# DESCRIPTIONS OF STREPSIPTERA (INSECTA) FROM SOUTHEAST ASIA, WITH A CHECKLIST OF THE GENERA AND SPECIES OCCURRING IN THE REGION

**Jeyaraney Kathirithamby**

*ABSTRACT.*- Ten new species: six of Halictophagidae, three of Myrmecolacidae and one of Elenchidae, are described and twelve new records: two of Corioxenidae and ten of Myrmecolacidae are provided. A checklist of the genera and species of Southeast Asian Strepsiptera, along with keys to the subfamilies of Halictophagidae, and the genera of Halictophaginae are given.

## INTRODUCTION

The first strepsipteran from Southeast Asia was captured by Wallace in 1867. This was from a homopteran in Sarawak and was later described by Westwood (1877) as *Colacina insidiator.* This was also the first description of a strepsipteran from a non-hymenopteran host.

Five hundred and fifty-four species of Strepsiptera have been described worldwide so far. This paper is the first comprehensive one of Strepsiptera from Southeast Asia.

## MATERIALS AND ABBREVIATIONS

**Abbreviations: ZML - Zoological Museum, Lund, Sweden; CNC - Canadian National Collection, Ottawa, Canada; OUM - Hope Entomological Collections, University Museum, Oxford, U.K.; S.A. - S. Adebratt (name of collector).**

**Wing expanse - widest length of wing.**

Location: A1L - Mendolong, Sipitang, Sabah, N. Borneo, $40^0$ 52' N, $115^0$ 43' E; W5L - Mendolong, Sipitang, Sabah, N. Borneo; P1 - Mendolong area, Sipitang, Sabah, N. Borneo, $4^0$ 48' N, $115^0$ 40' E.

**Jeyaraney Kathirithamby** - Department of Zoology, University of Oxford, South Parks Road, Oxford, OX1 3PS.

## CHECKLIST OF STREPSIPTERA FROM SOUTHEAST ASIA

| Taxa | Distribution | Hosts |
|---|---|---|
| | **Family Corioxenidae Kinzelbach, 1970** | |
| **Subfamily Corioxeninae Kinzelbach, 1970** | | |
| Genus *Malayaxenos* Kifune, 1981 | | |
| *kitaokai* Kifune, 1981 | Ipoh (W. Malaysia) | unknown |
| **Subfamily Triozocerinae Kinzelbach, 1970** | | |
| Genus *Triozocera* Pierce, 1909 | | |
| *boharti* Luna de Carvalho, 1967 | Negros, Mindanao | unknown |
| *mexicana:* Luna de Carvalho, 1956 (nec Pierce, 1909) | (Philippines) | |
| *siamensis* Kifune & Hirashima, 1979 | San Pa Tong (Thailand) | unknown |
| | Tawau (Sabah) | |
| | Luang Prabang (Laos) | |
| | Perak (W. Malaysia) | |
| | **Family Halictophagidae Perkins, 1905** | |
| **Subfamily Tridactylophaginae Hofeneder & Fulmek, 1943** | | |
| Genus *Tridactylophagus* Subramanium, 1932 | | |
| *similis* Kinzelbach, 1971a | Mindanao (Philippines) | unknown |
| **Subfamily Halictophaginae Perkins, 1905** | | |
| Genus *Halictophagus* Curtis, 1831 | | |
| *australensis* Perkins, 1905 | Qld. (Australia), W. Malaysia, Sarawak (E. Malaysia) | *Cofana spectra* |
| *spectrus Yang*, 1964 | Sri Lanka, China, Japan, | |
| *helleri* Kinzelbach, 1971c | Sabah (E. Malaysia) | |
| *jacobsoni* de Meijere, 1908 | Java | *Ozoides lineatus* Biermann |
| *peradeniya* (Pierce, 1911) | Peradeniya (Sri Lanka) | *Thompsoniella arcuata* Mots. |
| | Kuala Lumpur (W. Malaysia-Dover, 1927) | |
| *javanensis* (Pierce, 1918) | Buitenzorg (Java) | unknown |
| (*Cyrtocaraxenos*) | Leyte (Philippines) | |
| *fulmeki* (Hofeneder, 1927) | Sumatra | unknown |
| *piperi* Bohart, 1943 | Luzon (Philippines) | *Cofana longa* Wall |
| *bipunctatus* Yang, 1955 (*Tettigoxenos*) | China, Japan | *Nephotettix nigropictus* (Stål) |
| *munroei* Hirashima & Kifune, 1978 | | *N. cincticepus* (Uhler) |
| Hirashima & Kifune, 1985 | Indonesia | *N. virescens* (Distant) |
| | Philippines, W. Malaysia, Sarawak (E. Malaysia) | *Recilia dorsalis* (Motschulsky) |
| *steffani* Kinzelbach, 1971a | Tarawakan (Philippines) | unknown |

## Checklist of Strepsiptera from Southeast Asia (cont'd)

| Taxa | Distribution | Hosts |
|---|---|---|
| *longipenis* Kifune, 1981 | Ipoh (W. Malaysia) | unknown |
| *malayanus* Kifune, 1981 | Ipoh (W. Malaysia) | unknown |
| *chantaneeae* Kifune & Hirashima, 1983a | San Po Tong (Thailand) | unknown |
| *thaiae* Kifune, 1983a | Bah Mae Kachiang (Thailand) | *Thaia oryzivora* Ghauri |
| *yaeyamanus* Kifune (in Kifune & Hirashima, 1984) | Japan | |
| *stenocrani* Kifune, 1986a | Japan | *Stenocranus minutus* (Fabricius) |
| *thoracicus* Kifune & Hirashima, 1989 | Forest Camp (Sabah, E. Malaysia) | unknown |
| *angustipes* Kifune & Hirashima, 1989 | Tawau (Sabah, E. Malaysia) | unknown |
| *shepardi* Barrion & Litsinger, 1989 | *Laguna* (Philippines) | *Heralus viridis* (Distant) |
| *libetarioi* Barrion & Litsinger, 1989 | Mindanao (Philippines) | unknown |
| Genus *Stenocranophilus* Pierce, 1914 | | |
| *dicranotropidis* (Pierce, 1918) (*Muirixenos*) | Java | *Dicranotropis muiri* Kirkaldy |
| | **Family Calliphaarixenidae** Pierce, 1918 | |
| Genus *Calliphaarixenos* Pierce, 1918 | | |
| *siamensis* (Pierce, 1918) (*Chrysocorixenos*) | Thailand | *Chrysocoris grandis* Thunberg |
| | **Family Elenchidae** Perkins, 1905 | |
| **Subfamily Elenchinae** Perkins, 1905 | | |
| Genus *Elencholax* Kinzelbach, 1971a | | |
| *noonadanae* Kinzelbach, 1971a | Balabac (Philippines) | unknown |
| Genus *Colacina* Westwood, 1877 | | |
| *insidiator* Westwood, 1877 | Sarawak (E. Malaysia) | *Epora subtilis* Walker |
| Genus *Elenchus* Curtis, 1831 | | |
| *japonicus* (Esaki & Hashimoto, 1931) | Japan, China | *Sogatella furcifera* (Horváth) |
| *yasumatsui* Kifune & Hirashima, 1975 | W. Malaysia, Sarawak (E. Malaysia) Philippines, Thailand | *Nilaparvata lugens* (Stål) *Laodelphax striatellus* (Fallén) *Nilaparvata muiri* China *Sogatella vibix* (Haupt) |
| | **Family Myrmecolacidae** Saunders, 1872 | |
| Genus *Lychnocolax* Bohart, 1951 | | |
| *mindanao* Bohart, 1951 | Mindanao (Philippines) New Ireland, New Guinea, Palau Is. | unknown |

Checklist of Strepsiptera from Southeast Asia (cont'd)

| Taxa | Distribution | Hosts |
|---|---|---|
| *mindoro* Bohart, 1951 | Mindoro, Busuanga, Culion (Philippines) | unknown |
| *postorbis* Bohart, 1951 | Mindanao (Philippines) | unknown |
| | Ipoh (W. Malaysia), Kalabakan (Sabah) | unknown |
| *ovatus* Bohart, 1951 | Mindanao (Philippines) | unknown |
| | Kalabakan (Sabah, E. Malaysia) | |
| *palpalis* Bohart, 1951 | Mindanao (Philippines) | unknown |
| *orientalis* Kifune, 1981 | Ipoh (W. Malaysia), Solomon Is. | unknown |
| *aerius* Kifune & Hirashima, 1989 | K. Tahan to K. Tembeling (W. Malaysia) | unknown |
| *vietnamicus* Kifune & Hirashima, 1989 | Vietnam | unknown |
| Genus *Myrmecolax* Westwood, 1861 | | |
| *nietneri* Westwood, 1861 | Ramboddo, Sri Lanka | *Camponotus* group (host of male) *maculatus-mitis* group |
| *Elenchus tenuicornis:* Green, 1902 (nec Kirby, 1815) | Peradeniya, Sri Lanka, Kuala Tembeling (Pahang, W. Malaysia-Dover, 1927) | |
| *flagellatus* (de Meijere, 1908) | Java (Indonesia) | unknown |
| *culionensis* Bohart, 1951 | Calamianes (Philippines) | unknown |
| *furcatus* Bohart, 1951 | Mindanao, Busnanga (Philippines) | unknown |
| | Bau (Sarawak, E. Malaysia) | |
| *philippinensis* Bohart, 1941 | Mindanao (Philippines) | unknown |
| *rossi* Bohart, 1951 | Mindoro, Mindanao, Luzon, Busnanga (Philippines), Ipoh (W. Malaysia), Sumatra (Indonesia), Lantau (Hong Kong) | unknown |
| *odontognathus* Kogan & Oliveira, 1964 | New Guinea, Soloman Is., New Britain Luzon (Philippines), Tawau (Sabah, E. Malaysia), Tebang (Sarawak, E. Malaysia) | unknown |
| *chantaneeae* Kifune & Hirashima, 1979 | Sau Pa Tong (Thailand) | unknown |
| *genitalis* Kifune & Hirashima, 1989 | Laos, Pahang (W.Malaysia) | unknown |
| Genus *Stichotrema* Hofeneder, 1910 | | |
| *dallatorreanum* Hofeneder, 1910 | Admiralty Is., New Guinea Australia, Sri Lanka | *Segestes decoratus* Redtenbacher, |
| | Tawau (Sabah, E. Malaysia) | *Sexava nubila* (Stål), *Segestidea novaeguineae* (host of female) |
| *davao* (Bohart, 1951) *(Rhipidocolax)* | Mindanao, Busnanga (Philippines) | unknown |
| *retrorsum* (Bohart, 1951) *Rhipidocolax retrosus* | Mindanao (Philippines) Ipoh (W. Malaysia) Tawau (Sabah, E. Malaysia) | unknown |
| *acutipenis* Kogan and Oliveira, 1964 | New Guinea, Tawau (Sabah, E. Malaysia) Northern Territory (Australia), Sri Lanka | *Camponotus papua* Emery |

## Checklist of Strepsiptera from Southeast Asia (cont'd)

| Taxa | Distribution | Hosts |
|---|---|---|
| *malayanum* Kifune, 1981 | Ipoh (W. Malaysia) | unknown |
| *yasumatsui* Kifune, 1983b | Thailand | *Euscyrtus* sp. (host of female) |
| *silvaticum* Kifune & Hirashima, 1989 | Tawau (Sabah, E. Malaysia) | unknown |
| | Family **Stylopidae** Kirby, 1813 | |
| Subfamily **Xeninae** Saunders, 1872 | | |
| Genus *Xenos* Rossi, 1793 | | |
| *Xenos* du Buysson, 1903 | | |
| *Acroschismus* Pierce, 1908 | | |
| *Schistosiphon* Pierce, 1908 | | |
| *Vespaexenos* Pierce, 1909 | | |
| *Belonogastechthrus* Pierce, 1911 | | |
| *Clypoxenos* Brèthes, 1923 | | |
| *Brasixenos* Kogan & Oliveira, 1966 | | |
| *moutoni* du Buysson, 1903 | China, Taiwan, Japan | *Vespa mandarina nobilis* Sonan |
| *Vespaexenos crabronis* Pierce, 1909 | | |
| *V. buyssoni* Pierce, 1909 | Vietnam | *V. tropica pseudosorer* |
| *V. matsumurai* Székessy, 1965 | | |
| *V. japonicum* Matsumura, 1931 | | |
| *ropalidiae* (Kinzelbach, 1975) | New Guinea, Indonesia | *Ropalidia fulvopruinosa* |
| | Philippines, Pakistan | *R. ferruginea, R. varietata* |
| *formosanus* Kifune & Maeta, 1985 | Puli, Taiwan | *Vespa velutina flavitarsus* Sonan |
| *circularis* Kifune & Maeta, 1985 | Chunyang, Taiwan | *Polistes rothneyi gressitti* van der Vecht |
| *yamaneorum* Kifune & Maeta, 1985 | Hengchun, Taiwan | *Polistes gigas* (Kirby) |
| *provesparum* Kifune, 1986b | Sumatra | *Provespa anomala* (Saussure) |
| | | *P. nocturna* van der Vecht |
| Genus *Pseudoxenos* Saunders, 1872 | | |
| *Leinotoxenos* Pierce, 1909 | | |
| *Monobiophila* Pierce, 1909 | | |
| *Monerzumiophila* Brèthes, 1923 | | |
| *Macroxenos* Schultze, 1925 | | |
| *piercei* (Schultze, 1925) | Luzon, Cebu, | *Rhynchium atrum atrum* Saussure |
| (*Macroxenos*) | Mindanao (Philippines) | *R. atrissimum* van der Vecht |
| *schultzei* Kifune & Maeta, 1965 | | |
| Genus *Paraxenos* Saunders, 1872 | | |
| *abbotti* (Pierce, 1909) (f) | Thailand | *Sphex* sp. |
| *kurosawai* Kifune, 1983 | Palawan (Philippines) | *Sphex madasummae* van der Vecht |
| Subfamily **Stylopinae** Kirby, 1813 | | |
| Genus *Hylecthrus* Saunders, 1850 | | |
| *taiwan* Kinzelbach, 1971d | Shonorya, Taiwan | *Hylaeus* sp. |

Checklist of Strepsiptera from Southeast Asia (cont'd)

| Taxa | Distribution | Hosts |
|---|---|---|
| Genus *Halictoxenos* Pierce, 1908 | | |
| *Apractelytra* Pierce, 1908 | | |
| *Halictostylops* Pierce, 1909 | | |
| *Halictoxenos* (*Halictophilus*) Pierce, 1909 | | |
| *Halictoxenos* (*Augochloraphilus*) Pierce, 1911 | | |
| *manilae* Pierce, 1909 | Manila (Philippines) | *Eulaeus manilae* (Ashmead) |
| *robbii* Pierce, 1909 | Manila (Philippines) | *E. robbii* (Ashmead) |

## FAMILY CORIOXENIDAE KINZELBACH, 1970

Mengeidae Pierce, 1908: 75.
Callipharixenidae Blair, 1936: 116.
Corioxeninae Kinzelbach, 1970: 106; Miyamoto & Kifune (1984): 143; Kathirithamby (1989a): 71.

Nine species have been described from the Australian-Pacific Region (Kathirithamby, 1990), and three from Southeast Asia: two of which are noted as new records here. Only the subfamilies Corioxeninae and Triozocerinae have been recorded from Southeast Asia. Uniclavinae is endemic to the African region.

## SUBFAMILY CORIOXENINAE KINZELBACH, 1970

Corioxeninae Kinzelbach, 1970: 106.
Corioxeninae - Kathirithamby (1989a): 71.
Blissoxeninae Miyamoto & Kifune, 1984: 142 (syn).

There are six genera in this subfamily. *Austrostylops* is endemic to the Australian region (Kathirithamby, 1989a), *Malayaxenos* to Asia, *Blissoxenos* to Japan, and there is one new genus from Florida (Kathirithamby & Peck, in press).

### Genus *Malayaxenos* Kifune, 1981

*Malayaxenos* Kifune, 1981: 323.
Type species: *Malayaxenos kitaokai* Kifune, 1981.

### *Malayaxenos kitaokai* Kifune, 1981

*Malayaxenos kitaokai* Kifune, 1981, *Kontyû* 49(2): 323. Loc: WEST MALAYSIA: Ipoh, Perak.

***Material***. - 1 male (ZML), light trap, A1L, Mendolong, Sipitang, Sabah, coll. S.A., 26.xi.1987.

***Distribution.*** - Ipoh, W. Malaysia; Sipitang, Sabah.

***Remarks.*** - The subfamily Corioxeninae incorporates the genera *Blissoxenos*, *Loania*, *Corioxenos*, *Mufagaa*, *Malayaxenos* and *Australoxenos*. *A. yetmaniensis* Kathirithamby, 1990, is similar to *M. kitaokai* in the structure of the mandibles, and the Xth abdominal segment, but differs from it in the absence of the projections on the Ist and IInd tarsal segments, $CuA_1$ being longer than half of $CuA_2$, CuP being as long as $CuA_1$, and the smaller overall size.

## SUBFAMILY TRIOZOCERINAE KINZELBACH, 1970

Triozocerinae Kinzelbach, 1970: 105.
Triozocerinae - Kathirithamby, 1989a: 71.

### Genus *Triozocera* Pierce, 1909

*Trioxocera* Pierce, 1909: 89; 1911: 490.
Type species: *Triozocera mexicana* Pierce, 1909.

#### *Triozocera siamensis* Kifune & Hirashima, 1979

*Triozocera siamensis* Kifune & Hirashima, 1979, *Esakia*, 14: 62. Loc. THAILAND: San Pa Tong. - Kifune, 1981, *Kontyû*, 49(2): 322. Loc. W. MALAYSIA: Ipoh, Perak. - Kifune & Hirashima, 1989, *Esakia*, 28: 13. Loc. SABAH: Tawau District, Kalabakan; LAOS: Luang Prabang.

***Material.*** - male (ZML), light trap, A1L, Mendolong, Sipitang, Sabah, coll. S.A., 26.xi.1987; 1 male, 20.ii.1988, same data as above.

***Distribution.*** - San Pa Tong, Thailand; Ipoh, W. Malaysia; Tawau District and Sipitang, Sabah; Luang Prabang, Laos.

## FAMILY HALICTOPHAGIDAE PERKINS, 1905

Halictophaginae Perkins, 1905: 98.
Halictophagoidea - Pierce, 1908: 76.
Halictophagidae - Pierce, 1908: 76.
Dioxoceridae Pierce, 1908: 76.
Diozoceridae - Pierce, 1911: 504.

Kinzelbach (1971b) divided the Halictophagidae into three subfamilies, Coriophaginae Kinzelbach, 1971b, Tridactylophaginae Hofeneder & Fulmek, 1943, and Halictophaginae Perkins, 1905. But the characters he gave for the erection of Coriophaginae as a subfamily are not sufficient for its separation from the Halictophaginae. It is proposed that *Coriophagus*, *Stenocranophilus* and *Halictophagus* are three genera in the subfamily Halictophaginae.

*Halictophagus*, *Coriophagus* and *Tridactylophagus* have been recorded in Southeast Asia.

## KEY TO THE SUBFAMILIES OF HALICTOPHAGIDAE

Adult males:

1. Antenna 6-segmented with flabellum only on IIIrd segment; parasites of Diptera (Tephritidae) ..... Dipterophaginae
   Antenna 7-segmented with flabellum on segments III, or III-VI ..... 2

2. Antenna with flabellum only on segment III; parasites of Orthoptera (Tridactylidae) .... ..... Tridactylophaginae
   Antenna with flabellum on segments II-IV, III-V or III-VI; parasites of Homoptera (Cicadellidae, Delphacidae, Eurybrachyidae, Fulgoridae, Tetttigometridae, Issidae, Tettigometridae, Flatidae, Cercopidae, and Membracidae) and Heteroptera (Pentatomidae) ..... Halictophaginae

## SUBFAMILY HALICTOPHAGINAE PERKINS, 1905

Halictophaginae Perkins, 1905: 98.
Coriophaginae Kinzelbach, 1971b: 8.

## KEY TO THE GENERA OF HALICTOPHAGINAE

Adult males:

1. Flabella of antennal joints broad and flattened ..... 2
   Flabella of antennal joints round, and may be short on Vth and VIth segments ..... ..... *Stenocranophilus*

2. Head capsule with recognisable regions; larger species ..... *Coriophagus*
   Head capsule simplified; smaller species ..... *Halictophagus*

### Genus *Coriophagus* Kinzelbach, 1971b

*Halictophagus* Bohart, 1962: 91 (partim).
*Coriophagus* Kinzelbach, 1971b: 8.

Type species: *zanzibarae* Bohart, 1962.

Seven species have been described from the Australian-Pacific Region (Kifune & Hirashima, 1989; Kathirithamby, 1992).

### *Coriophagus adebratti*, new species
(Figs. 1-7)

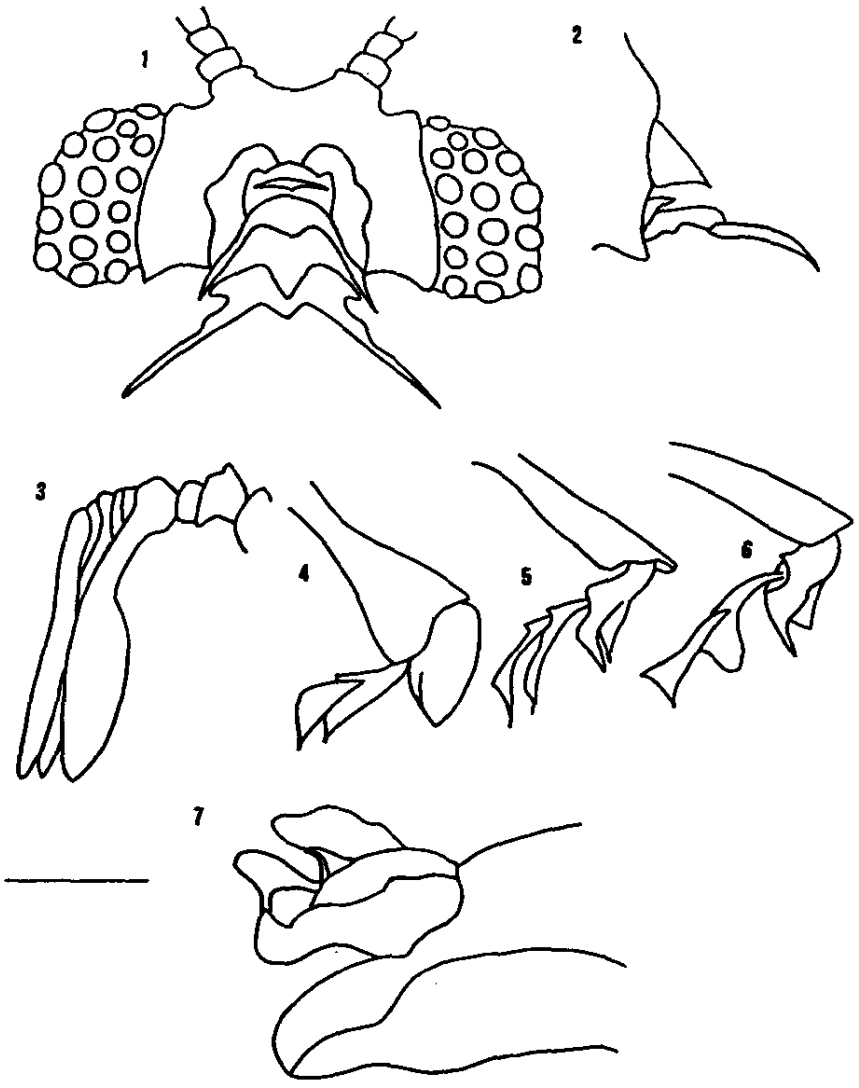
***Material.*** - Holotype - male (ZML), A1L, Mendolong, Sipitang, Sabah, coll. S.A., 6.iv.1988.

***Description***. - Male. Ommatidia ± 25. Head width (including eyes) 0.97mm, (excluding eyes) 0.56mm (Fig. 1). Mandibles (0.09mm) almost the same length as basal segment of maxilla (1.00mm), maxillary palpi, 1.50mm (Fig. 2).

Ist antennal segment, 0.09mm, IInd, half as long (0.04mm), IIIrd, the longest, 0.64mm; IVth-VIIth almost the same lengths, (IVth, 0.58mm; Vth, 0.59mm; VIth, 0.58mm; VIIth, 0.54mm) (Fig. 3).

Wing span, 2.05mm.

Tarsi as in Figs 4-6.




Figs. 1-7. *Coriophagus adebratti*, new species. 1, head, dorsal view; 2, mandible and maxilla, right lateral view; 3, left antenna; 4, left fore tarsi; 5, left mid tarsi; 6, left hind tarsi; 7, right lateral view of IXth and Xth abdominal segment. Scale line: 1 & 3, 0.3mm; 2, 4, 5, 6 & 7, 0.2mm.

VIIIth abdominal segment large, aedeagus length, 0.11mm (Fig. 7).

Total body length, 3.47mm.

***Etymology.*** - This species is named after the collector S. Adebratt.

***Remarks.***- Differs from *C. borneensis*, new species, by larger ommatidia, maxilla and aedeagus of different shape and size.

Smaller size than *C. rieki* Kinzelbach, 1971a, with larger ommatidia, and different shape and size of maxilla and aedeagus.

Differs from *C. lockerbiensis* Kathirithamby, 1992, from Australia by the larger and fewer ommatidia, shape and size of maxilla and aedeagus.

Differs from *C. monteithi* Kathirithamby, 1992, from Australia by the different shape and size of maxilla and aedeagus.

### *Coriophagus borneensis*, new species
(Figs. 8-15)

***Material.***- Holotype - male (ZML), P1, Mendolong, Sipitang, Sabah, coll. S.A., 10.iii.1989.

***Description.***- Male. Ommatidia ± 25. Head width (including eyes) 0.85mm (Fig. 8). Mandibles (0.09mm) longer than maxillary palpi (0.05mm); basal maxillary segment (0.02mm) (Fig. 9). Ist antennal segment (0.06mm) slightly longer than IInd (0.04mm); IIIrd, longest (0.55mm); IVth, 0.51mm; Vth, 0.53mm; VIth (0.48mm) almost as long as VIIth (0.47mm) (Fig. 10).

$R_2$ half the length of $R_3$. Wing span, 2.30mm.

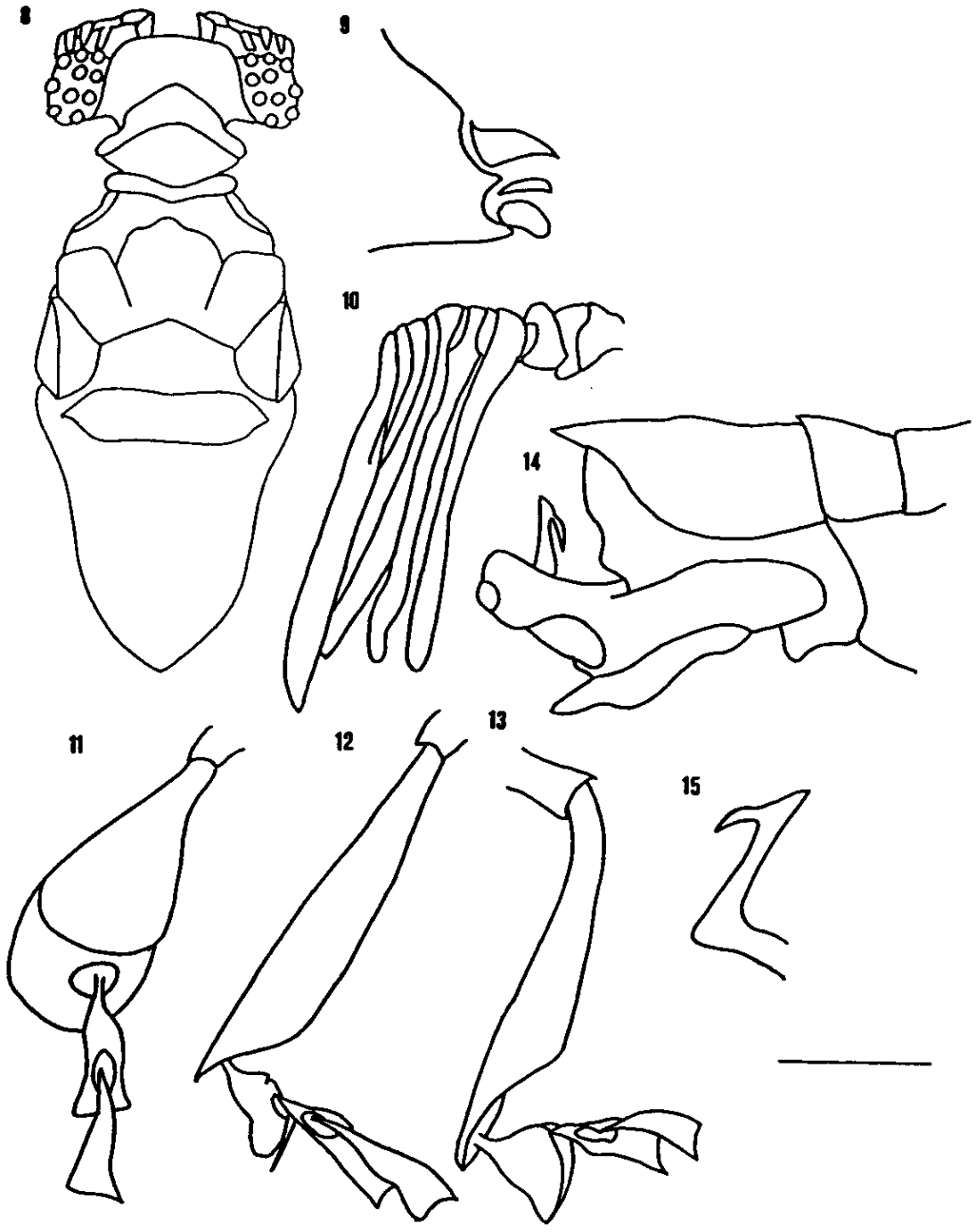
Ist tarsal segment on proleg rounded, Ist tarsal segment on mid- and hind legs with projections (Figs 11-13).

VIIIth abdominal sternite large (Fig. 14), IXth segment about half the size of VIIIth. Aedeagus length, 0.23mm (Fig. 15).

Total body length, 3.41mm.

***Remarks.***- These are the first Coriophaginae to be described from Southeast Asia, which have so far been recorded from the Australian-Pacific region and Africa (Kifune & Hirashima, 1989; Kathirithamby, 1992).

This new species differs from the Australian species *C. lockerbiensis* Kathirithamby, 1992, from Queensland by the smaller maxillary palpi, larger and fewer ommatidia and the shape of the aedeagus; from *C. rieki* Kinzelbach, 1971a, from Canberra and New South Wales by the smaller size, larger and fewer ommatidia, longer antennal segments, smaller 10th segment and shape of the aedeagus; and from *C. gressittorum* Kifune and Hirashima, 1989, from the Soloman Islands, by the larger size, longer wing span, and length of $R_2$ and $R_3$ of wing.




Figs. 8-15. *Coriophagus borneensis*, new species. 8, head and thorax, dorsal view; 9, mandible and maxilla, right lateral view; 10, left antenna; 11, right fore leg; 12, right mid leg; 13, right hind leg; 14, VIIIth, IXth and Xth abdominal segments, left lateral view; 15, aedeagus right lateral view. Scale line: 8, 0.05mm; 9, 10, 11, 12, 13 & 15, 0.2mm; 14, 0.3mm.

## Genus *Halictophagus* Curtis, 1831

*Halictophagus* Curtis, 1831: 433.
*Halictophaugs* (*Bruesia*) Perkins, 1905: 102.
*Megalechthrus* Perkins, 1905: 105.
*Pentacladocera* Pierce, 1908: 80.
*Pentoxocera* Pierce, 1908: 80.
*Anthericomma* Pierce, 1908: 84.
*Dioxocera* Pierce, 1908: 81.
*Agalliaphagus* Pierce, 1908: 83.
*Neocholax* Pierce, 1909: 160.
*Pentogrammaphila* Pierce, 1909: 169.
*Diozocera* Pierce, 1911: 504.
*Pentozocera* Pierce, 1911: 504.
*Pentozoe* Pierce, 1911: 504.
*Tettigoxenos* Jeannel, 1913: 4.
*Pyrilloxenos* Pierce, 1914: 128.
*Dacyrtocara* Pierce, 1918: 473.
*Cyrtocaraxenos* Pierce, 1918: 475.
*Indoxenos* Subramanian, 1927: 132.
*Oedicystis* Hofeneder, 1927: 377.
*Pseudopatella* Bohart, 1937: 101.
*Membracixenos* Pierce, 1952: 5.

Fourteen Australian-Pacific species have been described so far (Kifune & Hirashima, 1989; Kathirithamby, 1992).

### *Halictophagus abdominalis*, new species
(Figs. 16-23)

***Material***.- Holotype - male (ZML), A1L, Mendolong, Sipitang, Sabah, coll. S.A., 30.iv.1988.

***Description***.- Male. Ommatidia ± 20. Head width (including eyes), 0.55 mm wide, between eyes, 0.43mm (Fig. 16). Mandibles small (0.07mm). Maxillary palpi, 0.16mm; basal segment, 0.04mm (Fig. 17). Antennae as in fig. 18

Ist tarsal segment of proleg rounded (Fig. 19). Ist tarsal segment of mid- and hind leg with hooks (Figs. 20, 21).

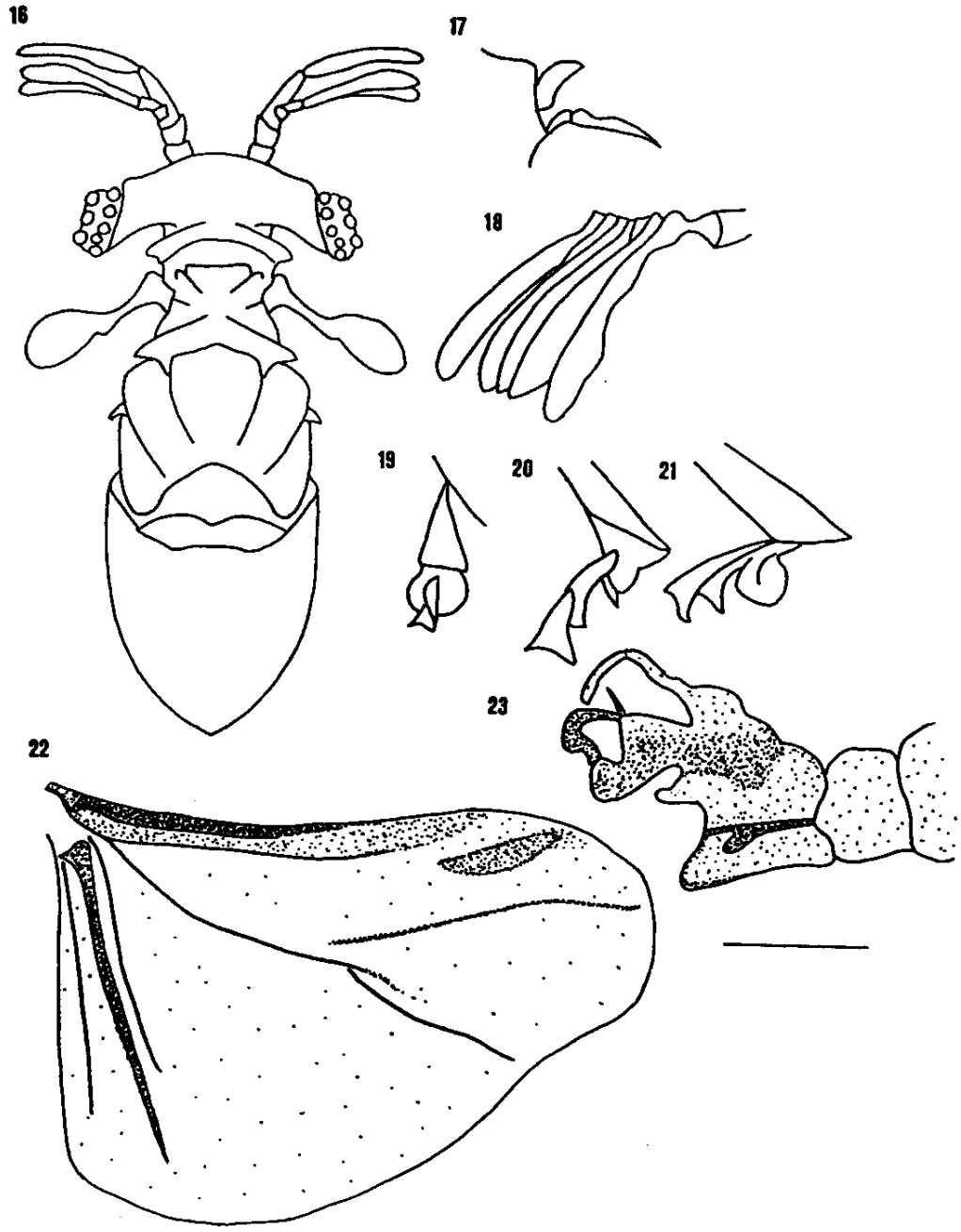
$R_4$ very long and two thirds the length of $R_5$ (Fig. 22). Wing expanse, 1.23mm.

Aedeagus length, 0.10mm. Xth abdominal segment very long and covers aedeagus (Fig. 15). VIIIth segment unusually shaped with projections (Fig. 23).

Total body length, 1.00mm.

***Etymology***.- This species is named *abdominalis* due to its peculiarly shaped abdominal segments.

***Remarks***.- This species is distinguished from all others by the elaborately shaped VIIIth and long Xth abdominal segments.




Figs. 16-23. *Halictophagus abdominalis*, new species. 16, head and thorax, dorsal view; 17, mandible and maxilla, right lateral view; 18, left antennae; 19, right fore tarsus; 20, right mid tarsus; 21, right hind tarsus; 22, right wing; 23, IXth and Xth abdominal segments, right lateral view. Scale line: 16 & 22, 0.03mm; 17, 18, 19, 20, 21 & 22, 0.2mm.

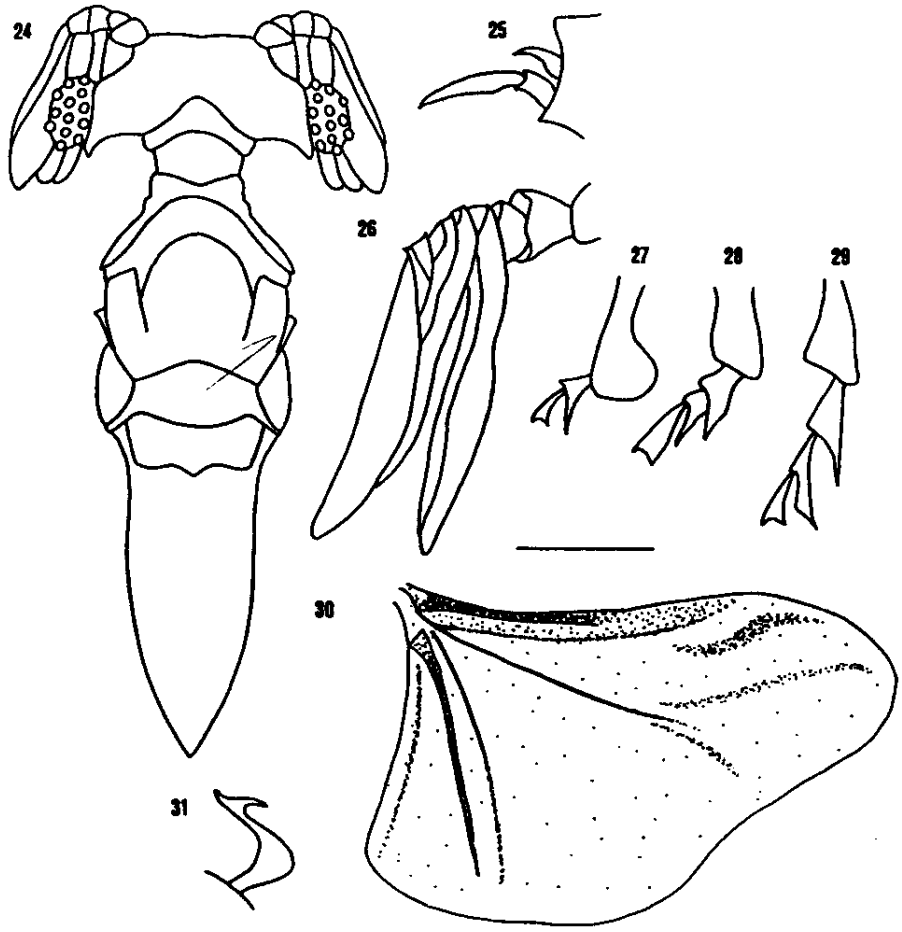
***Halictophagus antennalis*, new species**
(Figs. 24-31)

*Material*.- Holotype - male (ZLM), P1, Mendolong, Sipitang, Sabah, coll. S.A., 10.iii.1989.

Paratypes - 2 males, same data as above; 1 male (ZLM), W5L, light trap, coll. S. A., 19.iv.1988.

*Description*.- Number of ommatidia ± 25. Head width 0.66-0.69mm (Fig. 24). Mandibles 0.05-0.06mm. Maxillary palpi (0.11-0.12mm) twice that of basal segment (0.05-0.07mm) (Fig. 25).

Ist antennal segment 0.05mm; IInd, 0.04mm slightly shorter than Ist; IIIrd, 0.43-0.36mm; IVth, spoon-shaped and longest (0.45-0.47mm); Vth and VIth (0.37mm) short and hidden in VIIth; VIIth (0.38-0.41mm) more spoon-shaped than IVth (Fig. 26).




Figs. 24-31. *Halictophagus antennalis*, new species. 24, head and thorax, dorsal view; 25, left mandible and maxilla; 26, left antenna; 27, right fore tarsus; 28, right mid tarsus; 29, right hind tarsus; 30, right wing; 31, left lateral view of aedeagus. Scale line: 24, 0.3mm, 25, 26, 27, 28, 29 & 31, 0.2mm; 30, 0.5mm.

Tarsus on proleg circular (Fig. 27), mid- and hind tarsus as in figs. 28 and 29.

Wing span 1.84mm. $R_2$ very broad and half the length of $R_3$. $R_3$ ending close to wing margin (Fig. 30).

Aedeagus with small dorsal hump (length 0.08mm) (Fig. 31).

Total length, 2.41-2.47mm.

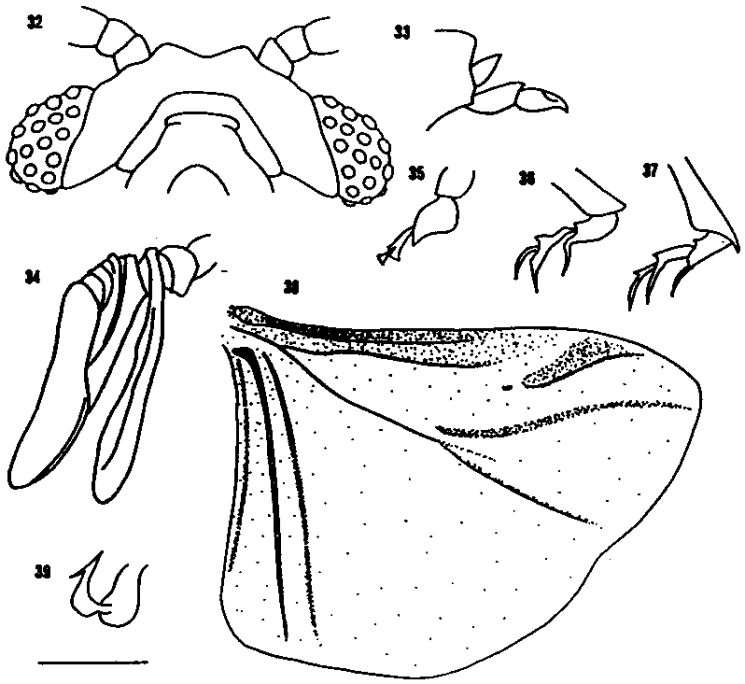
***Etymology.***- This species is named *antennalis* due to its eloborate antennal segments.

***Remarks.***- This species is distinguished from all others by the large spoon-shaped IVth and VIIth antennal segments, the maxillary palps and aedeagus.

### *Halictophagus hirashimai*, new species
(Figs. 32-39)

***Material.***- Holotype - male (ZML), W5L, Mendolong, Sipitang, Sabah, coll. S. A., 19.iv.1988.

Paratypes - 1 male (ZML), A1L, Mendolong, Sipitang, Sabah, coll. S. A.: 29.xi.1987; 1 male, same data as above, 30.iv.1988; 1 male, same data as above, 1.v.1988; 1 male, sama data as above, 5.v.1988.




Figs. 32-39. *Halictophagus hirashimai*, new species. 32, head, dorsal view; 33, right mandible and maxilla; 34, right antenna; 35, right fore tarsus; 36, right mid tarsus; 37, right hind tarsus; 38, right wing; 39, right lateral view of aedeagus. Scale line: 32, 33, 34, 35, 36, 37 & 39, 0.2mm; 38, 0.3mm.

***Description.***- Number of ommatidia ± 20. Head width 0.57mm (including eyes) 0.39mm (excluding eyes) (Fig. 32). Mandibles 0.05mm. Maxillary palpi same length as basal segment (0.08mm) (Fig. 33).

Ist and IInd antennal segment same length (0.05mm); IIIrd, long and spoon-shaped, (0.39mm); 4th, 0.36mm; Vth, shortest and hidden (0.31mm); 6th, 0.36mm, VIIth longest and spoon-shaped (0.41mm) (Fig 34).

Tarsus of pro, mid and hind legs as in figs 35, 36, 37.

Wing span, 1.54mm (Fig 38)

Aedeagus length 0.12mm (Fig. 39).

Total length, 1.33mm.

***Etymology.*** - This species is named after the Japanese Entomologist Yashihiro Hirashima who has described many Strepsiptera, particularly from Southeast Asia and Japan.

***Remarks.***- This species is similar to *H. antennalis*, new species, but differs from it by the smaller head width, the triangular shaped maxillary palpi that is the same size as the basal segment (whereas in *H. antennalis* the palpi is twice the size of the basal segment), differently shaped tarsus and is a smaller species.

### *Halictophagus sarawakensis*, new species
(Figs. 40-45)

***Material.***- Holotype - male (CNC), Sematin, Sarawak, coll. A. T. Finnamore, 23.ii.1987.

***Description.- Male.*** Ommatidia ± 20. Head width 0.27mm. Mandibles, 0.06mm, palpi of maxilla twice as long as basal segment (palpi, 0.27mm; basal, 0.09mm) (Fig. 40).

Ist and IInd antennal segments same length (0.03mm); IIIrd and IVth, longest (0.16mm); IVth, large and spoon-shaped; Vth, 0.11mm, VIth and VIIth, shortest (0.09mm) (Fig. 41).

Pro- and mid tarsus as in figs. 42 and 43.

Wing expanse, 0.72mm (Fig. 44).

VIIIth sternite with fork-like projections (Fig. 45), which is the distinguishing feature of this species.

Total length, 1.90mm.

***Remarks.***- Differs from *H. malayanus* Kifune, 1981, from W. Malaysia by the smaller size, antennal segments, venation on wings, and protarsus which are not rounded; from *H. minimus* Kifune & Hirashima, 1983b, from Sri Lanka, by the larger size, antennae, veination on wings; and from *H. peradenyia* Pierce, 1911, from Sri Lanka, by the venation on the wings. The chief distinguishing character of this species are the forked projections on the VIIIth sternite.

## Family Elenchidae Perkins, 1905

Elenchidae Perkins, 1905: 98.
Elenchoidea - Pierce, 1908: 76.
Elenchinae - Ulrich, 1930: 7; Riek, 1970: 634.

## SUBFAMILY ELENCHINAE PERKINS, 1905

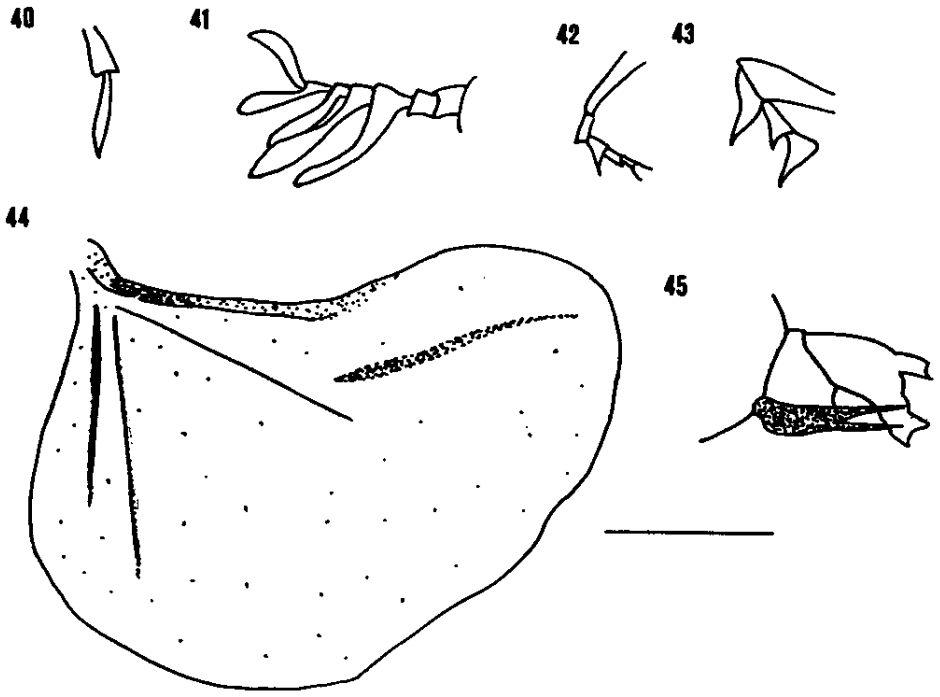
Elenchinae Perkins, 1905: 106.
Deinelenchinae Kinzelbach, 1971b: 9, syn. nov.

### Genus *Deinelenchus* Perkins, 1905

*Deinelenchus* Perkins, 1905: 107.
*Elenchus* Bohart, 1941: 125.

Type species: *Deinelenchus australensis* Perkins, 1905.

Three Australian-Pacific species have been described.




Figs. 40-45. *Halictophgus sarawakensis*, new species. 40. right maxilla; 41, right antenna; 42, right pro tarsus; 43, right mid tarsus; 44, right wing; 45, left lateral view of VIIIth, IXth and Xth abdominal segments. Scale line: 40, 41, 42, 43, 44 & 45, 0.2mm.

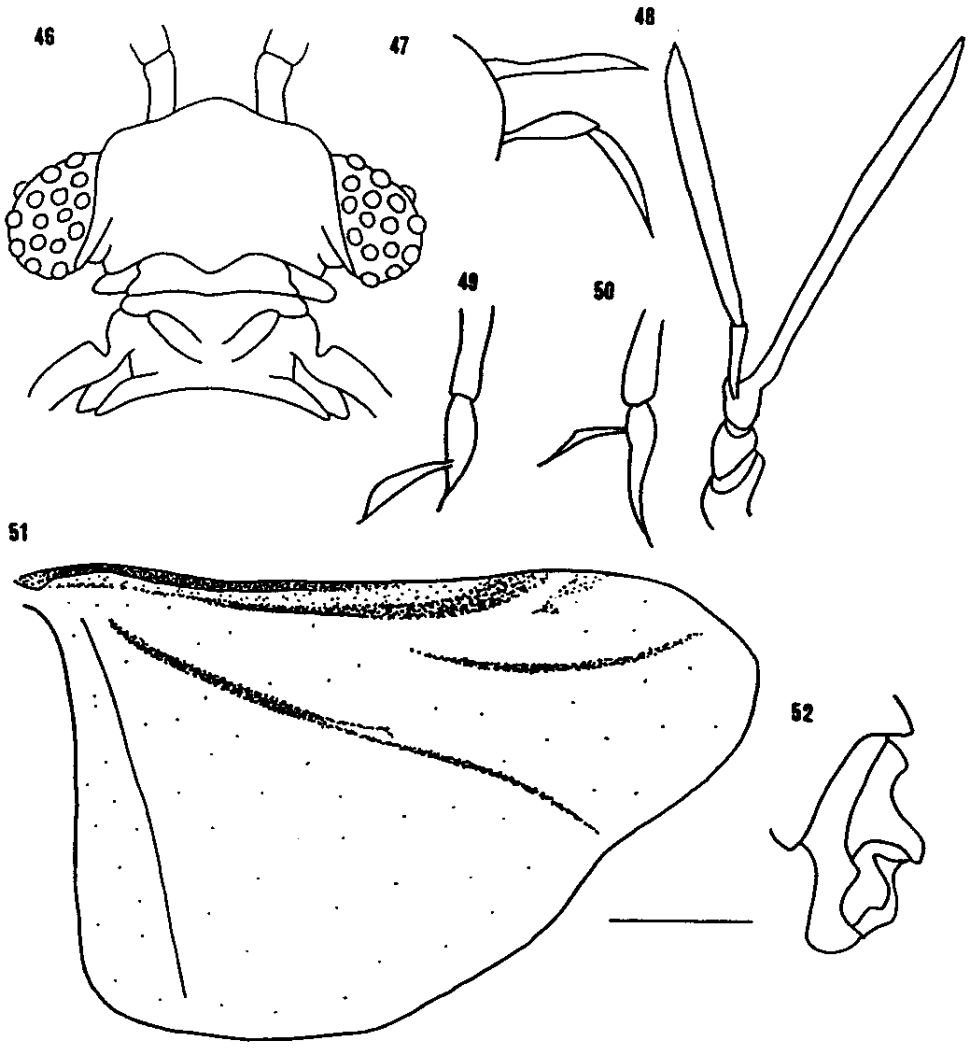
## *Deinelenchus sabahensis*, new species
(Figs. 46-52)

*Material.* - Holotype - male (ZML), P1, Mendolong, Sipitang, Sabah, coll. S.A. 10.iii.1989.

*Description.*- Male. Ommatidia ± 25. Head width (including eyes). 0.45mm, and wide between eyes (0.34mm) (Fig. 46). Mandibles 0.10mm in length. Maxillary palpi (0.13mm) twice the length of basal segment (0.06mm) (Fig. 47).

Antennal segments I and II of same length (0.06mm); IIIrd with long flabellum (0.60mm); IVth, short (0.13mm); Vth, 0.42mm (Fig. 48).

Fore- and hind tarsus as in figs. 49 and 50.




Figs. 46-52. *Deinelenchus sabahensis*, new species. 46, dorsal view of head; 47, right mandible and maxilla; 48, right antenna; 49, right fore tarsus; 50, right hind tarsus; 51, right wing; 52, left lateral view of IXth abdominal segment and aedeagus. Scale line: 46, 47, 48, 49, 50 & 52, 0.2mm; 51, 0.3mm.

Wing expanse, 2.38mm (Fig. 51).

Aedeagus with hump basally (length, 0.10mm) (Fig. 52).

Total length, 1.76mm.

***Remarks***.- This is the first record of *Deinelenchus* from Southeast Asia. Previously they have only been recorded for Australia and Africa (Kathirithamby, 1989a; 1989b), and New Guinea (Kifune & Hirashima, 1989). *D. sabahensis* differs from the Australian species *D. australensis* Perkins, 1905, from Queensland, by the structure of the smaller and fewer ommatidia, antennal segments, maxillae, veination on wings, tarsi, thorax, aedeagus and the smaller size; from *D. berrimahensis*, Kathirithamby, 1989b, from Northern Territory, by the structure of the antennae, maxillae, venation on wings, Xth abdominal segment, shape of the aedeagus and the larger size; from *D. deviatus* Kinzelbach, 1971a, from New Guinea, by the structure of the antennae; from *D. hamifer* Kinzelbach, 1971a, from New Guinea, by the structure of the tarsi, wing venation and the antennal segments.

## FAMILY MYRMECOLACIDAE SAUNDERS, 1872

Myrmecolacidae Saunders, 1872: 20.
Myrmecolacidae - Pierce, 1908: 76.
Stichotrematoidea Hofeneder, 1910: 49.
Stichotrematidae - Hofeneder, 1910: 49.

A key to this family is given by Kathirithamby (1993). Except for *Caenocholax* all the other three genera are found in Southeast Asia.

### Genus *Lychnocolax* Bohart, 1951

*Lychnocolax* Bohart, 1951: 95.

Type species: *Lychnocolax mindoro* Bohart, 1951.

### *Lychnocolax mindanao* Bohart, 1951

*Lychnocolax mindanao* Bohart, 1951, *Wasmann, J. Biol.* 9(1): 98. Loc. PHILIPPINES: Maco Tagum, Davano, Mindanao. - Kinzelbach, 1971a, Zoologica (119): 157. - Kifune & Hirashima, 1989, *Esakia* 28, 28. Loc. NEW IRELAND: "Camp Bishop"; NEW GUINEA: Neth, Waris S. of Holland; PALAU Isls., Koror.

***Material***.- 2 males (ZML), T4/R, Mendolong, Sipitang, Sabah, coll. S. A., 14.iii.1989. – 1 male (CNC), Malaise trap, 100m, 7km NW Kg. Ayer Puteh, Trengganu, Malaysia, coll. M. Sharkey, 28.ii-2.iii.1990.

***Distribution***.- Maco, Philippines; "Camp Bishop", New Ireland; Neth., New Guinea; Koror, Palau Isls; Sipitang, Sabah.

### *Lychnocolax ovatus* Bohart, 1951

*Lychnocolax ovatus* Bohart, 1951, *Wasmann J. Biol.* 9(1): 101. Loc. PHILIPPINES: Maco, Tagum, Davao, Mindanao. - Kinzelbach, 1971a, *Zoologica* (119): 157. - Kifune & Hirashima, 1989, *Esakia* 28: 28. Loc: SABAH: Kalabakan, Tawau District.

***Material.*** - (ZML), light trap, A1L, Mendolong, Sipitang, Sabah, coll. S. A.: 1 male, 8.xii.1987; 1 male, same data as above; 1 male, 7.iv.1988, same data as above; 1 male, coll. S.A, 9.iv.1988; 2 males, same data as above; 4 males, 11.iv.1988, same data as above; 2 males, 12.iv.1988, same data as above; 1 male, 13.iv.1988, sama data as above; 1 male, 2.v.1988, same data as above; 1 male, 5.v.1988, same data as above; 1 male, same data as above; 1 male, same data as above; 1 male, 2.iii.1989. INDONESIA: 2 males (OUM), Dumogo-Bone N.P., Sulawesi Utara, coll. Project Wallace, B.M. 1985-10, Roy. Ent. Soc. Lond., ix.1985; 1 male, same data as above .

***Distribution.***- Maco, Philippines; Tawau District and Sipitang, Sabah; Sulawesi, Indonesia.

### *Lychnocolax postorbis* Bohart, 1951

*Lychnocolax postrobis* Bohart, 1951, *Wasmann. J. Biol.* 9(1): 100. Loc. PHILIPPINES: Maco, Tagum, Davao, Mindonao. - Kinzelbach, 1971a, *Zoologica* (119), 157. - Kifune, 1981, *Kontyû* 49(2): 328. Loc: W. MALAYSIA: Ipoh, Perak.

***Material.***- 7 males (CNC), Malaise trap, 100m, 7km NW Kg. Ayer Puteh, Trengganu, W. Malaysia, M. Sharkey, 27.ii-2.iii.90; 1 male (ZML), A1L, light trap, Mendolong, Sipitang, Sabah, coll. S.A., 8.iv.1988; 1 male, 13.iv.1988, same data as above; 1 male, 28.iii.1988, same data as above; 1 male, 26.iv.1988, same data as above; 2 males, 2.v.1988, same data as above.

***Remarks.***- This species was first described from the Philippines, and in 1981 Kifune recorded it for the first time in W. Malaysia.

***Distribution.***- Maco, Philippines; Ipoh, Perak and Ayer Puteh, Trengganu, W. Malaysia; Sipitang, Sabah.

## Genus *Myrmecolax* Westwood, 1861

*Myrmecolax* Westwood, 1861: 418.
*Parastylops* de Meijere, 1908: 185.
*Afrostylops* Fox & Fox, 1964: 754, pro part.

Type species: *Myrmecolax nietneri* Westwood, 1861.

### *Myrmecolax chantaneeae* Kifune & Hirashima, 1979

*Myrmecolax chantaneeae* Kifune & Hirashima, 1979, *Esakia* 14: 65. Loc. THAILAND: San Pa Tong Rice Experiment Station, San Pa Tong.

***Material.***- male (ZML), A1L, Mendolong, Sipitang, Sabah , coll. S.A., 6.iv.1988; 1 male, 12.iv.1988, same data as above.

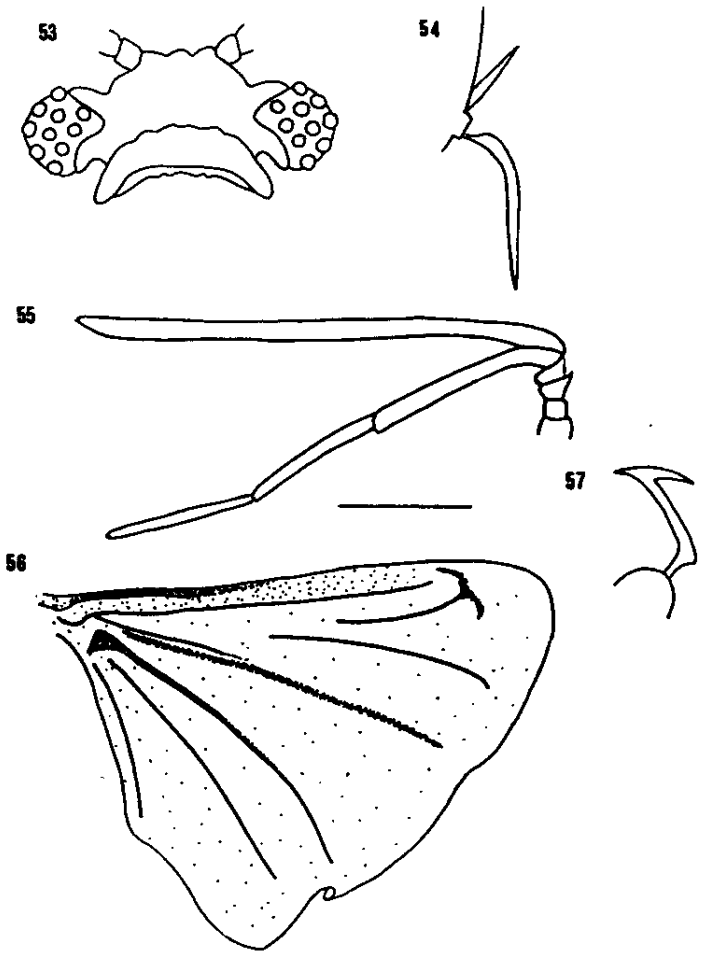
***Distribution***.- San Pa Tong, Thailand; Sipitang, Sabah.

### *Myrmecolax malayensis*, new species
(Figs. 53-57)

***Material***.- Holotype - male (ZML), P1, Mendolong, Sipitang, Sabah, coll. S.A., 10.iii.1989.

Paratypes - 1 male, A1L, Mendolong, Sipitang, Sabah, coll. S.A. 20.iv.1988; 1 male, 9.iv.1988, same data as above (ZML).

***Description***.- Male. Ommatidia ± 22. Head width, (including eyes) 0.56mm, excluding eyes, 0.29mm (Fig. 53). Width of globular eyes, 0.29mm. Mandible length, 0.10mm; basal segment of maxilla, 0.04mm; palpi, 0.27-0.32mm (Fig. 54).




Figs. 53-57. *Myrmecolax malayensis*, new species. 53, head, dorsal view; 54, right maxilla; 55, right antenna; 56, right wing; 57, left lateral view of aedeagus. Scale line: 53 & 55, 0.3mm; 54, 57, 0.2mm; 56, 0.5mm.

Length of Ist antennal segment, 0.07mm; IInd, 0.04mm; IIIrd, 1.04-1.09mm; IVth, 0.04-0.46mm; Vth, 0.40-0.41mm; VIth, 0.26-0.29mm; VIIth, 0.40mm (Fig. 55).

Wing expanse, 1.01-1.03mm (Fig. 56).

Aedeagus length, 0.23-0.24mm (Fig. 57).

Total length, 1.17-1.28mm.

***Remarks***.- Similar to *M. chantaneeae*, but this new species has differently shaped maxillary palpi, smaller ommatidia, flabellum of IIIrd antennal segment reaching to tip of VIIth segment, and is a smaller species.

***Distribution***.- Sabah, Sipitang.

## Genus *Stichotrema* Hofeneder, 1910

*Stichotrema* Hofeneder, 1910: 47.
*Caenocholax* Pierce, 1909: 88 pro parte.
*Mantidoxenos* Ogloblin, 1939: 1277.
*Rhipidocolax* Bohart, 1951: 94.

Type species: *Stichotrema dallatorreanum* Hofeneder, 1910

### *Stichotrema ceylonense* Kifune & Hirashima, 1980

*Stichotrema ceylonense* Kifune & Hirashima, 1980, *Esakia*, 15: 147. Loc. SRI LANKA: Olatithoduvai, 10 miles NW of Mannar.

***Material***.- male (ZML), P1,Mendolong, Sipitang, Sabah, coll. S.A. 10.iii.1989.

***Distribution***.- Koslanda, Sri Lanka; Sipitang, Sabah.

### *Stichotrema davao* Bohart, 1951

*Stichotrema davao* Bohart, 1951, *Wasmann J. Biol.*, 9: 93. Loc. PHILIPPINES: Maco, Tagum, Davao, Mindanao.

***Material***.- male (ZML), A1L, Mendolong, Sipitang, Sabah, coll. S.A., 5.iv.1988; 1 male, 8.iv.1988, same data as above; 1 male, 12.iv.1988, same data as above.

***Distribution***.- Maco, Philippines; Sipitang, Sabah.

### *Stichotrema krombeini* Kifune & Hirashima, 1980

*Stichotrema krombeini* Kifune & Hirashima, 1980, *Esakia*, 15: 149. Loc. SRI LANKA: Diyaluma Falls, Koslanda, Bad. Dist.

***Material.***- male (ZML), A1L, Mendolong, Sipitang, Sabah, coll. S.A., 7.iv.1988; male, 14.iv.1988, same data as above.

***Distribution.***- Diyaluma Falls, Sri Lanka; Sipitang, Sabah.

### *Stichotrema malayanum* Kifune, 1981

*Stichotrema malayanum* Kifune, 1981, *Kontyû* 49(2): 331. Loc: W. MALAYSIA: Ipoh, Perak.

***Material.***- male (ZML), Mendolong, Sipitang, Sabah, coll. S.A., 8.iv.1988; male, same data as above, 5.v.1988.

***Distribution.***- Ipoh, Perak, W. Malaysia; Siptang, Sabah.

### *Stichotrema retrorsum* Bohart, 1951

*Rhipidocolax retrorsus* Bohart, 1951, *Wasmann J. Biol.* 9(1): 94. Loc. PHILIPPINES: Maco, Tagum, Davano, Mindanao.

*Stichotrema retrorsum* (Bohart, 1951): Kinzelbach, 1971a, *Zoologica* (119): 159. - Kifune, 1981, *Kontyû* 49(2): 330. Loc: W. MALAYSIA: Ipoh, Perak. - Kifune & Hirashima, 1989, *Esakia* 28: 40. Loc. SABAH: Tawau District, Kalabakan.

***Material.***- male (ZML), A1L, Mendolong, Sipitang, Sabah, coll. S.A., 20.ii.1988; 1 male, W5L, same data as above, 19.iv.1988; male, A1L, same data as above, 5.v.1988; male, P1, same data as above, 10.iii.1989.

***Distribution.***- Maco, Philippines; Ipoh, Perak, W. Malaysia; Tawau District and Sipitang, Sabah.

### *Stichotrema simile* Kifune & Hirashima, 1980

*Stichotrema simile* Kifune & Hirashima, 1980, *Esakia*, 15: 150. Loc. SRI LANKA: Diyaluma Falls, Koslanda, Bad. District.

***Material.***- male (ZML), W5L, Mendolong, Sipitang, Sabah, coll. A.S., 19.iv.1988.

***Distribution.***- Diyaluma Falls, Sri Lanka; Sipitang, Sabah.

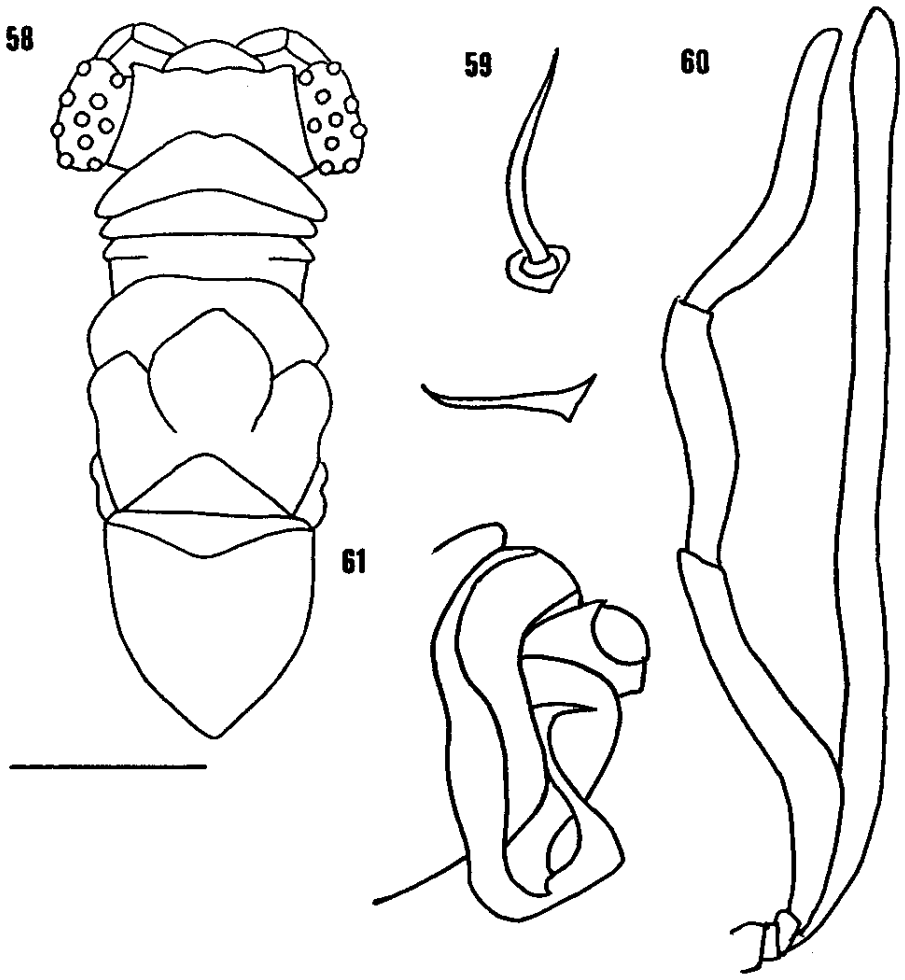
***Stichotrema longiflagellatum*, new species**
(Figs. 58-61)

***Material***.- Holotype - male (ZML), W5L, Mendolong, Sipitang, Sabah, coll. S.A. 19.iv.1988.

***Description***.- Male. Ommatidia ± 22. Head width, 0.47mm (Fig. 58). Mandibles, 0.07mm; maxillary palpi, 0.17mm (Fig. 59).

IIIrd antennal segment (1.00mm) very long and surpasses VIIth segment (0.29mm); Vth is two thirds the length of VIth (0.25mm) (Fig. 60).

Hind wing with one detached vein between radius and median.




Figs. 58-61. *Stichotrema longiflagellatum*, new species. 58, head and thorax, dorsal view; 59, right mandible and maxilla; 60, right antenna; 61, left lateral view of aedeagus. Scale line: 258, 0.3mm; 59, 60 & 61, 0.2mm.

Wing span, 1.30mm.

Aedeagus with no dorsal projection, length, 0.14mm (Fig. 61).

Total length, 1.60mm.

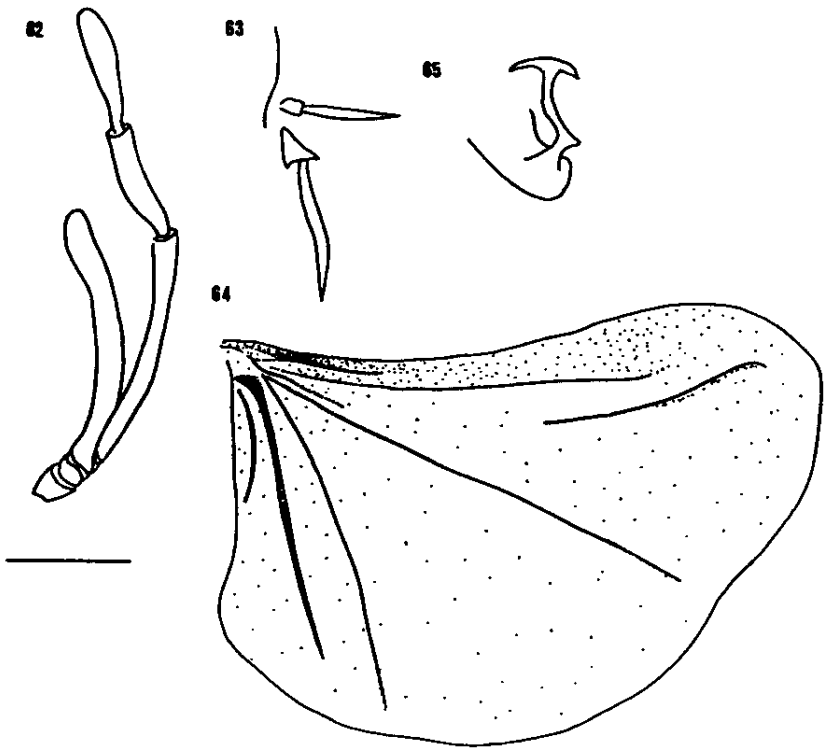
***Etymology.***- This species is named *longiflagellatum* due to its long flabellum on the IIIrd antennal segment.

***Remarks.***- Distinguished from all other species of *Stichotrema* by the long flabellum on IIIrd antennal segment that surpasses the VIIth segment, and its blunt apex. Similar to *S. krombeini* Kifune & Hirashima, 1980, from Sri Lanka, but differs from it by the VIth + VIIth segments longer than Vth, absence of dorsal projection on aedeagus, and the narrow postlumbium.

***Distribution.***- Sabah, Sipitang.

### *Stichotrema mendolong*, new species
(Figs. 62-65)

***Material.*** - Holotype - male (ZML), P1, Mendolong, Sipitang, Sabah, coll. S.A., 16.iii.1989.




Figs 62-65. *Stichotrema mendolong*, new species. 62, right mandible and maxilla; 63, right antenna; 64, right wing; 65, left lateral view of aedeagus. Scale line: 62, 63 & 64, 0.2mm; 64, 0.3mm.

Paratype - male (ZML), Mendolong, Sipitang, Sabah, coll. S.A. 8.iv.1988.

***Description***.- Male. Ommatidia ± 20. Head width, 0.51mm.

Mandibles, 0.11mm; maxillary palpi, 0.18mm (Fig. 62).

IIIrd antennal segment (0.44mm) not reaching to base of VIth; Vth (0.33mm) more than twice VIth (0.15mm), and VIth + VIIth (0.18mm) subequal to Vth (Fig. 63).

One detached vein between radius and median. $R_5$ very long and ends at wing margin (Fig. 64). Wing span, 1.35mm.

Aedeagus with hump basally, with anterior dorsal and ventral projections subequal. Length of aedeagus, 0.15mm (Fig. 65).

Total length, 1.47mm.

***Etymology***.- This species is named after the field site. Name used as a noun in apposition.

***Remarks***.- Similar to *S. vilhenai* (Luna de Carvalho, 1956), differs from it by the smaller size, maxilla, aedeagus and antennae. Similar to *S. silvaticum* Kifune & Hirashima, 1989, from Sabah, North Borneo, but differs from it by the smaller size, aedeagus and maxilla.

***Acknowledgments***. - I am greatful to Professor T. Kifune for his useful comments on the manuscript, to Professor S. B. Peck, Dr. R. Danielsson and the British Museum (Natural History) for the loan and gift of the specimens, and to the Leverhulme Trust for the Research Fellowship.

## LITERATURE CITED

Barrion, A. T. & J. A. Litsinger, 1989. Two new species of *Halictophagus* (Strepsiptera:Halictophagidae) from the Philippines. *Orient. Insects*, 23: 183-91.

Blair, K. G. 1936. A new genus of Strepsiptera. *Proc. R. ent. Soc. Lond.* Ser. B 5: 113-117.

Bohart, R. M., 1937. A new genus and species of Strepsiptera from Canada. *Pan-Pacific Ent.*, 13: 101-105.

Bohart, R. M., 1941. A revision of the Strepsiptera with special reference to the species of North America. *Univ. Calif. Publs Ent.*, 7(6): 91-160.

Bohart, R. M., 1943. New species of *Halictophagus* with a key to the genus in North America (Strepsiptera, Halictophagidae). *Ann. ent. Soc. Am.*, 36(3): 341-59.

Bohart, R. M., 1951. The Myrmecolacidae of the Philippines (Strepsiptera). *Wasmann J. Biol.*, 9(1): 83-103.

Bohart, R. M., 1962. A new Strepsipteran parasitic on Coreidae (Strepsiptera: Halictophagidae and Hemiptera: Coreidae). *Proc. ent. Soc. Wash.*, 64(2): 91-94.

Brèthes, J., 1923. Primera contribución para el conocimento de los "Strepsiptera" argentinos. *Rev. Fac. Agron. Univ. nac. La Plata*, 15: 41-56.

Buysson, R. du, 1903. Note pour servir à l'histoire des Strepsiptères. *Bull. Soc. ent. Fr.*, [1903]: 174-175.

Curtis, J., 1831. *Elenchus Walkeri* [with comments by A. H. Haliday]. *Brit. Entomol.*, **VIII**: 385.

Dover, C., 1927. On Strepsiptera from the Malay Peninsula. *J. fed. Malay St. Mus.* **13**: 263-264.

Esaki, T. & S. Hashimoto, 1931. Report on the leaf-hoppers injurious to the rice plant and their natural enemies, No. 2. *Ent. Lab. Dept. Agr. Kyushu Imp. Univ. Publ.*, 2: 39-52.

Fox, J. W. & R. M. Fox, 1964. A new genus and species of Stylopidae (Strepsiptera) from Liberia, West Africa. *Ann. ent. Soc. Am.*, **57**(6): 754-756.

Green, E. E., 1902. A stylopid attracted by light. *Entomologist's mon. Mag.*, **37**: 219.

Hirashima, Y. & T. Kifune, 1978a. Strepsipterous parasites of Homoptera injurious to the rice plant in Sarawak, Borneo, with descriptions of a new species (Notulae Strepsipterologicae - III). *Esakia*, **11**: 53-58.

Hirashima, Y. & T. Kifune, 1985. On the identity of *Halictophagus munroei* Hirashima et Kifune with *H.bipunctatus* Yang (Notulae Strepsipterologicae - XV). *Esakia*, **23**: 58-59.

Hofeneder, K., 1910. *Stichotrema* n. g. *Dalla-Torreanum* n. sp. Eine in einer Orthoptere lebende Strepsiptere. *Zool. Anz.*, **36**: 47-49.

Hofeneder, K., 1927. Eine neue Strepsiptere aus Sumatra. *Treubia*, **9**(4): 376-379.

Hofeneder, K. & L. Fulmek, 1943. Verzeichnis der Strepsipteren und ihrer Wirte. *Arb. physiol. angew. Ent., Berl.*, **10**(2/3): 139-698.

Jeannel, R., 1913. Strepsiptera. - In: Voyage de CH. Alluaud et R. Jeannel en Afrique orientale (1911-1912): Résultats Scientifiques, Insectes Strepsiptères, 1-8. Paris.

Kathirithamby, J., 1989a. Review of the order Strepsiptera.*Invert. Taxon.*, **14**(1): 41-92.

Kathirithamby, J., 1989b. Descriptions and biological notes of the Australian Elenchidae (Strepsiptera). *Invert. Taxon.*, **3**(2): 175-195.

Kathirithamby, J., 1990. Descriptions of Corioxenidae (Strepsiptera) from Australia, with a checklist of the world genera and species of Corioxenidae. *Invert. Taxon.*, **3**(4): 469-481.

Kathirithamby, J., 1992. Descriptions and biological notes of Halictophagidae (Strepsiptera) from Australia, with a checklist of the world genera and species. *Invert. Taxon.*, **6**(1): 159-196.

Kathirithamby, J., 1993. Descriptions of Myrmecolacidae (Strepsiptera) from Australia. *Invert. Taxon.*, **7** (in press).

Kathirithamby, J. & S. B. Peck, (in press). Strepsiptera of south Florida and the Bahamas with the description of a new genus and new species of Corioxenidae. *Can. Ent.*

Kifune, T., 1981. Records of the Strepsiptera from West Malaysia with descriptions of the new genus, *Malayaxenos*, and five new species (Notulae Strepsipterologicae - VII). *Kontyû*, **49**(2): 322-333.

Kifune, T., 1983a. A new species of the genus *Halictophagus* from Thailand with a proposition of a new subgenus *Allohalictophagus* (Strepsiptera, Halictophagidae) (Notulae Strepsipterologicae - IX). *Kontyû*, **51**(2): 165-168.

Kifune, T., 1983b. A new *Stichotrema* from Thailand (Strepsiptera, Myrmecolacidae). (Notulae Strepsipterologicae - VIII). *Kontyû*, **51**: 83-89.

Kifune, T., 1984. A new species of the genus *Paraxenos* (Strepsiptera, Stylopidae) from Palawan, the Philippines. *Bull. nat. Sci. Mus., Tokyo*, Series A **10**(2): 87-90.

Kifune, T., 1986a. A new *Halictophagus* (Strepsiptera, Halictophagidae) parasitic on the genus *Stenocranus* (Homoptera, Delphacidae) in Japan (Studies on the Japanese Strepsiptera XI). *Kontyû*, **54**(3): 495-499.

Kifune, T., 1986b. A new species of the genus *Xenos* (Strepsiptera, Stylopidae) parasitic on the genus *Provespa* (Hymenoptera, Vespidae) from West Sumatra, Indonesia (Notulae Strepsipterologicae - XVI). *Kontyû*, 54(1): 84-88.

Kifune, T. & Y. Hirashima, 1975. A new species of the genus *Elenchus* from Thailand (Strepsiptera: Elenchidae) (Notulae Strepsipterologicae - II). *Mushi*, 48: 145-8.

Kifune, T. & Y. Hirashima, 1979. Two new species of Strepsiptera from Thailand (Notulae Strepsipterologicae -V). *Esakia*, 14: 61-71.

Kifune, T. & Y. Hirashima, 1980. Records of the Strepsiptera of Sri Lanka in the collection of the Smithsonian Institution, with descriptions of seven new species (Notulae Strepsipterologicae - VI). *Esakia*, 15: 143-159.

Kifune, T. & Y. Hirashima, 1983a. Records of the Strepsiptera from Australia and Sri Lanka in the collection of the Smithsonian Institute, with descriptions of four new species (Notulae Strepsipterologicae-XI). *Esakia* 20: 157-165.

Kifune, T. & Y. Hirashima, 1983. A new species of the genus *Halictophagus* from Thailand (Strepsiptera:Halictophagidae) (Notulae Strepsipterologicae - XII). *Esakia*, 20: 167-9.

Kifune, T. & Y. Hirashima, 1984. Synopsis of the genus *Halictophagus* (Strepsiptera:Halictophagidae) of Japan, with description of a new species (Studies on the Japanese Strepsiptera - VIII). *Esakia*, 22: 77-85.

Kifune, T. & Y. Maeta, 1985. Taxonomical studies on the genus *Xenos* (Strepsiptera, Stylopidae) parasitic on *Vespa* and *Polistes* (Hymenoptera, Vespidae) of Taiwan with descriptions of three new species (Notulae Strepsipterologicae - XIV). *Kontyû*, 53(3): 426-435.

Kifune, T. & S. Hirashima, 1989. Taxonomic studies on the Strepsiptera in the collection of Bishop Museum (Notulae Strepsipterologicae - XX). *Esakia*, 28: 11-48.

Kifune, T. & Y. Maeta, 1965. A tentative list of the Strepsiptera. Part I. The genus *Pseudoxenos* Saunders, 1872 (Stylopidae) (Notulae Strepsipterologicae-I). *Tohoku Konchu Kenkyu* (2): 1-10.

Kinzelbach, R. K., 1970. *Loania canadensis* n. gen. n. sp. und die Untergliederung der Callipharixenidae (Insecta :Strepsiptera). *Senkenberg. Biol.*, 51(1/2): 99-107.

Kinzelbach, R. K., 1971a. Morphologische Befunde an Fächerflügler und ihre phylogenetische Bedeutung (Insecta:Strepsiptera). *Zoologica*, 41(119:1/2): 256pp.

Kinzelbach, R. K., 1971b. Strepsiptera (Fächerflügler). - In *Handbuch der Zoologia*, IV. Band Arthropoda, 2. Hälfte: Insecta, 2 (24) 1-61 (Lief. 15), 54 Abb. Berlin.

Kinzelbach, R. K., 1971c. *Halictophagus helleri* (Insecta:Strepsiptera). *Stuttg. beitr. Naturk.*, 230: 1-8.

Kinzelbach, R. K., 1971d. Redeskription und Revision der Gattung *Hylecthrus* Saunders 1850 (Insecta, Strepsiptera). *Angew. Parasit.*, 12(4): 204-220.

Kinzelbach, R. K., 1975. Die Fächerflügler des Senkenberg - Museums. III. *Pseudoxenos ropalidiae* n. sp. (Insecta:Strepsiptera). *Senkenberg. biol.*, 56: 69-73.

Kirby, W., 1813. Strepsiptera a new order of insects proposed; and the characters of the order, with those of its genera, laid down. *Trans. Linn. Soc. Lond.*, 86-123.

Kogan, M. & S. J. Oliveira, 1964. New Guinean Mengeidae and Myrmecolacidae of the American Museum of Natural History (Strepsiptera). *Studia ent.*, 7(1-4): 459-70.

Luna de Carvalho, E., 1956. Primeira contribuição para o Estudo dos Estrepsípteros angolenses (Insecta, Strepsiptera). *Publiçoes cult. Co. Diam. Angola*, 29: 11-54.

Luna de Carvalho, E., 1967. Terçeira contribuiçao para o Estudo dos Estrepsipteros angolenses (Insecta Strepsiptera). *Publiçoes cult. Co. Diam. Angola*, 77: 13-56.

Meijeiri, J. C. H. de, 1908. Zwei neue Strepsipteren aus Java. *Tijdschr. Ent.*, 51: 185-190.

Miyamoto, S. T. & T. Kifune, 1984. Description of a new genus and two new species of Strepsiptera parasitic on Japanese Heteroptera (Strepsiptera, Corioxenidae). *Kontyû*, 52(1): 137-149.

Ogloblin, A. A., 1925. The Strepsiptera of the collections of the entomological department of the national Museum in Prague (II.Pt). *Acta ent. Mus. natn. Pragae*, 3(24): 171-175.

Ogloblin, A. A., 1939. The Strepsiptera parasites of ants. *Cong. Int. Ent. Berlin*, 1277-1284.

Perkins, R. C. L., 1905. Leafhoppers and their natural enemies (Part III Stylopidae). *Bull. Hawaiian Sug. Plrs' Ass. Exp. Stn.*, No. 1(3): 90-111.

Pierce, W. D., 1908. A preliminary review of the classification of the order Strepsiptera. *Proc. ent. Soc. Wash.*, 9: 75-85.

Pierce, W. D., 1909. A monographic revision of the twisted winged insects comprising the order Strepsiptera Kirby. *Bull. U.S. natn. Mus.*, 66: 1-232.

Pierce, W. D., 1911. Notes on insects of the order Strepsiptera, with descriptions of new species. *Proc. U.S. natn. Mus.*, 40(1834): 487-511.

Pierce, W. D., 1914. Description of two new species of Strepsiptera parasitic on sugar cane insects. *Proc.ent. Soc. Wash.*, 16(3): 126-129.

Pierce, W. D., 1918. A comparative morphology of the order Strepsiptera with records and descriptions of insects. *Proc. U. S. natn. Mus.*, 54(22-42): 391-501.

Pierce, W. D., 1952. A new strepsipterous parasite of Membracidae. *Bull. Sth. Calif. Acad. Sci.*, 51(1): 4-8.

Pierce, W. D., 1961. A new genus and species of Strepsiptera parasitic on a leafhopper vector of a virus disease of rice and other Gramineae. *Ann. ent. Soc. Am.*, 54(4): 467-474.

Riek, E. F., 1970. Strepsiptera. In: *Insects of Australia* pp. 622-635. Melbourne University Press.

Rossi, P., 1793. Observations de M. Rossi sur un nouveau genre d'Insecte, voisin des Icheumons. *Bull. Soc. philomath. Paris*, 1:49.

Saunders, S. S., 1850. Descriptions of two new strepsipterous insects from Albania, parasitical on bees of the genus *Hylaeus* with some account of their habits and metamorphoses. *Trans. R. ent. Soc. Lond.*, 1(2): 43-59.

Saunders, S. S., 1872. Stylopidarum, ordinem Strepsipteorum Kirbii constituentium, mihi tamen potius Coleopterorum Familiae, Rhipiphoridis meloidisque propinquae, Monographia. *Trans. ent. Soc. Lond.*, 1872: 48pp.

Schultze, W., 1925. *Macroxenos piercei* (Order Strepsiptera), a new genus and species of wasp parasites of the Philippine Islands. *Philipp. J. Sci.*, 27(2): 235-241.

Subramanian, T. V., 1927. A new genus and species of Strepsiptera from South India, *Indoxenos membraciphaga* gen. and spec. nov. *Trans. R. ent. Soc. Lond.*, 75: 131-134.

Subramanian, T. V., 1932. On a new genus and species of Strepsiptera. *Rec. Indian Mus.*, 34: 43-6.

Ulrich, W., 1930. Ordnung: Fächerflügler, Strepsiptera Kirby (1813). - In: *Die Tierwelt Mitteleuropas.* Ins. 2, Abt. XIII: 1-26.

Westwood, J. O., 1861. Notice on the occurence of a strepsipterous insect parasite in ants discovered in Ceylon by Herr Nietner. *Trans. ent. Soc. Lond.*, 5: 418-20.

Westwood, J. O., 1877. Notes upon a strepsipterous insect parasitic on an exotic species of Homoptera. *Trans. ent. Soc. Lond.*, 1877: 185-187.

Yang, C. K., 1955. Descriptions of a new species of Strepsiptera parasitic on the rice leaf-hoppers. *Acta ent. Sin.*, 5: 327-33. (In Chinese with English summary).

Yang, C. K., 1964. Notes on the genus *Halictophagus* of China (Strepsiptera: Halictophagidae). *Acta zootaxon. sin.*, 1(1): 76-93. (In Chinese with English summary).