

Biosystematic Studies
of Ceylonese Wasps,
II: A Monograph of the Scoliidae
(Hymenoptera: Scoliidea)

KARL V. KROMBEIN

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ABSTRACT

Krombein, Karl V. Biosystematic Studies of Ceylonese Wasps, II: A Monograph of the Scoliidae (Hymenoptera: Scoliioidea). *Smithsonian Contributions to Zoology*, number 283, 56 pages, 36 figures, 1978.—Twenty-five species-level taxa belonging to 11 genera are reported from Sri Lanka; seven of these belong to the Campsomerinae, 18 to the Scoliinae. Twelve taxa are known so far only from Sri Lanka, and 13 occur also in South India or are more widely distributed in the Oriental Region. The endemic Ceylonese taxa are most closely related to other species or subspecies occurring in the Oriental Region. Six new taxa are described: *Liacos erythrosoma cruszi*, new subspecies; *Austroscolia ruficeps henryi*, new subspecies; and *Scolia (Discolia) vollenhoveni wickwari*, new subspecies; *S. karunaratnei*, new species; *S. keiseri*, new species; and *S. gunawardanae*, new species.

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Contents

| | <i>Page</i> |
|--|-------------|
| Introduction | 1 |
| Composition, Affinities, and Seasonal Occurrence of the Ceylonese Fauna .. | 2 |
| Taxa Recorded Erroneously from Sri Lanka | 4 |
| Biology | 5 |
| Acknowledgments | 5 |
| Treatment of Individual Taxa | 6 |
| Key to Ceylonese Taxa of Scoliidæ | 8 |
| Subfamily CAMPSOMERINÆ | 14 |
| 1. <i>Phalerimeris phalerata turneri</i> (Betrem) | 14 |
| 2. <i>Colpacampsomeris indica eliformis</i> (Saussure) | 16 |
| 3. <i>Sericocampsomeris pseudindica</i> (Betrem) | 17 |
| 4. <i>Campsomeriella collaris collaris</i> (Fabricius) | 18 |
| 5. <i>Micromeriella marginella marginella</i> (Klug) | 19 |
| 6. <i>Megacampsomeris ceylonica ceylonica</i> (Kirby), new combination | 21 |
| 7. <i>Megacampsomeris vanoordti</i> (Betrem), new combination | 22 |
| Subfamily SCOLIINÆ | 22 |
| 8. <i>Liacos erythrosoma cruszi</i> , new subspecies | 22 |
| 9. <i>Megascolia (Regiscolia) azurea michaa</i> (Betrem) | 24 |
| 10. <i>Microscolia hydrocephala</i> (Micha) | 25 |
| 11. <i>Austroscolia ignota</i> (Betrem) | 27 |
| 12. <i>Austroscolia ruficeps henryi</i> , new subspecies | 28 |
| 13. <i>Scolia (Discolia) cyanipennis</i> Fabricius | 29 |
| 14. <i>Scolia (Discolia) affinis</i> Guérin | 31 |
| 15. <i>Scolia (Discolia) vollenhoveni wickwari</i> , new subspecies | 33 |
| 16. <i>Scolia (Discolia) trivandrumensis</i> Betrem | 34 |
| 17. <i>Scolia (Discolia) aureipenniformis</i> Betrem | 35 |
| 18. <i>Scolia (Discolia) quadripustulata</i> Fabricius | 38 |
| 19. <i>Scolia (Discolia) fasciatopunctata</i> Guérin | 39 |
| 20. <i>Scolia (Discolia) binotata binotata</i> Fabricius | 41 |
| 21. <i>Scolia (Discolia) karunaratnei</i> , new species | 43 |
| 22. <i>Scolia (Discolia) keiseri</i> , new species | 45 |
| 23. <i>Scolia (Discolia) gunawardaneae</i> , new species | 46 |
| 24. <i>Scolia (Discolia) picteti</i> Saussure | 47 |
| 25. <i>Scolia (Discolia) ceylonicola</i> Betrem | 48 |
| Literature Cited | 55 |

Biosystematic Studies of Ceylonese Wasps, II: A Monograph of the Scoliidae (Hymenoptera: Scoliioidea)

Karl V. Krombein

Introduction

The family Scoliidae constitutes one of the most attractive groups of Ceylonese wasps. The species are moderate to large in size, the majority 15–25 mm in length, although some are as small as 5 mm and some as large as 35 mm. Many of them have bright yellow, orange, or red integumental markings; many have dark wings with brilliant purple, blue, or coppery effulgence; and a few have conspicuous white or reddish-gold vestiture on parts of the body.

Members of the family are distinguished quite readily from those of other families of wasps by two characters. The wing membrane beyond the cells is closely striolate and the meso- and metasternum form a flat plate overlying the bases of the mid and hind coxae.

The Ceylonese Scoliidae were treated previously by Betrem (1928) in his notable pioneering monograph of the Indo-Australian members of the family. His work was handicapped by the paucity of material available more than half a century ago when he undertook the study. Most of his Ceylonese specimens came from the Colombo Museum but he also included the relatively few specimens from the country in the collections of the British, Leiden, and Vienna museums.

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The material available to Betrem enabled him to list 25 taxa from the island. As will be noted subsequently, four taxa were recorded erroneously from Sri Lanka. Also, as a result of my own study, I found that two taxa recognized as discrete by Betrem are actually just color phases occurring together with normally colored individuals; I do not consider that they merit nomenclatural distinction.

F. Keiser, Basel Museum, collected about 200 specimens of Scoliidae during his prolonged stay in Ceylon from May 1953 to February 1954. His material was studied by Guiglia (1965) and was found to contain one taxon not listed from Ceylon by Betrem.

My monographic study has been based primarily on the very rich material with lengthy series of most species collected by me and by other specialists, 1969–1976. Our field work in Sri Lanka was supported by two grants from the Smithsonian Research Foundation for the project, “Biosystematic Studies of the Insects of Ceylon.” This project was carried on in collaboration with the Department of National Museums, Colombo, under Director P.H.D.H. de Silva, who served as co-principal investigator. Material available in other collections, as noted in the acknowledgments, was also included in the present study. I also recognize 25 taxa from Sri Lanka including 6 that are described as new.

Contribution number I of my series, “Biosystematic Studies of Ceylonese Wasps,” is “A Preliminary Re-

vision of the Amiseginae (Hymenoptera: Chrysididae)," to be published in the commemorative volume for P.E.P. Deraniyagala, former director of National Museums, Colombo, Sri Lanka.

COMPOSITION, AFFINITIES, AND SEASONAL OCCURRENCE OF THE CEYLONESE FAUNA.—Twenty-five taxa have been collected in Sri Lanka, some extremely common and widely distributed within the country, others known from so few specimens that meaningful conclusions cannot be drawn as to the distributional pattern and seasonal occurrence. Two subfamilies of Scoliidae occur in Sri Lanka, the Campsomerinae with seven taxa (1-7 of the listing below) and the Scoliinae with 18 taxa (8-25). In passing, it should be noted that in a series of papers beginning in 1941 Betrem raised to generic or subgeneric rank all of the subgenera and species groups in his revision of the Indo-Australian fauna except for the species groups in what he (1928) called *Scolia* subgenus *Scolia* Fabricius. Many of these latter species groups, now placed in the subgenus *Discolia* Saussure, will undoubtedly be raised to generic or subgeneric rank when the Oriental fauna as a whole receives intensive study based on much more extensive collections than were available in the mid-1920s.

The consolidated listing that follows treats the 25 taxa in systematic sequence, giving the distribution and seasonal occurrence within Sri Lanka, any extralimital distribution, and comments on affinities with extralimital taxa. Thorough, year-around collecting has been done only in the Colombo and Kandy areas; these furnish the most reliable data on seasonal occurrence. (The reader is referred to the comprehensive article by Brinck et al. (1971), which discusses inter alia the terrestrial habitats, division of the country into Wet and Dry zones, and the several ecozones. The map (Figure 7) showing annual rainfall and division into Wet and Dry zones is particularly helpful.)

1. *Phalerimeris phalerata turneri* (Betrem): Widely distributed in both Wet and Dry zones from sea level to some 7000 ft elevation; appears to breed throughout the year in Colombo and Kandy areas; occurs also in South India; typical *P. phalerata* (Saussure) occurs from northern India through Thailand and Southeast Asia to Celebes, and also in China and Taiwan; the genus has other species ranging widely through the Oriental Region.

2. *Colpacampsomeris indica eliformis* (Saussure): Restricted mostly to low country Wet Zone habitats; Kandy area records are March through September and Colombo records February through December, so *C. i. eliformis* probably is active throughout the year in favorable habitats; it occurs only in Sri Lanka; two other subspecies are reported from India, Assam, and Malacca; the genus is restricted to the Oriental Region.

3. *Sericocampsomeris pseudindica* (Betrem): Quite rare and restricted to areas of copious rainfall under 2000 ft in the Wet Zone; seasonal occurrence unknown for any particular area but throughout its range it has been collected in January, April, June, September, and October; it occurs only in Sri Lanka; the polytypic *S. rubromaculata* (Smith) is the closest relative with four subspecies ranging from Tenasserim and Burma through Southeast Asia to Hainan, Borneo, and Behar; the genus is restricted to the Oriental Region.

4. *Campsomeriella collaris collaris* (Fabricius): Widely distributed and abundant in both Wet and Dry zones from sea level to about 2000 ft; apparently breeds throughout the year in the Kandy and Colombo areas; occurs in South India; other subspecies range from India eastward to China, Java, and the Philippines; the genus occurs in the southern Palearctic, Ethiopian, Oriental, and Australian regions (though not in Australia).

5. *Micromeriella marginella marginella* (Klug): Widely distributed and relatively common at low altitudes in the Dry Zone and occurring sparingly in the Wet Zone in areas of moderate rainfall; records from the Colombo area suggest that it breeds throughout the year under favorable conditions; occurs also in India; other subspecies are found in Taiwan, the Philippines, and East Indies as far as the Moluccas but are apparently absent from Thailand and Southeast Asia; the genus occurs in the southern Palearctic, Ethiopian, and Oriental regions.

6. *Megacampsomeris ceylonica ceylonica* (Kirby): Occurs chiefly and commonly in Wet Zone forested areas of moderate to heavy rainfall at higher elevations; probably breeds throughout the year in Kandy area; occurs only in Sri Lanka; the subspecies *M. c. mentaweiensis* (Betrem) occurs in Sumatra and Mentawai Island, and several closely related species are found in India; the genus occurs in the Oriental and eastern Palearctic regions.

7. *Megacampsomeris vanoordti* (Betrem): A rare species restricted to Dry Zone areas of very low rainfall in the northern quarter of Sri Lanka; dates of capture are November and January; could occur also in South India, but no records; not at all close to *M. c. ceylonica*, its closest relative being *M. reticulata* (Cameron) from South and Central India.

8. *Liacos erythrosoma cruzi*, new subspecies: Quite rare, occurs in both Wet and Dry zones in areas of low to moderate altitude with quite low to moderate rainfall; known dates of capture are January–February, April, and September; occurs only in Sri Lanka; other subspecies are recorded from India, Andaman Islands eastward through Southeast Asia, Malaysia to Java, and Taiwan.

9. *Megascolia (Regiscolia) azurea michae* (Betrem): Common and widely distributed in both Wet and Dry zones in areas of very light to heavy rainfall and from sea level to about 2000 ft; records from the Kandy area and Sinharaja Jungle suggest that breeding may occur throughout the year; occurs also in Sri Lanka; other subspecies range from India through Thailand, Southeast Asia, and Malaysia to Java; the genus occurs in the Oriental and southern Palaearctic regions.

10. *Microscolia hydrocephala* (Micha): This uncommon species occurs in both Wet and Dry zones at rather low altitudes in areas of moderate to heavy rainfall; months of collection at scattered localities range from April through January; occurs also in South India; closest relatives are *M. tyrianthina* (Kirby) from the Andaman Islands and the Javan *M. cephalotes* (Burmeister); the genus is widely distributed in the Old World Tropics from northern Australia, Solomon Islands and New Guinea, through the Philippines and East Indies to eastern, western, and South Africa.

11. *Austroscolia ignota* (Betrem): Widely distributed and relatively common in Wet and Dry zones but only at low to moderate altitudes and in areas of light to moderate rainfall; has been taken throughout the year but at scattered localities; could occur also in South India, but no records; closest relative appears to be *A. nudata* (Smith) from India and Assam; the genus is as broadly distributed in the Old World Tropics as *Microscolia* and occurs also in Madagascar.

12. *Austroscolia ruficeps henryi*, new subspecies: Quite rare, occurs in both Wet and Dry zones from

sea level to 1800 ft and in areas of light to moderate rainfall; dates of capture are June, September, and December; occurs only in Sri Lanka; nine other subspecies range from India and Andaman Islands through Southeast Asia and East Indies to Flores Island, and northward into China and the Philippine Islands.

13. *Scolia (Discolia) cyanipennis* Fabricius: Relatively uncommon although sometimes locally abundant, occurs in both Dry and Wet zones at altitudes below 2000 ft and in areas of low to moderate rainfall; dates of capture in Colombo area suggest that it may breed throughout the year at least in that locality; also occurs throughout India north to Sikkim and Kashmir; the only Ceylonese member of species group *maura* that has one other species each in Australia and the Palaearctic Region.

14. *Scolia (Discolia) affinis* Guérin: Common and widely distributed in Dry and Wet zones, mostly in areas of low to moderate rainfall and at altitudes below 2500 ft; ranges north through India and Bangladesh and eastward into Southeast Asia; the only Ceylonese member of species group *sauteri* that has other species in Taiwan, Southeast Asia, Sumatra, Sumba, and Celebes.

15. *Scolia (Discolia) vollenhoveni wickwari*, new subspecies: Very rare, occurring in Dry and Wet zones in areas of low to moderate rainfall and at low to intermediate altitudes; dates of capture are May, June, and October; occurs only in Sri Lanka; the only Ceylonese representative of species group *vollenhoveni*; other subspecies of *S. vollenhoveni* Saussure occur in the East Indies and western Himalayas, and another species occurs in Thailand and Burma.

16. *Scolia (Discolia) trivandrumensis* Betrem: Quite uncommon, occurs in Dry and Wet zones in areas of low to moderate rainfall and at relatively low altitudes; occurs also in South India; this and the following taxon are the only Ceylonese representatives of species group *bilunata* which has two other species farther north in India.

17. *Scolia (Discolia) aureipennisformis* Betrem: Extremely abundant but females have never been collected in Sri Lanka; occurs almost entirely in Wet Zone in areas of moderate to heavy rainfall and at altitudes of 400 to 2000 ft; occurs also in South India; closest relative is *S. bilunata* Saussure from Nepal and northern India.

18. *Scolia (Discolia) quadripustulata* Fabricius: Quite rare; occurs almost entirely in Dry Zone in areas of low rainfall; widely distributed in India; the only known representative of group *quadripustulata* (= group *obscuropunctata* of Betrem).

19. *Scolia (Discolia) fasciatopunctata* Guérin: Rather uncommon though occasionally abundant locally; occurs in both Wet and Dry zones in areas of light to moderate rainfall and at altitudes below 2000 feet; occurs also in South India; the only Ceylonese representative of group *sexpustulata*; the other three closely related taxa of this group occur in India, Assam, and Sikkim.

20. *Scolia (Discolia) binotata binotata* Fabricius: Common, occurs both in Dry and Wet zones in areas of light to moderate rainfall and usually at altitudes considerably less than 2500 ft; occurs also in India; the polytypic *S. b. binotata* has several other subspecies ranging from Japan, Taiwan, and China south to the East Indies and Southeast Asia and west to India; this and the following three taxa are the Ceylonese representatives of group *binotata* (=group *quadripustulata* sensu Betrem).

21. *Scolia (Discolia) karunaratnei*, new species: Relatively uncommon though occasionally abundant locally; except for one specimen from Colombo, this taxon occurs only in the Dry Zone in areas of low rainfall and at altitudes from sea level to 200 ft; dates of capture throughout its range are March, May, June, September, October, and December; might occur in South India but no records.

22. *Scolia (Discolia) keiseri*, new species: Rare, the few records from the boundary area between Dry and Wet zones in areas of moderate rainfall during February, April, June, and November; not likely to occur in South India.

23. *Scolia (Discolia) gunawardanae*, new species: Rare, the only known specimen from northeastern quadrant of Dry Zone at low elevation and in an area of very low rainfall; collected in August; might occur in South India but no records.

24. *Scolia (Discolia) picteti* Saussure: Uncommon although sometimes abundant locally; occurs in Wet Zone, mostly in areas of moderate rainfall at altitudes below 2000 ft; dates of capture throughout its range are January–February, May, June, and August through December; it occurs also in South India; this and the following taxon are the Ceylonese representa-

tives of group *erythrocephala*; other taxa in the species group range from the southern Palaearctic Region to northern and central India.

25. *Scolia (Discolia) ceylonicola* Betrem: Uncommon, known only from the Colombo vicinity, a Wet Zone area of moderate rainfall and low altitude; occurs also in South India; dates of capture suggest that it may breed throughout the year; its closest relative is the foregoing species, *S. picteti* Saussure.

Consideration of the distributional data demonstrates very clearly that the affinities of the Ceylonese taxa are entirely with other taxa occurring in the Oriental Region. Ten Ceylonese taxa (1–3, 8, 14–19) belong to genera or species groups restricted to the Oriental Region. Eleven taxa (5–7, 9, 13, 20–25) belong to genera or species groups that occur in the Oriental and southern or eastern Palaearctic regions and occasionally extend into the Australian. Four taxa (4, 10–12) belong to genera that are essentially Old World Tropical ranging through the Ethiopian and Oriental regions and occasionally entering the Australian.

It is of interest to note that almost exactly half of the taxa are known to occur only in Sri Lanka (2, 3, 6–9, 11, 12, 15, 21–23). It is possible, inasmuch as four of these (7, 11, 21, 23) occur primarily in the northern quadrant of the Dry Zone, that thorough collecting in South India may demonstrate their presence there. Even so, the substantial number of taxa restricted to Sri Lanka suggests that country has been separated from peninsular India for sufficient duration to permit differentiation of taxa at the specific or subspecific level. Eight of the remaining taxa (1, 4, 10, 16, 17, 19, 24, 25) occur both in Sri Lanka and South India. Finally, five taxa (5, 13, 14, 18, 20) are more widely distributed throughout India, one of them (14) ranging as far as Southeast Asia.

TAXA RECORDED ERRONEOUSLY FROM SRI LANKA.—Betrem (1928:228) in a list of the taxa of *Scolia (Triscolia)* Section *Triscolia* sensu stricto reported *S. azurea Michae* (!) Betrem and *S. fulvifrons* Saussure from Ceylon, but omitted Ceylon from the distribution of *S. fulvifrons* in his description of that taxon (1928:238–239). Betrem indicated (in litt., 28 Mar 1974) that inclusion of *fulvifrons* from Ceylon (p. 228) was a lapsus. This taxon is now called *Megascolia (Regiscolia) fulvifrons* (Saussure) (see Betrem in Betrem and Bradley, 1964a:444).

Betrem (1947:414) in a list of Malayan Scoliidae cited *Scolia (Triscolia) azurea democratica* Micha questionably from Ceylon. He stated (in litt., 28 Mar 1974) that this was a lapsus. The taxon is now called *Megascolia (Regiscolia) azurea azurea* (Christ) form *democratica* (Micha) (see Betrem in Betrem and Bradley, 1964a:443).

Betrem (1928:310) in a list of the taxa of the group *Scolia 6-pustulata* Klug reported *Scolia (Scolia) paradeniyensis* (!) Betrem, and *S. (S.) fichteli* Betrem from Ceylon. In describing *S. fichteli* as a new species (1928:313-314), however, he includes only one specimen from Malabar and several "ohne Fundort." He stated (in litt., 28 Mar 1974) that listing it from Ceylon was probably a lapsus. I have seen no specimens from Sri Lanka that are referable to *S. fichteli*. The taxon is now known as *Scolia (Discolia) fichteli* Betrem (see Betrem and Bradley, 1964b:93).

Cameron (1892:112) described *Elis (Trielis) orientalis* from Ceylon from the Rothney collection. I have examined the unique type in the Oxford Museum. It bears a locality label "Barrackpore (Rothney)." Cameron's species is a synonym of the Australian *Australelis anthracina* (Burmeister) as indicated by Betrem (in litt., 28 Mar 1974). The locality label on Cameron's type is unquestionably erroneous, for *A. anthracina* occurs only in Australia.

A number of Ceylonese specimens have been misidentified and ascribed to taxa that do not occur in Sri Lanka. Insofar as possible, such misidentifications are noted in the synonymy of the appropriate taxon in the descriptions that follow.

BIOLOGY.—There are no host records for Ceylonese Scoliidae, but it is presumed that scarabaeid (Coleoptera) larvae in the soil or in decaying wood are hosts as in the other areas for which such information is available. Krombein (1963) summarized published information for two species of Campsomerinae occurring in Queensland, Australia, which parasitize second or third instar scarabaeid larvae in sugarcane fields. The female wasp burrows into the soil to a larva at a depth of 12-18 inches, paralyzes it by stinging, and constructs a cell around the larva. An egg, laid on the abdominal venter anteriorly, hatches in about three days. The wasp larva consumes the host larva in about a week and then spins a tough cocoon from which the adult wasp emerges in an average of five weeks. There are four generations

annually with the second to fourth broods overlapping. Development of the fourth brood is retarded because of cooler weather, so the combined egg and larval stages require about three weeks and the cocoon stage lasts two or more months.

Apparently most of the Ceylonese scoliids attack larval hosts in the soil, for a number of females have been collected that bear dried soil adhering to the stout, fossorial mid and hind tibiae. *Microscolia hydrocephala* (Micha), however, undoubtedly parasitizes scarabaeid larvae in decaying wood for we have collected males flying around such logs; the East Indian *M. parastasiae* (Betrem) was reared from a scarabaeid larva in a fallen palm trunk. We observed a large population of *Colpacampsomeris indica eliformis* (Saussure) in a coconut plantation, which suggests that its host may be a scarabaeid larva attacking coconut.

Both sexes frequently visit flowers to obtain nectar on which they subsist. Such plants as the introduced, widely distributed *Stachytarpheta jamaicensis* (balumaguta or dogtail) and *Eupatorium rivalis* are particular favorites.

Males often perform prenuptial flights in a more or less figure-8 pattern close to the ground awaiting the emergence of females.

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| | |
|------------|--|
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| Lund | P. Brinck, Lund University, Lund, Sweden |
| Ottawa | L. Masner, Canada Department of Agriculture, Ottawa |
| USNM | United States National Museum collections (in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.: NMNH) |

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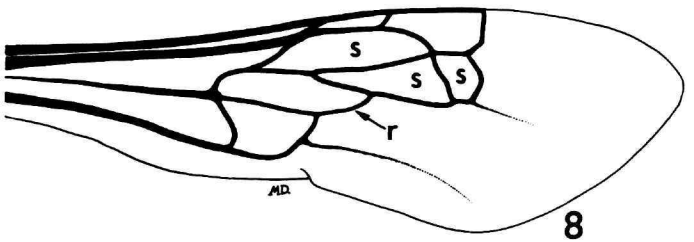
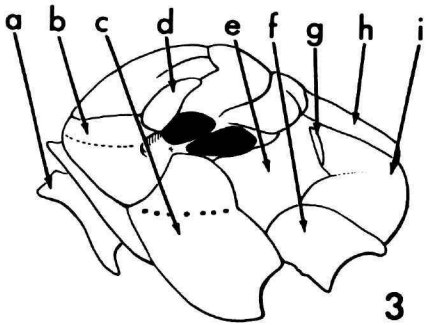
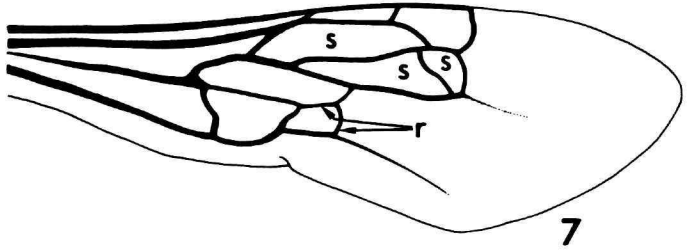
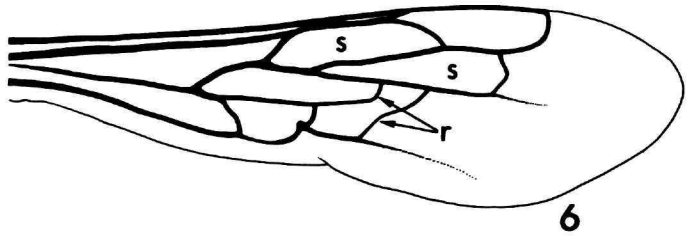
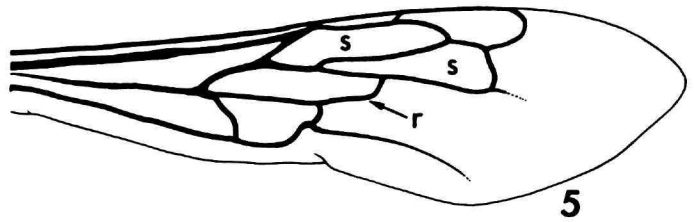
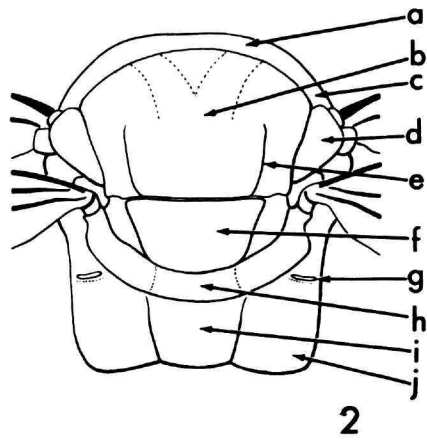
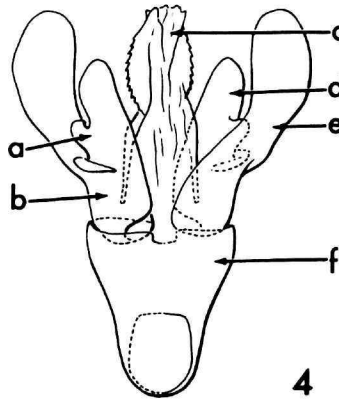
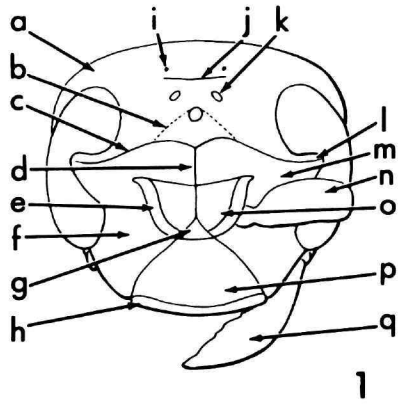
TREATMENT OF INDIVIDUAL TAXA.—In the section following the key are detailed treatments of each of the Ceylonese taxa. The references cited beneath each specific heading include the original description and those of any synonyms, notes on type fixation when appropriate, and papers citing the taxon from Ceylon. References to the taxon in extralimital areas only are normally not included.

Several paragraphs of discussion on such subjects as distribution, synonymy, and differentiating characters follow. Next are descriptions of the female and

male, where both sexes are known. Finally, there is a listing of the specimens examined arranged by Province and District.

Label data are given in full for the type series of all new taxa. Label data for specimens of previously described taxa have been consolidated insofar as possible. For example, one consolidated record under *Phalerimeris phalerata turneri* (Betrem) reads "2 ♀, 5 ♂, Teldeniya (includes Bambaragala Rock, Woodside Plantation, Urugalla), 11 Jan, 11 Feb, 10 May, 16 Sep, 19 Nov, Henry, Karunaratne et al., Keiser, Krombein et al (USNM, Colombo, Basel)." The names in parentheses following the village are in the immediate vicinity of Teldeniya. Specific dates of collection are given next except that the year is omitted. Dates are followed by the names of collectors except that only the name of the first collector is cited from a label bearing the names of two or more collectors. Finally, the depositories in which the specimens are found are cited in parentheses; the only abbreviation used is USNM for specimens in the National Museum of Natural History, Smithsonian Institution.

FIGURES 1-8.—1, Face: *a*, vertex; *b*, location of carina in *Austroscolia* male only; *c*, carina frontalis; *d*, fissura frontalis; *e*, lamina frontalis; *f*, scrobe; *g*, area frontalis; *h*, anterior margin of clypeus; *i*, ocellar pit; *j*, ocellar furrow; *k*, posterior ocellus; *l*, ocular sinus; *m*, front; *n*, antennal scape; *o*, spatium frontale; *p*, clypeus; *q*, mandible. 2, Thorax, dorsal aspect: *a*, pronotum; *b*, mesoscutum; *c*, scapula; *d*, tegula; *e*, parapsidal furrow; *f*, scutellum; *g*, propodeal spiracle; *h*, postscutellum; *i*, median horizontal area of propodeum; *j*, lateral horizontal area of propodeum. 3, Thorax, lateral aspect: *a*, pronotum; *b*, scapula; *c*, mesopleuron; *d*, tegula; *e*, upper plate of metapleuron; *f*, lower plate of metapleuron; *g*, propodeal spiracle; *h*, lateral horizontal area of propodeum; *i*, lateral surface of propodeum. 4, Male genitalia, ventral aspect at left, dorsal aspect at right: *a*, lamina volsellaris; *b*, squama; *c*, aedeagus; *d*, cuspis volsellaris; *e*, paramere; *f*, cardo. (Modified from Krombein, 1963.) 5, Forewing with two submarginal (*s*) cells and one recurrent (*r*) nervure as in *Colpacampsomeris* and *Scolia*. 6, Forewing with two submarginals and two recurrents as in all other Campsomerinae. 7, Forewing with three submarginals and two recurrents as in *Liacos*. 8, Forewing with three submarginals and one recurrent as in *Megascolia*, *Microscolia*, and *Austroscolia*.



Key to Ceylonese Taxa of Scoliidæ

1. Second recurrent vein of forewing not coalesced above with first, absent in *C. indica eliformis*; sexual dimorphism well developed, males more slender and frequently with numerous yellow integumental markings; thorax usually silvery or golden tomentose.¹ FEMALE: Viewed from above the upper mesopleural plate not conically produced, rarely with a distinct dorsal surface, the juncture of anterior and posterior surfaces of lower plate sharply crested except in *C. c. collaris* and *M. m. marginella*; integument of abdomen black except *P. phalerata turneri* with yellow markings. MALE: Volsella divided in middle into apical and basal parts by a transverse suture; head, thorax, abdomen, and legs with yellow markings except in *M. vanoordti*, *C. indica eliformis*, and *S. pseudindica*. CAMPSOMERINAE 2
- Second recurrent vein of forewing frequently lacking, if present coalescing with first before latter reaches cubital vein; sexual dimorphism not so marked, males comparatively more robust than in Campsomerinae, only *S. picteti* and *S. ceylonicola* with numerous yellow integumental markings; thoracic tomentum not silvery or golden. FEMALE: Viewed from above the upper mesopleural plate conically produced and with a distinct dorsal surface, the juncture of anterior and posterior surfaces of lower plate rounded; abdominal integument black or with red spots, yellow spots present only in *S. picteti* and *S. ceylonicola*. MALE: Volsella not divided by a suture, though often constricted in middle; head, thorax, abdomen, and legs with yellow markings only in *S. picteti* and *S. ceylonicola*, many species with red maculations on abdomen, some with integument entirely black. SCOLIINAE 15
2. FEMALES: Robust forms; antenna 12-segmented; legs fossorial, fore tibia with pecten of stout spines, outer surface of mid and hind tibiae flattened and with numerous, short, heavy spines; last abdominal tergum with dense, decumbent heavier setae, the sting frequently protruding between it and last sternum 3
MALES: Slender forms; antenna 13-segmented; legs slender, without such modifications; last abdominal tergum with scattered, erect setae on basal half, three spines sometimes protruding between it and last sternum 9
3. First to third abdominal terga each with an apical yellow band, widest along midline, that of first narrowed gradually toward side, those of second and third abruptly narrowed halfway toward side; forewing yellowish with a strong subapical black mark; antenna and legs ferruginous; head and thorax with abundant reddish-golden setae, fringes of abdominal segments similarly colored; 12–18 mm long 1. *Phalerimeris phalerata turneri* (Betrem)
Abdominal integument completely black; forewing not strongly yellowish, relatively clear, smoky or black, a diffuse darker subapical spot only in *M. c. ceylonica*; antenna and legs black, only *M. c. ceylonica* with antennal scape and legs red; setae of head and thorax red only in *M. c. ceylonica*, white or black in other species; abdominal fringes white or black, except entirely red in *M. c. ceylonica* and fringes of apical segments red in *C. indica eliformis* and *S. pseudindica* 4
4. Head, thorax, legs, and abdomen with abundant reddish golden hair; legs red; wings smoky, forewing with a diffuse, darkened subapical spot; side of thorax with abundant golden tomentum; 19–24 mm long 6. *Megacampsomeris c. ceylonica* (Kirby)
Reddish golden hair lacking or present only as apical fringes on second or third through fifth abdominal segments and covering the pygidium entirely; wings relatively clear and yellowish only along anterior margin, or black, no darkened subapical spot; side of thorax without golden tomentum 5
5. Very large species; vestiture entirely black except for pygidium and apical fringes of most abdominal segments, which are golden reddish; propodeum with quite coarse, close punctures dorsally and on part of posterior surface 6
Small to medium species; vestiture entirely black, almost entirely white or a mixture of the two; propodeal punctation finer, more scattered except in *M. vanoordti* 7
6. Second recurrent vein absent; head behind ocelli impunctate; longer spur of hind tibia strongly spatulate at apex; side of propodeum with coarse, contiguous punctures; lower metapleural plate without larger punctures except for a few adjacent to hind coxa; 28–34 mm 2. *Colpacampsomeris indica eliformis* (Saussure)
Second recurrent vein present; head behind ocelli with scattered punctures; longer spur

- of hind tibia very weakly spatulate at apex; side of propodeum with smaller, somewhat dispersed punctures; lower metapleural plate with punctures on anterior half; 31–35 mm 3. *Sericocampsomeris pseudindica* (Betrem)
7. Vestiture entirely black; vertex with numerous punctures especially posteriorly; median horizontal area of propodeum with relatively deep, contiguous punctures except a narrow strip along midline; lower two-thirds of lower metapleural plate punctate; 26–29 mm long 7. *Megacampsomeris vanoordti* (Betrem)
- At least the vestiture of occiput, pronotum, and scutum white; vertex impunctate or almost so; median horizontal area of propodeum with shallower punctures, many of which are subcontiguous or separated by as much as the width of a puncture; lower metapleural plate either impunctate or only lower half with punctures 8
8. Larger species, 14–27 mm long; wings black; vestiture black except for conspicuous ruff of abundant, erect white setae on occiput and pronotum, and decumbent, sparser white setae on scutum; propodeum with large, conical tubercle in middle of hind margin of dorsal surface, posterior surface with no larger punctures, just dense micropunctures; longer spur of hind tibia slightly spatulate at apex 4. *Campsomeriella c. collaris* (Fabricius)
- Smaller species, 9–15 mm long; wings hyaline, anterior margin yellowish in cells; vestiture white except black on last two abdominal segments, no conspicuous ruff anteriorly on thoracic dorsum; propodeum not tuberculate, the posterior surface with some scattered larger punctures in addition to the dense micropunctures; longer spur of hind tibia tapering gradually to apex 5. *Micromeriella m. marginella* (Klug)
9. Large species, 20–28 mm long; integument entirely black as well as most of vestiture; some of apical fringes of abdominal segments red, or white in part or entirely, except vestiture entirely black in *M. vanoordti*; wings very dark 10
- Smaller species, 5–20 mm long; integument of head, thorax, and abdomen with yellow maculations; most of vestiture white or red, at most the last two or three abdominal segments black haired; wings much lighter, at most somewhat infumated 12
10. Second recurrent vein of forewing absent; apical fringes of second to fourth abdominal segments white, occasionally also those of first tergum and fifth segment; genitalia (Figure 13); 20–28 mm long 2. *Colpacampsomeris indica eliformis* (Saussure)
- Second recurrent vein present; vestiture entirely black except terminal abdominal segments with reddish hair in *S. pseudindica* 11
11. Vestiture entirely black; median horizontal surface of propodeum not tuberculate apically in middle; scutellum flat, without a short median carina posteriorly; genitalia (Figure 10); 20–22 mm long 7. *Megacampsomeris vanoordti* (Betrem)
- Fourth to seventh abdominal segments partly or entirely with suberect red hair; median horizontal surface of propodeum with a small tubercle at apex; scutellum at apex with a short median carina; genitalia (Figure 14); 25–27 mm long 3. *Sericocampsomeris pseudindica* (Betrem)
12. Erect vestiture of head, thorax, abdomen, and legs red, tomentum of thorax golden; legs red; thorax with yellow maculations on pronotum only; genitalia (Figure 15); 14–20 mm long 6. *Megacampsomeris c. ceylonica* (Kirby)
- Erect vestiture of these parts white except black on last two or three abdominal segments, tomentum of thorax silvery; thorax with yellow maculations on pronotum, scutellum, and postscutellum, markings on latter two sclerites lacking in very small (5–7 mm) individuals of *M. m. marginella* 13
13. Yellow abdominal maculations more extensive, usually covering almost entire dorsum of first segment and apical two-thirds of second, although occasionally only apical two-thirds of first and apical half of second yellow; only the first four terga with apical bands, very rarely the fifth with a pair of small, transverse yellow spots, sterna rarely entirely black, usually the second and third each with a very small posterolateral yellow spot; thoracic dorsum with dense silvery tomentum in addition to sparser erect setae; sixth sternum with dense erect setae; genitalia (Figure 15); 11–19 mm 4. *Campsomeriella c. collaris* (Fabricius)
- Yellow abdominal maculations less extensive, at most the apical half of first two abdominal terga yellow, second and third sterna (and occasionally fourth) either with narrow apical bands or each with an elongate posterolateral spot; thoracic dorsum with sparser silvery

- tomentum only anteriorly on scutum; sixth sternum with only scattered setae; 5-6 mm long 14
14. First five abdominal terga each with a yellow apical band, those of second and third emarginate anteriorly on middle half except narrow and non-emarginate in very small specimens, uniformly wide toward sides; second to fourth sterna each with a narrow apical band, that on fourth sometimes interrupted in middle or lacking; genitalia (Figure 12); 5-13 mm long 5. *Micromeriella m. marginella* (Klug)
- Fifth abdominal tergum black, apical yellow band of second emarginate anteriorly in middle and at sides, that of third emarginate only on sides, that of fourth narrowly to more widely interrupted in middle; second and third (and occasionally fourth) sterna each with a pair of narrow apical spots broadly separated in middle; genitalia (Figure 9); 10-16 mm long 1. *Phalerimeris phalerata turneri* (Betrem)
15. Forewing with three submarginal cells 16
- Forewing with two submarginal cells; second recurrent vein always lacking 20
16. Forewing with two recurrent veins, the second coalescing with first before reaching cubital vein; second abdominal tergum with a pair of circular red spots (lacking in two males), terga three through six (seven in one male) entirely red and with reddish golden vestiture, sides of third and fourth sterna and all of fifth and sixth with similar vestiture and integumental color. FEMALE: 20 mm long. MALE: Front with transverse ridge from ocular sinus passing beneath fore ocellus; genitalia (Figure 19); 17-22 mm long 8. *Liacos erythrosoma cruzi*, new subspecies
- Forewing with second recurrent vein absent (a stub occasionally present above in males of *M. azurea michaae*); abdominal integument and vestiture black except in *M. azurea michaae*, which has much of head yellowish red as well as similarly colored integument on parts of third and some or all of succeeding abdominal terga 17
17. Very large species with yellowish red integumental markings on head and parts or all of posterior abdominal segments; last three (♀) or four (♂) abdominal segments with dense, long vestiture, most of it on dorsum reddish golden; male without a transverse frontal ridge; genitalia (Figure 16); ♀, 27-33 mm long; ♂, 19-30 mm long 9. *Megascolia (Regiscolia) azurea michaae* (Betrem)
- Much smaller species, integument entirely black except head red in *A. ruficeps henryi*; posterior abdominal segments with sparser, shorter black vestiture 18
18. Mesopleuron with deep, coarse punctures that are so close together that many interspaces between them are lamelliform; female scutum posteriorly without impunctate area; male without arched ridge across front; male genitalia (Figure 20); ♀, 14-16 mm long; ♂, 12-14 mm long 10. *Microscolia hydrocephala* (Micha)
- Mesopleuron with shallower punctures, the interspaces between punctures narrow but not lamelliform; female scutum posteriorly with large median impunctate area; male with an arched ridge running from ocular sinu to behind anterior ocellus 19
19. Integument entirely black; fissura frontalis weak or absent in ♀; horizontal surface of first tergum with a short transverse ridge (= tubercle) anteriorly in middle; male genitalia (Figure 17); ♀, 13-20 mm long; ♂, 10-17 mm long .. 11. *Austroscolia ignota* (Betrem)
- Head and antenna red; wings with strong violet reflections, the male also with coppery reflections on forewing; fissura frontalis strongly impressed in female; first tergum without a tubercle; male genitalia (Figure 18): ♀, 19-21 mm long; ♂, 20 mm long 12. *Austroscolia ruficeps henryi*, new subspecies
20. Head, thorax, and abdomen with yellow integumental maculations; most of erect vestiture reddish golden in female, white in male; wings of female yellowish, forewing with large, dark apical or subapical mark; wings of male slightly infumated, weak subapical mark present only in *S. ceylonicola* 21
- Integument entirely black in some species, others have red maculations on third and occasionally fourth abdominal terga; wings dark brown or black in both sexes 22
21. FEMALE: Scutum closely punctate; upper plate of metapleuron coarsely and deeply punctate on upper two-thirds; second discoidal cell of forewing with elliptical dark mark; clypeus entirely red and mesopleuron red or red and black, neither with any yellow maculation; 17-25 mm long. MALE: Head black except clypeus yellow on sides and above; no red areas on thorax; forewing lacking a subapical mark but with a weak mark in second discoidal cell; genitalia (Figure 31); 16-20 mm long 24. *Scolia (Discolia) picteti* Saussure

- FEMALE: Scutum punctate except for a small, smooth area in middle posteriorly; upper plate of metapleuron finely punctate on upper half; second discoidal cell of forewing without dark mark; yellow markings similar but clypeus and mesopleuron above in middle also yellow; 15–19 mm long. MALE: Clypeus, supraclypeal area, and inner eye orbits to sinus, yellow; propodeum mostly red, and occasionally metapleuron and scapulae also; forewing with a weak subapical mark, second discoidal cell lacking a mark; genitalia (Figure 32); 12–16 mm long 25. *Scolia (Discolia) ceylonicola* Betrem
22. FEMALES: Antenna shorter, 12-segmented; body stouter 23
 MALES: Antenna longer, 13-segmented; body more slender though not so markedly as in Campsomerinae 32
23. Abdomen entirely black 24
 Third and usually fourth abdominal terga with paired red spots or a broad band 27
24. Antenna almost or entirely orange red 25
 Antenna black; postscutellum and horizontal median area of propodeum with larger, closer punctures; median tubercle present at base of horizontal section of first abdominal tergum; length 16–19 mm 13. *Scolia (Discolia) cyanipennis* Fabricius
25. Entire antenna and clypeus orange red; postscutellum and horizontal median area of propodeum with larger, closer punctures; tubercle lacking on first abdominal tergum; length 26 mm 15. *Scolia (Discolia) vollenhovens wickwari*, new subspecies
 Only the flagellum orange red, entirely or in part 26
26. Entire flagellum orange red; scutum with large, quadrate smooth space posteriorly; postscutellum and horizontal median area of propodeum almost entirely smooth, with very scattered, fine punctures; median tubercle at base of horizontal section of first abdominal tergum well developed; length 17–25 mm 14. *Scolia (Discolia) affinis* Guérin
 Basal flagellar segment black; scutum without a quadrate smooth area; postscutellum and horizontal median area of propodeum with contiguous to subcontiguous coarser punctures; median tubercle on first tergum very weak; length 15 mm 17. *Scolia (Discolia) aureipennisformis* Betrem²
27. Scapula, scutum on posterior half in middle, and scutellum with only a few scattered punctures; inner half of lateral horizontal area of propodeum impunctate; front impunctate; fissura frontalis weak, extending only halfway to anterior ocellus; hair on occiput entirely white; third and fourth abdominal terga with a pair of well-separated, rounded red spots; length 14–21 mm 20. *Scolia (Discolia) binotata binotata* Fabricius
 Scapula and scutellum with moderately separated to subcontiguous punctures, scutum on posterior half with a smaller impunctate area in middle; at most only the inner anterior angle of lateral horizontal area of propodeum impunctate; hair on occiput entirely black or mixed black and white, entirely white only in *S. keiseri*; third and fourth terga with red bands or a pair of spots, fourth tergum black only in *S. keiseri* . 28
28. Erect hair of entire body white except apical fringes of abdominal terga mixed black and white or entirely black; third abdominal tergum with a pair of ovoid, well-separated red spots; length 11–12 mm 22. *Scolia (Discolia) keiseri*, new species
 Erect hair entirely black except that on occiput mixed black and white in *S. karunaratnei*; occasionally second, always third, and usually forth terga with red spots or bands, markings on fourth quite small in *S. karunaratnei* 29
29. Smaller species, 11–15 mm long; median horizontal area of propodeum more sparsely punctured, most interspaces the diameter of a puncture; area frontalis and front mostly impunctate; fissura frontalis weak and extending only halfway to anterior ocellus; third abdominal tergum with red band sometimes narrowed in middle, fourth tergum immaculate or with a pair of red spots varying in size and shape; vestiture mostly black, but with some scattered white hairs on occiput, and usually also on venter of thorax and femora 21. *Scolia (Discolia) karunaratnei*, new species
 Larger species, not less than 16 mm long; median horizontal area of propodeum with contiguous or subcontiguous punctures, the interspaces less than diameter of a puncture; vestiture entirely black, or with cinereous or brown hair on hind margin of head and depressed anterior part of pronotum in *S. quadripustulata* 30
30. Front almost impunctate; fissura frontalis weak, extending only halfway to anterior ocellus; scutum with a large, median impunctate space on posterior half; second abdominal tergum occasionally with a pair of red spots, third with a broad red band, fourth

- usually with a narrower red band but occasionally entirely black; antenna black; length 17–26 mm 19. *Scolia (Discolia) fasciatopunctata* Guérin
- Lower half of front with scattered to subcontiguous punctures; fissura frontalis stronger, extending to anterior ocellus; scutum without such a large impunctate space; second abdominal tergum black, third and fourth with paired red spots, those on third coalescing on midline occasionally 31
31. Flagellum reddish in varying degrees; lower front with mostly subcontiguous punctures; apical margin of clypeus broadly and gently rounded in middle; abdominal sterna usually all black, third sternum occasionally with pair of tiny spots; 16–21 mm long 16. *Scolia (Discolia) trivandrumensis* Betrem
- Flagellum black; lower front with more scattered punctures; apical margin of clypeus truncate in middle; second and third abdominal sterna mostly red, as is base of fourth occasionally; 18 mm long 18. *Scolia (Discolia) quadripustulata* Fabricius
32. Abdomen entirely black^a 33
- Abdomen with red or yellow markings 41
33. Antennal flagellum orange red or red on at least apical segment, sometimes entirely orange red 34
- Antennal flagellum entirely black 36
34. Entire antenna and clypeus except narrow apical margin light red; flagellum comparatively shorter (Figure 35), segments toward apex (8–10) as broad as long; genitalia (Figure 24); length 16–17 mm 15. *Scolia (Discolia) vollenhoveni wickwari*, new subspecies
- Clypeus black, only antennal flagellum red entirely or in part, flagellar segments 8–10 more elongate (Figure 34), varying from 1.35 to 1.8 times as long as broad 35
35. Propodeal punctation sparser, many of punctures on median horizontal and lateral surfaces separated from each other by the diameter of a puncture, those on median horizontal surface very shallow; flagellum entirely orange red, at least beneath, the upper surface sometimes entirely infuscated; anterior half of forewing very little darker than rest of surface; genitalia (Figure 23), volsella with apical tuft of capitate bristles; 13–21 mm long 14. *Scolia (Discolia) affinis* Guérin
- Propodeal punctation both denser and deeper, most of those on median horizontal surface subcontiguous, those on lateral surface not so close but separated by less than the diameter of puncture; flagellum entirely orange red or only apical two or three segments so colored; anterior half of forewing much darker than rest of surface; genitalia (Figure 29), volsella with only setiform bristles; 14–18 mm long 17. *Scolia (Discolia) aureipennisformis* Betrem
36. Antennal flagellum longer, not clavate toward apex, segments toward tip clearly longer than broad (1.2:1), these segments beneath slightly concave in profile 37
- Flagellum shorter, clavate toward apex, the segments toward tip as broad as long, these segments beneath straight in profile 38
37. Lower plate of metapleuron with very scattered, quite small punctures; median horizontal area of propodeum with shallow, dimpled, more separated punctures; horizontal surface of first abdominal tergum without an anterior tubercle in middle; genitalia (Figure 33), volsella very large, base not divided from apex by a constriction, and clothed with dense long hair; 14–22 mm long 19. *Scolia (Discolia) fasciatopunctata* Guérin
- Metapleuron with coarse, close, deep punctures; median horizontal area of propodeum with similar punctures; horizontal surface of first abdominal tergum with a strong median tubercle anteriorly; genitalia (Figure 26), volsella with shorter, sparser setae, base separated from apex by a constriction; 18–20 mm long 18. *Scolia (Discolia) quadripustulata* Fabricius
38. Vestiture entirely black; upper part of mesopleuron beneath tegula strongly produced; genitalia (Figure 21); 11–18 mm long 13. *Scolia (Discolia) cyanipennis* Fabricius
- Head and scutum, and occasionally rest of thorax and anterior abdominal segments with some erect white hair 39
39. Forewing membrane beyond cells covered with fine setae; head, thorax, and abdomen except last two terga with suberect white vestiture; genitalia (Figure 29), volsellar base larger and with longer, denser setae; 10–14 mm long 22. *Scolia (Discolia) keiseri*, new species
- Much of forewing membrane beyond cells devoid of setae; volsellar base smaller and with shorter, sparser setae 40

40. Front immediately below anterior ocellus impunctate; posterior half of forewing and hind wing quite light; upper half of upper metapleural plate with large punctures; genitalia (Figure 27), volsella longer, lateral margin with a shallow incision separating basal prominence from upper part; 8–10 mm long 20. *Scolia (Discolia) binotata binotata* Fabricius (color phase *coeruleans* Betrem)
- Front with a few punctures immediately below anterior ocellus; entire wing membrane quite dark although the anterior half of forewing even darker; upper metapleural plate devoid of large punctures except immediately beneath hind wing; genitalia (Figure 30), volsella shorter, lateral margin with a relatively deep, narrow incision separating basal prominence from upper part; 12 mm long 23. *Scolia (Discolia) gunawardanae*, new species
41. Entire flagellum or only apical segments light red; fourth and occasionally third abdominal terga with paired, transverse red or yellow spots 42
- Flagellum entirely black; red abdominal markings in form of a band or rounded or quadrate spots 43
42. Flagellum entirely light red except basal segment above; third and fourth abdominal terga with a pair of small transverse posterolateral yellowish red spots, these terga rarely dark chestnut elsewhere; genitalia (Figure 25), inner volsellar margin broadly and evenly rounded above constriction dividing apical and basal sections; 17 mm long 17. *Scolia (Discolia) aweiipennisformis* Betrem⁴
- Only the last one to three flagellar segments red, at least beneath; fourth and occasionally third abdominal terga with somewhat larger paired transverse orange red spots; genitalia (Figure 22), inner volsellar margin strongly lobed above constriction dividing basal and apical sections; 13–17 mm long 16. *Scolia (Discolia) trivandrumensis* Betrem
43. Erect vestiture entirely black including that on vertex and occiput; genitalia (Figure 33), volsella very large, clothed with dense long setae, no constriction between basal and apical areas; length 14–22 mm 19. *Scolia (Discolia) fasciatopunctata* Guérin
- Head, thorax, and abdomen in part usually with rather abundant erect white vestiture except in *S. quadripustulata*, where the pale vestiture is restricted to vertex and occiput and intermixed with darker setae 44
44. Most of metapleuron covered with coarse, contiguous to subcontiguous punctures; wings uniformly quite dark, forewing membrane beyond cells devoid of microtrichiae except small triangular area adjacent to marginal cell; genitalia (Figure 26), dorsal surface of paramere entirely devoid of tiny setae; larger species, 17–20 mm long 18. *Scolia (Discolia) quadripustulata* Fabricius
- Large areas of metapleuron devoid of larger punctures, which when present are more separated; anterior half of forewing darker than posterior half, membrane beyond cells extensively covered with microtrichiae except in *S. binotata* where they are as restricted as in *S. quadripustulata*; upper surface of paramere with some tiny setae that are interspersed with longer, stouter setae on apical section; smaller species, not over 16 mm long 45
45. Antennal flagellum longer, not clavate toward apex, segments toward tip clearly longer than broad (1.2:1), the segments beneath slightly concave in profile; third abdominal tergum with a pair of large rounded spots, the fourth sometimes with a pair of smaller spots; genitalia (Figure 22), paramere broader, basal section of volsella broadly rounded on outer margin; 10–14 mm long 21. *Scolia (Discolia) harunaratnei*, new species
- Antennal flagellum shorter, clavate toward apex, segments toward tip as broad as long (Figure 33); genitalia (Figures 27 and 29), paramere not so broad, outer margin of basal section of volsella almost straight 46
46. First five abdominal terga with erect vestiture white except for apical fringe; third tergum with red spots quite small, fourth tergum entirely black; forewing membrane beyond cells extensively clothed with microtrichiae; genitalia (Figure 29), volsellar base with denser, longer setae and without a distinct basal prominence on outer margin, paramere broadened toward apex; 10–14 mm long 22. *Scolia (Discolia) keiseri*, new species
- Pale vestiture on abdomen restricted, usually only on first tergum and on red spots; third and usually fourth terga with paired red spots that are larger on third, occasionally lacking

on fourth (color phase *S. bipunctata* Klug); forewing membrane beyond cells devoid of microtrichiae except a small triangular area adjacent to marginal cell; genitalia (Figure 27), volsellar base with sparser, shorter setae and with a distinct basal prominence on outer edge adjacent to incision separating basal and apical sections, paramere not broadened toward apex; 9–16 mm long 20. *Scolia (Discolia) binotata binotata* Fabricius

¹ See Figures 1–8 for diagrammatic figures of morphology and wing venation.

² These key characters are based on the allotype from an unknown locality. Females of *S. aureipenniformis* have never been collected in Sri Lanka.

³ To date we know that all black males occasionally occur in several taxa of *Scolia* (*S. binotata binotata* Fabricius, *S. quadripustulata* Fabricius, *S. fasciatopunctata* Guérin, *S. keiseri*, new species) whose males normally bear distinct red markings on the abdomen. These four taxa are keyed out in both sections of the key. An all-black phase is not known in *S. karunaratnei*, new species, or *S. trivandrumensis* Betrem.

⁴ *Scolia aureipenniformis* Betrem males are very common and are characterized usually by having the abdomen entirely black and the antennal flagellum red in varying extents from entirely so, to just the lower surface, and to just the terminal segments. Three specimens have been found with paired yellowish spots as noted in couplet 42. Such a color phase is not known in any of the other *Scolia* species with the abdomen normally all black.

Subfamily CAMPSOMERINAE

Betrem (1928:66 et seq.) assigned the Indo-Australian Campsomerinae to the genus *Campsomeris* Guérin, which he divided into four subgenera and a number of species groups and subgroups. Betrem refined his reclassification of this subfamily since 1941 in a series of papers by him or in joint authorship with Bradley. A number of genera and subgenera have been proposed and the seven Ceylonese taxa are now assigned to six genera.

The species are relatively easy to identify as compared with those belonging to the other subfamily, the Scoliinae. Except in a few taxa the color pattern and characters of the vestiture provide immediate recognition. There is much stronger sexual dimorphism in the Campsomerinae than in the Scoliinae. This is particularly striking in a species such as *Campsomeriella collaris* (Fabricius), in which the stocky female is entirely black with black wings and has a conspicuous collar of dense white vestiture on the forepart of the thorax, whereas the slender male has abundant yellow markings, relatively clear wings, and lacks the conspicuous collar of white hair.

I have restricted the descriptions that follow primarily to the essential diagnostic characters of color and vestiture, for the details of punctuation are not needed to separate one Ceylonese species from another.

1. *Phalerimeris phalerata turneri* (Betrem)

FIGURE 9

Campsomeris ceylonica Kirby, 1889:452 [♀ allotype from Ceylon misidentified].

Campsomeris (Dielis) phalerata turneri Betrem, 1928:104 [proposed as a new name for the misidentified female allotype of *Scolia ceylonica* Kirby; included specimens from Ceylon and South India].—Betrem, 1941:100.

Campsomeris phalerata turneri Betrem.—Giuglia, 1965:316 [Ceylon localities].

REMARKS.—*Phalerimeris phalerata* (Saussure) is a widely distributed polytypic taxon. Typical *P. phalerata* occurs from Celebes westward through Southeast Asia and Thailand to northern India, and also in China and Taiwan. The Ceylonese subspecies *P. p. turneri* (Betrem) is restricted to Sri Lanka and South India. Within Sri Lanka *P. p. turneri* is one of the most widely distributed species of Scoliidae, occurring from sea level to some 7000 ft elevation and in both Dry and in very Wet zones. Collection dates from the Kandy and Colombo areas suggest that the species breeds throughout the year.

The female is the only campsomerine with yellow bands on the abdomen and a very dark, well-defined subapical mark in the forewing. The male can be confused only with those of *C. c. collaris* (Fabricius) and *M. m. marginella* (Klug). Males of *C. c. collaris* have broader yellow bands on the abdomen than do

P. phalerata turneri; the absence of dense erect setae on the sixth abdominal sternum will readily separate *C. c. collaris* from the occasional more extensively maculated male of *P. p. turneri*. Males of *M. m. marginella* are smaller, have five rather than four yellow bands on the abdominal terga, and usually complete rather than interrupted yellow bands on the second to fourth sterna.

Females of typical *P. phalerata* have the vestiture of the last two terga black rather than yellowish red as in *P. p. turneri*. Males of the two subspecies cannot be distinguished except on the basis of range.

FEMALE.—Length 12–18 mm. Black, antenna and legs light red, first three terga with narrow apical orange bands, that on second narrowed toward sides. Both erect vestiture and tomentum fiery reddish golden. Wings yellowish, apex of forewing with large, dark, well-defined mark.

MALE.—Length 10–16 mm. Black, abdomen with faint blue reflections, pale yellow markings as follows: clypeus except narrow median streak, lower inner eye orbit, pronotum, tiny posterolateral mark on scutum, narrow anterior band on scutellum, small anterior spot on postscutellum, posterior bands on first four terga, that on first covering apical half or more, that of second emarginate anteriorly and at sides, that on third narrow, emarginate on sides, that of fourth narrower and usually narrowly to broadly interrupted at midline, second and third, and occasionally fourth, sterna with narrow apical spots quite widely separated at midline, spot at apex of fore femur beneath, mid femur with narrow stripes above and below, and outer surface of fore and mid tibiae. Erect vestiture pale except black on last three abdominal segments; tomentum on head and thorax silvery. Wings slightly infumated, forewing without subapical dark mark. Genitalia as figured (Figure 9).

SPECIMENS EXAMINED.—**EASTERN PROVINCE.** TRINCOMALEE DISTRICT: 1 ♂, Kantalai, 30 Jun (Colombo); 1 ♀, Niroddumunai, Sep (Colombo); 2 ♂, Trincomalee, Humbert (Geneva; det. as *E. 4-fasciata* and *E. phalerata*). BATTICALOA DISTRICT: 1 ♂, 5 mi W of Vakaneri, 9 Jun, Wood et al. (USNM). AMPARAI DISTRICT: 1 ♀, 1 ♂, Inginiyagala, 1–5 June, 6–7 Sep, Davies et al., Messersmith et al. (USNM); 3 ♂, Ekgal Aru Reservoir Jungle, 9–12 Jun, 1 in Malaise trap, Krombein et al. (USNM); 2 ♀, 1 ♂, Lahugala, 14–15 Jun, ♂ in Malaise trap, Krombein et al. (USNM).

CENTRAL PROVINCE. MATALE DISTRICT: 1 ♀, Sigiriya, 18 Jun, Messersmith et al. (USNM). KANDY DISTRICT: 18 ♀, 53 ♂, Kandy (includes Udawattakele, Lady Blake's Drive, Rosencath, Peak View Motel, Hantana Hill, Deiyan-

newela), 1600–2100 ft, 7–14 Jan, 9–13 Feb, 26–30 Mar, 9, 14–20 and 29–30 Apr, 8–11, 26–28 and 29–30 May, 3–5 and 11 Jun, 5–15 Jul, 23 and 6–31 Aug, 1–17, 9–12, 20–27 and 30 Sep, 1–3 and 27–28 Oct, 1–2 Nov, Baumann et al., Davies et al., Karunaratne et al., Keiser, Krombein et al., Messersmith et al., Wickwar (USNM, Colombo, Basel, Ottawa); 4 ♀, 13 ♂, Katugastota (includes Kahalla, Kalugala), 1600 ft, 28–31 Aug, Oct, 2–3 and 22–24 Nov, Karunaratne (Ottawa); 2 ♀, 4 ♂, Peradeniya (includes Botanic Garden), 5 Jan, 13 Feb, 28–29 Mar, 24 Oct, Humbert, Lemche, Piyadasa et al. (USNM, Copenhagen, Geneva (♂ det. as *E. limbata*)); 2 ♀, 5 ♂, Teldeniya (includes Bambaragala Rock, Woodside Plantation, Urugalla), 11 Jan, 11 Feb, 10 May, 16 Sep, 19 Nov, Henry, Karunaratne et al., Keiser, Krombein et al. (USNM, Colombo, Basel); 1 ♀, Wategama, 9 Jul, Keiser (Basel); 1 ♀, Watawela, Jan (Colombo); 1 ♀, Haragama, 8 Dec, Keiser (Basel); 1 ♀, Ambacotta, 15 Dec, Keiser (Basel); 1 ♂, Galaha group, 26 Aug, Davies et al. (USNM); 1 ♂, Hasalaka, 17 Feb, Krombein et al. (USNM). NUWARA ELIYA DISTRICT: 1 ♀, Nuwara Eliya, 28 May, Keiser (Basel); 1 ♀, Kappetipala, 28 Sep, Davies et al. (USNM).

NORTH WESTERN PROVINCE. PUTTALAM DISTRICT: 1 ♀, Puttalam, 22 Feb, Keiser (Basel); 1 ♂, Eluamkulam, 15 mi N of Puttalam, 1–5 May, Karunaratne, (Colombo); 3 ♂, Kala-Oya, Malaise trap, 1 Aug, Huang, Peyton et al. (USNM). KURUNEGALA DISTRICT: 13 ♂, Kurunegala (includes Badagamuwa Jungle and near Elephant Rock), 24–27 Jan, mostly on flowers of *Eupatorium rivalis*, Krombein et al. (USNM).

WESTERN PROVINCE. COLOMBO DISTRICT: 10 ♀, 9 ♂, Colombo (includes Museum Gardens, Park), 8–14 Feb, 18 and 28 Mar, 2 and 30 Apr, Jul, 2–3 and 5 Sep, 10–20 and 27 Oct, 11–21 Nov, Karunaratne, Krombein et al., Robinson et al., Wickwar, (USNM, Colombo, Ottawa); 1 ♀, Negombo, 5 Aug, Keiser (Basel); 5 ♂, Nugegoda, Papiiyana, 3–4 May, 5 and 21 Sep, Karunaratne (USNM, Ottawa); 2 ♀, 2 ♂, Labugama Reservoir Jungle, 400 ft, 16 Feb, 9 May, 15–18 Aug, 2–3 Oct, Hevel et al., Krombein et al. (USNM, Colombo); 7 ♂, Kalatuwawa Reservoir, 300 ft, 6–11, and 12–15 Aug, 19 Sep, Flint et al., Huang, Peyton et al. (USNM); 1 ♀, 5 ♂, Ratmalana near airport, 50 ft, 6 Jun, 26 Nov, Hevel et al., Krombein et al. (USNM); 2 ♂, Kurana, Paddukka, 200 ft, 21 Jul, Karunaratne (Ottawa); 1 ♂, Kurana Timber Reserve, Paddukka-Ingiriya Rd, 18 Jan, Krombein et al. (USNM); 1 ♂, Biyagama, 28 Oct, Robinson et al., (USNM); 1 ♀, Gampaha Botanical Gardens, 24 May, Messersmith et al., (USNM). KALUTARA DISTRICT: 1 ♀, Agalawatta, Malaise trap, 27 Jul, Huang, Peyton et al. (USNM).

SABARAGAMUWA PROVINCE. KEGALLA DISTRICT: 1 ♀, Kitulgala, 150 ft, 30 Sep, Flint et al. (USNM); 1 ♂, Kegalla, 13 Feb (Colombo). RATNAPURA DISTRICT: 1 ♂, Ratnapura, 18 Oct, Krombein et al. (USNM); 1 ♀, 5 ♂, Balangoda, Feb, 13 and 17 Apr, 7 Jun (Colombo); 1 ♂, Uggalkaltota, 1–5 Jul (Colombo); 2 ♀, 21 ♂, Gilimale, 17–18 May, 17–21 Jun, a few in Malaise trap, Krombein et al., Wood et al. (USNM); 1 ♂, 5 mi W of Vakaneri, 9 Jun, Wood et al. (USNM); 1 ♂, Opanake, 500 ft, 13 Oct,

Flint et al. (USNM); 1♂, Sinharaja Jungle, 3 mi S of Weddagala, 10–11 Feb, Krombein et al. (USNM); 3♂, Kukula Ganga, 1000 ft, 16 Apr at black light, Baumann et al. (USNM); 4♂, Rajawaka, 20 Jun, Krombein et al. (USNM); 3♂, Kiriwandeniya, 13 mi on Wewelwatta Rd, 20 Jun, Krombein et al. (USNM).

UVA PROVINCE. BADULLA DISTRICT: 1♀, 11♂, Welimada (includes Gurutalawa Nadungama, Uva Ben Head), 30 Aug, 2 Sep, Gunawardane, Keiser (Colombo, Basel); 1♂, Badulla, 30 Sep, Davies et al. (USNM); 2♂, Ella, 26 Nov, Hevel et al. (USNM). MONORAGALA DISTRICT: 1♂, Bibile, 7 Jun, Wood et al. (USNM); 1♂, Wellawaya, 10 Aug, Krombein et al. (USNM); 5♂, Monoragala, 4–5 Sep, Davies et al. (USNM).

SOUTHERN PROVINCE. GALLE DISTRICT: 1♀, 9♂, Kanneliya Jungle (includes Udugama, Hiniduma), 400–500 ft, 11–16 Jan, 18–26 Feb, 11–12 Mar, 21–22 Apr, 26 Aug, 6–12 Oct, Baumann et al., Krombein et al. (USNM, Colombo). MATARA DISTRICT: 1♀, 1♂, Enselwatte, 25 May, Wood et al. (USNM); 1♀, Dondra, Sep (Colombo); 1♂, Weligama, Dec (Colombo). HAMBANTOTA DISTRICT: 5♂, Palatupana, Yala, 8–10 Mar, Krombein et al. (USNM).

MISCELLANEOUS. 1♂, Mackwood, Aug (Colombo); 1♀, Ceylonia (Copenhagen; Mus. Drows.); 1♀, Ceyl. (Geneva); 1♀, 2♂, no locality label (Colombo).

2. *Colpacampsomeris indica eliformis* (Saussure)

FIGURE 13

- Scolia (Lacosi) eliformis* Saussure, 1858:215 [♂; "Habite: Les Indes. Ceylan"].
- Scolia (Discolia) eliformis* Saussure and Sichel, 1864:120.
- Discolia indica* (Saussure).—Saussure, 1880:23 [synonymized *S. eliformis* under *D. indica*].
- Scolia eliformis* Saussure.—Bingham, 1897:89 [♂; Ceylon, South India].
- Scolia elidiformis* Dalla Torre, 1897:156 [unnecessary emendation, credited to Saussure!].
- Scolia indica* Saussure.—Turner, 1911b:619 [synonymized *S. eliformis* under *S. indica*].
- Campsomeris (Dielis) indica* (Saussure).—Betrem, 1928:116–117 [Ceylon, India, Assam, Malacca; synonymized *S. eliformis* under *S. indica*].
- Campsomeris (Colpacampsomeris) indica eliformis* (Saussure).—Betrem, 1941:102 [Ceylon, South India; established a new subgenus for *C. indica* and placed *C. eliformis* as a valid subspecies].—Betrem in Bradley and Betrem, 1967:308.
- Campsomeris indica* (Saussure).—Guiglia, 1965:317 [♀ ♀, Ceylon localities except ♀ from Wewelwatta misidentified].
- Campsomeris indica eliformis* (Saussure).—Guiglia, 1965:317 [♂ ♂, Ceylon localities].
- Colpacampsomeris indica eliformis* (Saussure).—Bradley, 1974:436 [designation of lectotype of *S. eliformis*; Betrem in Bradley and Betrem, 1967:308, raises *Colpacampsomeris* to generic rank.]

REMARKS.—In his lectotype designation for *C. i. eliformis*, Bradley (1974) noted that there were four males in the Geneva collection, only three of which were syntypes. One was labeled "Ceylan," one "Indes," and one bore no locality label. Bradley selected the former as lectotype inasmuch as it agreed better with the original description. This designation restricted the name *C. i. eliformis* to the Ceylonese population of *C. indica*.

The Ceylonese population of *C. indica* is subspecifically distinct, as established by Betrem (1941 and in Bradley and Betrem, 1967), and not synonymous with typical *C. indica* as proposed by Saussure (1880), Turner (1911b), and Betrem (1928). I have seen the female lectotype of *D. indica* (Geneva Museum). It matches exactly Saussure's original description even to the body and wing lengths. It differs from females from Sri Lanka by having pale erect setae fringing the occiput and in having both red and black setae anterolaterally on the dorsum of the first metasomal tergum; the decumbent apical fringes of the second through fifth metasomal segments and the decumbent setae on the pygidium are fiery red as in the Sri Lanka females.

Males of *C. indica eliformis* differ from those of the other subspecies by having the legs entirely clothed with black setae and in having the apical fringes on the second through fourth metasomal segments almost entirely white and occasionally white fringes laterally on the fifth segment. Some males have the hair on occiput and/or temples white. I have seen the male lectotype of *C. i. eliformis* (Geneva Museum); it has no white erect hair on the head and white fringes on only the second through fourth segments.

The occurrence of *C. indica eliformis* in South India rests on Bingham's (1897) record of the taxon occurring in both South India and Ceylon. Identification of the South Indian population as *C. i. eliformis* was erroneous. There is in the Smithsonian collection a pair of *C. indica* sensu lato from Malabar (collector Deschamps, 1890) and a female labeled "Tarancore" [Travancore?]. These represent an undescribed subspecies distinguished from the Ceylonese population by having the female with black setae on the pygidium and the male with totally black vestiture.

This and the following species, *Sericocampsomeris pseudindica* (Betrem), share the distinction of being the largest Ceylonese campsomerines. Superficially they are quite similar in appearance, differing from

the other taxa in having the integument, wings, and vestiture entirely black except for the presence of reddish golden hair on the apical abdominal segments of the female and in having some pale hair on the abdomen of the males. The absence of a second recurrent vein in the forewing of both sexes readily separates *C. indica eliformis* from *S. pseudindica*. Females of the former taxon also have the longer hind tibial spur strongly spatulate at apex instead of weakly so, and the vertex is smooth instead of having scattered punctures. Males of *C. indica eliformis* have white apical fringes on at least the second to fourth terga instead of reddish hair on the terminal terga as in *S. pseudindica*, and the scutellum of the latter has a short median ridge at apex which is lacking in the former.

Colpacampsomeris indica eliformis is reasonably abundant and widely distributed primarily in low country Wet Zone habitats. It seems probable that it may parasitize larvae of one of the large scarabaeid beetles infesting coconut plantations. We collected a long series, mostly males, 24–27 January 1975 in a coconut plantation on the edge of Kurunegala near the Badagamuwa Jungle.

FEMALE.—Length 28–34 mm. Integument entirely black. Vestiture black except apices of second to fifth terga with golden reddish setae, pygidium entirely so clothed, and apical fringes of second to fifth sterna entirely or partly so clothed. Wings very dark brown with strong blue reflections.

MALE.—Length 20–28 mm. Integument entirely black, abdomen with weak blue reflections. Vestiture black except apical fringes of second to fourth abdominal segments mostly or entirely white, as are the fringes occasionally of first tergum and fifth segment. Wings lighter brown than in female, anterior part of forewing darker, with weaker blue reflections than in female. Genitalia as figured (Figure 13).

SPECIMENS EXAMINED.—NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 1♂, Welī Oya, Feb (Colombo).

CENTRAL PROVINCE. KANDY DISTRICT: 3♀, 6♂, Kandy (includes Udawattakele, Asgiriya), 6 Mar, 29–30 Apr, May, Sep, Karunaratne, Keiser, Wickwar (Colombo, Basel); 4♀, 1♂, Peradeniya, Botanic Garden, 10 Jun, Keiser (Basel); 1♀, Wariagalla, Plantation, 24 Jul, Keiser (Basel); 5♂, Uda Pusselawa, Jun (Colombo); 1♀, Minipe, 14 Jan, Perera (Lund).

NORTH WESTERN PROVINCE. PUTTALAM DISTRICT: 1♂, Puttalam, Nov (Colombo). KURUNEGALA DISTRICT: 4♀, 41♂, Kurunegala, Badagamuwa Jungle, coconut plan-

tation, most ♂♂, a few ♀♀ on flowers of *Stachytarpheta jamaicensis* (= dogtail or balu-maguta), ♂♂ freshly emerged, ♀♀ somewhat worn, 26–27 Jan, Krombein et al. (USNM).

WESTERN PROVINCE. COLOMBO DISTRICT: 2♂, Boralasgamuwa, 24 Apr (Colombo); 3♀, Colombo, Jun, Nov (Colombo); 2♀, 2♂, Padukka, Arakawila Jungle, 26 Nov, 10 Dec, Karunaratne (USNM); 1♀, 1♂, Negombo, 4 Aug, Keiser (Basel); 1♀, 1♂, Papiliyana, 28–29 Jun, 15 Nov, Karunaratne (USNM); 1♂, Avissawella, 7 Oct, Keiser (Basel); 6♀, 8♂, Labugama Reservoir Jungle, 400 ft, 16 Feb, 9 May, 12 Aug, 2–3 Oct, Gunawardane, Hevel et al., Krombein et al. (USNM, Colombo); 1♀, Battaramulla, 11 Jun (Colombo); 1♂, Kalatuwawa, 15 Aug, Gunawardane (Colombo); 1♀, Hanwella, 4 May (Colombo). KALUTARA DISTRICT: 4♂, Kalutara Dist. (Colombo); 2♀, Horana, 30 Mar, 26 Jun, Karunaratne (Ottawa).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 2♂, Pelmadulla, 8 Oct, Keiser (Basel); 1♂, Opanaka, 10 Jun (Colombo); 1♂, Balangoda, 7 Jun (Colombo).

SOUTHERN PROVINCE. GALLE DISTRICT: 2♂, Kottawa, Aug, Oct (Colombo); 4♂, Hiniduma, 19–26 Feb, 3 Aug (Colombo). MATARA DISTRICT: 1♂, Dondra, Sep (Colombo); 4♂, Deniyaya, 3 Jan (Colombo).

MISCELLANEOUS. 2♀, 1♂, no locality label (Colombo); 1♀, 1♂, Ceylonia (Copenhagen; from Mus. Drets.); 4♂, Ceylon, Burdeyron, Ferrière (Geneva; one is Bradley's lectotype of *C. i. eliformis*).

3. *Sericocampsomeris pseudindica* (Betrem)

FIGURE 14

Dielis rubromaculata (Smith).—Turner, 1911a:154.
Campsomeris (*Dielis*) *rubromaculata pseudindica* Betrem, 1928:120 [♀, ♂; Ceylon localities].
Campsomeris (*Sericocampsomeris*) *pseudindica* Betrem.—Betrem, 1941:95 [raised to specific rank].
Campsomeris indica Saussure.—Guiglia, 1965:317 [♀ from Wewelwatta misidentified].

REMARKS.—As noted in the synonymy above, Betrem described this as a subspecies of *D. rubromaculata* (Smith) but later raised it to specific rank. Its affinities and separation from other Ceylonese campsomerines are discussed above under *Colpacampsomeris indica eliformis* (Saussure), a taxon to which it bears a strong superficial resemblance.

It is quite a rare species and the available records indicate that it is restricted to areas of quite copious rainfall.

FEMALE.—Length 31–35 mm. Integument black. Vestiture black except apices of third to fifth abdominal terga and of second sternum with reddish golden setae, pygidium entirely so clothed. Wings dark brown with strong blue reflections.

MALE.—Length 25–27 mm. Integument black, abdomen with faint blue reflections. Vestiture black except fifth to seventh, or only sixth, terga with light reddish setae at least at apex, and seventh sternum so clothed in one specimen. Wings lighter brown, though darker than in *C. indica eliformis*, anterior part of forewing darker, effulgence dull golden. Genitalia as figured (Figure 14).

SPECIMENS EXAMINED.—CENTRAL PROVINCE. KANDY DISTRICT: 1 ♂, Kandy, Wickwar (Colombo); 2 ♂, Maskeliya (Colombo); 1 ♀, Woodside Plantation, Urugalla, 16 Apr, Henry (Colombo; the holotype).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 1 ♀, Wewelwatta, 10 Oct, Keiser (Basel); 1 ♂, Gilimale, 19–22 Jun, Krombein et al. (USNM).

UVA PROVINCE. BADULLA DISTRICT: 1 ♀, Nadungama, 2 Sep, Gunawardane (Colombo).

SOUTHERN PROVINCE. GALLE DISTRICT: 1 ♀, 1 ♂, Kanneliya, Sinharaia Jungle, 11–16 Jan, Krombein et al., ♂ on flowers of *Eupatorium rivalis* (USNM).

4. *Campsomeriella collaris collaris* (Fabricius)

FIGURE 15

Tiphia collaris Fabricius, 1775:354 [♀; coast of Malabar; type in Copenhagen].

Colpa parvula Lepeletier, 1845:548 [♂; Indes; type probably lost].—Betrem in Bradley, 1964b:192 [synonym of *C. parvula* under *C. c. collaris*].

Campsomeris (*Campsomeris*) *collaris* (Fabricius)—Betrem in part, 1928:126–128 [♀, ♂; specimens from Ceylon and South India only].

Campsomeris (*Campsomeriella*) *collaris collaris* (Fabricius).—Bradley, 1964a:12 [note on holotype].—Guiglia, 1965:318 [Ceylon localities].

Campsomeriella (*Campsomeriella*) *collaris* (Fabricius).—Betrem, 1967:29 [*Campsomeriella* raised to generic rank, and *collaris* placed in subgenus *Campsomeriella*, section *Campsomeriella*, group of *C. collaris*].

REMARKS.—*Campsomeriella collaris* (Fabricius) ranges from the Indian subcontinent eastward to China, Java, and the Philippines. It is a polytypic species, and the typical subspecies, *C. c. collaris*, occurs only in Sri Lanka and South India.

Typical *C. c. collaris* is both the most abundant and widely distributed Ceylonese scoliid. It is quite adaptable for it occurs in all of the ecosystems and in areas of sparse to very heavy rainfall.

It is also one of the most easily recognized of the Ceylonese scoliids. The integument of the female is

black, the wings are very dark with strong blue reflections, and the occiput and pronotum have a very conspicuous ruff of erect white setae. The male has more extensive yellow maculations on the abdomen, which usually cover almost the entire dorsum of first segment, the apical two-thirds of the second, and narrower bands on the third and fourth; the fifth segment rarely has a pair of small, transverse spots. The parameral and volsellar setae are also longer than in other Ceylonese Campsomerinae, and the parameres are slender, strongly bowed outward in middle. The sixth sternum is clothed with dense, erect white or black setae.

FEMALE.—Length 14–27 mm. Integument black. Vestiture black except clypeus and front sometimes with intermixed cinereous setae, occiput and scapula with dense, erect white setae, scutum with moderately dense, decumbent setae and silvery tomentum on anterior half. Wings dark brown with deep blue reflections.

MALE.—Length 11–19 mm. Integument black, abdomen with faint blue reflections on black areas of basal segments, the following bright to pale lemon yellow: clypeus except median triangular black mark, pronotum anteriorly in middle and a narrow stripe adjacent to tegula, scutellum with a narrow anterior stripe usually narrowly interrupted at midline, post-scutellum with tiny median, anterior spot, stripe on apical half of all femora, outer surface of all tibiae, outer surface of first and last fore tarsal segments, usually almost entire dorsal surface of first tergum, usually apical two-thirds of second, usually apical half of third and fourth, occasionally a pair of small, transverse spots on fifth, sterna rarely all black, usually the second and third with tiny posterolateral spot. Erect vestiture glittering white except black on last three abdominal segments, that of sixth and seventh sterna much denser than normal; tomentum on head and thorax silvery, especially dense on all of thorax. Wings very lightly infumated, with weak yellowish reflections. Genitalia as figured (Figure 15).

SPECIMENS EXAMINED.—NORTHERN PROVINCE. JAFFNA DISTRICT: 1 ♀, Achchuveli (Geneva); 1 ♀, Elephant Pass, 2 Jan (Colombo); 12 ♀, 1 ♂, Kilinochchi, 80 ft, 25–26 Jan, Krombein et al. (USNM). VAVUNIYA DISTRICT: 1 ♂, Parayanalankulam, irrigation canal, 25 mi NW of Medawachchiya, 100 ft, 20–25 Mar, Davis et al. (USNM); 1 ♀, Nedunkeni, Jan (Colombo); 3 ♀, Mankulam, Nov (Colombo); 5 ♂, Malwatu Oya, Cheddikulam, 15–16 Jun, 19–27 Sep, Karunaratne, Messersmith et al. (USNM, Colombo). MANNAR DISTRICT: 7 ♂, ½ mi NE of

Kokmotte Bungalow, Wilpattu Natl. Park, 21–25 May, Krombein et al. (USNM).

NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 1 ♂, Anuradhapura, 250 ft, 20 Mar, Davis et al. (USNM); 1 ♀, Mihintale, 4 Dec, Keiser (Basel); 1 ♂, Padaviya tank, 180 ft, 20–21 May, Krombein et al. (USNM). **POLONNARUWA DISTRICT:** 1 ♀, Polonnaruwa, 19 Jul, Keiser (Basel); 3 ♂, 20–23 mi N of Polonnaruwa, 11–12 Jun, Wood et al. (USNM); 2 ♀, Diyabedama, Giritala, 17 Jan, Karunaratne (Colombo).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 3 ♀, 4 ♂, Trincomalee, Humbert (Geneva; ♀♀ determined as *E. thoracica*, ♂♂ as *E. collaris* and *E. annulata*); 1 ♀, 6 ♂, Niroddumunai, Jan, May, Sep (Colombo); 4 ♂, Kantalai, 2–18 Aug, Gunawardane (Colombo); 1 ♀, Kuchchaveli, 4 Jul, Keiser (Basel). **BATTICALOA DISTRICT:** 18 ♂, Punani, Maduru Oya, 500 ft, 9–12 Jun, Karunaratne (Colombo, Ottawa); 1 ♂, Vakaneri Tank, 9–14 Jun, Karunaratne (Colombo).

CENTRAL PROVINCE. KANDY DISTRICT: 15 ♀, 16 ♂, Kandy (includes Udawattakele at 1600 ft, Lady Blake's Drive, Lady Horton's Drive), 2 Mar, 14–20 Apr, May, 3–5, 11 and 18 Jun, 16–31 Aug, 1–17 and 20–27 Sep, 27–28 Oct, 24 Nov, Karunaratne et al., Keiser, Krombein et al., Petersen, Wickwar (USNM, Colombo, Basel, Copenhagen, Ottawa); 2 ♀, 2 ♂, Aruppola, 14 Apr, Karunaratne et al. (USNM); 2 ♀, Katugastota, 1600 ft (includes Kahalla, Kalugala), 28 and 31 Aug, Karunaratne (Ottawa); 8 ♀, 5 ♂, Peradeniya (includes Botanic Garden, Experimental Station), 3 and 13 Feb, 21 May, 5 and 10 Jun, 14 Aug, 24 Oct, Keiser, Krombein et al., Lemche, Piyadasa et al., Spangler et al. (USNM, Colombo, Basel, Copenhagen); 4 ♂, Teldeniya, 11 Feb, Krombein et al. (USNM); 1 ♀, 4.3 mi NW of Laksapana, 1000 ft, 25 Sep, Flint et al. (USNM); 1 ♀, Ganoruwa, 12 Jun, Keiser (Basel); 2 ♂, Hasalaka Circuit Bung., 30–31 May, Messersmith et al. (USNM). **NUWARA ELIYA DISTRICT:** 1 ♀, Kappetipala, 28 Sep, Davies et al. (USNM).

NORTH WESTERN PROVINCE. PUTTALAM DISTRICT: 1 ♀, Marai Villu, 25 Mar (Colombo); 2 ♀, Puttalam, 21–22 Feb, Keiser (Basel); 1 ♂, Eluamkulam, 1–20 Mar, Karunaratne (Ottawa); 1 ♂, Wilpattu Natl. Pk., Maddikulam, 15 Jun, Messersmith et al. (USNM); 9 ♀, 12 ♂, Wilpattu Natl. Park, Kali Villu, 12–14 Jun, Messersmith et al. (USNM). **KURUNEGALA DISTRICT:** 2 ♀, Badagamuwa Jungle, Kurunegala, 24–27 Jan, Krombein et al. (USNM).

WESTERN PROVINCE. COLOMBO DISTRICT: 14 ♀, 58 ♂, Colombo (includes Museum Gardens, Colpetty), 5–13, 15 and 28–31 Jan, 5 and 8–14 Feb, Mar, 2 Apr, 17 May, 13, 16 and 30 Jun, Jul, 3, 12, 14 and 16 Aug, 27, 29 and 30 Sep, 3, 8, 11, 12 and 29 Oct, 3, 11, 14, 16, 17, 21, 26, and 28 Nov, 24 Dec, Karunaratne, Krombein et al., Wickwar (USNM, Colombo, Ottawa); 25 ♂, Ja-Ela, Old Dutch Canal, sea level, 8 May, Krombein et al. (USNM); 1 ♂, Kohuwala, 4 Oct, Karunaratne (Ottawa); 2 ♂, Mt. Lavinia, 1 Jul, Karunaratne (Ottawa); 3 ♀, 7 ♂, Nugegoda, Papiliyana, 16 Mar, 1 May, 28–29 Jun, 5 Jul, 21 Sep, Karunaratne (USNM); 7 ♀, 18 ♂, Ratmalana (includes Zoo Farm and

near airport), 19–21 Jan, 15 Feb, 6 Jun, 29 Sep, 27 Oct, 1 and 28 Nov, Hevel et al., Karunaratne, Krombein et al., ♂♂ at flowers of *Eupatorium rivalis*, Robinson et al. (USNM); 2 ♀, Gampaha Botanic Garden, 24 May, Messersmith et al. (USNM); 5 ♀, 4 ♂, Labugama Reservoir Jungle, 400 ft, 12 Aug, 2–3 and 14 Oct, Gunawardane, Hevel et al., Krombein et al. (USNM); 4 ♀, Avissawella, 7 Oct, Keiser (Basel); 1 ♀, Battaramulla, 3 Aug (Colombo); 7 ♂, Alhidiya, 14 Jul, Karunaratne (Ottawa); 1 ♂, Kotte, 11 Sep, Karunaratne (Ottawa); 2 ♀, 16 ♂, Kalatuwawa, 6–11 and 12–15 Aug, Gunawardane, Messersmith et al. (USNM, Colombo); 1 ♂, Laxapathiya, 13 mi S of Colombo, 15–30 Jan, Perera (Kansas).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 2 ♀, 2 ♂, Ratnapura, 18 Oct, 20–21 Dec, Krombein et al. (USNM, Colombo); 2 ♀, 5 ♂, Gilimale, 17–18 May, 17–22 Jun, 6 Oct, Davies et al., Krombein et al., Wood et al. (USNM); 1 ♂, Rakwana, 1 May (Colombo); 3 ♂, Uggalkalota, 500 ft, 10–14 Oct, Flint et al. (USNM); 1 ♂, Kukula Ganga, 1000 ft, 16 Apr, at black light, Baumann et al. (USNM); 1 ♂, Balangoda, Feb. (Colombo); 1 ♀, Sinhharaja Jungle, 3 mi S of Weddagala, 10–11 Feb, Krombein et al. (USNM).

UVA PROVINCE. BADULLA DISTRICT: 1 ♀, Badulla, 15 Apr (Colombo); 1 ♂, Mahiyangana, 3 Sep, Davies et al. (USNM). **MONORAGALA DISTRICT:** 1 ♂, Gal Oya, 14 mi E of Bibile, 300 ft, 8 Mar, on sandy ground, Brinck et al. (Lund); 1 ♀, Bibile, 22 Jul (Colombo); 1 ♂, Nadungama, Welimada, 2 Sep, Gunawardane (Colombo); 1 ♂, Monoragala, 4–5 Sep, Davies et al. (USNM); 1 ♀, 1 ♂, along Mau-Aru, 13 mi E of Uda Walawe, on sand, 16 Jun, Krombein et al. (USNM).

SOUTHERN PROVINCE. GALLE DISTRICT: 1 ♂, Hikkaduwa, 22 Feb, Petersen (Copenhagen); 1 ♀, 1 ♂, Hini-duma, 19–26 Feb (Colombo); 1 ♀, Kottawa Forest Reserve, 11 Jan, Krombein et al. (USNM); 1 ♀, Kottawa, Dec (Colombo). **HAMBANTOTA DISTRICT:** 1 ♀, 17 ♂, Palatupana, Yala, 8–10 Mar 72, Krombein et al. (USNM); 1 ♀, Tissamaharama, 29 Jul (Colombo); 1 ♀, Talgasmankada, Yala, 21 Mar (Colombo).

MISCELLANEOUS. 4 ♀, 2 ♂, Ceylon, Ferrière (Geneva); 1 ♀, Dec, no locality label (Colombo); 4 ♀, 2 ♂, no label or label illegible (Colombo); 1 ♂, no label (USNM).

5. *Micromeriella marginella marginella* (Klug)

FIGURE 12

Scolia marginella Klug, 1810:214 [♂; India, Orient; type in Berlin].

Elis (Campsomeris) hirsuta Saussure, 1858:234 [♀; Tranquebar; type in Copenhagen?]

Campsomeris (Campsomeris) marginella marginella (Klug).—Betrem, 1928:135 [♀, ♂; Ceylon, India].

Campsomeris (Campsomeriella) marginella marginella (Klug).—Betrem, 1941:90 [Ceylon, India].

Campsomeris (Micromeris) marginella marginella (Klug).—Bradley and Betrem, 1968:329–330 [note on holotype].

Micromeriella marginella (Klug).—Betrem, 1972 (1971): 119.

Micromeriella marginella marginella (Klug).—Bradley, 1974:443 [synonym of *hirsuta* with typical *marginella*].

REMARKS.—*Micromeriella marginella* is a widely distributed, polytypic species ranging from the Indian subcontinent eastward in the East Indies to the Moluccas and northward to the Philippines and Taiwan. The typical subspecies *M. m. marginella* is restricted to the Indian subcontinent. In Sri Lanka it occurs at low altitudes chiefly in the Dry Zone or in areas of moderate rainfall. It may be present in rather large numbers in certain localities.

It is the smallest of the Ceylonese Campsomerinae. In addition to its size, the female is characterized by the clear wings with yellowish anterior margin, and the sparse, all white vestiture except on last two abdominal segments. The male is distinguished by its small size, presence of narrow, pale yellow bands at apices of first five abdominal terga and by the slender, evenly curved parameres of the genitalia.

In the male the clypeal spot varies in size; the scutellum and postscutellum are rarely entirely black; rarely are yellow bands present on only first four terga. Occasionally, as in two very small males from Palatupana, the very narrow bands on second and third terga are slightly widened in the middle instead of being narrowed.

FEMALE.—Length 9–15 mm. Integument black. Vestiture white, relatively sparse except apical fringes on abdominal segments, fifth and sixth segments with black setae; tomentum silvery, sparse, present only on side of thorax. Wings hyaline, anterior margin of forewing yellowish in cells.

MALE.—Length 5–13 mm. Integument black, abdomen with faint blue reflections on black areas, flagellum beneath occasionally reddish, the following lemon yellow to cream: clypeus except median blotch, dorsum of pronotum, usually a stripe across middle of scutellum, usually a narrower band on postscutellum, small stripe on apical half of all femora, outer surface of all tibiae, upper surface of fore tarsus, mid basitarsus, first five terga with apical bands rarely lacking on fourth, that of first emarginate anteriorly in middle and covering apical half or a bit more of dorsal surface, those of second and third emarginate anteriorly in middle except in very small specimens and covering apical half of segments, those of fourth and

fifth progressively narrower and not emarginate anteriorly, second to fourth sterna with narrow apical bands, that of fourth occasionally interrupted at midline or entirely lacking. Erect vestiture glittering white, moderately sparse, black on last two abdominal segments; tomentum silvery, relatively sparse on head, side of thorax, and all of propodeum. Wings hyaline, anterior margin of forewing somewhat infumated, with faint yellowish reflections. Genitalia as figured (Figure 12).

SPECIMENS EXAMINED.—NORTHERN PROVINCE. JAFFNA DISTRICT: 2♂, Mandativu Island, 23 Oct, Krombein et al. (USNM); 1♀, 2♂, Elephant Pass, 2 Jan, 23 Oct, Krombein et al. (USNM, Colombo). VAVUNIYA DISTRICT: 2♀, 2♂, Kokkilai, Wickwar (Colombo). MANNAR DISTRICT: 1♀, 2♂, ½ mi NE of Kokmotte Bungalow, Wilpattu Natl. Park, 21–25 May, 1♂ in Malaise trap, Krombein et al. (USNM).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 1♀, 3♂, Trincomalee, Humbert (Geneva; ♀ determined as *E. hirsuta*, ♂♂ as *M. m. marginella*); 1♂, Kuchchaveli, 20 mi NW of Trincomalee, 9–10 Feb, swept from dry grassland, Brinck et al. (Lund); 1♂, Irrakkandi, 15 May, Krombein et al. (USNM). BATTICALOA DISTRICT: 1♂, Punani, Maduru Oya, 500 ft, 9–14 June, Karunaratne (Ottawa). AMPARAI DISTRICT: 1♂, Inginiyagala, Kondawattuan Tank, 2 Jun, Messersmith et al. (USNM).

CENTRAL PROVINCE. KANDY DISTRICT: 2♀, 4♂, Udawattakele, Kandy, 16–31 Aug, 1–17 and 20–27 Sep, Karunaratne (USNM).

NORTH WESTERN PROVINCE. KURUNEGALA DISTRICT: 1♀, Kurunegala, Badagamuwa Jungle, 24–27 Jan, Krombein et al. (USNM); 3♂, Arukallu, Eluamkulam, 1–20 Mar, Karunaratne (Ottawa).

WESTERN DISTRICT. COLOMBO DISTRICT: 40♀, 33♂, Colombo (includes Museum Gardens, Victoria Park), 28–31 Jan, 5 and 7–14 Feb, 11 Mar, Apr, May, 24 and 26 Jun, 5, 6, 12 and 28 Jul, 7, 16, 19, 20 and 27 Aug, 2, 5, and 7 Sep, 5 and 16 Oct, 2, 17, 23 and 24 Nov, 1 Dec, Karunaratne, Krombein et al., Wickwar (USNM, Colombo, Ottawa); 6♀, Katunayaka, 30 Sep, Karunaratne (USNM); 1♀, 2♂, Papiliyana, Nugegoda, 5 Jul, 5 Sep, 24 Nov, Karunaratne (USNM, Ottawa); 29♂, Ratmalana (locality includes Zoo Farm near airport; also specimens swept from dry vegetation on sandy beach), 19–21 Jan, 15 Feb, 6, 7–13 Jun, 29 Sep, Brinck et al., Karunaratne, Krombein et al. (USNM, Lund); 1♂, Kohuwala, 4 Oct, Karunaratne (Ottawa).

SOUTHERN PROVINCE. GALLE DISTRICT: 1♀, 2♂, Hikkaduwa, 11 mi NW of Galle, 25 Jan, 22 Feb, Brinck et al., Petersen (Copenhagen, Lund). HAMBANTOTA DISTRICT: 6♀, 17♂, Palatupana, Yala, 8–10 Mar, 22 Oct, Keiser, Krombein et al. (USNM, Basel).

MISCELLANEOUS. 4♀, 2♂, no locality label or data illegible (Colombo).

6. *Megacampsomeris ceylonica ceylonica* (Kirby),
new combination

FIGURE 11

Campsomeris ceylonica Kirby, 1889:452 [♂, Kandy, Ceylon, holotype in British Museum; ♀ misidentified and renamed *P. phalerata turneri* Betrem].

Scolia (Dielis) lindenii ceylonica (Kirby).—Turner, 1911b: 623 [♂ holotype reassigned].

Campsomeris (Megacampsomeris) ceylonica Kirby.—Betrem, 1928:149–150 [assigned to Group II, *S. lindenii*, Ceylon localities].—Betrem, 1941:72 [assigned to geographic genus of *formosensis*].

Campsomeris ceylonica Kirby.—Guiglia, 1965:317 [Ceylon localities].

REMARKS.—Betrem (1928) redescribed *C. ceylonica* from several localities in Ceylon. He also described a new subspecies, *C. c. mentaweiensis*, from Sipora on Mentawai Island and Siberut Island.

Typical *M. c. ceylonica* and *Phalerimeris phalerata turneri* (Betrem) are distinct among Ceylonese campsomerines in that females have red legs and an abundance of golden reddish or reddish vestiture on the entire body. Females of *M. c. ceylonica* lack the yellow bands on the abdomen and the subapical dark mark in the forewing is more diffuse toward the apex. Males of *M. c. ceylonica* are recognizable immediately as being the only campsomerine male with red legs, an abundance of reddish vestiture on the entire body, and golden rather than silvery tomentum on the head and thorax.

This taxon seems to be confined to forested areas of moderate to heavy rainfall at higher elevations. Detailed records suggest that it probably breeds throughout the year in the Kandy area. I noted a female (12077 A) at 10:40 AM in the Udawattakele Jungle crawling under leaf litter at the base of a tree. Upon removing the leaves, I found her burrowing rapidly into the soft soil.

FEMALE.—Length 19–24 mm. Integument black, mandible, apex of clypeus, scape, tegula, legs except coxae red. Vestiture light red; tomentum on back and side of head, and on side of thorax dense, golden. Wings yellowish-hyaline, forewing beyond marginal cell with a large, diffuse infumated area, effulgence weak golden.

MALE.—Length 14–20 mm. Integument black, tegula and legs red except coxae black and fore femur beneath and fore tibia outwardly with yellow streak, the following yellowish to orange: mandible except

tip, clypeus except small subapical dark mark, inner eye margin to ocular sinus, small anterior spot on scapula, narrow bands at apices of first four terga and small, transverse posterolateral mark on second to fourth sterna. Erect vestiture on head, thorax, legs, and abdomen light red; tomentum on head, thorax, and propodeum golden, quite dense on side of thorax and entire propodeum. Genitalia as figured (Figure 11).

SPECIMENS EXAMINED.—CENTRAL PROVINCE. MA-TALE DISTRICT: 1♀, Mousakande, Gammaduwa, 6 Nov (Colombo). KANDY DISTRICT: 5♀, 43♂, Kandy (includes Udawattakele, Lady Horton's Drive, Roseneath, Reservoir Jungle), 20 Jan, 4 Feb, 26–30 Mar, 14–20 and 29–30 Apr, 29–30 May, Sep, 18 and 27–28 Oct, 1 and 22 Nov, Karunaratne et al., Keiser, Krombein et al., Wickwar (USNM, Colombo, Basel); 1♀, 2♂, Peradeniya (includes Experiment Sta, upper Hantane Hill at 2300 ft), 12–16 Jan, 15 Aug, 4 Nov, Davis et al., Keiser (USNM, Basel); 1♂, Laksapana, 1200 ft, 23–29 Sep, Flint et al. (USNM); 1♀, 2.5 mi NE of Laksapana, 2700 ft, 26 Sep, Flint et al. (USNM); 8♀, 1♂, Kabaragala, Nillomalai, 22–23 Mar, Karunaratne et al. (USNM); 3♀, 3♂, Maskeliya, 2 Jan, Apr, 20 Jun (Colombo); 5♀, 5♂, Woodside Plantation, Urugalla, 2, 5, 14, 15, 28 and 29 Apr, Henry (Colombo). NUWARA ELIYA DISTRICT: 3♀, Nuwara Eliya, 9 Jan, 16, 27–29 May, Messersmith et al. (USNM, Colombo); 1♀, Kanda-ela Reservoir, 5.6 mi SW of Nuwara Eliya, 6200 ft, 10–21 Feb, Davis et al. (USNM); 4♂, Hakgala Botanical Gardens, 6000 ft, 6–8 Oct, Hevel et al. (USNM); 5♂, Menickwalla Ela, 4 mi NW of Hatton, 18 Mar, swept from vegetation along stream in tea plantation, Brinck et al. (Lund); 3♀, Hakgala, Feb, 6 May, 15 Jul (Colombo); 1♀, Pundaluoya, Oct (Colombo); 1♂, Horton Plains (Ohiya), 18 Apr (Colombo); 1♂, Katmalae, 26 Apr (Colombo).

WESTERN PROVINCE. COLOMBO DISTRICT: 1♀, Labugama, 15 Sep (Colombo).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 1♂, Deerwood, Kuruwita, 6 mi NNW of Ratnapura, 18–21 Feb, in ravine with small stream, Brinck et al. (Lund); 1♂, Miyanapalawa, 21–26 Feb (Colombo); 1♂, Sinharaja Jungle, 3 mi S of Weddagala, 10–11 Feb, Krombein et al. (USNM); 1♀, Gilimale, 17–18 May, Wood et al. (USNM); 1♂, Balangoda, Jan (Colombo); 5♂, Bulutota, May (Colombo); 1♂, near Kurawita, trail to Batalomba Cave, 24 Oct, Hevel et al. (USNM).

UVA PROVINCE. BADULLA DISTRICT: 1♀, 1♂, West Haputale (Ohiya), 6000 ft, 29 May, 2–7 Aug (Colombo).

SOUTHERN PROVINCE. GALLE DISTRICT: 8♀, 3♂, Udugama, Kanneliya Jungle, 400 ft, 11–16 Jan, 18 Feb, 6–12 Oct, 3–13 Nov, Krombein et al. (USNM, Colombo); 1♂, Kottawa Forest, 23 Oct, Robinson et al. (USNM); 1♂, Haycock Mt, 21 mi NNE of Galle, 1200 ft, 29 Jan, swept from vegetation along small stream, Brinck et al. (Lund).

MISCELLANEOUS. 2♂, Ceylonia (Copenhagen; Mus. Drows.); 1♀, 2♂, no data, Apr (Colombo).

7. *Megacampsomeris vanoordti* (Betrem),
new combination

FIGURE 10

Campsomeris (*Megacampsomeris*) *vanoordti* Betrem, 1928:
158 [♀; Trincomalee; type in Leiden].

REMARKS.—This rarest of Ceylonese campsomerines is known from seven specimens, all from Dry Zone localities in the northern quarter of the island. This essentially northern distribution suggests the possibility that it may be found eventually in South India. It is the only Ceylonese campsomerine in which both the integument and vestiture are entirely black.

FEMALE.—Length 26–29 mm. Integument and vestiture completely black, abdomen with very faint blue reflections. Wings dark brown, effulgence dark blue.

MALE.—Length 20–22 mm. Integument and vestiture entirely black, abdomen with faint blue reflections. Wings lighter brown than in female, effulgence light golden. Genitalia as figured (Figure 10).

SPECIMENS EXAMINED.—NORTHERN PROVINCE. JAFFNA DISTRICT: 1♀, Kilinochchi, 80 ft, 25–26 Jan, Krombein et al. (USNM).

NORTH CENTRAL PROVINCE. POLONNARUWA DISTRICT: 1♀, Diyabeduma, Konduruwawa, 17 Jan, Karunaratne (Colombo).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 3♂, Trincomalee, Nov, Wickwar (Colombo).

MISCELLANEOUS. 1♂, no label (Colombo).

Subfamily SCOLIINAE

Betrem (1928:160 et seq.) assigned all of the Indo-Australian Scoliinae to the genus *Scolia*, dividing it into eight subgenera, five of which were known to occur in Sri Lanka. These were *Liacos* Guérin, *Austroscolia* Betrem, *Diliacos* Saussure and Sichel, *Triscolia* Saussure and Sichel, and *Scolia* Fabricius sensu stricto. The first four taxa are now recognized as having generic status, although the name *Triscolia* was restricted to species occurring in North America (Betrem and Bradley, 1964a:435) and was replaced by *Megascolia* Betrem for the Oriental species.

All of the Ceylonese species belonging to the subgenus *Scolia* sensu Betrem (1928) were assigned by Betrem and Bradley (1964b:92–94) to the subgenus *Discolia* Saussure. These constitute quite a diverse assemblage of genus-level taxa, and it is certain that the Ceylonese species should be assigned to several

subgenera. These may or may not be equivalent to some or all of the species groups recognized by Betrem. Such assignments to new subgenera, however, should be based on a comparative study of the entire Oriental fauna rather than on the minuscule representation occurring in Sri Lanka. Accordingly, I am retaining all of the Ceylonese *Scolia* species in the subgenus *Discolia* and assigning them to the species groups recognized by Betrem (1928).

Specific identification of Ceylonese Scoliinae is a problem only in some of the mostly black species of *Scolia* that are superficially quite similar in appearance. The problem of identification is made more complex in these particular species because males that normally have light red spots on the abdomen may rarely have an all black phase, or those that are normally entirely black may have a rare color phase in which the abdomen bears one or two pairs of tiny yellow spots. Careful attention to differentiating characters in the foregoing key and to the detailed descriptions should resolve many difficulties, but male genitalia may have to be extracted for study to assign particularly puzzling specimens to the proper taxa.

The Ceylonese taxa of *Scolia* are assigned to the following species groups recognized by Betrem (1928) or modified by him (1941) or by me.

- Group of *Scolia maura* Fabricius—*S. cyanipennis* Fabricius
- Group of *Scolia sauteri* Betrem—*S. affinis* Guérin
- Group of *Scolia vollenhoveni* Saussure—*S. vollenhoveni wickwari*, new subspecies
- Group of *Scolia bilunata* Saussure—*S. trivandrumensis* Betrem, *S. aureipenniformis* Betrem
- Group of *Scolia quadripustulata* Fabricius, new name (= group of *Scolia obscuropunctata* Betrem)—*S. quadripustulata* Fabricius
- Group of *Scolia sexpustulata* Klug—*S. fasciatopunctata* Guérin
- Group of *Scolia binotata* Fabricius, new name (= group of *Scolia quadripustulata* Fabricius, sensu Betrem, 1928)—*S. b. binotata* Fabricius, *S. karunaratnei*, new species, *S. keiseri*, new species, *S. gunawardanae*, new species
- Group of *Scolia erythrocephala* Fabricius—*S. picteti* Saussure, *S. ceylonicola* Betrem

8. *Liacos erythrosoma cruzi*, new subspecies

FIGURE 19

REMARKS.—This rare scoliid has been collected in three areas of light to moderate rainfall, and at rather low altitudes (350–1600 ft). It is the only taxon of

Liacos that occurs in Sri Lanka. In color patterns of the abdomen it most closely resembles *L. e. fulvopicta* (Cameron) from Barrackpore and Andaman Islands, but that taxon has the third to sixth (seventh in male) abdominal segments yellowish and with golden hair, whereas they are red and clothed with fiery red hair in *L. e. cruszi*.

I take pleasure in naming this subspecies for Professor Hilary Cruz, head, Department of Zoology, University of Sri Lanka at Peradeniya, who has been most helpful in forwarding Smithsonian scientific projects in his country.

It seems probable that *L. e. cruszi* occurs only in Sri Lanka and not in South India also. I have in my collection a South Indian female from Walayar Forests, South Malabar, 1000 ft, August 1956, P. S. Nathan. It has much more red on the abdomen and golden reflections on the wings, so that it agrees much more closely with typical *L. erythrosoma* (Burmeister). It may represent still another undescribed subspecies for Betrem (1928:168) restricts the range of typical *L. erythrosoma* to Sumatra, Siberut, and Borneo.

HOLOTYPE.—♀, Sri Lanka, Sabaragamuwa Province, Ratnapura District, Uggalkaltota, irrigation bungalow, 350 ft, 31 January–8 February, 1970, D. R. Davis and W. H. Rowe (USNM Type 75717).

FEMALE.—Length 20 mm. Black, the following ferruginous: a pair of elongate spots on second abdominal tergum, third to sixth terga, sides of third sternum and all of fourth to sixth sterna. Vestiture black, fiery red on third to sixth abdominal segments. Wings dark brown with violaceous reflections, anterior edge of forewing darker.

Clypeus impunctate in middle, with scattered punctures laterally and denser ones along apical margin; laminae frontales narrow and raised, margined on spatium frontale by a strip of close punctures; fissura frontalis weakly impressed, extending to anterior ocellus; front with a few scattered punctures; a weak groove behind ocelli; vertex impunctate; occiput with small punctures separated by two or more times the diameter of a puncture.

Scapulae moderately punctate, most punctures separated by the diameter of a puncture or more; scutum with a large quadrate impunctate area on posterior two-thirds about one-third width of sclerite, with moderate scattered punctures anteriorly and laterally; scutellum with punctures separated by about their diameter, median groove weak, apparently com-

plete but obscured in part by pin; postscutellum with more scattered punctures especially posteriorly; produced upper part of mesopleuron smooth in middle, punctate above and below, lower part of sclerite with punctures separated by about half the diameter of a puncture; upper plate of metapleuron smooth except for narrow punctate area above; median area of dorsal propodeum with finer, sparser punctures anteriorly, becoming coarser and closer posteriorly; lateral horizontal area with an impunctate area anterolaterally, elsewhere with punctation pattern as on median area; lateral area with scattered small punctures; posterior surface with subcontiguous punctures that are coarser on median area.

First tergum with a weak median keel on anterior half of dorsal surface; third to fifth terga with small, dense punctures on apical half or two-thirds; second sternum with a strong median tubercle anteriorly.

ALLOTYPE.—♂, Sri Lanka, Central Province, Kandy District, Kandy, September 1909, O. S. Wickwar (Colombo).

Length 22 mm. Colored as in female but second tergum all black and seventh segment ferruginous. Vestiture as in female. Wings as in female but with coppery reflections.

Clypeus with scattered punctures; spatium frontale with contiguous punctures; fissura frontalis deep, not extending onto front; front and ocellar area with scattered punctures; postocellar groove lacking; vertex with fine, very scattered punctures; occiput with fine closer punctures.

Scapulae and scutum with somewhat scattered, small punctures, latter with a smaller smooth area than in female; scutellum with sparser punctation than in female, with complete, shallow median groove; scutellum and mesopleuron correspondingly more sparsely and finely punctate than in female; metapleuron similarly punctate; propodeum as in female but punctation a bit sparser.

First tergum with a weak median keel on anterior third of dorsum; punctation on posterior terga not so crowded as in female; second sternum with a strong median tubercle anteriorly. Genitalia as figured (Figure 19).

PARATYPE.—1 ♂, same data as allotype (USNM); 1 ♂, Northern Province, Vavuniya District, Nedun-keni, April 1904 (Colombo). The paratypes are 17 and 20 mm long; the male from Kandy has a pair of

small, rounded, posterolateral ferruginous spots on second sternum.

**9. *Megascolia (Regiscolia) azurea michae*
(Betrem)**

FIGURE 16

Triscolia philippinensis erratica Micha, 1927:124 [♂; Ceylon; lectotype in Berlin Museum].

Scolia (Triscolia) azurea michae Betrem, 1928:226, 233 [new name for *T. philippinensis erratica*, a secondary homonym in *Scolia*; misspelled *michae* on p. 226].—Guiglia, 1965:323-324 [misspelled *michae*].

Megascolia (Regiscolia) azurea azurea f. *rubiginosa* (Fabricius).—Bradley, 1972:8-9 [lectotype designation for *T. p. erratica*].

REMARKS.—This is the largest and one of the most common taxa of Ceylonese Scoliinae. It occurs only in Sri Lanka, where it is widely distributed at lower altitudes from the xeric to the wettest zones. Collection dates in the Kandy District and in the Sinharaja Jungle suggest that *M. a. michae* may breed throughout the year, at least in areas of greater rainfall.

Betrem and Bradley (1964a: 444) erroneously listed *Triscolia philippinensis erratica* Micha as a synonym of *Megascolia (Regiscolia) azurea hindostana* (Micha). The latter taxon from South India has the clypeus and abdominal integument entirely black.

FEMALE.—Length 27-33 mm. Black, the following light reddish yellow: head except apex of clypeus, a pair of large rounded spots on third tergum and most of fourth and fifth terga. Vestiture black except fiery red on third to sixth terga and sides of third to fifth sterna. Wings dark brown, anterior area of forewing darker, with blue reflections.

Clypeus rather flat, apex broadly rounded, a subapical strip of dense, small punctures, lateral areas with close, larger punctures, center of disk smooth; area frontalis with subcontiguous punctures; spatium frontale densely punctate below, laminae frontales strongly raised, relatively narrow; fissura frontalis well developed halfway to anterior ocellus; front with quite scattered, small punctures, none in ocular sinus; anterior ocellus in a very shallow pit, a very weak groove behind posterior ocelli; vertex very sparsely punctate; occiput impunctate.

Scapula with dense, small punctures except area adjacent to tegula with only a few scattered punctures; scutum anteriorly with short median groove,

median third impunctate except for extreme anterior margin, area between this space and parapsidal furrow with scattered punctures, laterad of parapsidal furrow with many subcontiguous punctures; scutellum with moderate-sized punctures, which anteriorly are separated by about the width of a puncture and which become progressively sparser posteriorly; postscutellum with a narrow, median impunctate strip, laterad of this with subcontiguous small punctures; mesopleuron with small, mostly contiguous punctures except a narrow posterior strip with quite scattered punctures; metapleuron with small contiguous punctures except lower third of upper and upper third of lower plates impunctate; propodeal dorsum with contiguous punctures of same size as those on postscutellum; lateral area with much sparser punctures except adjacent to dorsal and posterior surfaces; median section of posterior surface with punctures on most of area separated by two or more times the diameter of a puncture, closer only adjacent to dorsal surface; lateral area of posterior surface mostly with subcontiguous punctures; forewing with three submarginal cells and one recurrent nervure.

First tergum with a well-developed median tubercle on horizontal surface, the latter with dense small punctures except immediately behind tubercle; anterior fourth of second tergum with small punctures separated by once or twice the diameter of puncture, middle half with very scattered, larger punctures, posterior fourth with subcontiguous small punctures; extreme base of third tergum with scattered punctures, median area smooth, posterior third on sides with subcontiguous punctures, the punctate area becoming very narrow toward midline; fourth and fifth terga with subcontiguous punctures except for a smooth basal area with arcuate posterior margin.

MALE.—Length 19-30 mm. Coloration as in female except clypeus entirely reddish yellow as is sixth tergum and lateral spots on third or fourth to sixth or seventh sterna. Vestiture also as in female except head with yellowish hair, third tergum with fiery red hair on light spots only, fourth to seventh terga entirely and sides of third or fourth to sixth sterna also fiery red. Wing color and refulgence as in female.

Clypeus subcontiguously punctate on upper half, sides, and a narrow subapical strip, elsewhere with more scattered punctures; area frontalis and spatium frontale with small contiguous punctures; fissura frontalis absent; a small area impunctate on front as

wide as ocellar triangle, elsewhere with punctures separated by interspaces ranging from the diameter of a puncture to half of that distance; anterior ocellus in a shallow pit, a very shallow groove behind posterior ocelli; most vertexal punctures separated by diameter of a puncture.

Pronotum with fine subcontiguous punctures; scutum with larger somewhat more separated punctures, a small transversely rectangular smooth area in middle; scutellum with subcontiguous punctures of same size as on scutum, a narrow rounded posterior area smooth; postscutellum similarly punctate except for a narrow, smooth median strip; mesopleuron with small, mostly subcontiguous punctures; metapleuron similarly punctate except for narrow impunctate strips on lower part of upper and upper part of lower plates; propodeal dorsum with contiguous to subcontiguous punctures a bit larger than on postscutellum; lateral propodeal surface densely punctate only adjacent to dorsal and posterior surfaces; median section of posterior surface closely punctate adjacent to dorsal surface, with more scattered punctures elsewhere; lateral posterior surface with subcontiguous punctures; forewing with three submarginal cells and one recurrent nervure except that occasionally the stub of a second recurrent may be present.

First tergum with strong median tubercle at base of horizontal surface, rest of surface with small, contiguous punctures; second tergum similarly punctate; third tergum more sparsely punctate on anterior two-thirds, contiguously punctate elsewhere as are fourth through sixth terga; genitalia as figured (Figure 16).

SPECIMENS EXAMINED.—NORTHERN PROVINCE. JAFFNA DISTRICT: 1♂, Elephant Pass, 28 Jan, Keiser (Basel). VAVUNIYA DISTRICT: 1♀, Olumadu, Dec (Colombo; misspelled "Olumaou" on label).

NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 1♀, 10♂, Padaviya tank, 180 ft, 18–19 May, 2–8 Nov, Flint et al., Krombein et al. (USNM); 1♀, Padaviya, Archeological site, 20 May, Krombein et al. (USNM).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 1♂, Trincomalee, Humbert (Geneva); 1♂, Kantalai, 2–18 Aug, Gunawardane (Colombo); 1♂, Tennamaravadi, 18 May, K. V. Krombein et al. (USNM). AMPARAI DISTRICT: 1♂, Lahugala Tank, 28–30 Dec, Karunaratne (USNM); 1♂, Ekgal Aru Reservoir Jungle, 19–22 Feb, Krombein et al. (USNM).

CENTRAL PROVINCE. MATALE DISTRICT: 1♂, Dambulla, 26 Dec, Keiser (Basel); 1♀, Puakkpitiya, Gammaduwa, 23 Nov, Henry (Colombo). KANDY DISTRICT: 1♂, Hantane, 14 Dec, Henry (Colombo; holotype); 1♂, Madugoda, 24 Nov, Keiser (Basel); 1♂, Maskeliya, May,

Henry (Colombo; paratype); 2♀, 4♂, Kandy (includes Udawattakele) 7 Jan, 1–17 and 20–27 Sep, Henry, Karunaratne (Colombo, ♀ paratype; USNM); 3♀, Woodside Plantation, Urugalla, Apr, Sep, Nov, Henry (Colombo; allotype, 1 paratype).

NORTH WESTERN PROVINCE. PUTTALAM DISTRICT: 1♀, 2♂, Eluamkulam, 15 mi N of Puttalam, 1–5 Mar, Karunaratne (Colombo). KURUNEGALA DISTRICT: 1♀, 2♂, Kurunegala (includes Badagamuwa Jungle, Elephant Rock or Athugala), 24–27 Jan, Krombein et al. (USNM).

WESTERN PROVINCE. COLOMBO DISTRICT: 1♀, Papi-liyana, 21 Sep, Karunaratne (USNM); 3♂, Colombo, Nov (Colombo); 2♂, Labugama Reservoir Jungle, 16 Feb, Krombein et al. (USNM). KALUTARA DISTRICT: 2♀, 15♂, Morapitiya near Agalawatta, 27–28 May, 13–14 Oct, Hevel et al., Wood et al. (USNM).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 1♀, 1♂, Balangoda District, 16–18 Jul, (Colombo); 1♂, Ratnapura, 20 Dec (Colombo); 3♀, Gilimale, 17–18 May, 19–22 Jun, 6 Oct, Davies et al., Krombein et al., Wood et al. (USNM); 1♀, 27♂ Weddagala, Sinharaja Jungle, 10–11 Feb, 18–21 Jun, Krombein et al. (USNM).

UVA PROVINCE. BADULLA DISTRICT: 1♀, Haputale, Jul (Colombo); 2♂, Diyatalawa, Nov, (Colombo).

SOUTHERN PROVINCE. GALLE DISTRICT: 1♀, 4♂, Kanneliya Jungle, 400 ft., 11–16 Jan, 22–24 May, 6–12 Oct, Krombein et al., Wood et al., (USNM). MATARA DISTRICT: 1♀, Deniyaya, 20 Sep (Colombo).

MISCELLANEOUS. 2♂, Ceylon, Sarasin (Basel); 1♂, Ceyl. (Geneva); 1♂, Ceylan (Geneva); 1♀, Ceylonia (Copenhagen; from Mus. Drevs.); 1♀, no label (Colombo). 2♂, Ceylon, Nietner (lectotype and syntype of *T. p. erratica*; Berlin).

10. *Microscolia hydrocephala* (Micha)

FIGURE 20

Triscolia hydrocephala Micha, 1927:86 [♀; Ceylon; type in Berlin Museum].

Scolia (Microscolia) hydrocephala (Micha).—Betrem, 1928: 199, 203, fig. 29, no. 8 [♀, ♂; Ceylon, South India].—Guiglia, 1965:318 [♂, Dambulla, Ceylon].

Microscolia hydrocephala (Micha).—Betrem in Bradley, 1972:10 [Betrem gives this as proper combination; Bradley (1972:10) states that the taxon is var. "a" of Saussure and Sichel (1864:104) of *Scolia cyanipennis* Fabricius].

REMARKS.—The extremely coarse, deep punctation, especially on the mesopleuron, readily distinguishes this sole species of *Microscolia* from the other taxa of Ceylonese Scoliidae. *Microscolia hydrocephala* occurs only in Sri Lanka and South India in areas of moderate to heavy rainfall. The relatively few other species of the genus have a wide distribution in the Old World Tropics, occurring from northern Australia, the Solo-

mon Islands and New Guinea, through the Philippines and East Indies into east, west, and South Africa.

One East Indian species, *M. parastasiae* (Betrem), has been reared from the larva of a scarabaeid beetle in a fallen palm trunk. It seems probable that the other species of the genus may prey upon larvae in a similar ecological niche, for we collected two males of *M. hydrocephala* flying around the trunk of a fallen tree near Weddagala in the Sinharaja Jungle.

FEMALE.—Length 14–16 mm. Black, abdomen with dark blue reflections. Vestiture entirely black except front and vertex with scattered, short brown setae. Wings dark brown with dark reflections, anterior area of forewing darker than rest of membrane, refugence purplish blue.

Median area of clypeus with a few scattered punctures above and a submarginal row of close ones above the gently rounded apical margin, lateral margin narrowly and deeply emarginate adjacent to median lobe, lateral areas more closely punctate than median; area frontalis with small, shallow punctures, the interspaces ranging from subcontiguous to about the diameter of a puncture; spatium frontale with larger, deeper contiguous to subcontiguous punctures; laminae frontales narrow, raised, separated from spatium frontale by a row of contiguous punctures; fissura frontalis weak, linear, extending halfway to anterior ocellus; front and area laterad of ocelli with punctation about as on spatium frontale; anterior ocellus in a weak pit, punctate groove behind posterior ocelli; vertex with scattered, small shallow punctures; occiput with similar, closer punctures.

Scapula with deep, moderately large subcontiguous punctures; scutum with larger deep punctures and with a V-shaped impunctate area in middle; scutellum with close punctures along margins of raised area, more scattered punctures within area; postscutellum with denser discal punctation than scutellum; mesopleuron with very coarse, extremely deep punctures, so close that the interspaces are lamelliform; metapleuron with coarse contiguous punctures on upper half of upper plate and lower half of lower plate, the rest of sclerite smooth; median horizontal area of propodeum with coarse, deep, mostly contiguous punctures, lateral horizontal area smooth along inner margin, elsewhere subcontiguously punctate; lateral propodeum with smaller, more scattered punctures; median posterior area practically devoid of large

punctures, lateral posterior area subcontiguously punctate; forewing with three submarginal cells and one recurrent nervure.

First tergum with median anterior tubercle lacking or only very faintly indicated, anterior median discal area with large, shallow dimpled punctures, posteriorly with scattered small punctures, laterally with larger, subcontiguous punctures; second to fifth terga with scattered, very small punctures and an apical row of fine, close punctures; second sternum not tuberculate near base.

MALE.—Length 12–14 mm. Black, abdomen with purplish blue reflections. Vestiture cinereous on head, black elsewhere. Wings dark brown, anterior area of forewing darker, with purplish reflections beyond the cells and coppery in cellular areas.

Median area of clypeus with a few punctures, lateral area subcontiguously punctate; area frontalis with small subcontiguous punctures; spatium frontale coarsely and contiguously punctate; laminae frontales very narrow, raised; fissura frontalis narrow, extending halfway to anterior ocellus; front and area laterad of ocelli contiguously to subcontiguously punctate; each ocellus set in a small pit, posterior ocelli without posterior groove; vertex with finer punctures, interspaces half as wide to as wide as diameter of puncture.

Scapula with small, contiguous punctures; scutum with larger, deeper, more scattered punctures, with a smaller V-shaped impunctate area in middle; scutellum with more separated punctures than scutum; postscutellum with smaller punctures of about same density as scutellum; mesopleuron with very deep, large contiguous punctures not so close as in female; upper plate of metapleuron with subcontiguous punctures on upper third, lower plate with coarser punctures, which are contiguous on lower two-thirds, more scattered on upper third; propodeal punctation much as in female, except median area of posterior surface with more punctures on upper part.

First tergum with a small median tubercle at base of horizontal surface, basal area with large, confluent, dimpled punctures, laterally with subcontiguous, rounded punctures, posteriorly with more scattered, smaller punctures; first to sixth terga with apical row of close, fine punctures; second to fifth terga elsewhere with scattered, small, dimpled punctures; second sternum not tuberculate near base, genitalia as figured (Figure 20).

SPECIMENS EXAMINED. — NORTHERN PROVINCE.
VAVUNIYA DISTRICT: 1 ♀, Cheddikulam, 3–10 Aug, Karunaratne (Colombo).

NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 1 ♂, Mihintale, 7–9 Jul (Colombo).

CENTRAL PROVINCE. MATALE DISTRICT: 1 ♂, Dambulla, 21 Nov, Keiser (Basel).

WESTERN PROVINCE. COLOMBO DISTRICT: 1 ♀, 1 ♂, Papiliyana, 5 Jul and 21 Sep, Karunaratne (USNM).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 1 ♀, Balangoda, 14 Apr (Colombo; plesiotype, Betrem, 1928); 1 ♂, Ratnapura, 20 Dec (Colombo); 1 ♂, Belihuloya, 1 Sep. (Colombo); 1 ♀, 1 ♂, Gilimale, 17–22 Jun, ♂ in Malaise trap, Krombein et al. (USNM); 2 ♂, Weddagala, Sinharaja Jungle, 18–21 Jun, Krombein et al. (USNM).

UVA PROVINCE. MONORAGALA DISTRICT: 1 ♂, Wellawaya, Apr (Colombo).

SOUTHERN PROVINCE. GALLE DISTRICT: 1 ♀, 1 ♂, Kanneliya Jungle (includes Udugama), 400 ft, 11–16 Jan, 6–12 Oct, Krombein et al. (USNM).

MISCELLANEOUS. 1 ♂, no label (Colombo). 1 ♀, Ceylon, Nietner (Berlin; the holotype).

11. *Austroscolia ignota* (Betrem), new combination

FIGURE 17

Scolia (Austroscolia) ignota Betrem, 1928:220–221 [♀, ♂; Ceylon localities; type series in Colombo Museum].—Guiglia, 1965:319–320, fig. 1 [♀, ♂; Ceylon localities].

REMARKS.—So far as known this scoliid occurs only in Sri Lanka. Its relatively broad distribution at lower altitudes, however, suggests that it may be collected eventually in South India. Records from the Colombo area and from localities in North Central Province indicate that it may be on the wing a good part of the year. It occurs in both the Dry Zone and areas of moderate rainfall.

It is readily distinguished from *A. ruficeps henryi*, new subspecies, the only other Ceylonese *Austroscolia*, by the entirely black integument and presence of a tubercle at the base of the first abdominal tergum.

FEMALE.—Length 13–20 mm. Integument and vestiture entirely black, abdomen with moderate blue reflections. Wings very dark brown, forewing mostly with purplish reflections and some coppery, hind wing with coppery predominating.

Mandible with two small blunt teeth along inner margin near apex; raised median portion of clypeus impunctate, lateral area with subcontiguous moderately large punctures, apical margin weakly bisinuate, neither lateral nor median lobes well developed; fisura frontalis weak, spatium frontale subcontiguously

punctate, laminae frontales not raised; front with a patch of moderate sized, scattered to subcontiguous punctures between spatium frontale and anterior ocellus, lateral area impunctate; ocelli in weak pits, ocellar groove behind posterior pair; area behind groove impunctate, but scattered punctures laterad of this on vertex.

Scapulae, scutellum, and postscutellum with moderately small punctures, the density ranging from subcontiguous to punctures separated from each other by diameter of a puncture; scutum with more scattered punctures and a quadrate impunctate median space about one-fourth the width of scutum; mesopleuron with a horizontal area above, the upper part strongly produced posteriorly, surface with moderate-sized subcontiguous punctures; metapleuron with similar size and density of punctation except lower half of upper area with dense micropunctures only; propodeum with coarse, subcontiguous punctures except small impunctate areas anteriorly on lateral horizontal surface and below on median posterior surface.

First tergum with a short, median transverse ridge (=tubercle) anteriorly on horizontal surface.

MALE.—Length 10–17 mm. Integument and vestiture entirely black, abdomen with faint blue reflections. Wings dark brown, anterior half of forewing darker, with purplish and coppery reflections.

Punctation of head as in *A. ruficeps henryi*; ocelli not so deeply impressed as in that taxon; vertex also as in that taxon; flagellar segments shorter, about as long as broad.

Thoracic punctation very similar to that of *A. ruficeps henryi* except with a somewhat larger median area of scutum more sparsely punctate; dorsal and lateral surfaces of propodeum with coarse, subcontiguous punctures, posterior surface with similar punctation but punctures quite sparse on median area and on inner half of lateral areas; forewing with three submarginal cells.

First tergum with a short, narrow transverse ridge (=tubercle) anteriorly in middle, punctation on dorsal surface a bit sparser than in *A. ruficeps henryi*; succeeding terga with smaller, more scattered punctures than on first; genitalia as figured (Figure 17), apex of paramere truncate.

SPECIMENS EXAMINED. — NORTHERN PROVINCE.
JAFFNA DISTRICT: 1 ♂, Elephant Pass, Jan, Henry (Colombo; allotype). **MANNAR DISTRICT:** 1 ♂, Mannar, 29 Jan, Keiser (Basel).

NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 1 ♂, Padaviya, irrigation bungalow, 180 ft, 27 Feb-9 Mar, Davis et al. (USNM); 1 ♀, 2 ♂, Mihintale, 3-4 Dec, Keiser (Basel). POLONNARUWA DISTRICT: 1 ♀, Habarana, Nov (Colombo); 1 ♀, Diyabeduma, Kondurawawa, 17 Jan, Karunaratne (Colombo).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 1 ♂, Kantalai, 2-18 Aug, Gunawardane (Colombo).

CENTRAL PROVINCE. KANDY DISTRICT: 13 ♀, 5 ♂, Kandy (includes Lady Blake's Drive, Udawattakele), 14-20 Apr, 1-17, 8, 20-27 Sep, Karunaratne et al., Keiser (USNM, Basel).

NORTH WESTERN PROVINCE. PUTTALAM DISTRICT: 3 ♂, Puttalam, 2 Feb, Keiser (Basel). KURUNEGALA DISTRICT: 1 ♂, Ambanpola, 7 Dec, Keiser (Basel).

WESTERN PROVINCE. COLOMBO DISTRICT: 3 ♂, Colombo, Museum Gardens, 18 Mar, 11 Apr, Karunaratne (USNM); 18 ♀, 21 ♂, Nugedoda, Papiliyana, 16 Mar, 1, 3-4, and 17 May, Karunaratne (USNM); 2 ♂, Labugama, 11 Jun, 15 Sep (Colombo).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 7 ♂, Gilimale, Indurawa, 6 Oct, Karunaratne, (USNM).

SOUTHERN PROVINCE. GALLE DISTRICT: 1 ♀, Uduagama, 26 Aug (Colombo; holotype). HAMBANTOTA DISTRICT: 1 ♀, Palatupana, Yala, 8-10 Mar, Krombein et al. (USNM).

12. *Austroscolia ruficeps henryi*, new subspecies

FIGURE 18

Scolia (*Austroscolia*) *ruficeps* Smith.—Guiglia, 1965:318-319 [♂; Mihintale].

REMARKS.—This taxon is the only Ceylonese scoliid in which the head and antennae are entirely red and the thorax, abdomen, and legs entirely black. It is one of the rarest Ceylonese scoliids, being known from four specimens from three localities in areas of low to moderate rainfall and at altitudes ranging from near sea level to 1800 feet. *Austroscolia ignota* (Betrem) is the only other Ceylonese species of the genus; its integument is entirely black.

Austroscolia ruficeps (Smith) is a widely distributed, polytypic taxon. Betrem (in litt.) advised me that he recognizes nine subspecies ranging from India in the west through Southeast Asia and the East Indies to Flores Island and northward into China and the Philippine Islands. Discrimination of the various subspecies of *A. ruficeps* depends in part upon the coloration and reflection of the forewings of the females.

Females of the Ceylonese population agree with the population of *A. r. cupreoviolacea* (Micha) from the Andaman Islands in having the forewings predomi-

nantly purplish with some coppery reflections. The male from Mihintale has dark hair on the clypeus and the forewing with mixed purple and coppery reflections as in the males from the Andaman Islands. The Ceylonese population differs, however, from that occurring on the Andaman Islands in enough details so that it must be recognized as a tenth subspecies of *A. ruficeps*.

This rare taxon is named for G. M. Henry, Surrey, England, former entomologist and ornithologist at the Colombo Museum, and collector of many of the insects in that collection.

The female of *A. r. henryi* differs from *A. r. cupreoviolacea* in having the fissura frontalis well developed on spatium frontale (lacking in *cupreoviolacea*), in having more punctures on the upper part of front, in having relatively sparser punctuation on scutellum and postscutellum, and in the weaker tubercle on first abdominal tergum. The male of *A. r. henryi* has more separated punctures on the spatium frontale, scutellum, and postscutellum; the apex of the paramere is pointed instead of being narrowly truncate as in *A. r. cupreoviolacea* and the base of volsella has longer setae than in that subspecies.

HOLOTYPE.—♀, Sri Lanka, Eastern Province, Am-parai District, Lahugala, 15 June 1976, K. V. Krombein, P. B. and S. Karunaratne (USNM Type 75718).

FEMALE.—Length 20 mm. Head and antenna light red, rest of integument black, abdomen with very weak blue reflections. Erect vestiture reddish to brown on head, black elsewhere. Wings dark brown, anterior edge of forewing darker, wings mostly with purplish and a few coppery reflections.

Mandible with two small blunt teeth along inner margin near apex; raised median portion of clypeus impunctate, lateral area with a few scattered punctures, apical margin strongly bisinuate, lateral lobes well developed; fissura frontalis strong, spatium frontale with subcontiguous punctures, laminae frontales not raised; front with a patch of small scattered punctures in middle, impunctate laterally; anterior and lateral ocelli only slightly depressed anteriorly and laterally respectively, a strong groove behind posterior ocelli; vertex with punctures along ocellar groove and laterad of posterior ocelli, smooth elsewhere.

Scapulae, scutellum, postscutellum with moderate-sized subcontiguous punctures; scutum with punctures a bit larger, somewhat more separated, and with a quadrate impunctate area posteriorly about a third

the width of scutum; mesopleuron with a definite horizontal area above, the upper part strongly produced posteriorly, surface with coarse, deep, subcontiguous to contiguous punctures; metapleuron with similar punctation except lower part of upper area with only dense, fine micropunctures; propodeum with coarse subcontiguous punctures, except a small impunctate area anteriorly on lateral horizontal surface and the lowest third of median posterior area; forewing with three submarginal cells.

First tergum with a very weak, median anterior tubercle.

ALLOTYPE.—♂, Sri Lanka, North Central Province, Anuradhapura District, Mihintale, 6 December 1953, F. Keiser (Basel).

MALE.—Length 20 mm. Head and antenna light red, rest of integument black, the abdomen with some faint blue reflections. Erect vestiture dark except for a few interspersed light brown or golden hairs on front and vertex. Wings dark brown, anterior half of forewing darker, forewing with mixed purple and coppery reflections, hind wing with coppery reflections.

Clypeus convex, with sparse, small punctures in middle, more closely punctate laterally; area frontalis similarly punctate; spatium frontale closely and subcontiguously punctate and with a narrow shallow median groove; ocular sinus with close small punctures on lower half and sparser ones above, front with scattered small punctures on median area, impunctate toward ocular sinus; fore ocellus deeply depressed anteriorly, posterior ocelli less deeply depressed laterally; vertex not grooved behind ocelli, moderately closely punctate; flagellum with segments distinctly longer than broad.

Scapulae and scutum rather closely and shallowly punctate except for a small impunctate median area on latter; scutellum and postscutellum similarly punctate except latter narrowly impunctate along midline; mesopleuron above with a definite horizontal surface, the upper part strongly produced posteriorly, the surface with coarser, mostly subcontiguous punctures; upper plate of metapleuron with coarse subcontiguous punctures above and close micropunctures below, the lower plate with coarse subcontiguous punctures; entire propodeum with coarse, subcontiguous punctures; forewing with three submarginal cells.

First tergum without a median anterior tubercle, the horizontal surface with closer, larger punctures

than on succeeding terga; genitalia as figured (Figure 18), apex of paramere angulate.

PARATYPES.—2 ♀, Sri Lanka, Central Province, Kandy District, Kandy, September 1907 and September 1918, O. S. Wickwar (Colombo). These specimens agree very well in all details with the holotype; they are 19–21 mm long. One has been deposited in NMNH; Smithsonian Institution.

13. *Scolia (Discolia) cyanipennis* Fabricius

FIGURE 21

Scolia cyanipennis Fabricius, 1804:244 [♀; Tranquebar; type in Copenhagen Museum].

Scolia caerulans Lepeletier, 1845:526 [♂; Indes; type in Spinola coll., Turin].

Scolia (Scolia) cyanipennis Fabricius.—Betrem, 1928:263–264.

Scolia (Discolia) cyanipennis Fabricius.—Bradley, 1964a:12 [designation of lectotype].

Scolia (Discolia) caerulans Lepeletier.—Bradley, 1964b:188 [notes on holotype and synonymy under *S. cyanipennis*].

REMARKS.—This species occurs only in the Indian subcontinent, where it ranges northward from Sri Lanka to Sikkim and Kashmir. In Sri Lanka it appears to be largely restricted to areas of relatively low to moderate rainfall. It also appears to be rather uncommon, although occasionally, as at Nugegoda, it may be quite abundant locally.

The female is quite easily identified, for it is the only species of *Scolia* with the antenna, body, and vestiture entirely black. The male has these same characters, which distinguish it from the other males with an all black abdomen except for the rare abnormal specimens of *S. b. binotata* Fabricius, *S. fasciatopunctata* Guérin and *S. quadripustulata* Fabricius with all black abdomen. The male of *S. affinis* is separated from this color variant of the latter two species by having the antennal flagellum shorter and clavate toward the apex; it is separated from the rare black phase of typical *S. b. binotata* because of the white vestiture on head and part of the thorax of that taxon.

FEMALE.—Length 16–19 mm. Integument and vestiture entirely black, abdomen with faint blue reflections; wings uniformly dark brown with strong bluish reflections.

Apical margin of clypeus slightly rounded, median trapezoidal area raised, smooth, sides subcontiguously

punctate; area frontalis with confluent punctures; spatium frontale with punctures separated by about the diameter of a puncture except confluent adjacent to moderately broad, slightly raised laminae frontales; spatium frontale linear, absent below, extending halfway to anterior ocellus; front sparsely punctate except adjacent to ocelli; anterior ocellus in a shallow pit, a row of separated punctures but no groove behind posterior ocelli; vertex with only a few scattered punctures; occiput entirely subcontiguously and finely punctate.

Scapula subcontiguously punctate on anterior two-thirds, more sparsely so adjacent to tegula; scutum punctate on anterior half, subcontiguously so anteriorly and becoming more sparsely so posteriorly, the posterior half mostly smooth except for punctures adjacent to parapsidal furrow and narrowly along posterior margin; disk of scutellum with subcontiguous punctures along anterior margin and scattered ones elsewhere; mesopleuron contiguously punctate except narrowly on anterior margin and a broader area along posterior margin; upper metapleural plate with coarse contiguous punctures on upper two-thirds, smooth elsewhere, lower plate with smaller, more separated punctures except on narrow smooth areas above and posteriorly; dorsal propodeal surface with moderately coarse punctures separated by less than the diameter of a puncture except anterior third of lateral surface smooth.

First tergum with a weak median tubercle anteriorly on horizontal surface, elsewhere with fine punctures with interspersed larger punctures; succeeding terga very sparsely punctate on most of disk except finely and densely punctate posteriorly with some interspersed larger punctures; second sternum with a median tubercle at base; sterna with coarse, quite scattered punctures except posterolaterally where they are separated by less than the diameter of a puncture.

MALE.—Length 11–18 mm. Integument and vestiture black, abdomen with blue reflections; wings uniformly dark brown, refugence mostly purplish with some coppery lights.

Clypeus broadly smooth, a few punctures above and subcontiguously punctate on sides; area frontalis more sparsely punctate than the contiguously punctate spatium frontale; fissura frontalis well developed, extending to anterior ocellus, which is in a deep pit; flagellum clavate toward apex, apical segments as broad as long, straight in profile beneath.

Scapula with small punctures mostly separated from each other by one or less times the diameter of a puncture; scutum with punctures of same size and density anteriorly and along posterior margin, becoming sparser in middle posteriorly, where they are separated by several times the diameter of a puncture, a narrow, shallow, median groove on anterior third; scutellum with a shallow median groove, with slightly coarser, subcontiguous punctures except a narrow median posterior area smooth; disk of postscutellum with punctures of similar size and density; mesopleuron mostly with small, subcontiguous punctures on upper three-fourths, lower plate smooth on upper half, lower half with smaller punctures becoming denser toward venter; dorsal surface of propodeum with coarse, mostly subcontiguous punctures except anterior third of lateral section smooth; lateral propodeal surface with more scattered, somewhat smaller punctures; posterior propodeal surface with coarse punctures, median section with an irregular pattern varying from contiguous to separated by twice the diameter of a puncture, lateral section mostly subcontiguously punctate.

First tergum with small median tubercle anteriorly on horizontal section, remainder of surface with small, close punctures becoming increasingly dense toward apex and sides; succeeding terga with fine punctures that are sparse on basal half, increasing in density laterally and posteriorly; second sternum with anterior, median tubercle; sterna more coarsely and sparsely punctate than terga, the punctures increasing in density posterolaterally; genitalia (Figure 21) as figured.

SPECIMENS EXAMINED.—NORTH CENTRAL PROVINCE. POLONNARUWA DISTRICT: 1 ♀, 16 mi N of Habarana, 12 Jun, Wood et al. (USNM); 1 ♂, Habarana, Wickwar (Colombo).

CENTRAL PROVINCE. KANDY DISTRICT: 1 ♀, Mahaweli Ganga, 7 mi from Kandy, 450 m, 10 Feb, Mussard et al. (Geneva); 4 ♀, 1 ♂, Udawattakele, Kandy, 1–17 and 20–27 Sep, Karunaratne (USNM).

WESTERN PROVINCE. COLOMBO DISTRICT: 5 ♂, Colombo, Museum Garden, 8–14 Feb, 18 Mar, 2 and 24–28 Apr, Karunaratne, Krombein et al. (USNM); 26 ♀, 51 ♂, Papiliyana, Nugegoda, 16 Mar, 1, 3–4 and 17 May, 28–29 Jun, 5 July, 13 and 21 Sep, 8 Nov, Karunaratne (USNM); 3 ♂, Kohuwala, Nugegoda, 6 Jun, Krombein et al. (USNM); 1 ♂, Ratmalana near airport, 50 ft, 6 Jun, Krombein et al. (USNM).

UVA PROVINCE. BADULLA DISTRICT: 1 ♀, Badulla, 28 Dec (Colombo).

SOUTHERN PROVINCE. MATARA DISTRICT: 1 ♂,

Dondra, Sep (Colombo).

MISCELLANEOUS. 1 ♂, no locality (Colombo).

14. *Scolia (Discolia) affinis* Guérin

FIGURES 23, 34

Scolia affinis Guérin, 1838:254 [♀, ♂; Senegal; type series in Paris Museum].—Bradley, 1973:218 [designation of ♀ lectotype].

Scolia (Lacosi) jurinei Saussure, 1855:45 [♀, ♂; "Des Indes Orientales"; lectotype in Geneva Museum].

Scolia (Discolia) aureipennis Lepeletier.—Saussure and Sichel, 1864:109 [misidentification of *S. aureipennis* Lepeletier, *S. jurinei* synonym under it].

Scolia (Scolia) aureipennis Lepeletier.—Betrem, 1928:280–282 [misidentification of *S. aureipennis*; ranges from Southeast Asia through India to Ceylon].

Scolia (Discolia) jurinei Saussure.—Betrem and Bradley, 1964b:93 [new subgeneric assignment].—Guiglia, 1965:320 [Ceylon localities].

Scolia jurinei Saussure.—Bradley, 1974:446–447 [designation of ♂ lectotype; *S. jurinei* a synonym of *S. affinis* Guérin].

REMARKS.—For many years this taxon was misidentified as *S. aureipennis* Lepeletier. The complicated synonymy and misidentifications were clarified in several recent papers by Betrem and Bradley. Guérin's type was certainly mislabeled as having come from Senegal. True *S. affinis* ranges from Sri Lanka north through India and Bangladesh, and eastward into Southeast Asia.

A combination of the orange red antennal flagellum, black abdomen, and almost entirely smooth post-scutellum and propodeal dorsum readily distinguish the female from its congeners. The male has the flagellum orange red at least beneath, the abdomen black, the propodeal dorsum sparsely and shallowly punctate, and it is the only Ceylonese scoliid with capitate bristles on the apex of the volsella.

Several females have mud adhering to outer surface of one or more of the mid- and hind tibiae indicating that the prey of *S. affinis* is undoubtedly a subterranean scarabaeid larva.

Scolia affinis is often quite abundant. During 1976 S. Karunaratne collected in Udawattakele Sanctuary, Kandy, for the Smithsonian Insect Project from 5 July to 27 September. He collected 32 females and 10 males as follows: 5 ♂, 5–15 July; 1 ♂, 16–31 August; 23 ♀, 4 ♂, 1–17 September; and 9 ♀, 20–27 September. At this same locality and elsewhere in the Kandy area 13 females and 25 males were obtained by a number of collectors during January and May

through October. These data suggest that *S. affinis* may be active throughout the year in this locality, possibly attaining a peak population during September.

FEMALE.—Length 17–25 mm. Integument and vestiture black except antennal flagellum orange red; wings dark brown, anterior area of forewing somewhat darker, refulgence dark blue.

Clypeus with apical margin of median lobe quite rounded, a shallow emargination between median lobe and rounded margin of lateral lobe, trapezoidal median section raised, smooth, lateral area and narrow strip adjacent to anterior margin confluent punctate; area frontalis and spatium frontale with coarse, confluent punctures; laminae frontales relatively narrow, raised; fissura frontalis linear, moderately deep, extending two-thirds of distance to fore ocellus; front with coarse scattered punctures except in middle, where there are about a dozen subcontiguous punctures; fore ocellus in a shallow pit, hind ocelli margined behind by a shallow groove; vertex virtually smooth; occiput with fine, relatively dense punctures.

Scapula with coarse, confluent, dimpled punctures; scutum anteriorly and laterally with larger, confluent punctures, a transverse smooth area behind middle, coarse punctures elsewhere separated by the diameter of a puncture, a narrow, shallow groove on anterior third; disk of scutellum with only a few scattered, smaller punctures, and a barely discernible median groove on posterior half; postscutellum with even fewer, smaller scattered punctures; mesopleuron with relatively broad smooth strip along anterior and posterior margins, elsewhere with subcontiguous coarse punctures; upper metapleural plate with coarse subcontiguous punctures on upper half, smooth on lower half, lower plate smooth on upper third and with scattered small punctures on lower two-thirds; upper and posterior propodeal surfaces with very scattered tiny punctures; lateral propodeal surface with larger punctures separated by once to twice the diameter of a puncture.

First tergum with well-developed median tubercle anteriorly on horizontal surface, rest of disk with scattered small punctures except posterolaterally where they are subcontiguous; second sternum without basal tubercle.

MALE.—Length 13–21 mm. Integument and vestiture black, except flagellum light to dull red in vary-

ing degrees—sometimes entire flagellum is light red, sometimes dorsum of flagellum is chestnut and underside reddish, sometimes base and or apex of some segments infuscated, rest of segment red; wings dark brown, anterior part of forewing slightly darker, refulgence purplish occasionally with some coppery lights.

Clypeus with small, smooth median area above anterior margin, elsewhere mostly contiguously punctate; area frontalis and spatium frontale with small contiguous punctures; fissura frontalis well developed, extending to anterior ocellus; most punctures on front separated by diameter of a puncture; anterior ocellus in a deep pit, posterior ocelli margined by a weak groove; flagellum elongate (Figure 34), not clavate toward apex, most segments at least 1.5 times as long as broad.

Scapula with small punctures mostly separated by half the diameter of a puncture; scutal punctation slightly larger and more separated; scutellum similarly punctured; mesopleuron with small subcontiguous punctures except narrowly along anterior margin and more broadly below along posterior margin; upper two-thirds of upper metapleural plate with small, mostly subcontiguous punctures, lower third smooth, lower plate smooth on upper fourth, with very fine scattered punctures on rest of area; median area of horizontal propodeal surface with small, shallow punctures mostly separated by the diameter of a puncture, lateral area with punctures of same size but closer, subcontiguous, the anterior third to half smooth; lateral propodeal surface with punctures of same size, separated by at least the diameter of a puncture except adjacent to dorsal surface where they are subcontiguous; posterior propodeal surface with small punctures as on lateral surface, median area with more dispersed punctures than on lateral area.

First abdominal tergum with a small, median anterior tubercle, remainder of horizontal surface with small punctures separated by the diameter of a puncture or a bit less; succeeding terga similarly punctate; second sternum without a basal tubercle; genitalia as figured (Figure 23).

SPECIMENS EXAMINED. — **NORTHERN PROVINCE.** VAVUNIYA DISTRICT: 2♂, Mankulam, 1 Oct, Nov (Colombo); 1♂, Odduchudan, Wickwar (Colombo).

NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 2♀, 3♂, Anuradhapura, Nov, 5 and 15 Dec, Keiser (Colombo, Basel); 2♀, Mihintale, 4 Dec, Keiser (Basel); 1♂, Tambuttegama, 6 Dec, Keiser (Basel).

DISTRICT: 1♂, Polonnaruwa, 10 Feb, Brinck et al. (Lund); 2♀, 1♂, Mannampitiya, 24–26 Dec, Karunaratne (USNM); 1♂, Kingurakgoda, 20 Dec, Keiser (Basel).

EASTERN PROVINCE. AMPARAI DISTRICT: 3♀, 3♂, Inginiyagala (includes Samudra Gardens), 1 and 22–23 Nov, 1♂ in Malaise trap, Hevel et al., Keiser (USNM, Basel).

CENTRAL PROVINCE. MATALE DISTRICT: 1♀, Sigiriya, 3 Mar, Petersen (Copenhagen); 1♀, Dambulla, 21 Nov, Keiser (Basel). **KANDY DISTRICT:** 45♀, 35♂, Kandy (includes Lady Horton's Drive, Lady Blake's Drive, Udawat-takele, Roseneath, Deiyannewela, Hantana, Siyambalapatiya, Asgiriya, Peak View Motel, 1600–1800 ft, 15–24 Jan, 29–30 May, 11, 16 and 20 Jun, 5–15 and 20–30 Jul, 2–13, 10, 13, 16–31, 18–20, 23, and 26–29 Aug, 1–17 and 20–27 Sep, 17 Oct, Davies et al., Davis et al., Karunaratne et al., Keiser, Krombein et al., Wickwar (USNM, Colombo, Basel, Ottawa); 3♀, 1♂, Haragama, 15 Jan, 5 Nov, Keiser (Basel); 1♀, 5♂, Peradeniya, Experiment Sta, 5–15 Jun, 15 Aug, Keiser (Basel); 7♀, 15♂, Ganoruwa Timber Reserve, 4 and 12 Jun, Keiser, Krombein et al. (USNM, Basel); 1♀, Ambacotta, 15 Dec, Keiser (Basel); 1♀, Madugoda, 24 Nov, Keiser (Basel); 1♀, Gampola, 23 May, Keiser (Basel); 5♀, 2♂, Teldeniya, 13 Jan, 8 Sep, 16–19 Nov, Keiser (Basel); 8♂, Hasalaka, 500 ft, 17 Feb, 22–25 Nov, Flint et al., Krombein et al. (USNM); 2♂, Katugastota (includes Kahalla), 1600 ft, 21 and 31 Aug, Karunaratne (Ottawa); 1♂, Halgranoaya, Oct (Colombo). **NUWARA ELIYA DISTRICT:** 1♀, Pundaluoya (Colombo).

NORTH WESTERN PROVINCE. KURUNEGALA DISTRICT: 1♀, 2♂, Kurunegala near Elephant Rock, 27 Jan, Krombein et al., ♀ on flowers of *Tricalysia (Diplospora) dalzellii*, 2♂ on flowers of another plant (USNM).

WESTERN PROVINCE. COLOMBO DISTRICT: 1♂, Yongamulla, 3 mi E of Yakkala, 18 mi NE of Colombo, 8–25 Mar, insect trap in ravine in stream, Brinck et al. (Lund); 14♂, Colombo (includes Museum Gardens, Borella), 8–14 Feb, 18 Mar, 2 and 24–28 Apr, May, 4 and 20 Jul, 20 Aug, Karunaratne, Krombein et al., Wickwar (USNM, Colombo); 24♀, 60♂, Nugegoda, Papiliyana, 16 Mar, 1, 3–4 and 17 May, 28–29 Jun, 7 Jul, 13 and 21 Sep, Karunaratne (USNM); 2♀, 7♂, Nugegoda, Kohuwala, 6 Jun, Krombein et al. (USNM); 1♂, Mahara, Jul (Colombo); 3♀, 1♂, Ratmalana near airport, 50 ft, 6 Jun, 26 Nov, Hevel et al., Krombein et al. (USNM); 1♂ Battaramulla, 19 May (Colombo); 1♂, Kurana, Padukka, 200 ft, 21 Jul, Karunaratne (Ottawa); 24♂, Labugama Reservoir Jungle, 400 ft, 9 May, Krombein et al. (USNM).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 4♀, 2♂, Balangoda, 9 and 16 Apr, 7 Jun, 16–18 Jul (Colombo); 1♂, Madola near Opanake, 16–23 Feb (Colombo); 1♂, Kiriwandeniya, 11 mi on Wewelwatta Rd, 10 Jun, Krombein et al. (USNM).

UVA PROVINCE. BADULLA DISTRICT: 6♀, 1♂, Diyatalawa, May, Oct, Nov (Colombo); 4♀, 1♂, Bandarawela (includes Uva Highlands), 14 Jan, 4, 7, and 14 Apr (Colombo); 3♂, Madulsima, Jan, Dec (Colombo). **MONORAGALA DISTRICT:** 2♀, Okkampitiya, 1–10 Dec, Karunaratne (Ottawa); 2♀, Wellawaya, 6 and 9 Jan (Colombo).

SOUTHERN PROVINCE. MATARA DISTRICT: 1 ♂, Deniyaya, 20 Sep (Colombo); 1 ♀, Enselwatta, above 2500 ft, 19–20 Oct, Hevel et al. (USNM). HAMBANTOTA DISTRICT: 1 ♂, Tanamalwila, 7 Jan, Keiser (Basel).

MISCELLANEOUS. 1 ♂, Ceylon, Sarasin (Basel); 1 ♀, Ceylonia (Copenhagen; from Mus. Drefs.); 1 ♀, 1 ♂, no label (Colombo).

15. *Scolia (Discolia) vollenhoveni wickwari*,
new subspecies

FIGURES 24, 35

REMARKS.—This rare taxon is known only from three specimens from areas of low to moderately heavy rainfall and at low to intermediate altitudes. Both sexes are distinguished at once from other Ceylonese Scoliidae by having the clypeus and entire antenna light red, the rest of the integument black.

Scolia vollenhoveni wickwari is the Ceylonese representative of Betrem's geographic group of *Scolia vollenhoveni* Saussure (Betrem, 1941:142–143) that contains the two polytypic species *S. vollenhoveni* Saussure and *S. clypeata* Sickmann. In addition to *S. v. wickwari*, the polytypic *S. vollenhoveni* consists of the typical subspecies from the East Indies, an undescribed subspecies from the Philippines, and *S. v. chumponi* Betrem from Thailand and Burma. *Scolia v. wickwari* is closest to *S. v. chumponi* in coloration and punctuation, but the female has black rather than red hair on the occiput, the wings have blue rather than purplish golden reflections, and the spatium frontale has scattered punctures rather than being smooth above.

The taxon is named for the late O. S. Wickwar, who collected the allotype female.

HOLOTYPE.—♂; Sri Lanka, Southern Province, Matara District, Deniyaya, 8–9 October 1975, D. M. Davies, S. Karunaratne, and D. W. Balasooriya (USNM Type 75719).

MALE.—Length 17 mm. Clypeus except narrow apical margin, small spot on area frontalis, and entire antenna light red; rest of integument black, the abdomen with faint blue reflections. Erect vestiture black except reddish on clypeus, scape, front, and vertex. Wings dark brown with purplish reflections, forewing anteriorly somewhat darker, membrane beyond cells with microtrichiae.

Clypeus with scattered small punctures except laterally more densely punctate; area frontalis with scattered small punctures; spatium frontale with moder-

ately dense, small punctures; fissura frontalis deep, not extending above spatium frontale; front with somewhat sparser punctures than spatium frontale, the ocular sinus with very small, moderately dense punctures; fore ocellus in a moderately deep pit; post-ocellar groove absent, vertex and occiput with fine, moderately close punctures; antenna (Figure 35) somewhat thickened toward apex, flagellar segments toward apex as broad as long.

Scapulae moderately closely and shallowly punctate; scutum similarly punctate except more closely so posterolaterally and with a quadrate median area rather sparsely punctate; scutellum with shallow, subcontiguous punctures except a narrow space along midline that is slightly depressed and impunctate; postscutellum with smaller subcontiguous punctures and a narrower, median impunctate strip; mesopleuron above with a narrow horizontal surface, the upper part moderately produced posteriorly, the surface with moderate-sized, shallow punctures varying in density from subcontiguous to separated by about the diameter of a puncture; upper metapleural plate with coarse, subcontiguous punctures except for a small area below, lower plate with dense micropunctures except for a small area of larger punctures adjacent to hind coxa; horizontal and posterior surfaces of propodeum mostly with coarse, subcontiguous punctures except for a small smooth area anteriorly on lateral horizontal surface; lateral propodeal surface with more scattered, slightly smaller punctures.

First tergum without a median anterior tubercle, the horizontal surface with large, subcontiguous punctures except posteriorly, where they become finer and denser; second tergum with finer, more separated punctures on most of disk except for a narrow apical area of much closer fine punctures; succeeding terga without the apical concentration of dense punctures; genitalia as figured (Figure 24).

ALLOTYPE.—♀; Sri Lanka, Central Province, Kandy District, Kandy, May 1911, O. S. Wickwar (Colombo Museum; on long-term loan deposit in NMNH, Smithsonian Institution).

FEMALE.—Length 27 mm. Clypeus and entire antenna light red, rest of integument black, abdomen without blue reflections. Erect vestiture black, except light red on clypeus and front. Wings dark brown with purplish blue reflections, forewing anteriorly somewhat darker, membrane beyond cells with less conspicuous microtrichiae than in male.

Mandible worn, but apparently with only one small blunt tooth on inner margin near apex; raised median portion of clypeus smooth, apical margin broadly rounded and with a row of close punctures set in a groove, lateral areas contiguously punctate; laminae frontales broadened below and smooth, bordered posteriorly by a row of contiguous punctures bearing rather long setae; fissura frontalis short and weak; spatium frontale with a few scattered punctures as is the front below ocelli; area laterad of ocelli with a narrow strip of small, subcontiguous punctures; anterior ocellus in a shallow pit, hind ocelli bordered by a faint groove; vertex mostly smooth, with only a few scattered punctures.

Pronotum closely punctate in middle, with scattered punctures on scapulae; scutum anteriorly with small, close punctures, center of disk with a quadrate smooth area, posteriorly with several rows of small, subcontiguous punctures; scutellum faintly depressed along midline, with small punctures of variable density; postscutellum with finer, close punctures; mesopleuron with a horizontal area above, strongly produced posteriorly, the disk with rather large, subcontiguous punctures; upper plate of metapleuron with coarse, subcontiguous punctures except for an area below, lower plate mostly with close, fine micropunctures except for an area of larger ones adjacent to hind coxa; horizontal surface of propodeum with coarse, mostly subcontiguous punctures except for narrow median impunctate strip on median area and an anterior impunctate space on lateral area; lateral surface of propodeum with smaller, shallower punctures varying in density from subcontiguous to separated by more than the diameter of a puncture.

First tergum without an anterior median tubercle, the disk with rather long, recumbent vestiture, anteriorly with scattered coarse punctures and more numerous small punctures, posteriorly with denser, fine punctures except in middle; second tergum anterolaterally with scattered coarse punctures and denser small punctures, posteriorly with very dense, fine punctures except in middle, the rest of disk with scattered, moderately large punctures; third to fifth terga with a similar pattern of punctation.

PARATYPE.—1 ♂, Sri Lanka, Eastern Province, Amparai District, Lahugala Tank, 14–15 June 1976, in Malaise trap, K. V. Krombein, P. B. and S. Karunaratne. This specimen is 16 mm long and agrees very well with the holotype in details of punctation and

coloration. The paratype has been deposited in the Colombo Museum.

16. *Scolia (Discolia) trivandrumensis* Betrem

FIGURE 22

Scolia (Scolia) trivandrumensis Betrem, 1928:257, 301 [♀; holotype in Zoological Survey of India, Calcutta].

Scolia (Discolia) trivandrumensis Betrem.—Betrem in Betrem and Bradley, 1964b:93.—Guiglia, 1965:320–321 [Ceylon localities].

Scolia (Discolia) aureipenniformis (!) Betrem.—Guiglia, 1965:321 [♂ from Teldeniya misidentified].

Scolia (Discolia) quadripustulata Fabricius.—Guiglia, 1965:322 [2 ♂ from Teldeniya misidentified].

REMARKS.—This is a rather uncommon species in Sri Lanka. It occurs also in South India (Trivandrum). Betrem (1928) suggested that it might be a subspecies of *S. aureipenniformis*, but this is most unlikely considering the dissimilarity of the male genitalia in the two taxa. The male of *S. trivandrumensis* was unknown until restudy of Keiser's material (Basel) brought to light three males from Teldeniya misidentified by Guiglia (1965).

Scolia trivandrumensis Betrem, *S. aureipenniformis* Betrem, *S. quadripustulata* Fabricius, and *S. fasciata-punctata* Guérin constitute the group of larger, mostly black Ceylonese *Scolia* with orange red or yellow abdominal markings. The antennal flagellum is orange red entirely or in part in the first species, all black in the latter two species. In *S. trivandrumensis* the abdominal markings are larger and orange red; these are comparatively smaller and yellow in rare specimens of *S. aureipenniformis*. The male genitalia of the two species are rather similar but those of *S. trivandrumensis* differ in having the apex of the paramere rounded rather than subtruncate and in having denser setae on the basal part of the volsella.

FEMALE.—Length 16–21 mm. Integument and vestiture black except as follows: flagellum orange red in varying extents from all except basal segment to only the apical half in which case basal half is chestnut; third tergum with a pair of large orange red spots that may be only narrowly separated at midline; fourth tergum with smaller rounded orange red spots that coalesce to form a band in one specimen; one specimen with a small orange red spot on left side of fifth tergum; one specimen with a pair of tiny anterolateral orange red spots on third sternum;

wings dark brown, anterior half of forewing darker, with dark blue reflections.

Clypeus broadly rounded across its width, central area not strongly raised, apical margin broadly rounded, broad central area impunctate, sides contiguously punctate; area frontalis and spatium frontale contiguously punctate; laminae frontales raised, very narrow; fissura frontalis extending to anterior ocellus; lower front with subcontiguous punctures, upper part virtually impunctate; anterior ocellus in a shallow pit, posterior ocelli margined by a row of punctures in a weak groove; vertex with a few scattered larger punctures; occiput with smaller subcontiguous punctures.

Scapula with large, mostly contiguous punctures; scutum similarly punctate but becoming more sparsely so toward middle, where there is usually a narrow V-shaped smooth area; scutellum with contiguous to subcontiguous punctures except a narrow smooth area posteriorly in middle; discal area of postscutellum with smaller, mostly contiguous punctures except a small, narrow, smooth area at apex; mesopleuron with contiguous and subcontiguous punctures except a narrow strip along anterior margin, posterior slope with smaller scattered punctures on anterior half, smooth posteriorly; upper metapleural plate with small contiguous punctures on upper two-thirds, lower plate with small punctures separated by diameter of a puncture on lower two-thirds; dorsal propodeal surface with relatively coarse, mostly subcontiguous punctures except a small anterior strip on lateral area; posterior surface similarly punctate except lower half of median area with very scattered small punctures; lateral surface with punctures separated by diameter of a puncture or more except adjacent to dorsal surface, where they are closer.

First tergum with a weak median basal tubercle, anterior half with scattered, larger punctures, posterior half with smaller closer punctures; succeeding terga with a generally similar pattern of punctation; second sternum without basal tubercle.

MALE.—Length 13–17 mm. Vestiture and integument black except as follows: last one to three flagellar segments orange red at least beneath, fourth or third and fourth terga with paired transverse orange red spots; abdomen with faint blue reflections; wings medium brown, anterior half of forewing darker, with dark blue to purple reflections.

Clypeus with scattered punctures in middle, laterally and above with subcontiguous ones; area frontalis

with subcontiguous punctures; spatium frontale with contiguous punctures; fissura frontalis weak but extending to anterior ocellus, which is in a shallow pit; posterior ocelli margined by a shallow groove.

Scapula with shallow subcontiguous punctures; scutum with somewhat larger, subcontiguous punctures; scutellum with larger contiguous punctures, a smooth narrow area posteriorly; upper two-thirds of upper metapleural plate with small contiguous punctures, lower two-thirds of lower plate with scattered very small punctures; dorsal propodeal surface with moderate, contiguous to subcontiguous punctures except for a small anterior strip on lateral area; lateral surface with punctures separated by about their diameter except above where they are contiguous.

First tergum with anterior tubercle lacking, discal surface with scattered small punctures anteriorly in middle, subcontiguously punctate laterally and posteriorly; succeeding terga with fine punctures separated by more than diameter of a puncture; second sternum without basal tubercle; genitalia as figured (Figure 22).

SPECIMENS EXAMINED.—NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 1 ♀, Padaviya, 180 ft, 2–8 Nov, Flint (USNM); 1 ♀, Anuradhapura, Nov, Wickwar (Colombo).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 1 ♀, Niroddumunai, Oct (Colombo).

CENTRAL PROVINCE. MATALE DISTRICT: 1 ♀, Dambulla, 21 Nov, Keiser (Basel). KANDY DISTRICT: 2 ♀, Hara-gamma, 5 Nov, Keiser (Basel); 2 ♀, Ambacotta, 14–15 Dec, Keiser (Basel); 1 ♀, Urugala, 2 Dec, Keiser (Basel); 3 ♂, Teldeniya, 16 and 19 Nov, Keiser (Basel).

MISCELLANEOUS. 1 ♀, no locality (Colombo).

17. *Scolia (Discolia) aureipennisformis* Betrem

FIGURE 25

Scolia (Scolia) aureipennisformis Betrem, 1928:252, 255, 301–302 [♂, ♀; India, Ceylon; holotype ♂ in Betrem collection; allotype ♀ in Zoological Museum, Amsterdam].
Scolia (Discolia) aureipennis Lepeletier.—Betrem, 1928: 282 [♂ from Kandy, June, misidentified].
Scolia (Discolia) aureipennisformis Betrem.—Betrem in Betrem and Bradley, 1964b:93.—Guiglia, 1965:321 [misspelled *aureopennisformis*; Ceylon localities].

REMARKS.—Betrem described this from males from South India and Ceylon and from a female without locality label.

I have examined a male from Kandy, June 1898, in the Colombo Museum misidentified by Betrem as *S. aureipennis* Lapeletier. It is actually an unusual specimen of *S. aureipenniformis* in which the fourth tergum has a pair of small yellowish spots and the ground color of the third and fourth terga is dark chestnut; the genitalia, however, show that it is definitely *S. aureipenniformis*; the entire flagellum is reddish. Two of 19 males from Kiriwandeniya have small, paired, transverse yellow spots on sides of third and fourth terga; the punctation and genitalia of these two specimens agree exactly with those characters in the rest of this series. Another unusual color variant from Kandy, 16–31 August 1976, has a pair of tiny yellowish spots on the scapulae; only the last three flagellar segments are reddish, and the abdomen is black; the genitalia are abnormal in that the paramere is narrower at apex than normal.

The rare occurrence of specimens with yellow spots on the abdomen raises the question whether normal *S. aureipenniformis* with entirely black abdomen is not actually just a color phase of *S. bilunata* Saussure, recorded by Betrem (1928:300–301) from northern India. I have studied the type series of *S. bilunata* Saussure (1858:212) from the Berlin Museum collection. It consists of two males and two females each bearing a handwritten label "Nepal/Melly 5"; one male also bears Bradley's (1974:426) lectotype label. Males are very similar to those of *S. aureipenniformis* and its yellow-spotted color phase; genitalia are identical; the apical six flagellar segments of *S. bilunata* are relatively longer, the length being respectively 1.8, 1.8, 1.6, 1.6, 2.0, and 3.3 times the width; the fourth tergum has a pair of bilunate yellow spots and the fifth a pair of tiny yellow spots in one specimen. The females agree in punctation with the redescription of the *S. aureipenniformis* allotype given below but are 20–23 mm long and have a pair of oval yellow spots on the third tergum. At the present time it is certainly preferable to retain *S. bilunata* and *S. aureipenniformis* as discrete species, but eventually it may be proven that they are the two extremes of a cline extending from the Himalayas southward into Sri Lanka. A great deal of intensive collecting is required throughout India to solve this and other perplexing problems concerning the actual status of supposedly distinct Ceylonese and Indian species and subspecies.

The color of the antennal flagellum of the male is variable; in some specimens it may be entirely orange

red, only the apical one or two segments may be so colored, and intermediates occur between the two extremes. There is no correlation between coloration and locality or date. Also, the punctation of the median area of the propodeal dorsum varies in a few males in which it is coarser, deeper, and closer than normal as in three of a series of 13 males captured at Labugama in May by Messersmith et al.

This is one of Sri Lanka's most puzzling scoliids. Males are extremely common, almost 200 having been recorded mostly from areas of moderate rainfall, but not a single female has been captured. I have visited Labugama Reservoir Jungle near Colombo several times to search especially for females, with no success. The female should be all black except that the antennal flagellum is probably orange red in part or entirely. The only Ceylonese *Scolia* female having these characteristics is *S. affinis* Guérin. I have studied and restudied my series of females of that species and I am convinced that I have not confused *S. aureipenniformis* females with them. Females of *S. affinis* have parts of the thorax very sparsely punctate, a characteristic that also separates *S. affinis* males from the more densely punctate males of *S. aureipenniformis*. If Betrem is correct in his association of sexes in *S. aureipenniformis*, we should expect the Ceylonese females to have all except the basal flagellar segment orange red (flagellum entirely orange red in *S. affinis*) and to be comparatively more coarsely punctate especially on the scutum, postscutellum, and dorsal surface of propodeum.

I have studied the female allotype of *S. aureipenniformis*. It bears a printed label, "Patria ignota/Museum Natura/Artis Magistra." The color of the antennal flagellum and relative density of punctation suggest that Betrem's sex association is correct. If so, however, this must be an abnormally small female (15 mm). For example, males of *S. aureipenniformis* are 14–18 mm long and males of *S. affinis* have approximately the same size range, 13–21 mm. Females of *S. affinis*, however, are 17–25 mm long, so one would expect a somewhat larger female than this allotype from an unknown locality. The female description that follows is based on the allotype.

Males of *S. aureipenniformis* and *S. affinis* are very similar in appearance owing to the black integument and elongate antennal flagellum that is orange red entirely or in part. The comparatively denser and coarser propodeal punctation separates *S. aureipenni-*

formis with ease; the genitalia of the two also are quite different.

MALE.—Length 14–18 mm. Black, flagellum orange red in varying degrees ranging from entirely so except dorsum of first segment to only last segment entirely and penultimate segment beneath, one specimen with a tiny yellow spot on scapula, three specimens with small paired transverse yellow spots on sides of fourth or third and fourth terga, abdomen with faint blue reflections; vestiture black; wings dark brown, anterior area of forewing darker, usually with dark blue reflections but occasionally with some golden.

Clypeus with quite scattered punctures in middle, elsewhere with contiguous to subcontiguous punctures; area frontalis and spatium frontale with smaller contiguous punctures; fissura frontalis well developed, extending to anterior ocellus; many punctures on front separated by less than diameter of a puncture; anterior ocellus in a shallower pit than in *S. affinis*; posterior ocelli not margined by a groove; flagellum elongate, not clavate toward apex, the apical six segments with length 1.4, 1.4, 1.4, 1.4, 1.6, and 2.0 times width.

Scapula with small punctures mostly separated by half the diameter of a puncture; scutum and scutellum with larger punctures of about same density, latter sclerite with a smooth median area posteriorly; mesopleuron with small subcontiguous punctures except narrowly along anterior margin and more broadly below along posterior margin; upper metapleural plate with small contiguous punctures on all but lower fourth, lower plate with smaller subcontiguous punctures except on a narrow strip above; median area of dorsal propodeal surface with coarse contiguous to subcontiguous punctation, lateral area similarly punctate except anterior fourth; lateral propodeal surface with punctures of same size, which are dense adjacent to dorsal surface, elsewhere subcontiguous more or less in irregular rows, interspaces between rows as much as twice the diameter of a puncture; posterior propodeal surface with punctures of same size as on dorsum, mostly subcontiguous except lower half of median area with very scattered punctures.

First tergum with anterior median tubercle extremely weak or lacking, remainder of horizontal surface with small subcontiguous punctures; succeeding terga with smaller punctures separated by about the diameter of a puncture; second sternum without a basal tubercle; genitalia as figured (Figure 25).

FEMALE (based on allotype).—Length 15 mm. Integument entirely black, flagellum except basal segment orange red. Vestiture black. Wings medium brown, anterior part of forewing darker, effulgence purple.

Clypeus with median section smooth, gently rounded, sides closely punctate; area frontalis and spatium frontale closely punctate; laminae frontales narrow, raised; fissura frontalis narrow, extending to fore ocellus, which is in a relatively deep pit; lower front closely punctate, upper part with very scattered punctures except rather close in ocular sinus; shallow punctate groove behind posterior ocelli; vertex with only a few scattered punctures.

Pronotum with subcontiguous, rather small punctures; scutum with larger punctures that are mostly subcontiguous to contiguous, no smooth quadrate space in middle, but punctures somewhat more separated than elsewhere; scutellum and postscutellum mostly subcontiguously punctate except for small, smooth median space posteriorly; metapleural punctation quite small, closer on upper half of upper plate, relatively scattered on lower two-thirds of lower plate; dorsal surface of propodeum with shallow, mostly subcontiguous, small punctures, a small smooth area anteriorly on lateral section; lateral propodeal surface with smaller, more scattered punctures.

First abdominal tergum with a very weak, median anterior tubercle, anterior half of dorsal surface with very scattered, larger punctures than on sides and posteriorly, where they are smaller, separated by the diameter of a puncture or less; second sternum without an anterior tubercle.

SPECIMENS EXAMINED.—NORTH CENTRAL PROVINCE. POLONNARUWA DISTRICT: 1 ♂, Habarana, 5 Jul, Keiser (Basel).

CENTRAL PROVINCE. KANDY DISTRICT: 21 ♂, Kandy (includes Udawattekele, reservoir, Asgiriya, Blaze Watta), 25 May, 17 Jun, 16–31 and 17–18 Aug, 1–17 and 20–27 Sep, 5 Nov, Karunaratne, Keiser, Robinson et al., Wickwar (USNM, Colombo, Basel); 2 ♂, Peradeniya (includes Experiment Sta), 5 Jun, Sep, Keiser (Colombo, Basel); 2 ♂, Ganoruwa, 12 Jun, Keiser (Basel); 13 ♂, Haragama, 3–5 Nov, Keiser (Basel); 2 ♂, Teldeniya, 16 and 19 Nov, Keiser (Basel).

WESTERN PROVINCE. COLOMBO DISTRICT: 1 ♂, Avisawella, 7 Oct, Keiser (Basel); 40 ♂, Labugama Reservoir Jungle, 400 ft, 25 and 30 May, 17 and 23 Jun, 12, 15–18 and 24 Aug, 14 Oct, Ekis et al., Gunawardane, Krombein et al., Messersmith et al. (USNM, Colombo); 72 ♂, Kalatuwawa, 6–11 and 12–15 Aug, Gunawardane, Huang, Peyton et al. (USNM, Colombo).

SABARAGAMUWA PROVINCE. KEGALLA DISTRICT: 3 ♂, Kitulgala, 31 May, Wood et al. (USNM). RATNAPURA DISTRICT: 13 ♂, Ratnapura, 18–20 Jun, 10 Oct, Keiser, Krombein et al. (USNM, Basel); 1 ♂, Bulutota, May (Colombo; paratype); 5 ♂, Gilimale, 19–22 Jun, Krombein et al. (USNM); 19 ♂, Kiriwadeniya, 13 mi on Wewelwatta Rd, 20 Jun, Krombein et al. (USNM).

SOUTHERN PROVINCE. GALLE DISTRICT: 1 ♂, Kottawa, Udugama, Aug (Colombo; paratype).

MISCELLANEOUS. 1 ♂, Ceylonia (Copenhagen; from Mus. Drows., determined as *S. jurinei* Saussure).

18. *Scolia (Discolia) quadripustulata* Fabricius

FIGURE 26

Scolia 4-pustulata Fabricius, 1782:453 [♂; Malabar, India; holotype in Banks' collection, British Museum].

Scolia (Scolia) obscuropunctata Betrem, 1928:308–309 [♀; holotype from Trincomalee, Ceylon, in Leiden Museum; described from series from Ceylon and India]. [New synonymy (J. G. Betrem).]

Scolia (Scolia) kumaonensis Betrem, 1928:309 [♀; Kousanie, Kumaon, 6075 ft; holotype in Zoological Survey of India, Calcutta]. [New synonymy.]

Scolia (Scolia) kumaonensis calcuttensis Betrem, 1928:309 [♀; Calcutta, Raipur, Dehra Dun; holotype from Calcutta in Zoological Survey of India, Calcutta]. [New synonymy.]

Scolia quadripustulata Fabricius.—Bradley, 1964a:22 [statement that type is ♂ not ♀ and that correct combination is *Scolia (Discolia) quadripustulata quadripustulata*].

Scolia (Discolia) obscuropunctata Betrem.—Betrem in Betrem and Bradley, 1964b:93.

REMARKS.—Fabricius' name *S. quadripustulata* has consistently been misapplied to the taxon discussed elsewhere in this revision as *S. b. binotata* Fabricius. Betrem (in litt., 28 March 1974) advised me of the misapplication of the name and stated that *S. obscuropunctata* Betrem was a junior synonym. I have examined the holotypes of typical *S. kumaonensis* Betrem and *S. k. calcuttensis* Betrem and find that they agree in details of punctuation with a single female from Ratmalana, Sri Lanka, which I had placed as the previously unrecognized female of *S. quadripustulata*. *Scolia obscuropunctata* Betrem, known only from males, and *S. kumaonensis* Betrem, known only from females, are the only taxa assigned by Betrem to his group of *Scolia obscuropunctata*. Unquestionably, they are opposite sexes of a single taxon. Betrem (1928:309) had suggested that *S. obscuropunctata* might be the male of *S. kumaonensis*.

Although this rare species has a wide distribution in India, it is known in Sri Lanka from only a few localities mostly in the Dry Zone. The light red

second and third sterna of the female distinguish that sex from any of the other mostly black *Scolia* with red spots on the terga. Otherwise, it is superficially similar to *S. trivandrumensis* Betrem but has a black rather than reddish antennal flagellum and a truncate rather than broadly rounded apical margin of median lobe of clypeus. Differentiation of the male is more difficult inasmuch as it occurs in an all black phase as well as the normal red-spotted form. Apparently red-spotted males are rather variable in the extent of these markings. Betrem's holotype of *S. obscuropunctata* has only a pair of red markings on the third tergum. The most extensively maculated male before me has large red spots on third tergum, a smaller pair on second, a very small pair on fourth, as well as having the second to fourth sterna largely red.

FEMALE.—Length 18 mm (20 mm in Indian specimens). Black, abdomen with faint blue reflections, second and third abdominal terga with rounded, orange red spots that are larger on third, second and third sterna almost entirely orange red; vestiture black except brown to cinereous on hind margin of head and depressed anterior part of pronotum; wings dark brown, effulgence blue.

Anterior margin of median lobe of clypeus truncate, a relatively broad band of dense small punctures above margin, median surface of clypeus raised, smooth, laterally with subcontiguous larger punctures; area frontalis and spatium frontale with small, subcontiguous punctures; laminae frontales raised, moderately broad; fissura frontalis extending to anterior ocellus, which is in a shallow pit; lower front with subcontiguous punctures, upper part with a few scattered ones; ocellar area with a few smaller punctures; posterior ocelli margined by a shallow punctate groove; vertex smooth except for a few scattered smaller punctures; occiput with small punctures separated by about the width of a puncture.

Scapulae with moderately large, mostly contiguous punctures; scutum similarly punctate anteriorly, middle with narrow, V-shaped smooth area, laterad of this with more scattered punctures, posterior margin with narrow band of close punctures; scutellum with large contiguous to subcontiguous punctures as is disk of postcutellum; mesopleuron with smaller contiguous to subcontiguous punctures, broadly smooth posteriorly; metapleuron with mostly subcontiguous punctures on upper three-fourths of upper plate and lower three-fourths of lower plate; median area of

dorsal propodeum with a very narrow, smooth median strip, elsewhere with very narrowly separated coarse punctures, the lateral area similarly punctate except anterior half smooth; lateral propodeal surface mostly with subcontiguous coarse punctures.

First tergum with a strong median, anterior tubercle, behind this a small smooth area, elsewhere with subcontiguous, moderate-sized punctures.

MALE.—Length 17–20 mm. Black, abdomen with very faint blue reflections, orange red abdominal markings usually present and varying from just a pair of round spots on third tergum to paired spots on second to fourth terga, those on third largest, on fourth smallest, and, rarely, second and third sterna nearly entirely; vestiture black except occiput with some interspersed brown to cinereous hair; wings dark brown, anterior half of forewing not noticeably darker, effulgence dark blue.

Clypeus smooth in middle, contiguously punctate on sides, less so above; area frontalis with subcontiguous punctures; spatium frontale with dense, small punctures; fissura frontalis strong, extending to anterior ocellus, which is in a moderately deep pit; flagellum not clavate toward apex, the apical segments about 1.25 times as long as broad.

Pronotum and scutum mostly subcontiguously punctate, latter sclerite with more separated punctures in middle; scutellum with somewhat more separated punctures and a broad, barely discernible, shallow median groove; metapleuron mostly with subcontiguous punctures except for a very narrow strip below on upper plate; median area of dorsal propodeum with subcontiguous punctures, lateral dorsal area similarly punctate except for smooth anterior third.

First tergum anteriorly with well-developed median tubercle, elsewhere subcontiguously punctate; genitalia as figured (Figure 26).

SPECIMENS EXAMINED. — NORTHERN PROVINCE. VAVUNIYA DISTRICT: 4♂, Mankulam, Sep (Colombo; paratypes).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 1♂, Kantalai, 2–18 Aug (Colombo).

WESTERN PROVINCE. COLOMBO DISTRICT: 1♀, Ratmalana Airport, Robinson et al. (USNM).

MISCELLANEOUS. 2♂, no label (Colombo).

19. *Scolia (Discolia) fasciatopunctata* Guérin

FIGURE 33

Scolia fasciatopunctata Guérin, 1830:254 [♀; Indes orientales, Java; type presumably in Paris Museum].

Scolia (Discolia) 4-pustulata Fabricius.—Saussure, 1867:103 [2♂, 8♀ from Trincomalee misidentified].

Scolia peradeniyensis Betrem, 1928:257, 258, 310, 312 [misspelled *paradeniyensis* on pp. 310, 312; ♀, ♂; Ceylon localities; holotype in Vienna Museum].—Betrem and Bradley, 1964b:93 [misspelled *paradeniyensis*].—Guiglia, 1965:321–322 [Ceylon localities; misspelled *paradeniyensis*]. [New synonymy (J. G. Betrem).]

REMARKS.—This species occurs only in South India and Sri Lanka. Guérin's type, which has not yet been found in the Paris Museum, was from India orientalis: Betrem advised me (in litt.) that his *S. peradeniyensis* was almost certainly a synonym; he listed *S. fasciatopunctata* as a questionable senior synonym of *S. peradeniyensis* in 1928.

This is one of the more variable species of *Scolia* in both sexes insofar as the amount of red, or lack thereof, on the abdomen. In the female the typical color pattern is a broad red band on the third tergum, a narrower band on the fourth usually interrupted along midline, and usually the base of the third sternum; occasionally the third sternum may have a pair of small, rounded spots, and the base of the fourth sternum is red in one specimen. In the male the second tergum never has red spots and the third sternum is red basally in about half of the specimens; the third tergum usually has a pair of large, narrowly separated spots but several specimens have a broad red band; the fourth tergum has a pair of small red spots in about half the specimens; one specimen has a broad band on third tergum, a narrower one on the fourth, and a pair of small transverse spots on the fifth. Four of the 35 males are entirely black, the specimens coming from Trincomalee, Nugegoda-Papiliyana, and Udawattakele; they occurred with males having red markings of variable extent.

The male genitalia are variable in the shape of the outer margin of the paramere: in some it is evenly rounded, in others it bulges a bit at the middle. These variations are not correlated with the extent of red on the abdomen or lack thereof.

The broad red band on the third abdominal tergum of the female distinguishes that sex from those of the other mostly black *Scolia* which normally have paired red spots on that tergum. Discrimination of the males is a more difficult problem because of the rare occurrence of an all black phase. The extremely large volsella of the genitalia occurs in no other Ceylonese species.

Scolia fasciatopunctata is one of the more uncommon species although it is sometimes reasonably abundant locally. For example, in a period of four days we collected a series (8 ♀, 6 ♂) along a road through the Badagamuwa Jungle, almost all of them on flowers of *Eupatorium rivalis*, and P. B. Karunaratne got a long series (1 ♀, 14 ♂) at Papiliyana. S. Karunaratne collected a series of 10 ♀ and 7 ♂ in Udawattakele, Kandy, from July through September. Collection data from Kandy suggest that *S. fasciatopunctata* may breed continually throughout the year in favorable areas, for it was taken there during January, February, April, May, July, August, September, and November. The species occurs mainly in the drier (not arid) zones of the island although it breeds successfully in areas of higher rainfall such as Kandy; however, it has never been collected in areas of the greatest rainfall in the southwestern part of the island.

FEMALE.—Length 17–26 mm. Vestiture and integument black, abdomen with faint blue reflections, the following light red: rarely a pair of small spots on second tergum, broad band on third, usually a narrower band on fourth, which may be separated on midline, occasionally a pair of small rounded spots on third sternum, and rarely the base of fourth sternum. Wings dark brown, anterior half of forewing darker, effulgence dark blue.

Margin of clypeus broadly rounded, in fresh specimens median lobe almost subtruncate, raised central portion smooth, laterally subcontiguously punctate; area frontalis contiguously punctate; spatium frontale with narrow strip of contiguous punctures adjacent to raised, moderately broad laminae frontales, elsewhere with scattered punctures; fissura frontalis weak, extending halfway to anterior ocellus, which is in a very shallow pit; front virtually impunctate, a few fine punctures adjacent to ocellar area; posterior ocelli margined by a shallow groove bearing a few small punctures; vertex smooth; occiput with subcontiguous punctures.

Scapula with relatively large, mostly subcontiguous punctures except smooth narrow area adjacent to tegula; scutum with subcontiguous punctures becoming sparser toward middle and sides, posterior half with large, smooth quadrate space in middle; disk of scutellum with subcontiguous punctures anteriorly, more scattered on posterior two-thirds; disk of postscutellum with subcontiguous punctures except for sides and a narrow median strip that are smooth;

mesopleuron contiguously punctate except for smooth narrow strip anteriorly and broader smooth strip posteriorly; upper two-thirds of upper metapleural plate with mostly contiguous punctures; lower plate smooth on upper third, with finer, more separated punctures elsewhere, which become denser at lower anterior angle; dorsal propodeal surface with coarse subcontiguous to contiguous punctures except small smooth anterior area on lateral section; median section of posterior surface with scattered, smaller punctures, lateral areas more closely punctate; lateral surface with quite scattered small punctures that are close only adjacent to dorsal and posterior surfaces.

First tergum with strong anterior tubercle, coarse scattered punctures on anterior half, finer punctures posteriorly, which are very dense laterally; second tergum with scattered fine punctures on anterior two-thirds except for smooth transverse strip laterally, posterior third with dense fine punctures; second sternum not tuberculate.

MALE.—Length 14–22 mm. Vestiture and integument black, abdomen with faint bluish gold reflections, abdomen rarely all black, usually with light red markings as follows: third tergum with a pair of large, transverse spots, occasionally with a broad band, fourth tergum with a pair of small spots in half the series, very rarely a pair of tiny spots on fifth tergum, and third sternum basally in about half the series; wings dark brown, forewing anteriorly darker, effulgence golden or coppery, sometimes purplish beyond cells.

Clypeus with a few scattered punctures in middle, a narrow strip of fine close punctures above apical margin, above and laterally with larger subcontiguous punctures; area frontalis and spatium frontale with small subcontiguous punctures; fissura frontalis well developed, extending to anterior ocellus, which is in a shallow pit; front with a few scattered punctures; ocellar area closely punctate, posterior ocelli margined behind by a groove; vertex with fine, very scattered punctures; flagellum not clavate toward apex, apical segments about two-thirds as broad as long.

Scapula with small punctures, many separated by almost the diameter of a puncture; scutal punctures larger, also separated by nearly the diameter of a puncture; scutellum with subcontiguous punctures of same size, a narrow transverse smooth area at apex in middle; postscutellum subcontiguously punctate

except for a narrow median strip and posterolaterally; mesopleuron with mostly subcontiguous punctures except posteriorly, where they are finer and quite sparse; upper two-thirds of metapleural plate with small punctures mostly separated by almost the diameter of a puncture, lower plate with very fine, quite scattered punctures; dorsal propodeum with shallow subcontiguous punctures except narrow smooth strip anteriorly on lateral area; lateral surface with quite small punctures mostly separated by more than the diameter of a puncture.

First tergum without anterior median tubercle, surface with small subcontiguous punctures; second sternum without anterior median tubercle; genitalia as figured (Figure 33), the volsella massive, base and apex not divided by a lateral constriction.

SPECIMENS EXAMINED. — **NORTHERN PROVINCE.** MANNAR DISTRICT: 1 ♀, ½ mi NE of Kokmotte Bungalow, Wilpattu Natl. Park, 21–25 May, Krombein et al. (USNM).

NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 5 ♂, Habarana, 5 Jul, Keiser (Basel); 1 ♀, Hunuwilagama, 22–26 May, Krombein et al. (USNM).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 1 ♂, China Bay, Ridge Bungalow, Trincomalee, 0–100 ft, 13–17 May, Krombein et al. (USNM); 2 ♀, 9 ♂, Trincomalee, Humbert (Geneva). AMPARAI DISTRICT: 1 ♂, Lahugala Tank, 14–15 Jun, in Malaise trap, Krombein et al. (USNM).

CENTRAL PROVINCE. MATALE DISTRICT: 1 ♀, Pussella, Ratota, 21 Nov (Colombo); 2 ♂, Sigiriya, 18 Jun, Messersmith et al. (USNM). KANDY DISTRICT: 18 ♀, 22 ♂, Kandy (includes Udawattakele, Lady Blake's Drive, Rose-neath, Peak View Motel), 1800–2100 ft, 15–24 Jan, 9–13 Feb, 14–20 and 29–30 Apr, 29–30 May, 3–5 Jun, 5–15 and 20–30 Jul, 2–13 Aug, 1–17, 8 and 20–27 Sep, 1 Nov, Davis et al., Karunaratne et al., Keiser, Krombein, et al., Wickwar (USNM, Colombo, Basel); 1 ♀, Peradeniya, Botanic Garden, 10 Jun, Keiser (Basel); 2 ♂, Bambaragala Rock, Teldeniya, 10 May, Karunaratne et al. (USNM); 1 ♀, Haragama, 5 Nov, Keiser (Basel); 1 ♀, Ambacotta, 15 Dec, Keiser (Basel).

NORTH WESTERN PROVINCE. KURUNEGALA DISTRICT: 10 ♀, 6 ♂, Kurunegala (includes Badagamuwu Jungle, Elephant Rock or Athugala), 24–27 Jan, 5 Feb, most specimens on flowers of *Eupatorium rivalis*, Keiser, Krombein et al. (USNM, Basel).

WESTERN PROVINCE. COLOMBO DISTRICT: 13 ♀, 34 ♂, Nugegoda, Papiliyana, 16 Mar, 17 May, 28–29 Jun, 5 Jul, 13 and 21 Sep, Karunaratne (USNM); 1 ♀, 1 ♂, Lahugama Reservoir Jungle, 400 ft, 2–3 Oct, Hevel et al. (USNM); 2 ♂, Colombo, Museum Garden, 13–15 and 27 Apr, Karunaratne (USNM). KALUTARA DISTRICT: 1 ♂, Horana, 28 Jun, Karunaratne (Ottawa).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 1 ♂, Balangoda Dist., 16–18 Aug (Colombo).

UVA PROVINCE. MONORAGALA DISTRICT: 1 ♂, Bibile, 7 Jun, Wood et al. (USNM).

MISCELLANEOUS. 2 ♀, no label (Colombo).

20. *Scolia (Discolia) binotata binotata* Fabricius

FIGURES 27, 36

Scolia binotata Fabricius, 1804:244 [♂; Tranquebar; Copenhagen Museum].

?*Scolia bipunctata* Klug, 1805:36 [♂; Ostindien; Berlin Museum].

Scolia 4-pustulata Fabricius.—Saussure, 1867:103 [1 ♀ misidentified as *S. quadripustulata* Fabricius].

Scolia (Scolia) 4-pustulata Fabricius.—Betrem, 1928:314–316 [*S. b. binotata* erroneously placed in synonymy of *S. quadripustulata*].

Scolia (Scolia) 4-pustulata var. *bipunctata* Klug.—Betrem, 1928:316.

Scolia (Scolia) 4-pustulata var. *coerulans* [sic] Lepeletier.—Betrem, 1928:316 [misidentification and misspelling of *S. caerulans* Lepeletier].

Scolia binotata Fabricius.—Bradley, 1964a:11 [designation of ♂ lectotype and statement that the currently valid name is *Scolia (Discolia) quadripustulata* Fabricius].

Scolia (Discolia) quadripustulata Fabricius.—Guiglia, 1965:322, fig. 4 [3 ♂ from Inginiyagala are *S. karunaratnei*, new species; 1 ♂ from Kandy is *S. fasciatopunctata* Guérin; 2 ♂ from Teldeniya are *S. trivandrumensis* Betrem; the other specimens are *S. b. binotata* Fabricius].

Scolia (Discolia) quadripustulata var. *bipunctata* Klug.—Guiglia, 1965:322 [5 ♂ from Habarana are *S. fasciatopunctata* Guérin; 1 ♂ from Kurunegala is *S. keiseri*, new species; the other males listed are true *S. b. bipunctata* Klug].

Scolia bipunctata Klug.—Bradley and Betrem, 1968:325 [notes on Klug's type and statement that the valid name is *Scolia (Discolia) quadripustulata quadripustulata* Fabricius, form *S. bipunctata* Klug].

REMARKS.—Betrem (in litt., 28 Mar 74) advised me that *Scolia 4-pustulata* Fabricius, sensu Betrem, 1928, is actually *S. b. binotata* Fabricius. *Scolia obscuripunctata* Betrem, 1928, is identical with the Fabrician type of *S. quadripustulata* in the Banks collection in London.

This widely distributed polytypic taxon ranges from Japan, Taiwan, and China, southward to the East Indies and Southeast Asia, and westward to India and Sri Lanka. Typical *S. b. binotata* is apparently confined to the Indian subcontinent. Fabricius described *S. b. binotata* from two males from Tranquebar; *S. b. binotata* is a misnomer since Betrem (in Bradley, 1964a:11) noted that there are paired red spots on abdominal terga 3 and 4. The correct application of

subspecific names and disposition of varietal names is a most difficult problem and must await the study of larger series of specimens than are now available throughout the range.

Insofar as the Ceylonese population is concerned, I believe that all specimens must be considered typical *S. b. binotata*. The females are uniform in having paired, well-separated, rounded red spots on abdominal terga 3 and 4. The males are variable in the extent and number of red spots: 47 of those before me have paired spots on both terga 3 and 4, those on 4 sometimes smaller than normal; 29 have paired red spots on tergum 3 only, none on 4; and five have no red spots whatsoever. I believe that there is no need to apply varietal names to these color forms in Sri Lanka. The all black variety occurs only in and near Colombo, where one also finds the 2- and 4-spotted varieties; 2- and 4-spotted varieties have been taken on the same dates in Nugegoda (Papiliyana and Kohuwala); and all three color phases occurred on 6 June at Ratmalana.

I have indicated above that *S. bipunctata* Klug is a questionable synonym of typical *S. b. binotata* Fabricius. Klug described it "Aus Ostindien" and the holotype male is labeled "Ind. Orient. Dald. S." (Bradley and Betrem, 1968:325). If Klug's specimens actually came from the East Indies rather than eastern India, his name must then apply to some other subspecies.

Betrem (1928:316) misidentified a male of the Ceylonese black phase as *S. 4-p. var. coeruleans* [sic] Lepelletier; however, true *S. caeruleans* is a synonym of *S. cyanipennis* (Bradley, 1964b:188). Betrem suggested (in litt.) that *S. 4-p. var. coeruleans* Betrem be used for the Ceylonese color phase but I consider it not worth naming.

In Sri Lanka typical *S. b. binotata* occurs usually only at very low altitudes and in the drier zones. Dates of collection in the Colombo area suggest that it breeds throughout the year.

Females of typical *S. b. binotata* are readily distinguished from females of the other Ceylonese taxa with red markings on the abdomen by a combination of the impunctate front, white hair on the occiput, and very sparsely punctate scapula, posterior half of scutum and scutellum.

Differentiation of *S. b. binotata* males is a more difficult problem because the abdomen may have four or two red spots, or none at all. The relatively short, black antennal flagellum that becomes clavate

toward the apex and in which the apical segments are as broad as long separate *S. b. binotata* males from all taxa except *S. cyanipennis*, *S. keiseri*, and *S. gunawardanae*. The all black vestiture separates *S. cyanipennis* easily, and *S. keiseri* has the forewing membrane beyond the cells covered with fine setae that are mostly lacking in *S. binotata*. The presence of a fissura frontalis, lighter wings, and relatively more densely punctate upper metapleural plate separate *S. b. binotata* from *S. gunawardanae*. The small acute basal prominence of the volsella immediately separates *S. b. binotata* from the other three taxa in which the basal prominence is larger and rounded or lacking.

FEMALE.—Length normally 14–17 mm, rarely as much as 21 mm. Black, third and fourth terga each with a pair of large, rounded, light red spots. Vestiture black except that on occiput white. Wings medium brown, anterior area of forewing darker, wing reflections blue.

Anterior margin of clypeus rounded, median third impunctate, sides with small contiguous punctures; area frontalis and spatium frontale with a few scattered punctures except for concentration adjacent to relatively broad but not raised laminae frontales; fissura frontalis linear, extending halfway to anterior ocellus; front impunctate, vertex virtually so; anterior ocellus in a shallow pit, posterior ocelli margined by a very weak, shallow groove; occiput posteriorly with a narrow strip of fine, close punctures.

Posterior three-fourths of scapula with a few scattered punctures; scutum with anterior and posterior fourths with mostly subcontiguous punctures and a row of close punctures laterally, the rest of disk impunctate or virtually so; scutellum and postscutellum with sparse, scattered punctures except for an anterior row of subcontiguous punctures; anterior aspect of mesopleural prominence smooth, the sclerite beneath with subcontiguous coarser punctures on anterior half, smaller, relatively sparser punctures posteriorly; upper plate of metapleuron smooth except narrow strip of subcontiguous punctures above, lower plate smooth except for some small punctures on lower half; median area of horizontal surface of propodeum with moderately large punctures separated by half the diameter of a puncture, lateral horizontal area smooth except for some smaller punctures on outer half; lateral surface of propodeum with scattered small punctures becoming denser above; median surface of posterior

aspect smooth except for some small punctures below, the lateral surface with denser small punctures.

Median tubercle anteriorly on horizontal surface of first tergum, a small area behind it smooth, elsewhere with subcontiguous to contiguous small to moderate-sized punctures; second sternum with a weak anterior, median tubercle.

MALE.—Length 8–16 mm. Black, abdomen more commonly with paired, rounded, light red spots on third and fourth terga, those on third much larger, those on fourth smaller, frequently absent, and, rarely, abdomen entirely black. Vestiture mostly black, but mostly white on head, occasionally cinereous on scapula, mesopleuron and legs in part, white to cinereous on red abdominal maculations. Wing membrane dark brown at base and on anterior half of forewing, elsewhere relatively paler than in other mostly black *Scolia*, refulgence bluish purple; forewing membrane beyond cells devoid of microtrichiae except for a small patch adjacent to apex of marginal cell.

Spatium frontale with contiguous, relatively coarse punctures; fissura frontalis linear, extending to anterior ocellus; front with small impunctate area in front of fore ocellus, which is in a relatively deep pit; flagellum (Figure 36) clavate toward apex, the segments toward tip as broad as long, straight beneath in profile.

Scapula with small punctures separated by one to two times the diameter of a puncture, scutum with larger punctures mostly separated by less than the diameter of a puncture, usually a small median area posteriorly less closely punctate or smooth; scutellum with very faint median groove, discal punctures subcontiguous except for a small smooth area posteriorly; upper half of upper metapleural plate with contiguous to subcontiguous punctures.

First tergum with a weak median tubercle at base of horizontal surface; second sternum with weak median tubercle near base; genitalia (Figure 27) with volsella longer than in *S. gunawardanae*, the lateral margin with a shallow incision separating the small, acute basal prominence.

SPECIMENS WITH FOUR RED SPOTS ON ABDOMEN

NORTHERN PROVINCE. MANNAR DISTRICT: 5♀, Mannar, 31 Jan, Keiser (Basel).

NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 1♂, Anuradhapura, 12 Dec (Colombo); 1♀, Mihintale, 4 Dec, Keiser (Basel); 1♀, Habarana, 5 Jul, Keiser (Basel).

EASTERN PROVINCE. TRINCOMALEE DISTRICT: 1♀, Trincomalee, Humbert (Geneva); 2♂, Niroddumunai, Sep (Colombo).

NORTH WESTERN PROVINCE. PUTTALAM DISTRICT: 1♂, Wilpattu Natl. Park, Maddikulam, 15 Jun, Messersmith et al. (USNM); 5♀, Puttalam, 22–23 Feb, Keiser (Basel); 1♂, Puttam (= Puttalam?) (Geneva).

WESTERN PROVINCE. COLOMBO DISTRICT: 1♀, Negombo, 5 Aug, Keiser (Basel); 8♀, 8♂, Colombo, 8 Feb, Mar, Apr, May, 2, 14, and 28 Jul, Oct, 2 Nov, Karunaratne, Wickwar (Colombo, Ottawa); 1♂, Nugegoda, Kohuwala, 6 Jun, Krombein et al. (USNM); 57♀, 19♂, Nugegoda, Papiliyana, 16 Mar, 1, 3–4 and 17 May, 28–29 Jun, 5 Jul, 13 and 21 Sep, 24 Nov, Karunaratne (USNM); 22♀, 11♂, Ratmalana, near airport, 50 ft, 19–21 Jan, 15 Feb, 6 Jun, 29 Sep, 1 Nov, Karunaratne, Krombein et al. (USNM); 1♀, 1♂, Labugama, 9 Mar, 12 Aug, Gunawardane (Colombo); 1♂, Kalatuwawa, 12–13 Aug, Huang, Peyton et al. (USNM).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 1♀, Gilimale, 19–22 Jun, Krombein et al. (USNM).

SOUTHERN PROVINCE. MATARA DISTRICT: 1♀, Dondra, Sep (Colombo); 1♀, Enselwatte, above 2500 ft, 19–20 Oct, Hevel et al. (USNM).

MISCELLANEOUS. 1♂, Ceylonia (Copenhagen; from Mus. Drows.); 1♀, no locality (Colombo).

SPECIMENS WITH TWO RED SPOTS ON ABDOMEN

NORTHERN PROVINCE. MANNAR DISTRICT: 1♂, Mannar, 31 Jan, Keiser (Basel).

NORTH CENTRAL PROVINCE. ANURADHAPURA DISTRICT: 1♂, Habarana, 5 Jul, Keiser (Basel).

NORTH WESTERN PROVINCE. PUTTALAM DISTRICT: 3♂, Puttalam, 21–23 Feb, Keiser (Basel).

WESTERN PROVINCE. COLOMBO DISTRICT: 2♂, Colombo, 18 Mar, 6 Jun, Karunaratne, Uzel (Colombo, Vienna; Betrem's plesiotype of *S. bipunctata* in latter museum); 1♂, Nugegoda, Kohuwala, 6 Jun, Krombein et al. (USNM); 7♂, Nugegoda, Papiliyana, 1, 3–4, and 17 May, 21 Sep, Karunaratne (USNM); 13♂, Ratmalana, near airport, 50 ft, 15 Feb, 18 May, 6 Jun, 29 Sep, Karunaratne, Krombein et al. (USNM).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 1♂, Pelmadulla, 8 Oct, Keiser (Basel).

SPECIMENS WITH BLACK ABDOMEN

WESTERN PROVINCE. COLOMBO DISTRICT: 2♂, Colombo (Colombo, Vienna; Betrem's plesiotype of *S. 4-p. var. coeruleans* [sic] in latter museum); 3♂, Ratmalana near airport, 50 ft, 6 Jun, Krombein et al. (USNM).

21. *Scolia (Discolia) karunaratnei*, new species

FIGURE 28

Scolia (Scolia) 4-pustulata Betrem in part [not Fabricus], 1928:316 [1♂ from Colombo misidentified].

Scolia (Discolia) quadripustulata Guiglia in part [not Fabricus], 1965:322 [3 ♂ from Inginiyagala misidentified].

REMARKS.—Except for one male from Colombo, the type series is known only from the Dry Zone. All specimens were taken at altitudes of 200 feet or less.

The female of *S. karunaratnei* is distinguished as follows: third abdominal tergum with a broad band sometimes narrowed at midline, fourth tergum immaculate or with a pair of red spots varying in size and shape; scapula and scutum with moderately spaced to subcontiguous punctures, the latter sclerite with a smaller median impunctate area than in *S. b. binotata*; and vestiture mostly black but with some scattered white hairs on occiput and usually on venter of thorax and femora. The distinguishing characters of the male are: flagellum all black, longer and not clavate as in *S. b. binotata*; third abdominal tergum with a pair of large rounded red spots, fourth tergum occasionally with a pair of smaller spots; head, thorax, and base of abdomen with rather abundant, erect white hair with intermixed black hair, paramere broader than in *S. b. binotata*, basal section of volsella broadly rounded on outer margin and clothed with quite long setae. The descriptions below are based in part on comparison with *S. b. binotata*.

I take pleasure in naming this species for P. B. Karunaratne, curator of insects at the National Museums in Colombo, who accompanied me on almost all of my collecting trips in his country.

HOLOTYPE.—♀, Sri Lanka, Southern Province, Hambantota District, Yala, Palatupana, sea level—50 ft, 8–10 March 1972, K. V. Krombein and P. B. Karunaratne (USNM Type 75720).

FEMALE.—Length 15 mm. Black, third metasomal tergum with broad red band narrowed on posterior margin at midline, fourth tergum with a pair of small, round red spots anterolaterally. Wings dark brown, forewing with metallic blue reflections, the anterior third darker than rest of membrane, microtrichiae confined to cells except a small patch adjacent to marginal cell. Erect vestiture black, except in part white on occiput, thoracic venter, and femora.

Sculpture of head much as in *S. b. binotata* except front between ocellar triangle and eye with a few scattered punctures, and vertex with a faint median groove.

Thoracic punctation comparatively more densely and more coarsely punctate than in *S. b. binotata*;

scapulae with contiguous to subcontiguous punctures; scutum with many punctures separated from each other by less than their diameter, posteriorly in middle with a quadrate impunctate area about one-fourth as wide as scutum; scutellum similarly punctured and with a small, median impunctate area posteriorly; strongly produced upper part of mesopleuron without a moderately large impunctate area; upper half of upper metapleural area with moderate-sized, relatively close punctures, lower part with scattered very fine punctures on lower two-thirds; median area of dorsal surface of propodeum mostly subcontiguously punctate, lateral area with a smaller, impunctate anterolateral area; median area of posterior surface with scattered small punctures on upper two-thirds, some of which are separated by less than the diameter of a puncture, the lateral areas somewhat more closely punctate overall.

First abdominal tergum with a very weak, median tubercle anteriorly on dorsal surface; punctation of succeeding terga slightly denser than in *S. b. binotata*, especially on the red markings.

ALLOTYPE.—♂, same data as type (USNM).

MALE.—Length 13 mm. Black, third abdominal tergum with a pair of large, rounded light red spots anterolaterally. Wings much paler brown than in female, forewing with mostly bronzy reflections, the anterior third darker than rest of membrane, entire membrane beyond cells with relatively dense microtrichiae. Erect vestiture mostly white on clypeus, mostly black on front, white and black intermixed on vertex and occiput; on thorax mostly white but black on scutum, scutellum, and postscutellum; abdomen with intermixed black and white on first five segments, black on last two.

Punctures on spatium frontale less crowded than in *S. b. binotata*, many separated by nearly the diameter of a puncture; front also more sparsely punctate and with a shallower median groove; fore part of anterior ocellus not in a deep pit; flagellum not clavate toward apex, segments toward tip about 1.2 times as long as broad, slightly concave beneath.

Thoracic punctation of about same density as in *S. b. binotata* but the punctures more shallow.

First abdominal tergum without a median tubercle anteriorly on dorsal surface; punctation more delicate and somewhat sparser than in *S. b. binotata*; genitalia (Figure 28), compared to *S. b. binotata* (Figure 27),

the paramere broader, base of volsella clothed with longer setae and broadly rounded on outer angle.

PARATYPES.—6 ♀, 4 ♂, same data as holotype (USNM); 1 ♂, Southern Province, Hambantota District, Yala, 15–18 Dec 1931 (Colombo); 1 ♀, North Western Province, Puttalam District, Wilpattu, Maddikulam, 15 Jun 1975, D. H. Messersmith, G. L. Williams, and P. B. Karunaratne (USNM); 1 ♀, Northern Province, ½ mi NE of Kokmotte Bungalow, Wilpattu Nat. Park, 21–25 May 1976, K. V. Krombein, P. B. and S. Karunaratne, D. W. Balasooriya (USNM); 1 ♂, Western Province, Colombo District, Colombo, 8 Oct 1921, G. M. Henry (Colombo; determined as *S. 4-pustulata* by Betrem); 3 ♂, Eastern Province, Amparai District, Inginiyagala, 1 and 3 Sep 1953, F. Keiser (Basel; determined as *S. quadri-pustulata* by Guiglia); 1 ♂, North Central Province, Anuradhapura District, 6 mi S of Tantilimalai, 200 ft, 31 Oct 1976, Dietz et al. (USNM). Female paratypes are 11–15 mm long; two of them lack paired red spots on the fourth metasomal tergum; and two lack white vestiture on thoracic sternum and femora. Male paratypes are 11–14 mm long; five of them have a pair of small, rounded anterolateral red spots on the fourth tergum; one has such paired spots on the fourth and fifth terga, although the latter pair is quite tiny.

22. *Scolia (Discolia) keiseri*, new species

FIGURE 29

Scolia (Discolia) quadri-pustulata var. *bipunctata* Guiglia [not Klug], 1965:322 [♂ from Kurunegala misidentified].
Scolia (Discolia) quadri-pustulata var. *coerulans* Guiglia [not Betrem], 1965:323 [♂ from Kurunegala misidentified].

REMARKS.—This small rare taxon is known only from the two males cited above from the Kurunegala District and from two females from the Badulla District. Both sexes are distinguished by the abundance of erect white vestiture covering most of the body and by the presence of small paired red spots on the third abdominal tergum. These spots are very tiny in one male and readily overlooked (hence Guiglia's misidentification of one male as the all black *S. 4-p.* var. *coerulans*). Superficially, the males resemble very much the two-spotted color phase of *S. b. binotata* Fabricius. Notable differences are: the first

five terga are almost entirely white haired, whereas *S. b. binotata* has pale vestiture usually only on the first tergum and on the red spots; the forewing membrane beyond cells is broadly clothed with microtrichiae, whereas these are confined to a small area adjacent to the marginal cell in *S. b. binotata*; and the genitalia have broader parameres, the volsellar bases have longer setae and lack the distinct basal prominence of *S. b. binotata*. The female has the thoracic dorsum comparatively more densely punctate than in *S. b. binotata* and has more extensive white vestiture on the terga.

The species is named for the late Fred Keiser of the Basel Museum, collector of the two known males, who obtained many interesting Scoliidæ during his year in Ceylon, 1953–1954.

I visited the Kurunegala area with a team 24–27 January 1975, close to the date Keiser collected one of his two males. We collected on and around Athugala (=Elephant Rock) and in the Badagama Timber Reserve but found no additional *S. keiseri*.

HOLOTYPE.—♀, Sri Lanka, Uva Province, Badulla District, 7 mi NW of Welimada near Paranagama, 27 November 1976, P. B. Karunaratne (USNM Type 75721).

FEMALE.—Length 11 mm. Black, abdomen with faint blue reflections, third tergum with a large ovoidal, anterolateral red spot two-thirds as long as and a third as wide as tergum. Wings moderate brown, anterior wing with violaceous reflections and anterior third a bit darker than rest of membrane. Erect vestiture of head, thorax, abdomen, and legs white except apical fringes of second to fourth terga with some intermixed black hairs, fringe of fifth tergum all black, and all of sixth segment with black hair.

Fissura frontalis extending on front halfway to anterior ocellus, the spatium frontale slightly more punctate than in *S. b. binotata*; front with areas below ocellar triangle and along upper eye margin with most punctures separated by the diameter of a puncture or less, ocular sinus impunctate as are areas of front between the two patches of close punctures; ocellar triangle with about six punctures, a deep punctate groove behind triangle; vertex impunctate; occiput with dense, relatively coarse punctures.

Punctures on scapulae mostly separated by less than diameter of a puncture; scutum anteriorly, laterally, and posteriorly with most of punctures as dense as

on scapulae, a quadrate area toward apex about half the length of sclerite and a third its width smooth except for a few punctures near midline; scutellum with slightly more separated coarse punctures on narrow anterior and posterior strips, the median area smooth; median area of postscutellum with coarse punctures separated by the diameter of a puncture or less; anterior slope of mesopleuron with coarse, subcontiguous punctures, posterior slope smooth except for narrow anterior strip of finer punctures; metapleuron smooth except for close, moderate-sized punctures on upper half of upper plate, and smaller, more scattered punctures on lower third of lower plate; upper surface of propodeum with coarse, subcontiguous punctures except for smooth area anteriorly and along inner edge of lateral area; lateral surface with smaller punctures that are denser above and quite scattered on most of surface; median area of posterior surface with very scattered small punctures that are denser on only a narrow strip above, lateral areas with closer, small punctures except along inner edge.

First tergum with very weak median tubercle anteriorly; abdominal punctation much as in *S. b. binotata* but lacking the narrow apical concentrations of fine punctures at apices of terga.

ALLOTYPE.—♂, Sri Lanka, North Western Province, Kurunegala District, Kurunegala, Elephant Rock, 5 February 1954, F. Keiser (Basel).

MALE.—Length 10 mm. Black and shining, abdomen with faint blue iridescence, third tergum with a pair of small, rounded anterolateral red spots. Wings light brown, anterior third of forewing darker, with violaceous reflections and some coppery reflections within cells, membrane beyond cells in forewing with abundant microtrichiae. Most of erect vestiture on head, thorax, abdomen, and legs white except mostly dark on scutum, and entirely black on apical fringes of first five abdominal segments and all of sixth and seventh segments.

Punctation of head relatively a bit sparser than in *S. b. binotata* but with same basic pattern; fissura frontalis weaker; anterior ocellus in a shallower pit; flagellum clavate toward apex as in *S. b. binotata*, segments toward tip as broad as long.

Punctures on scapulae denser, mostly separated by less than the diameter of a puncture; scutal punctation sparser, no median impunctate area although punctation is sparser there; scutellum with very faint impressed median line; mesopleural punctation rela-

tively a bit sparser; metapleuron with lower half of upper plate and upper half of lower plate with micro-punctures only; propodeal punctation noticeably sparser than in *S. b. binotata*, punctures on dorsum mostly separated by at least half the diameter of a puncture, anterior half of lateral area impunctate, lateral surface with quite scattered, smaller punctures; posterior surface with more separated punctures, relatively few on lateral area subcontiguous.

Abdomen with punctures smaller and more separated than in *S. b. binotata*; first tergum without anterior median tubercle; genitalia (Figure 29) with paramere broader than in *S. b. binotata*, base of volsella with longer setae and without the distinct basal prominence of *S. b. binotata*.

PARATYPES.—1 ♂, same locality and collector as allotype, but 23 June 1953 (USNM); 1 ♀, Badulla District, Bandarawela, 3 April 1931 (Colombo). The female paratype is 12 mm long, the apical fringes of second to fourth terga are predominantly black haired, and the fissura frontalis is shorter, present only on spatium frontale. The male paratype is 14 mm long and the red spots on third tergum are extremely tiny.

23. *Scolia (Discolia) gunawardaneae*, new species

FIGURE 30

This rare, relatively small species is known only from the holotype male from the Dry Zone. Superficially it appears rather similar to the all black color phase (*S. 4-p.* var. *coerulans*) of *S. b. binotata*, especially in that the antennal flagellum is somewhat clavate toward the apex with the segments toward the tip as broad as long, and in having the forewing membrane beyond the cells almost devoid of microtrichiae. It may be readily separated from *S. b. binotata*, however, by the much darker wing membrane, by the different metapleural punctation, and by the genitalic differences noted below.

I take pleasure in naming this species for Dr. (Mrs.) W.T.T.P. Gunawardane, assistant in entomology at the National Museums in Colombo, who has been most helpful in making arrangements for many of my collecting trips in her country.

HOLOTYPE.—♂, Sri Lanka, Eastern Province, Trincomalee District, Tennamaravadi, 11–14 August 1934, G. M. Henry (Colombo). The holotype is on long-term loan deposit in NMNH, Smithsonian Institution.

MALE.—Length 12 mm. Integument entirely black. Erect vestiture mostly white on head and most of thorax, but black on scutellum, postscutellum, propodeum, and abdomen. Wings darker brown than in *S. b. binotata*, forewing with violaceous reflections, the anterior third darker than rest of membrane; microtrichiae mostly confined to cells but a small, narrow, dense patch present along anterior margin adjacent to marginal cell, and a few scattered ones in areas adjacent to second submarginal and discoidal cells.

Spatium frontale with punctures as crowded as in *S. b. binotata* but shallower; front without a median groove but with a few punctures before anterior ocellus, anterior edge of fore ocellus in a deep pit; flagellum clavate toward apex, the segments toward tip as broad as long, straight beneath.

Thoracic punctation very similar in density to that of *S. b. binotata* but shallower; upper plate of metapleuron devoid of large punctures except immediately beneath hind wing.

First tergum with an extremely weak median tubercle at anterior margin of horizontal surface; tergal punctation denser than in *S. b. binotata* but finer; genitalia (Figure 30), compared to *S. b. binotata* (Figure 27) the volsella comparatively shorter, its lateral margin with a deep narrow incision separating the larger rounded basal prominence from the upper section.

24. *Scolia (Discolia) picteti* Saussure

FIGURE 31

- Scolia histrionica* Fabricius, 1798:256 [Tranquebar; type probably lost, teste Bradley, 1964a:16]; preoccupied in *Scolia* by *Tiphia histrionica* Fabricius, 1787.
- Scolia (Lacosi) picteti* Saussure, 1855:42 [♀; "Des Indes Orientales"; type in Geneva].
- Scolia pulchra* Smith, 1855:88 [♀; India; type in British Museum].—Bradley and Betrem, 1967:318 [confirm *S. pulchra* as a synonym of *Scolia (Discolia) picteti*].
- Scolia (Discolia) histrionica* Fabricius.—Saussure and Sichel, 1864:121–122 [*S. picteti* and *S. pulchra* synonymized; "India orientali"].
- Scolia (Scolia) histrionica* Fabricius.—Betrem, 1928:330–331 [South India and Ceylon].
- Scolia (Scolia) picteti* Saussure.—Betrem, 1941:165–166 [notes that this is valid name for taxon treated (1928) as *S. histrionica* Fabricius, 1798].
- Scolia (Discolia) picteti* Saussure.—Betrem and Bradley, 1964b:94. [assign *S. picteti* to subgenus *Discolia*].—Guiglia, 1965:323 [Ceylon localities].

REMARKS.—*Scolia picteti* and *S. ceylonicola* Betrem are unique among the Ceylonese Scoliinae in the very abundant yellow markings. The former differs from the latter in being somewhat larger (♀, 17–25 mm; ♂, 16–20 mm), in having a dark mark in the second discoidal cell, and in aspects of punctation and color pattern as detailed in the foregoing key. *Scolia picteti* has a rather restricted distribution in South India and Sri Lanka. In Sri Lanka it seems to be restricted to areas of moderate to heavy rainfall. The male was unknown previously and is described from two males collected during field work of the Smithsonian Insect Project.

These two species are the only representatives in Sri Lanka of Betrem's group of *Scolia erythrocephala* Fabricius, a group of brightly marked species that range from the southern Palearctic Region to India and Sri Lanka.

FEMALE.—Length 17–25 mm. Head predominantly bright yellow, the following ferruginous: mandible except apex, clypeus, antenna on basal half, lower temple. The following black: apex of mandible, spatium frontale, ocellar triangle, most of temple and head beneath. Thorax including legs predominantly ferruginous; scapula mostly bright yellow. The following black: scutum anteriorly and a small spot in middle, side of pronotum, mesopleuron narrowly both anteriorly and posteriorly, and sternum. Wings strongly yellowish, forewing with a large dark area at apex and a small, elliptical dark mark in second discoidal cell. Abdomen predominantly black. The following bright yellow: large paired spots or a band on second tergum, large paired spots on third, and smaller paired spots on fourth. The following ferruginous: paired transverse spots or band across base of horizontal aspect of first tergum, and first to third sterna except at base. Vestiture mostly reddish, sometimes with a fiery tinge especially on last two terga and apical fringe of fourth, that on yellow abdominal markings yellowish, and apical fringes of first to third terga black.

Area frontalis and spatium frontale densely punctate; fissura frontalis extending to anterior ocellus; front mostly smooth with a few scattered punctures except for a denser patch between eye and ocellar triangle and in the triangle; vertex with scattered punctures; occiput more densely punctate.

Scapula and scutum mostly subcontiguously punctate, the latter without smooth median area poste-

riorly; upper plate of metapleuron with coarse, contiguous punctures on upper two-thirds; dorsal surface of propodeum contiguously punctate, posterior surface densely but not so closely punctate.

First tergum without a median tubercle at base of horizontal surface.

MALE.—Length 16–20 mm. Black, the following pale yellow: clypeus on sides and above, scapula, base of tegula, small, longitudinal posterolateral streak on scutum, scutellum, postscutellum in middle, tiny spot in middle on dorsal surface of propodeum, most of lateral areas of dorsal and posterior surfaces of propodeum, narrow stripes on outer surface of fore and mid tibiae, and relatively broad apical bands on first five terga, anterior margin of first narrowly and shallowly emarginate in middle, that of second narrowly and more deeply emarginate, that of third broadly and shallowly emarginate, that of fifth narrowed and almost divided along midline. Wings pale, forewing slightly infumated along anterior margin and with a weak darkened mark in second discoidal cell. Erect vestiture of head and thorax whitish, black on abdomen except on yellow areas where it is whitish, apical tergal fringes black.

Flagellum not clavate toward apex, most of segments longer than broad; spatium frontale densely punctate; fissura frontalis extending to anterior ocellus, first tergum without an anterior median tubercle on horizontal surface; genitalia (Figure 31) with paramere broader than in *S. ceylonicola* and clavate toward apex, volsella more sparsely setose on basal section and more uniformly setose on apical section.

SPECIMENS EXAMINED.—CENTRAL PROVINCE. KANDY DISTRICT: 38 ♀, Kandy (including Udawattakele, Lady Blake's Drive), 10 and 16–31 Aug, 1–17, 8 and 20–27 Sep, Oct, Karunaratne, Keiser, Wickwar (USNM, Colombo, Basel); 2 ♀, Haragama, 5 Nov, Keiser (Basel); 2 ♀, Teldeniya, 16 Nov, Keiser (Basel); 6 ♀, Mailapitiya, 3 Nov, Keiser (Basel).

WESTERN PROVINCE. COLOMBO DISTRICT: 3 ♀, Labugama Reservoir Jungle, 19 May, 23–24 Jun, 12 Aug, Gunawardane, Karunaratne, Wood et al. (USNM); 6 ♀, Kalatuwawa, 6 and 12–15 Aug, Gunawardane, Huang and Peyton, et al. (USNM, Colombo).

SABARAGAMUWA PROVINCE. RATNAPURA DISTRICT: 3 ♀, Ratnapura, 17–18 Sep, 21 Dec (Colombo); 2 ♂, Uggalkaltota, irrigation bungalow, 350 ft, 21 Jan–8 Feb, Davis et al. (USNM); 1 ♀, Kiriwandeniya, 13 mi on Wewelwatta Rd, 20 Jun, Krombein et al. (USNM).

MISCELLANEOUS. 2 ♀, no locality label (Colombo).

25. *Scolia (Discolia) ceylonicola* Betrem

FIGURE 32

Campsomeris (Campsomeris) collaris Fabricius.—Betrem in part, 1928:128 [3 ♂ from Colombo misidentified as *C. collaris*].

Scolia (Scolia) ceylonicola Betrem, 1928:262, 332 [♀; Ceylon; holotype in Colombo Museum].

Scolia (Discolia) ceylonica Betrem.—Betrem and Bradley, 1964b:94 [lapsus].

REMARKS.—Betrem described this uncommon taxon from four females from Colombo. I have examined the type and two paratypes in the Colombo Museum. In addition, I found in that collection a number of females and five *S. ceylonicola* males, also from Colombo, three of the males that Betrem misidentified as *Campsomeris collaris* Fabricius. At the present time *S. ceylonicola* has been collected only in or near Colombo in Sri Lanka. I have seen two females from Tranquebar, South India (Berlin).

Scolia ceylonicola shares with *S. picteti* Saussure the distinction of being the most brightly marked of Ceylonese Scoliinae. It is the smaller of the two species (♀, 15–19 mm; ♂, 12–16 mm), lacks a dark mark in the second discoidal cell, and differs in details of punctuation and color as stated in the foregoing key.

FEMALE.—Length 15–19 mm. Head almost entirely bright yellow; the following ferruginous: mandible except base, antenna at base but becoming yellower toward apex, a narrow stripe between eyes across ocellar triangle and head beneath. Thorax predominantly ferruginous but the following bright yellow: pronotum, scutellum, postscutellum, upper part of mesopleuron, and outer surface of fore tibia and apical spot on outer surface of fore femur. Wings less strongly yellowish than in *S. picteti*; apex of forewing with a smaller, lighter infumated spot and second discoidal cell without dark area. Abdomen predominantly ferruginous, the following bright yellow: large paired spots on second to fourth terga, occasionally coalescing at midline. Vestiture mostly reddish, sometimes with a fiery tinge especially apical fringe of fourth tergum and all on fifth and sixth, apical fringes of first two terga black, vestiture on yellow abdominal spots yellowish.

Area frontalis and spatium frontale densely punctate; fissura frontalis extending to anterior ocellus; front smooth except a few punctures adjacent to fissura frontalis and a denser concentration adjacent to

ocellar triangle; vertex with scattered punctures; occiput with a denser concentration.

Scapula more sparsely punctate than in *S. picteti*, a small area at apex smooth; scutum subcontiguously punctate but with a small median smooth area posteriorly; upper plate of metapleuron with smaller, close punctures than in *S. picteti*; dorsal surface of propodeum with smaller, somewhat more separated punctures than in *S. picteti*, posterior surface with much sparser punctation.

First tergum without a median tubercle at base of horizontal surface.

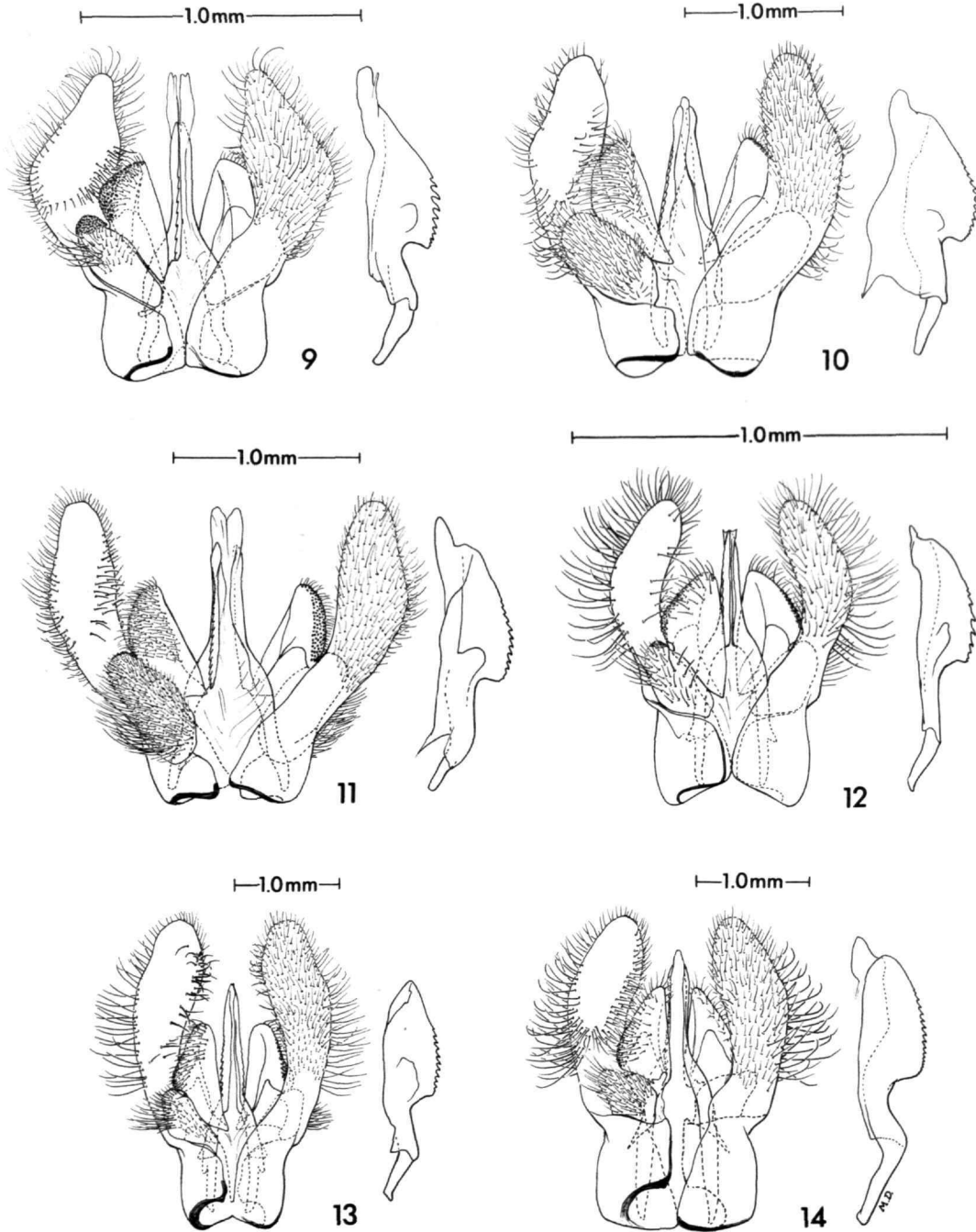
MALE.—Length 12–16 mm. Head black, the following brighter yellow than in *S. picteti*: basal two-thirds of mandible, clypeus, supraclypeal area, streak along inner eye margin to and including all of ocular sinus, and narrow streak along posterior eye margin. Thorax black to some extent; the following brighter yellow than in *S. picteti*: pronotum, tegula at base, scutellum, middle of postscutellum, mesopleuron in middle, and streaks on or entire outer surface of femora and tibiae; the following ferruginous: pronotum in one specimen, metapleuron except in one specimen, legs except for yellow areas and all of propodeum except base of

dorsal surface. Wings pale, anterior margin of forewing yellowish except for diffuse, infumated spot at apex. Abdomen predominantly black especially beneath; the following brighter yellow than in *S. picteti*: broad bands on first four terga very slightly and narrowly emarginate in middle anteriorly (these bands present only on first two terga in one specimen). The following ferruginous: first sternum and broad band on third tergum in one specimen. Vestiture whitish on head, thorax, and first four abdominal segments, reddish to brown on remaining abdominal segments.

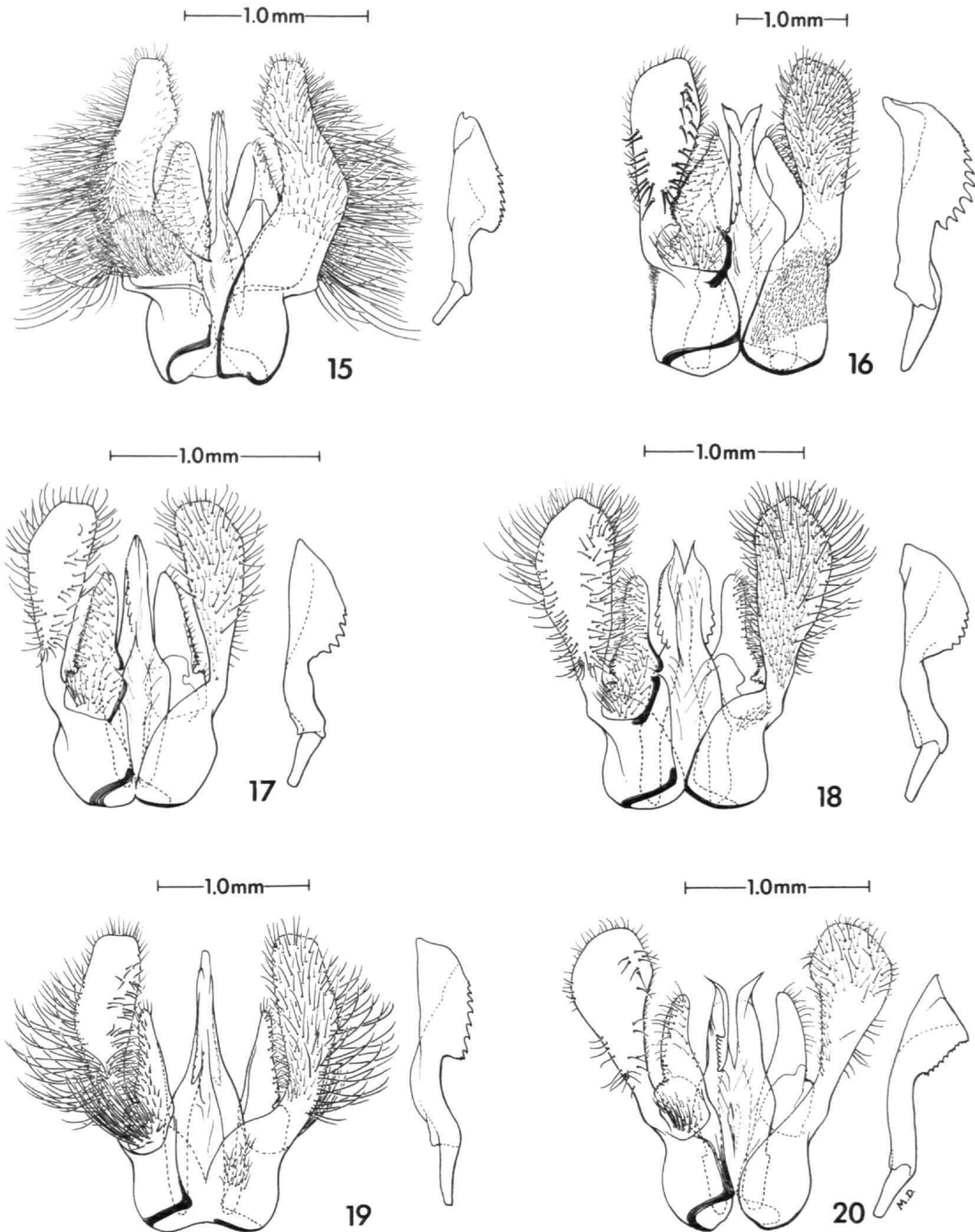
Flagellum not clavate toward apex, most of segments longer than broad; spatium frontale densely punctate; fissura frontalis extending to anterior ocellus; first tergum without an anterior median tubercle on horizontal surface; genitalia (Figure 32) with paramere narrower than in *S. picteti* and not clavate toward apex, volsella more densely setose on basal section and more sparsely so on apical section.

SPECIMENS EXAMINED. — WESTERN PROVINCE. COLOMBO DISTRICT: 16 ♀, 5 ♂, Colombo, 8 Feb, Mar, May, 6 Jul, 30 Aug, Oct, 4 and 29 Nov (Colombo; ♀ holotype, 2 ♀ paratypes); 1 ♀, Katunayake, 30 Sep, P. B. Karunaratne (USNM).

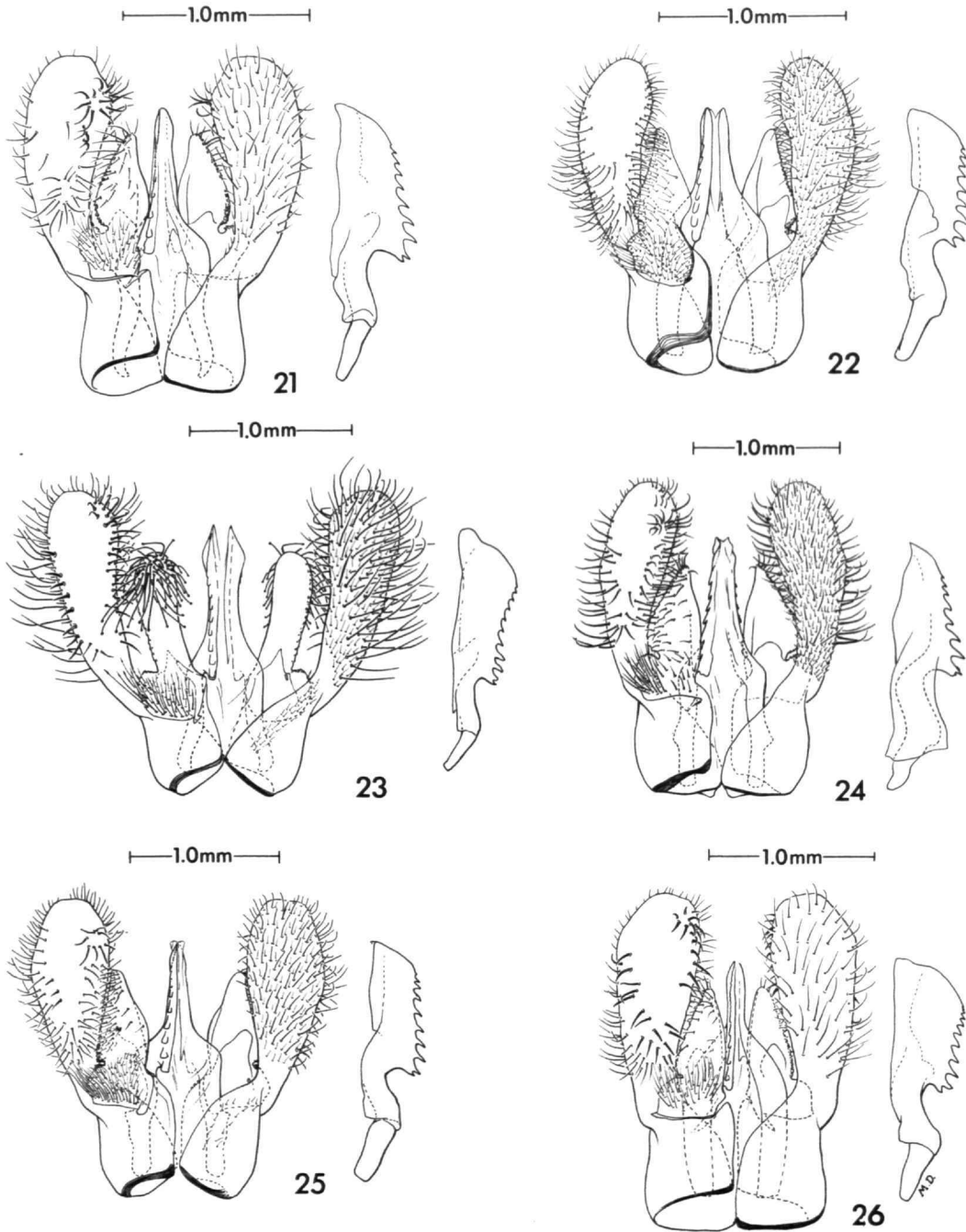
MISCELLANEOUS. 1 ♀, no locality label (Colombo).



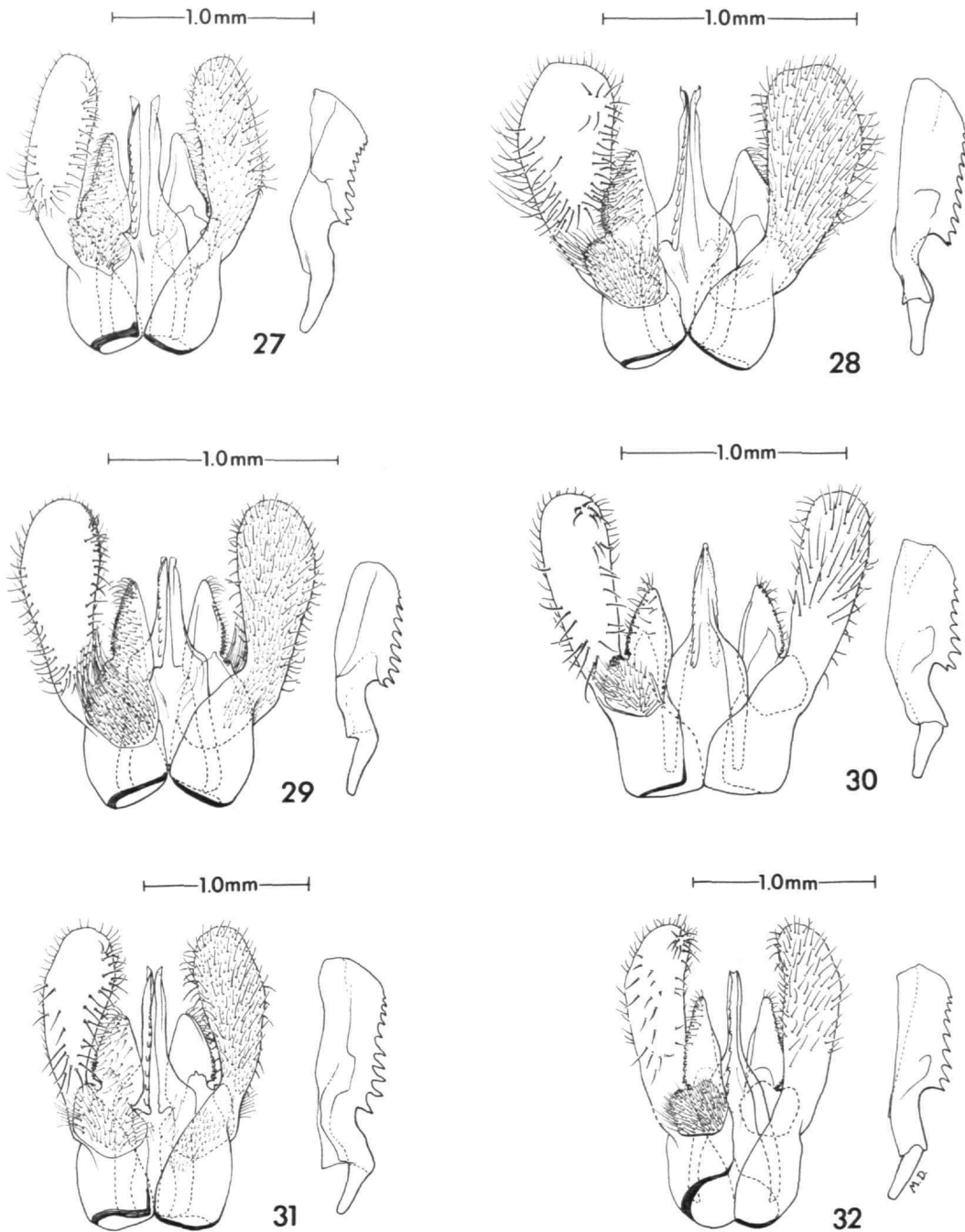
FIGURES 9-14.—Male genitalia, ventral aspect at left, dorsal aspect in middle, aedeagus in profile at right: 9, *Phalerimeris phalerata turneri* (Betrem); 10, *Megacampsomeris vanoordti* (Betrem); 11, *Megacampsomeris c. ceylonica* (Kirby); 12, *Micromeriella m. marginella* (Klug); 13, *Colpacampsomeris indica eliformis* (Saussure); 14, *Sericocampsomeris pseudindica* (Betrem).



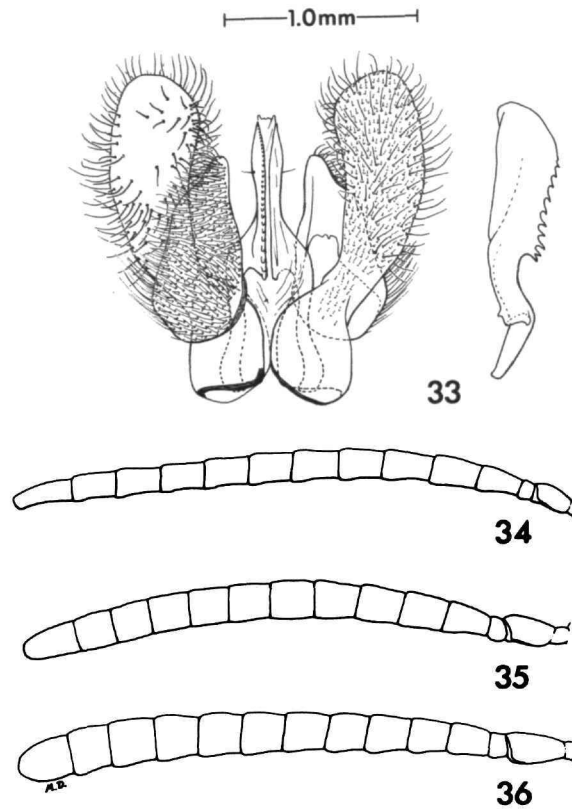
FIGURES 15-20.—Male genitalia, ventral aspect at left, dorsal aspect in middle, aedeagus in profile at right: 15, *Campsomeriella c. collaris* (Fabricius); 16, *Megascolia azurea michae* (Betrem); 17, *Austroscolia ignota* (Betrem); 18, *Austroscolia ruficeps henryi*, new subspecies; 19, *Liacos erythrosoma cruzi*, new subspecies; 20, *Microscolia hydrocephala* (Micha).



FIGURES 21-26.—Male genitalia, ventral aspect at left, dorsal aspect in middle, aedeagus in profile at right: 21, *Scolia cyanipennis* Fabricius; 22, *Scolia trivandrumensis* Betrem; 23, *Scolia affinis* Guérin; 24, *Scolia vollenhoveni wickwari*, new subspecies; 25, *Scolia aureipennisformis* Betrem; 26, *Scolia quadripustulata* Fabricius.



FIGURES 27-32.—Male genitalia, ventral aspect at left, dorsal aspect in middle, aedeagus in profile at right: 27, *Scolia b. binotata* Fabricius; 28, *Scolia karunaratnei*, new species; 29, *Scolia keiseri*, new species; 30, *Scolia gunawardanae*, new species; 31, *Scolia picteti* Saussure; 32, *Scolia ceylonicola* Betrem.



FIGURES 33-36.—Male genitalia, ventral aspect at left, dorsal aspect in middle, aedeagus at right: 33, *Scolia fasciatopunctata* Guérin. Male antennae: 34, *Scolia affinis* Guérin; 35, *Scolia vollenhoveni wickwari*, new subspecies; 36, *Scolia b. binotata* (Fabricius).

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