Biosystematic Studies of Ceylonese Wasps, XVI: A Revision of *Gastrosericus* Spinola (Hymenoptera: Sphecoidea: Larridae)

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SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY · NUMBER 436

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Biosystematic Studies of Ceylonese Wasps, XVI: A Revision of *Gastrosericus* Spinola (Hymenoptera: Sphecoidea: Larridae)

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SMITHSONIAN INSTITUTION PRESS
City of Washington
1986

ABSTRACT

Krombein, Karl V., and Wojciech J. Pulawski. Biosystematic Studies of Ceylonese Wasps, XVI: A Revision of *Gastrosericus* Spinola (Hymenoptera: Sphecoidea: Larridae). *Smithsonian Contributions to Zoology*, number 436, 20 pages, 34 figures, 1986.—Six species of *Gastrosericus* are recorded from Sri Lanka (only *rothneyi* was previously known from this country), and a key to their identification is provided. Three previously known species are redescribed and three endemic species, *asilivorus* Pulawski, *tissa* Pulawski, and *vedda* Pulawski, are described. *Gastrosericus maracandicus dubius* Gussakovskij, 1931, is synonymized with *waltlii* Spinola, 1839, and *thailanditus* Tsuneki, 1974, with *rothneyi* Cameron, 1889. A lectotype is designated for *rothneyi* Cameron. Behavioral and ecological data are presented for the first time for *asilivorus*, *rothneyi*, and *tissa* and compared with details known for other species. Two unusual discoveries are the use of asilid flies as prey by *asilivorus* instead of the orthopteroids used by other species; and the placement of the egg on the ceiling of the cell of *rothneyi* rather than on one of the prey.

OFFICIAL PUBLICATION DATE is handstamped in a limited number of initial copies and is recorded in the Institution's annual report, *Smithsonian Year*. SERIES COVER DESIGN: The coral *Montastrea cavernosa* (Linnaeus).

Library of Congress Cataloging in Publication Data
Krombein, Karl V.
Biosystematic studies of Ceylonese wasps, XVI.
(Smithsonian contributions to zoology ; no. 436)
Bibliography: p.
Supt. of Docs. no.: SI 1.27:436
1. Gastrosericus—Classification. 2. Insects—Classification. 3. Insects—Sri Lanka—Classification. I. Pulawski, Wojciech J. II. Title. III. Series.
QL1.S54 no. 436 [QL568.S7] 591 s [595.79] 85-600250

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Introduction

Gastrosericus Spinola is one of the most distinctive genera of Ceylonese Larridae. These small, mostly black wasps are unique in the family in having only two submarginal cells and in the shape of the modified posterior ocelli, which are long, narrow, and oriented to form a shallow angle with each other. Most species in Sri Lanka range from 5 to 9 mm long, but males of *vedda* may be only 4 mm long and females of *waltlii* may attain a length of 12 mm. The head and legs may bear white, yellow, or red markings; the thorax is black except for a yellow pronotal lobe; and the gaster is black or all or partly red.

The genus was not recorded from Sri Lanka until Bohart and Menke (1976) listed *rothneyi* Cameron as occurring there, based on material collected during field work of the Smithsonian Institution's "Ceylon Insect Project." The first author (KVK) collected extensively during a dozen trips to Sri Lanka from 1969 to 1981, obtained tens of thousands of wasps and made biological observations on many species. The second author (WJP) undertook identifications of more than 80 species in the Larridae. Among these he found six species of *Gastrosericus*; three of them are endemic new species.

The present study was drafted by the first author developing the section on behavior and ecology and the second author preparing the section on systematics. The two authors exchanged drafts of their respective sections and, after essential modifications, agreed upon the contribution presented here.

The terminology used in the systematic section is that adopted by Bohart and Menke (1976). The symbol ! followed by the word "Holotype" or "Lectotype" in the synonymical references indicates that such a specimen was examined by the second author.

ABBREVIATIONS.—The following abbreviations are used for institutional or personal collections:

BMNH British Museum (Natural History), London
CAS California Academy of Sciences, San Francisco

Karl V. Krombein, Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560. Wojciech J. Pulawski, Department of Entomology, California Academy of Sciences, San Francisco, California 94118.

IMZU	Istituto e Museo di Zoologia dell'Università, Turin
OUM	Oxford University Museum, Oxford
USNM	United States National Museum collections in National Museum of Natural History, Smithsonian Institution, Washington, D.C.
WJP	W.J. Pulawski, San Francisco (personal collection)
ZIL	Zoological Institute, Academy of Sciences of the USSR, Leningrad

Collectors of specimens in type series of new species are abbreviated as follows:

DWB	D.W. Balasooriya
GR	G. Ratnavira
KVK	K.V. Krombein
LJ	L. Jayawickrema
LW	L. Weeratunge
MJ	M. Jayaweera
PBK	P.B. Karunaratne
PF	P. Fernando
PL	P. Leanage
SK	S. Karunaratne
SS	S. Siriwardane
TG	T. Gunawardane
TW	T. Wijesinhe
VG	V. Gunawardane

ACKNOWLEDGMENTS.—Field work by Krombein in Sri Lanka was funded by Smithsonian Research Foundation Grant SFG-0-6955, and travel was provided in part by Fluid Research Funds from former Secretary S. Dillon Ripley. Within Sri Lanka Krombein is indebted to W. Thelma T.P. Gunawardane, presently Director, Department of National Museums, who planned itineraries and arranged accommodations for field parties. P.B. Karunaratne, former Curator of Insects at the Museum, accompanied many of the field parties and participated in making some of the behavioral observations as well as in collecting some of the specimens on which this study is based.

We are grateful to the following for critically important material: Tikahiko Naito, Kobe University, Japan, for the loan of voucher specimens of *Gastrosericus siamensis* Tsuneki whose prey and nesting behavior were reported by Iwata and Yoshikawa (1964); Christopher O'Toole, Oxford University Museum, England, for sending two syntypes of *rothneyi* Cameron; Tadashi Tano, Fukui Prefectural Institute for Educational Research, Japan, for the loan of the holotype of *siamensis* Tsuneki and the holotype and a single paratype of *thailanditus* Tsuneki; and Colin R. Vardy, British Museum (Natural History), London, for the loan of the type of *wroughtoni* Cameron and other specimens from India.

Masashi Kimura, Tokyo, former Illustrations Intern, Smithsonian Institution, prepared illustrations for the section on behavior and ecology; and Mary Ann Tenorio, California Academy of Sciences, drew the illustrations of morphological details and took the scanning electron micrographs.

The first author thanks the following for identifications of prey or natural enemies: Nicholas D. Jago, Centre for Overseas Pest Research, London (Acrididae); Lloyd V. Knutson, Systematic Entomology Laboratory, U. S. Department of Agriculture, Washington (Asilidae); and Yu G. Verves, Kiev University, USSR (Sarcophagidae).

Both authors appreciate the thorough technical reviews provided by Frank E. Kurczewski, Syracuse University, and Donald R. Davis, Smithsonian Institution.

Behavior and Ecology

Together with my Sri Lanka collaborators, I collected six species in Sri Lanka, and obtained behavioral data on three of them, *asilivorus*, *rothneyi*, and *tissa*. Most of the observations were made in the Dry Zone because *Gastrosericus* prefer the more xeric habitats and are almost never found in areas of copious rainfall, such as in the rain forests.

Relatively little has been published on the life history of members of the genus. Arnold (1922:120) reported that in Zimbabwe *simplex* Arnold nested in a sandy path and preyed upon nymphal *Tridactylus* species (Tridactylidae), a pygmy mole cricket. He also said (Arnold, 1944 [1945]:92) that two specimens of the Madagascan *madecassus* (Kohl) were pinned respectively with a nymphal grasshopper (Acrididae) and a small cercopid (Homoptera). The latter prey record is

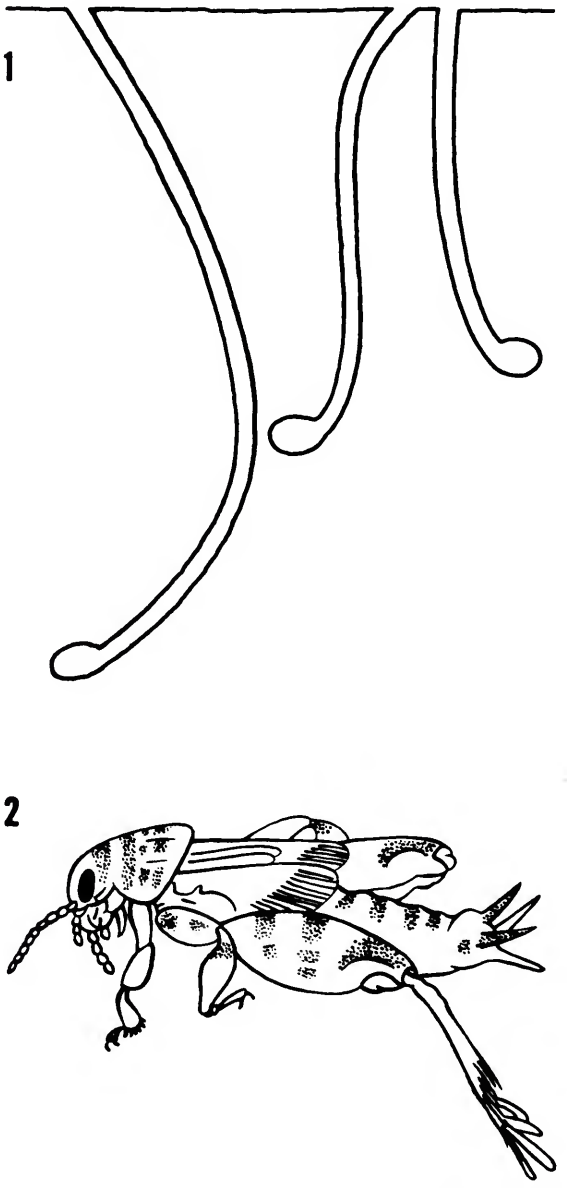
perhaps erroneous, but my experience with *asilivorus* establishes that the prey of *Gastrosericus* species are not necessarily restricted to Orthoptera. Honoré (1942:53) noted that in Egypt *waltlii* Spinola nested in the ground at the edge of the desert or in cultivated areas, and preyed upon young nymphal crickets (Gryllidae).

The only detailed account of nesting was that of *siamensis* Tsuneki, 1974, in Thailand by Iwata and Yoshikawa (1964:389–390, figs. 3, 5), which was identified for them as *binghami* (the latter actually is a junior synonym of *rothneyi*). The wasps began their nests in a bare area of fine loose sand. They brought up a load of damp sand when excavating and flew 10–20 cm from the burrow entrance to drop the sand. The wasp always made a temporary closure of sand at the entrance when leaving the nest, followed by a short orientation flight. This species preyed upon nymphal and adult pygmy mole crickets, 3–6 mm long, belonging to a single species of *Tridactylus* (Figure 2). The prey was transported in flight to the nest, venter to venter, and placed on the ground near the entrance. The prey was carried into the burrow by the hind legs after the wasp scratched open the entrance. Three burrows were 4.6, 8, and 10 cm long, 2.5 mm in diameter, penetrated the ground perpendicularly or at an angle of 45°–50° to the surface, curved once or twice, and terminated in an ellipsoidal cell, 3–3.5 mm wide and 6 mm long (Figure 1). Each of the three cells excavated contained only a single prey but no egg. The observers supposed that the egg would have been deposited on one of the prey brought into the cell later. In view of my findings on *rothneyi*, however, it is possible that the egg might already have been placed on the ceiling of the cell.

Source material for the observations in Sri Lanka are as follows:

Gastrosericus tissa: 2475 C; 12478 B.
Gastrosericus rothneyi: 21675 A; 101377 D,E,I.
Gastrosericus asilivorus: 10977 B,C,D,Q,R; 101077 H,I,J.

Any specimens observed (wasps, prey, parasites) have been assigned the same code number as the field note in which each was recorded. Field notes and voucher specimens are in the National Museum of Natural History, Smithsonian Institution.



FIGURES 1, 2—Nest and prey of *Gastrosericus siamensis* Tsuneki: 1, nest profiles; 2, nymphal prey, *Tridactylus* species. (Redrawn from Iwata and Yoshikawa, 1964).

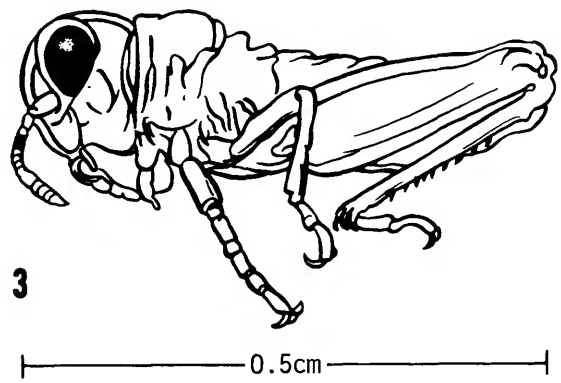


FIGURE 3.—Nymphal prey, *Acrotylus humbertianus* Saussure of *Gastrosericus tissa* Pulawski, new species.

1. *Gastrosericus tissa* Pulawski, new species

FIGURE 3

I obtained only prey records for this uncommon species. It is similar to *rothneyi* in that it captures very small nymphal Acrididae.

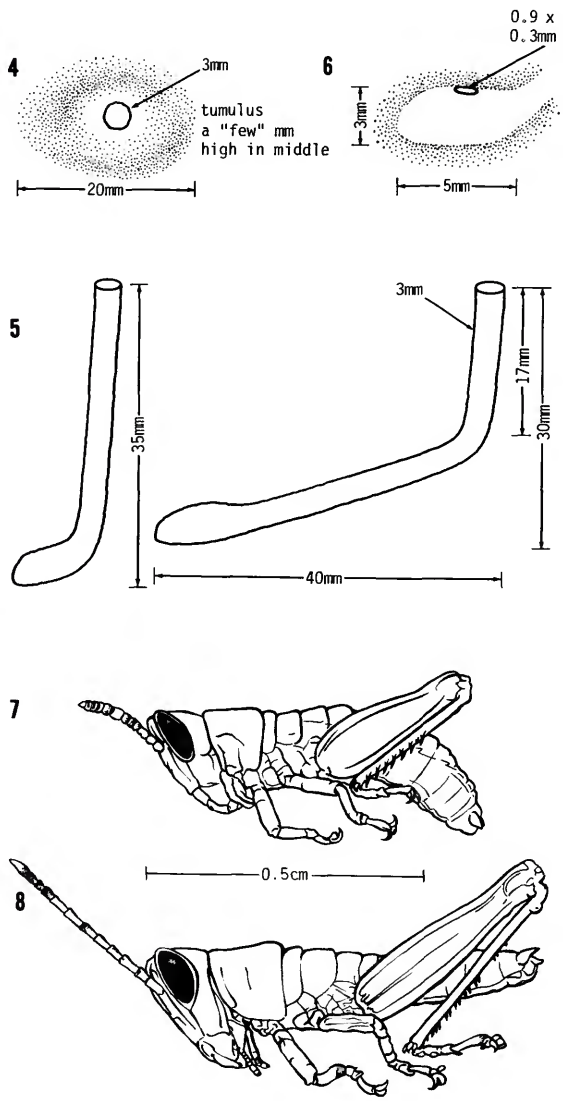
I caught the first female in a level, sparsely vegetated sandy area near the coastal dunes at Palatupana beach, Hambantota District, at 1440 on 4 February 1975. The wasp, 5 mm long, was struggling to turn over a nymphal grasshopper of the same size, which it had just stung. This nymph (Figure 3) and an adult captured at the same locality, apparently of the same species, were identified as *Acrotylus humbertianus* Saussure (Oedipodinae), a species widespread in the Indian subcontinent.

P.B. Karunaratne found another female, 4.8 mm long, on sand near the beach at Silavathurai, Kondachchi, Mannar District, at 1230 on 24 January 1978. The wasp held a paralyzed green nymphal grasshopper, 5.5 mm long, and was trying to find her nest entrance.

4. *Gastrosericus rothneyi* Cameron

FIGURES 4–8

NEST STRUCTURE (Figure 5).—The first observation of nesting was at Labugama Reservoir, Colombo District, at 1230 on 16 February 1975. A female was captured as she emerged from her burrow. The nest was in a level path of hard-packed sandy loam fill with interspersed fine gravel. The burrow went in at an angle of 60°–70° for 51 mm and had a diameter of 3 mm. The nest had not been completed for there was



FIGURES 4–8.—4–6, *Gastrosericus rothneyi* Cameron: 4, spoil heap around burrow entrance; 5, nest profiles; 6, cell profile from slightly below to show egg placement on ceiling; 7, nymphal prey, *Tristria pulvinata* Uvarov; 8, nymphal prey, *Stenocatantops splendens* (Thunberg).

only a little loose earth in the bottom and no cell.

Later Karunaratne and I found three females, 7–8 mm long, nesting in flat, damp sandy loam at the Padaviya Antiquities Site, Anuradhapura District, on 13 October 1977 between 0930 and 1340. Each of the three nests contained only a single cell, none of which was completely provisioned. During excavation of the burrow the female deposited the grains of soil in a spoil heap (about 20 mm in diameter and several mm high) surrounding the burrow entrance (Figure 4). Each burrow was perpendicular and 3 mm in diameter. It continued to a depth of 35 mm in two nests and ended in a horizontal cell 5 mm long and 3 mm wide. The burrow of the third nest was perpendicular for only 17 mm, then continued downward at a slight angle and terminated in a cell 30 mm below the surface and about 40 mm horizontally from the burrow entrance. None of the cells had a temporary closure. We do not know whether the wasps might have constructed additional cells after completing the first cell we observed.

PREY.—The three unicellular nests contained completely paralyzed, pale green, first instar nymphs of Acrididae, 5.8–7.2 mm long, two in one nest, three in another and six in a third. One wasp brought in the sixth prey as we were excavating her nest. There were four female and five male nymphs of *Tristria pulvinata* Uvarov (Tropidopolinae) (Figure 7) and one male nymph of *Stenocatantops splendens* (Thunberg) (Catantopinae) (Figure 8).

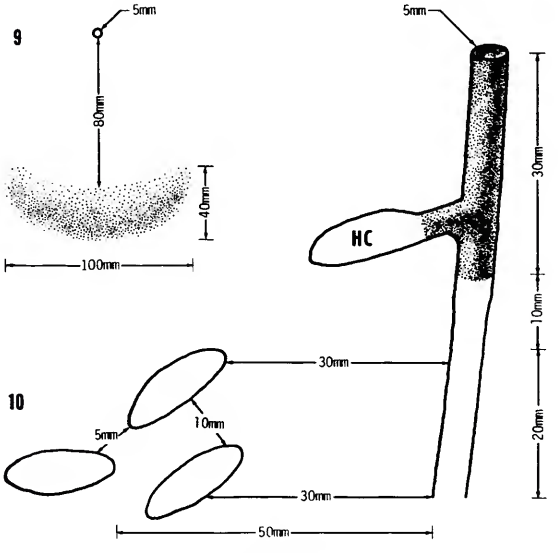
EGG PLACEMENT.—A most unusul habit is that the female places its egg on the ceiling of the cell (Figure 6), presumably before the first prey is brought in. We noted this placement in only the cell containing three prey. The egg was found on a loose grain of earth at the bottom of the cell containing six prey, probably having been dislodged from the ceiling during excavation of the nest. We did not find an egg in the first nest excavated, but we examined only the bottom of the cell, not the ceiling. The length of the egg is 0.9 mm and its width, 0.3 mm.

NATURAL ENEMIES.—A cuckoo wasp (Chrysididae), an apparently undescribed species of *Hedychridium*, 4.2 mm long, is probably parasitic on *G. rothneyi*. We saw a female enter the burrow of one wasp twice, and captured it when it emerged the second time. There was no chrysidid egg in the cell or on the prey.

5. *Gastrosericus asilivorus* Pulawski, new species

FIGURES 9–12

This species is of exceptional interest in that it preys upon adult asilid flies rather than orthopterous nymphs as do its congeners. We found a small aggregation of about six females on 9 October 1977 at an abandoned World War II antiaircraft battery position near the China Bay Ridge Bungalow in Trincomalee, Trincomalee District. We observed their behavior intermittently during that and the following day between 1100 and 1500. They were nesting in flat, damp sandy loam covered with sparse, small prostrate plants and grasses, and the entire nesting area was open to the sun throughout the day. We collected only one female as a voucher specimen.



FIGURES 9, 10.—Nest of *Gastrosericus asilivorus* Pulawski, new species: 9, spoil heap behind burrow entrance; 10, nest profile, stippled area represents loose aggregation of soil lumps (HC = holding cell).

We revisited China Bay in July 1978 and again in February 1979 but found no *asilivorus*. We had captured another female earlier, 24–26 September 1977, in a sandy stream bed at Mau Aru, Monaragala District.

NEST CONSTRUCTION.—Burrow excavation proceeded rapidly, the wasp backing out of the burrow with a lump of soil, 1.0–1.5 mm in diameter, between her forelegs and head. She then walked backward from 60 to 150 mm to deposit the load on the spoil heap. The low spoil heaps were crescentic and about 100 mm wide (Figure 9). Three of them were 60–100, 80–120 and 100–150 mm from the nest entrance.

NEST STRUCTURE (Figure 10).—The burrows were 3–5 mm in diameter but occasionally the upper section might be as wide as 8 mm when the nest was begun in drier, more sandy soil. The burrows were usually perpendicular to the surface. Occasionally, however, they penetrated the substrate at an angle of 20°–30° for 10–20 mm and then went downward at a very steep angle or perpendicularly.

The wasps probably had begun nesting very recently for we found no completed nests. Evidence from two nests demonstrated that the wasp may or may not complete the burrow to its lowest level before constructing the first cell. In one nest the lowest cell at 40 mm depth had a small larva, and cells at shallower depths contained either an egg or neither egg nor larva. Another nest had a small larva in a cell at 40 mm, a newly hatched larva in a cell at 50 mm, and two cells without eggs at 50 and 60 mm.

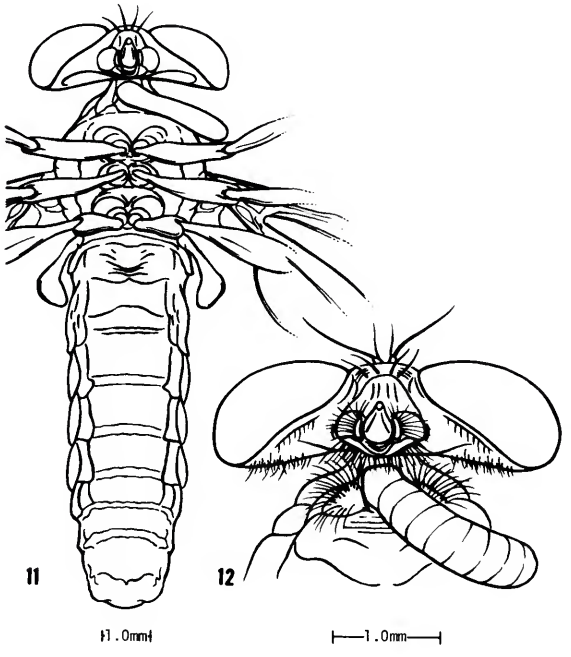
The ellipsoid cells, about 20 mm long and 5–7 mm wide, were horizontal, angled downward as much as 45°, or were perpendicular. They were arranged around the burrow axis at varying distances from 20 to 50 mm, sometimes radially at the same level or at progressively higher levels. The wasp did not make a firmly packed plug to seal a cell but placed only loose earth between the cell and the burrow axis. Twenty-two of the cells were at depths of 25–80 mm (mean 50 mm). We found as many as seven cells in a single uncompleted nest.

We watched one wasp removing loads of reddish soil to the spoil heap for 1½ hours. The wasp brought up a load of soil 8–10 seconds after reentering the burrow. After completing her nest she started to bring in grains of light sand from around the burrow entrance to form a temporary closure within the burrow.

HUNTING AND PROVISIONING.—Most wasps flew directly from the burrow to hunt for prey, but one individual made a brief low orientation flight over the nest area and returned with a prey 70 seconds later. She backed out of the burrow with one load of soil, made another brief orientation flight, and returned with another prey in 2¾ minutes. Another wasp made a provisioning flight lasting 2⅓ minutes. We noted that frequently after a wasp brought in a prey, she would excavate a load or two of soil before departing on the next provisioning flight. The burrows usually were not filled to the surface with loose soil when the wasp flew off for prey but did have such loose soil to within 5 mm of the surface. The wasp always flew directly into the nest with a prey and did not land first at the entrance. The fill in the burrow was so loose that the wasp disappeared rapidly, with no sign of soil being excavated to facilitate ingress.

We noted prey capture once when a wasp was seen struggling on the ground with an asilid. Apparently it must have pounced on the fly in the vicinity of the nest. We did not observe stinging, but paralysis was complete, only a few flies exhibiting weak reflex movements of the tarsal segments or parts of the genitalia when exhumed.

PREY.—The flies belonged to two species of *Xenomyza*, an asilid with large goggle-eyes that "indicate a degree of alertness unusual even among Asilidae" (Oldroyd, 1972:255). Altogether we recovered 78 females and 49 males of a more slender species, 7.0–9.5 mm long, and five females and six males of the second heavier-bodied species, 7.0–7.5 mm long. Most cells contained both sexes of the smaller species. Specimens of the larger species occurred at random in cells containing a preponderance of the smaller species. A number of flies were probably teneral specimens because the abdomens shri-



FIGURES 11, 12.—Prey and larva of *Gastrosericus asilivorus* Pulawski, new species: 11, venter of adult prey, *Xenomyza* species, young larva attached at cervix; 12, detail of venter of head and anterior thorax of adult prey to show young larva attached to intersegmental area of cervix.

veled when the flies dried. The prey selection is so unusual that one might speculate that it may have been entirely fortuitous. Perhaps the shift from the normal orthopterous prey of other *Gastrosericus* and most other larrine wasps was occasioned by a mass emergence of the two species of *Xenomyza* that were attacked while in the vulnerable teneral condition.

Another unusual behavioral trait is that the female accumulates prey in the burrow among the grains of loose soil or in a holding cell 10–20 mm from the burrow axis. We found two prey in the burrow at 20 mm in one nest, and one at 40 mm in another nest. The holding cell, if one is present, is 25–30 mm below the surface. We found a holding cell with three flies and no wasp egg in one nest, and five prey with no egg in a second.

The number of flies in 22 completed cells ranged from 2 to 10 (mean 4.8). The cephalic end of the egg, which is 1.6 mm long and 0.3–0.4 mm wide, is attached ventrally to the cervical region between the head and thorax (Figure 11). The egg may extend along the posterior margin of the eye or backward along the thorax. The eggs are attached so loosely that we may have lost some while digging up the nests, or, perhaps, some cells may never have contained an egg. Ten of 22 completed cells contained neither wasp egg nor larva. Two completed cells each contained only three flies and an egg; presumably these would have developed into male wasps. The newly hatched larva (Figure 12) ruptures the delicate intersegmental membrane in the cervical region to commence feeding.

NATURAL ENEMIES.—The only parasites encountered were miltogrammine flies (Sarcophagidae). I captured an adult female *Apodacra (Parapodacra) ceylonica* Verves, 5 mm long, perched on a small plant adjacent to one nest that was being excavated by the wasp.

We dug up a one-celled nest on 9 October 1977 that contained seven paralyzed asilids but no wasp egg. There were two miltogrammine maggots next to the fly in the inner end of the cell, and we saw a third maggot within the abdomen of this prey. These maggots formed puparia on 11 and 12 October and two females and one male of *Metopia* (*Australoanicia*) *nudibasis* (Malloch), 3.5 mm long, eclosed 19 and 21 October.

We found two small miltogrammine(?) maggots in a cell of a seven-celled nest but were unable to rear them.

Summary

The observations accumulated during our studies in Sri Lanka, together with previously published information, enable us to present a markedly broader picture of the generic life cycles than before. The following generalizations can be made.

1. The nest is established in the ground (*asilivorus, rothneyi, siamensis, simplex, tissa, waltlii*). Ground nesting is postulated for all members of the genus inasmuch as the females have a rake

of spines on the foretarsus and a flat, triangular pygidium.

2. When digging the nest, the female does not use her tarsal rake for evacuating soil from the burrow. She holds a load of sand between her head and forecoxae, moves away, then drops the load (*asilivorus*, *siamensis*). Of these, *asilivorus* walks on the ground, while *siamensis* flies away with her load. Apparently, various projections present in the females of *Gastrosericus* (genal tooth or teeth in many species including *asilivorus* and *rothneyi*, propleural process in *madecassus* and *swalei*) are structures that help in evacuation of soil from the nest.

3. The material excavated is scattered over the ground by *siamensis* but deposited as a low, crescentic tumulus by *asilivorus*, and as a circular tumulus around the nest entrance of *rothneyi*.

4. The nest burrow is perpendicular to strongly inclined (60°–90°) to the ground surface (*asilivorus*, *rothneyi*, *siamensis*), although it may start at a lesser angle (20°–30°) in some *asilivorus* nests and then penetrate at a much steeper angle. This obviously is a correlation with the method of soil removal described above in 2. Burrows are not so strongly inclined in sphecids that use their foretarsal rake for evacuating soil particles from the burrow.

5. Nests of *asilivorus* are multicellular but may be uni- or multicellular in those of *rothneyi* and *siamensis*.

6. The nest is temporarily closed by *siamensis* during the provisioning period when the female is away, but it is permanently open in those of *asilivorus* and *rothneyi*. However, *asilivorus* makes a plug of loose soil a short distance below the surface. Correspondingly, the female *siamensis* drops her prey at the nest entrance before opening it and entering; in *asilivorus* and *rothneyi*, the female goes directly into the nest without dropping the prey.

7. The known prey consists of nymphal acridids (*rothneyi*, *tissa*), nymphal gryllids (*waltlii*), nymphal and adult tridactylids (*siamensis*, *simplex*), or adult asilids (*asilivorus*). Arnold's 1944 [1945] record of *madecassus* using a cercopid in addition to an acridid needs confirmation.

8. The prey is transported in flight by *asilivorus* and *siamensis*.

9. The number of prey per cell is as many as six in nests of *rothneyi*, and two to ten in those of *asilivorus*. The number of prey per cell is unknown for other species.

10. The egg is attached to the body of the asilid prey by *asilivorus*, but placed against the cell ceiling by *rothneyi*.

Gastrosericus Spinola

Key to Sri Lankan Species of *Gastrosericus*

Females

1. Setae of head and thorax woolly, many of them longer than basal width of mandible ..... 6. ***waltlii*** Spinola
   Setae of head and thorax straight, shorter than basal width of mandible 2
2. Gena with one or two teeth; sternum II pubescent throughout 3
   Gena simple; sternum II glabrous apicomesally 4
3. Clypeus [Figure 25]: surface nondentate, free margin with two teeth on each side midway between median projection and orbit; gena with two teeth: one behind mandible and one halfway between mandible and vertex [Figure 27]; frontal vestiture silvery .... 4. ***rothneyi*** Cameron
   Clypeus [Figures 28, 29]: disk with two longitudinally elongate teeth near free margin; the latter nondentate between median projection and orbit

[Figure 28]; gena [Figure 30] with a single tooth between base of mandible and occipital carina; frontal pilosity golden. . . . . 5. ***asilivorus*** Pulawski, new species

4. Upper prepectus expanded into round, yellow lamella partly covering subalar fossa [Figure 21, 22] . . . . . 3. ***vedda*** Pulawski, new species

Upper prepectus not expanded, not covering subalar fossa 5

5. Pygidial plate densely setose; tarsomeres V with at least one basoventral spine (with three such spines in most individuals). . . . . 2. ***moricei*** Saunders

Pygidial plate [Figure 15] at most with a few setae apically; tarsomeres V without basoventral spines . . . . . 1. ***tissa*** Pulawski, new species

MALES

(Unknown and not included: *asilivorus*)

1. Setae woolly on head and thorax, many of them longer than basal width of mandible; sterna III and IV depressed (except laterally), depressions fimbriate [Figure 34], foretrochanter not emarginate basoventrally . . . . . 6. ***waltlii*** Spinola

Setae of head and thorax straight, shorter than basal width of mandible; sterna nondepressed, shortly pubescent (except sterna III and IV fimbriate in *G. moricei*); foretrochanter emarginate basoventrally 2

2. Clypeus [Figure 26]: free margin sharply pointed mesally and deeply concave between midpoint and orbit; mandible with carina close to ventral margin between orbit and notch; gaster black . . . . . 4. ***rothneyi*** Cameron

Clypeus different; mandible noncarinate; gaster red to black 3

3. Upper prepectus expanded into round, yellow lamella which partly covers subalar fossa [cf. Figures 21, 22] . . . . . 3. ***vedda*** Pulawski, new species

Upper prepectus not expanded, not covering subalar fossa 4

4. Clypeus yellow, mesally produced into obtusely angulate lobe which is not delimited laterally [Figure 18]; sterna III and IV fimbriate [Figure 19] . . . . . 2. ***moricei*** Saunders

Clypeus black, mesally produced into a lobe which is well defined laterally (corner prominent) and whose free margin is concave between corner and midpoint [Figure 14]; all sterna shortly, evenly pubescent. . . . . 1. ***tissa*** Pulawski, new species

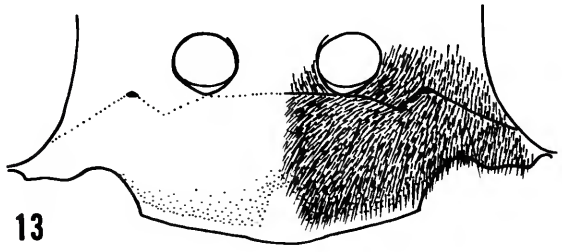
1. *Gastrosericus tissa* Pulawski, new species

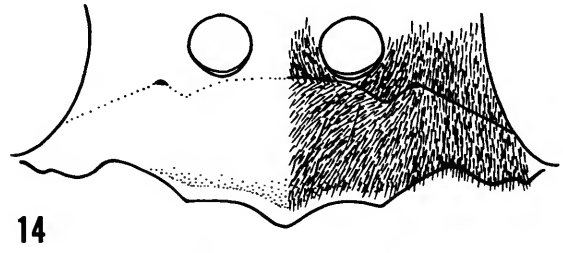
FIGURES 13–16

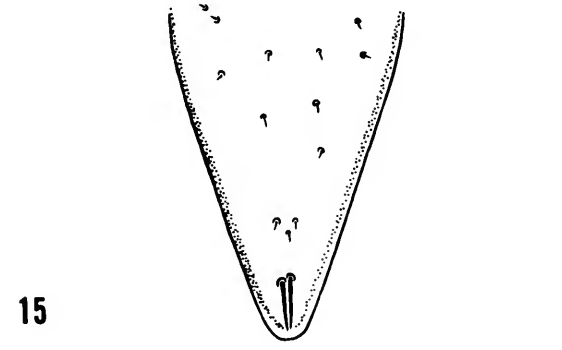
ETYMOLOGY.—Named after Devanampiya Tissa, the king during whose reign (250–210 B.C.) Buddhism was established in Sri Lanka; noun in apposition.

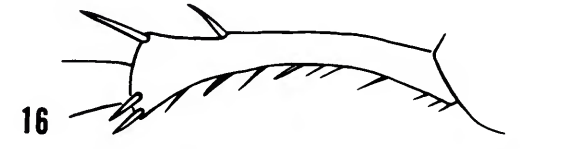
COMPARATIVE DIAGNOSIS.—Like *G. chalcithorax* Arnold (South Africa), *electus* Nurse (India, Soviet Middle Asia), and *siamensis* Tsuneki (Thailand), the female of *tissa* has vestiture appressed on the head and mesothorax and nearly appressed on the propodeum; clypeal surface flat; clypeal lobe broad, with free margin evenly

arcuate; and pygidial plate asetose or with a few preapical setae. Unlike *chalcithorax* (in which the tibiae are ferruginous and yellow, the tarsi ferruginous and the distance between postocellar scar and orbit is equal to scar length), the tibiae of *tissa* are black and yellow, the tarsi black, and the distance between postocellar scar and orbit is equal to 0.7–0.8 of scar length; unlike *electus*, the femora of *tissa* are almost entirely black (rather than red with large yellow spots) and the flagellum is all black; the vertex and propodeal dorsum are finely, inconspicuously sculptured (rather than with fine but well-defined punctures present in *siamensis*).









FIGURES 13–16.—*Gastrosericus tissa* Pulawski, new species: 13, female clypeus; 14, male clypeus; 15, female pygidium; 16, male midbasitarsus.

The male of *tissa* has a unique shape of the clypeus (Figure 14) and midbasitarsus (Figure 16).

DESCRIPTION.—Mandible: ventral margin notched; surface noncarinate between condyle and notch. Orbit closer to hindocellus than to antennal socket in female, equidistant in male. Pronotum and propleuron simple. Thorax microsculputured, vertex and scutum with inconspicuous, microscopic punctures. Marginal cell: length of foremargin 3.0–4.0 times apical truncation. Recurrent veins shortly petiolate or interstitial.

Body vestiture appressed, including setae between mandible and occipital carina, partly obscuring mesopleural integument; setae nearly appressed on posterior corners of propodeum.

Head black, including clypeus and scape, mandible yellowish (except apex). Thorax black, pronotal lobe pale yellow. Gastral segments I–II or I–III red, remainder black (all sterna red in the single male examined). Femora black except narrowly pale yellow at apex. Tibiae dark brown, with pale yellow outer side or (hindtibia) pale yellow dorsum. Tarsi dark brown. Wings hyaline.

FEMALE.—Mandibular inner margin without preapical tooth. Clypeus (Figure 13) with well-defined lobe, lobe corners about 2.5 times as far from each other as a corner is from orbit; free margin concave between lobe corner and orbit, free margin of lobe evenly arcuate. Gena simple. Dorsal length of flagellomere I 1.5–1.7 times apical width. Forecoxa simple. Forebasitarsus with 5 rake spines; length of apical one about 1.8 times apical width of basitarsus. Venter of tarsomere V without preapical spines. Sternum II apicomesally with glabrous, triangular area. Py-

gidial plate asetose or with 1 or 2 preapical spines (Figure 15). Length 5.5–6.2 mm.

MALE.—Clypeus (Figure 14) with well-defined lobe; lobe corners about 1.5 times as far from each other as a corner is from orbit; free margin concave between lobe corner and orbit; free margin of lobe pointed mesally, concave between point and corner. Dorsal length of flagellomere I about equal to its apical width. Foretrochanter excavate basoventrally, excavation longer than distance which separates it from trochanteral apex. Forebasitarsus with 3 rake spines; longest spine equal to apical width of basitarsus. Midbasitarsus slightly bent (Figure 16). Tergum VII densely punctate but asetose. Sterna not depressed, shortly, evenly pubescent. Sternum VIII rounded apically. Length 5.0 mm.

GEOGRAPHIC DISTRIBUTION.—The species is known only from Sri Lanka, where it is found only in the more xeric areas of the Dry Zone and at very low altitudes, usually near the coast.

SPECIMENS EXAMINED.—*Holotype:* ♂, Sri Lanka, EASTERN PROVINCE; *Trincomalee District*: Tennamaravadi, 18 May 1976, KVK, PBK, SK, DWB (USNM).

Paratypes (USNM unless indicated otherwise): Sri Lanka, NORTHERN PROVINCE, *Mannar District*: 0.5 mi (0.8 km) NE Kokmotte, Wilpattu National Park, 15–16 Feb 1979, KVK, TW, SS, TG (1♀ CAS; 1♀); Kondachchi, Ma Villu, 11–12 Apr 1981, KVK, LW, PL (1♀); Marichchukkadi, 26 Jan 1978, PBK, TW, LJ, GR (1♀); Silavathurai, 24 Jan 1978, PBK (1♀); Silavathurai, Kondachchi, 23–27 Jan 1978, PBK, TW, MJ, GR (1♀ CAS; 1♀). NORTH CENTRAL PROVINCE, *Amparai District*: Panama, Radella Tank, 14 Jun 1976, KVK, PBK, SK (1♀ CAS; 1♀). WESTERN PROVINCE, *Colombo District*: Pamunugama, 16 Jan 1977, KVK, PF, DWB, VG (1♀); 16 Mar 1981, KVK, TW, LW (1♀ CAS; 2♀). SOUTHERN PROVINCE, *Hambantota District*: Bundala Sanctuary, Circuit Bungalow, 22–24 Aug 1980, KVK, PBK, TW, LJ, LW (1♀); Palatupana, Wildlife and Nature Protection Society (WLNPS) Bungalow, 18–21 Jan 1979, KVK, PBK, TW, SS, TG (1♀ BMNH; 1♀ CAS; 1♀ Sri Lanka National Museum, Colombo; 1♀), 30 Mar–1 Apr 1981, KVK, TW, LW (1♀, headless); Palutapana Tank, 4 Feb 1975, KVK (1♀); Yala, Palatupana Tank, 8–10 Mar 1972, KVK, PBK (1♀).

2. *Gastrosericus moricei* Saunders

FIGURES 17–19

Gastrosericus moricei Saunders, 1910:529 [♂] [holotype ♂, Algeria: Biskra (OUM, coll. Morice)].

Gastrosericus fimbriatus Kazenas, 1980:1104 [♂, ♀] [holotype ♂, Tadzhik SSR, Kolkhozabad District: 7 km E Garauty near Yangiabad (ZIL)].—Pulawski, 1981 [1982]:363 [synonymized with *moricei*].

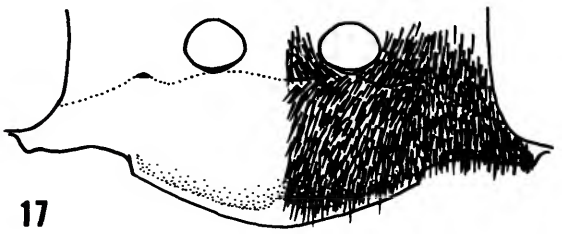
COMPARATIVE DIAGNOSIS.—*Gastrosericus moricei* and *sanctus* Pulawski, 1973 (known only from Israel) have appressed genal and propodeal pubescence. The females have a fully setose pygidial plate and basoventral spines on tarsomere V. The males have fimbriate sterna III and IV. The females differ as follows: in *moricei*, tarsomere V has one (occasional specimens from Sri Lanka) to four basomedian spines on the venter besides the spines on lateral margins, and the clypeal surface is flat; in *sanctus*, tarsomere V has one basomedian spine on the venter plus a spine on each lateral margin, and the clypeus has a glabrous tubercle near each lip corner. In the male of *moricei*, the clypeal lobe is roundly, obtusely angulate, and sterna III and IV are fimbriate side to side and not depressed, while in the male of *sanctus* the clypeal lobe is truncate, and sterna III and IV are shallowly depressed under fimbriae, which are absent laterally.

DESCRIPTION.—Mandible: ventral margin notched; surface noncarinate between condyle and notch. Orbit scarcely closer to hindocellus than to antennal socket. Pronotum simple, propleuron posteriorly with obtuse, pilose tubercle. Thorax microsculptured, without well-defined punctures. Marginal cell: length of foremargin 2.0–2.2 times apical truncation. Recurrent veins separated or interstitial.

Body vestiture appressed, including area between mandible and occipital area; almost totally obscuring mesopleural integument.

Head and thorax black, but the following are

pale yellow: mandible (except apex), clypeus (black laterally in some Sri Lankan females), scape and pronotal lobe (only posteriorly so in some Sri Lankan specimens). Gaster ferruginous. Legs ferruginous, with pale yellow markings.



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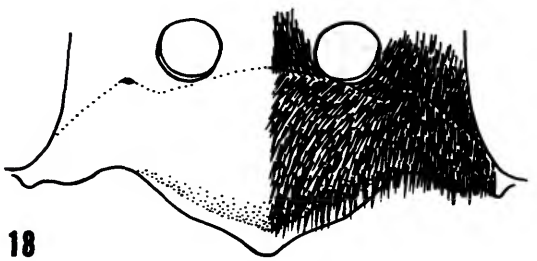

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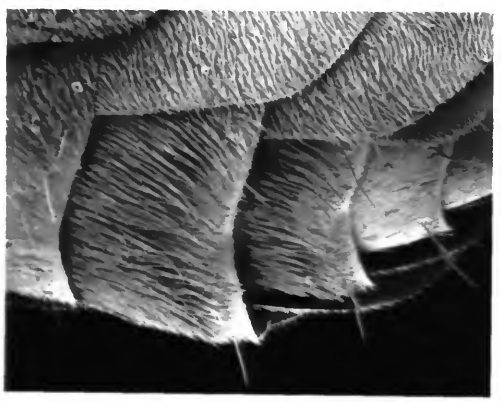

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FIGURES 17–19.—*Gastrosericus moricei* Saunders: 17, female clypeus; 18, male clypeus; 19, male sterna (× 75).

FEMALE.—Mandibular inner margin without preapical tooth. Clypeus (Figure 17): lobe broad (distance between corners about 2.4 times clypeal midlength), not sharply delimited laterally (free margin shallow between lobe and orbit); lip gently, evenly arcuate, depressed mesally in some specimens, shallowly emarginate in some Sri Lankan individuals. Gena nondentate. Dorsal length of flagellomere I 1.75–2.0 times apical width. Forecoxa simple. Forebasitarsus with 6 or 7 rake spines; length of apical one 2.0 times basitarsus apical width. Venter of tarsomere V with preapical spines: a few basoventral spines (their number and position vary geographically), and in most specimens also with two spines at each lateral margin; the number of spines may be less on foretarsus than on remaining tarsi. Sternum II apicomesally with glabrous, triangular area. Pygidial plate setose, setae largely obscuring integument. Length 6.5–7.0 mm.

MALE.—Clypeus (Figure 18): lobe roundly, obtusely angulate, not sharply delimited laterally. Dorsal length of flagellomere I 1.2–1.3 times apical width. Foretrochanter excavate basoventrally, excavation longer than distance that separates it from trochanter apex. Forebasitarsus with 3 or 4 rake spines; longest spine 1.3–1.5 times apical width of basitarsus. Tergum VII pilose. Sterna (Figure 19) without depressions, but sterna III and IV fimbriate throughout. Sternum VIII rounded apically or scarcely emarginate. Length 5–6 mm.

GEOGRAPHIC VARIATION.—Various populations of *moricei* differ in color of femora and tibiae, and also in number of spines of female tarsomere V. Individuals from Sri Lanka are characterized as follows. In the female, the femora are all black, or pale yellow apically. In the male, the femora are reddish brown, pale yellow apically and ventrally; the tibiae are brown reddish, foretibia yellow dorsally, hindtibia with varying amounts of yellow markings dorsally. In most females tarsomeres V have three basoventral spines, but in one specimen there are only one inconspicuous basoventral spine and one similar spine on each lateral margin.

GEOGRAPHIC DISTRIBUTION.—North Africa,

Israel, Tadzhik SSR, and Sri Lanka. Within the latter country it occurs at low altitudes in the more xeric parts of the Dry Zone.

COLLECTING PERIODS.—All months except November and December.

SPECIMENS EXAMINED (USNM unless indicated otherwise).—Sri Lanka, EASTERN PROVINCE, *Trincomalee District*: Tennamaravadi (1♂), Trincomalee, China Bay Ridge Bungalow (2♂ CAS; 2♀, 5♂), 7 mi (11.3 km) W Trincomalee (1♀, 2♂; 1♂, WJP). WESTERN PROVINCE, *Colombo District*: Pamunugama (2♀ CAS; 3♀), Uswetakeiyawa (2♂ CAS; 4♀, 2♂). NORTHERN PROVINCE, *Mannar District*: 0.5 mi (0.8 km) NE Kokmotte, Wilpattu National Park (2♂ CAS; 6♀, 6♂; 1♀, 1♂ WJP), Marichchukkaddi (1♀), Ma Villu (2♀, 5♂ CAS; 6♀, 7♂), Pesalai Beach (2♂); *Vavuniya District*: Parayanalankulam, Irrigation Canal 25 mi (40 km) NW Medawachchiya (1♀, 2♂; 1♀ WJP). NORTH CENTRAL PROVINCE, *Anuradhapura District*: Hunuwilagama (2♀), Padaviya (1♀, 1♂). NORTH WESTERN PROVINCE, *Puttalam District*: Wilpattu National Park, Kali Villu (1♀ WJP). SOUTHERN PROVINCE, *Hambantota District*: Bundala Sanctuary, Circuit Bungalow (6♀ CAS; 12♀, 5♂), Palatupana Tank (1♀), Palatupana, WLNPS Bungalow (3♀, 3♂ CAS; 7♀, 7♂), Yala, Palatupana (1♀, 3♂; 1♂ WJP). UVA PROVINCE, *Monaragala District*: Mau Aru, 10 mi (16 km) E Uda Walawe (1♀).

3. *Gastrosericus vedda* Pulawski, new species

FIGURES 20–24

ETYMOLOGY.—Named after the Vedda people, the aboriginal inhabitants of Sri Lanka; noun in apposition.

DIAGNOSIS.—*Gastrosericus vedda* is unique in the genus in having the upper prepectus expanded into a rounded, yellow lamella, which partly covers the subalar fossa (Figures 21, 22).

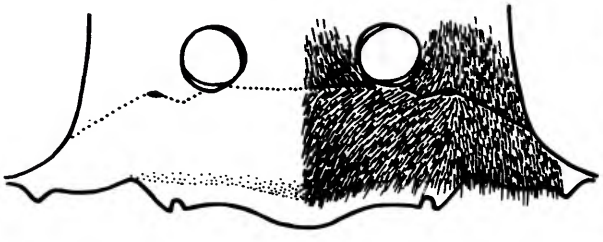
DESCRIPTION.—Mandible: ventral margin notched; surface noncarinate between condyle and notch. Orbit equidistant from antennal socket and hindocellus. Pronotum simple. Propleuron without expansion or carina. Scutum punctate, mesopleuron microsculptured, without well-defined punctures. Upper prepectus (Figures 21, 22) expanded into rounded, yellow lamella which extends over anterior part of subalar fossa. Marginal cell: length of foremargin 2.5–3.0 times apical truncation. Recurrent veins interstitial or separate.

Body vestiture appressed, including area between mandible and occipital area, largely obscuring mesopleural integument.

Head black, but mandible (except apex), clypeus largely (including lateral section), and scapal venter yellowish red. Thorax black, but pronotal lobe posteriorly and laminar expansion beneath subalar fossa pale yellow. Gaster reddish with largely black terga (many females) or all black. Femora black, pale yellow apically. Tibiae ferruginous, pale yellow on outer side or (hindtibia) on dorsum. Tarsi ferruginous. Wings hyaline.

FEMALE.—Mandibular inner margin without preapical tooth. Clypeus (Figure 20) with short but well-defined lobe; its corners sharp, 2.4 times as distant from each other than each corner is from orbit; free margin shallowly concave between lobe and orbit; free margin of lobe sinuate, incised laterally. Gena nondentate. Dorsal length of flagellomere I about 1.2 times apical width. Forecoxa somewhat flattened. Forebasitarsus with 4 rake spines; length of apical one about equal to basitarsus apical width. Tarsomere V with several basoventral spines, including spines on each lateral margin. Sternum II apicomesally with glabrous, triangular area. Pygidial plate (Figure 23) with setae which are mainly sparse, but dense, largely obscuring integument apically. Length 4.5–5.5 mm.

MALE.—Clypeus (Figure 24): lobe scarcely more prominent than lateral section, its free margin weakly sinuate, with slightly prominent lateral corner. Dorsal length of flagellomere I about 0.8 times apical width. Foretrochanter excavate basoventrally, excavation longer than distance, which separates it from trochanter apex. Forebasitarsus with 2 or 3 rake spines; longest one about 0.6 times basitarsus apical width. Tergum VII pubescent. Sterna without depressions, shortly, evenly pubescent. Sternum VIII rounded apically. Length 4.0–4.5 mm.



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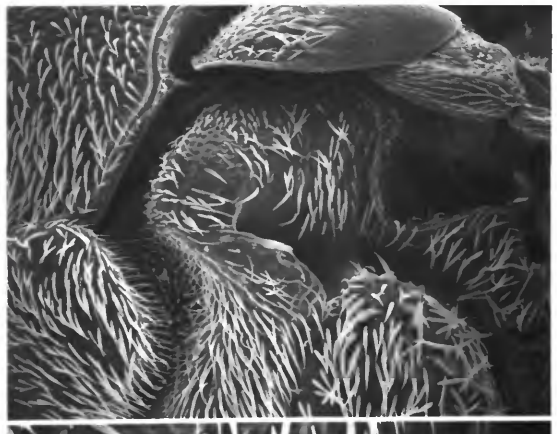

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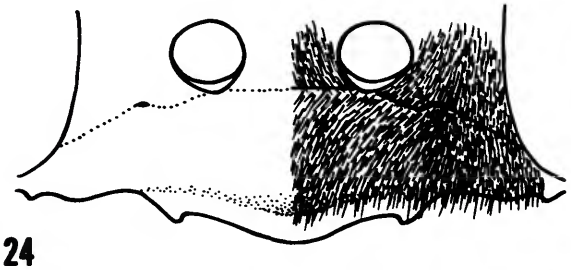

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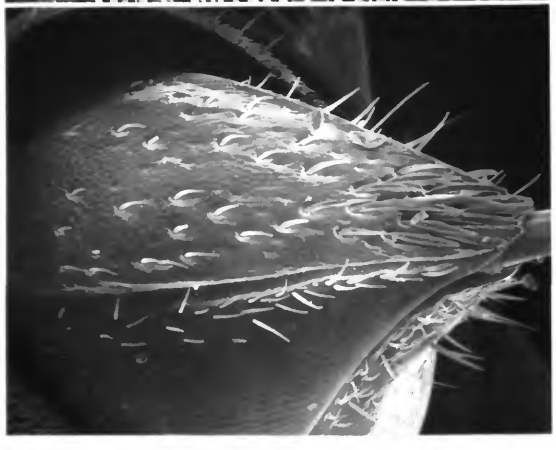

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FIGURES 20–24.—*Gastrosericus vedda* Pulawski, new species: 20, female clypeus; 21, upper mesopleuron of female (× 140); 22, upper mesopleuron of female (× 315); 23, female pygidium (× 140); 24, male clypeus.

GEOGRAPHICAL DISTRIBUTION.—The species is known only from Sri Lanka, where it occurs at low altitudes in the more xeric areas of the Dry Zone.

SPECIMENS EXAMINED.—*Holotype:* ♀, Sri Lanka, EASTERN PROVINCE, *Amparai District:* Panama, Radella Tank, 14 June 1976, KVK, PBK, SK (USNM).

Paratypes (USNM unless indicated otherwise): Sri Lanka, same data as holotype (1♀ BMNH; 1♀, 1♂ CAS; 1♀ Sri Lanka National Museum, Colombo; 3♀, 1♂). EASTERN PROVINCE, *Trincomalee District:* Tennamaravadi, 18 May 1976, KVK, PBK, SK, DWB (1♀); Amarivayal, 18 May 1976, KVK, PBK, SK, DWB (1♀). SOUTHERN PROVINCE, *Hambantota District:* Palatupana Tank, 18–20 Jan 1979, KVK, PBK, TW, TG (1♀ CAS); 21–22 Jun 1978, KVK, PBK, TW, SS, TG (1♀ CAS; 1♀). UVA PROVINCE, *Monaragala District:* Angunakolapelessa, 21–23 Jan 1979, KVK, PBK, TW, SS, TG (1♀, 1♂).

4. *Gastrosericus rothneyi* Cameron

FIGURES 25–27

Gastrosericus Rothneyi Cameron, 1889:147 [♀, incorrect original spelling; !Lectotype: ♀, India, Bengal, Barrackpore (OUM), present designation by Pulawski].

Gastrosericus Binghami Cameron, 1897:22 [♂, incorrect original spelling; !Holotype ♂: India, Bengal, Barrackpore (OUM)].—Pulawski, 1974 [1975]:318 synonymized with *rothneyi*]; [nec sensu Tsuneki, 1963:3, or Iwata and Yoshikawa, 1964:389 (= *Gastrosericus siamensis*)].

Gastrosericus thailanditus Tsuneki, 1974:622 [♀, ♂; !Holotype: ♀, Thailand, Sara Buri (Tadashi Tano coll., Fukui). New synonym by Pulawski].

LECTOTYPE SELECTION.—Two female syntypes, labeled "*Gastrosericus Rothneyi* Cam. Type," but without locality label, are preserved in Oxford University Museum. I have examined them, and designated and labelled one as lectotype and the other as paralectotype.

DIAGNOSIS.—*Gastrosericus rothneyi* differs from all other Sri Lankan species in having the mandible with a carina between notch and orbit, close to the ventral margin. The carina is also found in the Afrotropical species *neavei* Turner. The female of *rothneyi* can be recognized by the presence of two teeth on each side of the gena, and also by the peculiar clypeus (see "Description" below). Females of some Afrotropical species also have two genal teeth (*pulchellus* Arnold) or a similar clypeus (*fluviatilis* Arnold, *neavei* Turner), but not a combination of both.

The male of *rothneyi* can be recognized, in addition to the mandibular character, by the inner claw of the mid- and hindtarsus being markedly shorter than the outer claw. The combination of a sharply pointed clypeus and the straight pilosity is also unique among the Sri Lankan species. The latter combination is also found in some Afrotropical species: *laticeps* Arnold whose gaster is red basally (gaster all black in *rothneyi*), *neavei* Turner whose thorax is coarsely punctate (thoracic punctures fine in *rothneyi*); and also in two insufficiently known species, *fluviatilis* Arnold and *turneri* Arnold.

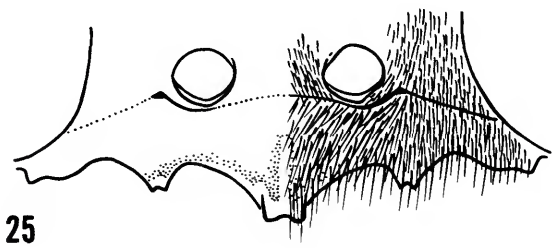
DESCRIPTION.—Mandible: ventral margin notched; surface with carina between condyle and notch parallel to ventral margin; area between carina and margin concave. Orbit about equidistant from antennal socket and hindocellus in female, in male slightly closer to antennal socket than to hindocellus. Propleuron simple. Punctures fine on mesothorax and propodeal side, but well defined on scutellum, propodeal dorsum, and hindface. Marginal cell: length of foremargin 4–6 times apical truncation. Recurrent veins interstitial or forming short petiole.

Vestiture short, appressed on scape, frons, vertex, and thorax (excluding propodeum); setae between mandible and occipital carina erect, about 0.3 times basal width of mandible; partly concealing mesopleural sculpture; longest propodeal setae suberect, equal to 2 midocellar diameters.

Head, thorax, and gaster black, but the following are yellow: tegula anteriorly, pronotal lobe posteriorly, male mandible mesally, and male scape apically. Legs black and yellow (as detailed below). Wings slightly infumate.

FEMALE.—Mandibular inner margin without preapical tooth. Clypeus (Figure 25): lobe broad

(distance between lobe corners 2 times clypeal midlength), produced into a projection mesally (projection narrow, almost parallelsided, emarginate apically); free margin markedly concave between projection and corner (each corner forming two prominent teeth). Gena (Figure 27) with 2 processes: behind mandibular base and at midheight. Dorsal length of flagellomere I 1.6 times apical width. Pronotum with prominent tubercle anterolaterally (just above forecoxa). Forecoxa concave admesally. Forebasitarsus with 6 rake spines; length of apical one equal to apical width of basitarsus. Venter of tarsomere V without preapical spines. Sternum II pubescent throughout. Pygidial plate setose, setae largely obscuring integument on posterior half. Length 7–8 mm.



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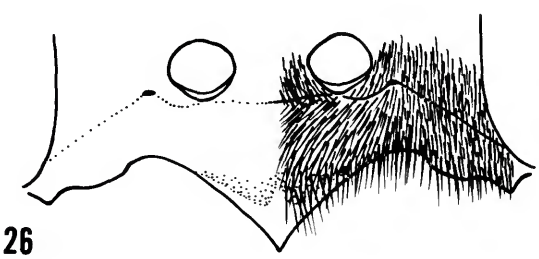

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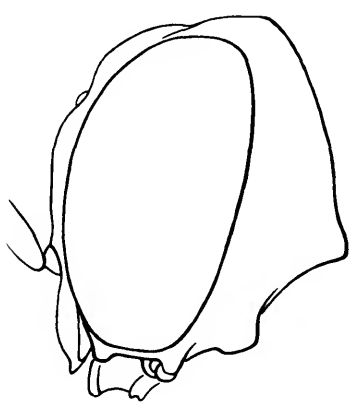

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FIGURES 25–27.—*Gastrosericus rothneyi* Cameron: 25, female clypeus; 26, male clypeus; 27, female head laterally.

Legs black, but the following are yellow: fore- and midfemora apicoventrally (up to half length of forefemur), fore- and midtibiae externally, hindtibia dorsally (but apex of all tibiae black); foretibia brown on inner side.

MALE.—Clypeal lobe (Figure 26) sharply pointed, indistinctly delimited laterally. Gena and pronotum simple. Dorsal length of flagellomere I 1.4–1.6 times apical width. Foretrochanter with shallow, inconspicuous excavation basoventrally. Forebasitarsus with 3 or 4 rake spines; longest one equal to apical width of basitarsus. Inner claw of mid- and hindtarsus markedly shorter than the outer claw. Tergum VII pilose. Sterna not depressed, shortly, evenly pubescent. Sternum VIII evenly rounded apically. Length 5.5–6.5 mm.

Legs black, but the following are yellow: fore and midfemora apicoventrally (up to ⅔ length of forefemur), hindfemoral apex, foretibia (except black venter and brown inner face), mid- and hindtibiae (except venter largely black mesally), and tarsomeres I and II of all legs.

GEOGRAPHIC DISTRIBUTION.—*Gastrosericus rothneyi* is known from India, Sri Lanka, and Thailand. Within Sri Lanka it is the most common and widely distributed species of the genus. It occurs principally in Dry Zone localities ranging from 900 to 1700 mm of average annual rainfall, but was collected several times on the ground at Labugama Reservoir where the rainfall is 2400 mm and once in a Malaise trap at Gilimale where it is 3900 mm.

COLLECTING PERIODS.—January–May, September–November.

SPECIMENS EXAMINED (USNM if not indicated otherwise).—Sri Lanka, NORTHERN PROVINCE, *Jaffna District:* Kilinochchi (2♂); *Mannar District:* Kondachchi, Ma Villu (4♀, 8♂); 0.5 mi (0.8 km) NE Kokmotte, Wilpattu National Park (1♀); *Vavuniya District:* Parayanalankulam, Irrigation Canal 25 mi (40 km) NW Medawachchiya (4♀, 2♂; 1♀, 1♂ WJP). NORTH CENTRAL PROVINCE, *Anuradhapura District:* Hunuwilagama (24♀, 5♂; 7♀, 3♂ WJP), Padaviya (10♀, 1♂); *Polonnaruwa District:* Pimburettawa, 13 mi (21 km) S Mannampitiya (1♀). EASTERN PROVINCE, *Trincomalee District:* Amarivayal (1♀); Trincomalee, China Bay Ridge Bungalow (1♀, 3♂). CENTRAL PROVINCE, *Kandy District:* Hasalaka (1♀), 5 mi (8 km) NW Mahiyangana (1♂). SABARAGAMUWA PROVINCE, *Ratnapura District*: Gilimale, Induruwa Jungle (1♀). WESTERN PROVINCE, *Colombo District:* Labugama Reservoir Jungle (7♀, 2♂). UVA PROVINCE, *Monaragala District:* Angunakolapelessa (1♂); Tanamalwila (1♀).

5. *Gastrosericus asilivorus* Pulawski, new species

FIGURES 28–31

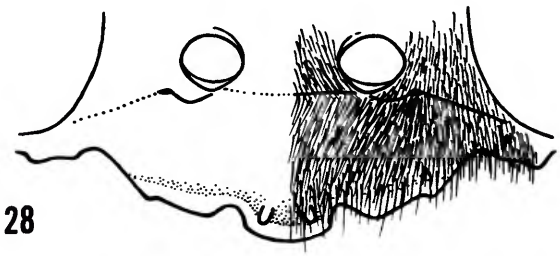
ETYMOLOGY.—*Asilivorus* is derived from the Latin words *asilus*, a gadfly, and *vorare*, to devour, with reference to prey of this species.

DIAGNOSIS.—The female of *asilivorus* can be recognized by the particular shape of the clypeus (Figures 28, 29). Unlike other species, except *waltlii*, the frontal vestiture is golden.

DESCRIPTION.—Mandible: ventral margin notched; integument shallowly concave along ventral margin between condyle and notch. Orbit closer to hindocellus than to antennal socket. Pronotal foremargin slightly prominent at the level of propleural hindmargin. Propleuron simple. Thorax and vertex micropunctate. Marginal cell: length of foremargin 4.0–4.6 times apical truncation. Recurrent veins separated.

Body vestiture appressed, including setae between mandible and occipital carina; propodeal hindcorners with nearly appressed setae; setae nearly obscuring mesopleural integument.

Head black, including scape; clypeal middle section largely yellow in one specimen examined. Mandible yellow, black apically. Thorax black,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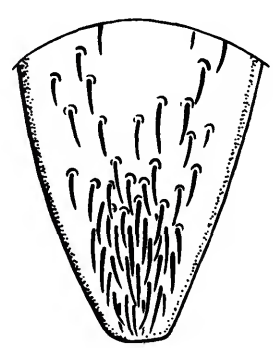
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FIGURES 28–31.—*Gastrosericus asilivorus* Pulawski, new species, female: 28, clypeus; 29, clypeal tooth laterally; 30, head laterally; 31, pygidial plate.

pronotal lobe yellow posteriorly. Gaster black. Femora black, narrowly yellow apically, fore- and midfemur yellow apicoventrally on about one-fourth to one-third of femoral length. Foretibia brown, yellow on outer side; mid and hindtibiae yellow dorsally. Tarsi brown. Wings slightly infumate. Frontal vestiture golden.

FEMALE.—Mandibular inner margin without preapical tooth. Clypeus (Figures 28, 29) produced into lobe, which is subdivided by a pair of indentations into a central and two lateral portions; clypeal free margin concave between lobe and orbit; lobe corners about 3 times as distant from each other as each corner is from orbit; lateral portion of lobe with unevenly arcuate free margin; median portion produced anterad, with arcuate free margin, with a pair of preapical teeth on its surface. Gena (Figure 30) with tooth at the level of mandibular base (but closer to occipital carina than to mandible). Dorsal length of flagellomere I 1.6 times apical width. Forecoxa concave admedially. Forebasitarsus with 6 rake spines; apical one equal to apical width of basitarsus. Venter of tarsomere V without preapical spines. Sternum II pubescent throughout. Pygidial plate sparsely setose anteriorly, densely setose posteriorly (Figure 31). Length 8.5–9.0 mm.

MALE.—Unknown.

GEOGRAPHIC DISTRIBUTION.—The species occurs only in Sri Lanka, where two females were collected in more xeric areas of the Dry Zone at low altitudes.

SPECIMENS EXAMINED.—*Holotype:* ♀, Sri Lanka, EASTERN PROVINCE, *Trincomalee District:* Trincomalee, China Bay Ridge Bungalow, 9 Oct 1977, PBK (USNM).

Paratype: Sri Lanka, UVA PROVINCE, *Monaragala District:* Mau Aru, 10 mi (16 km) E Uda Walawe, 24–26 Sep 1977, KVK, PBK, TW, MJ (1♀ CAS).

6. *Gastrosericus waltlii* Spinola

FIGURES 32–34

Gastrosericus waltlii Spinola, 1838 [1839]:481 [♂].—de Beaumont, 1952:49 [designated lectotype: ♂, Egypt (IMZU)].

Gastrosericus maracandicus Radoszkowski, 1877:23 [♀; ! Holotype ♀: Uzbek SSR: Samarkand (Zoological Museum, Moscow State University).— Pulawski, 1965:574 [synonymized with *waltlii*].

Gastrosericus rufiventris F. Morawitz, 1889:135 [♀; !Holotype ♀; China, Inner Mongolia: Tsagan Buryuk (ZIL)].—Gussakovskij, 1930 [1931]:452 [synonymized with *maracandicus*].

Gastrosericus rufitarsis Cameron, 1902:286 ["♀" = ♂; !Holotype ♂: India, Gujarat, Deesa (BMNH, Type Hym. 21.402)].—Pulawski, 1981 [1982]:364 [synonymized with *waltlii*].

Gastrosericus lanuginosus Arnold, 1922:117 [♂; syntypes: Zimbabwe, Sawmills (South African Museum, Capetown)].—Pulawski, 1981 [1982]:364 [synonymized with *waltlii*].

Gastrosericus maracandicus dubius Gussakovskij, 1931:453 [♂; !Lectotype: ♂, Turkmen SSR: Komarovskiy near Askhabad (ZIL), present designation and new synonym by Pulawski].

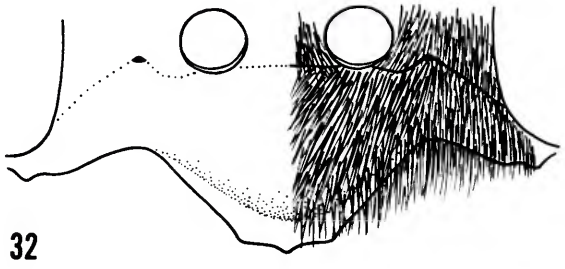
COMPARATIVE DIAGNOSIS.—*Gastrosericus waltlii* is the only Sri Lankan species with conspicuous, woolly setae on the head and thorax. The pilosity is also woolly in four other species (all extralimital), which have a differently shaped clypeus. Of them, *capensis* occurs in South Africa, *drewseni* is known from North Africa and Israel, *guigliae* from Egypt and Libya, and *shestakovi* from Turkmen SSR. Unlike these species, the foretrochanter is not emarginate basoventrally in the male of *waltlii*.

DESCRIPTION.—Mandible: ventral margin notched; surface noncarinate between condyle and notch. Orbit closer to hindocellus than to antennal socket. Pronotum simple. Propleuron with glabrous, slightly raised area which is prominent posteromesally. Thorax densely punctate, punctures contiguous on mesopleuron. Marginal cell: length of foremargin 1.5–2.6 times apical truncation. Recurrent veins separated or interstitial.

Setae woolly on thorax and also between mandible and occipital carina where they are equal to basal width of mandible or longer; partly obscuring mesopleural integument; woolly, suberect on scapal venter and hindfemoral venter.

Head and thorax black, mandible (except apex) pale yellow. Wings hyaline.

FEMALE.—Mandibular inner margin with conspicuous preapical tooth. Clypeus (Figure 32): lobe roundly truncate, with small, median pro-



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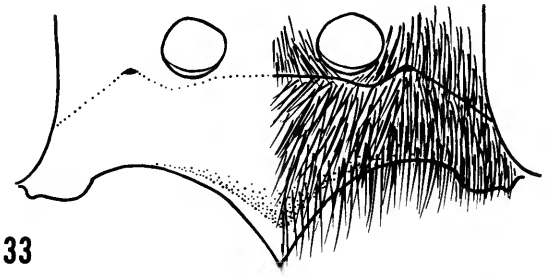

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FIGURES 32–34.—*Gastrosericus waltlii* Spinola: 32, female clypeus; 33, male clypeus; 34, male sterna (× 40).

jection, which is absent in small specimens; lobe corners much closer to each other than to orbit. Gena nondentate. Dorsal length of flagellomere I 2.1–2.2 times apical width. Forecoxa neither carinate nor concave. Forebasitarsus with 7 or 8 rake spines; length of apical one 2.0–2.2 times apical width of basitarsus. Venter of tarsomere V without preapical spines. Sternum II apicomesally with glabrous, triangular area. Pygidial plate with appressed setae, which almost totally obscure sculpture. Length 9–12 mm.

Gaster, femora, tibiae and tarsi varying in color, but black in Sri Lankan specimens.

MALE.—Clypeal lobe (Figure 33) acutely pointed. Dorsal length of flagellomere I 1.6–2.1 times apical width. Foretrochanter not excavate. Forebasitarsus with 4–6 rake spines; longest one 1.5–1.8 times basitarsus apical width. Tergum VII pilose. Sterna III–IV (Figure 34) depressed except laterally, depressions fimbriate, sterna V and VI with usual, straight setae which delimit apical depression, and with shorter, dense, erect setae. Sternum VIII rounded or roundly truncate apically. Length 7.5–9.0 mm.

Gaster black, basally red in many extralimital specimens. Femora black. Tibiae black (except narrowly yellow basally), or hindtibia red in many specimens from other areas. Tarsi all red or darkened basally.

GEOGRAPHIC DISTRIBUTION.—*Gastrosericus waltlii* has a wider distribution than any other species of the genus occurring in Sri Lanka. It is known also from Zimbabwe, Chad, North Africa, Cyprus, Israel, Turkey, Iran, Soviet Middle Asia, Mongolia, China (Inner Mongolia), and India. The species has been found during May at two localities in Sri Lanka in xeric areas of the Dry Zone, and was quite abundant in one of them.

SPECIMENS EXAMINED.—Sri Lanka, EASTERN PROVINCE: *Trincomalee District:* Tennamaravadi (2♂, USNM). NORTHERN PROVINCE, *Mannar District:* 0.5 mi (0.8 km) NE Kokmotte, Wilpattu National Park (4♀, 28♂ USNM; 1♀, 1♂ WJP).

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