

Biosystematic Studies of Ceylonese
Wasps, XXI: A Revision of the
Bethylinae and Epyrinae
(Cephalonomiini and Sclerodermini)
(Hymenoptera: Bethylidae)

KARL V. KROMBEIN

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ABSTRACT

Krombein, Karl V. Biosystematic Studies of Ceylonese Wasps, XXI: A Revision of the Bethylinae and Epyrinae (Cephalonomiini and Sclerodermini) (Hymenoptera: Bethyridae). *Smithsonian Contributions to Zoology*, number 579, 29 pages, 34 figures, 1 table, 1996.—Keys are presented to the family-, genus-, and species-level taxa. New taxa are: *Odontepyrus muesebecki*, *O. ruficrus*, *O. mandibularis*, *O. ventralis*, *Goniozus comatus*, *G. villosus*, *G. ecarinatus*, *G. lucidulus*, *G. valvicolus*, *G. fulgidus*, *G. rutherfordi*, *Cephalonomia lignicola*, *Sclerodermus variegatus*, *S. hirsutus*, *Discleroderma undulatum*, *Glenosema splendidum*, and *G. dispersum*. The new taxa are known only from Sri Lanka except *O. mandibularis*, which also occurs in India. *Discleroderma* Kieffer and *D. tuberculatum* (Magretti), from Burma, and *Odontepyrus* Kieffer are redescribed. A table is included of known host species in Sri Lanka of Bethylinae, Cephalonomiini, and Sclerodermini.

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Biosystematic Studies of Ceylonese Wasps, XXI: A Revision of the Bethylinae and Epyrinae (Cephalonomiini and Sclerodermini) (Hymenoptera: Bethyridae)

Karl V. Krombein

Introduction

The Bethyridae are primitive, relatively small (usually 1–10 mm long) wasps that primarily parasitize lepidopterous or coleopterous larvae. The majority of species deposit several eggs on a host, but in a few genera, e.g., *Pristocera* Klug, *Epyris* Westwood, and *Holepyris* Kieffer, only one egg is laid per host. The known host records, presented in the section “Natural History” and in Table 1, suggest that some Ceylonese bethyrid species may be important in biological control of pests of important agricultural crops, such as rice, tea, and coconut.

The majority of species are small, relatively inconspicuous insects that attracted little attention from collectors during the nineteenth century. Consequently, relatively few species were described from Sri Lanka prior to recent years. Motschulsky (1863) was the earliest contributor, describing a new genus and four new species. During the next 100 years, other authors described only 10 additional species.

Nevertheless, the bethyrids constitute one of the largest wasp families in Sri Lanka, and a wealth of specimens was collected after 1950 by F. Keiser, Basel Museum, Switzerland; P. Brinck and his colleagues, Lund University, Sweden; and personnel

who participated in the Smithsonian Institution’s “Ceylon Insect Project.” Moczar (1984) included 28 species of Ceylonese Mesitiinae in his review of the Oriental fauna. I recognize about 125 species in the other three subfamilies, the Bethylinae (14), Pristocerinae (~43), and Epyrinae (~68). Only one of the new species described herein is known to occur outside of Sri Lanka; however, most of the new taxa are probably more widely distributed, particularly in southern India—an area in which thorough collecting of Bethyridae has not been accomplished.

As planned originally, this revision was to have included all of the Sri Lankan species of Bethyridae as represented in the extensive material from the Smithsonian Institution’s Ceylon Insect Project and from other institutions listed in the “Acknowledgments” section. The problem that precluded treatment of the family as a whole was uncertainty as to the identity of some 50 taxa from India described as Bethyloidea in a series of papers by Kurian (1952, 1954b, 1955) and an inability to locate and study his types. (See following section, “Taxa of Bethyridae Described by C. Kurian.”) Accordingly, the decision was made to publish the revision in two parts, the first part including the subfamily Bethylinae and the tribes Cephalonomiini and Sclerodermini of the subfamily Epyrinae. The tribe Epyrini and subfamily Pristocerinae will be treated subsequently. The 28 Ceylonese species of the remaining bethyrid subfamily, the Mesitiinae, were described by Moczar in a series of papers and are keyed in his extensive contribution on the Oriental fauna (1984).

The preceding number in this series was “XX: A Revision of *Tachysphex* Kohl, 1883, with Notes on Other Oriental Species (Hymenoptera: Sphecidae: Larrinae),” *Smithsonian Contributions to Zoology*, 552:1–106, 257 figures, by Karl V. Krombein and Wojciech J. Pulawski.

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TAXA OF BETHYLIDAE DESCRIBED BY C. KURIAN.—Kurian described 43 taxa as Bethylidae; however, his new genus and species, *Neoclystopenella luffae*, was recognized as a male ant, a species of *Tapinoma* (Brown, 1987). Another new genus and species, *Lustrina assamensis*, was recognized as belonging to the Cleptinae by Nagy (1968), and the genus subsequently was synonymized with *Cleptes* Latreille by Kimsey and Bohart (1991). Other species cannot be recognized with certainty from the descriptions. Another specialist on Bethylidae, Q. Argaman, who has worked extensively on the Old World fauna, believes that some of Kurian's species are placed incorrectly at the generic level (pers. comm.). Neither Argaman nor I can interpret *Neodisepyrus* Kurian, and we believe that he included in it species belonging to several genera.

Another factor that causes difficulty with Kurian's descriptions is that they antedated Evans's (1964) pioneering work on bethylid taxonomy. Kurian did not include measurements and ratios (see following section on "Technical Terms and Abbreviations") that we find most useful in characterizing taxa.

Kurian (1952, 1954b, 1955) mentioned the depositories from which material had been borrowed. V.K. Gupta (in litt., 1984) advised me that, while at Agra in 1955–1956, he had sent two boxes of specimens including types to the Forest Research Institute (FRI), Dehra Dun, India, and that "nearly all loan material was returned to the institutions that loaned the material." I addressed letters to entomologists at the institutions concerned requesting information on the Kurian types supposedly in their collections. The only response I had was from P. Singh, FRI, who wrote that there were three Kurian types in that collection; based on data from Kurian's papers, I estimate that there should be nearly 30 Kurian types deposited at FRI.

During a trip for field work in Sri Lanka in 1993, I had an opportunity to visit the Indian Agricultural Research Institute, Delhi, India. There were no Kurian types in their well-curated collection; there should have been at least two (Kurian, 1952). I had planned visits to FRI and Agra University during this trip, but my plans had to be cancelled due to an accident sustained in Calcutta.

TECHNICAL TERMS AND ABBREVIATIONS.—For the most part I have adopted the abbreviations used by Evans (1964, 1978) as follows:

LH	head length from apex of clypeus to posterior margin of vertex
WH	head width including eyes
WF	width of front (least interocular distance)
HE	maximum height of eye measured laterally
EV	distance from top of eye to posterior margin of vertex measured from side
OOL	ocellocular line, shortest distance between lateral margin of posterior ocellus and margin of eye
WOT	width of ocellar triangle including posterior ocelli
FL	length of forefemur
FW	maximum width of forefemur

I follow Evans (1964, 1978) in using the term abdomen to mean the gaster or metasoma.

COLLECTORS.—The names in the locality data accompanying the species descriptions are abbreviated as follows (some labels bear only initials):

AD	?
AR	A. Rutherford
BAC	Brinck-Andersson-Cederholm
CBRK	C.B.R. King
CKS	?
DRD	D.R. Davis
DWB	D.W. Balasooriya
ERG	?
GAB	G.A. Brett
GE	G. Ekis
GFH	G.F. Hevel
GHKT	G.H.K. Thwaites
JCH	J.C. Hutson
JSN	J.S. Noyes
KVK	K.V. Krombein
LDG	L.D. Galahiha
LJ	L. Jayawickrama
LW	L. Weeratunge
MBL	Mussard-Besuchet-Löbl
MJ	M. Jayaweera
MSK	?
NK	N. Karunaratne
PBK	P.B. Karunaratne
PF	P. Fernando
PKL	P.K. Lal
QW	Q. Winney
RED	R.E. Dietz
SK	S. Karunaratne
SLW	S.L. Wood
SR	S. Ramachandra Rao ?
SS	S. Siriwardane
SSL	S.S. Light
TG	T. Gunawardane
TW	T. Wijesinhe
VG	V. Gunawardane
VK	V. Kulasekera
WHR	W.H. Rowe

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O'Toole, University Museum, Oxford, Great Britain (OXFORD); Roberto Poggi, Museo Civico di Storia Naturale, Genoa, Italy (GENOA); and Andrew Polaszek, International Institute of Entomology, London, Great Britain (BMNH).

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Anura Wijesekara, Central Agricultural Research Institute, Gannoruwa, Peradeniya, Sri Lanka, was helpful in furnishing additional information on some of the *Goniozus* reared at the Institute that were sent to London (BMNH) for identification.

I am very grateful to Byron A. Alexander, Howard E. Evans, and Michael A. Prentice for their thorough and helpful reviews of an earlier draft of the manuscript.

Natural History

Our knowledge in this area is very meagre except for detailed information on *Goniozus nephantidis* (Muesebeck) and *G. montanus* Kieffer, which are effective parasitoids of pests of important agricultural crops. Host records in Sri Lanka of Bethylinae, Cephalonomiini, and Sclerodermini are listed in Table 1.

Goniozus nephantidis (Muesebeck)

Goniozus nephantidis is apparently host-specific on *Nephantis serinopa* Meyrick (Xyloryctidae), the black-headed or coconut caterpillar. However, one paratype from Thurmapuri, India, bears the label: "par. on cotton bolls." If labeled correctly, this suggests that *G. nephantidis* has a broader host range and parasitizes one or more pests of cotton.

The biology of *G. nephantidis* in India was discussed in detail by Ramachandra Rao and Cherian (1928) and in Sri Lanka by Jayaratnam (1941a, 1941b) and Dharmaraju (1963); their observations are condensed below. Gordh (1990) lists many additional references to the biology of *G. nephantidis* in India.

The moth deposits its eggs in batches on the undersides of coconut leaflets, frequently in rows in the grooves of the midribs. After hatching, the caterpillars settle in the groove of the midrib and soon construct protective galleries from pieces of leaf and of feces. The wasp searches for a larva in the third or fourth instar and stings it, paralyzing it permanently. The

TABLE 1.—Host records for Ceylonese Bethylinae, Cephalonomiini, and Sclerodermini.

Parasitoid	Host
<i>Odontepyrus mandibularis</i> , n. sp.	Noctuidae: <i>Mythimna</i> sp. (in India)
<i>Goniozus montanus</i> Kieffer	Tortricidae: <i>Homona coffearia</i> (Nietner), tea tortrix, a leaf roller
	Gracillariidae: <i>Caloptilia theivora</i> (Walsingham), tea leaf roller
	Crambidae: <i>Cnaphalocrocis medinalis</i> Guenée, rice leaf roller; <i>Omiodes indicata</i> (Fabricius); <i>Syllepte derogata</i> (Fabricius), cotton leaf roller; <i>Tabidia aculealis</i> Walker, leaf folder on sweet potato
<i>Goniozus nephantidis</i> (Muesebeck)	Xyloryctidae: <i>Nephantis serinopa</i> Meyrick, black-headed or coconut caterpillar
<i>Goniozus valvolicola</i> , n. sp.	caterpillars in pods of <i>Tephrosia candida</i>
<i>Cephalonomia lignicola</i> , n. sp.	Scolytidae: <i>Phloesinus concinnulus</i> (Walker)?
<i>Prorops nasuta</i> Waterston	Scolytidae: <i>Hypothenemus hampei</i> (Ferrari), coffee-berry borer
<i>Sclerodermus vigilans</i> Westwood	Bostrichidae(?): specimen labeled "in wood with <i>Heterobostrychus aequalis</i> [Waterston], etc."

wasp usually feeds on the fluid contents of the caterpillar before oviposition and occasionally just feeds on the caterpillar without laying eggs on it. She deposits from 1 to 15 eggs on 1 or more of the third through the last abdominal segments of the larva. As many as 74 eggs were laid by 1 female on 12 caterpillars over a period of 13 days, but the average number of eggs was 19 for 18 wasps maintained under laboratory conditions. A reared lot in BMNH and USNM, bearing Commonwealth Institute of Entomology number 8823, consists of 13♀ and 7♂.

The eggs, 0.50–0.75 mm long, hatch 24–40 hours after oviposition. The larvae feed for 2½–3½ days and attain a length of 3.0–4.5 mm before spinning their cocoons in a mass within the galleries of the host caterpillars. The cocoons, 4.0–6.0 mm long and 1.5–2.0 mm in diameter, range in color from white to buff brown. The pupal stage lasts about 5 days, but the newly emerged adult remains in the cocoon until the integument hardens. Mating occurs about 24 hours after adults emerge from the cocoons. The life cycle from oviposition to adult emergence from the cocoon ranges from 11½ to 15 days.

Natural enemies of *G. nephantidis* larvae in India are an unidentified proctotrupoid wasp, two chalcid wasps (a species of *Pleurotopis* and a species of *Eurytoma*?), the mite *Pyemotes ventricosus* (Newport) (recorded as *Pediculoides*), and an unidentified fungus. The only enemy reported in Sri Lanka is the calliceratid wasp, *Calliceras* species.

Dharmaraju (1963:15) noted that parasitism of *N. serinopa* larvae in the field in Sri Lanka ranged from 0.75% to 19.25%.

***Goniozus montanus* Kieffer**

Ranaweera (1950) reared *G. montanus* on the tea tortrix, *Homona coffearia* (Nietner), in Sri Lanka, and he provided detailed notes on the life history. The female *G. montanus* easily cut through the silk webbing of the leaf roll enclosing the caterpillar, usually a half-grown larva, paralyzed it, and then malaxated the caterpillar's body. She then deposited up to 8 eggs individually on the posterior segments, transversely in the intersegmental grooves. One female deposited 62 eggs during her lifetime of as many days. This same female used 16 caterpillars for oviposition and fed on 7 more. The caterpillars

recovered from the paralysis 1 hour or more after being stung, sometimes fed lightly for several days, but did not molt.

The eggs, 0.29–0.36 mm long and 0.07–0.10 mm in diameter, hatched 3–5 days after being laid. The larvae fed for 4–5 days, attaining a length of 2.8–3.1 mm. Each larva spun an opaque, ovoid, light brown cocoon, 4.1–5.4 mm long and 1.8–2.3 mm in diameter. Pupation occurred 1 day after the cocoon was spun, and adults eclosed 10–13 days later but remained in the cocoon 1–2 days before chewing a hole through it to emerge.

Males were maintained in the laboratory 1–28 days (average, 17.3) and females 11–65 days (average, 33.4). Mating occurred immediately after emergence from the cocoon or 5–17 days later. Unmated females deposited eggs that developed into males only. Both sexes developed from eggs laid by mated females.

Key to the Subfamilies and Tribes of Ceylonese Bethylinidae

1. Viewed from above, dorsal posterolateral angles of propodeum acutely angulate and frequently elongate **MESITIINAE***
Viewed from above, dorsal posterolateral propodeal angles rounded or at most bluntly and shortly angulate 2
2. Basal vein giving rise to stub or vein that may be very short or longer, sometimes enclosing areolet [Figures 2–4]; tarsal claws strongly curved, deeply bifid **BETHYLINAE**
Basal vein simple, not giving rise to stub or vein, or absent [Figure 21]; females sometimes brachypterous (some Epyrinae) or wingless (Pristocerinae, some Epyrinae); tarsal claws moderately to weakly curved, simple, dentate, or moderately bifid 3
3. Females: wingless, without tegulae or ocelli; eyes very small, HE 0.05–0.16 × WH in known Ceylonese species. Males: fully winged; metanotum well developed, separating scutellum and propodeum, metanotum almost always with well-developed median pit or short transverse furrow adjacent to scutellum **PRISTOCERINAE***
Females: usually fully winged, rarely brachypterous or apterous; if wingless, ocelli lacking but eyes larger, HE 0.30–0.33 × WH in Ceylonese species; both sexes with scutellum reaching propodeum or almost so, and then only laterally; if metanotum complete (only *Discleroderma*) then both sexes fully winged and lacking radial vein. Males: fully winged. **EPYRINAE** 4
4. Antennae 12-segmented; Ceylonese species with reduced venation, lacking closed median and submedian cells **CEPHALONIMIINI**
Antennae 13-segmented; winged forms lacking prostigma, median and submedian cells present in fully winged forms, latter cell lacking in *Scleroderma* 5
5. Clypeus very short, scarcely projecting beyond antennal insertions, apical margin truncate or shallowly emarginate; fully winged forms uncommon in Sri Lanka, usually brachypterous or apterous **SCLERODERMINI**
Clypeus with projecting median lobe either angularly produced or narrowly rounded; usually fully winged, only 1 brachypterous and no apterous species known from Sri Lanka **EPYRINI***

*This group is not considered further in this contribution.

Subfamily BETHYLINAE

Polaszek and Krombein (1994) reviewed the genera of Bethylinae, and they presented a phylogenetic analysis of the

subfamily. They recognized seven genera, only two of which occur in Sri Lanka, *Odontepyris* Kieffer, 1904, and *Goniozus* Förster, 1856.

Key to the Genera and Species of Ceylonese Bethylinae

1. Females: abdomen with 6 exposed segments, last segment conical as viewed from above, sting frequently exerted 2
Males: abdomen with 7 exposed segments, terminal segments occasionally telescoped, last segment with apical margin broadly rounded 15
2. Dorsal surface of propodeum with strong transverse carina posteriorly and longitudinal carina medially, basal area sculptured, delicately rugulose, or alutaceous. *Odontepyris* Kieffer 3
Dorsal surface of propodeum weakly or not at all transversely carinate posteriorly, median longitudinal carina absent, base with triangular, glossy, smooth area. *Goniozus* Förster 7
3. Forewing with closed areolet [Figures 2, 3] 4
Forewing without areolet, only short stub near lower end of basal vein, stub scarcely longer than width of vein [Figure 4] 6
4. Scutellum anteriorly with pair of lateral pits connected by shallow groove; dorsal surface of propodeum with median and lateral carinae only, sublateral carinae absent, basal median area delicately alutaceous; antennal scrobe not carinate; WF 1.09–1.13 × HE; male unknown . . . 3. *Odontepyris ruficrus*, new species
Base of scutellum with 4 foveae, those at side pit-like, those in middle shallower, wider, and separated on midline by carina; dorsal surface of propodeum with median, sublateral, and lateral carinae, basal median area shiny, either smooth or with delicate oblique wrinkles or rugulae; antennal scrobe with or without carina; WF 1.20–1.41 × HE 5
5. Antennal scrobe not carinate; malar groove present; mesopleuron scarcely protuberant behind fovea; forewing areolet [Figure 2] larger, wider than veins enclosing it; appendages brown except tibiae, tarsi, and underside of antennae light red 1. *Odontepyris muesebecki*, new species
Antennal scrobe weakly carinate; malar groove lacking; mesopleuron strongly protuberant behind median fovea; forewing areolet small [Figure 3], no wider than veins enclosing it; antennae and legs light red; male unknown
. 2. *Odontepyris quadrioveatus* (Muesebeck)
6. Dorsal surface of propodeum with median carina absent on basal 1/3, median basal area delicately alutaceous; 2nd abdominal sternum broadly concave medially, concavity margined by scattered, tiny piliferous tubercles [Figure 10]; 6th abdominal sternum flat except narrow apex with short oblique ridge on each side [Figure 11] 4. *Odontepyris mandibularis*, new species
Dorsal surface of propodeum with median carina complete, median basal area irregularly, transversely rugulose; 2nd sternum convex with large punctures separated by width of puncture or less [Figure 14]; 6th sternum convex, with dense small punctures [Figure 15]; male unknown
. 5. *Odontepyris ventralis*, new species
7. Forewing with closed areolet 8
Forewing with only a stub arising from basal vein 13
8. Ocular setae visible at ×8, twice or more as long as diameter of 1 facet 9
Ocular setae shorter, visible at ×32, no longer than diameter of 1 facet, or lacking (*G. lucidulus*) 10

9. Ocular setae 3 times as long as diameter of 1 facet; mandible relatively stout; dorsum of propodeum not carinate posteriorly; prostigma well developed; EV $0.43 \times HE$; FL $1.76 \times FW$; male unknown 6. *Goniozus comatus*, new species
- Ocular setae twice as long as diameter of 1 facet; mandible rather slender; dorsum of propodeum margined posteriorly by carina; prostigma weakly developed; EV $0.18 \times HE$; FL $1.96 \times FW$; male unknown 7. *Goniozus villosus*, new species
10. WH $1.07 \times LH$; EV $0.27 \times HE$; lower front with polished streak; dorsal propodeum not carinate posteriorly; male unknown 8. *Goniozus ecarinatus*, new species
- WH $0.82-0.95 \times LH$; EV $0.36-0.82 \times HE$; lower front with short carina extending upward from clypeal carina; dorsal propodeum weakly carinate posteriorly, at least at sides 11
11. WF = HE; EV $0.38 \times HE$; OOL $0.85 \times WOT$; ocular setae lacking; head and thoracic dorsum rather shiny, only delicately alutaceous; body medium to light brown; male unknown 9. *Goniozus lucidulus*, new species
- WF $1.08-1.20 \times HE$; EV vs HE variable; OOL $1.22-1.58 \times WOT$; ocular setae visible at $\times 32$; head and thoracic dorsum rather dull, moderately alutaceous; head and thorax black, abdomen dark brown 12
12. EV $0.71-0.82 \times HE$; OOL $1.54-1.58 \times WOT$; clypeal carina weaker, extending on front not much above bottom of eye; sides of head behind eyes parallel before curving inward at posterolateral angles [Figure 16]; areolet veins hyaline; median cell without setae on posterior $1/2$ 10. *Goniozus valvolicola*, new species
- EV $0.36-0.47 \times HE$; OOL $1.22-1.33 \times WOT$; clypeal carina stronger, extending on front at least $1/4$ eye height; sides of head behind eyes converging toward rounded posterolateral angles [Figure 17]; areolet veins testaceous; median cell with scattered setae over entire surface 11. *Goniozus nephantidis* (Muesebeck)
13. Head and scutum not alutaceous, very glossy; median lobe of clypeus rounded, not keeled; male unknown 12. *Goniozus fulgidus*, new species
- Head and scutum alutaceous, dull or less shining; median lobe of clypeus longitudinally keeled 14
14. Dorsal surface of propodeum carinate posteriorly, polished dorsal triangle broader, $1/2$ as wide at base as length of dorsal surface; notauli well developed; antennae longer, extending somewhat beyond posterior margin of head, segments 4-11 about as long as broad; species predominantly dark brown to black, usually more than 2.0 mm long 13. *Goniozus montanus* Kieffer
- Dorsal surface of propodeum not carinate posteriorly, polished dorsal triangle narrow, $1/3$ as wide at base as length of dorsal surface; notauli evanescent; antennae short, not extending beyond posterior margin of head, segments 4-11 slightly broader than long; species light brown, 2.0 mm long 14. *Goniozus rutherfordi*, new species
15. Dorsal surface of propodeum with strong carina posteriorly and medially, basal area smooth 16
- Dorsal surface of propodeum weakly or not at all transversely carinate posteriorly, median longitudinal carina absent, base with triangular, glossy, smooth area 17
16. Forewing with closed areolet [Figure 2]; median carina of dorsal propodeal surface complete 1. *Odontopyris muesebecki*, new species
- Forewing with short stub near lower end of basal vein scarcely longer than width of vein [see Figure 4]; median carina present only on apical $2/3$ of dorsal propodeal surface 4. *Odontopyris mandibularis*, new species
17. Forewing with closed areolet 18
- Forewing with only a stub arising from basal vein 19

18. Sides of head behind eyes parallel before curving inward at posterolateral angles; EV $0.75 \times HE$; OOL $1.36 \times WOT$ 10. *Goniozus valvolicola*, new species
Sides of head behind eyes converging toward rounded posterolateral angles; EV $0.56-0.61 \times HE$; OOL $0.94-1.10 \times WOT$ 11. *Goniozus nephantidis* (Muesebeck)
19. Dark brown to black species, 1.8 mm long or more; dorsal propodeal surface with weak transverse carina at apex, sometimes evanescent in middle; OOL $0.18-0.66 \times WOT$; WF $0.65-0.98 \times HE$ 13. *Goniozus montanus* Kieffer
Reddish brown species, 1.6 mm long; dorsal propodeal surface without transverse carina at apex; OOL $0.88 \times WOT$; WF $1.04 \times HE$ 14. *Goniozus rutherfordi*, new species

Odontepyris Kieffer, 1904

FIGURES 1-15

Polaszek and Krombein (1994) synonymized *Trissomalus* Kieffer, 1905, with *Odontepyris*, and they presented a brief diagnosis of the genus.

DIAGNOSIS.—Small- to medium-size wasps, 3.1–6.5 mm long, predominantly black, fully winged. Mandible quadridentate, lowest tooth longer than others; clypeus with beak-like lobe and well-developed central carina extending a short distance onto front and continuing upward as a narrow, median streak; malar space usually with groove; eyes moderately protuberant, bare or with very short setae; antennae 13-segmented; posterior margin of pronotum slightly arcuate; scutellum anteriorly with pair of lateral pits connected by shallow or deep groove, the latter sometimes divided into 2 foveae by median carina; mesopleuron sometimes with acute or blunt tooth behind median fovea, this area occasionally only slightly swollen; propodeal dorsum with median carina usually complete from base to transverse posterior carina, occasionally with pair of incomplete sublateral carinae, lateral carina strong; forewing with prostigma weakly or well developed, radial vein evenly curved, basal vein with adjacent areolet or short stub only; tarsal claw bifid in both sexes, inner tooth shorter, stouter, and blunt at apex; male subgenital plate (Figure 1b) subtruncate apically, slightly emarginate on either side of small median notch; male genitalia (Figure 1a): parameres with dorsal and ventral lobes.

HOSTS.—All records are of lepidopterous larvae. Kurian (1954b:439) reported *O. argyriae* Kurian as being parasitic on the sugar-cane borer, *Argyria sticticraspis* Hampson (Pyralidae) in Dharwar, India. Later (1955:121) he stated that *O. hypsipylae* (Kurian) (as *Goniozus*) was a parasite of *Hypsipyla robusta* (Moore) (Pyralidae) in "sack-bands [on] *Cedrela toona*" at Dehra Dun, India, that *O. cirphi* Kurian (1955:133) parasitized *Leucania* (recorded as *Cirphis*) (Noctuidae) larvae at Pusa, India, and that *O. indicus* (Kurian) (1954b:429; as *Trissomalus*) was reared from a sugar-cane borer (*Argyria sticticraspis*?). The holotype of *O. quadrioveatus* (Muesebeck) was reared from a cocoon, presumably that of a lepidopteran,

on betel leaf in Bellary District, Mysore, India (Muesebeck, 1934; as *Parasierola*). *Odontepyris mandibularis*, n. sp., is labeled as having been reared from *Mythimna* sp. (Noctuidae) in India (specimen at BMNH). The female of an undescribed species from Rajahmundry, India, is labeled as having been reared from a larva of *Heliothis armigera* (Hübner) (Noctuidae) on tobacco (specimen at USNM).

1. *Odontepyris muesebecki*, new species

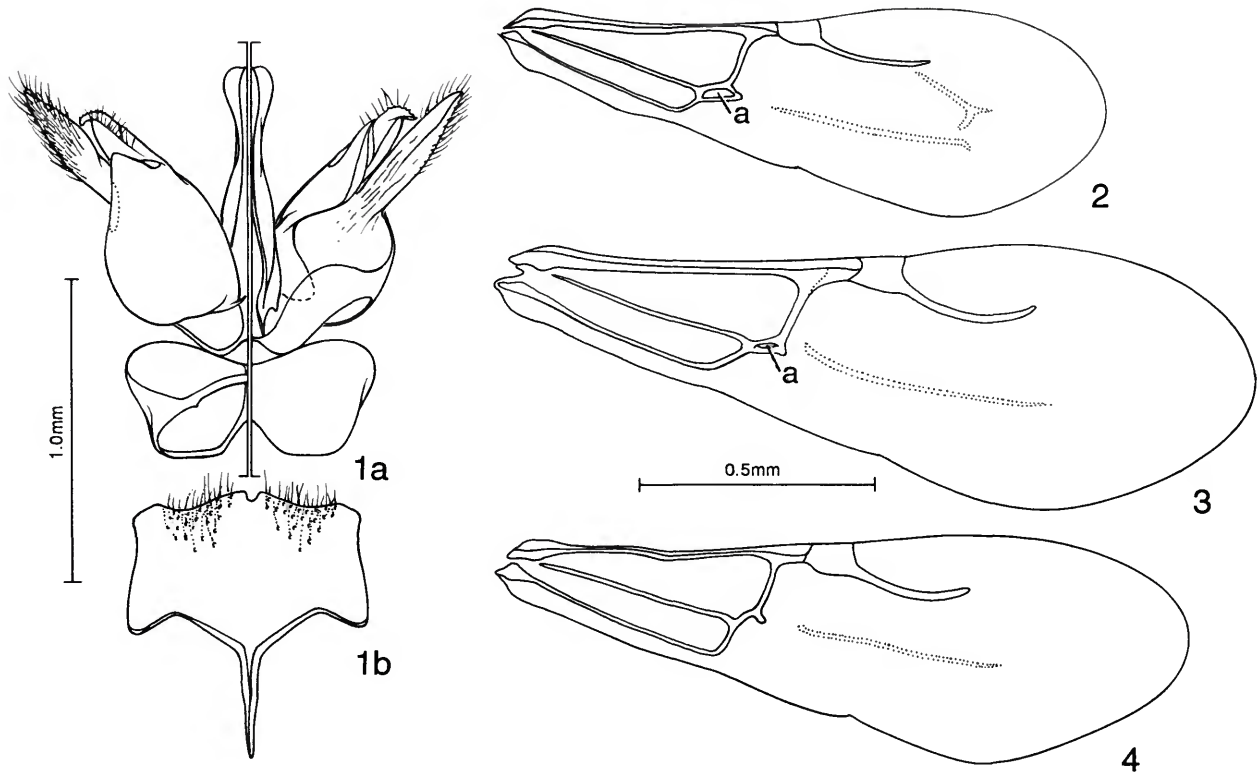
FIGURES 1, 2

ETYMOLOGY.—Named for Carl F. W. Muesebeck in recognition of his several contributions toward our knowledge of Indian Bethyloidea.

FEMALE.—Length 3.1–4.0 mm, forewing 2.1–2.6 mm. Body black with antennae beneath, tibiae, and tarsi light red, mandible and tegulae darker red, remainder of appendages varying shades of brown. Wings clear except apical half of forewing slightly infumated, stigma black, prostigma and veins testaceous.

Mandible slender; clypeus with median carina weaker than in *O. quadrioveatus* (Muesebeck) (see below), not extending onto front; eyes strongly protuberant, sides of head behind eyes converging abruptly toward slightly concave margin of vertex crest; WH $1.06-1.07 \times LH$; WF $1.20-1.33 \times HE$; EV $0.29-0.31 \times HE$; malar groove present; antennal scrobe ecarinate; front delicately alutaceous, punctures smaller than in *O. quadrioveatus*, mostly separated by 2–3 \times diameter of 1 puncture; ocelli in acute triangle, OOL $1.05-1.11 \times WOT$; first 4 antennal segments in a ratio of about 12:6:5:5, third segment length 1.60 \times width.

Dorsum of thorax more delicately alutaceous than head, rather shiny, punctures quite small and sparse; scutellum with 4 foveae anteriorly, lateral pair pit-like, median pair shallower, wider, and separated on midline by carina; mesopleuron only slightly swollen behind median fovea; propodeal dorsum with median carina and pair of weaker, incurving sublateral carinae that extend about halfway to apical carina, median area at base smooth or with delicate oblique wrinkles; forefemur length



FIGURES 1-4.—*Odontepyris* species: 1, male *O. muesebecki*, new species: a, genitalia, ventral aspect at left, dorsal at right; b, subgenital plate. 2-4, female forewings: 2, *O. muesebecki*, new species (a = areolet); 3, *O. quadrifoveatus* (Muesebeck) (a = areolet); 4, *O. ventralis*, new species.

2.45–2.55 × width; forewing (Figure 2) with prostigma weakly developed, areolet ellipsoidal, at least twice as wide as veins enclosing it.

Second and sixth abdominal sterna with only scattered fine punctures.

MALE.—Length 3.1–3.7 mm, forewing 2.2–2.3 mm. Color and sculpture much as in female, but mandible and entire antennae light red, femora and tibiae lighter brown.

Head having WH 1.03–1.11 × LH; WF 1.26–1.31 × HE; EV 0.29–0.31 × HE; OOL 1.06–1.09 × WOT; first 4 antennal segments in a ratio of about 8:4:3:3, third segment length 1.57 × width.

Genitalia and subgenital plate as in Figure 1a,b.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, UVA PROVINCE, *Monaragala District*: Angunakolapelessa, 100 m, 24–26 Sep 1977, KVK, PBK (USNM).

Paratypes (all USNM): Sri Lanka, EASTERN PROVINCE, *Amparai District*: 1♀, Ekgal Aru Reservoir Jungle, 11–12 Jun 1976, in Malaise trap, KVK, PBK, SK. CENTRAL PROVINCE, *Matale District*: 2♀, 2♂, Kibissa, 0.5 mi (0.8 km) W of Sigiriya, 28 Jun–4 Jul 1979, jungle (2♀ in Malaise trap), KVK,

PBK, TW, VK. UVA PROVINCE, *Monaragala District*: 1♀, Mau Aru, 100 m, 10 mi (16 km) E of Uda Walawe, 24–26 Sep 1977, KVK, PBK, TW, MJ. 4 ♀, holotype locality, as follows: 1♀, 30 Sep–1 Oct 1977, KVK, PBK; 1♀, 17–19 Jun 1978, KVK, TW, LJ, VK; 2♀, 27–28 Mar 1981, KVK, TW, LW.

A pair of paratypes will be deposited in the National Museum, Colombo, and a female paratype will be deposited in the Natural History Museum, London (BMNH).

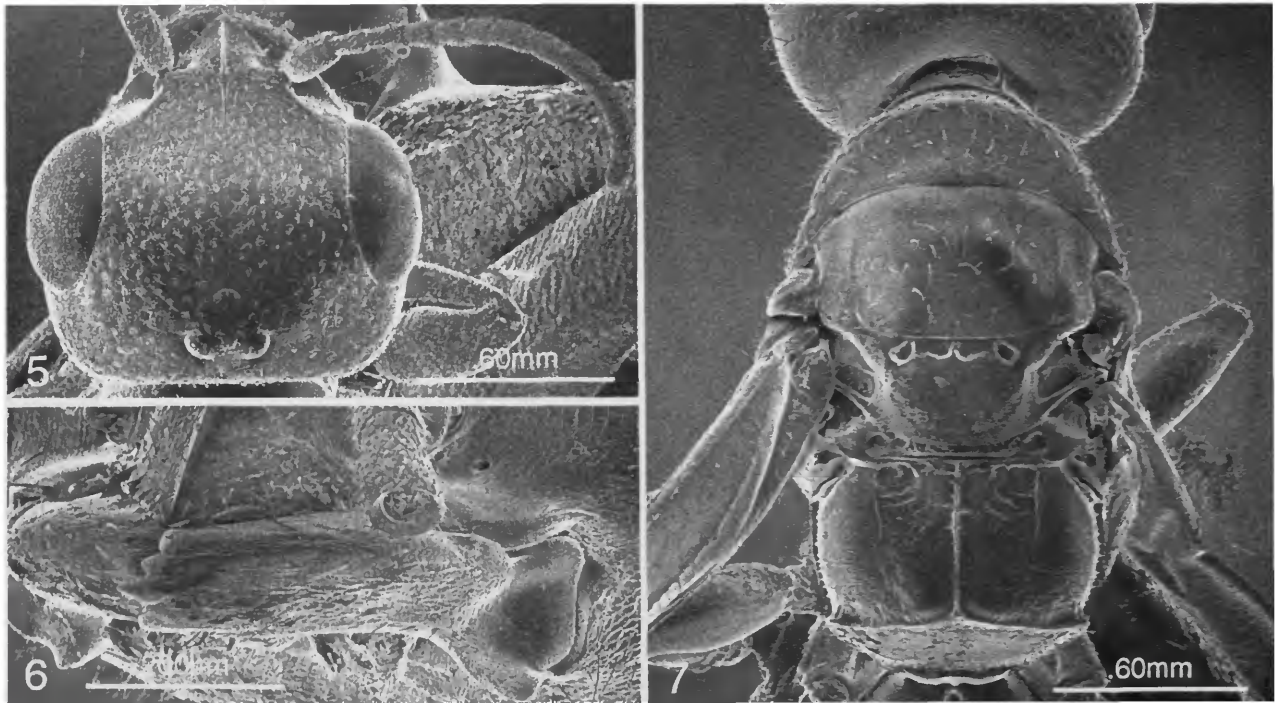
2. *Odontepyris quadrifoveatus* (Muesebeck, 1934)

FIGURES 3, 5-7

Parasierola quadrifoveata Muesebeck, 1934:227–229, fig. 2 [♀; Rampuram, Bellary District, Mysore, India; holotype in USNM].—Kurian, 1954a:287 [listed]; 1955:119–121 [redescribed].

Goniozus quadrifoveatus.—Gordh, 1988:363 [transferred]; 1990:28 [listed].
Odontepyris quadrifoveatus.—Polaszek and Krombein, 1994:98 [transferred].

FEMALE.—Length 4.6–5.0 mm, forewing 3.2–3.4 mm. Body black with mandible, antennae, tegulae, and legs light red. Wings clear, stigma and prostigma black, veins testaceous. Mandible slender (Figure 6); clypeus with sharp median



FIGURES 5-7.—*Odontepyris quadrifoveatus* (Muesebeck), female (uncoated): 5, head; 6, left mandible (scale bar = 200µm); 7, thorax, dorsal.

carina extending onto front about one-third toward anterior ocellus; eyes strongly protuberant, sides of head behind eyes converging slightly then rounding to straight vertex (Figure 5); WH 1.02–1.04 × LH; WF 1.33–1.41 × HE; EV 0.55–0.57 × HE; malar groove present; antennal scrobe weakly carinate; front strongly alutaceous, with shallow punctures separated by about twice their diameter; ocelli in acute triangle, OOL 1.40–1.50 × WOT; first 4 antennal segments in ratio of about 11:6:5:5, third segment length 1.45 × width.

Dorsum of thorax more delicately alutaceous than head, punctures smaller and more separated (Figure 7); scutellum with 4 foveae anteriorly, lateral pair pit-like, median pair shallower, wider, and separated on midline by carina; mesopleuron strongly protuberant behind fovea; propodeal dorsum with strong median and lateral carinae and pair of weaker sublateral carinae halfway between median and lateral carinae, sublateral carinae converging somewhat toward apex, basal area between median and sublateral carinae with oblique rugulae; forefemur length 2.30–2.36 × width; forewing (Figure 3) with prostigma moderately developed, areolet small, narrow, subtriangular, no wider than veins enclosing it.

Second and sixth abdominal sterna with only scattered fine punctures.

MALE.—Unknown.

SPECIMENS EXAMINED (USNM except as noted).—Sri Lanka, NORTHERN PROVINCE, *Mannar District*: 1♀, 0.5 mi (0.8 km) NE Kokmotte Bungalow, Wilpattu National Park, 15–16 Feb 1979, in Malaise trap, KVK, TW, SS, TG. EASTERN PROVINCE, *Amparai District*: 1♀, Ekgal Aru Sanctuary Jungle, 9–11 Mar 1979, in Malaise trap, KVK, TW, SS, LJ.

India, MADRAS (= TAMIL NADU): 1♀, Bellary, 28 Aug 1928, reared from cocoon on betel leaf (holotype). 1♀, 3 km E Manjaler Dam, 15–18 Oct 1979, JSN (BMNH). UTTAR PRADESH: 1♀, U[ttar] P[radesh], Oct 1973, ex larva *Syllepte* (BMNH). 1♀, U[ttar] P[radesh], 24 Oct 1970, [ex] cotton bollworm [= *Helianthus zea* (Boddie)] (BMNH).

REMARKS.—*Odontepyris hypsipylae* (Kurian) has a similarly shaped areolet (Kurian, 1955:119, fig. 194) but may be a different species.

3. *Odontepyris ruficrus*, new species

ETYMOLOGY.—From the Latin *rufus*, red, and *crus*, leg.

FEMALE.—Length 3.9–4.7 mm, forewing 2.9–3.2 mm. Body black with mandible, antennae and legs, except coxae, light red. Wings slightly infumated, stigma and prostigma dark brown, veins testaceous.

Mandible slender; clypeus with weak median carina extending onto front about one-fourth toward anterior ocellus; eyes moderately protuberant, sides of head converging toward slightly emarginate vertex crest; WH 0.98–1.00 × LH; WF 1.09–1.13 × HE; EV 0.33–0.38 × HE; malar groove present; antennal scrobe not carinate; front delicately alutaceous, with shallow punctures separated by 2–3 × their diameter; ocelli in acute triangle, OOL 1.53 × WOT; first 4 antennal segments in ratio of about 10:4:4:4, third segment length 1.67 × width.

Dorsum of thorax delicately alutaceous, punctures smaller than on head and quite separated; scutellum anteriorly with pair of lateral pits connected by shallow groove; mesopleuron moderately convex behind median fovea; propodeal dorsum with weak median carina, sublateral carinae absent, basal median area delicately alutaceous; forefemur length 2.07–2.16 × width; forewing with well-defined prostigma, areolet moderately large, subtriangular.

Second and sixth abdominal sterna moderately convex, with scattered fine punctures.

MALE.—Unknown.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, CENTRAL PROVINCE, *Kandy District*: Bambaragala Rock, Teldeniya, 10 May 1975, PBK, SK (USNM).

Paratypes: Sri Lanka, NORTH CENTRAL PROVINCE, *Anuradhapura District*: 1♀, Hunuwilagama, 22–26 May 1976, KVK, PBK, SK, DWB (USNM). UVA PROVINCE, *Badulla District*: 1♀, Koslanda, 26 Aug 1963, on bush, QW, Univ. Lond. Ceylon Expdn. (BMNH).

The paratype from Hunuwilagama will be deposited in the National Museum, Colombo.

4. *Odontepyrus mandibularis*, new species

FIGURES 8–11

ETYMOLOGY.—From the Latin *mandibula*, jaw, in allusion to the stout mandible.

FEMALE.—Length 6.0 mm, forewing 3.4 mm. Body black with legs light red, mandible, basal antennal segments, and tegulae darker red. Wings slightly infumated, stigma black, prostigma and veins testaceous.

Head as in Figure 8; mandible stout (Figure 9); clypeus with strong median carina extending onto front as weaker carina one-third toward anterior ocellus; eyes strongly protuberant, sides of head converging gradually behind eyes to emarginate vertex crest; WH 1.10 × LH; WF 1.38 × HE; EV 0.58 × HE; malar groove present; antennal scrobe strongly carinate; front strongly alutaceous, with shallow punctures mostly separated by 1.0–1.5 × their diameter; ocelli in acute triangle, OOL 1.36 × WOT; first 4 antennal segments in ratio of about 14:6:6:6, third segment length 1.65 × width.

Pronotal dorsum and scutum delicately alutaceous, punctures smaller and more separated than on head; scutellum glossy, with sparse fine punctures, anteriorly with pair of lateral pits connected by shallow groove; mesopleuron prominently

protuberant behind fovea; dorsal propodeal surface with median carina on posterior two-thirds only, median basal area delicately alutaceous, sublateral carinae weak, converging posteriorly; forefemur length 3.09 × width; forewing with poorly developed prostigma, basal vein with short stub.

Second abdominal sternum broadly concave medially, margin of concavity with scattered, tiny piliferous tubercles (Figure 10); sixth abdominal sternum flat except narrow apex with short oblique ridge on each side (Figure 11).

MALE.—Length 3.2 mm, forewing 2.1 mm. Body black, antennae beneath and legs light red, scape, first 4 flagellar segments above, and tegulae darker red. Wings slightly infumated, stigma brown, veins testaceous.

Head having WH = LH; WF 1.47–1.53 × HE; EV 0.41–0.44 × HE; OOL 1.38 × WOT; first 4 antennal segments in ratio of about 15:7:8:8, third segment length 1.6 × width.

Forefemur length 2.75 × width.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, NORTH CENTRAL PROVINCE, *Anuradhapura District*: Padaviya, Antiquities site, 20–23 Jul 1978, KVK, TW, LJ, VK (USNM).

Paratypes: India, UTTAR PRADESH: 2♀, 2♂, U[ttar] P[ra]desh], Faizabad, Ri2vi (= 2 Jun?), ex larva *Mythimna* (BMNH) (1 female lacks head). One pair, including headless female, has been retained for USNM.

5. *Odontepyrus ventralis*, new species

FIGURES 4, 12–15

ETYMOLOGY.—From the Latin *ventralis*, of the belly, in allusion to the unusual punctation of the second and sixth abdominal sterna.

FEMALE.—Length 4.4–5.2 mm, forewing 3.0–3.1 mm. Body black with legs light red, mandible, basal antennal segments, and tegulae darker red. Wings slightly infumated, stigma black, prostigma and veins testaceous.

Head as in Figure 12; mandible moderately stout, not as heavy as in *O. mandibularis*; clypeus with strong median carina extending onto front as weaker carina one-fourth toward anterior ocellus; eyes strongly protuberant, sides of head behind eyes converging gradually to emarginate vertex crest; WH 1.18–1.27 × LH; WF 1.25–1.32 × HE; EV 0.40 × HE; malar groove present; antennal scrobe moderately carinate; front moderately alutaceous, with shallow punctures separated by less than diameter of puncture; ocelli in acute triangle, OOL 1.30–1.33 × WOT; first 4 antennal segments in ratio of about 15:6:6:6, third segment length 1.42 × width.

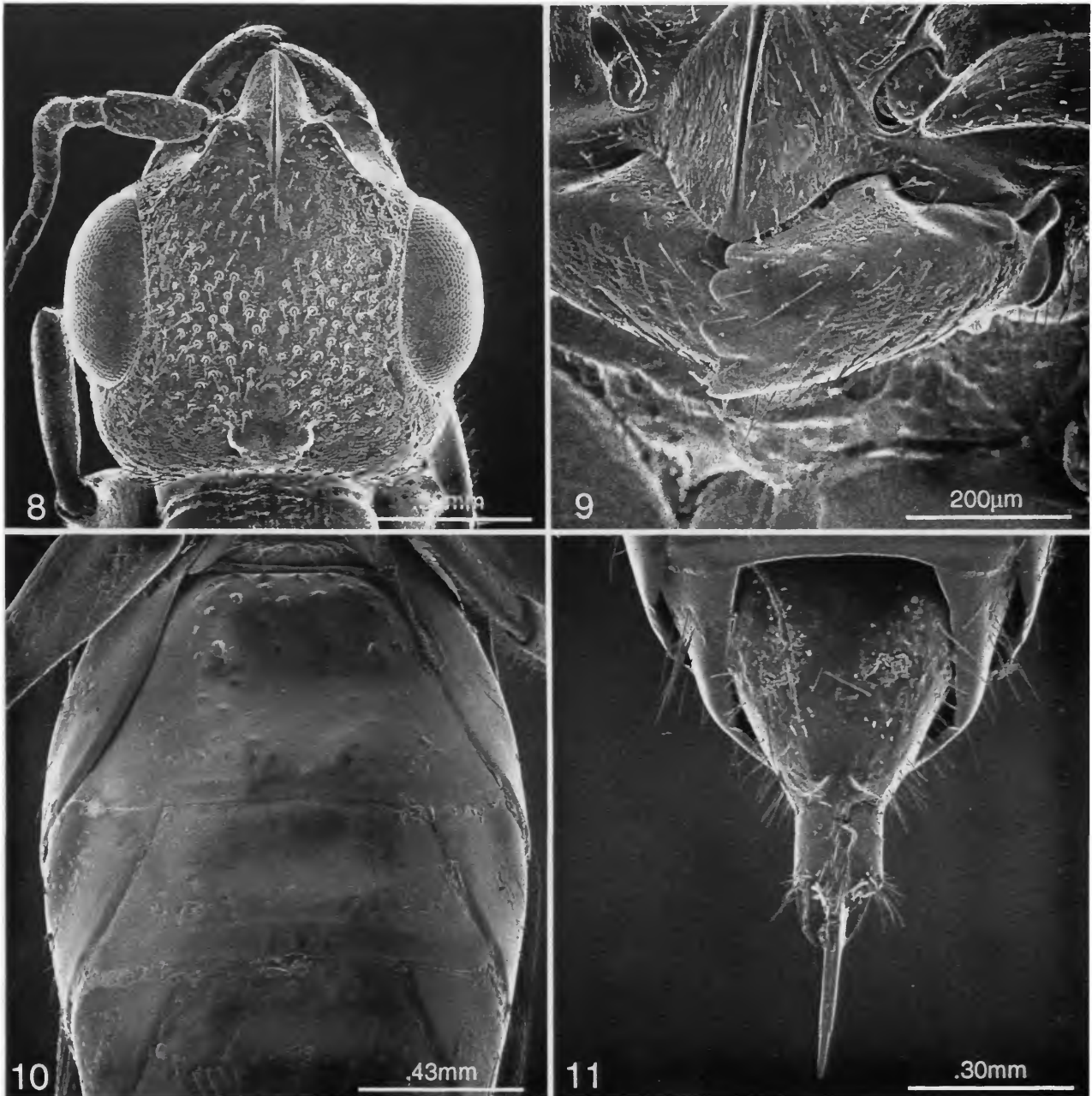
Dorsum of thorax as in Figure 13; pronotal dorsum and scutum delicately alutaceous, with smaller, more separated punctures than head; scutellum glossy and with scattered fine punctures, anteriorly with pair of lateral pits connected by groove; mesopleuron with blunt tooth behind median fovea; dorsal propodeal surface with complete median carina and with sublateral carinae converging posteriorly, area between them irregularly, transversely rugulose; forefemur length 2.58–2.63

× width; forewing (Figure 4) with poorly developed prostigma, basal vein with short stub.

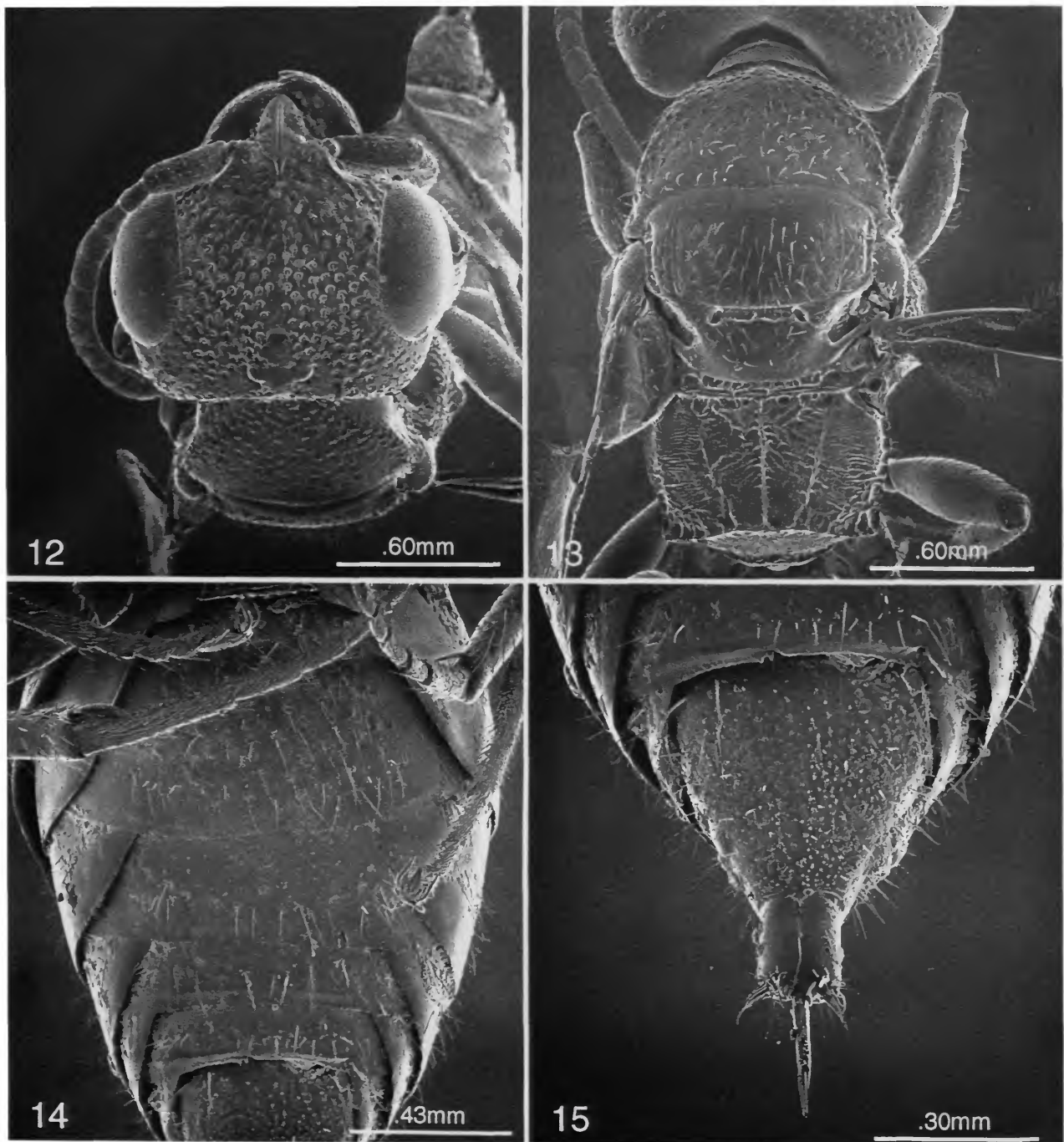
Second abdominal sternum with large close punctures on a broad median area (Figure 14); sixth sternum with dense small punctures (Figure 15).

MALE.—Unknown.

VARIATION.—I exclude from the type series a female from Sri Lanka, Eastern Province, Amparai District, Ekgal Aru Sanctuary Jungle, 11–12 Jun 1976, in Malaise trap, KVK, PBK, SK (USNM). The standard measurements agree well with those



FIGURES 8–11.—*Odontopyris mandibularis*, new species, holotype female (uncoated): 8, head; 9, left mandible; 10, abdominal sterna 2–4; 11, abdominal sternum 6.



FIGURES 12-15.—*Odontepyris ventralis*, new species, paratype female (uncoated): 12, head; 13, thorax, dorsal; 14, abdominal sterna 2-5, base of 6; 15, abdominal sternum 6.

of the type series except that OOL is $1.62 \times$ WOT and the forefemur length is $2.78 \times$ the width; the femora and tibiae are varying shades of brown rather than light red.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, NORTH-EERN PROVINCE, *Mannar District*: 0.5 mi (0.8 km) NE Kokmotte [misspelled Cockmuttai on label] Bungalow, 20 m, Wilpattu National Park, 6–7 Oct 1977, KVK, PBK, PF, TW, MJ (USNM).

Paratypes (all USNM): Sri Lanka, CENTRAL PROVINCE, *Matale District*: 3♀, Kibissa, 0.5 mi (0.8 km) W Sigiriya, jungle, 28 Jun–4 Jul 1978, in Malaise trap, KVK, PBK, TW, VK. UVA PROVINCE, *Monaragala District*: 1♀, Angunakolapelessa, 100 m, 21–23 Jan 1979, in Malaise trap, KVK, PBK, TW, SS, TG; 2♀, Angunakolapelessa, 27–28 Mar 1981, in Malaise trap, KVK, TW, LW.

One paratype will be deposited in the National Museum, Colombo, and one in the Natural History Museum, London (BMNH).

REMARKS.—This widely distributed species also should occur in India.

6. *Goniozus comatus*, new species

ETYMOLOGY.—From the Latin *comatus*, long-haired, in allusion to the rather long ocular setae and longer bristles on the vertex.

FEMALE (holotype).—Length 2.9 mm, forewing 1.9 mm. Body integument dark brown, apical abdominal segment lighter, mandible and antennae pale yellow, tarsi pale yellow, other leg segments testaceous. Wings slightly infumated. Vestiture pale, unusually long on front and thoracic dorsum; ocular setae 3 times as long as diameter of 1 facet, visible at $\times 8$ magnification; posterior margin of head with 2 pairs of very long, curving, inclinate bristles, bristles about 1.3 times length of scape.

Mandible moderately stout, with 4 small teeth; clypeal carina strong, arcuate in profile, extending onto front a distance equal to its length on clypeus; front moderately alutaceous, with small punctures separated by 1.0 – $1.5 \times$ their diameter; antennal scrobes ecarinate; WH $0.90 \times$ LH; WF $1.07 \times$ HE; EV $0.43 \times$ HE; ocelli in low triangle, posterior pair at vertex crest, OOL $0.88 \times$ WOT; first 4 antennal segments in ratio of about 11:4:5:5, third segment length $1.25 \times$ width.

Dorsum of thorax moderately alutaceous, with small, scattered punctures about as dense as on front; dorsum of propodeum not carinate posteriorly; forefemur length $1.76 \times$ width; forewing with closed areolet, prostigma well developed.

MALE.—Unknown.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, CENTRAL PROVINCE, *Kandy District*: Peradeniya, 8 Jun 1915, number 55 (BMNH).

7. *Goniozus villosus*, new species

ETYMOLOGY.—From the Latin *villosus*, hairy, in allusion to the relatively long and abundant ocular setae.

FEMALE (holotype).—Length about 2.4 mm (abdomen curled), forewing 1.8 mm. Body black with mandible, antennae, tegulae, and legs testaceous. Wings clear, subcosta, prostigma, and stigma medium brown, other veins testaceous. Vestiture pale, sparse, rather long on front and thoracic dorsum; ocular setae just visible at $\times 8$ magnification, about twice as long as diameter of 1 facet; inclinate bristles on posterior margin of head a little shorter than in *G. comatus*.

Mandible rather slender, with 4 tiny teeth; clypeal carina strong, arcuate in profile, extending onto front a distance equal to its length on clypeus; front strongly alutaceous, with small, shallow punctures separated from each other by twice or more their diameter; antennal scrobes delicately carinate; WH $0.95 \times$ LH; WF $0.91 \times$ HE; EV $0.18 \times$ HE; ocelli in quite low triangle, posterior pair almost touching posterior margin of head, OOL $0.86 \times$ WOT; first 4 antennal segments in ratio of about 12:6:5:5, third segment length about $1.4 \times$ width.

Thoracic dorsum moderately alutaceous, punctures about as dense as on front; dorsum of propodeum with carina posteriorly; forefemur length $1.96 \times$ width; forewing with closed areolet, prostigma only weakly developed.

MALE.—Unknown.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, WESTERN PROVINCE, *Kalutara District*: Morapitiya, near Agalawatta, 13–14 Oct 1976, GFH, RED, SK, DWB (USNM).

8. *Goniozus ecarinatus*, new species

ETYMOLOGY.—From the Latin *ex-*, without, and *carina*, ridge, in allusion to the lack of a posterior carina on the dorsal surface of the propodeum.

FEMALE (holotype).—Length 2.6 mm, forewing 1.8 mm. Body black with antennae and tegulae testaceous, tarsi testaceous, other leg segments light brown, mandible dark red. Wings clear, stigma and prostigma brown, veins testaceous. Ocular setae visible at $\times 32$ magnification, about as long as diameter of 1 facet.

Mandible quadridentate; clypeal carina moderately strong, median, arcuate in profile, and extending short distance onto front as polished streak; front rather dull, more strongly alutaceous than in *G. comatus*, punctures small and indistinct against surface sculpture, separated from each other by 1.0 – $1.5 \times$ their diameter; antennal scrobe delicately carinate; WH $1.07 \times$ LH; WF $1.35 \times$ HE; EV $0.27 \times$ HE; ocelli in low triangle, posterior pair at vertex crest, OOL $1.07 \times$ WOT; first 4 antennal segments in ratio of about 16:5:6:5, third segment length $1.11 \times$ width.

Dorsum of thorax rather dull, moderately alutaceous, with scattered, sparse punctures not prominent because of surface sculpture; dorsum of propodeum not carinate posteriorly, strongly alutaceous except polished median triangle; forefemur length $1.89 \times$ width; forewing with closed areolet.

MALE.—Unknown.

VARIATION.—The paratype is 2.8 mm long, forewing 2.1 mm; antennae, tegulae, foretibiae and -tarsi, mid- and hindlegs,

pale yellow; mandible and clypeus testaceous; lower front and pronotal dorsum reddish tinged; abdomen brown, apical segment lighter; WH $1.13 \times$ LH; WF $1.14 \times$ HE; EV $0.31 \times$ HE; OOL $0.86 \times$ WOT; forefemur length $1.90 \times$ width. Specimen possibly is teneral.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, CENTRAL PROVINCE, *Matale District*: Kibissa, 0.5 mi (0.8 km) W Sigiriya, 28 Jun–4 Jul 1978, in Malaise trap in jungle, KVK, PBK, TW, VK (USNM).

Paratype: 1♀, Ceylon, GHKT (OXFORD).

9. *Goniozus lucidulus*, new species

ETYMOLOGY.—From the Latin *lucidulus*, somewhat shining, in allusion to the somewhat shiny head and thoracic dorsum.

FEMALE (holotype).—Length 2.8 mm, forewing 2.0 mm. Head and thorax medium brown, abdomen lighter, mandible, antennae, and tegulae pale yellow, tarsi pale yellow, other leg segments testaceous. Wings clear, stigma and prostigma testaceous, veins almost colorless. Vestiture on head and thoracic dorsum sparse, short, decumbent; ocular setae lacking.

Head somewhat shining, delicately alutaceous; mandibles obscured by mounting medium; median carina of clypeus moderately strong, curved in profile, extending short distance onto front as low carina; punctures on front small, weak, separated from each other by $1.5\text{--}2.0 \times$ their diameter; antennal scrobe with delicate carina; WH $0.91 \times$ LH; WH = HE; EV $0.38 \times$ HE; ocelli in low triangle, posterior pair at posterior margin of head, OOL $0.85 \times$ WOT; first 4 antennal segments in ratio of about 10:5.5:5:5, third segment length $1.25 \times$ width.

Thoracic dorsum shinier and more delicately alutaceous than head and with delicate scattered punctures, punctures sparser on scutum and scutellum than on pronotum; dorsum of propodeum with delicate transverse carina posteriorly, surface moderately alutaceous adjacent to polished median triangle; forefemur length $1.94 \times$ width; forewing with closed areolet.

MALE.—Unknown.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, SABARAGAMUWA PROVINCE: 5 mi (8 km) NNW Balangoda, 2500 ft (762 m), 22 Feb 1962, in sweep net along stream, BAC (LUND).

10. *Goniozus valvolicola*, new species

FIGURE 16

ETYMOLOGY.—From the Latin *valvola*, pod, and *-cola*, inhabitant, in allusion to this wasp having as its host a lepidopterous larva feeding on seeds in the pod of the leguminous shrub, *Tephrosia candida* de Candolle.

FEMALE.—Length 2.3–2.5 mm, forewing 1.5–1.8 mm. Head and thorax black, abdomen dark brown; antennae, tegulae, and tarsi pale yellow to testaceous, other leg segments testaceous to light brown. Wings clear, stigma and prostigma brown, subcosta testaceous, other veins colorless. Vestiture on head and thoracic dorsum short, relatively sparse, suberect; ocular setae short, visible at $\times 32$ magnification.



FIGURE 16.—*Goniozus valvolicola*, new species, paratype female head (coated).

Head dull, moderately alutaceous, sides behind eyes parallel before curving inward at posterolateral angles (Figure 16); mandible robust, with 4 small apical teeth; clypeal keel moderately strong, median, curved in profile, and extending short distance onto front as low carina; punctures on front small, separated from each other by $1.5\text{--}2.0 \times$ their diameter; antennal scrobe not carinate; WH $0.82\text{--}0.86 \times$ LH; WF $1.08\text{--}1.31 \times$ HE; EV $0.71\text{--}0.82 \times$ HE; front angle of ocellar triangle about 90° , posterior pair of ocelli about 1 diameter from posterior margin of head, OOL $1.54\text{--}1.58 \times$ WOT; first 4 antennal segments in ratio of about 10:5:6:4, third segment length $1.20 \times$ width.

Pronotal disk rather dull, moderately alutaceous, scutum and scutellum somewhat more shiny, delicately alutaceous, with sparse small punctures; propodeal dorsum with weak posterior carina, evanescent in middle, surface moderately alutaceous except for polished median triangle; forefemur length $2.00\text{--}2.07 \times$ width; forewing with closed areolet.

MALE.—Length 2.2 mm, forewing 1.2–1.4 mm. Head and thorax black, abdomen dark brown, mandible (except apical teeth red), antennae, and tegulae pale yellow, tarsi pale yellow, outer surface of femora light brown, other leg segments

testaceous. Wings clear, stigma, prostigma, subcosta, and radial veins testaceous, other veins colorless. Vestiture sparse, quite short, suberect; ocular setae visible at $\times 100$ magnification.

Head shinier than in female, delicately alutaceous, sides behind eyes parallel before curving inward at posterolateral angles; mandible with 4 small teeth; clypeal carina weaker than in female, extending onto front as short polished streak; WH $0.91 \times LH$; WF $1.10 \times HE$; EV $0.75 \times HE$; ocelli arranged as in female but posterior pair separated from posterior margin of head by one-half their diameter, OOL $1.36 \times WOT$.

Dorsal propodeal surface with weak apical carina, carina interrupted in middle; forewing with closed areolet; forefemur length $2.00\text{--}2.18 \times$ width.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, NORTH WESTERN PROVINCE, *Puttalam District*: Nattandiya, 22 Oct 1938, [reared from] caterpillars [feeding on seeds] in pods of *Tephrosia candida*, JCH, number 6918 (BMNH).

Paratypes: Sri Lanka, 2♀, 2♂, same label data as holotype (1♂ without head) (BMNH). WITHOUT FURTHER LOCALITY: 1♀, Ceylon, 1927, parasite of caterpillar boring in pods of *Tephrosia candida*, SSL, B.Py.2 (BMNH).

A pair of paratypes are deposited in USNM.

11. *Goniozus nephantidis* (Muesebeck, 1934)

FIGURE 17

Parasierola species, Ramachandra Rao and Cherian, 1928:11–22 [biology in India].

Parasierola nephantidis Muesebeck, 1934:225–226 [♀, ♂; Coimbatore, India; holotype in USNM].—Jayaratnam, 1941b:115–127, figs. 1–5 [biology in Sri Lanka].—Kurian, 1954a:286 [listed]; 1954b:436 [in key]; 1955:135 [in parasite-host index].—Kurian and Antony, 1961:123–126 [systematics].—Dharmaraju, 1963:15–19, figs. 21–24 [rearing in Ceylon].

Parasierola species, Jayaratnam, 1941a:9, pl. 2: figs. 8, 9 [biology in Sri Lanka].

Goniozus nephantidis.—Gordh, 1988:363 [transferred]; 1990:25 [listed].

FEMALE.—Length 3.4–3.9 mm, forewing 2.2–2.5 mm. Body black with antennae, tibiae, and tarsi testaceous, other leg segments light brown. Wings clear, stigma and prostigma dark brown, veins testaceous. Vestiture sparse, short, subappressed; ocular setae visible at $\times 32$ magnification.

Head as in Figure 17; mandible robust, with 4 teeth; clypeal carina strong, arcuate in profile, extending onto front a distance equal to its length on clypeus; front dull, delicately alutaceous, with scattered, small shallow punctures separated from each other by $1.0\text{--}1.5 \times$ their diameter; antennal scrobes carinate; WH $0.94\text{--}0.95 \times LH$; WF $1.15\text{--}1.20 \times HE$; EV $0.36\text{--}0.47 \times HE$; ocelli in low triangle, posterior pair one-half their diameter from posterior margin of head, OOL $1.22\text{--}1.33 \times WOT$; first 4 antennal segments in ratio of about 15:6:5:5, third segment length $1.1 \times$ width.

Dorsum of thorax rather dull, delicately alutaceous, with small, scattered punctures; posterior dorsum of propodeum with transverse, medially evanescent carina, surface adjacent to



FIGURE 17.—*Goniozus nephantidis* (Muesebeck), female head (uncoated).

smooth median area strongly alutaceous; forefemur length $1.76\text{--}1.90 \times$ width; forewing with closed areolet.

MALE.—Length 2.5–2.6 mm, forewing 1.7–1.9 mm. Body black with mandible and tarsi pale yellow, antennae and tibiae testaceous, femora light brown. Wings and vestiture as in female, ocular setae barely visible at $\times 50$ magnification.

Mandible relatively slender compared to that of female, with 4 apical teeth; clypeal carina weaker than in female, extending onto front for shorter distance; front delicately alutaceous, shinier and with sparser punctation than in female; antennal scrobes weakly carinate; WH $0.90\text{--}1.00 \times LH$; WF $1.17\text{--}1.22 \times HE$; EV $0.56\text{--}0.61 \times HE$; ocelli almost in right triangle, posterior pair one-half their diameter from posterior margin of head, OOL $0.94\text{--}1.10 \times WOT$.

Dorsal propodeal surface with apical carina present only laterally and quite weak; forewing with closed areolet; forefemur length $2.06\text{--}2.27 \times$ width.

SPECIMENS EXAMINED (USNM except as noted).—

Holotype: ♀, India, TAMIL NADU: Coimbatore, South India, 15 Jan 1927, MSK (USNM 50138).

Paratypes: India, TAMIL NADU: 2♀, 2♂, holotype locality, as follows: 2♂, 7–8 Jul 1924, par. on *Nephantis*; 2♀, 24 Jul 1924, SR. 1♀, Salem, 2 May 1930, par. on *Nephantis*, CKS. KERALA: 1♀, Calicut, 2 Nov 1927, par. on *Nephantis*, ERG. WITHOUT FURTHER LOCALITY: 1♀, Thirupatur, 7 Oct 1925, par.

on *Nephantis*, SR. 1♀, Thurmapuri, 6 Nov 1927, par. on cotton bolls, AD.

Nontypes: Sri Lanka, EASTERN PROVINCE, *Batticaloa District*: 16♀, 7♂, Batticaloa, as follows: 3♀ (and 3 cocoons), 3 Mar 1937, number 8797; 13♀, 7♂, 23 Aug 1937, ex larva of *Nephantis serinopa* Meyr., JCH, number 8823 (BMNH except 1 pair USNM). NORTH WESTERN PROVINCE, *Kurunegala District*: 2♀, Kurunegala, 18 Oct 1928, larvae of *Nephantis serinopa*, JCH, number 6873 (BMNH).

12. *Goniozus fulgidus*, new species

ETYMOLOGY.—From the Latin *fulgidus*, shining, in allusion to the glossy integument of the head, scutum, and scutellum.

FEMALE (holotype).—Length 4.2 mm, forewing 2.5 mm. Body black with mandible, antennae, tegulae, tibiae, and tarsi testaceous, femora dark brown. Wings clear, stigma and prostigma light brown, veins testaceous. Vestiture sparse, short, suberect, ocular setae very short, barely visible at $\times 100$ magnification.

Mandible relatively slender, with 4 apical teeth; clypeus with margin of lobe obtusely angulate, lobe protruding but median line not carinate, rounded in profile along midline; front very glossy, lacking short median carina or streak above clypeus, surface with quite scattered, small punctures separated from each other by 3 or more times their diameter; antennal scrobes not carinate; WH $1.11 \times LH$; WF $1.20 \times HE$; EV $0.41 \times HE$; ocelli almost in right triangle, posterior pair separated from posterior margin of head by one-half their diameter, OOL $1.10 \times WOT$; first 4 antennal segments in ratio of about 13:7:9:7, third segment length about $2.3 \times$ width.

Pronotal disk delicately alutaceous except narrow glossy strip at apex and with scattered small punctures separated by $2-3 \times$ their diameter; scutum and scutellum glossy, the former punctured similarly to pronotum, the latter mostly impunctate; propodeal dorsum with complete apical carina; forewing with short stub arising from basal vein, about as long as section of basal vein from prostigma to stub; forefemur length $1.77 \times$ width.

MALE.—Unknown.

VARIATION.—The single paratype is 3.1 mm long, the forewing is 1.9 mm long. It is very similar to the holotype in color and sculpture. Pertinent measurements are WH $1.11 \times LH$, WF $1.22 \times HE$, EV $0.33 \times HE$, OOL $1.17 \times WOT$, and forefemur length $1.82 \times$ width.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, WESTERN PROVINCE, *Colombo District*: Labugama Reservoir, 11 Jul 1978, KVK, PBK, TW, VK, LJ (USNM).

Paratype: Sri Lanka, SOUTHERN PROVINCE, *Hambantota District*: 1♀, Palatupana Tank, 21–22 Jun 1978, in Malaise trap, KVK, PBK, TW, LJ, NK (USNM).

The paratype will be deposited in the National Museum, Colombo.

REMARKS.—This species is quite distinctive in having a glossy integument and in lacking a clypeal carina.

13. *Goniozus montanus* Kieffer, 1908

FIGURES 18, 19

Bethylus distigma Motschulsky, 1863:26–27 [♀: “Montagnes de Nura-Ellia,” Ceylon; holotype in Zoological Museum, Moscow State University; preoccupied in *Goniozus* by *distigmus* Thomson, 1862].—Dalla Torre, 1898:556 [listed].—Kieffer, 1914:514 [redescribed in German].—Ranaweera, 1950:127–132, [life history].—Kurian, 1954a:283–284 [hosts listed]; 1955:135 [hosts listed].

Goniozus montanus Kieffer, 1908:15 [new name for *Bethylus distigma* Motschulsky].—Krombein, 1987:357–358 [notes on holotype of *B. distigma*].—Gordh, 1988:363; 1990:24 [listed].

FEMALE.—Length 2.5–3.6 mm, forewing 1.9–2.4 mm. Usually black but occasionally dark brown (teneral specimens?), mandible, antennae, tibiae, and tarsi testaceous to pale yellow, femora ranging from chestnut to testaceous, forefemora usually slightly darker than posterior 2 pairs. Wings clear, subcosta, stigma, and prostigma brown, other veins testaceous. Vestiture rather long, moderately sparse, subappressed; eyes with sparse setae barely visible at $\times 100$ magnification.

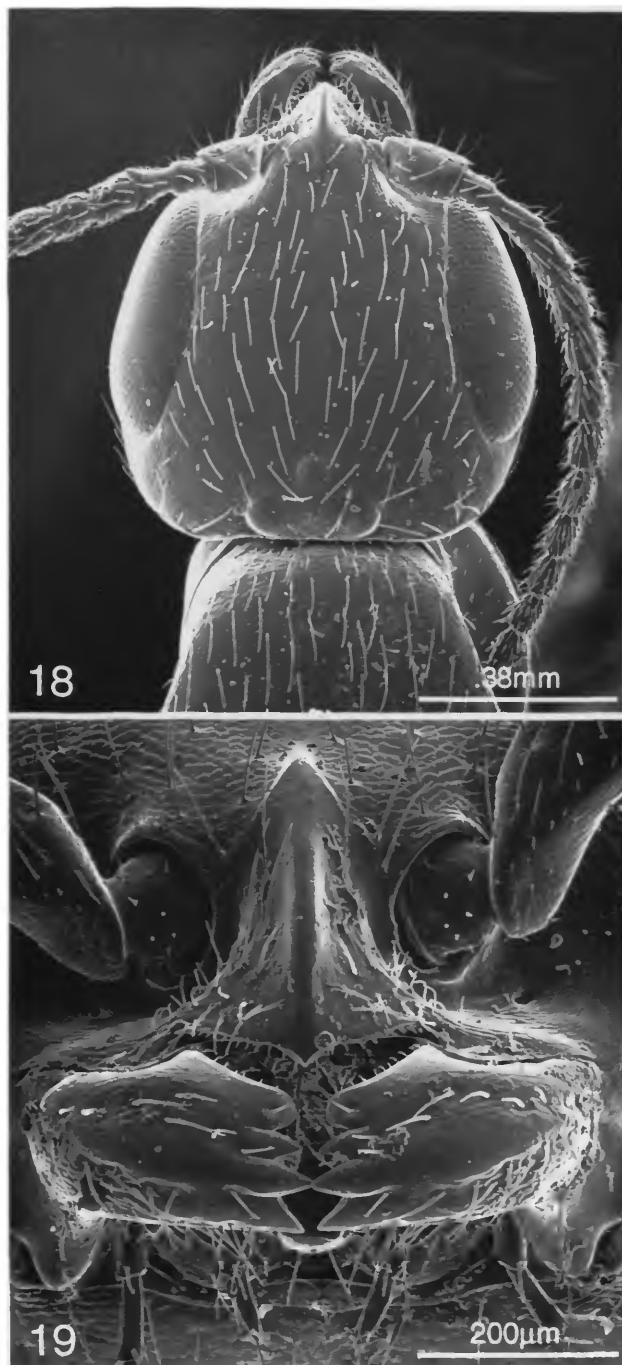
Head as in Figure 18; mandible relatively slender, with 4 teeth at apex (Figure 19); median clypeal carina strong, arched in profile, extending onto front as low carina a distance equal to its length on clypeus; front moderately alutaceous, somewhat shiny, with small shallow punctures, mostly separated from each other by $1.5-2.0 \times$ their diameter; antennal scrobes weakly carinate; WH $0.89-1.04 \times LH$; WF $0.79-1.12 \times HE$; EV $0.16-0.52 \times HE$; ocelli in low triangle, posterior pair almost at posterior margin of head, OOL $0.68-1.15 \times WOT$; first 4 antennal segments in ratio of about 9:4:5:4, third segment length $1.15-1.25 \times$ width, segments 4–11 about as long as broad.

Pronotum with surface sculpture similar to that on front; scutum and scutellum shinier, very delicately to scarcely alutaceous, punctures very sparse; notauli well developed; propodeal dorsum with posterior carina, polished median area twice as long as basal width, area adjacent to triangle alutaceous; forefemur length $1.67-2.13 \times$ width; forewing with stub from basal vein about as long as section of basal vein from prostigma to stub, prostigma well developed.

MALE.—Length 2.1–2.7 mm, forewing 1.5–1.9 mm. Head and thorax black, occasionally dark brown, abdomen brown, mandible, antennae, tibiae, and tarsi pale yellow, femora varying from light brown to testaceous. Wings clear, stigma and prostigma light brown, veins pale testaceous to colorless. Vestiture sparse, suberect, shorter than in female but longer than in males of other known Ceylonese species.

Mandible slender, with 4 apical teeth; clypeal carina well developed though weaker than in female, extending short distance onto front as a low carina; front shinier and more delicately alutaceous than in female, with small shallow punctures separated from each other by twice or more their diameter; antennal scrobes not carinate; WH $0.96-1.07 \times LH$; WF $0.65-0.98 \times HE$; EV $0.22-0.46 \times HE$; ocelli arranged as in female but variable in size, OOL $0.18-0.66 \times WOT$.

Dorsal propodeal surface carinate posteriorly, carina occasionally evanescent in middle; forefemur length $1.94\text{--}1.45 \times$ width; basal vein of forewing with stub.



FIGURES 18, 19.—*Goniozus montanus* Kieffer, female (coated): 18, head; 19, mandible and clypeus.

VARIATION.—This is a rather variable species as noted in the description above, a variation that may be linked to the different hosts that it attacks. Some variation, especially in males, also may be linked to adaptation for nocturnal activity. The males taken at light traps exhibit variable increase in size of the ocelli and also of the compound eyes. The two females collected in light traps do not have either ocelli or eyes enlarged. In males with both ocelli and eyes enlarged, the OOL \times WOT ratio is $0.18\text{--}0.48$, the WF \times HE ratio is $0.65\text{--}0.89$, and the diameter of the anterior ocellus may be as much as $1.8 \times$ OOL. Males with both ocelli and eyes of normal size have comparable OOL \times WOT and WF \times HE ratios of $0.56\text{--}0.66$ and $0.83\text{--}0.98$, respectively, and the diameter of the anterior ocellus may be only $0.5 \times$ OOL.

The holotype of *B. distigma* has been attacked by mold, and it is otherwise not in good condition. The head is detached from the body and mounted separately on the same card. Antennae are lacking except the right scape, and much of the vestiture is abraded. Pertinent measurements are WH $0.91 \times$ LH, WF $0.93 \times$ HE, OOL $0.88 \times$ WOT, EV $0.27 \times$ HE, and FL $1.90 \times$ FW.

BIOLOGY.—Kurian (1954a) and Gordh (1990) list papers by Indian entomologists who recorded *G. montanus* (as *B. distigma*) as a parasite of various lepidopterous larvae. Voucher specimens have not been available, so I cannot verify the identifications; these references have been excluded from the synonymy given above.

J. Nietner, who described *Homona coffearia*, the tea tortrix, was a coffee planter who sent Motschulsky the specimen that became the unique holotype of *Bethylus distigma*. It is possible that Nietner reared the bethylid from that host, but no such information is associated with the type.

SPECIMENS EXAMINED (USNM unless noted otherwise).—Sri Lanka, NORTHERN PROVINCE, *Mannar District*: 1♂, 4 mi (6.4 km) NW Mannar, 100 ft (30 m), 3 Nov 1976, black light, GFH, SK, DWB. CENTRAL PROVINCE, *Kandy District*: 2♂, Kandy, Peak View Motel, 1800 ft (549 m), 7–14 Jan 1970, DRD, WHR. 1♀, Kandy, Udawattakele Sanctuary, 1800 ft (549 m), 13–14 Aug 1973, GE; 1♂, 2100 ft (640 m), 4–5 Oct 1976, at black light, GFH, RED, SK, DWB. 3♀, Kandy, 28 March 1987, ex *Cnaphalocrocis medinalis* (BMNH). 14♀, 2♂, Peradeniya, as follows: 6♀, 29 Jun 1921, reared from [clusters of brown cocoons in leaves folded by] *Syllepte derogata*, leaf folder on *Boehmeria* sp., JCH, number 4854 (BMNH); 4♀, 11 Sep 1913, AR (2 ♀ BMNH); 1♀, 18 Oct 1913 [reared from caterpillar, probably *Homona coffearia*, in folded leaf of tea], AR, number 3393 (BMNH); 3♀, 2♂, 11 Nov 1928, reared from *Tabidia aculealis*, leaf folder on *Ipomoea batatas* Poirlet, JCH, number 6904 (BMNH). *Nuwara Eliya District*: 1♀, “Montagnes de Nura-Ellia” (MOSCOW; holotype of *Bethylus distigma* Motschulsky). 4♀, 1♂, Hanguranketa, 30 Jun 1937, ex larva of *Syllepte derogata* [on okra], JCH, number 8816 (BMNH). WESTERN PROVINCE, *Colombo District*: 1♀, Yakkala, 18 mi (29 km) NE Colombo, 15–31 Jan 1962, BAC (LUND). 1♀, Uswetakeiyawa, seashore, 16 Mar 1981, KVK, TW, LW.

SABARAGAMUWA PROVINCE, *Ratnapura District*: 1♀, Ratnapura, 22 Feb 1962, at light, BAC (LUND). 1♀, Ratnapura, 21 Jan 1970, MBL (GENEVA). 2♂, Rakwana, 27–28 Feb 1962, 1 in light trap, BAC (LUND). 1♀, Allerton, 1 mi (1.6 km) S Rakwana, 28 Feb 1962, at light, BAC (LUND). UVA PROVINCE, *Badulla District*: 3♀, 1♂, Badulla, 9 Mar 1929, ex *Homona coffearia*, larval parasite, JCH, number 6980 (BMNH). 2♀, Girandurukotte, 30 Jan 1987, ex larva of *Hadylepta indicata*, LDG (BMNH). 3♀, Aralaganwila, as follows: 1♀, 25 Mar 1991, ex larva of *Omiodes indicata* on *Vigna* sp.; 1♀, 5 Apr 1991, ex larva of *Omiodes indicata* on *Vigna radiata*; 1♀, 24 Sep 1991, ex larva of *Omiodes indicata* (all BMNH). SOUTHERN PROVINCE, *Galle District*: 1♂, Haycock, 21 mi (34 km) NNE Galle, 27 Jan 1962, at light, BAC (LUND). 1♀, Sinharaja Jungle, Kanneliya section, 13–16 Jul 1978, in Malaise trap, KVK, PBK, TW, VK, LJ. *Matara District*: 1♀, Mapalana, 19 Jan 1987, ex rice leaf folder, PKL (BMNH). WITHOUT FURTHER LOCALITY: 1♀, 1♂, Ceylon, 1933, CBRK, number H.53, pinned with mass of 4 parasite cocoons (BMNH). 5♀, Ceylon, GHKT (BMNH except 2♀, OXFORD).

14. *Goniozus rutherfordi*, new species

ETYMOLOGY.—Named for Andrew Rutherford, Government Entomologist of Ceylon from 1913 until his early death in 1915.

FEMALE.—Length 2.0 mm, forewing 1.4 mm. Body light brown, apical two-thirds of third tergum darker, with mandible, antennae, tegulae, tibiae, and tarsi testaceous. Wings clear, subcosta, prostigma, and stigma testaceous, other veins almost colorless. Vestiture quite sparse and short, subappressed, ocular setae lacking.

Mandible relatively slender, apical teeth not visible; clypeal carina moderate, curved in profile, extending as low ridge onto front a distance equal to its length on clypeus; front shining, very delicately alutaceous, with very scattered, small shallow punctures; antennal scrobes feebly carinate; WH 0.92 × LH; WF 0.95 × HE; EV 0.43 × HE; ocelli in low triangle, posterior pair at posterior margin of head, OOL = WOT; first 4 antennal segments in ratio of about 7:4:3:3, third segment as long as

broad, segments 4–11 slightly broader than long.

Thoracic dorsum shining, very delicately alutaceous, with sparse, small shallow punctures; notauli evanescent; propodeal dorsum with complete but weak posterior carina, polished median triangle narrow, basal width about one-third the propodeal length; forefemur length 1.92 × width; forewing with stub from basal vein about 1.7 times as long as section of basal vein from prostigma to stub, prostigma poorly developed.

MALE.—Length 1.6 mm, forewing 1.1 mm. Body brown, somewhat darker than female, mandible and tarsi pale yellow, other leg segments, antennae, and tegulae testaceous. Wings as in female. Vestiture sparser than female.

Mandible slender, with 4 apical teeth; clypeal carina weaker than in female, not extending onto front; front shining, more delicately alutaceous than in female, with scattered, tiny punctures; antennal scrobes not carinate; WH 0.96 × LH; WF 1.04 × HE; EV 0.41 × HE; ocelli as in female, OOL 0.88 × WOT.

Dorsal propodeal surface not carinate posteriorly; forefemur length 2.33 × width; basal vein of forewing with stub.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, CENTRAL PROVINCE, *Kandy District*: “Peradeniya, 16 Apr 1914, AR, number 3757” (USNM).

Paratype: Sri Lanka, 1♂, same label data as holotype (USNM).

REMARKS.—The pair was presumably reared by Rutherford during his studies of injurious insects and their parasites. They are the only known bethylids bearing his initials, AR, on the label. Howard (1930:224) noted that Rutherford had been a Carnegie Fellow for a year in the United States, possibly in one of the laboratories of the old Bureau of Entomology (USDA). He may have sent this unusual pair to Howard for identification; the holotype was identified as *Goniozus* sp. by C.F.W. Muesebeck.

Subfamily EPYRINAE

Evans (1964, 1978) recognized three tribes of Epyrinae. The tribes Cephalonomiini and Sclerodermini are treated herein; the Ceylonese Epyrini will be treated subsequently.

Key to the Tribes, Genera, and Species of Ceylonese Epyrinae

1. Antennae 12-segmented [Figure 20]; winged forms with both stigma and prostigma [Figure 21]. CEPHALONOMIINI 2
- Antennae 13-segmented; winged forms with stigma only, prostigma lacking. SCLERODERMINI 4
2. Radial vein present; fully winged forms; front produced into bifid process overlying antennal insertions and middle of clypeus [liberated in Peradeniya but not known to be established] 17. *Prorops nasuta* Waterston

- Radial vein lacking; extralimital wingless forms occur and may be found eventually in Sri Lanka; front simple, not produced into process overlying antennal insertions and base of clypeus 3
3. Female 1.5 mm long; female antennae short and subclavate toward apex, male antennae longer and filiform; female clypeus not mentioned, male clypeus with median lobe not raised except slightly along midline, its apex acute, minutely bifid; antennae and legs of both sexes yellowish; female head with LH 1.88 × thickness of head in lateral view and EV 2.47 × HE
- 15. *Cephalonomia peregrina* Westwood
- Female 2.2 mm long; antennae short and subclavate; clypeus [Figure 20] with median lobe raised into narrow triangle bounded laterally by carina; flagellum, mid- and hindfemora, and tibiae brown, scape and mid- and hindtarsi testaceous; LH 1.98 × thickness of head in lateral view, EV 1.07 × HE; male unknown
- 16. *Cephalonomia lignicola*, new species
4. Mandible at apex with 5 (♂) or 7 (♀) teeth [Figure 31]; females brachypterous or fully winged, radial vein present in latter forms; dorsal surface of propodeum transversely carinate at apex 5
- Mandible at apex with 3 or 4 teeth; apterous or winged, radial vein lacking in latter forms; dorsal surface of propodeum rounding into posterior surface, not carinate at apex 6
5. Head above rather dull, delicately and closely granulate [Figure 29]; female forewing short, 0.5 mm long, extending slightly beyond propodeum, male forewing longer, 1.3–1.6 mm long 23. *Glenosema dispersum*, new species
- Head above glossy, narrowly alutaceous adjacent to occiput, front with scattered punctures [Figure 33]; female forewing 0.06 mm long, no larger than tegula; male unknown 24. *Glenosema splendidum*, new species
6. Fully winged, forewing with anal vein complete; parapsidal furrows well developed [Figure 27]; males of Ceylonese species unknown, males in extralimital species with acute lateral tooth on abdominal terga 3–5 [Figure 25]
- 21. *Discleroderma undulatum*, new species
- Fully winged or wingless, if winged, forewing without anal vein; parapsidal furrows lacking or only weakly indicated in *Sclerodermus hirsutus*; males of Ceylonese species unknown, males of extralimital species usually fully winged, rarely wingless, without lateral teeth on terga 7
7. Wingless females; ocelli lacking 8
- Fully winged females; ocelli present 9
8. Head testaceous to rufotestaceous, thorax and legs testaceous, abdomen rufotestaceous tending toward pale brown at base and apex, narrowly infuscated transversely on posterior 1/3 of terga 2–5; clypeus with broad V-shaped emargination; forefemur length 1.92–2.10 × width; male unknown
- 18. *Sclerodermus vigilans* Westwood
- Body and appendages testaceous or paler except abdomen with dark blotches on base of 1st tergum, laterally on 2nd tergum, and last 2 terga completely dark; clypeus with shallow median emargination; forefemur length 1.74 × width; male unknown 19. *Sclerodermus variegatus*, new species
9. Body light brown; vestiture sparse, short, eyes bare; WH 0.84–0.86 × LH; OOL 2.11–2.25 × WOT; male unknown 18. *Sclerodermus vigilans* Westwood
- Body castaneous; rather hairy species, eyes with setae a bit longer than width of 1 facet, front with scattered setae mostly twice as long as ocular setae, pair of setae in front of posterior ocelli 2/3 as long as scape; WH 0.71 × LH; OOL 3.57 × WOT; male unknown 20. *Sclerodermus hirsutus*, new species

Tribe CEPHALONOMIINI

15. *Cephalonomia peregrina* Westwood, 1881

Cephalonomia ?peregrina Westwood, 1881:127-128, pl. 6: figs. 5, 6 [♂, ♀; Ceylon; syntypes in OXFORD].—Dalla Torre, 1898:557 [listed].—Kieffer, 1908:40 [listed]; 1914:248 [translated original description into German].—Swezey, 1933:226 [introduced into Hawaii and apparently established].—Fouts, 1936:7 [listed].—Kurian, 1954a:263 [listed]; 1955:76 [in key; misspelled *perigrina*].—Gordh, 1990:79 [listed].

Westwood's brief description was made from a pair mounted on slides in balsam. They were collected in Ceylon by D. Staniforth Green. C. O'Toole was unable to find the syntypes in the slide collection at the Oxford University Museum, and the species cannot be recognized from the original description. If the specimens were collected in Colombo, where Green resided, it is possible that they belong to one of the fully winged species of *Cephalonomia* having a worldwide distribution that are parasites of coleopterous larvae in stored grains or other food products. The following is based on Westwood's Latin description and his figures.

FEMALE.—Length 1.5 mm, forewing 1.2 mm; body not depressed as in *C. waterstoni* Gahan. Body pale pitch black, antennae and legs yellowish.

Head length $1.88 \times$ depth of head in lateral view; eye small, rounded, on side of head; $EV\ 2.47 \times HE$; clypeus not mentioned; ocelli distinct; antennae short, subclavate toward apex.

Fully winged, forewing not extending beyond abdomen, with oblong, oval stigma, margin before stigma thickened (i.e., prostigma?), median vein absent.

MALE.—Length 2.25 mm, forewing 1.69 mm (these lengths assume that figs. 5, 6 in Westwood (1881) are drawn to same scale). Entirely pale fulvous (teneral?).

Head subquadrate, sides behind eyes converging slightly toward vertex; $WH\ 0.82 \times LH$; $WF\ 2.25 \times HE$; $EV\ 1.75 \times HE$; apex of mandible acutely curved, armed with 3 small teeth above large acute apical tooth; median lobe of clypeus produced into an acute, minutely bifid apex; ocelli present, $OOL\ 1.2 \times WOT$; antennae filiform, longer than in female.

Forewing with subcosta short, bearing setae, stigma oval, median vein lacking.

16. *Cephalonomia lignicola*, new species

FIGURES 20, 21

ETYMOLOGY.—From the Latin *lignum*, wood, and *-cola*, dweller.

FEMALE.—Length 2.2 mm, forewing 1.2 mm. Head and thorax black, abdomen dark brown, mandible, flagellum, mid- and hindfemora, and tibiae brown, scape, midtrochanter, and mid- and hindtarsi testaceous. Vestiture sparse, short, and appressed on head, eyes bare, thorax mostly bare (vestiture abraded?), abdomen with a few longer, suberect bristles toward apex.

Head (Figure 20) with surface glossy; $WH\ 0.85 \times LH$; $WF\ 1.60 \times HE$; $EV\ 1.07 \times HE$ and $2.29 \times$ length of malar space; $LH\ 1.98 \times$ depth of head in lateral view; eyes oval, not especially protuberant; mandible with 3 teeth at apex, lowest tooth the largest; median lobe of clypeus produced into narrow, triangular, raised area with strong lateral carina, apical margin with few setae, the longest about as long as lateral carina; ocelli in equilateral triangle, $OOL\ 2.06 \times WOT$.

Dorsum of thorax delicately alutaceous; notauli and parapsidal furrows lacking; scutellum with basal transverse furrow; dorsal surface of propodeum dull, more strongly alutaceous, sides converging slightly toward apex, length $0.68 \times$ basal width and $0.71 \times$ apical width, with weak median carina extending to apical transverse carina, posterolateral dorsal angles not dentiform; posterior propodeal surface without median carina; forewing (Figure 21) without closed median cell, radial and anal veins represented by short stubs only.

Abdomen shining.

MALE.—Unknown.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, SABA-RAGAMUWA PROVINCE, *Ratmalana District*: Gilimale, 17 May 1975, on *Myristica dactyloides*, SLW (USNM).

REMARKS.—The specimen is not in perfect condition. The left wings and both forelegs are missing as well as the right hind tarsus. The head was detached and mounted separately on the point. We removed the right forewing so that it could be drawn; it has been remounted on the point.

S.L. Wood collected the specimen in a small, broken limb about four inches in diameter together with mature brood of the scolytid beetle, *Phloeosinus concinnulus* (Walker). Larvae of this beetle are the presumed host of the wasp.

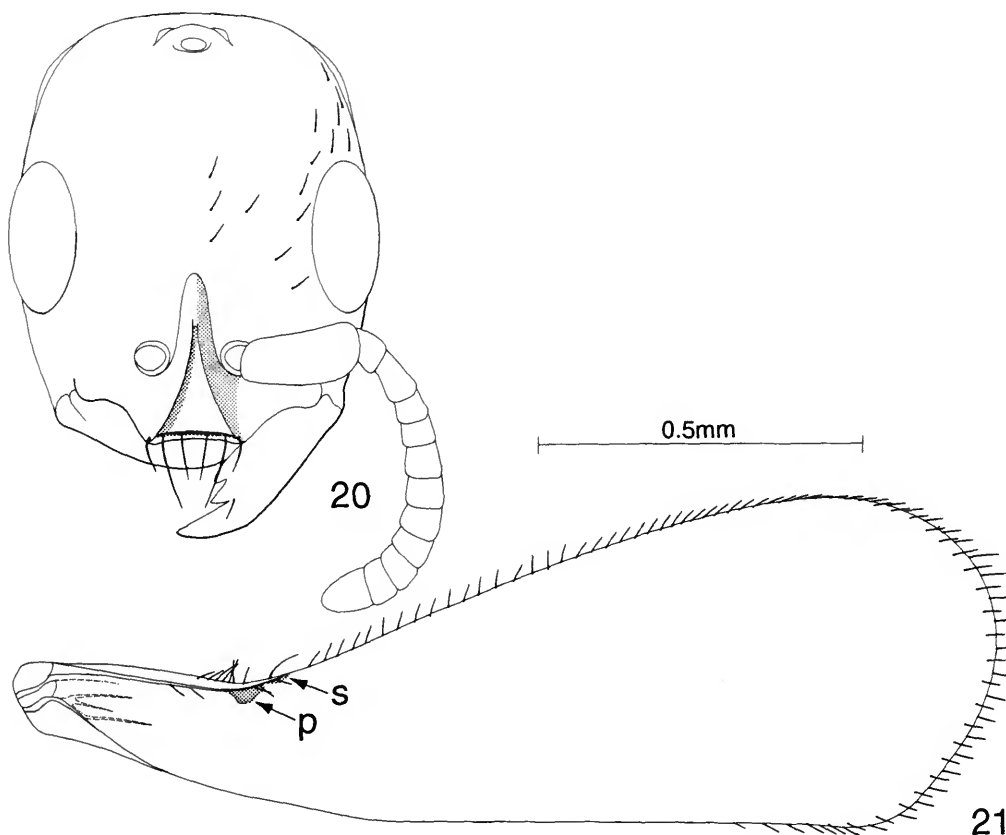
Myristica dactyloides Gaertner is commonly called *perimavara* or *malabota* in Sinhalese, *palmanikam* in Tamil. The tree has a light, soft wood that is used to make tea crates.

17. *Prorops nasuta* Waterston, 1923

Prorops nasuta Waterston, 1923:113-114, figs. 5, 6 [♀; Uganda; BMNH].—Hargreaves, 1926:350-351, fig. 2 [host, life history].—Hutson, 1939:D 39 [liberated in Sri Lanka].—Evans, 1978:196-197, figs. 13, 40, 141 [redescribed].—Gordh, 1990:141 [listed].

Hutson (1939) reported that the bethylid, *Prorops nasuta* Waterston, was imported from Uganda and bred at the Experiment Station, Peradeniya. Several hundred of these parasites were liberated in 1938 in a coffee plantation at the Station for control of the coffee-berry borer, *Hypothenemus hampei* (Ferrari) (reported in genus *Stephanoderes*). No parasites were recovered in the field later that year and there have been no subsequent reports that it was established successfully.

The species may be recognized easily by the frontal projection overlying the antennal insertions and middle of the clypeus.



FIGURES 20, 21.—*Cephalonomia lignicola*, new species, holotype female: 20, head; 21, right forewing (p = prostigma, s = stigma).

Tribe SCLERODERMINI

18. *Sclerodermus vigilans* Westwood, 1881

Scleroderma vigilans Westwood, 1881:123, pl. 5: figs. 3, 4 [♀; Ceylon; syntypes in OXFORD].—Dalla Torre, 1898:560 [listed].—Kieffer, 1908:42 [listed]; 1914:264 [redescribed].—Kurian, 1954a:265 [listed]; 1955:77–78 [in key].—Gordh, 1990:167 [listed].

Scleroderma Thwaitesiana Westwood, 1881:123 [♀; Ceylon; holotype in OXFORD].—Dalla Torre, 1898:560 [emended to *S. thwaitesianum*].—Kieffer, 1908:42 [listed]; 1914:264 [redescribed; emended to *S. thwaitesianus*].—Kurian, 1954a:264 [listed]; 1955:78 [in key].—Gordh, 1990:166 [listed]. [New synonym.]

There are two female syntypes of *S. vigilans*, mounted on a single card, one winged and one lacking wings. The wingless female is partially submerged in the mounting medium, which obscures certain details. The head of the winged specimen was fractured, either at the time of capture or when it was mounted. Both specimens have well-developed ocelli, and the conformation of the thorax is identical, that is, tegulae are present as well as the scutum, scutellum, and a narrow metanotum. I presume

that the specimens were mounted on the card by their collector, G.H.K. Thwaites, and that the wings became detached from one specimen. So far as is known, apterous females of *Sclerodermus* usually lack ocelli (present in two Hawaiian species), and the scutum and scutellum are fused into a single sclerite. I designate the winged specimen as the lectotype of *S. vigilans*, and the specimen lacking wings as a paralectotype.

The female holotype of *S. thwaitesiana*, also collected by Thwaites, is mounted on a card. This specimen is very similar in color, integumental sculpture, and several body proportions to the syntypes of *S. vigilans*. I am convinced that the two merely represent the wingless and winged forms of the same taxon, hence the synonymy listed above. Winged and wingless females are known in several species of *Sclerodermus*, e.g., the European *S. domesticus* Klug and the North American *S. macrogaster* (Ashmead). Such species are possibly of more common occurrence than currently realized. Wingless males also occur, but very rarely. Alate females have relatively larger eyes than their apterous counterparts. The head of winged

females of *S. macrogaster* is only 3.07–3.25 × eye length, whereas it is 3.95–4.09 × eye length in apterous females. Similar measurements in *S. vigilans* are head 3.17–3.37 × eye length in alate females and 3.70–3.90 × eye length in wingless females.

FEMALE (winged).—Length 3.0 mm, forewing 1.6 mm long. Body shiny, light brown, antennae and legs testaceous, abdominal terga 2–5 narrowly and vaguely infuscated transversely on posterior one-third. Vestiture sparse, short, mostly appressed; eyes bare.

Head with sides almost straight, rounded posterolaterally to straight posterior margin; ocelli present; front with few scattered tiny punctures; WH 0.84–0.86 × LH; WF 1.58–1.64 × HE; EV 1.83–1.91 × HE; LH 3.17–3.36 × HE; ocelli in equilateral triangle, OOL 2.11–2.25 × WOT.

Thorax moderately alutaceous; parapsidal furrows lacking; forefemur length 2.00 × width; propodeum very slightly widened posteriorly, 1.01–1.02 × wider than at spiracles, posterior dorsal angles rounded.

Abdomen moderately alutaceous, wider than head or thorax, and as long as both combined.

FEMALE (wingless).—Length 2.0–2.8 mm, ocelli lacking. Head testaceous to rufotestaceous, thorax and appendages testaceous, abdomen rufotestaceous tending toward pale brown at base and apex, narrowly and vaguely infuscated transversely on posterior one-third of terga 2–5.

Clypeus with broad, V-shaped apical emargination; head with sides weakly convex; eyes bare; LH 1.58–1.68 × depth of head in lateral view; WH 0.81–0.85 × LH; WF 1.70–1.86 × HE; EV 2.10–2.33 × HE; LH 3.80 × HE; front very shiny, weakly alutaceous, with few scattered tiny punctures.

Thorax shining, mesonotum and propodeum less weakly alutaceous than pronotum; propodeum slightly widened posteriorly, 1.12–1.17 × wider than at spiracles, posterior dorsal angles rounded; forefemur length 1.92–2.10 × width.

MALE.—Unknown.

SPECIMENS EXAMINED (USNM except where noted).—Sri Lanka, WESTERN PROVINCE, *Colombo District*: 1♀, Colombo, Museum Garden, 10–20 Oct 1976, PBK. WITHOUT FURTHER LOCALITY: 3♀, GHKT (holotype of *S. thwaitesianum*, syntypes of *S. vigilans*; OXFORD). 1♀, 11 Apr 1947, in wood with *Heterobostrychus aequalis*, etc., GAB, number 58707 (BMNH).

The specimens listed above are apterous except the syntypes of *S. vigilans*.

19. *Sclerodermus variegatus*, new species

ETYMOLOGY.—The Latin *variegatus*, parti-colored.

FEMALE.—Length 2.0 mm, wingless, ocelli lacking. Body shining, mostly testaceous, antennae and legs stramineous, abdomen with fuliginous areas as follows: small spot at base of first tergum, pair of large blotches covering most of lateral one-third of second tergum, and last 2 segments.

Clypeus with shallow median emargination; sides of head almost straight, curving posterolaterally to straight vertex; front delicately alutaceous, with few scattered tiny punctures; eyes bare; LH 1.68 × depth of head in lateral view; WH 0.81 × LH; WF 1.70 × HE; EV 2.10 × HE.

Dorsum of thorax and abdomen delicately alutaceous, slightly more pronounced than on head; propodeum slightly widened posteriorly, 1.07 × wider than at spiracles, posterior dorsal angles rounded; forefemur length 1.74 × width.

Abdomen as delicately alutaceous as head, wider than head or thorax, and as long as both combined.

MALE.—Unknown.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, SOUTHERN PROVINCE, *Hambantota District*: Palatupana Tank, 0–50 ft (0–15 m), 24–26 Aug 1980, on or in leaf litter, KVK, PBK, TW, LJ, LW (USNM).

20. *Sclerodermus hirsutus*, new species

ETYMOLOGY.—From the Latin *hirsutus*, hairy.

This unusual species is characterized by being relatively quite hairy compared to other *Sclerodermus*. The holotype is fully colored, but apparently it died as a teneral specimen because the body and legs are flattened.

FEMALE.—Length 3.1 mm, forewing 1.4 mm. Body castaneous, mandible, except tip, and tibiae lighter, apex of scape, pedicel and tarsi testaceous. Wings whitish, veins testaceous. Vestiture sparse, cinereous; eyes with short setae slightly longer than width of 1 facet, front with most setae twice as long as ocular setae, pair of setae in front of posterior ocelli two-thirds as long as scape, few setae of equal length along side of head beneath, abdomen with scattered long setae, some along posterior sides as long as the scape.

Head shining, delicately alutaceous; mandible tridentate; clypeus with shallow median emargination; WH 0.71 × LH; WF 1.48 × HE; EV 2.04 × HE; LH 3.22 × HE; ocelli small, OOL 3.57 × WOT.

Thorax shining, delicately alutaceous; parapsidal furrows weak, incomplete; FL 1.74 × FW.

Abdomen shining, delicately alutaceous, slightly wider than head or thorax, and slightly longer than both combined.

MALE.—Unknown.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, SOUTHERN PROVINCE, *Hambantota District*: Palatupana, WLNPS Bungalow, 20–22 Jun 1978, in Malaise trap, KVK, PBK, TW, LJ, NK (USNM).

Discleroderma Kieffer, 1904

FIGURES 22–28

Kieffer (1904:372) proposed this genus for *Scleroderma tuberculata* Magretti. Magretti's species was based on a unique male from Burma, and no additional specimens of the genus

have been reported until now. Kieffer separated *Discleroderma* from *Scleroderma* by the presence of acute lateral tubercles on the third through fifth abdominal terga, parapsidal furrows on the scutum, and a complete submedialis (i.e., anal vein).

I assign a Ceylonese female to *Discleroderma* because it has parapsidal furrows and a complete anal vein. It lacks acute lateral tubercles on the middle abdominal terga, but this feature possibly is present only in males. The apices of the second to fifth terga and third to fifth sterna of the female are modified, however, being abruptly and narrowly depressed across their median three-fourths. The anterior margin of the depressed area is undulate with 3 scallops, the intersections between median and lateral scallops broadly but distinctly angulate. It appears that the tergal angulations are homologous with the acute tubercles on the male abdomen, because they occur in the same position on the segment. The narrow apical margins of these abdominal segments of male *D. tuberculatum* are not abruptly depressed.

DIAGNOSIS.—Small wasps, 4.1–4.5 mm long, black, appendages varying shades of brown or red, fully winged. Head longer than wide, subequal in width to thorax; maxillary palpi 5-segmented, labial palpi 3-segmented; female mandible with 4 teeth decreasing in size from the apical tooth, the fourth tooth tiny; male mandible with only 1 small tooth visible next to large apical tooth; clypeus with short median lobe, apex shallowly, broadly emarginate; antennae 13-segmented, inserted just above clypeus and below base of eyes, scape long, stout at apex; malar space one-fourth as long as eye height in female, one-fifth as long in male; eyes with very short, sparse setae, height of eyes almost one-half width of head; ocelli small.

Dorsum of thorax as in Figures 23, 27; pronotum with smooth contours, sloping gradually to collar; parapsidal furrows well developed, extending to posterior margin of scutum (present but did not register on SEM of female thorax); scutellum with transverse arcuate groove anteriorly, slightly widened laterally; metanotum complete, a narrow sclerite, female metanotum with small median pit adjacent to scutellum, male metanotum, if present, concealed by apex medially of scutellum; female propodeum with dorsal surface smooth, margined laterally by weak groove, male propodeum with strong median, lateral, and posterior carinae; mesopleuron moderately prominent, without dorsal surface, forming widest part of thorax; femora moderately swollen; midtibia not spinose; tarsal claws dentate; forewing with costa and radial vein absent, subcosta, median, anal, basal, and transverse median veins present, basal vein meeting subcosta basad of stigma by about one-half its length.

Abdomen broader than head and thorax, about as long as both combined; apices of terga 2–5 and sterna 3–5 of female narrowly and abruptly depressed across median three-fourths, anterior margin of depressed area undulate with 3 scallops, intersections between median and lateral scallops broadly

angulate (Figure 28); terga 3–5 of male with pair of subapical, acute lateral tubercles (Figure 25), small on third tergum and increasing gradually in size posteriorly, tubercles posteriorly diminishing abruptly to low carinae that curve inward toward narrow depressed apices of terga 3–5 (Figure 24).

21. *Discleroderma undulatum*, new species

FIGURES 26–28

ETYMOLOGY.—From the Latin *undulatus*, wavy, in allusion to the undulate anterior margin of the depressed apices of some of the abdominal segments.

FEMALE.—Length 4.5 mm, forewing 2.6 mm. Body black, shining, delicately alutaceous, with antennae, mid- and hindfemora dark brown, forelegs, mid- and hindtibiae, and tarsi lighter brown, mandible, except apex, and tegulae red. Wings clear, stigma and veins testaceous. Vestiture cinereous, sparse, and scattered, short on head and thorax, longer on abdomen.

Sides of head slightly convex, rounding posterolaterally to rounded posterior margin (Figure 26); LH 1.67 × depth of head in lateral view; WH 0.91 × LH; WF 1.31 × HE; EV 0.94 × HE; clypeus with weak median carina, apex not thickened; front delicately alutaceous, with scattered small punctures; ocelli in acute triangle, OOL 2.50 × WOT.

Dorsum of thorax as in Figure 27; propodeum about as wide posteriorly as at base, sides slightly bowed inward, posterior dorsal angles rounded, dorsal surface with lateral carina but lacking median and posterior carinae; forefemur length 1.83 × width.

Dorsum of abdomen as in Figure 28; second sternum of abdomen with close, tiny piliferous punctures.

MALE.—Unknown.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, SOUTHERN PROVINCE, *Hambantota District*: Palatupana Tank, 10–16 m, 6–7 Oct 1980, on or in leaf litter, KVK, PBK, TW, LJ, VG (USNM).

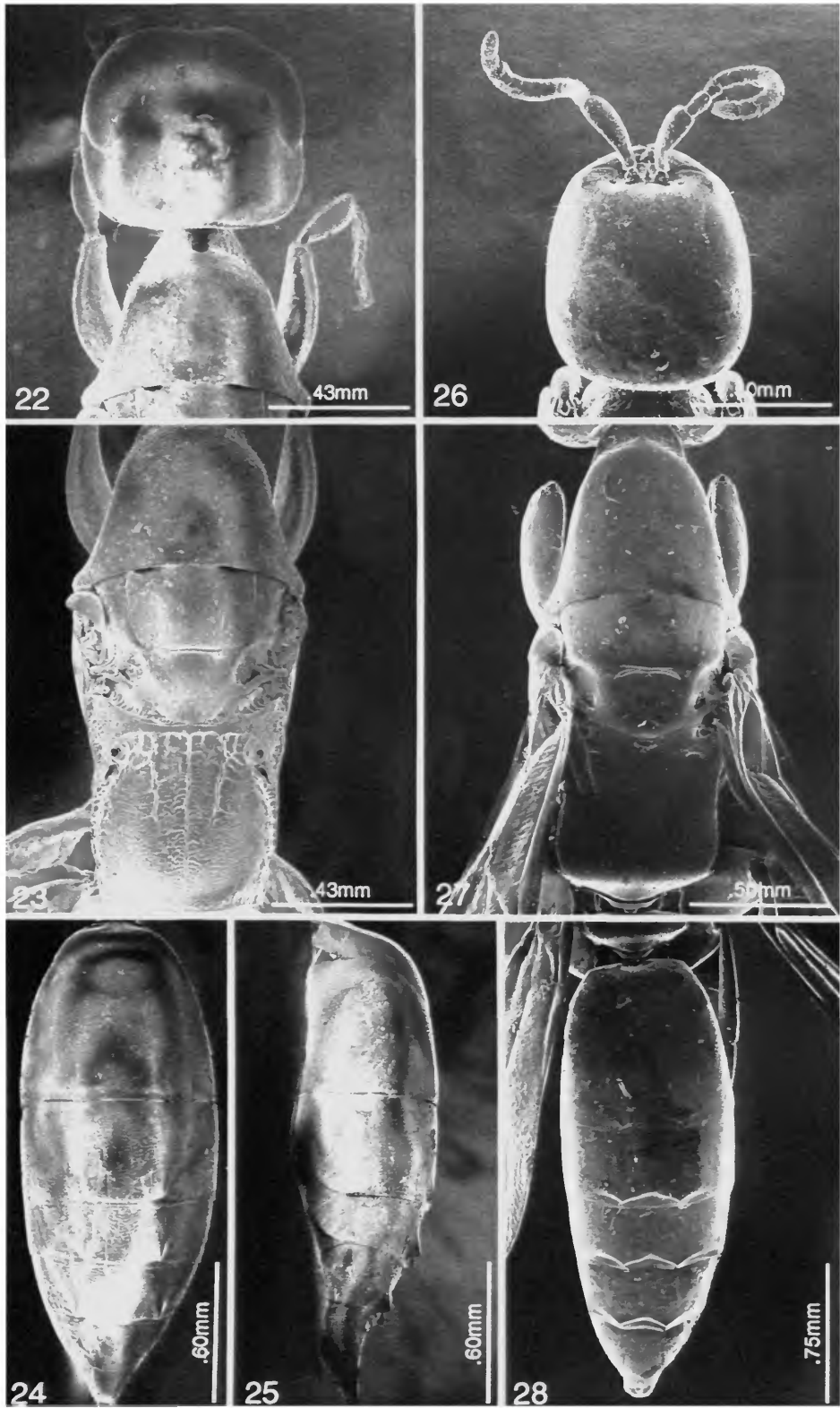
22. *Discleroderma tuberculatum* (Magretti, 1897)

FIGURES 22–25

Scleroderma tuberculata Magretti, 1897:318, fig. 8 [♂; Mooleyit, 500–600 m, Tenasserim; unique type in GENOA].

Discleroderma tuberculatum.—Kieffer, 1904:372–373 [redescribed in French]; 1905:106 [in key]; 1908:36 [listed]; 1914:271–272 [redescribed in German].—Kurian, 1954a:265 [listed].—Gordh, 1990:83 [listed].

MALE.—Length 4.1 mm (not 4.8 mm as given by Kieffer (1904)) forewing 2.4 mm. Body black, less shiny than *D. undulatum*, head more delicately alutaceous than thorax; antennae beneath, mandible, apex of clypeus, tegulae, tibiae, and tarsi light red; antennae above, femora, last tergum, and abdominal venter brown. Wings slightly infumated on apical two-thirds, stigma and veins stramineous. Vestiture sparse,



FIGURES 22–28 (opposite page).—*Discleroderma* species. 22–25, *D. tuberculatum* (Magretti), holotype male (uncoated): 22, head and pronotum, dorsal; 23, thorax, dorsal; 24, abdomen, dorsal; 25, abdomen, lateral. 26–28, *D. undulatum*, new species, holotype female (uncoated): 26, head, dorsal; 27, thorax, dorsal; 28, abdomen, dorsal.

cinereous, short except longer on head beneath, forefemur beneath, and apices of posterior abdominal segments.

Sides of head slightly convex, rounding posterolaterally to slightly rounded vertex (Figure 22); LH $1.48 \times$ depth of head in lateral view; WH $0.95 \times$ LH; WF $1.16 \times$ HE; EV $0.80 \times$ HE; clypeus with stronger median carina than *D. undulatum*, apex thickened; front delicately alutaceous but more strongly so than *D. undulatum*, with small, scattered punctures; ocelli in almost equilateral triangle, OOL $1.25 \times$ WOT.

Thoracic dorsum more strongly alutaceous than in *D. undulatum* (Figure 23); propodeal dorsum with sides tapering toward rear, $1.15 \times$ as broad at base as at apex, median length equal to apical width, median and lateral carinae complete to apex, disk with sublateral carina on either side of median carina, converging slightly posteriorly and extending halfway to apex, area between median and sublateral carinae minutely areolate, disk with apical carina but posterolateral angles not protruding.

Abdomen shining, very delicately alutaceous (Figure 24), terga 3–5 tuberculate (Figure 25) as noted in generic diagnosis.

FEMALE.—Unknown.

REMARKS.—This species is not known to occur in Sri Lanka, but I present the description above from the unique type so that the male of *D. undulatum*, when discovered, may be differentiated from it. The type bears a printed label, "Tenasserim/Thagata/Fea. Apr. 1887," but the description states that the specimen is from Mooleyit, 500–600 m, Tenasserim. I cannot explain the differences in locality, but the specimen bears Magretti's hand-printed label, "Scleroderma/tuberculata/♂ Magr." It agrees well with the original description.

Glenosema Kieffer, 1905

FIGURES 29–34

SEM micrographs show a mandible of great complexity in the female of *Glenosema dispersum*, new species. The mandible is more bristly than usual on the exterior surface, has seven teeth at the apex (Figure 30), and the upper, inner margin has a series of close, small teeth extending halfway to the mandibular base (Figure 31). These characters have already been reported for other known females of *Glenosema*. The inner surface of the mandible (Figure 32), however, possesses an additional row of small teeth parallel to and near the lower margin. It is presumed that mandibles of other female *Glenosema* will possess similar armature on the inner surface.

Glenosema is neuter in gender, so male and female endings of taxa listed in Gordh (1990) need to be changed.

23. *Glenosema dispersum*, new species

FIGURES 29–32

ETYMOLOGY.—From the Latin, *dispargo*, scattered about, dispersed, in allusion to the species' wide distribution in Sri Lanka. It probably also occurs in India.

FEMALE (holotype).—Length 2.0 mm, forewing 0.5 mm. Body black with mandible, antennae, trochanters, tibiae, and tarsi light red, coxae and femora brown. Wings pale, veins testaceous. Vestiture sparse, short, cinereous.

Head (Figure 29) as broad as long, broadest across eyes, sides tapering toward straight vertex, posterolateral angles rounded, surface slightly shining, delicately and closely granulate, LH $1.71 \times$ depth of head in lateral view; mandible with 7 teeth at apex (Figure 30); side and venter of head glossy, faintly alutaceous; eyes with short, sparse setae barely visible at $\times 100$ magnification; WH = LH; WF $1.48 \times$ HE; EV $1.10 \times$ HE; ocelli in less acute triangle than in *G. splendidum*, new species (see below), about $1.5 \times$ their diameter from occipital carina, OOL $2.43 \times$ WOT.

Pronotum, scutum, and scutellum slightly shining, finely and closely beaded, propodeum shinier and more delicately beaded; forewing with radial vein present; propodeum slightly broader anteriorly than at apex, posterior dorsal angles more strongly angulate than in *G. splendidum* though bluntly so, dorsal surface with 3 complete longitudinal carinae on median half, area between median and lateral carinae with 1 or 2 short, irregular carinae, posterior margin transversely carinate; forefemur length $2.75 \times$ width.

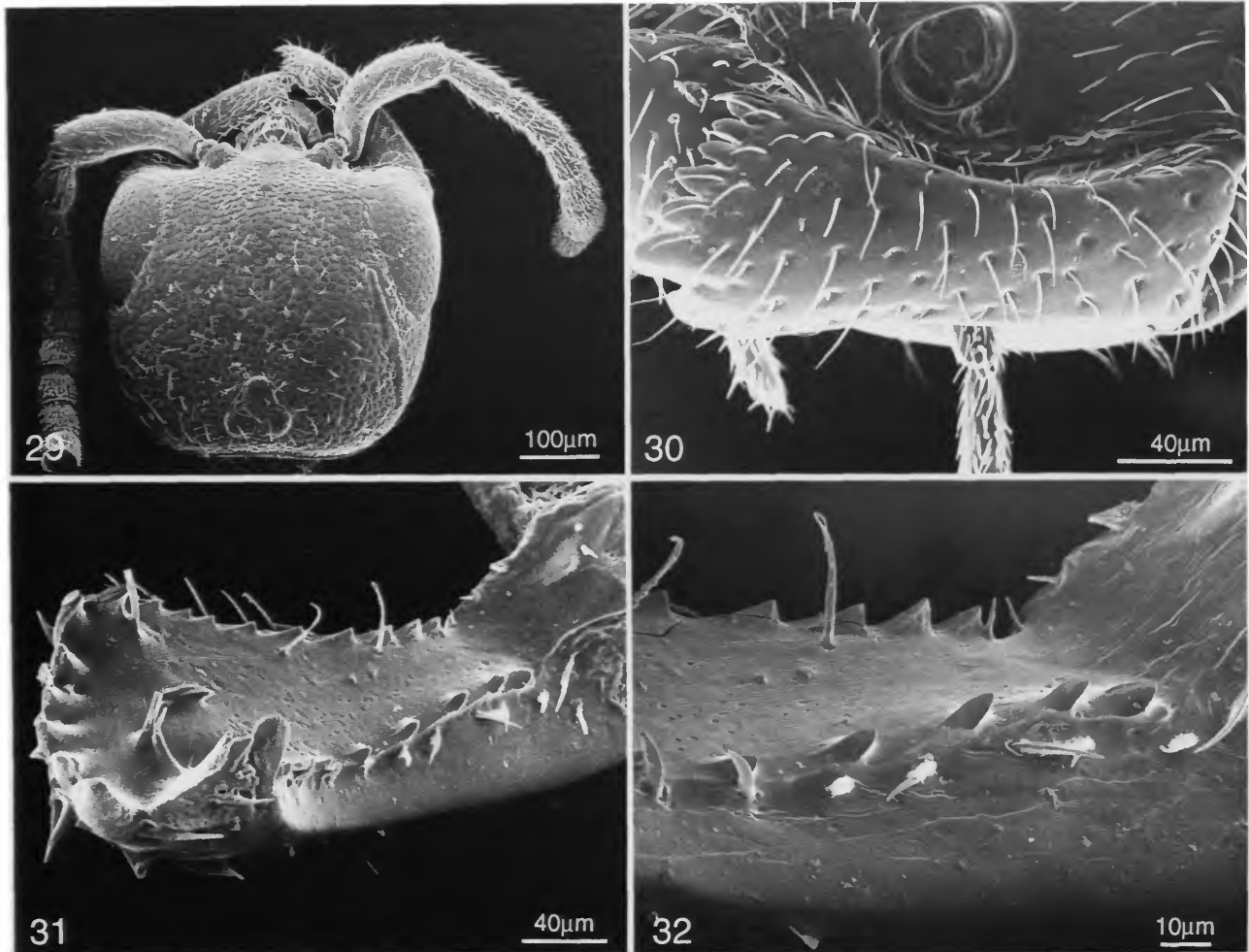
Dorsum of abdomen delicately alutaceous except broad semicircular area at apex of second tergum, and narrow apices of terga 3–5.

MALE.—Length 2.2–2.5 mm, forewing 1.3–1.6 mm. Body black with mandible and tarsi light red, flagellum light brown, other leg segments and scape darker brown. Wings clear, veins testaceous. Surface sculpture much as in female.

Head slightly longer than broad, broadest across eyes (eyes more protuberant than in female), sides tapering toward vertex, length 1.67 – $1.81 \times$ depth in lateral view; mandible with 5 teeth; eyes with scattered short setae; WH 0.94 – $0.98 \times$ LH; WF 1.71 – $1.72 \times$ HE; EV 1.17 – $1.39 \times$ HE; OOL 1.67 – $2.00 \times$ WOT; antennae elongate, first 4 segments in ratio of about 24:9:22:22, third segment length $1.83 \times$ width.

Forewing with radial vein; disk of propodeum with 5 complete longitudinal carinae, areas between carinae with fine transverse carinules; posterior surface with median carina.

VARIATION.—Most females have short, narrow wings, 0.5–0.8 mm long, that extend only a short distance beyond the apex of the propodeum and have a closed median cell only; they are unquestionably incapable of flight.

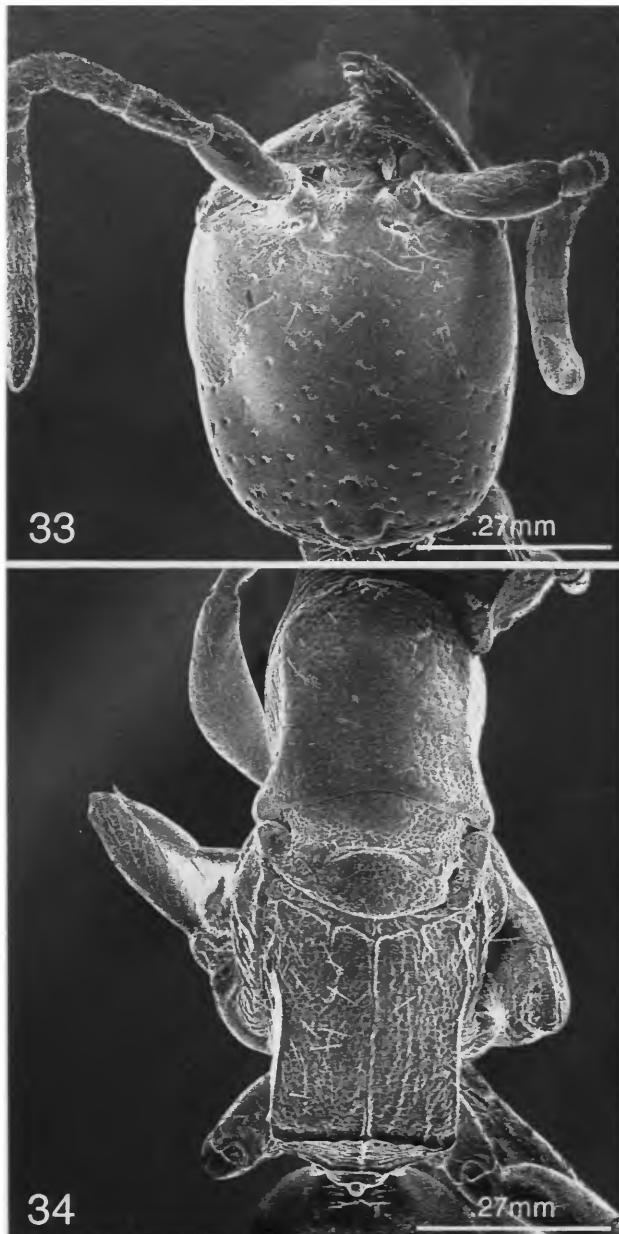


FIGURES 29–32.—*Glenosema dispersum*, new species, paratype female (coated): 29, head; 30, left mandible, outer surface; 31, right mandible, inner surface; 32, right mandible, middle of inner surface, oblique.

Two females with broader wings, 0.9–1.1 mm long, may have been capable of flight; they have closed median and submedian cells. Pertinent measurements are length 1.6–2.2 mm, forewing 0.5–1.1 mm, WH 1.00–1.07 × LH, WF 1.53–1.64 × HE, EV 1.08–1.17 × HE, LH 1.70–1.78 × head depth in lateral view, OOL 2.17–2.43 × WOT, and forefemur length 2.63–2.78 × width. The coxae and femora range from light to dark brown; the median half of the dorsal propodeum rarely has two or three incomplete carinae between the median and lateral carinae.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, SOUTHERN PROVINCE, *Hambantota District*: Palatupana Tank, 15 m, 29 Mar–2 Apr 1981, collected on or in leaf litter, KVK, TW, LW (USNM).

Paratypes (all USNM): Sri Lanka, 13♀, holotype locality, as follows: 3♀, 29 Mar–2 Apr 1981, KVK, TW, LW; 9♀, 30–50 ft (9–15 m), 24–26 Aug 1980, on or in leaf litter, KVK, PBK, TW, LJ, VG; 1♀, 10–20 m, 27–29 Sep, KVK, PBK. UVA PROVINCE, *Monaragala District*: 4♀, Angunakolapelessa, 8–9 Oct 1980, on or in leaf litter, KVK, PBK, TW, LJ, VG. NORTHERN PROVINCE,



FIGURES 33, 34.—*Glosema splendidum*, new species, paratype female (uncoated): 33, head; 34, thorax, dorsal.

Mannar District: 2♂, Ma Villu, 16–19 Sep 1980, 1 in Malaise trap, KVK, PBK, TW, LJ, VG.

A pair of paratypes will be deposited in the National Museum, Colombo, and one female paratype in the Natural History Museum, London (BMNH).

24. *Glosema splendidum*, new species

FIGURES 33, 34

ETYMOLOGY.—From the Latin, *splendidus*, bright or shining, in allusion to the glossy surface of the head.

FEMALE.—Length 2.2 mm, forewing 0.06 mm. Body black with mandible, antennae, tegulae, and legs light red, femora somewhat darker; wings pale. Vestiture sparse, short, pale, glittering.

Head (Figure 33) somewhat elongate, about 0.9 times as wide as long, surface shiny, narrowly alutaceous adjacent to occiput; mandible with 7 teeth; head widest across eyes, sides narrowing slightly toward straight vertex, LH 1.75 × depth of head in lateral view; front with scattered small punctures; eyes with sparse, short setae, about as long as width of 1 facet; WH 0.91 × LH; WF 1.43 × HE; EV 1.33 × HE; ocelli in narrow triangle, posterior ocelli about twice their diameter from occipital carina, OOL 3.33 × WOT.

Thorax (Figure 34) less shining than head, dorsum strongly alutaceous except pronotal disk with median longitudinal area delicately so; propodeum slightly wider anteriorly, posterior width 0.91 × width at spiracles, posterior dorsal angles bluntly angulate, dorsal surface with 3 weak longitudinal carinae on anterior half, posterior margin transversely carinate; forefemur length 2.56 × width.

Abdominal dorsum moderately alutaceous.

MALE.—Unknown.

VARIATION.—The single paratype agrees very well with the holotype in details of color and surface sculpture. Slight variations are length 2.3 mm, forewing 0.07 mm; LH 1.86 × depth in lateral view; WH 0.88 × LH; WF 1.57 × HE; OOL 3.50 × WOT; posterior width of propodeum 0.93 × width at spiracles; and forefemur length 2.50 × width.

SPECIMENS EXAMINED.—*Holotype*: ♀, Sri Lanka, NORTHERN PROVINCE, *Mannar District*: Ma Villu, 16–19 Sep 1980, KVK, PBK, TW, LJ, VG (USNM).

Paratype: Sri Lanka, 1♀, same label data as holotype. This specimen will be deposited in the National Museum, Colombo.

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