinuatus** n. sp.
Fore femora mutic 3
3. Head black, strongly contrasting with bright tan pronotum **nigrocephalus** n. sp.
Head and at least anterior pronotal lobe uniformly black 4
4. Membrane almost completely dark smoky, antennal segment 2 black; labial segment 1 attaining base of head **fumidus** n. sp.
Membrane except veins completely white or hyaline; labial segment 1 remote from base of head 5
5. Corium with large, dark, apical black patches present; pronotum uniformly black; membrane opaque white with veins brown; very small species, not exceeding 3.5 mm **ambiguus** n. sp.
Corium uniformly pale tan throughout, lacking a dark apical area; pronotum broadly yellow-orange across humeri; membrane completely hyaline, veins not darkened; larger species, 4.5 mm **thoracicus** (Distant)

Ischnodemus ambiguus Slater, Ashlock and Wilcox, new species

Fig. 21a.

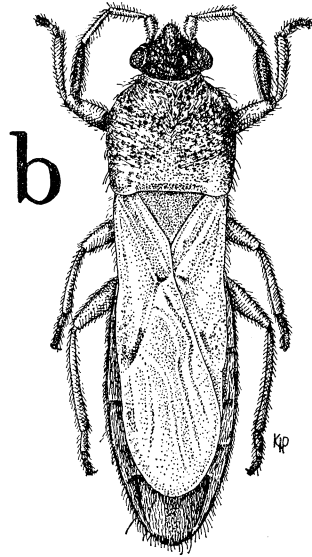
Small, linear, moderately robust; head, pronotum, scutellum, a large triangular area at apex of corium, and antennal segments 3 and 4 black; head and pronotum above completely shining; scutellum, head, and entire pleural and sternal areas of thorax dull gray pruinose; hemelytra white, infuscated with sordid brown on basal 1/3 of clavus, along entire apical corial margins, apex of corium as mentioned above, and veins of membrane; legs and antennal segments 1 and 2 uniformly pale testaceous; abdomen black mesally, becoming bright tan along lateral margin of connexivum; head, pronotum, and scutellum bearing prominent shallow distinctly separated punctures; clothed with numerous upright to semi-upright sericeous hairs.

Head non-declivent, moderately acuminate, tylus attaining distal 1/3 of antennal segment 1, moderately convex across vertex, eyes large, set slightly away from anterolateral pronotal angles,



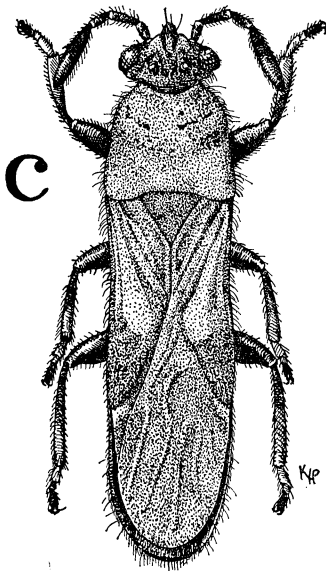
a

ambiguus



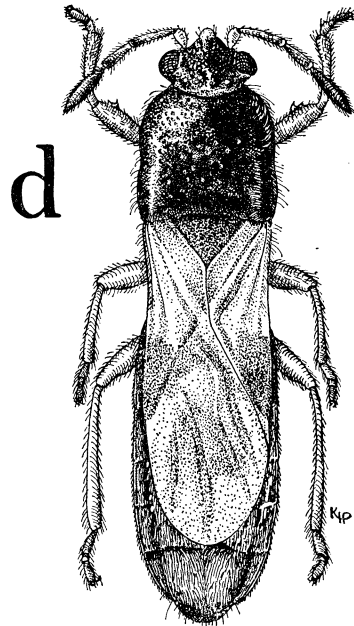
b

nigrocephalus



c

noctulus



d

sinuatus

Fig. 21. *Ischnodemus*, dorsal views of named species.

not produced laterally, head length 0.38 mm, width 0.55 mm, interocular space 0.34 mm; pronotum flattened dorsally, transverse impression complete but very shallow, lateral margins straight from humeral angles to calli, then strongly and evenly curving anteromesad, posterior margin straight before scutellum with small, posteriorly directed lobes laterad, pronotal length 0.63 mm, width 0.80 mm; scutellum lacking distinct median longitudinal elevation, scutellar length 0.23 mm, width 0.34 mm; hemelytra with lateral corial margins slightly sinuate, narrowing from base, membrane attaining anterior 1/3 of abdominal tergum 7, distance apex clavus - apex corium 0.65 mm, distance apex corium - apex abdomen 1.14 mm; metathoracic scent gland auricle short, oval, auricular; all femora mutic, very slightly incrassate; labium extending well onto mesosternum, segment 1 remote from base of head, length labial segments I 0.27 mm, II 0.27 mm, III 0.19 mm, IV 0.23 mm; mesosternum with a deep median longitudinal groove; antennae slender, segments 2 and 3 terete, segment 4 fusiform, length antennal segments I 0.11 mm, II 0.23 mm, III 0.20 mm, IV 0.45 mm; total length 3.34 mm.

Holotype ♀ (BISHOP 8801), Thailand: Mai Klang, Chiangmai Prov., 11.VI.1965, P. D. Ashlock. Paratypes: VIET NAM: 1 ♂, Minh Hoa, N of Nha Trang, 28.XI.1960, C. M. Yoshimoto; 1 ♀, Kontum, N of Pleiku, 550 m, 13.V.1960, L. W. Quate; 1 ♀, Fyan, 900-1000 m, 11.VII.1961, N. R. Spencer. THAILAND: 1 ♀, Loei, Dansai, Na Phung, Bangkok, 10.VI.1955, R. E. Elbel; 1 ♂, 37 km SE of Dalat, 780 m, 25.IV.1960, L. W. Quate. In BISHOP, USNM and Slater coll'n.

This minute species resembles many species of the genus *Blissus* and its allies in its black and white color pattern. It is, however, in our opinion, most closely related to *Ischnodemus nigrocephalus* and *I. sinuatus*, both from SE Asia. This relationship is evidenced by the dorsally shining head and pronotum and the uniformly dull pruinose appearance of the head and thorax below, together with the straight apical corial margins, the short oval scent gland auricle, and the slender terete antennae. The systematic position of *ambiguus* is difficult to understand and perhaps important in the evaluation of character complexes within the subfamily. In *ambiguus* the fore coxal cavities are definitely open in contrast to *nigrocephalus* and *sinuatus*, where they are narrowly closed. (This, together with the mutic fore femora, straight apical corial margin, and shining head and pronotum, would place the species in the genus *Dimorphopterus*. It is a combination of characters also found in *Blissus navis* Slater from South Africa.) That this species is clearly much more closely related to the two species of *Ischnodemus* discussed above points up the danger of relying upon any one characteristic to ascertain the relationships of these perplexing insects; while the open or closed coxal cavity is usually of great importance in indicating relationships of species within the subfamily, it is not an absolutely definitive character. For the present, we feel it advisable to retain all of these species in the genus *Ischnodemus* pending a complete analysis of generic and subgeneric relationships in the Blissinae.

***Ischnodemus fumidus* Slater, Ashlock and Wilcox, new species** Fig. 22.

Small, robust, linear; head and pronotum black, shining, completely lacking dull pruinose areas above, pruinose below except for large central shining area on mesosternum, hemelytra sordid testaceous, marked with dark chocolate brown as follows: entire basal 1/3 of clavus and broadly along inner margin to and including apex, entire distal 1/3 of corium and anteriorly along cubital vein to basal 1/3, membrane smoky, almost entirely infuscated, with small, diffuse, white areas at base, adjacent to apical corial margins, and centrally 1/3 distance from base; all legs

and antennal segment 1 bright yellowish brown; abdomen, apex of tylus, and antennal segments 2-4 dark red-brown to nearly black; head and pronotum very evenly and shallowly punctate, scutellum with a few scattered punctures; clothed with scattered, rather elongate, semi-decumbent and upright sericeous hairs, sparsely so on head and pronotum.

Head slightly declivent, moderately convex across vertex, tylus attaining distal 1/2 of antennal segment 1, eyes small, set away slightly from anterolateral pronotal angles on short lateral shelves, head length 0.46 mm, width 0.62 mm, interocular space 0.40 mm; pronotum subquadrate, only slightly narrowing from humeral area to anterior lobe, then narrowing abruptly but evenly to anterior margin, transverse impression absent, posterior margin very slightly sinuate, nearly straight, pronotal length 0.76 mm, width 1.03 mm; scutellum lacking a distinct median elevation, slightly, raised basally, scutellar length 0.34 mm, width 0.46 mm; hemelytra nearly parallel-sided, slightly narrowed opposite claval commissure, membrane evenly rounded at apex, covering anterior 1/3 of abdominal tergum 7, apical corial margins straight, distance apex clavus - apex corium 0.72 mm, distance apex corium - apex abdomen 1.33 mm; fore femora slightly incrassate, mutic; metathoracic scent gland auricle short, rounded, auricular; mesosternum with a deep median groove; labium long, reaching well between mesocoxae, segment 1 considerably exceeding base of head, length labial segments I 0.32 mm, II 0.36 mm, III 0.22 mm, IV 0.26 mm; antennae slender, segments 2 and 3 terete, 4 fusiform, length antennal segments I 0.15 mm; II 0.38 mm; from paratype, III 0.30 mm, IV 0.53 mm; total length 3.84 mm.

Holotype ♀ (BISHOP 8802), Thailand (N.): Pangmakampom (Pangkampawng), nr Fang, 450 m, 15-16. XI. 1957, J. L. Gressitt. Paratype: ♀, same data as holotype. In Slater coll'n.

As discussed above, this species, together with *sinuatus*, *ambiguus*, and *nigro-*

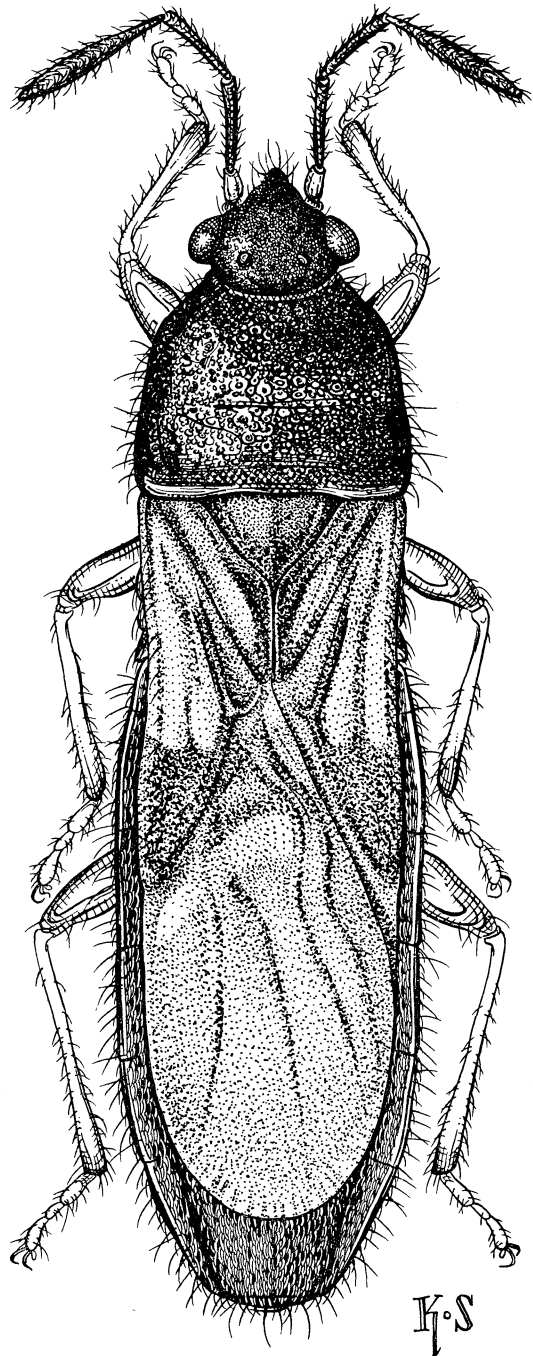


Fig. 22. *Ischnodemus fumidus*, n. sp., dorsal view.

cephalus, forms a distinct complex within the genus *Ischnodemus*. *I. fumidus* resembles *I. sinuatus* very closely in general coloration, possessing the same black, shining head and pronotum, dark smoky membrane, and a very similar pattern of light and dark coloration on the clavus and corium. While there may ultimately prove to be a Müllerian significance to this resemblance in color pattern, *fumidus* is on structural grounds more closely related to both *ambiguus* and *nigrocephalus* than it is to *sinuatus*. *Fumidus* may readily be separated from *sinuatus* by the lack of fore femoral spines, lack of a transverse pronotal impression, by having a much longer labium, longer antennae, and by the dull rather than shining acetabula of the prothorax. *Fumidus* and *ambiguus* are very closely related species, both possessing exactly the same conformation of the head and pronotum, similar antennae, elongate labia, eye shape, and scent gland auricle. *Ambiguus* is a noticeably smaller species with a uniformly pale membrane, a first labial segment remote from the posterior margin of the head, and a pale rather than dark 2nd antennal segment.

***Ischnodemus nigrocephalus* Slater, Ashlock and Wilcox, new species** Fig. 21b.

Small, robust, linear; head and pronotum subshining, completely lacking dull pruinose areas dorsally; scutellum, venter of head and thorax completely dull pruinose; head and base of scutellum black with apex of tylus, remainder of scutellum, and entire pronotum a strongly contrasting bright orangish brown with a narrow, glabrous, shining, transverse band adjacent to posterior pronotal margin; hemelytra testaceous with veins on clavus and corium slightly darker, shading to dark brown distally, those on membrane very dark brown and strongly contrasting with somewhat infuscated smoky membrane, a small diffuse brown area at apex of clavus, a small distinct spot at inner angle of corium opposite claval commissure, and a larger dark area at apex of corium; legs uniformly pale yellowish; antennal segments 1-3 light tan, 4 dark brown on distal 2/3; abdomen dark red-brown to fuscous on abdominal venter; head at most rugulose, pronotum with large, coarse, well separated punctures across area of obsolete transverse impression, with finer punctures anteriorly and posteriorly; rather thickly clothed with semi-decumbent sericeous hairs.

Head non-declivent, evenly convex, tylus reaching halfway to distal end of antennal segment 1, eyes prominent, set slightly away from anterolateral pronotal angles, not produced laterally, head length 0.44 mm, width 0.57 mm, interocular space 0.34 mm; pronotum with lateral margins very slightly sinuate, only slightly narrowing from humeral angles to area of calli, then narrowing abruptly and evenly to anterior margin, posterior margin almost straight before scutellar base, slightly produced posteriorly laterad of scutellum; transverse impression obsolete, pronotal length 0.64 mm, width 0.80 mm; scutellum with a weak but distinct median elevation, slightly elevated basally, strongly punctate laterad, scutellar length 0.27 mm, width 0.38 mm; hemelytra with lateral margins slightly sinuate, narrowing evenly to leave connexiva well exposed, membrane covering anterior 1/3 of abdominal tergum 7, distance apex clavus - apex corium 0.61 mm, distance apex corium - apex abdomen 1.06 mm; fore femora only slightly incrassate, mutic, tibiae terete; metathoracic scent gland auricle short, rounded, auricular; labium reaching onto anterior 1/3 to 1/2 of mesosternum, usually not attaining mesocoxae, mesosternum with a deep median furrow, length labial segments I 0.25 mm, II 0.27 mm, III 0.20 mm, IV 0.23 mm; antennae slender, segments 2 and 3 terete, 4 narrowly fusiform, length antennal segments I 0.14 mm, II 0.36 mm, III 0.33 mm, IV 0.49 mm; total length 3.23 mm.

Holotype ♂ (BISHOP 8803), Laos, Vientiane, 29.V.1965, P. D. Ashlock. Paratypes: 21 ♂♂, 37 ♀♀, same data as holotype; 2 ♂♂, 1 ♀, same data plus Mekong R. banks; 1 ♂, same data but 28.V.1965; 5 ♂♂, 12 ♀♀, Pakse, 15.V.1965, bunch grass along Mekong Riv., P.

D. Ashlock ; 8 ♂♂, 12 ♀♀, same data but 16. V. 1965. Also examined : 89 nymphs, same data as holotype. In BISHOP and Slater coll'n.

This tiny species is one of the few *Ischnodemus*-like forms which has a completely shining pronotum in combination with straight corial margins, terete antennae, and closed coxal cavities. Its relationships with other species with shining pronota are discussed under *I. ambiguus* and *I. fumidus*.

This species was collected on the same bunch grass plants (fig. 28a) as *Geoblissus mekongensis* (for discussion of habitat, see *G. mekongensis*). The plants were beaten or crushed down, and the insects were collected on the sand underneath. Unlike the *Geoblissus*, the *Ischnodemus* lay where it fell. The black head, reddish-brown pronotum, scutellum, and corial apices, and the otherwise white wings and white appendages made the insect very difficult to distinguish from sand particles on which it lay.

The series available for study was collected from 2 localities on the Mekong River in Laos : Vientiane in the north and Pakse in the south. The 2 populations, although certainly conspecific, show some difference in size, with the northern specimens somewhat smaller. The following table (in mm) will illustrate the differences in total length :

Table A. *Ischnodemus nigrocephalus*, differences in total length

Locality	♂ (29)			♀ (51)		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum
Vientiane	3.07	3.28	3.52	3.30	3.71	4.07
Pakse	3.40	3.52	3.61	3.53	3.80	4.07

Some specimens differ from the holotype in coloration : the 1st 3 antennal segments may be yellow and the membrane of the wing dusky. All specimens in the series are macropterous, and all were collected from bunch grass.

One specimen only is oligomerous, the right antennae being 3-segmented but the antennae much shorter than normal and relatively somewhat thickened.

5th instar nymph (alcohol) : Head, pronotum, scutellar area, and wing pads very dark chocolate brown, nearly black, eyes red, abdomen dull yellowish tan with terga 1 and 2 contrasting white, segments 3-7 covered with very tiny dark brown dots irregularly interspersed with larger pale spots at the base of each hair follicle ; marked with very dark chocolate brown (nearly black) as follows : area about abdominal scent glands, segment 8 and a transversely rectangular patch at posterior margin of tergum 7 ; lateral abdominal margins also suffused with darker coloration to give a marginal dark stripe ; below chocolate brown on thoracic pleura, as a transverse broad band on venter of head at level of compound eyes, and conventionally on abdominal sterna mesally, all of segment 8, a posterior expanded median patch on 7 and a narrow macula on 6 not reaching posterior margin ; antennae dark brown, becoming pale on distal 1/4 of segments 2 and 3, femora dark brown with pale apices, the tibiae and tarsi pale testaceous.

This nymph is interesting in that it shows the basal portion of the abdomen white as in nymphs of *Blissus*, but has an elongate body shape and black thoracic sclerites along the distal portion of the abdomen that are reminiscent of *Ischnodemus*. Once again this

points out the somewhat anomalous nature of the species.

The 3rd and 4th instars resemble the 5th closely in general coloration and appearance, although the abdomen of the 5th instar is somewhat darker red-brown. In addition to the usual differences in wing pad length, the most striking differentiating feature between earlier nymphs and the 5th instar is that in earlier nymphs the dark sclerotized pigmented area on the tergum of abdominal segment 6 is divided into 2 mesally separated quadrate patches, and that on segment 7, which in the 5th instar completely covers the tergum, is divided transversely into an anterior slender stripe and a complete ventral band. The division of the color marking on the 6th tergum is evident in the 5th instar nymph, but the areas are usually narrowly joined along the meson.

Second instar nymphs are the same, but the dark markings on segment 6 are reduced to small, widely separated spots.

Ischnodemus noctulus Distant Fig. 21c.

Ischnodemus noctulus Dist., 1901, *Ann. Mag. Nat. Hist.* ser. 7, 8: 468-69.

Ischnodemus nubilus Slater, 1964, *So. African Animal Life* 10: 122-23. **New Synonymy.**

I. noctulus is a very distinct element in the Oriental fauna, being the only known *Ischnodemus* from the region that possesses a completely dull pruinose head and pronotum, lacking shining areas even across the humeri. In addition, it is readily recognizable by the nearly uniformly dull gray-black body coloration and an unusually elongate and robust 4th antennal segment.

The material that represents *noctulus* shows considerable variability. The species may ultimately prove to be composite, but at present it appears somewhat more likely that the variation is geographic.

As in *I. sinuatus*, 2 rather distinct labial lengths are present, 1 in which the labium reaches the posterior margin of the prosternum, and the other where it reaches well onto the mesosternum. The following table shows the distribution of these 2 conditions.

Table B. *Ischnodemus noctulus*, distribution of labial lengths

Locality	No. shorter	No. longer
Malaya.....	8	2
Thailand	1	37
Viet Nam	0	7
Ceylon	0	2
India	0	2
Java	1	0
Sumatra	1	0

The coloration varies from almost completely dull black on the pronotum to reddish brown across the humeri; on the forewings from very dark brown throughout to testaceous on the distal 1/2 of the clavus, the basal 2/3 of the corium, and on the membrane distally and between the apices of the coria. None of these color variations appear to be geographically correlated.

Overall size does show some geographical correlation (however, series are very limited from most localities) with specimens from Ceylon, Malaya, and Sumatra being the largest, and those from Thailand the smallest. The Ceylonese specimens have the 4th antennal segment significantly longer, as can be seen by the following table.

Table C. *Ischnodemus noctulus*, comparison of lengths

Locality	Sex	Total Length			Ratio length 4th antennal segment to interocular width				
		No. Spm.	Mean	Min.	Max.	No. Spm.	Mean	Min.	Max.
Sumatra	♂	0	-	-	-	0	-	-	-
	♀	1	5.75	-	-	0	-	-	-
Perak (Malaya)	♂	2	5.40	5.35	5.46	2	1.49	1.45	1.53
	♀	0	-	-	-	0	-	-	-
Ceylon	♂	3	5.14	5.04	5.22	3	1.77	1.72	1.82
	♀	1	5.40	-	-	1	1.74	-	-
Malaya	♂	3	4.84	4.68	5.04	3	1.53	1.50	1.57
	♀	3	5.12	5.04	5.16	3	1.51	1.47	1.53
India	♂	1	4.68	-	-	0	-	-	-
	♀	1	4.86	-	-	1	1.39	-	-
Viet Nam	♂	4	4.40	3.72	4.74	5	1.35	1.26	1.42
	♀	3	4.87	4.76	4.94	6	1.36	1.27	1.48
Thailand	♂	14	4.20	3.90	4.68	13	1.37	1.28	1.48
	♀	7	4.37	4.08	5.04	9	1.35	1.29	1.50

5th instar nymph (dried): Conventional *Ischnodemus* type, with head, pronotum, and mesothoracic wing pads uniformly rich brown; abdomen pink, marked with dark brown dorsally as follows: narrowly around scent gland orifices, all of terga 8 and 9, posterior 1/2 of tergum 7 except for pale narrow strip separating large central patch from narrow linear lateral strip, venter of sterna 7-9 darkened mesally, tapering on anterior segments, all thoracic pleura broadly dark brown; appendages light testaceous yellow; labium reaching mesocoxae; antennal segment 4 extremely robust and elongate, length antennal segments I 0.15 mm, II 0.30 mm, III 0.23 mm, IV 0.80 mm.

This description is from 5 nymphs taken in "Ceylon (Green)," presumably representing part of Distant's original type series. They are in every way conventional *Ischnodemus* nymphs except for the extremely elongate 4th antennal segment.

MATERIAL EXAMINED. VIET NAM: 2 ♂♂, 3 ♀♀, 20 km N of Pleiku, 650 m, 9.V.1960, L. W. Quate; 1 ♂, 1 ♀, Ban Me Thuat, 500 m, 16-18. V. 1960, S. Quate; 1 ♀, same data but 20. XII. 1960, C. M. Yoshimoto. THAILAND: 15 ♂♂, 9 ♀♀, NW Chiangmai Prov., Doi Suthep, 1278 m, 29. III-4. V. 1958, T. C. Maa; 1 ♂, 1 ♀, Mae Sa, Chiangmai Prov., 16. VI. 1965, P. D. Ashlock; 1 ♂, Trang Prov., Khaophappa Khaochang, 200 m, 11-12. I. 1964, G. A. Samuelson; 3 ♂♂, Fang (Agr. Exp. Sta.), 500 m, Chiangmai Prov., 14. VI. 1965, Ashlock; 1 ♂, Chiangmai Prov., 3. XII. 1962, P. Pholboen. In BISHOP, THAILAND, and Slater coll'n.

DISTRIBUTION: Ceylon, India, Malaya, Perak, Sumatra, Java.

I. noctulus was originally described from Ceylon. In the Deutsches Entomologisches

Institut, Berlin, is a specimen from Perak bearing a red "typus" label and an additional label with a name based on the Latin word for "mournful." We have not been able to find such a published name by Breddin and either we have overlooked a reference or it is a manuscript name.

To judge from the somewhat general description, *Ischnodemus macrotomus* Bergroth, described from Borneo, is probably synonymous; the type is apparently not in either the Helsinki or Stockholm museums, where most of Bergroth's unlabeled "types" are found.

Distant (1904) mentions *noctulus* as "injurious to foliage of Mysore Cardamon plant. The irritation caused by the punctures of the insects causes the leaves to roll up longitudinally, under which cover the bugs live and breed." We take this plant to be *Elettaria cardomomum* Maton, a member of the ginger family (Zingiberaceae), and this is of interest as a few other records of Blissinae are slowly accumulating to indicate a broader host range in the monocots than had previously been suspected. *Spalacocoris sulcatus* has been reported from the roots of a zingiberous plant, and *Ischnodemus fulvipes* (De Geer) in the American tropics on Cannaceae, bananas, bromeliads, and Marantaceae. An additional food plant record in this series is that of the Malayan specimens being taken on "Alpinia," also a member of the ginger family.

I. nubilis Slater was based upon a single, partially mutilated specimen from Rhodesia. Re-examination of the type specimen indicates that there are no significant differences between this specimen and Oriental specimens of *noctulus* and that the two are synonymous. The presence of *noctulus* in Africa is important zoogeographically, as it explains the presence of this species in Asia as an extension of the Ethiopian *Ischnodemus* fauna into the Orient.

***Ischnodemus sinuatus* Slater, Ashlock and Wilcox, new species** Fig. 21d.

Small, robust, sinuately linear; head and pronotum uniformly black, surface shining, completely lacking dull pruinose areas; scutellum, venter of head and thorax dull gray pruinose except for central large shining area on mesosternum and extreme apex of scutellum; hemelytra sordid testaceous, marked with chocolate brown areas as follows: entire basal 1/4 of clavus and narrowly along inner margin to apex, posterior 2/3 of inner margin of corium adjacent to claval suture, entire apical corial margin, entire distal 1/3 of corium and all veins on membrane; membrane smoky, infuscated; apex of tylus, scutellum, legs, and antennae bright red-brown, antennal segment 4 darker; head and pronotum bearing large, distinct, coarse punctures, scutellum obscurely punctate laterad; clothed with fine, rather elongate, semidecumbent and upright sericeous hairs, nearly glabrous on pronotum in area of calli and across humeral angles.

Head slightly declivent, little convex across vertex, tylus attaining distal 1/3 of antennal segment 1, eyes large, prominent, set well away from anterolateral pronotal angles, slightly produced laterally, head length 0.46 mm, width 0.70 mm, interocular space 0.44 mm; pronotum only slightly narrowing anteriorly from humeral area to middle of anterior lobe, then narrowing abruptly to anterior margin, posterior margin evenly concave, transverse impression shallow but complete, pronotal length 0.82 mm, width 0.98 mm; scutellum lacking a distinct median elevation, slightly raised basally, scutellar length 0.34 mm, width 0.38 mm; hemelytra with lateral corial margins sinuate, narrowing opposite claval commissure, then evenly and strongly expanding nearly to apex, membrane covering at least anterior 1/3 of abdominal tergum 7, distance apex clavus—apex corium 0.80 mm, distance apex corium—apex abdomen 1.25 mm; fore femora

slightly incrassate, armed below on distal 1/3 with 2 divergent spines set on a single small blunt protuberance; metathoracic scent gland auricle very short, subcircular, auricular, distal end protrudent from body surface; labium exceeding fore coxae but not reaching posterior margin of prosternum (see discussion below), mesosternum lacking a median furrow, length labial segments I 0.25 mm, II 0.21 mm, III 0.14 mm, IV 0.24 mm; antennae short, robust, segments 2 and 3 slightly clavate, 4 fusiform, length antennal segments I 0.13 mm, II 0.28 mm, III 0.23 mm, IV 0.51 mm; total length 3.91 mm.

Holotype ♂ (BISHOP 8804), Vietnam (S): Fyan, 1200 m, 11.VII.1961, N. R. Spencer. Paratypes: VIETNAM (S.): 14 ♂♂, 10 ♀♀, Fyan, 900-1000 m and 1200 m, 11.VII-9.VIII.1961, N. R. Spencer; Vietnam (N), 1 ♂, Tonkin, Hoa-Binh, A. de Cooman; 1 ♀, Tonkin, Chapa, VI. 1916, R. V. Salvaza. THAILAND: 1 ♂, 1 ♀, Chiangmai Prov., Doi Pui, 17.VI.1965, K. Morimoto, S. Asahina; 1 ♀, Nakhon Nayok Prov., Khaoyai Nat. Park, 6.VI.1965, K. Morimoto. SABAH (N. BORNEO): 1 ♀, W. Coast Residency, Ranau, 13 km N, Paring Hot Springs, 500 m, 8-11. X. 1958, T. C. Maa; 2 ♂♂, Ranau, 500 m, 28. IX-7. X. 1958, Maa, 8-18. X. 1958, L. W. Quate. SABAH (SE): 2 ♂♂, Forest Camp, 9.8 km SW of Tenom, 18. XII. 1962, Y. Hirashima. NW NEW GUINEA: 1 ♀, Vogelkop, Kebar Vall. W of Manokwari, 550 m, 4-31. I. 1962, S. Quate. NEPAL: 1 ♂, Gopaldhara Darjeeling, 1500-2000 m, 11. VI. 1914, H. Stevens. MALAYA: 1 ♀, Kuala Lumpur nr 1. gardens, 2. X. 1933, H. M. Pendlebury. BURMA (UPPER): 1 ♂, 1 ♀, Nam Tamai Valley, 27. VII. 1938, lat. N 27° 42' long. E 97° 54', 1300 m, R. Kaulback. BURMA: 1 ♀, S. Shan States, Taunggyi, 1500 m, 1. VIII-22. IX. 1934, R. Malaise. S. CHINA: Fukien, Chungan, Bohea Hill, 30. IV. 1960, T. C. Maa. In BISHOP, BMNH, STOCKHOLM, USNM (C. J. Drake coll.), and Slater coll'n.

In the series of 41 specimens available for study, we find 2 distinct labial lengths. Most of the specimens have a relatively short labium which barely exceeds the fore coxae. However, nine of the larger specimens (5 ♂♂, 4 ♀♀) have labia reaching onto the mesosternum with almost all of the 4th segment exceeding the fore coxae. There seems to be no geographic significance in this character, as series collected on the same day at the same place and altitude possess the 2 different labial lengths. Despite the unusual degree of variation in this character, we feel the series undoubtedly represents a single species.

The wing polymorphism of this species is particularly interesting. Of the 41 specimens in the study series, 3 ♂♂ and 4 ♀♀ are "submacropterous" with all the elements of the hemelytra present and distinct but with the membrane markedly tapering, rather than broadly rounded as in completely macropterous specimens, and with the membrane usually extending caudad only to the anterior margin of the 6th abdominal tergum at most. Such individuals have a well-developed hind wing with distinct venation.

Actually, there are at least 4 different categories of wing development. Table D was compiled from a series of 23 specimens from Fyan, Viet Nam, and from the whole study series.

From these figures, despite the low numbers involved, it appears evident that there may be modest shortening of the wing from the maximum length, with the corium and membrane both proportionately reduced; but that when a marked brachyptery occurs (as in d), the membrane has been reduced significantly relative to the corium, and a trend is established that, if continued, could lead to the marked brachyptery found in

Table D. *Ischnodemus sinuatus*, comparison of lengths of corium & membrane

Condition	Sex	Fyan specimens			Whole series		
		No.	Av. ratio corium/ membrane	Range	No.	Av. ratio corium/ membrane	Range
(a)							
Membrane covering abdominal segment 7	♂	2	1.46	1.40-1.52	2	1.46	1.40-1.52
	♀	0	.....	.....	0		.....
(b)							
Membrane covering 1/2- 1/3 abdominal tergum 7	♂	7	1.40	1.32-1.45	7	1.40	1.32-1.45
	♀	5	1.39	1.37-1.42	7	1.38	1.31-1.42
(c)							
Membrane covering abdominal tergum 6	♂	1	1.34	.....	6	1.44	1.24-1.63
	♀	4	1.45	1.34-1.55	8	1.44	1.34-1.61
(d)							
Membrane covering abdominal tergum 5	♂	3	1.58	1.55-1.64	3	1.58	1.55-1.64
	♀	1	1.62	.....	4	1.59	1.46-1.62

many Hemiptera. Variability of wing length occurs throughout the range, although series from some localities are not available to determine whether or not the percentages of variation are similar.

Despite the wide distribution, there is surprisingly little variation in the type series other than the peculiar labial difference mentioned above. In some specimens, the dark coloration of the hemelytron is more extensive than in the type, the membrane sometimes being almost entirely darkened except for a light spot near the apex of the corium and a 2nd spot basally between the apical corial margins. The pronotum is sometimes provided with a deeper transverse impression and is generally more tapering from humeral angles to anterior margin in ♀♀ than in ♂♂. Many ♂♂ have the lateral pronotal margins nearly straight for most of their length as noted for the type.

Ischnodemus thoracicus (Distant) Fig. 23.

Macropes thoracicus Dist., 1909, *Ann. Mag. Nat. Hist.* 8, 3: 325-26.

Ischnodemus thoracicus: Slater & Ahmad, 1967, *Acta Ent. Mus. Nat. Prague* 37: 255-59.

Moderately elongate and linear; head and pronotum completely shining, scutellum and central area of prosternum anterior to coxae dull gray pruinose; head and pronotum jet black except pronotum yellow-orange broadly across humeri; clavus and corium uniformly pale testaceous yellow, membrane hyaline; legs uniformly dull testaceous; antennae black to dark chocolate brown; clothed conspicuously with moderately elongate, decumbent hairs; bearing conspicuous discrete punctures on head, pronotum, and scutellum.

Head dorsally convex, tylus extending to distal 1/3 of antennal segment 1, eyes large, not produced laterally, head length 0.49 mm, width 0.65 mm, interocular space 0.38 mm; pronotum somewhat flattened, transverse impression shallow but complete, lateral margins slightly sinuate, very little narrowed from humeral angles to area of calli, then strongly curving mesad to anterior margin, posterior margin straight before base of scutellum with very small, posteriorly directed lobes laterally, pronotal length 0.80 mm, width 0.99 mm; scutellum with a

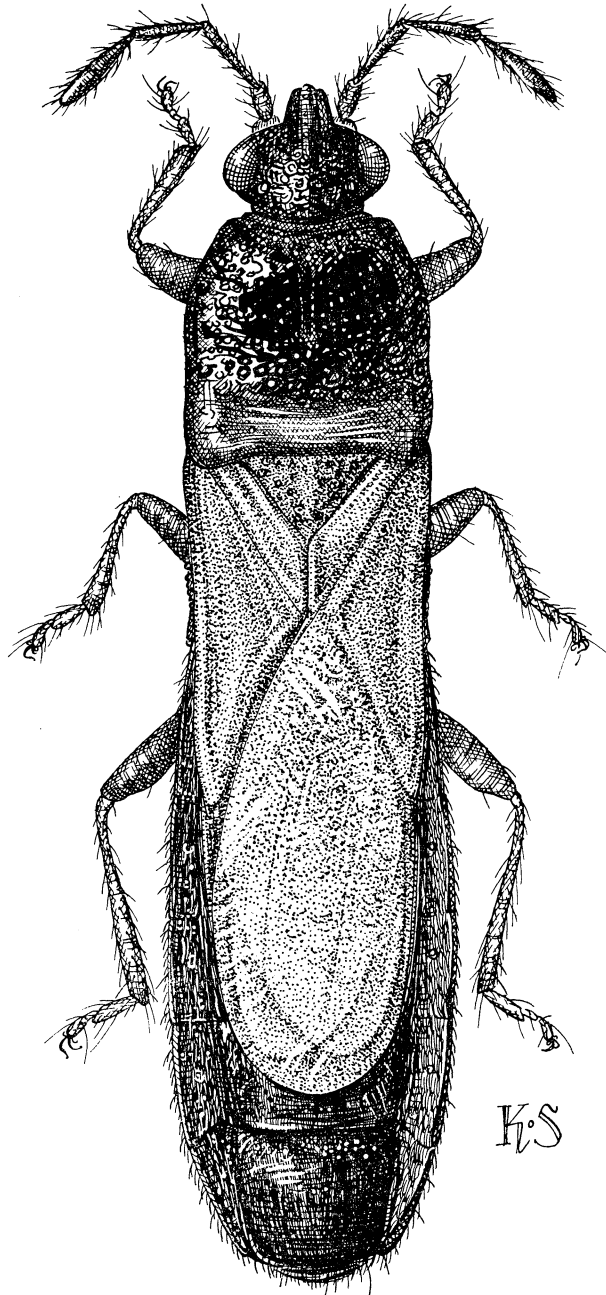


Fig. 23. *Ischnodemus thoracicus* (Distant), dorsal view.

very weak longitudinal elevation on distal 1/3, scutellar length 0.30 mm, width 0.46 mm; hemelytra with lateral corial margins narrowing from base, nearly straight, apical corial margin slightly concave, membrane extending to anterior margin of abdominal tergum 7, distance apex clavus - apex corium 0.76 mm, distance apex corium - apex abdomen 1.90 mm; metathoracic scent gland auricle short, ovoid, auricular; all femora mutic and only slightly incrassate; mesosternum with a shallow median groove; labium extending well onto mesosternum but not attaining mesocoxae, segment I remote from base of head, length labial segments I 0.11 mm, II 0.35 mm, III 0.27 mm, IV 0.42 mm; antennae short, at most very slightly clavate distally on segment 3, length antennal segments I 0.30 mm, II 0.32 mm, III 0.25 mm, IV 0.27 mm; total length 4.68 mm.

MATERIAL EXAMINED. VIET NAM: 1 ♀, Dalat, 1500 m, 29.IV-4.V.1960 L. W. & S. Quate; 2 ♀♀, Mt. Lang Bian, 1500-2000 m, 19.V-8.VI.1961, N. R. Spencer; 1 ♂, 20 km S of Dalat, 1300 m, 12.IX.1960, J. L. Gressitt; 1 ♀, 15 km NE of Dalat, 1850 m, 5.V.1960, L. W. Quate. In BISHOP and Slater coll'n.

This species was described and previously known only from Nepal. There is no reason apparent for placing the species in *Macropes*, as the fore legs are very little incrassate and are mutic. We are keeping *thoracicus* in *Ischnodemus* for the present, although its generic position is not entirely satisfactory. The shining head and pronotum, slightly concave apical corial margins, hyaline membrane, and very narrowly closed coxal cavities are all somewhat transitional characters. In many ways *thoracicus* resembles *Atrademus* Slater, but lacks the fore femoral spines that are present in the species of this genus. The habitus is also similar to *Micaredemus* Slater, but in addition to the lack of femoral spines, the scent gland auricle of *Micaredemus* is extremely different. The small shining species with mutic fore femora and narrowly closed fore coxal cavities present problems in generic relationships too complex to be dealt with in a paper of this nature.

These specimens were kindly compared with the type of *thoracicus* by Mrs G. M. Black of the British Museum (Nat. Hist.).

Genus *Dimorphopterus* Stål

Dimorphopterus Stål, 1872, *Ofv. Vet. Akad. Forh.* 29: 44-45.

Esmun Distant, 1909, *Ann. Mag. Nat. Hist.* ser. 8, 3: 330. **New Synonymy.**

Euhemerus Dist., 1909, *Ann. Mag. Nat. Hist.* ser. 8, 3: 331. **New Synonymy.**

Both *Esmun* and *Euhemerus* were described by Distant (1909) as new genera of Heterogastrinae. Horváth (1911) reduced both to junior synonyms of *Blissus* and so they have remained to the present. The genus *Blissus* as discussed below is unquestionably composite and neither *Esmun typicus* or *Euhemerus latus* (the types of the two "genera") is congeneric with *Blissus* as we have limited the taxon. The two species are, however, congeneric and it seems to us that they form a portion of a group of species congeneric with the genus *Dimorphopterus*, which has hitherto been confined in distribution to the Palearctic Region. The genus *Dimorphopterus* as we conceive it can be characterized as follows: fore femora mutic; apical corial margin shallowly concave; fore coxal cavities open; head and pronotum above strongly shining and completely non-pruinose; scutellum completely pruinose; fore tibiae terete with only a few small scattered spines near apex; antennae moderately clavate; metathoracic scent gland auricle auricular, broad and rounded; membrane of fore wing hyaline, subhyaline, or opaque. Species newly assigned to *Dimorphopterus* are: *Esmun typicus*, Distant, *Euhemerus*

latus Distant, *Acanthia gibbus* Fabricius, *Ischnodemus atramaculatus* Distant, *Ischnodemus erebus* Distant, *Blissus bicoloripes* Distant, *Blissus latoides* Slater, *Dimorphopterus lepidus* n. sp., *Dimorphopterus rondoni* n. sp., *Blissus oblongus* Stål, *Blissus fulgidus* Slater, *Blissus hirsutululus* Bergroth, and *Blissus upembensis* Slater.

Using this concept, we are eliminating from *Dimorphopterus* those species with fore femoral spines, fossorial flattened fore tibiae, a shining rather than pruinose scutellum, and those with dorsal pruinosity on head and pronotum or both. It is undoubtedly true that some of the Eastern Hemisphere species with a single spine on the fore femur are in all other respects similar to species we include in *Dimorphopterus*. Preliminary evidence from the genitalia indicates the generic concept may need to be expanded further to include some species with spined fore femora, but it seems to us premature to do so at the present time. However, we believe it desirable to define the genus objectively as above, at least until our knowledge of evolutionary trends within *Dimorphopterus* is more advanced. There remain recognizable subgroups - the Palearctic species and some of the Oriental and African species generally have a completely opaque membrane on the fore wing, whereas in such Oriental species as *gibbus*, *typicus*, *latus*, etc., the membrane is transparent with only a narrow rim of opaqueness on the membrane adjacent to the apical corial margin. Also, some of the Palearctic and Ethiopian species have lost the pruinosity laterally on the prothorax as well as dorsally, whereas in most Oriental and African species the lateral surface is pruinose at least in part. While recognizing these differences, we also see evidence of intermediate situations, and do not believe that, at the present state of our knowledge, it would be advantageous to establish a narrow generic definition.

KEY TO THAILAND AND INDOCHINA SPECIES OF DIMORPHOPTERUS

1. Labium elongate, extending between or exceeding metacoxae 2
 Labium short, at most barely attaining mesocoxae 3
2. Apical corial margin deeply concave; metathoracic scent gland auricle evenly rounded at distal end; antennae red-brown or sordid testaceous; antennal segment 1 not attaining apex of tylus **rondoni** n. sp.
 Apical corial margin straight with at most a very slight concavity at extreme base; metathoracic scent gland auricle blunt pointed at distal end; antennae black; antennal segment 1 attaining or slightly exceeding apex of tylus **lepidus** n. sp.
3. Body relatively elongate (fig. 25), distance from posterior margin of pronotum to apex of abdomen more than 3.5× length of pronotum, usually more than 4× length (in very small specimens proportions may be slightly less than 3.5) **gibbus** (Fabricius)
 Body relatively short and stout (fig. 24), distance from posterior margin of pronotum to apex of abdomen appreciably less than 3.5× pronotal length, frequently less than 3× **latus** (Distant)

Dimorphopterus latus (Distant), n. comb.

Fig. 24.

Euhemerus latus Dist., 1909, *Ann. Mag. Nat. Hist.* ser. 8, 3: 331.

Body small, stout, moderately robust, head and pronotum black, shining, becoming red-brown at apex of tylus and across pronotal humeral angles, scutellum completely pruinose; clavus and

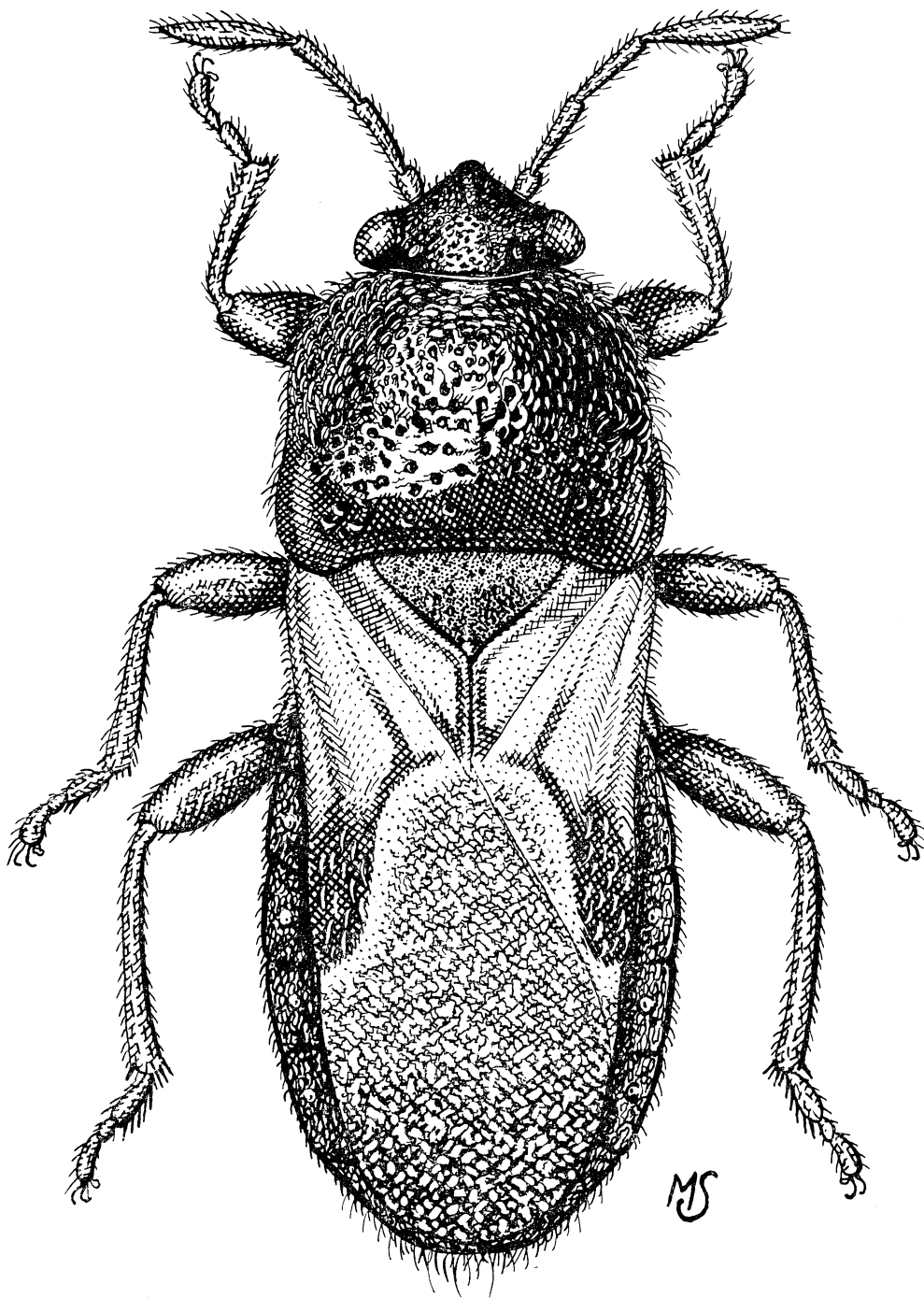


Fig. 24. *Dimorphopterus latus* (Distant), dorsal view.

corium opaque milky white with dark brown spot on apical 1/4 of corium, margined with light brown along claval commissure and at apex, cubital vein light brown distally, membrane transparent except for diffuse, irregular, milky white area adjacent to apical corial margins; antennae and legs yellowish brown, abdomen red-brown; head and pronotum shallowly and evenly punctate, scutellum rugose with a few scattered punctures; pronotal hairs elongate but completely decumbent.

Head slightly declivent, convex across vertex, tylus reaching distal end of antennal segment 1, eyes small, transverse, set slightly away from anterolateral pronotal angles on narrow lateral head extensions, head length 0.36 mm, width 0.57 mm, interocular space 0.34 mm; pronotum subquadrate, nearly as broad across calli as across humeri with lateral margins slightly sinuate, tapering evenly and arcuately from area of calli to anterior margin, posterior margin shallowly concave adjacent to base of scutellum, pronotal length 0.68 mm, width 0.99 mm; scutellar length 0.26 mm, width 0.42 mm; hemelytra with lateral margins slightly constricted opposite claval commissure, membrane evenly rounded at apex, nearly attaining end of abdomen, leaving connexivum well exposed, distance apex clavus-apex corium 0.49 mm, distance apex corium-apex abdomen 0.95 mm; fore femora moderately incrassate, metathoracic scent gland auricle short, rounded, outer end raised above body surface; labium reaching well onto mesosternum, segment 1 not or barely reaching base of head, length labial segments I 0.30 mm, II 0.34 mm, III 0.23 mm, IV 0.26 mm; total length 2.70 mm.

MATERIAL EXAMINED. Holotype from Bombay, India (BMNH). THAILAND: 2 ♂♂, 2 ♀♀, Doi Suthep, Tang Keo, Chiangmai Prov., 10. VI. 1965, P. D. Ashlock; 1 ♂, same data but no "Doi Suthep"; 1 ♀, Chiangmai (Zoo.), Chiangmai Prov., 16. VI. 1965; 1 ♂, Chiangmai Prov., Doi Suthep, 1000 m, 12. VI. 1965, Ashlock. THAILAND (NW): 3 ♂♂, 6 ♀♀, Chiangmai Prov., Fang, 500 m, 15. IV. 58, T. C. Maa; 1 ♀, same data, "Ex. standing stagnant water." INDOCHINA: 1 ♂, 1 ♀, no locality. LAOS: 4 ♂♂, 3 ♀♀, Pakse, Sedone Prov., 14. V. 1965, in lawn grass, Ashlock; 1 nymph, Vientiane, 28. V. 1965, Ashlock; 4 nymphs, Vientiane, Mekong R. banks, 29. V. 1965, N. Wilson; 2 ♀♀, Pakse, 21. V. 1965, bunch grass nr Mekong R., Ashlock; 1 ♂, same data, but 15. V. 1965; 1 ♂, 16. V. 1965, fallow rice paddy. In BISHOP, BUDAPEST, USNM, Ashlock, and Slater coll'n.

There is danger of confusion in the literature regarding the name *latus*. Although Horváth (1911) synonymized *Euhemerus* with *Blissus*, Distant apparently never recognized this synonymy, for in 1918 (*Fauna Brit. India, Rhync.* 7:188) he described an entirely different insect with spinous fore femora and fossorial fore tibiae as "*Blissus latus* n. sp.," which he stated was based upon immature forms. (This is incorrect, as the type series in the British Museum is composed entirely of adult brachypters.) Thus, since 1918, 2 species have existed in the literature as *Blissus latus*. However, the removal of *latus* Distant 1909 (*nec latus* Distant 1918) results in a case of escaped homonymy and the present species need not be renamed. This situation apparently confused Slater in his 1964 Catalogue, where the 1918 *Blissus latus* is not cited.

There is some variation in labial length in the series before us. In some individuals, particularly those from Laos, the labium reaches the mesocoxae, whereas in the majority of specimens, the labium does not attain the mesocoxae, although reaching well onto the mesosternum.

Fifth instar nymphs (alcohol) possess a completely black head, pronotum, and mesothoracic wing pads, and white colored abdominal segments 1 and 2, which contrast strongly with the brick-red succeeding segments.

Dimorphopterus rondoni Slater, Ashlock and Wilcox, new species

Body short, robust; head and pronotum black, shining, becoming red-brown in area of pronotal collar and on posterior pronotal lobe; scutellum gray-black, pruinose; hemelytra light testaceous with dark brown areas on apical 1/3 of corium, narrowly along apical margin and distal 1/2 of radius and cubitus, clavus infuscated on basal 1/3 and along margins, membrane transparent hyaline with veins a distinctly differentiated light brown, and with a diffuse opaque white area adjacent to corial margins; antennae, apex of tylus, and all legs yellowish brown; abdomen red-brown; head and pronotum shallowly and evenly punctate with punctures becoming larger and deeper in area of pronotal transverse impression, scutellum with a few scattered irregular punctures; heavily clothed with long upright and semi-erect sericeous hairs.

Head non-declivent, convex across vertex, tylus extending slightly beyond distal end of antennal segment 1, eyes transverse, small, set slightly away from anterolateral pronotal angles on narrow lateral head extensions, head length 0.49 mm, width 0.54, interocular space 0.32 mm; pronotum subquadrate, nearly parallel-sided until area of calli, then tapering arcuately to anterior margin, posterior margin only slightly concave mesally, nearly straight, transverse impression obsolete, pronotal length 0.61 mm, width 0.89 mm; scutellum lacking median elevation, scutellar length 0.23 mm, width 0.38 mm; hemelytra with lateral margins nearly parallel, membrane evenly rounded at apex, reaching at least half way onto abdominal tergum 7, leaving connexivum well exposed, distance apex clavus-apex corium 0.48 mm, distance apex corium-apex abdomen 0.91 mm; antennae with segments 2 and 3 terete, 4 narrowly fusiform, length antennal segments I 0.13 mm, II 0.28 mm, III 0.23 mm, IV 0.42 mm; fore femora slightly incrassate, fore tibiae moderately swollen at apex but not flattened or fossorial, with several short, sharp spines present near apex; metathoracic scent gland auricle short, rounded, auricular, distal end protruding from body surface; labium elongate, reaching onto abdomen, segment 1 surpassing base of head, length labial segments I 0.44 mm, II 0.48 mm, III 0.42 mm, IV (paratype) 0.34 mm; total length 2.94 mm.

Holotype ♂ (BISHOP 8805), Thailand (NW): Chiangmai Prov., Fang, 500 m, 15. IV. 1958, T. C. Maa. Paratypes: 1 ♂, 2 ♀♀, same data as holotype. In BISHOP and Slater coll'n.

Dimorphopterus rondoni is closely related to *E. latus* (Distant) but may be readily recognized by the much more elongate labium, which extends between or beyond the hind coxae in *rondoni*, while at most attaining the middle coxae in *latus*. *Rondoni* also is a smaller, less robust species with a more elongate, attenuated head, with dark membranous veins, a less quadrate and more tapering pronotum, and with pronotal and hemelytral hairs that are more scattered and less decumbent.

This species is named for J. A. Rondon for his aid in making possible the collection of many interesting Lygaeidae from SE Asia.

Dimorphopterus lepidus Slater, Ashlock and Wilcox, new species

Body short, stout, robust; head, antennae, pronotum, and abdomen black, shining; scutellum dull pruinose; femora dark red-brown, becoming lighter at base and apex, hemelytra including entire membrane smoky gray to testaceous with darker brown areas as follows: all of clavus

except for small area between veins on distal 1/2, basal 1/4, veins and apical 1/3 of corium; head and pronotum shallowly and evenly punctate, scutellum laterally with a few indistinct punctures; clothed with moderately elongate semidecumbent and upright sericeous hairs.

Head non-declivent, acuminate, slightly convex across vertex, tylus reaching distal end of antennal segment 1, eyes transverse, strongly projecting caudolaterad on short shelf-like lateral head extensions; head length 0.44 mm, width 0.68 mm, interocular space 0.44 mm; pronotum with lateral margins slightly sinuate at area of obsolete transverse impression, evenly tapering from humeri to anterior margin, posterior margin slightly sinuate, nearly straight, pronotal length 0.72 mm, width 1.10 mm; scutellum with a distinct elevation on distal 1/2, scutellar length 0.34 mm, width 0.55 mm; hemelytra with lateral margins nearly parallel, membrane evenly rounded at apex, reaching well onto abdominal tergum 7, leaving connexivum well exposed, distance apex clavus-apex corium 0.63 mm, distance apex corium-apex abdomen 1.00 mm; fore femora moderately incrassate; metathoracic scent gland auricle acuminate, distally pointed; labium elongate, reaching beyond posterior margin of metasternum, segment I slightly exceeding base of head, length labial segments I 0.44 mm, II 0.46 mm, III 0.36 mm, IV 0.34 mm; total length 3.36 mm.

Holotype ♂ (KYUSHU), S. Thailand : Songkla, 22.VI.1965, K. Morimoto, S. Miyamoto coll'n.

D. lepidus has much the same general habitus as *D. rondoni* n. sp., with a similar tapering head, elongate labium, and general body shape. *Lepidus*, however, is not very closely related: the apical corial margin is almost straight, with only the very slightest indication of a basal concavity. This straight corial margin has caused us some hesitation in placing the species in *Dimorphopterus*. However, in all other ways this species shows such obvious relationships that there seems little doubt that *lepidus* and *latus* are congeneric. *Lepidus* may also be distinguished by the acutely pointed rather than rounded scent gland auricle, by the almost completely dark smoky gray membrane, and by the less quadrate pronotum, which is markedly narrower across the calli than across the humeri.

***Dimorphopterus gibbus* (Fabricius), n. comb. Fig. 25.**

Acanthia gibbus Fabr. 1794, *Ent. Syst.* 4: 75.

Cimex gibbus: Thurton, 1800, *Gen. Syst. Nat.* 2: 613.

Coreus gibbus: Fabricius, 1803, *Syst. Rhyng.* p. 202.

Blissus gibbus: Stål, 1868, *Hem. Fabr.* 1: 69.

Ischnodemus sauteri Bergroth, 1914, *Ent. Mitt.* 3: 357. **New Synonymy.**

Blissus kyushensis Hidaka, 1959, *Ins. Matsumura.* 22 (3-4): 106. **New Synonymy.**

Body stout, robust; head and anterior pronotal lobe black, shining, becoming bright red-brown across base and on humeri, scutellum dull gray, pruinose, hemelytra creamy white, slightly darker yellowish tan on veins and basal 1/2 of clavus and as a large apical corial spot, membrane transparent hyaline with a narrow, diffuse, opaque, white area adjacent to apical corial margin, antennae and abdomen red-brown, femora yellowish brown, tibiae and tarsi sordid yellow; pronotum shallowly punctate in area of transverse impression and on posterior lobe, scutellum with a few scattered punctures; sparsely clothed with short decumbent silvery hairs.

Head broad, slightly declivent, tylus extending nearly to distal end of antennal segment 1,

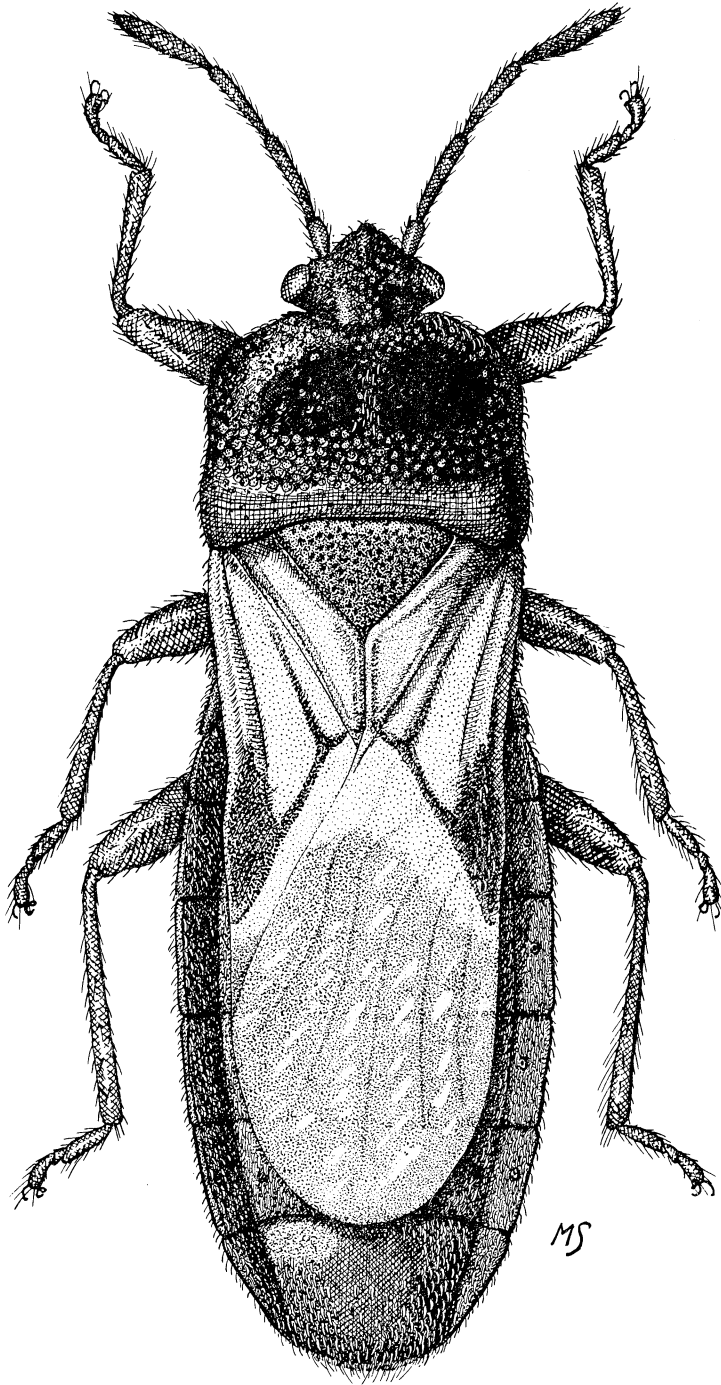


Fig. 25. *Dimorphopterus gibbus* (Fabricius), dorsal view.

Table E. *Dimorphus gibbus*, comparative measurements

Area	♂ N	total length			ratio width head/interocular			ratio width pronotum/length pronotum			♀ N	total length			ratio width head/interocular			ratio width pronotum/length pronotum		
		mean	min	max	mean	min	max	mean	min	max		mean	min	max	mean	min	max	mean	min	max
New Guinea	5	4.67	4.53	4.91	1.55	1.55	1.57	1.58	1.57	1.61	3	5.17	4.91	5.53	1.51	1.47	1.55	1.57	1.49	1.66
Philippines	6	4.57	4.22	4.92	1.60	1.56	1.63	1.49	1.44	1.57	6	5.29	4.84	5.61	1.58	1.51	1.63	1.46	1.40	1.51
India	3	4.43	4.15	4.62	1.47	1.43	1.50	1.49	1.45	1.56	1	5.45	-	-	1.55	-	-	1.46	-	-
Taiwan	4	4.41	4.26	4.68	1.54	1.50	1.59	1.46	1.42	1.53	2	4.91	4.84	4.99	1.54	1.52	1.57	1.39	1.32	1.46
China	0	-	-	-	-	-	-	-	-	-	6	5.0	4.76	5.22	1.49	1.45	1.55	1.53	1.44	1.62
Java	1	4.22	-	-	1.49	-	-	1.42	-	-	1	5.22	-	-	1.55	-	-	1.63	-	-
New Britain	1	3.99	-	-	1.60	-	-	1.68	-	-	1	4.91	-	-	1.65	-	-	1.44	-	-
SE Asia	2	3.88	3.77	3.99	1.67	1.66	1.69	1.42	1.39	1.46	1	3.77	-	-	1.71	-	-	1.39	-	-

eyes small, set slightly away from anterolateral pronotal angles on short lateral head extensions, head length 0.42 mm, width 0.61 mm, interocular space 0.36 mm; pronotum quadrate, lateral margins parallel from humeri to calli area, then evenly, arcuately curving to anterior margin, transverse impression broad, shallow, nearly obsolete mesally, posterior margin very shallowly concave adjacent to scutellum, pronotal length 0.76 mm; width 1.06 mm; scutellum broad, lacking shining median elevation, scutellar length 0.30 mm, width 0.49 mm; hemelytra with lateral corial margins sinuate, membrane reaching middle of abdominal tergum 7, apical corial margins concave at basal 1/4, distance apex clavus-apex corium 0.68 mm, distance apex corium-apex abdomen 1.29 mm; fore femora moderately incrassate; metathoracic scent gland auricle small, rounded, auricular, set at right angles to longitudinal body axis; labium elongate, reaching well onto mesosternum but not attaining mesocoxae, segment 2 reaching between fore coxae, length labial segments I 0.36 mm; II and III obscured, VI 0.27 mm; antennae with segment 2 and probably 3 slightly clavate, length antennal segments I 0.14 mm, II 0.28 mm, III and IV missing; total length 3.77 mm.

MATERIAL EXAMINED. VIET NAM (N) : 2 ♂♂, Tonkin, Cho-Gahn, L. Suport; 1 ♂, Mt. Liang Bian, 1500-2000 m, 19.V-8.VI.1961, N. R. Spencer; 1 ♀, 6 km S of Dalat, 1400-1500 m, 9.VI-7.VII.1961, Spencer. ANNAM or LAOS: 1 ♀. In PARIS, BUDAPEST, BISHOP, and Slater coll'n.

The above description is taken from a ♂ from Tonkin noted above. We believe that these specimens represent Fabricius' *gibbus*, but the type is apparently lost. These SE Asian specimens run considerably smaller than other material from the Orient available for study. The situation is complex, and its solution will require much more material than we have available for study. Table E will indicate the variation present. The 2 Viet Nam specimens are very small and slender and are placed here provisionally.

We have examined the type series of *Ischnodemus sauteri* Bergroth and can find no significant differences. We therefore reduce *sauteri* to junior synonymy. Of the type series of *sauteri* we have examined 7 specimens from "Anping, Formosa." Of these, a ♀ in the Deutsches Entomologisches Institute, Berlin, bears a label in Bergroth's handwriting "Ischnodemus sauteri Bergr. type" and a second red label "Typus." Bergroth in his original description did not designate a holotype, and therefore we designate this ♀ as lectotype. An appropriate label is placed on the specimen. In the Deutsches Entomologisches Institute are 3 more ♀♀ and 1 ♂ from the same locality but not bearing type labels. Paralectotype labels are placed on these specimens. In the Paris Museum are 2 ♀♀ with identical locality and collector labels but bearing in addition a red "paratype" label. Paralectotype labels have also been placed upon these specimens. There are apparently 11 additional specimens of this series in the Deutsches Entomologisches Institute and 1 in the Stockholm Museum.

Blissus kyushensis is also synonymous with *gibbus*.

These names may in the future be applicable to subspecific populations as there is evidence of geographic variation in size and color in the study series before us: for example, Taiwan specimens lack color markings on the hemelytra.

Genus **Geoblissus** Hidaka

This taxon represents the "true" genus *Blissus* Burmeister under the International

Rules. The situation is unfortunate. Slater & China (1961) recognized that the genus *Blissus* was composite and appealed to the International Commission to use its plenary powers to set aside *Blissus hirtulus* Burmeister as type species of *Blissus* and establish *Blissus leucopterus* Say, the economically important North American "chinch bug" as the type species of *Blissus*. This appeal was rejected by the Commission (Opinion 705, 1964), which placed *Blissus* on the official list of Generic Names with *Blissus hirtulus* as type species. The result of this decision is to place all the North American species of *Blissus* presumably in the genus *Neoblissus* Bergroth. Since the Commission's decision several prominent Hemipterists have requested us to petition the Commission for a reconsideration of the case. Until the feasibility and desirability of such an action has been determined, we hesitate to upset current usage by adopting the Commission's ruling. Accordingly, we hold the matter in abeyance here and continue to use *Geoblissus* Hidaka for the taxon to which *Blissus hirtulus* belongs and which, under the ruling of the International Commission, would be *Blissus sensu strictu*. To this taxon belong *Blissus hirtulus* Burmeister, *Blissus niger* Slater, *Blissus putoni* Jakovlev, and *Geoblissus mekongensis* n. sp. The taxon may be characterized as follows: head, pronotum above, and scutellum shining, non-pruinose; fore tibiae flattened and expanded, a dense row of sharp elongate spines along the outer tibial margin (fig. 29); fore femora mutic; fore coxal cavities open; antennae short and clavate; lateral thoracic surface pruinose; scutellum with a broad, elevated, shining, "T"-shaped central and basal area, basal lateral angles produced into a blunt, laterally directed tubercle (usually obsolete in *mekongensis*); apical corial margin deeply concave basally; densely clothed with very elongate, upstanding and semidecumbent hairs; metathoracic scent gland auricle broad, rounded, and auricular; mesosternum with a deep median furrow.

The genus is restricted in distribution to the Ethiopian and Oriental faunal regions.

KEY TO THAILAND AND INDOCHINA SPECIES OF GEOBLISSUS

1. Scutellum with anterolateral angles produced into tubercular spines; apex of corium with dark brown spot, contrasting with remainder of wing *hirtulus* Burmeister
Scutellum usually lacking anterolateral spines; apex of corium white, lacking dark spot, nearly unicolorous with remainder of wing *mekongensis* n. sp.

Geoblissus mekongensis Slater, Ashlock, and Wilcox, new species Fig. 26-28.

Head, pronotum, and scutellar elevation black, shining, with collar, posterior pronotal margin between humeri yellowish brown, scutellum very narrowly dull gray pruinose laterad of elevation and across base, clavus and corium translucent white with an opaque white macula at apical corial angle, membrane transparent hyaline; antennae and legs uniformly dark reddish brown, tarsi and antennal segment 4 a contrasting sordid yellow, abdomen dark red-brown; head and anterior lobe of pronotum finely, obscurely, and shallowly punctate, more coarsely punctate in area of transverse impression; clothed with elongate silvery upright and semidecumbent sericeous hairs.

Head declivent, little convex across vertex, tylus extending nearly to distal end of antennal segment 1, eyes small, transverse, protrudent, set slightly away from anterolateral pronotal margins, head length 0.46 mm, width 0.64 mm, interocular space 0.42 mm; pronotum with

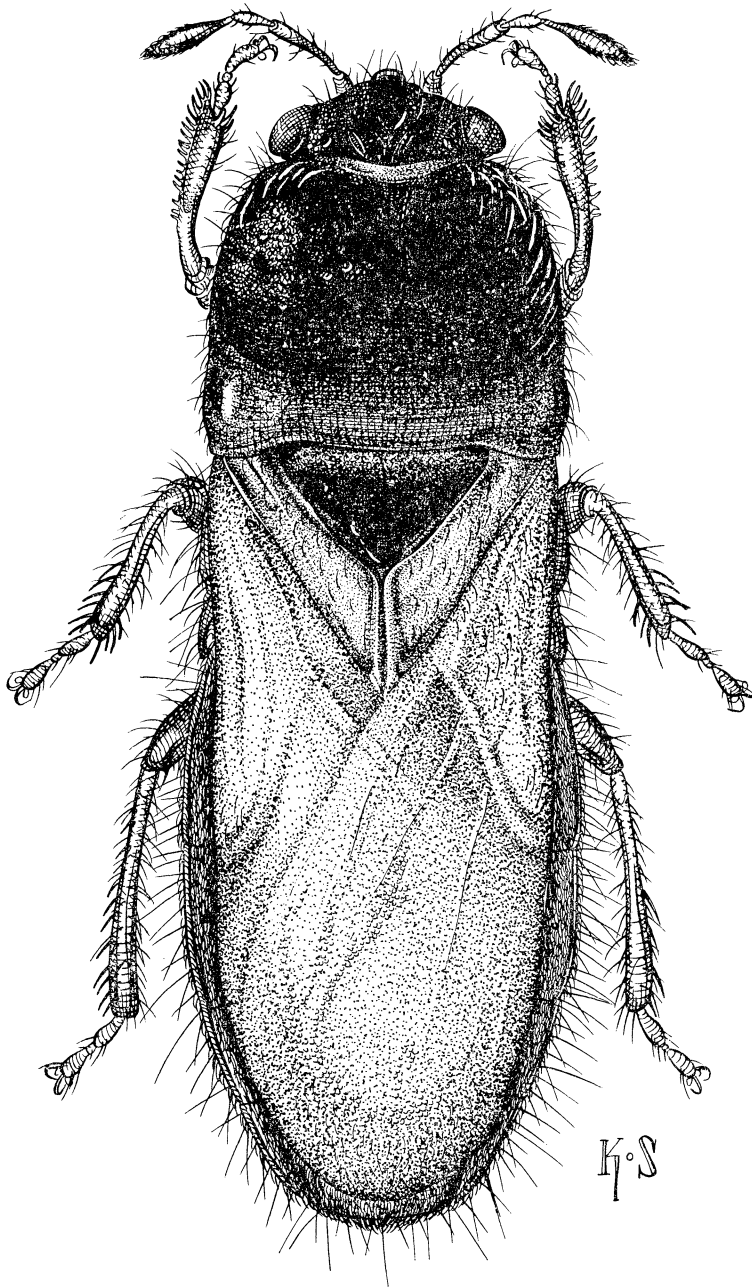


Fig. 26. *Geoblissus mekongensis*, n. sp., dorsal view.

lateral margins nearly parallel from humeri to anterior extension of calli, slightly sinuate in area of transverse impression, abruptly and arcuately tapering from calli to anterior margin, posterior margin straight before scutellar base with very short posterior lobes laterally, transverse impression broad, shallow, complete, a shallow, obsolete, median depression present longitudinally on anterior lobe, anterior lobe of metapleuron strongly swollen, pronotal length 0.78 mm, width 1.06 mm; scutellum without or with extremely obsolete sub-basal lateral projections, scutellar length 0.30 mm, width 0.49 mm; hemelytra with apical corial margin concave basally, incised at nearly a right angle at level of apex of claval commissure, lateral margins nearly parallel, tapering slightly to rounded apex of membrane, membrane nearly reaching apex of abdomen, distance apex clavus - apex corium 0.49 mm, distance apex corium - apex abdomen 1.08 mm; fore femora moderately incrassate, middle and hind tibiae armed with numerous scattered, short, sharp spines; labium reaching onto anterior portion of mesosternum, remote from mesocoxae, segment 1 reaching base of head, length labial segments I 0.29 mm, II 0.27 mm, III 0.19 mm, IV 0.20 mm; antennae with segments 2 and 3 slightly clavate, 4 broadly, ovately fusiform, noticeably wider than preceding segments, length antennal segments I 0.11 mm, II 0.23 mm, III 0.11 mm, IV 0.23 mm; total length 3.23 mm.

Holotype ♂ (BISHOP 8806), Laos: Vientiane, 29.V.1965, bunchgrass, P. D. Ashlock. Paratypes: 84 ♂♂, 57 ♀♀, 15 nymphs, same data as holotype; 45 ♂♂, 58 ♀♀, 1 nymph, same data as holotype except 28.V.1965; 2 ♂♂, same data as holotype except 27.V.1965. LAOS: 1 ♀, Pakse, 23.V.1965, P. D. Ashlock; 1 ♀, same except 16.V.1965, bunchgrass; 1 ♀, same except 21.V.1965, bunchgrass nr. Mekong R. (In BISHOP and Slater coll'n.).

5th instar nymph (alcohol) (fig. 27): Coloration dark brown as follows: head, pronotum, wing pads, area about scent gland auricles (prominently anterior to opening, but only as a narrow strip posteriorly), a transversely oval spot on either side of midline on posterior 1/3 of abdominal tergum 7, all of terga and sterna 8 and 9, mesal area of sternum 7, thoracic pleura, antennae, and legs, becoming dusky gray on tibiae and tarsi; abdomen pale testaceous (indications of reddish coloration on terga 3-7 contrasting with white coloration of segments 1 and 2); epicranial stem very short; fore tibiae with spines along lateral surface much shorter than in adults, with those near distal end more elongate than others, fore tibiae flattened, with an additional series of preapical spines transversely across ventral surface, middle and hind tibiae with prominent spines on lateral and dorsal faces; labium extending onto mesosternum.

4th instar nymph (alcohol): Similar to above, abdominal segments 3-7 definitely red, con-

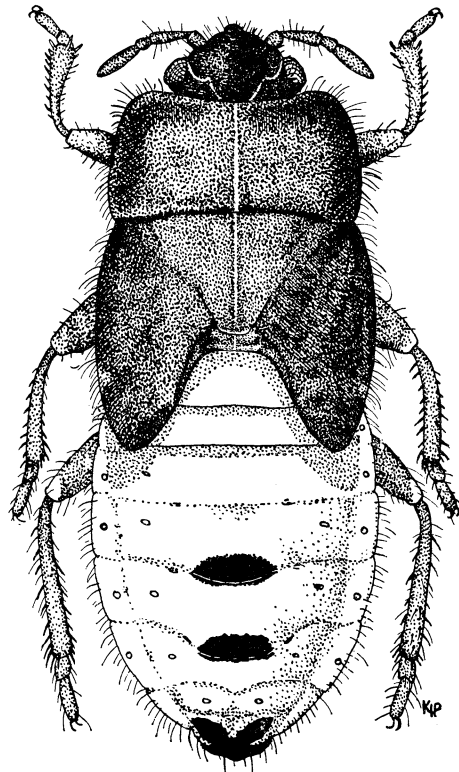


Fig. 27. *Geoblissus mekongensis*, n. sp., dorsal view, 5th instar nymph.

trasting strongly with white segments 1 and 2, dark coloration of tergum 8 reduced to a pair of plates on either side of midline on posterior 1/3 of segment, dark patches on tergum 7 small, triangular; tibial spines relatively reduced, fore tibiae only slightly flattened and splayed out.

3rd instar nymph (alcohol): Dark areas absent on abdominal terga 7 and 8; tibial spines small and reduced.

Mekongensis is closely related to *Geoblissus hirtulus* (Burmeister), but is usually separable by the reduction or, in most specimens, the lack of lateral scutellar projections, lack of dark coloration in the forewing, and by the more slender, elongate body form.

The very long series of this species from a single locality has enabled us to observe a potentially confusing type of variation in these fossorial insects. In many specimens, the tibial spines on all of the legs are short and blunt rather than elongate and pointed; sometimes they are reduced to very small pegs that barely project from the tibial surface. We believe this to be the result of wear by the insect either digging in the sand or pushing between the surfaces of the leaf sheath. Moreover, most specimens with "worn" spines have a part or almost completely glabrous pronotal surface where, presumably, the elongate hairs have been broken or worn off, and several have the membrane broken and frayed. For some reason, the majority of specimens showing "wear" have the entire posterior 1/2 of the pronotum a bright reddish tan instead of merely the extreme posterior margin, as in "unworn" specimens. The legs and antennae are often paler in such specimens, also. Perhaps in some areas of the body the insect becomes paler with age rather than darker, as one might have surmised. Students of this complex should, therefore, take into account this type of variation when dealing with members of the genus.

Geoblissus mekongensis and *Ischnodemus nigrocephalus* were taken together on the same bunch grasses (fig. 28a) growing on a sandbar at a bend of the Mekong River just before the monsoon season. When beaten from the grass clumps, the 2 species reacted very differently. *G. mekongensis*, the structure of whose legs suggests a digging function, immediately began to dig actively, and in a few seconds was completely buried in the sand (fig. 28b). *I. nigrocephalus* specimens, on the other hand, remained motionless when beaten onto the sand and made no attempt to dig. Several authors, notably Southwood (1960) and Sweet (1964), have commented recently upon the correlation of the development of brachyptery to the relative permanence of habitat. It is significant, therefore, to note that, while the occurrence of brachyptery in the subfamily Blissinae is widespread, all specimens of the long series of both species are completely macropterous. The sandbar habitat is unquestionably a temporary one. Two weeks after the type series was taken, Dr Nixon Wilson of the Bishop Museum noted that the river had risen to the point where the sand bar had become an island. In conversation with Mr Jaques A. Rondon, it was discovered that this sand bar is completely covered annually during the monsoon season.

***Geoblissus hirtulus* (Burmeister)** Fig. 29.

Blissus hirtulus Burm., 1835, *Handb. Ent.* p. 290.

Geoblissus rotundatus Hidaka, 1959, *Kontyû* 27: 269. **New Synonymy.**

This appears to be a very wide ranging species, occurring from Africa through Syria,

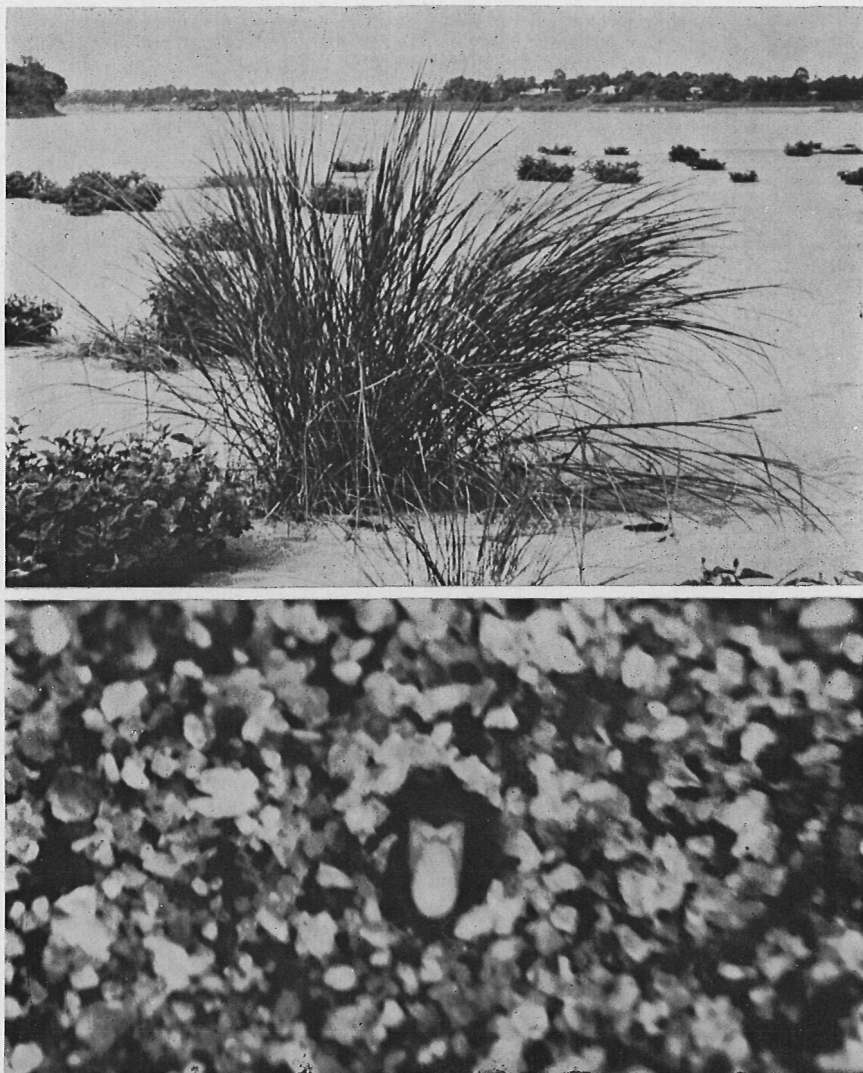


Fig. 28. a, upper, Bunch grass host plant of *Geoblissus mekongensis* and *Ischnodemus nigrocephalus* at Vientiane, Laos. Mekong River and Thailand in background. b. lower, *Geoblissus mekongensis* digging itself into sand.

India, southern China, and southern Japan to Thailand and Borneo. We have carefully compared topotypes of Hidaka's *Geoblissus rotundatus* with what we believe to be the holotype of *hirtulus* Burmeister, and cannot detect significant differences.

The Berlin-Humboldt Museum possesses a male specimen bearing the following labels: 1) "1804," 2) "*hirtulus* Klug* Burm.," 3) a green label with a species name based on narrowness, 4) a green label "Marabut Etr." (spelling?). We believe that this specimen represents the type locality, noting that Klug says "habitat ad Marabut Alexandriae."

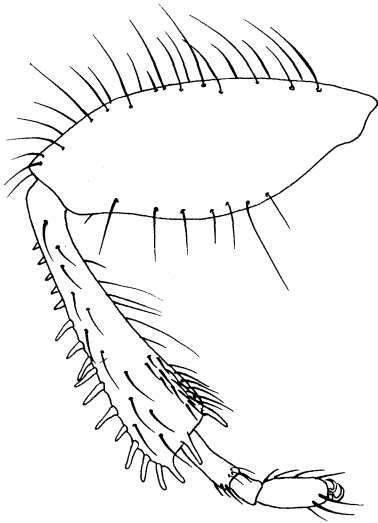


Fig. 29. *Geoblissus hirtulus* (Burmeister), fore leg.

There is a large lake near Alexandria, Egypt, named Maryut that could well be the type locality. We have not been able to locate a Marabut in present Ethiopia. In any event, we believe the Berlin-Humboldt specimen represents the holotype of *hirtulus* and an appropriate label has been affixed.

Most of the records of *hirtulus* refer to *Stenoblissus curtulus* (Dohrn).

Lindberg (1948) reports *hirtulus* from Cyprus on *Aeluropus villosus*, but this may well refer to a species of *Stenoblissus*. Burmeister (1835) notes the species as being taken on sand. From the morphology of the insect and from the known habitat of the related *mekongensis* n. sp., a sand habitat would, indeed, seem to be indicated.

MATERIAL EXAMINED. Holotype as discussed above. SE ASIA, SIAM: 1 ♂, Loey Prov. ? (Csan Tong?) (label in Thai characters), 2. III. 1958, Lot 505. In P. D. Ashlock collection. Other localities, CHINA: 2 ♂♂, 2 ♀♀, Hong Kong, J. J. Walker; 1 ♂, Fukien, Changting, Hotien, 15. IV. 1941, T. C. Maa; 1 ♂, Fukien, Shaowu, 17. IV. 1945, Maa; 1 ♂, Prov. Fo-Kien, 25. VIII. 1905 (G. Siemssen); 1 ♀, Fukien, Changting City, 23. IV. 1941, Maa. JAPAN: 1 ♂, Kyushu, 1927, C. F. Baker; 1 ♂, 1 ♀, Kii, Wakayama, 1950. 4. 10, S. Groto. S. INDIA: 1 ♂, Kerikal Terr., Kurumbagarum, 17. VIII. 1951, P. S. Nathan. EGYPT: 2 ♂♂, Assouam. SABAH N. BORNEO: 1 ♀, Jesselton, 30. XII. 1962, Y. Hirashima. 3 ♂♂, no locality, "Nr. 1804." In BMNH, BISHOP, USNM, BUDAPEST, BERLIN-HUMBOLDT, Scudder, Ashlock and Slater coll'n.

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