

The Raffles Bulletin of Zoology

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BLOW FLIES
(INSECTA: DIPTERA: CALLIPHORIDAE)
OF MALAYSIA AND SINGAPORE

H. Kurahashi, N. Benjaphong and B. Omar

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BLOW FLIES (INSECTA: DIPTERA: CALLIPHORIDAE) OF MALAYSIA AND SINGAPORE

H. Kurahashi, N. Benjaphong and B. Omar

ABSTRACT. - Malaysian and Singapore calliphorid flies (118 species) are reviewed. List of new localities, distributions and ecological data are also recorded. Five new species are described and illustrated: *Onesia indersinghi*, new species, *Phumosia flavipennis*, new species, *Booponus malayana*, new species, *Verticia chani*, new species, and *Borbororhinia nigradorsum*, new species.

Seventeen species are recorded for the first time from the area of Malaysia and Singapore. Keys are provided for identifications of 114 species recorded from the area, excluding four nominal taxa in need of revision: *Phumosia emimelania* (Rondani, 1875), *Rhyncomya indica* (Rondani, 1875), *Isomyia confixa* (Walker, 1856) and *I. mallochi* James, 1977 (= *Strongyloneura micans* Malloch, 1928).

KEY WORDS. - Blow flies, Calliphoridae, new species, Malaysia, Singapore.

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H. Kurahashi - Department of Medical Entomology, The National Institute of Health, Toyama 1-23-1, Shinkuku-ku, Tokyo 162, Japan. **N. Benjaphong** - Division of Medical Entomology, Department of Medical Sciences, Soi Bamrasnaradura Hospital, Amphur Muang, Nonthaburi 11000, Thailand. **B. Omar** - Department of Parasitology, University Kebangsaan Malaysia, Jalan Raja Muda, 50300 Kuala Lumpur, Malaysia.

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INTRODUCTION

The adults of Calliphoridae are known as blow flies, blue bottle flies or green bottle flies. Several species of these flies are of great medical and veterinary importance due to their roles in disseminating agents of infectious diseases.

A number of papers are particularly useful when studying the blow flies of Malaysia and Singapore. James (1977) published A Catalog of the Diptera of the Oriental Region including Malaysian and Singapore species. Inder Singh et al. (1979) published a preliminary key to the common calliphorid flies of Peninsular Malaysia. Hii Lu King and Kurahashi (1977) and Kurahashi (1989) published a key to the species of *Phumosia* from Malaysia. Peninsular Malaysia is located to the south of Thailand. Most of the species of blow flies from Peninsular Malaysia also occur in Thailand. From the works of Tumrasvin et al. (1979), Inder Singh et al. (1979) and the present study, the distributions of known species of calliphorids from both countries can be compared as in Table 1.

The present paper reviews 118 species including 5 species new to science and 17 newly recorded species from the Malaysian and Singapore area. Keys are provided to subfamilies, genera and species. Keys are provided for identifications of 114 previously recorded species from the area, excluding four nominal taxa in need of revision: *Phumosia emimelania* (Rondani, 1875), *Rhyncomya indica* (Rondani, 1875), *Isomyia confixa* (Walker, 1856) and *I. mallochi* James, 1977 (= *Strongyloneura micans* Malloch, 1928). For the sake of convenience, a few keys contained several unrecorded species which are likely to be found in near future. The data of bionomics and localities whenever available are included in the text. Newly recorded species and localities are preceded by asterisk.

The calliphorid fauna of the relevant area seems to be characterized by Oriental (67 spp., 56.8% of the total) and Oriental-Australasian (14 spp., 11.9%) elements and by a high frequency of endemic species or species which have so far not been recorded elsewhere (28 spp., 23.7%). The remaining 9 species comprise East Palaearctic-Oriental-Australasian (3 spp., 2.5%), East Palaearctic-Oriental (2 spp., 1.7%), Afrotropical Oriental-Australasian (2 sp., 1.7%) and Pantropical (2 sp., 1.7%) elements.

Abbreviations for institutions housing specimens are as follows: BMNH, The Natural History Museum, London; BPBM, Bishop Museum, Honolulu; CAS, California Academy of Sciences, San Francisco; MNHA, Museum of Nature and Human Activities, Hyogo; LU, Department of Zoology, Lund University, Lund; MUEL, Entomological Laboratory, Faculty of Agriculture, Meijo University, Nagoya; NIHJ, Reference Museum, Department of Medical Entomology, National Institute of Health, Tokyo; NSMT, National Science Museum (Natural History), Tokyo; OU, Obihiro University of Agriculture and Veterinary Medicine, Obihiro; SMK, Sarawak Museum, Kuching; SU, Singapore University, Singapore.

In order to save space, only references recording or otherwise referring to the Malaysian and Singapore fauna have been listed. Taxonomic references (author, year: page) are used extensively, but not all have been included in the Literature Cited. Other relevant bibliographic information is found in the Oriental catalogue (James, 1977). Type localities are given in their original version, but they are not strict quotes. Modern names of countries are given in brackets. Locality names of specimens examined are cited as shown on the label of specimen. Countries given under distribution are listed roughly in west-east sequence. Terminology mainly follows Senior-White et al. (1940) and measurement of frons was made in a similar manner to Fan (1965). Frons index is the same as Fan's index of frons.

Table 1. Composition of the blow fly fauna in Malaysia+Singapore and Thailand.

Species	Malaysia+Singapore	Thailand (Tumrasvin et al., 1979) (Kurahashi, 1992;1995a;1995b)
Subfamily AMENIINAE		
Tribe Ameniini		
<i>Silbomyia</i>	<i>asiatica</i> <i>*metallica</i>	
Tribe Catapicephalini		
<i>Catapicephala</i>	<i>kurahashii</i> <i>micans</i> <i>*michikoeae</i> <i>sinica</i> <i>?splendens</i>	<i>kurahashii</i> <i>michikoeae</i> <i>sinica</i>
Subfamily CALLIPHORINAE		
Tribe Calliphorini		
<i>Calliphora</i>	<i>fulviceps</i>	<i>vomitorea</i> <i>pattoni</i>
<i>Melinda</i>	<i>abdominalis</i> <i>*nigricans</i> <i>*nuortevae</i> <i>scutellata</i>	<i>nigripalpis</i> <i>nuortevae</i> <i>scutellata</i>
<i>Tricycleopsis</i>	<i>paradoxa</i>	<i>paradoxa</i>
<i>Polleniopsis</i>	<i>elongata</i> <i>toxopei</i>	<i>pilosa</i>
<i>Onesia</i>	<i>atripalpis</i> <i>indersinghi</i> , new species	<i>parafacialis</i>
<i>Tainanina</i>	<i>javanica</i> <i>sarcophagoides</i>	<i>pilisquama</i> <i>sarcophagoides</i>
<i>Phumosia</i>	<i>abdominalis</i> <i>*coomani</i> <i>?emimelania</i> <i>flavipennis</i> , new species <i>indica</i> <i>murphyi</i> <i>nigronitens</i> <i>promittens</i> <i>testacea</i> <i>viridis</i>	<i>indica</i> <i>testacea</i>
Tribe Luciliini		
<i>Lucilia</i>	<i>*calviceps</i> <i>cuprina</i> <i>hainanensis</i> <i>papuensis</i> <i>porphyrina</i> <i>sinensis</i>	<i>cuprina</i> <i>papuensis</i> <i>porphyrina</i> <i>sinensis</i>
<i>Hemipyrellia</i>	<i>ligurriens</i> <i>tagaliana</i>	<i>ligurriens</i> <i>pulchra</i>
<i>Hypopygiopsis</i>	<i>fumipennis</i> <i>violacea</i>	<i>infumata</i> <i>tumrasvini</i>

Species	Malaysia+Singapore	Thailand (Tumrasvin et al., 1979) (Kurahashi, 1992;1995a;1995b)
Tribe Polleniini		
<i>Dexopollenia</i>	<i>bicolor</i> <i>bicoloripes</i> <i>hirtiventris</i> <i>monsdulitae</i> <i>wyatti</i>	<i>fangensis</i> <i>yuphae</i>
<i>Pollenia</i>		<i>chotei</i>
Tribe Melanodexiini		
<i>Nepenthomyia</i>	<i>malayana</i>	
Tribe Bengalini		
<i>Bengalia</i>	<i>bezzii</i> <i>concava</i> <i>emarginata</i> <i>escheri</i> <i>hobbyi</i> <i>jejuna</i> <i>labiata</i> <i>recurva</i> <i>varicolor</i> <i>xanthopyga</i>	<i>asymmetria</i> <i>bezzii</i> <i>chiangmaiensis</i> <i>emarginata</i> <i>labiata</i> <i>pseudovaricolor</i> <i>siamensis</i> <i>torosa</i> <i>varicolor</i>
<i>Booponus</i>	<i>malayana</i> , new species	
<i>Verticia</i>	<i>chani</i> , new species <i>fasciventris</i> <i>nigra</i> <i>orientalis</i>	<i>fasciventris</i>
Subfamily CHRYSOMYINAE		
Tribe Chrysomyini		
<i>Chrysomya</i>	<i>bezziana</i> <i>chani</i> <i>defixa</i> <i>megacephala</i> <i>nigripes</i> <i>pinguis</i> <i>rufifacies</i> <i>*thanomthini</i> <i>villeneuvei</i>	<i>bezziana</i> <i>chani</i> <i>megacephala</i> <i>nigripes</i> <i>pinguis</i> <i>rufifacies</i> <i>thanomthini</i> <i>villeneuvei</i>
Subfamily RHINIINAE		
Tribe Rhiniini		
<i>Chlororhinia</i>	<i>exempta</i> <i>fuscohirta</i>	
<i>Rhinia</i>	<i>apicalis</i>	
<i>Stomorhina</i>	<i>discolor</i> <i>melastoma</i> <i>procula</i> <i>townsendi</i> <i>unicolor</i> <i>veterana</i> <i>xanthogaster</i>	<i>siamensis</i>

Kurahashi et al.: Blow flies of Malaysia and Singapore

Species	Malaysia+Singapore	Thailand (Tumrasvin et al., 1979) (Kurahashi, 1992;1995a;1995b)
<i>Idiella</i>	<i>divisa</i> <i>euidielloides</i> <i>mandarina</i>	
Tribe Cosminini		
<i>Cosmina</i>	<i>bicolor</i> <i>biplumosa</i> <i>limbipennis</i> <i>?simplex</i>	<i>bicolor</i> <i>biplumosa</i> <i>limbipennis</i> <i>nipae</i> <i>thailandica</i> <i>vanidae</i>
<i>Borbororhinia</i>	<i>bivittata</i> <i>nigradorsum</i> , new species	<i>laojanae</i>
<i>Sumatria</i>	<i>*chiekoeae</i> <i>latifrons</i> <i>rufithorax</i> <i>vittigera</i>	<i>chiekoeae</i>
<i>Malayomyza</i>	<i>humeralis</i>	
<i>Isomyia</i>	<i>borneensis</i> <i>ceballosi</i> <i>chalconotum</i> <i>chrysoides</i> <i>confixa</i> <i>cupreoviridis</i> <i>*delectans</i> <i>dotata</i> <i>electa</i> <i>fulvicornis</i> <i>*hetauda</i> <i>malayensis</i> <i>?mallochi</i> <i>oestracea</i> <i>*perisi</i> <i>*pictifacies</i> <i>*pseudonepalana</i> <i>viridaurea</i>	
<i>Strongyloneura</i>	<i>prolata</i>	
<i>Rhyncomya</i>	<i>*divisa</i> <i>?indica</i>	
<i>Metalea</i>	<i>*erinacea</i> <i>*flavibasis</i> <i>notata</i> <i>setosa</i>	

KEY TO THE SUBFAMILIES OF CALLIPHORIDAE

1. Stem vein of wing without setulae on dorsal side of basal section 2
- Stem vein of wing with distinct setulae on postero-dorsal side of basal section 3

2. Anterior lappet of metathoracic spiracle with a conspicuous backwardly directed tuft of long hairs; postscutellum forming a definite convex swelling which is microrugose and sometimes shows slight trace of shallow median incision; female postabdomen nontelescopic, modified for deposition of grown larvae; large tachinid-like flies SUBFAMILY AMENIINAE
- Anterior lappet of metathoracic spiracle bare or at most with a very few small inconspicuous hairs; postscutellum not at all convex or at most with rudimentary trace of swelling, not as above; female postabdomen forming a telescopic ovipositor, but sometimes short in larviparous species for deposition of first instar larvae SUBFAMILY CALLIPHORINAE

3. Subalar knob with erect hairs; thoracic squama largely lobulate, subtruncate at apex, concave on outer margin, haired in parts of upper surface; upper occiput without glossy submarginal band SUBFAMILY CHRYSOMYINAE
- Subalar knob bare or without distinct hairs; thoracic squama usually tongue-like, narrowly rounded at apex, straight on outer margin, rarely lobulate in some species of *Isomyia*; a bare glossy submarginal band on upper occiput extending almost entirely across its width SUBFAMILY RHINIINAE

SUBFAMILY AMENIINAE

KEY TO THE TRIBES AND GENERA OF AMENIINAE

1. Head almost always with very large facial carina; propleuron and prosternum almost always haired; hind tibia with apical *pv*; outer *ph* situated mesad of *prs*; ventral surface of costa setulose between apices of subcostal (*Sc*) and first longitudinal (*R*₁) veins Tribe Ameniini, *Silbomyia* Macquart
- Head without facial carina; propleuron bare; prosternum bare, sometimes hairy; hind tibia without apical *pv*; outer *ph* situated laterad of *prs*; ventral surface of costa bare between apices of subcostal (*Sc*) and first longitudinal (*R*₁) veins Tribe Catapicephalini, *Catapicephala* Macquart

TRIBE AMENIINI

Genus *Silbomyia* Macquart

Silbomyia Macquart, 1843: 274 (117). Type species: *Musca fuscipennis* Fabricius, 1805, des. by Engel (1925: 348).

KEY TO THE SPECIES OF *SILBOMYIA*

1. Frontal stripe 2.4-2.8 X as broad as one of parafrontalia (Fig. 1a); parafrontalia and parafacialia yellowish-white dusted, with a brilliant creamy white or silvery appearance in a ceratin incidence of light *S. asiatica* Crosskey
- Frontal stripe 1.4-1.7 X as broad as one of parafrontalia (Fig. 1b); parafrontalia correspondingly broad; anterior half of parafrontalia and parafacialia silvery white dusted in male, entirely golden yellow dusted in female *S. metallica* Crosskey

***Silbomyia asiatica* Crosskey**

(Fig. 1a)

Silbomyia asiatica Crosskey, 1965: 80. Type locality: Biserat, Thailand.

Silbomyia asiatica: James, 1977: 527.

Length: 10.0-13.5 mm.

Specimens examined. - No available material from Malaysia and Singapore.

Bionomics. - Nothing is known.

Distribution. - India, Thailand and Malaysia (Malaya: Crosskey, 1965).

****Silbomyia metallica* Crosskey**

(Fig. 1b)

Silbomyia metallica Crosskey, 1965: 81. Type locality: Babidjoelan, E. Borneo, Indonesia.

Silbomyia metallica: James, 1977: 527.

Length: 10.0-12.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 4 males 3 females, Perak, Padang Rengas, nr Taiping, 50 m, 17 Mar.1990, H. Kurahashi (NIHJ).

Bionomics. - Adults frequent flowers.

Distribution. - *Malaysia (Malaya) and Indonesia (Kalimantan).

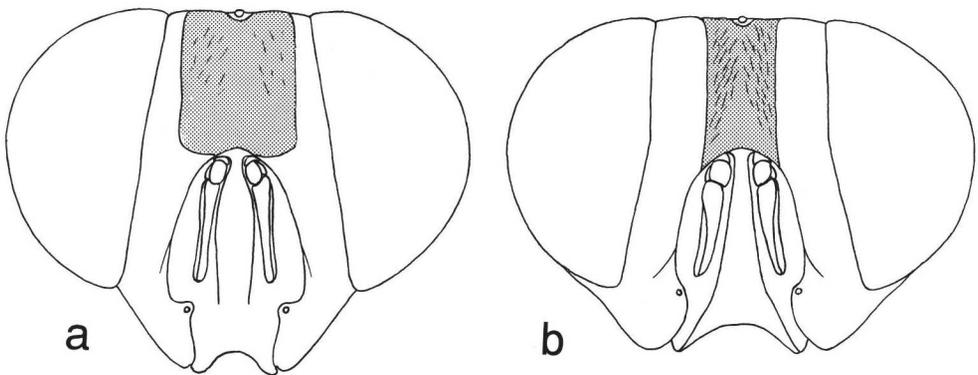


Fig. 1. Male frons, frontal view. a, *Silbomyia asiatica* Crosskey; b, *S. metallica* Crosskey.

TRIBE CATAPICEPHALINI

Genus *Catapicephala* Macquart

Catapicephala Macquart, 1851: 210 (237). Type species: *Catapicephala splendens* Macquart, 1851, orig. des.

Trongia Townsend, 1916: 299. Type species: *Trongia viridis* Townsend, 1916, orig. des. (= *Musca micans* Fabricius, 1805).

KEY TO THE SPECIES OF *CATAPICEPHALA*

1. Body metallic blue; *ors* 2+2 in male & female; mid tibia with 1 *v* and 2-3 *ad* in male & female; frons index 0.26-0.28 in male, 0.36 in female; claws and pulvilli very short and stout; postgena with black hairs anteriorly *C. kurahashii* Tumrasvin et Kano
- Body metallic green; *ors* 2+1 or 0+1 in male; mid tibia without *v* and with 1 *ad* in male, with 1 *v* and 2 *ad* in female; frons index less than 0.23; claws and pulvilli very long, longer than the last tarsal segment in male, normal in female; postgena clothed with white hairs only 2
2. Antenna orange, darkened apically; prosternum hairy; *ors* 0+1 in male, 2+1 in female *C. sinica* Fan
- Antenna entire fuscous; prosternum bare or hairy; *ors* 2+1 in male & female 3
3. Palpus fuscous black, silvery pubescent; sternites 6-7 reddish in female *C. michikoeae* Tumrasvin et Kano
- Palpus yellowish orange; sternites 6-7 black in female 4
4. Tergites 4-5 brilliantly metallic green with brassy, sometimes coppery or/and purple tinged; tergite 5 with silver white pollinosity on lateral and ventral sides not visible in dorsal view; *ors* 2+1 in both male and female *C. micans* Fabricius
- Tergites 4-5 brilliantly metallic blue; silver white pollinosity on lateral and ventral sides of tergite 5 extending to dorsal side, visible in dorsal view; *ors* 0+1? in male, 2+1 in female *C. splendens* Macquart

Catapicephala micans (Fabricius)

Musca micans Fabricius, 1805: 291. Type locality: "India orientali".

Trongia viridis Townsend, 1916: 299. Type locality: Trong, Lower Siam [Thailand].

Length: 9.5-13.5 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 male 1 female, Sabah, 47 mi Lungmanis, 20 Oct.1967, F. E. (NIHJ); 1 male 1 female, Sabah, Papar, 50 km SW Kota Kinabalu, 13-15 Nov.1975, H. Shima (NSMT); 1 male, Sarawak, Kuala Bok, 3 Mar.1969, T. Kunou & Y. Arita (NIHJ); 4 females, Mamut Copper Mine, nr Ranau, 600 m, ex. human feces, 15 Nov.1995, T. Hayashi (NIHJ).

Bionomics. - Adults were found along the margin of dense native forests. Larviparous.

Distribution. - Malaysia (Borneo: Sabah).

Catapicephala kurahashii Tumrasvin et Kano

Catapicephala kurahashii Tumrasvin et Kano, 1977: 127. Type locality: Khao Khiaw, Thailand.

Catapicephala kurahashii: Inder Singh, Kurahashi & Kano, 1979: 8.

Length: 10.5-13.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Mt. Berinchang, 2,110 m, natural forest, 15 Mar.1990, H. Kurahashi (NIHJ); 2 females, Pahang, Cameron Highlands, Gunung Jasar, 15-27 Nov.1994, T. Pape (SMNH).

Bionomics. - Adults were found along the margin of dense native forests.

Distribution. - Thailand and Malaysia (Malaya).

****Catapicephala michikoe* Tumrasvin et Kano**

Catapicephala michikoe Tumrasvin et Kano, 1977: 129. Type locality: Sai Yok, Thailand.

Length: 8.5-10.0 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 male 7 females, Sabah, Mamut Copper Mine, nr Ranau, 600 m, 15 Nov.1995, T. Hayashi (NIHJ).

Bionomics. - Above specimens were collected on human feces.

Distribution. - Thailand and *Malaysia (Borneo).

***Catapicephala sinica* Fan**

Catapicephala sinica Fan, 1965: 195. Type locality: China.

Catapicephala sinica: Inder Singh, Kurahashi & Kano, 1979: 9.

Length: 12.0-14.5 mm.

Specimens examined. - SINGAPORE: 1 male, ?, 1975, D. H. Murphy (NIHJ); 1 female, Bot. Garden, 14 Dec.1952, S. Asahina (NIHJ). MALAYSIA(MALAYA): 2 females, Bukit Mandul, 20 km W of Kuala Lumpur, 1 Nov.1975, S. Shinonaga & H. Shima (NSMT); 2 males 2 females, Perak, Padang Rengas, nr Taiping, 50 m, 17 Mar.1990, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - Myanmar, Thailand, Malaysia (Malaya) and *Singapore.

?*Catapicephala splendens* Macquart

Catapicephala splendens Macquart, 1851: 210 (237). Type locality: Java [Indonesia].

Catapicephala splendens: Senior-White, Aubertin & Smart, 1940: 106.

Catapicephala splendens: James, 1977: 532.

Previous records (Senior-White et al., 1940; James, 1977) from Sabah and Sarawak seem to be concerned with *C. micans* (Fabricius).

Length: 14.0 mm.

Specimens examined. - No available material from Malaysia and Singapore.

Bionomics. - Nothing is known.

Distribution. - Myanmar (Tenasserim), Malaysia (Malaya, ?Sarawak), Singapore and Indonesia (Java).

SUBFAMILY CALLIPHORINAE

KEY TO THE TRIBES AND GENERA OF CALLIPHORINAE

1. Propleuron hairy 2
- Propleuron bare 12
2. Thoracic squama more or less hairy on upper surface Tribe Calliphorini (in part) 7
- Thoracic squama quite bare on upper surface 3
3. Posterior part of suprasquamal ridge with a posterior parasquamal tuft of black setulose erect hairs on a small well-defined black sclerite Tribe Luciliini 5
- Posterior parasquamal tuft absent 4
4. Anterior part of suprasquamal ridge bare; distance between right and left of presutural *ac* rather large; mesothoracic spiracle rather large, sometimes swollen Tribe Phumosiini, *Phumosia* Robineau-Desvoidy
- Anterior parasquamal tuft present, if not so, a distance between right and left of presutural *ac* small; mesothoracic spiracle smaller, not particularly swollen Tribe Calliphorini (in part) 7
5. Supraspiracular convexity clothed with long, upstanding, fine hairs 6
- Supraspiracular convexity bare or pubescent *Lucilia* Robineau-Desvoidy
6. Legs in male more or less fringed; hypopygium strongly developed; generally large flies, more than 15 mm in length *Hypopygiopsis* Townsend
- Legs not fringed in both sexes; male hypopygium normal; medium and small flies, less than 10 mm in length *Hemipyrellia* Townsend
7. Presutural *ac* usually 1, rarely absent; facial carina more or less developed *Polleniopsis* Townsend
- Presutural *ac* 2; facial carina absent 8
8. Thoracic squama quite bare on upper surface; anterior parasquamal tuft developed *Melinda* Robineau-Desvoidy
- Thoracic squama more or less hairy on upper surface, if not so, anterior parasquamal portion bare 9
9. Male frons very broad; eyes dichoptic in male and female; 3rd antennal segment elongate, more than 4 times as long as 2nd; presutural *ia* absent *Tainanina* Villeneuve
- Eyes holoptic or subholoptic in male and dichoptic in female; length of 3rd antennal segment variable; presutural *ia* present or absent 10
10. Body medium-sized, largely testaceous, with yellow femora and tibiae *Tricycleopsis* Villeneuve
- Body small- to large-sized, blackish, with metallic blue abdomen and black legs 11

11. Body small- to medium-sized; distance between right and left of presutural *ac* small (cf. Kurahashi, 1970: 521, Fig. 1b) *Onesia* Robineau-Desvoidy
 - Body large-sized; distance between right and left of presutural *ac* rather large (cf. Kurahashi, 1970: 521, Fig. 1a) *Calliphora* Robineau-Desvoidy
12. Prosternum usually hairy, bare in *Verticia*; thorax not clothed with golden curly hairs; eyes dichoptic in male and female; body at least partly yellowish Tribe Bengalini 13
 - Prosternum bare; thorax usually with golden curly hairs, if no curly hairs, eyes holoptic in male and body black in male and female 15
13. Vibrissae inserted well above oral margin, if more or less level with oral margin then face not deeply sunk; arista long plumose to tip; frontal stripe clothed with rather long setulae
 *Bengalia* Robineau-Desvoidy
 - Vibrissae inserted at level of oral margin; face more or less deeply sunk; arista plumose or pectinate; frontal stripe without setulae 14
14. Arista plumose; facialia and face normally formed; prosternum bare; proclinate *ors* and *ov* in male *Verticia* Malloch
 - Arista pectinate; facialia diverging for the greater part of their length, then rapidly converging above oral margin; prosternum hairy; neither proclinate *ors* nor *ov* in male
 *Booponus* Aldrich
15. Thorax clothed with fine tawny-colored crinkly hairs; presutural *ia* absent; body at least in part testaceous yellow; parafacialia bare; *ac* 0-1+1-2 .. Tribe Polleniini, *Dexopollenia* Townsend
 - Body without crinkly hairs; presutural *ia* present; thorax fuscous to black, abdomen variable in colour; parafacialia setulose; *ac* 1-2+3 Tribe Melanodexiini 16
16. Thorax black with a girdle of silvery dusting from sternopleuron, across mesopleuron, dorsally banded to posterior half of presutural area, across from side to side; prescutellar area also with a transverse band, clothed with black hairs; abdomen black, largely silver-dusted on tergite 4; parafacialia with a row of several fine black setulae along anterior margin above; wing cell R_5 open *Nepenthomyia* Kurahashi et Beaver
 - Thorax black, rather heavily grey-dusted and black haired on dorsum; pleura clothed with soft white hairs; abdomen testaceous at least on lateral and ventral sides of tergites 1+2-3; parafacialia clothed with white setulae; R_5 closed. [No record, but probably found in Singapore and Malaysia according to the distribution of *Nepenthes* plants]
 *Wilhelmia* Schmitz et Villeneuve

TRIBE CALLIPHORINI

Genus *Calliphora* Robineau-Desvoidy

Calliphora Robineau-Desvoidy, 1830: 433. Type species: *Musca vomitoria* Linnaeus, 1758, orig. des.

Subgenus *Paracalliphora* Townsend

Paracalliphora Townsend, 1916: 151. Type species: *Calliphora oceaniae* Robineau-Desvoidy, 1830, orig. des.

Calliphora (Paracalliphora) fulviceps van der Wulp

Calliphora fulviceps van der Wulp, 1881: 44. Type locality: Kerentji, Pic of Indrapura, Sumatra [Indonesia].

Calliphora (Paracalliphora) javanica de Meijere, 1914: 174, as *fulviceps* var. Type locality: Gunung Gedeh, Pangerango, and Tosari, Java [Indonesia].

Calliphora (Paracalliphora) malayana Malloch, 1927: 415. Type locality: Gunung Benom, Pahang, Malaya [Malaysia].

Calliphora fulviceps: Senior-White, Aubertin & Smart, 1940: 34.

Calliphora malayana: Senior-White, Aubertin & Smart, 1940: 36.

Calliphora fulviceps: Inder Singh, Kurahashi & Kano, 1979: 10.

Length: 8.5-11.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 females, Pahang, Cameron Highlands, Mt. Brinchang, 2-7 Jan.1959, L. W. Quate (BPBM); 4 males 42 females, Pahang, Mt. Berinchang, 2,110 m, natural forest, 25 Oct.1975, 15 Mar.1990, S. Shinonaga & H. Kurahashi (NSMT, NIHJ); 1 female, Pahang, Cameron Highlands, Gunung Jasar, 15-27 Nov.1994, T. Pape (SMNH). MALAYSIA (BORNEO): 1 male 20 females, Sabah, Mt. Kinabalu, Paka, 9 Apr.1964, S. Hayashida (NSMT); 41 males 129 females, Mt. Kinabalu, 1,300-2,600 m, 6-7 Nov.1975, S. Shinonaga & H. Shima (NSMT); 1 male 11 females, Mt. Kinabalu, 2,300 m, moss forest, 1-2 May.1979, H. Kurahashi (NIHJ); 1 female, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 1 male, Mt. Kinabalu, Kamberanga, 2,140 m, 22-30 Oct.1958, T. C. Maa (BPBM).

Bionomics. - Larviparous. Adults are attracted to decaying animal matter.

Distribution. - Malaysia (Malaya, Borneo) and Indonesia (Sumatra, Java).

Genus *Melinda* Robineau-Desvoidy

Melinda Robineau-Desvoidy, 1830: 439. Type species: *Musca caerulea* Meigen, 1826 (preocc., = *Musca cognata* Meigen, 1830), des. by Hendel (1901: 32).

KEY TO THE SPECIES OF *MELINDA*

1. Scutellum entirely black; squamae fuscous; fore and mid femora fuscous; all tibiae dull yellow *M. nigricans* (Villeneuve)
- Scutellum with at least apex yellowish; squamae brown; all femora and tibiae testaceous yellow 2
2. Fore coxa yellow in front; scutellum entirely semi-pellucid yellow; tergites 1+2-3 semi-pellucid yellow, with black apices and black median vitta sharply delimited *M. abdominalis* (Malloch)
- Fore coxa fuscous in front; scutellum more or less darkened basally; tergite 1+2-4 fuscous, brassy shining, more or less tessellated 3
3. Humeral and postalar calli red; epandrium reddish in male; tergite 5 in female with orange apex; scutellum largely reddish *M. nuortevae* Kurahashi
- Humeral and postalar calli dark, sometimes metallic; epandrium fuscous, submetallic; abdomen in both sexes entirely blackish; scutellum largely black except for narrow reddish margin *M. scutellata* (Senior-White)

Melinda abdominalis (Malloch)

Paradichosia abdominalis Malloch, 1931: 198. Type locality: Malaya [Malaysia].

Paradichosia abdominalis: Senior-White, Aubertin & Smart, 1940: 59.

Melinda abdominalis: Kurahashi, 1970: 530.

Melinda abdominalis: James, 1977: 535.

Length: 8.0 mm.

Specimens examined. - MALAYSIA (MALAYA): Holotype male, Pahang, Gunong Jahan Padang, 1500 m, 12 Dec.1921, H. M. Pendlebury (BMNH); 5 males, Pahang, Cameron Highlands, nr Tanah Rata, Gustafsson, 15-27 Nov.1994, Heinakroon & Pape (SMNH).

Bionomics. - Nothing is known.

Distribution. - India (Uttar Pradesh) and Malaysia (Malaya).

****Melinda nigricans* (Villeneuve)**

Paradichosia nigricans Villeneuve, 1927: 387. Type locality: Chip Chip, Formosa [Taiwan].

Length: 7.0-8.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 9 males, Pahang, Cameron Highlands, nr Tanah Rata, Gustafsson, 15-27 Nov.1994, Heinakroon & Pape (SMNH).

Bionomics. - Nothing is known.

Distribution. - Taiwan and *Malaysia (Malaya).

****Melinda nuortevae* Kurahashi**

Melinda nuortevae Kurahashi, 1970: 526. Type locality: Kambaiti, NE Burma [Myanmar].

Length: 6.0-7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 females, Pahang, Cameron Highlands, Mt. Beremban, 1,100-1,700 m, 26 Oct.1975, S. Shinonaga (NSMT); 1 male, Pahang, Bukit Fraser (Fraser's Hill), 10-11 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - Nothing is known.

Distribution. - Myanmar, Thailand and *Malaysia (Malaya).

***Melinda scutellata* (Senior-White)**

Paradichosia scutellata Senior-White, 1923: 312. Type locality: Mungpoo, Darjeeling District, India.

Paradichosia scutellata: Senior-White, Aubertin & Smart, 1940: 61.

Melinda scutellata: Kurahashi, 1970: 530.

Melinda scutellata: James, 1977: 536.

Melinda scutellata: Tumrasvin, Kurahashi & Kano, 1979: 246.

Melinda scutellata: Kurahashi & Thapa, 1994: 201.

Length: 7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 3 males, Pahang, Gunong Benom, 1,800 m, 31 Jul.1925, I. H. N. Evans (BMNH).

Bionomics. - Nothing is known.

Distribution. - Nepal, India (Sikkim, W. Bengal), Myanmar, Thailand and Malaysia (Malaya).

Genus *Tricycleopsis* Villeneuve

Tricycleopsis Villeneuve, 1927: 388. Type-species: *Tricycleopsis paradoxa* Villeneuve, 1927, orig. des.

Tricycleopsis paradoxa Villeneuve

Tricycleopsis paradoxa Villeneuve, 1927: 389. Type locality: Koshun, Formosa [Taiwan].

Calliphora (Pseudocalliphora) semifulva Malloch, 1927: 51. Type locality: Fort de Kock, Sumatra [Indonesia].

Calliphora paradoxa: Senior-White, Aubertin & Smart, 1940: 37.

Tricycleopsis paradoxa: Kurahashi, 1970: 540.

Tricycleopsis paradoxa: James, 1977: 540.

Tricycleopsis paradoxa: Tumrasvin, Kurahashi & Kano, 1979: 247.

Tricycleopsis paradoxa: Kurahashi, 1987a: 53.

Tricycleopsis paradoxa: Kurahashi & Suenaga, 1991: 2.

Length: 6.0-7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Cameron Highlands, 700-1,000 m, 23-24 Oct.1975, S. Shinonaga (NSMT); 1 female, Pahang, Cameron Highlands, Tanah Rata, 1,400 m, light, 27 Mar.1992, Gustafsson, Hippa & Sellerholm (SMNH); 1 female, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH). MALAYSIA (BORNEO): 1 male, Sabah, Tenompok, 48 km E of Jesselton, 1,400 m, 26-31 Jan.1959, T. C. Maa (BPBM).

Bionomics. - Nothing is known.

Distribution. - Japan, Taiwan, Thailand, Malaysia (Malaya, Borneo) and Indonesia (Sumatra).

Genus *Polleniopsis* Townsend

Polleniopsis Townsend, 1917: 201. Type species: *Polleniopsis pilosa* Townsend, 1917, orig. des.

KEY TO THE SPECIES OF *POLLENIOPSIS*

1. Abdomen black, densely covered with yellowish grey to golden dusting, strongly tessellated; legs black; claws and pullvilli normal in size; facial carina well developed; external *ph* present *P. toxopei* (Senior-White)
- Abdomen bronzy, more or less silver-grey dusted, with an obscure black median stripe; femora and tibiae fulvous, sometimes entirely fuscous; claws and pullvilli large; facial carina poorly developed; external *ph* absent *P. elongata* Kurahashi

***Polleniopsis elongata* Kurahashi**

Polleniopsis elongata Kurahashi, 1972: 712. Type locality: Kamaranga, Mt. Kinabalu, N. Borneo [Malaysia].

Length: 7.0-7.5 mm.

Specimens examined. - MALAYSIA (BORNEO): 2 males 3 females, Sabah, Mt. Kinabalu, 1,300-2,600 m, 6-7 Nov.1975, S. Shinonaga (NSMT).

Bionomics. - Adults are found in mountainous areas.

Distribution. - Malaysia (Borneo: Sabah).

***Polleniopsis toxopei* (Senior-White)**

Paratricyclea toxopei Senior-White, 1926: 135. Type locality: Buru Is., Dutch East Indies [Indonesia].

Calliphora (Polleniopsis) carinata Malloch, 1927: 53. Type locality: Tjibodas, Java [Indonesia].

Polleniopsis toxopei: Kurahashi, 1972: 710.

Polleniopsis toxopei: Kurahashi, 1987a: 53.

Length: 5.0-9.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Cameron Highlands, 5,565 ft, 20 May.1967, Torrevillas (BPBM). MALAYSIA (BORNEO): 1 female, Sabah, Mt. Kinabalu, 1,300-2,600 m, 6-7 Nov.1975, S. Shinonaga (NSMT); 30 males, Sarawak, Nanga Pelagus nr Kapit, 180-585 m, 7-14 Aug.1958, T. C. Maa (BPBM); 1 male 3 females, Sarawak, Muara Mongkos, 100 km NE of Kuching, 25-27 Nov.1975, H. Shima (NSMT).

Bionomics. - Nothing is known.

Distribution. - Taiwan, Philippines, Malaysia (Malaya, Borneo), Indonesia (Sumatra, Java, Buru I.), PNG (New Guinea, Bismarck Arch.), Solomon Is. and Admiralty Is.

Genus *Onesia* Robineau-Desvoidy

Onesia Robineau-Desvoidy, 1830: 365. Type species: *Onesia floralis* Robineau-Desvoidy, 1830, des. by Townsend (1916: 8).

KEY TO THE SPECIES OF *ONESIA*

- 1. Presutural *ia* present; basicosta and mesothoracic spiracle blackish; abdomen metallic, very slightly dusted *O. atripalpis* (Malloch)
- Presutural *ia* absent; basicosta and mesothoracic spiracle yellow; abdomen grey-dusted, more or less tesellated *O. andersinghi*, new species

***Onesia atripalpis* (Malloch)**

Calliphora atripalpis Malloch, 1935: 669. Type locality: Kamborangah, Mt. Kinabalu, Borneo [Malaysia].

Calliphora atripalpis: James, 1977: 531.

Onesia atripalpis: Inder Singh, Kurahashi & Kano, 1979: 10.

Length: 5.0-8.0 mm.

Specimens examined. - MALAYSIA (MALAYA): Pahang, Cameron Highlands, 700-1,000 m, 23-24 Oct.1975, S. Shinonaga (NSMT). MALAYSIA (BORNEO): 1 male 7 females, Sabah, Mt. Kinabalu, 2,300 m, moss forest, 1-2 May.1979, H. Kurahashi (NIHJ).

Bionomics. - Adults are found only in mountainous areas.

Distribution. - Malaysia (Malaya, Borneo).

***Onesia indersinghi*, new species**

(Fig. 2)

Materia examined. - Holotype male, MALAYSIA (BORNEO): British N. Borneo, Jesselton, 30 Dec.1962, Y. Hirashima.

Paratypes. MALAYSIA (BORNEO): 4 males 4 females, same data as holotype.

Type depository. Holotype (male) and paratypes (3 males 3 females) in Bishop Museum, Honolulu (BPBM); paratypes (1 male 1 female) in the Reference Museum, Taxonomy and Ecology Laboratory, Department of Medical Entomology, The National Institute of Health, Tokyo (NIHJ).

Description. - Male. - Head: eyes bare, holoptic, separated at narrowest point by slightly less than the width of ocellar triangle; frons index 0.05-0.06; frontal stripe dark brown, reddish anteriorly, widened anteriorly and posteriorly, reduced to a fine line at narrowest point; parafrontalia narrow, silver-grey dusted, darkened toward vertex, with black setulae anteriorly, with ca 10 pairs of *ori*; parafacialia fuscous, reddish along anterior margin, silver-grey dusted, sparsely beset with fine black setulae; face fuscous, reddish brown on lower 1/3, slightly grey-dusted, without median carina; facialia reddish brown, slightly grey-dusted, setulose on lower 1/4; mediana reddish brown, slightly grey-dusted, bare; vibrissaria very narrow, reddish brown, slightly grey-dusted, with a few black setulose hairs; vibrissae well developed; epistome reddish brown; gena black, grey-dusted, clothed with black hairs; postgena concolorous with gena, clothed with yellowish brown hairs except for several ones black anteriorly; occiput black, clothed with yellowish brown hairs on central portion; 2nd antennal segment dark brown; 3rd antennal segment dark brown except for basal 1/2 and venter of basal 1/2 reddish, subequal to 3 X as long as 2nd; arista fuscous brown, median 1/3 yellowish brown, long plumose on basal 2/3; palpus yellowish orange.

Thorax: black with bluish tinge, covered with grey dusting; prescutum with two narrow submedian stripes and broad triangular black lateral spots which are more or less distinct when viewed from behind; median and lateral black stripes on scutum usually obscure; humerus, postalar callus and scutellum concolorous with dorsum; prosternum blackish haired; propleuron hairy; suprspiracular convexity pubescent, without erect hairs; hypopleural hairs black, situated along row of hypopleural bristles; other pleural hairs black; mesothoracic spiracle yellow, longer than the length of propleural depression; metathoracic one fuscous; postalar declivity with tuft of black hairs in central circle; tympanic tuft of black hairs present; anterior parasquamal tuft of black hairs present. Chaetotaxy: *ac* 2+3; *dc* 2+3; *ia* 0-1+2, presutural *ia* usually absent; *h* 3-4; *ph* 1-2; *prs* 1; *sa* 3; *pa* 2; *st* 2+1; *sc* 3+1; *n* 2; *pp* 1-2; *pst* 1.

Wings: hyaline, slightly brownish tinged basally; veins brown; epaulet yellowish brown; basicosta pale yellow; subcostal sclerite yellowish brown, pubescent; node of 2nd and 3rd longitudinal veins (R_{2+3} and R_{4+5}) with several black setulae above and below; 4th longitudinal vein (M) bent with an obtuse angle; section of the 4th vein from bend to wing margin slightly curved inward on basal half; alar squama pale brown; thoracic one fuscous brown except for pale base, with black hairs on upper surface. Halteres yellowish brown.

Legs: black, black haired; fore tibia with 1 *p* and a row of short *ad*; mid tibia with 1 *a*, 1-2 *p* and 1 *v*; hind tibia 3 *ad*, 3 *pd* and 1 *av*.

Abdomen: black, with faint bluish green tinge, covered with whitish grey dustings which produce a more or less tessellated pattern; trace of black median stripe present on tergites 3 and 4; tergites 1+2 and 3 with several black lateral marginal bristles on lateral sides of abdomen; tergites 4-5 with a row of erect marginal bristles, discal bristles developed on tergite 5; sternites black, grey-dusted; hairs on sternites and lateral sides of tergites rather long, black. Hypopygium normal in size, black, grey-dusted; sternite 5, cercus, parolobus and aedeagus as shown in Fig. 2.

Female.- Head: eyes separated at vertex by a distance equal to 0.31-0.32 of head width; frontal stripe broad, reddish brown, darkened and narrowed toward the level of posterior proclinate *ors*, about 2 X the width of one of parafrontalia just in front of anterior ocellus; parafrontalia black, densely silver-grey dusted, darkened toward vertex, setulose, provided with ca. 7 pairs of *ori*; *ors* 2+1; *oc* developed; *acoc* absent; *pooc* weak; *ov* and *iv* well developed; *poc* divergent; *occ* 2.

Legs: mid tibia with 2-3 *ad*, 2 *p*, 1 *pd* and 1 *v*; hind tibia with 3 *ad*, 5-6 *pd* and 1 *av*.

Abdomen: more stout than that of male; abdominal bristles strong, but more or less decumbent. Ovipositor short, probably indicating a larviparous habit. Otherwise same as for male.

Length: 5.0-8.0 mm.

Etymology. - The specific name is in honour of Dr. K. Inder Singh, Institute of Medical Research, Kuala Lumpur, Malaysia.

Remarks. - The present new species is morphologically most similar to *Onesia pubescens* (Maquart, 1851) from New Guinea. Principal differences between the two species are found in the shape of male genitalia.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Borneo: Sabah).

Genus *Tainanina* Villeneuve

Tainanina Villeneuve, 1926: 271. Type species, *Tainanina grisella* Villeneuve, mon.(= *Pollenia pilisquama* Senior-White, 1925).

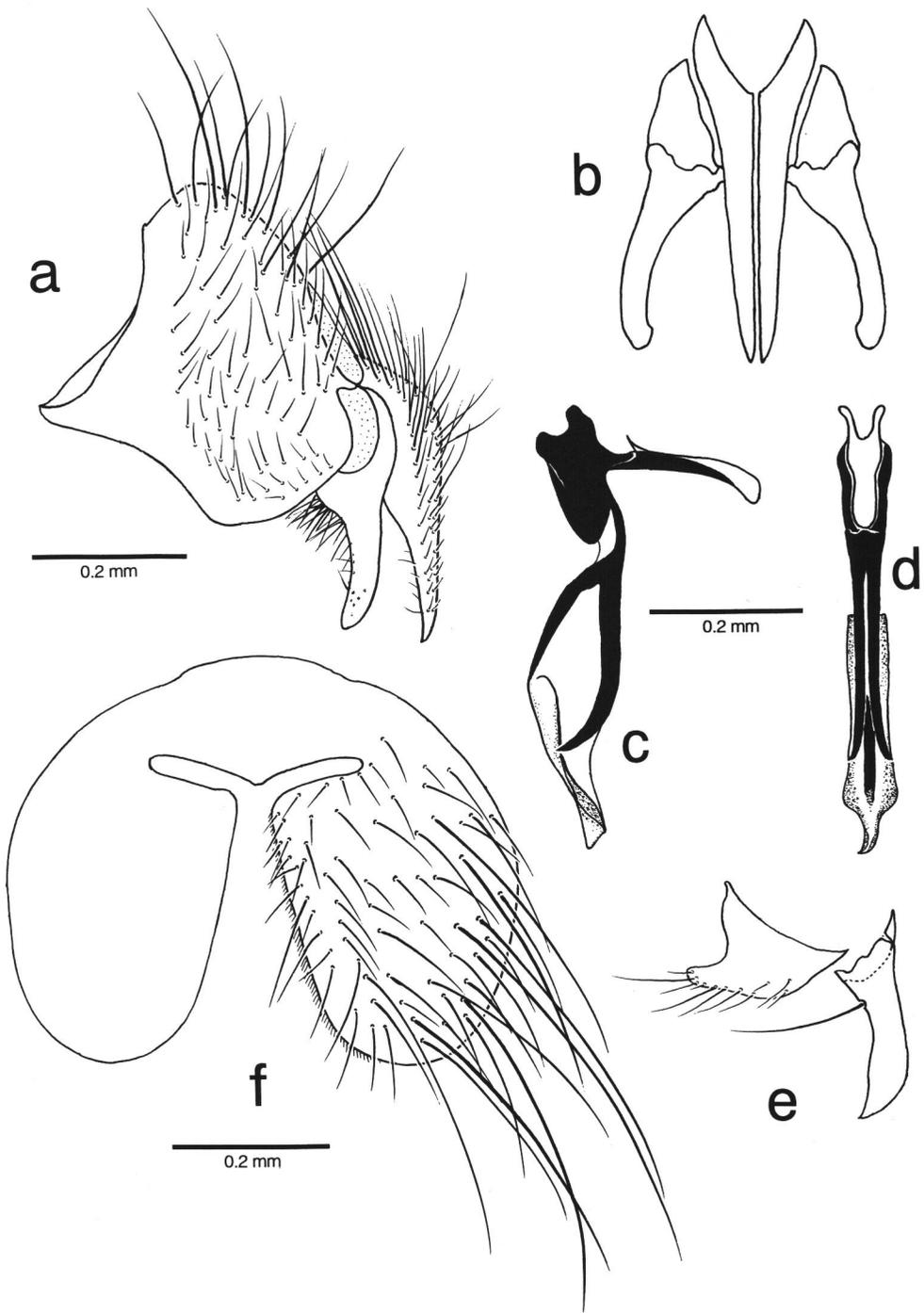


Fig. 2. *Onesia indersinghi*, new species, male genitalia. a, epandrium, cercus and parolobus, lateral view; b, cerci and paralobi, caudal view; c, aedeagus, lateral view; d, aedeagus, posterior view; e, anterior and posterior parameres, lateral view; f, sternite 5, ventral view.

KEY TO THE SPECIES OF *TAINANINA*

1. External *ph* usually developed; presutural *dc* 2-4; hairs on thoracic squama usually yellow; thoracic and alar squamae and base of wing yellowish; larger species, more than 6.5 mm in length .
..... *T. javanica* Kurahashi
- External *ph* absent; presutural *dc* usually 2; hairs on thoracic squama fuscous brown; wing entirely hyaline; smaller species, less than 6.5 mm in length *T. sarcophagoides* (Malloch)

***Tainanina javanica* Kurahashi**

Tainanina javanica Kurahashi, 1978: 6. Type locality: Puncak, Java, Indonesia.
Tainanina javanica: Inder Singh, Kurahashi & Kano, 1979: 10.

Length: 6.5-8.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Cameron Highlands, Mt. Brinchang, 2,300 m, 25 Oct.1975, S. Shinonaga (NSMT). MALAYSIA (BORNEO): 1 male, Sabah, Tenompok, 30 mi E of Jesselton, 1,460 m, 26-31 Jan.1959, T. C. Maa (BPBM); 3 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 2 females, Sabah, Mt. Kinabalu, 1,300 m, 9-11,21 Nov.1975, H. Shima & S. Shinonaga (NSMT).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo) and Indonesia (Java, Irian Jaya).

***Tainanina sarcophagoides* (Malloch)**

Calliphora sarcophagoides Malloch, 1931: 192. Type locality: Pahang, Malaysia (Malaya).
Tainanina sarcophagoides: Senior-White, Aubertin & Smart, 1940: 110.
Tainanina sarcophagoides: James, 1977: 540.
Tainanina sarcophagoides: Kurahashi, 1978: 4.
Tainanina sarcophagoides: Tumrasvin, Kurahashi & Kano, 1979: 248.
Tainanina sarcophagoides: Kurahashi, 1986: 14.
Tainanina sarcophagoides: Kurahashi, 1987a: 52.
Tainanina sarcophagoides: Kurahashi, 1987b: 7.

Length: 3.0-6.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Perak, Bukit Larut, 800 m, natural forest, 18 Mar.1990, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 1 female, Sabah, Forest Camp, 19 km N of Kalabakan, 10 Nov.1962, K. J. Kuncheria (BPBM); 1 female, Sarawak, Tuba Forest clearing at Longhouse, 20 km SE of Sebuyau, 15-22 Jan.1979, Goerdenforts et al. (LU); 13 males 6 females, Sarawak, Santubong, 30 km N of Kuching, 19-20 Nov.1975, H. Shima & S. Shinonaga (NSMT); 5 males 3 females, Sabah, Papar, 50 km SW of Kota Kinabalu, 13-15 Nov.1975, H. Shima & S. Shinonaga (NSMT); 1 male, Poring, 700 m, ex. human feces, 13-17 Nov.1995, T. Hayashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - Japan (Ryukyu Is.), Taiwan, Philippines, Viet Nam, Thailand, Malaysia (Malaya, Borneo), Indonesia (Lombok, Irian Jaya), PNG (New Guinea, Bismarck Arch.) and Solomon Is.

TRIBE PHUMOSIINI

Genus *Phumosia* Robineau-Desvoidy

Phumosia Robineau-Desvoidy, 1830: 427. Type species: *Phumosia abdominalis* Robineau-Desvoidy, 1830, mon.

Plinthomyia Rondani, 1875: 427. Type species: *Plinthomyia emimelania* Rondani, 1875, mon.

Caiusa Surcouf, 1920: 52. Type species: *Caiusa indica* Surcouf, 1914, mon.

KEY TO THE SPECIES OF *PHUMOSIA*

1. Body entirely metallic blue with purple tinge like that of *Lucilia* spp. *P. viridis* Kurahashi
- Body usually testaceous yellow at least in part, or largely or entirely dark brown with bronze or bluish tinges 2
2. Sternopleural bristles 1+1; tympanic tuft of black hairs developed or absent 3
- Sternopleural bristles 2+1; tympanic tuft absent 6
3. Postsutural *ac* 1; tympanic tuft of black hairs developed; wing base, alar squama and basicosta reddish brown to dark brown 4
- Postsutural *ac* 4; tympanic tuft absent; wing base, alar squama and basicosta bright yellow *P. flavipennis*, new species
4. Scutellum dark, fuscous black *P. nigronitens* (Senior-White)
- Scutellum yellowish brown 5
5. Mesonotum all pale testaceous; hind tibia with 2 *pd* *P. testacea* (Senior-White)
- Mesonotum testaceous yellow, with a broad fuscous median stripe well defined by lateral sides *P. coomani* (Séguy)
- Mesonotum largely fuscous black; hind tibia with 1 *pd*, sometimes 2 *pd* *P. indica* (Surcouf)
6. Postsutural *dc* 4 *P. promittens* (Walker)
- Postsutural *dc* 3 7
7. Suprasquamal ridge with fine yellow hairs on almost entire length; wing usually with costal suffusion; body largely testaceous yellow [forest species] *P. abdominalis* Robineau-Desvoidy
- Suprasquamal ridge bare, at most with a few minute hairs on anterior and posterior extremities; wing hyaline with no costal suffusion; body dark brown with blue tinge; [seashore species] *P. murphyi* Hii et Kurahashi

Phumosia abdominalis Robineau-Desvoidy

Phumosia abdominalis Robineau-Desvoidy, 1830: 427. Type locality: Timor [Indonesia].

Phumosia abdominalis: Senior-White, Aubertin & Smart, 1940: 66.

Phumosia abdominalis: James, 1977: 537.

Length: 9.0-11.0 mm.

Specimens examined. - No available material.

Bionomics. - Adults are found in rain forests and are attracted to decaying animal matter and fruits. Larviparous.

Distribution. - Malaysia (Borneo), Indonesia (Sumatra, Timor, Sulawesi, Maluku, Ambon, Seram), PNG (New Guinea) and Philippines (Luzon).

****Phumosia coomani* (Séguy)**

Caiusa coomani Séguy, 1948: 146. Type locality: Tonkin [Viet Nam].

Phumosia coomani: Kurahashi, 1989b: 318.

Length: 8.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Ulogombach Rd., 30 km E of Kuala Lumpur, 30 Oct.1975, S. Shinonaga (NSMT); 1 female, Kuala Lumpur, 24-31 Dec.1958, L. W. Quate (BPBM).

Bionomics. - Nothing is known.

Distribution. - Japan (Ryukyu Is.), China (Hebei, Zhejiang, Sichuan, Hunan, Guangxi, Guangdong, Hainan Is.), Viet Nam and *Malaysia (Malaya).

?*Phumosia emimelania* (Rondani)

Plinthomyia emimelania Rondani, 1875: 428. Type locality: Borneo [Malaysia].

Phumosia emimelania: James, 1977: 537.

This species-group taxon is in need of revision.

Length: ?

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Borneo: Sarawak).

***Phumosia flavipennis*, new species**

(Fig. 3)

Material examined. - Holotype male, MALAYSIA (BORNEO: Sabah): Tenompok, 15 Feb.1959, T. C. Maa.

Paratype. MALAYSIA (BORNEO: Sabah): 1 male, Tenompok, 1,460 m, 48 km E of Jesselton, 26-31 Jan.1959, T. C. Maa.

Type depository. Holotype and paratype in Bishop Museum, Honolulu (BPBM).

Description. - Male. - Head: eyes bare, holoptic, almost contiguous, separated at narrowest point by less than the width of anterior ocellus; frons index 0.01; frontal stripe reddish brown, widened anteriorly and posteriorly, obliterated at narrowest point of frons; parafrontalia narrow, silver-grey dusted, darkened toward vertex, with black setulae anteriorly, with 4

pairs of *ori* and a few fine interstitials; parafacialia silver-grey dusted, bare; face fuscous, grey-dusted, without median carina; facialia fuscous, grey-dusted, flat, broad, setulose on lower 1/5; *mediana* narrow, reddish brown, slightly grey-dusted, with a few black setulae; vibrissaria narrow, silver-grey dusted, clothed with black hairs; vibrissae well developed; epistome pale brown; gena black, subshining, slightly grey-dusted, clothed with black hairs; postgena black subshining, clothed with rather strong bristly hairs; occiput concolorous with gena, clothed with yellowish brown hairs on central portion; 2nd antennal segment reddish orange; 3rd antennal segment fuscous, reddish at base, grey pubescent in a certain incident of light, slightly more than 2 X as long as 2nd; arista blackish brown, long plumose, but without hairs on basal 1/4 to 1/3 of ventral side; palpus yellowish orange, with black hairs.

Thorax: black shining, slightly bluish-tinged, grey-dusted, without distinct stripe; humerus, postalar callus and scutellum concolorous with dorsum, humerus and postalar callus more or less reddish along sutures; prosternum clothed with rather long hairs; propleuron with yellowish brown hairs; suprspiracular convexity with erect blackish hairs; hypopleural hairs blackish, rather long, present on upper posterior edge of hypopleuron; other pleural hairs blackish; mesothoracic and metathoracic spiracles fuscous brown; postalar declivity with tuft of black hairs in central circle; no tympanic tuft present; anterior parasquamal tuft also absent. Chaetotaxy: *ac* 1+4; *dc* 2+3; *ia* 1+3; *h* 2; *ph* 2; *prs* 1; *sa* 3; *pa* 2; *st* 1+1; *sc* 3+1; *n* 2; *pp* 1; *pst* 2.

Wings: yellowish hyaline, more strongly yellowish tinged basally; veins yellowish brown to yellow; epaulet reddish brown; basicosta yellow; subcostal sclerite yellowish brown, pubescent; first longitudinal vein (R_1) with several black setulae on apical half; node of 2nd and 3rd longitudinal veins (R_{2+3} and R_{4+5}) with several black hairs above and below, the hairs extended to 2/3 way to r-m cross vein above, 1/3 way to r-m cross vein below; 4th longitudinal vein (M) bent with obtuse angle; section of M from bend to wing margin inflexed; thoracic and alar squamae yellowish brown, thoracic one rounded, bare on upper surface. Halteres yellow.

Legs: fuscous brown, with black hairs; fore tibia with 1 *p* and 4-6 short *ad*; mid tibia with 1 *ad*, 2 *pd* and 1 short *v*; hind tibia with 2 *ad*, 2 *pd* and 1 *av*.

Abdomen: black, with brassy tinge, submetallic, without trace of black median stripe; tergites 1+2-3 with several strong lateral marginal bristles; tergites 4-5 with a row of erect marginal bristles; no discal bristle on tergite 5; hairs on sternites black, rather long bristly hairs also present. Hypopygium normal in size, submetallic. Male genitalia as shown in Fig. 3.

Female. Unknown.

Length: 7.5 mm.

Etymology. - The specific name is related to the yellowish tinged base of wings.

Bionomics. - Unknown.

Distribution. - Malaysia (Borneo: Sabah).

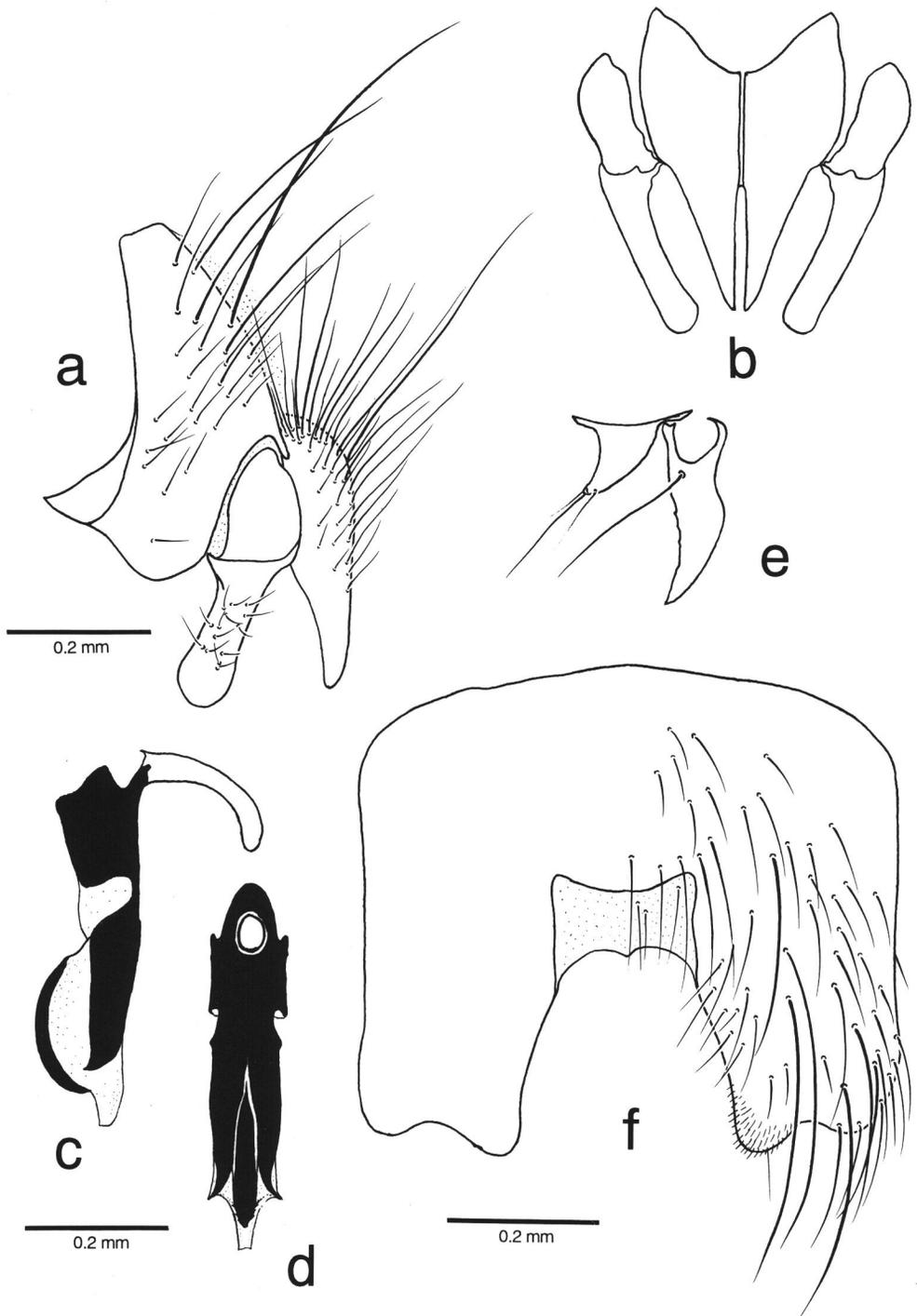


Fig. 3. *Phumosa flavipennis*, new species, male genitalia. a, epandrium, cercus and parolobus, lateral view; b, cerci and paralobi, caudal view; c, aedeagus, lateral view; d, aedeagus, posterior view; e, anterior and posterior parameres, lateral view; f, sternite 5, ventral view.

***Phumosia indica* (Surcouf)**

Caiusa indica Surcouf, 1914: 53. Type locality: Trichinopoly [India].

Caiusa indica: Senior-White, Aubertin & Smart, 1940: 66.

Phumosia indica: James, 1971: 9.

Phumosia indica: James, 1977: 537.

Phumosia indica: Tumrasvin, Kurahashi & Kano, 1979: 253.

Length: 6.5-9.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Str. Malacca, on ship, 31 Jan.1971, K. Moribe (NIHJ); 1 female, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 1 male, Sabah, Mt. Kinabalu, Bundu Tuhan, 1,000 m, 23 May.1979, H. Kurahashi (NIHJ); 2 males 1 female, Sabah, Kalabakan, fish bait trap, 10-19 Nov.1958, T. C. Maa (BPBM); 3 females, Sabah, Tawau District, Kalabakan, primary forest, fish bait trap, 8-15 Nov.1958, L. W. Quate (BPBM); 1 male, Sabah, Forest Camp, 19 km N of Kalabakan, 4 Nov.1962, K. J. Kuncheria (BPBM); 1 male, Sabah, 10 km N of Ranau, 700 m, 15 Nov.1995, M. Iwasa (OU); 1 female, Sabah, Poring, 500 m, 17 Nov.1995, M. Iwasa (OU).

Bionomics. - Adults are found in rain forests and attracted to decaying animal matter and fruits.

Distribution. - India, Sri Lanka, Thailand, Taiwan, Malaysia (Malaya, Borneo) and Indonesia (Java, Sulawesi).

***Phumosia murphyi* Hii et Kurahashi**

Phumosia murphyi Hii et Kurahashi, 1977: 222. Type locality: Kota Kinabalu, Sabah, East Malaysia, Borneo [Malaysia].

Length: 6.5-7.5 mm.

Specimens examined. - MALAYSIA (BORNEO): Holotype male, Sabah, Kota Kinabalu, Mangrove swamp, 12 Nov.1975, S. Shinonaga (SMK); 2 males 10 females paratypes, same data as holotype; 15 males 38 females, Sarawak, Santubong, 30 km N of Kuching, 19-20 Nov.1975, S. Shinonaga (SMK, SU, BMNH, BPBM, NSMT). SINGAPORE: 3 males 9 females, Sentosa I., Mangrove swamp, 15 Oct.1975, H. Kurahashi (NIHJ).

Bionomics. - Adults frequent on dead fishes in mangrove swamp forests.

Distribution. - Singapore, Malaysia (Borneo) and Philippines (Palawan).

***Phumosia nigronitens* (Senior-White)**

Caiusa nigronitens Senior-White, 1923: 38. Type locality: Singapore.

Caiusa nigronitens: Senior-White, Aubertin & Smart, 1940: 74.

Caiusa nigronitens: Kurahashi, 1971: 3.

Phumosia nigronitens: James, 1977: 538.

Phumosia nigronitens: Inder Singh, Kurahashi & Kano, 1979: 8.

Length: 7.5-8.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 female, Selangor, Bukit Mandul, 20 km W of Kuala Lumpur, 1 Nov.1975, H. Shima (NIHJ); 4 males 17 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 2 males 2 females, Sabah, Kalabakan, fly trap, dead fish, 10-19 Nov.1958, L. W. Quate (BPBM); 1 male, Poring, 700 m, ex. human feces, 13-17 Nov.1995, T. Hayashi (NIHJ); 1 male, Sarawak, Kamit Dist., Merirai V., 30-300 m, 1-6 Aug.1958, T. C. Maa (BPBM).

Bionomics. - Adults are found in rain forests and attracted to decaying animal matter and fruits.

Distribution. - Singapore and Malaysia (Malaya, Borneo).

Phumosia promittens (Walker)

Musca promittens Walker, 1860:134. Type locality: Makasar, Celebes [Indonesia].

Phumosia incerta Malloch, 1926: 499. Type locality: Selangor, Malaya [Malaysia].

Phumosia promittens: Senior-White, Aubertin & Smart, 1940: 68.

Phumosia promittens: James, 1977: 538.

Phumosia promittens: Inder Singh, Kurahashi & Kano, 1979: 8.

Length: 8.0-10.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 4 males, Pahang, Gua' Che Yatim to Terenggan, 17 Dec.1958, T. C. Maa (BPBM); 1 male 1 female, Selangor, Kepong, 130-300 m, 13-21 Mar.1966, L. W. Quate (BPBM); 9 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 8 females, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 4 males 8 females, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH); 1 female, Pahang, Fraser's Hill, 1,200 m, light, 16 Feb.1991, Gustafsson, Hippa & Sellerholm (SMNH). MALAYSIA (BORNEO): 1 female, Sarawak, Lundu Dist., Kampong Pueh, 690-1,500 m, 6-12 Jun.1958, T. C. Maa (BPBM); 1 male, Sarawak, Kapit Dist., Merirai V., 30-300 m, 1-6 Aug.1958, T. C. Maa (BPBM); 16 females, Sarawak, Muara Mongkos, 120 km NE of Kuching, 25-27 Nov.1975, S. Shinonaga (NSMT); 8 females, Sarawak, Balai Ringgin, 100 km N of Kuching, 22-24 Nov.1975, S. Shinonaga (NSMT); 1 female, Sabah, Forest Camp, 19 km N of Kalabakan, 17 Nov.1962, J. J. Kuncheria (BPBM); 4 females, Sabah, W. Coast Residency, Ranau, 500 m, ex. fresh human excrement, 22-25 Jan.1959, T. C. Maa (BPBM); 4 females, Sabah, Tawau Dist., Kalabakan, primary forest, fish bait tarap, 10-19 Nov.1958, T. C. Maa & L. W. Quate (BPBM); 1 female, Sabah, Qudin Mill, Tawan, 29 Jun.1962, H. Hoffmann (NIHJ); 4 females, Sabah, Papar, 50 km SW of Kota Kinabalu, 13-15 Nov.1975, S. Shinonaga (NSMT); 11 males 3 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m & 1,550 m, 1-2 May.1979, 14-16 Nov.1995, H. Kurahashi & T. Hayashi (NIHJ); 1 male 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, 13-17 Nov.1995, H. Kurahashi & T. Hayashi (NIHJ); 1 female, Sabah, Mt. Kinabalu, 2,300 m, moss forest, 1-2 May.1979, H. Kurahashi (NIHJ); 2 males, Tambunan, 1,650 m, ex. human feces, 10-12 Nov.1995, T. Hayashi (NIHJ); 1 male, Sarawak, Nanga Pelagus, nr Kapit, 180-585 m, 7-14 Aug.1958, T. C. Maa (BPBM); 1 male 1 female, Sabah, Tenompok, Jesselton 30 mi E, 1,460 m, 17-21 Oct.1958, L. W. Quate (BPBM); 1 male, Sabah, Bundu Tulan, ex. human excrement, 10 Feb.1959, T. C. Maa (BPBM); 1 male, Sabah, Tawau Residency, Kalabakan R., Tawau 48 km W, 9-18 Nov.1958, T. C. Maa (BPBM); 2 females, Sabah, Singkor, 19 Jan.1959, T. C. Maa (BPBM); 1 female, Sabah, Sandakan Bay, Sepilok For. Res., 1-10 m, ex. fresh human excrement, 26 Oct.1957, J. L. Gressitt (BPBM); 1 male 4 females, Sabah, Tambunan, 1,700 m, 10-12.16 Nov.1995, M. Iwasa (OU); 8 males 23 females, Sabah, Mt. Kinabalu, National Park, Pape, 2-5 Nov.1994, Gustafsson & Heinakroon (SMNH).

Bionomics. - Adults are found in rain forests and attracted to decaying animal matter and fruits.

Distribution. - Thailand, Malaysia (Malaya, Borneo), Indonesia (Sumatra, Sulawesi) and Philippines (Palawan).

***Phumosia testacea* (Senior-White)**

Caiusa testacea Senior-White, 1923: 310. Type-locality: Emelina Estate, Maskeliya, Ceylon [Sri Lanka].

Caiusa testacea: Senior-White, Aubertin & Smart, 1940: 72.

Phumosia testacea: James, 1977: 538.

Phumosia testacea: Tumrasvin, Kurahashi & Kano, 1979: 254.

Phumosia testacea: Kurahashi & Thapa, 1994: 208.

Length: 5.0-7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male 2 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 male 1 female, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH). MALAYSIA (BORNEO): 12 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 19 Oct.-19 Nov.1962, J. K. Kuncheria & Y. Hirashima (BPBM); 1 female, Sabah, Sandakan Bay, Sepilok For. Res., 110 m, ex fresh human excrement, 26 Oct.1957, J. L. Gressitt (BPBM); 1 male 1 female, Sabah, Tawau Dist., Kalabakan, primary forest, 8-15 Nov.1958, L. W. Quate (BPBM).

Bionomics. - Adults are attracted to decaying meat and excrement in forests. Larviparous.

Distribution. - India, Sri Lanka, Thailand, Malaysia (Malaya, Borneo), Taiwan, Philippines (Luzon) and PNG (Bougainville I.)

***Phumosia viridis* Kurahashi**

Phumosia viridis Kurahashi, 1989a: 124. Type locality: Taman Negara, Kuala Tahan, Malaysia (Malaya).

Length: 10.5-12.0 mm.

Specimens examined. - MALAYSIA (MALAYA): Holotype male and 1 male 3 females paratypes, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (BPBM, NIHJ).

Bionomics. - Adults are found only in rain forests and attracted to spoiled meat.

Distribution. - Malaysia (Malaya).

TRIBE LUCILIINI

Genus *Lucilia* Robineau-Desvoidy

Lucilia Robineau-Desvoidy, 1830: 452. Type species: *Musca caesar* Linnaeus, 1758 des. by Macquart (1834:162).

KEY TO THE SPECIES OF *LUCILIA*

1. Postsutural *ac* 3; basicosta yellow; subcostal sclerite pubescent; body cupreous in colour *L. cuprina* (Wiedemann)
- Postsutural *ac* 2; basicosta fuscous black; subcostal sclerite with several upstanding setulae; body metallic green, blue or purple in colour 2
2. Anterior pair of postsutural *ac* usually more advanced than the second pair of postsutural *dc*; tergites 3-5 without dark marginal band posteriorly *L. porphyrina* (Walker)
- Anterior pair of postsutural *ac* on the level with or slightly posterior to the 2nd pair of postsutural *dc*; tergites 3-5 with dark marginal band posteriorly 3
3. Anterior part of alar squama creamy, with a tuft of yellowish white hairs at inner lower margin; thoracic squama usually infuscated; narrowest part of male frons narrower than the distance between two posterior ocelli; occiput with only one row of black postocular setae; frons index 0.19-0.20 in female *L. sinensis* Aubertin
- Anterior part of alar squama, fuscous brown, usually with a tuft of blackish-brown (sometimes brown) hairs at inner lower margin; occiput with more than 2 irregular rows of black postocular setae 4
4. Body metallic blue; narrowest part of male frons broader than the distance between two posterior ocelli; parafacialia broader than the width of 3rd antennal segment in female; frons index in female 0.24-0.25 [usually found in montane forests more than 1,500 m above sea level]
..... *L. papuensis* Macquart
- Body metallic green; narrowest part of male frons distinctly narrower than the distance between both posterior ocelli; parafacialia as broad as, or narrower than the width of 3rd antennal segment in female [usually found in lowland forests] 5
5. Eyes in male separated at narrowest point by less than the width of anterior ocellus; parafacialia yellowish-grey dusted, narrower than the width of 3rd antennal segment in female
..... *L. hainanensis* Fan
- Eyes in male separated at narrowest point more than the width of anterior ocellus; parafacialia silver-grey dusted, as broad as the width of 3rd antennal segment in female
..... *L. calviceps* Bezzi

****Lucilia calviceps* Bezzi**

Lucilia calviceps Bezzi, 1927: 238. Type locality: Espiritu Santo and Epi Island, New Hebrides (Vanuatu).

Length: 8.0-11.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 males 6 females, Pahang, Fraser's Hill, Jerian W. Fall, 18-20 Apr.1979, H. Kurahashi (NIHJ); 1 female, Pahang, Tembeling, 50 m, 26 May.1979, S. Asahina (NIHJ). MALAYSIA (BORNEO): 22 males 9 females, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 1 male 11 females, Sabah, Ranau, W. Coast Residency, 500 m, 22-25 Jan.1959, T. C. Maa (BPBM); 1 female, Sabah, Kalabakan, ex human excrement, 10-19 Nov.1958, T. C. Maa (BPBM); 3 females, Sabah, Poring, 500 m, 13 Nov.1995, M. Iwasa (OU); 1 female, Sabah, 10 km N of Ranau, 700 m, 15 Nov.1995, M. Iwasa (OU).

Bionomics. - Adults are attracted to decaying meat and excrements in forests.

Distribution. - *Malaysia (Malaya, Borneo), PNG (New Guinea, New Britain, New Ireland, Bougainville I.), Vanuatu, Loyalty Is. and New Caledonia.

Lucilia cuprina (Wiedemann)

Musca cuprina Wiedemann, 1830: 654. Type locality: China.

Lucilia cuprina: Waterhouse & Paramonov, 1950: 322.

Lucilia cuprina: Inder Singh, Kurahashi & Kano, 1979: 9.

Lucilia cuprina: Kurahashi & Thapa, 1994: 211.

Length: 5.0-10.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Perak, 14-20 mls N of Tapah, 300-600 m, 28 Oct.1975, S. Shinonaga (NSMT); 1 male, Pahang, Genting Highlands, 1,700 m, 20-21 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - The adults are most numerous in market sections of towns, where they may be easily collected on decaying matter. The larva is primarily a scavenger, although in some parts of the world such as Australia and South Africa, the myiasis-producing habit becomes strongly developed.

Distribution. - Pantropical.

Lucilia hainanensis Fan

Lucilia bazini hainanensis Fan, 1965: 176. Type locality: Hainan I., Guangdong Prov., China.

Lucilia hainanensis: Schumann, 1986: 22, n. sta.

Lucilia calviceps: Kurahashi, 1987a: 56, misid.

Length: 9.0-11.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 male, Pahang, Taman Negara, K. Tahan, 60 m, 10 Mar.1982, B. Omar (NIHJ); 2 females, Pahang, Fraser's Hill, Jerian W. Fall, 18-20 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 8 males 8 females, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 6 males, Sabah, Mt. Kinabalu, Bundu Tahan, 1,000 m, 2-3 May.1979, H. Kurahashi (NIHJ); 2 males 4 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 1 female, Sabah, Mt. Kinabalu, 2,300 m, moss forest, 1-2 May.1979, H. Kurahashi (NIHJ); 1 male, Sabah, Mt. Kinabalu, National Park, 2-5 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH).

Bionomics. - Adults are commonly found in lowland forests.

Distribution. - Taiwan, China (Hainan I.) and Malaysia (Malaya, Borneo).

Lucilia papuensis Macquart

Lucilia papuensis Macquart, 1842: 298 (141). Type locality: D'Offak, terre des Papoux [PNG].

Musca metilia Walker, 1849: 898. Type locality: Nepal.

Musca tifata Walker, 1849: 871. Type locality: China.

Lucilia cyaneo-marginata Macquart, 1851: 221 (248). Type locality: Java [Indonesia].

Musca inducta Walker, 1852: 335. Type locality: "East Indies"[Indonesia].

Lucilia nosocomiocrum Doleschall, 1857: 413. Type locality: Amboina, Moluccas [Indonesia].

Musca marginifera Walker, 1859: 105. Type locality: Aru, Moluccas [Indonesia].

Musca inscribens Walker, 1860: 136. Type locality: Makasar, Celebes [Indonesia].

Musca nitescens Walker, 1861: 302. Type locality: Makian, Moluccas [Indonesia].

Somomyia nebulosa Bigot, 1887: 604 (in part). Type locality: Java [Indonesia].

Lucilia papuensis: Senior-White, Aubertin & Smart, 1940: 52.

Lucilia papuensis: James, 1977: 534.

Lucilia papuensis: Tumrasvin, Kurahashi & Kano, 1977: 4.

Lucilia papuensis: Inder Singh, Kurahashi & Kano, 1979: 9.

Lucilia papuensis: Kurahashi & Thapa, 1994: 212.

Length: 6.0-12.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 7 females, Pahang, Fraser's Hill, Jerian W. Fall, 18-20 Apr.1979, H. Kurahashi (NIHJ); 4 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 3 males 7 females, Poring, 700 m, ex. human feces, 15 Nov.1995, T. Hayashi (NIHJ); 1 male, Mt. Kinabalu, H. Q., 1,550 m, ex. human feces, 14 Nov.1995, T. Hayashi (NIHJ); 1 female, Mamut Copper Mine, nr Ranau, 600 m, ex. human feces, 15 Nov.1995, T. Hayashi (NIHJ); 1 male 1 female, Sabah, Kinabalu N. P., 1,500 m, 16 Nov.1995, M. Iwasa (OU); 3 females, Sabah, Tambunan, 1,700 m, 11 Nov.1995, M. Iwasa (OU); 4 males 25 females, Sabah, Mt. Kinabalu, National Park, 2-5 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - The adults are commonly found in woods and forests and attracted to excrement and decaying animal matter such as dead earthworms, land snails and snakes.

Distribution. - Japan, Taiwan, China, Thailand, Malaysia (Malaya, Borneo), Indonesia, Sri Lanka, India, Philippines, PNG and Australia (Queensland, New South Wales).

Lucilia porphyryna (Walker)

Musca porphyryna Walker, 1857: 24. Type locality: Mount Ophir, Malaya [Malaysia].

Somomyia obesa Bigot, 1877: 43. Type locality: Ceylon [Sri Lanka].

Somomyia pachystoma Bigot, 1887: 603 (in part). Type locality: Java [Indonesia].

Somomyia nebulosa Bigot, 1887: 604 (in part). Type locality: Java [Indonesia].

?*Lucilia craggi* Patton, 1922: 552. Type locality: India.

Lucilia porphyryna: Aubertin, 1933: 408.

Lucilia porphyryna: Senior-White, Aubertin & Smart, 1940: 53.

Lucilia porphyryna: Fan, 1965: 178.

Lucilia porphyryna: Kurahashi, 1971: 3.

Lucilia porphyryna: James, 1977: 535.

Lucilia porphyryna: Tumrasvin, Kurahashi & Kano, 1977: 2.

Lucilia porphyryna: Inder Singh, Kurahashi & Kano, 1979: 9.

Lucilia porphyryna: Kurahashi & Thapa, 1994: 212.

Length: 5.0-11.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 males 1 female, Pahang, Mt. Berinchang, 2,110 m, natural forest, 15 Mar.1990, H. Kurahashi (NIHJ); 1 male, Pahang, Gua' Che Yatim to Terenggan, 17 Dec.1958, L. W. Quate (BPBM); 1 male, Pahang, Fraser's Hill, 4,200 ft, 17 Jun.1962, E. S. Ross & D. G. Cavagnaro (CAS); 4 males 2 females, Genting Highlands, 1,000 m, 20-21 Apr.1979, H. Kurahashi (NIHJ); 5 males 9 females, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 5 males, Taman Negara, K. Tahan, 22-26 Apr.1979, H. Kurahashi (NIHJ); 3 males 2 females, Fraser's Hill, Jerian W. Fall, 18-20 Apr.1979, H. Kurahashi (NIHJ); 15 males 15 females, Kelantan, nr Gua Musang, Pape, 11-13 Nov.1994, Gustafsson & Heinakroon (SMNH); 3 males 6 females, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH). MALAYSIA (BORNEO): 1 male, Sabah, Mt. Kinabalu, moss forest, 2,300 m, 1-2 May.1979, H. Kurahashi (NIHJ); 5 males 2 females, Sabah, Poring, 700 m, 29-30 Apr.1979, 13-17 Nov.1995, H. Kurahashi & T. Hayashi (NIHJ); 1 male 1 female, Sabah, Mt. Kinabalu, Bundu Tuhan, 1,000 m., 2-3 May.1979, H. Kurahashi (NIHJ); 1 male 1 female, Sabah, Mt. Kinabalu, P. Head Q. 1,600 m &

1,550 m, 15 Nov.1995, H. Kurahashi & T. Hayashi (NIHJ); 6 males 3 females, Mamut Copper Mine, nr Ranau, 600 m, ex. human feces, 15 Nov.1995, T. Hayashi (NIHJ); 5 females, Sabah, Tambunan, 600 m, 10-12 Nov.1995, M. Iwasa (OU); 12 males 2 females, Sabah, Mt. Kinabalu, National Park, 2-5 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - Adults are attracted to excrement and decaying animal matter. Larvae are also scavengers. Primarily forest inhabitant.

Distribution. - Widely distributed in the Indo-Australian Region, India, Sri Lanka, Nepal, China, Thailand, Malaysia (Malaya, Borneo), Indonesia (Sumatra, Java), Philippines, Japan, Korea, Taiwan, PNG (New Guinea, Manus I., Mussau I., New Britain, New Ireland) and Australia (Queenland).

Lucilia sinensis Aubertin

Lucilia sinensis Aubertin, 1933: 407. Type locality: Chin-Fu-San, Szechuan (China).

Lucilia sinensis: Inder Singh, Kurahashi & Kano, 1979: 10.

Lucilia sinensis: Kurahashi & Thapa, 1994: 214.

Length: 10.0-11.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 3 males 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Adults are attracted to decaying animal matter in montane forests, especially along streams (Kurahashi & Thapa, 1994).

Distribution. - Nepal, China (Zhejiang, Sichuan, Hubei), Thailand, Malaysia (Malaya, Borneo) and PNG (New Guinea).

Genus *Hemipyrellia* Townsend

Hemipyrellia Townsend, 1918: 154. Type species: *Hemipyrellia curriei* Townsend, 1918, orig. des. (= *Lucilia fernandica* Macquart, 1855).

KEY TO THE SPECIES OF *HEMIPYRELLIA*

1. Thoracic squama pure white; eyes holoptic in male; male abdomen densely covered on ventral surface with long hairs, the longest one nearly as long as the length of arista; lateral lobes of epandrium oval with long fine hairs in male; facial tomentum silvery white; female parafacialia silvery white; abdomen thinly dusted, usually metallic bluish green *H. tagaliana* (Bigot)
- Thoracic squama brownish white; eyes in male separated by distance greater than width of 3rd antennal segment; hairs on ventral surface of abdomen shorter than the length of arista; lateral lobes of epandrium elongated, testaceous, very sparsely haired; facial tomentum greyish; female parafacialia grey; abdomen heavily dusted, usually metallic copper green
..... *H. ligurriens* (Wiedemann)

Hemipyrellia ligurriens (Wiedemann)

- Musca ligurriens* Wiedemann, 1830: 655. Type locality: Java [Indonesia] and China.
Musca solaia Walker, 1849: 887. Type locality: not given.
Musca fortunata Walker, 1860: 137. Type locality: Makasar, Celebes [Indonesia].
Somomyia caeruleolimbata Bigot, 1887: 599. Type locality: Java [Indonesia].
? *Lucilia ballardii* Patton, 1922: 572. Type locality: Burliar and Kallar, at foot of Coonoor Ghat, India.
Lucilia albopilosa Senior-White, 1926: 130. Type locality: Suduganga, Matale, Ceylon [Sri Lanka].
? *Lucilia orientalis* Townsend, 1927: 56. Type locality: Fort de Kock, Sumatra [Indonesia].
Lucilia cyaneomarginata: Malloch, 1927: 320, misid., nec Macquart, 1851.
Hemipyrellia ligurriens: Aubertin, 1931: 504.
Hemipyrellia ligurriens: Senior-White, Aubertin & Smart, 1940: 42.
Hemipyrellia ligurriens: Fan, 1965: 189.
Hemipyrellia ligurriens: Kurahashi, 1971: 3.
Hemipyrellia ligurriens: James, 1977: 533.
Hemipyrellia ligurriens: Inder Singh, Kurahashi & Kano, 1979: 7.
Hemipyrellia ligurriens: Tumrasvin, Kurahashi & Kano, 1979: 252.
Hemipyrellia ligurriens: Kurahashi, 1987a: 58.
Hemipyrellia ligurriens: Kurahashi & Thapa, 1994: 209.

Length: 6.5-9.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ); 1 female, Perak, Sungkai, 136 km N of Kuala Lumpur, 20 m, 14 Mar.1990, H. Kurahashi (NIHJ); 12 males 5 females, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH). MALAYSIA (BORNEO): 2 males 1 female, 10-19 Nov.1958, Kalabakan, T.C. Maa (BPBM); 1 male 3 females, Tawau, Quoin Hill, 3-7,8-14 Jul.1962, H. Holtmann (BPBM); 6 males 3 females, Tawan, Quoin Hill, Cocoa Res. Sta., 6, 26, 29 Sep.1962, Y. Hirashima (BPBM); 4 males, Sabah, Ranau, W. Coast Residency, Ranau, 500 m, 22-25 Jan.1959, T. C. Maa (BPBM); 3 males 4 females, Tawau District, Kalabakan, primary forest, 8-15 Jun.1958, T. C. Maa (BPBM); 1 male, Sarawak, Kuching, Santubong, 797-1,500 m, 18-30 Jun.1958, T. C. Maa (BPBM); 1 male, Sarawak, Sarikel Dist., Rejang Delta, 15-26 Jul.1958, T. C. Maa (BPBM); 1 male, Sarawak, Merirai V., Kapit Dist., 1-6 Aug.1958, T. C. Maa (BPBM); 2 males 1 female, Sabah, Kalabakan, 10-19 Nov.1958, T. C. Maa (BPBM); 3 males 4 females, Sabah, Tawau District, Kalabakan, primary forest, 8-15 Nov.1958, T. C. Maa (BPBM); 1 male, Sarawak, Kuching, Santubong, 797-1,500 m, 18-30 Jun.1958, T. C. Maa (BPBM); 1 male, Sarawak, Kapit Dist., Metitai V., 1-6 Aug.1958, T. C. Maa (BPBM); 2 males, Sarawak, Serian, 24 Mar.1995, M. Iwasa (OU); 1 male 7 females, Sabah, Mt. Kinabalu, Bundu Tuhan, 1,000 m, 2-3 May.1979, H. Kurahashi (NIHJ); 1 female, Sabah, Ulu Dusun, Sandakan, 22 May.1978, Ento-STAFF (NIHJ); 1 male, Mamut Copper Mine, nr Ranau, 600 m, ex. human feces, 15 Nov.1995, T. Hayashi (NIHJ); 1 female, Poring, 700 m, ex. human feces, 13-17 Nov.1995, T. Hayashi (NIHJ); 1 male, Sabah, Tambunan, 600 m, 11 Nov.1995, M. Iwasa (OU).

Bionomics. - *Hemipyrellia ligurriens* (Wiedemann) is very common in market sections and gardens in towns. Adults are attracted to human excreta around human dwellings and in open forests. Oviparous. The larva is a scavenger.

Distribution. - Japan, Korea, China, Taiwan, India, Sri Lanka, Thailand, Malaysia (Malaya Borneo), Singapore, Indonesia (Sumatra, Java, Sulawesi, Ambon), Philippines, PNG (New Guinea, Bismarck Arch., Bougainville I.) and Australia (Queensland).

Hemipyrellia tagaliana (Bigot)

- Somomyia tagaliana* Bigot, 1877: 44. Type locality: Philippines.
Hemipyrellia tagaliana: Senior-White, Aubertin & Smart, 1940: 45.
Hemipyrellia tagaliana: James, 1977: 533.
Hemipyrellia tagaliana: Inder Singh, Kurahashi & Kano, 1979: 7.

Length: 8.5-10.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Pahang, Taman Rompin, 5-20 m, 19 Sep.1960, J. L. Gressitt (BPBM); 1 male 1 female, Bukit Mandul, 20 km W of Kuala Lumpur, 1 Nov.1975, S. Shinonaga (NSMT); 1 female, Pahang, Cameron Highlands, 700-1,300 m, 27 Oct.1975, S. Shinonaga (NSMT); 2 females, Perak, Lubok Merbau. nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ).

Bionomics. - Adults are found in forests.

Distribution. - Malaysia (Malaya), Singapore, Indonesia (Java, Lombok) and Philippines.

Genus *Hypopygiopsis* Townsend

Hypopygiopsis Townsend, 1916: 300. Type species: *Hypopygiopsis splendens* Townsend, 1916, orig. des. (= *Musca fumipennis* Walker, 1856).

KEY TO THE SPECIES OF *HYPOPYGIOPSIS*

1. Antenna yellowish orange; facial tomentum golden yellow; tarsi in male without fringe
..... *H. fumipennis* (Walker)
- Antenna fuscous; facial tomentum silver white; tarsi in male with long fringes
..... *H. violacea* (Macquart)

Hypopygiopsis fumipennis (Walker)

Musca fumipennis Walker, 1856: 25. Type locality: Singapore, Malaya [Singapore].

Cynomyia fortis Walker, 1856: 127. Type locality: Sarawak, Borneo [Malaysia].

Cynomyia fulviventis Rondani, 1875: 425. Type locality: Sarawak, Borneo [Malaysia].

Hypopygiopsis splendens Townsend, 1916: 300. Type locality: Trong (=Trang), Thailand.

Hypopygiopsis fumipennis: Senior-White, Aubertin & Smart, 1940: 29.

Hypopygiopsis fumipennis: Kurahashi, 1977: 555.

Hypopygiopsis fumipennis: James, 1977: 533.

Hypopygiopsis fumipennis: Inder Singh, Kurahashi & Kano, 1979: 7.

Length: 12.0- 20.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Kuala Lumpur, 24-31 Dec.1958, L.W. Quate (BPBM); 2 males, Pahang, 16 mi NE of Kuala Lumpur, 1,000 ft, 8 Jun.1962, E. S. Ross & D. G. Cavagnaro (CAS); 16 males 6 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 12 males 8 females, Sabah, Poring, 700 m, 29-30 Apr.1979, 13-17 Nov.1995, H. Kurahashi & T. Hayashi (NIHJ); 9 males 1 female, Mamut Copper Mine, nr Ranau, 600 m, ex human feces, 15 Nov.1995, T. Hayashi (NIHJ); 1 male, Sepilok Laut, Sandakan, 17 Oct.1979, T. Jaafar (NIHJ); 16 males 6 females, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 male, Sabah, Sandakan Residency, Gomantong Caves, 20 mi. S. Sandakan, 22-26 Nov.1958, T. C. Maa (BPBM); 3 males 5 females, Sarawak, Kapit District, Marirai V. 30-300 m, 1-6 Aug.1958, T. C. Maa (BPBM); 1 female, Sarawak, Kuching, Santubong, 79-1,500 m, 18-50 Jun.1958, T.C. Maa (BPBM); 2 males, Sarawak, Merirai Valley, 180 m, nr. Kapit, 28 Jun.-6 Jul.1958, T. C. Maa (BPBM); 2 females, Sarawak, Bau District, Bidi, 90-240 m, 22-26 Nov.1958, ? (NIHJ); 2 females, Sabah (BNB), Sandakan Bay (SW), Sapagaya Lumber Camp, 2-20 m, 2 Nov.1957, ? (NIHJ); 1 female, Sabah (BNB), Sandakan Bay (NW), Sepilok For. Res., 1-10 m, 29 Oct.1957, ? (NIHJ).

Bionomics. - Adults are attracted to excrement and decaying animal matter in tropical rain forests (Kurahashi, 1977). Oviparous.

Distribution. - Thailand (Trang: Townsend, 1916), Malaysia (Malaya, Borneo), Singapore and Indonesia (Sumatra).

***Hypopygiopsis violacea* (Macquart)**

Cynomyia violacea Macquart, 1835: 233. Type locality: Java [Indonesia].

Musca infixa Walker, 1856: 25. Type locality: Singapore, Malaya [Singapore].

Phrissopoda metallica van der Wulp, 1881: 43. Type locality: Sumatra [Indonesia].

Hypopygiopsis violacea: Senior-White, Aubertin & Smart, 1940: 31.

Hypopygiopsis violacea: Kurahashi, 1977: 558.

Hypopygiopsis violacea: James, 1977: 534.

Hypopygiopsis violacea: Inder Singh, Kurahashi & Kano, 1979: 7.

Length: 9.0-16.0 mm.

Specimens examined. - SINGAPORE: 2 males 1 female, Kuala Tembeling, 11-12 Dec.1958, L. W. Quate (BPBM). MALAYSIA (MALAYA): 1 male, W Selangor, Ulu langar, 300-390 m, 14 Jun.1958, T. C. Maa (BPBM); 1 male, Perak, Bukit Larut, 800 m, natural forest, 18 Mar.1990, H. Kurahashi (NIHJ); 2 males, Pahang, 16 mi NE of Kuala Lumpur, 1,000 ft, 8 Jun.1962, E. S. Ross & D. G. Cavagnaro (CAS); 3 males 4 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 2 females, Selangor, 22 km NNE K. Lumpur, Templar Park, 29 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH); 2 males 2 females, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH). MALAYSIA (BORNEO): 2 females, Liawan, 14-17 Jan.1959, T.C. Maa (BPBM); 6 females, Sabah, Tawau, Quoin Hill Forest Camp 1, 3.5 km NSW of Cocoa Res. Sta., 9-20 Jul.1962, Y. Hirashima (BPBM); 3 females, Sabah, Forest Camp., N of Kalabukan, 8-17 Nov.1962, T. C. Maa (BPBM); 6 males 6 females, Sabah, Mt. Kinabalu, Bundu Tuhan, 1,000 m, 23 May.1979, H. Kurahashi (NIHJ); 1 male 1 female, Mamut Copper Mine, nr Ranau, 600 m, ex. human feces, 15 Nov.1995, T. Hayashi (NIHJ); 1 male 6 females, Poring, 700 m, ex. human feces, 13-17 Nov.1995, T. Hayashi (NIHJ); 1 male, Sabah, Sandakan, Tring-Hill, 16 Jan.1978, R. Yoshii & Adis (NIHJ); 1 female, Sabah, Poring, 500 m, 13 Nov.1995, M. Iwasa (OU); 1 female, Sarawak, Kuching, Matang, 450-894 m, 15 Sep.1958; 1 female, Sarawak, Kapit District, Merirai V., 30-300 m, 1-6 Aug.1958, T.C. Maa (BPBM); 1 male, Sarawak, Tuba Forest clearing at Long-house, 20 km SE of Sebuyau, 15-22 Jan.1979, Gaerdenfors et al. (LU).

Bionomic. - Adults are found in tropical rain forests. Oviparous.

Distribution. - Malaysia (Sembilan Is., Malaya, Borneo), Singapore, Indonesia (Anamba Is., Sumatra, Java).

TRIBE POLLENIINI

Genus *Dexopollenia* Townsend

Dexopollenia Townsend, 1917: 201. Type species: *Dexopollenia testacea* Townsend, 1917, orig. des.

KEY TO THE SPECIES OF *DEXOPOLLENIA*

1. Thorax entirely reddish orange or brown; abdomen sometimes with a trace of marginal band on tergites; *ac* 1+2 *D. wyatti* Kurahashi
- Thorax usually entirely black or at least fuscous on dorsum 2
2. Presutural *ac* present; pleura orange; abdomen mainly orange, tergite 3 with marginal band which is broken in the middle; tergites 4-5 broadly blackish posteriorly *D. bicoloripes* Malloch
- Presutural *ac* absent; colouration of pleura and abdomen different from above combination ... 3
3. Abdomen shining, very dark grey, tergite 1+2 testaceous discally and laterally in male, blackish shining except for venter in female; legs brown to dark brown; some pleura testaceous [Borneo] *D. monsdulitae* (Senior-White, Aubertin et Smart)
- Abdomen ferruginous yellow at least in part, more or less covered with yellowish grey dusting; legs fuscous; thorax entirely fuscous or black [Malaya] 4
4. Abdomen, viewed from behind, with hind margin of tergites 1+2-5 tickly covered with yellowish-silver dusting *D. bicolor* Malloch
- Abdomen, viewed from behind, with tergites 4-5 thinly and unevenly covered with grey dusting *D. hirtiventris* Malloch

***Dexopollenia bicolor* Malloch**

Dexopollenia bicolor Malloch, 1935: 671. Type locality: Larut Hills, Perak, Malaya [Malaysia].

Pollenia bicolor: James, 1977: 538.

Pollenia mallochi: Blackith, 1991: 271. A replacement name for *Pollenia bicolor* (Malloch, 1935), a secondary homonym of *Pollenia bicolor* Robineau-Desvoidy, 1830.

Length: 6.5 mm.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya).

***Dexopollenia bicoloripes* Malloch**

Dexopollenia bicoloripes Malloch, 1931: 199. Type locality: Bukit Kutu, Selangor, Malaya [Malaysia].

Pollenia bicoloripes: James, 1977: 538.

Length: 7.0 mm.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya).

***Dexopollenia hirtiventris* Malloch**

Dexopollenia hirtiventris Malloch, 1935: 669. Type locality: Fraser's Hill, Pahang, Malaya [Malaysia].
Pollenia hirtiventris: James, 1977: 539.

Length: 8.0-9.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Pahang, 16 mi NE of Kuala Lumpur, 1,000 ft, 8 Jun.1962, E. S. Ross & D. G. Cavagnaro (CAS).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya).

***Dexopollenia monsdulitae* (Senior-White, Aubertin et Smart)**

Pollenia monsdulitae Senior-White, Aubertin et Smart, 1940: 131. Type locality: Mount Dulit, Sarawak, Borneo [Malaysia].

Pollenia monsdulitae: James, 1977: 539.

Length: 8.0-10.5 mm.

Specimens examined. - MALAYSIA (BORNEO): 2 females, Sabah, Forest Camp, 19 km N of Kalabakan, 17 Oct.1962, K. J. Kuncheria (BPBM); 1 female, Sabah, Tenompok, 48 km E of Jesselton, 1,460 m, 26-31 Jan.1959, T. C. Maa (BPBM); 1 male 1 female, Sabah, Mt. Kinabalu, 1,300 m, 11 Nov.1979, S. Shinonaga (NSMT); 1 female, Sabah, Mt. Kinabalu, moss forests, 2,300 m, 1-2 May.1979, H. Kurahashi (NIHJ).

Bionomics. - Adults are found in moss forests.

Distribution. - Malaysia (Borneo).

***Dexopollenia wyatti* Kurahashi**

Dexopollenia wyatti Kurahashi, 1992a: 24. Type locality: Mt. Kinabalu, Sabah, Malaysia.

Length: 6.0-9.0 mm.

Specimens examined. - MALAYSIA (BORNEO): Holotype male, Sabah, Mt. Kinabalu, Lumu Lumu, 5,500 ft, 10 Apr.1929, H. M. Pendlebury, ex F.M.S.Museum (BMNH1955-354). 4 paratypes: 1 female, Sabah, Tenompok, 10-14 Feb.1959, T. C. Maa (BPBM); 1 male 1 female, Sabah, Mt. Kinabalu, Lumu Lumu, 5,500 ft, 17,18 Apr.1929, ?collector, ex F.M.S.Museum (BMNH1955-354); 1 male, Mt. Kinabalu, Mesilau Cave, 6,175 ft, 23-24 Mar.1964, S. Kueh, ex Royal Soc. Exped. (BMNH 1964-250).

Bionomics. - Unknown.

Distribution. - Malaysia (Borneo).

TRIBE MELANODEXIINI

Genus *Nepenthomyia* Kurahashi et Beaver

Nepenthomyia Kurahashi et Beaver, 1979: 26. Type species: *Nepenthomyia malayana* Kurahashi et Beaver, 1979, orig. des., mon.

Nepenthomyia malayana Kurahashi et Beaver

Nepenthomyia malayana Kurahashi et Beaver, 1979: 26. Type locality: Muka Head, Penang, W. Malaysia [Malaysia].

Length: 6.5-8.0 mm.

Specimens examined. - MALAYSIA (MALAYA): Holotype male, Muka Head, Penang, 27 Mar.1977, R. A. Beaver (BMNH); 2 males 1 female paratypes, same locality as holotype, 20-29 Mar.1977, 14-15 May.1977, R. A. Beaver (NSMT). SINGAPORE: 2 males 2 females, Upper Peirce Reservoir, ex *Nepenthes ampullaria*, 20 Oct.1994, M. Mogi (NIHJ).

Bionomics. - Probably oviparous. The larva is a scavenger and inhabits pitchers of *Nepenthes ampullaria* in Malaysia (Malaya) and Singapore. Descriptions and illustrations of immature stages are given by Kurahashi and Beaver (1979).

Distribution. - Malaysia (Malaya) and *Singapore.

TRIBE BENGALIINI

Genus *Bengalia* Robineau-Desvoidy

Bengalia Robineau-Desvoidy, 1830: 425. Type species: *Bengalia labiata* Robineau-Desvoidy, 1830, des. Townsend (1916: 6).

KEY TO THE SPECIES OF *BENGALIA*

1. Prealar knob pointed; sternite 4 with 1 pair of long and strong bristles in male; abdomen very slightly dusted; body small- to medium-sized 2
- Prealar knob rounded; sternite 4 without strong bristles in male; abdomen slightly to heavily tessellated; body medium- to large-sized 3
2. Mesonotum centrally blackish *B. labiata* Robineau-Desvoidy
- Mesonotum testaceous, more or less greenish-grey dusted
..... *B. hobbyi* Senior-White, Aubertin et Smart
3. Tergite 5 without discal bristles; hind tibia never fringed in male 4
- Tergite 5 with 1 pair of discal bristles; hind tibia more or less fringed in male 9
4. Hairs on pteropleuron wholly yellowish 5
- Hairs on pteropleuron never wholly yellowish, some black hairs present at least on upper part
..... 8

5. Vibrissae far above oral margin; clypeus strongly projecting forward; posterior margin of eye concave at middle; fore tibia in male with 5+2 ventral spines *B. torosa* (Wiedemann)
- Vibrissae level with oral margin; clypeus less strongly projecting; posterior margin of eye straight, not concave at middle; fore tibia in male with 3 ventral spines 6
6. Mesopleuron partly black on upper 1/3; abdominal tergite 5 testaceous on disc
- Mesopleuron wholly testaceous *B. xanthopyga* Senior-White 7
7. Tergites 3-4 with broad marginal band, the band broader than width of 3rd antennal segment; tergite 5 fuscous on disc, with dusting which produces a tessellate pattern
- Tergites 3-4 with narrow marginal band, bands on segments rather faint; tergite 5 entirely testaceous, thinly dusting *B. concava* Malloch
8. Mesopleuron bicolored, yellow on upper 1/3 and yellow upper part distinct from lower 2/3 blackish; pteropleuron largely covered with black hairs; sternopleuron also mostly blackish haired; femora largely fuscous
- Mesopleuron yellowish, but more or less brownish and with yellowish brown dusting; femora yellow; pteropleuron largely covered with yellow hairs except for tuft of several blackish hairs; sternopleural hairs yellow intermixed with small number of black ones
- *B. jejuna* (Fabricius)
9. Pteropleuron mostly clothed with black hairs, at least more than 20 hairs on upper part black; mid tibia fringed on posteroventral surface in male
- Pteropleuron mostly clothed with yellow hairs except for several black hairs less than 10 on upper part; mid tibia not fringed in male *B. bezzii* Senior-White 9
9. Sternite 5 in male with two-branched projection; mid tibia not fringed in male; tergite 5 in female with small indentation
- Sternite 5 in male projection rounded with small indentation; mid tibia double-fringed in male; tergite 5 in female without indentation in median part of posterior margin
- *B. emarginata* Malloch

***Bengalia bezzii* Senior-White**

Bengalia bezzii Senior-White, 1923: 306. Type locality: Sundunganga, Ceylon [Sri Lanka].
Bengalia bezzii: Senior-White, Aubertin & Smart, 1940: 99.
Bengalia bezzii: James, 1977: 528.

Length: 8.0-16.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Adults pouch on ants carrying larvae on the march and suck termites.

Distribution. - Sri Lanka, India, Thailand, Laos, Viet Nam, China, Taiwan, Japan (Ishigaki Shima I.), Malaysia (Malaya), Singapore, Indonesia (Java) and Philippines.

***Bengalia concava* Malloch**

Bengalia concava Malloch, 1927: 407. Type locality: Taiping Hill, Perak, Malaya [Malaysia].
Bengalia concava: Senior-White, Aubertin & Smart, 1940: 94.
Bengalia concava: James, 1977: 528.

Length: 13.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male 3 females, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 female, Fraser's Hill, 21 Feb.1991, RMexped (SMNH).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya).

Bengalia emarginata Malloch

Bengalia emarginata Malloch, 1927: 412. Type locality: Singapore.

Bengalia varicolor: Senior-White, Aubertin & Smart, 1940: 101, misid.

Bengalia emarginata: Kurahashi & Thapa, 1994: 217.

Length: 11.0-14.0 mm.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - China (Fujian, Guanxi, Hainan I.), Taiwan, Thailand and Singapore.

**Bengalia escheri* Bezzi

Bengalia escheri Bezzi, 1913: 76. Type locality: Formosa [Taiwan].

Length: 12.0 mm.

Specimen examined. - MALAYSIA (MALAYA): 1 female, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - India, Nepal, China, Taiwan and *Malaysia (Malaya).

Bengalia hobbyi Senior-White, Aubertin et Smart

Bengalia hobbyi Senior-White, Aubertin et Smart, 1940: 88. Type locality: Foot of Mount Dulit, junction of rivers Tuijar and Lojok, Sarawak, Borneo [Malaysia].

Length: 8.0-11.0 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 female, Sabah, Kalabakan, primary forest, 10-19 Nov.1958, T. C. Maa (BPBM); 1 female, Sabah, Forest Camp, 19 km N of Kalabakan, 21 Oct.1962, Y. Hirashima (BPBM); 1 female, Sabah, Sandakan Bay, Sapagaya Lumber Camp, 2-20 m, 1 Sep.1957, J. L. Gressitt (BPBM).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Borneo) and Philippines.

***Bengalia jejuna* (Fabricius)**

Bengalia jejuna (Fabricius), 1787: 342. Type locality: Tranquebar, India.

Bengalia lateralis: Senior-White, Aubertin & Smart, 1940: 91, misid.

Bengalia jejuna: James, 1977: 529.

Length: 11.0-12.0 mm.

Specimens examined. - No available material.

Bionomics. - This fly has been observed stealing pupae from ants on the march.

Distribution. - Sri Lanka, India, Malaysia (Malaya), Indonesia and Philippines.

***Bengalia labiata* Robineau-Desvoidy**

Bengalia labiata Robineau-Desvoidy, 1830: 426. Type locality: "Bengal"[probably Bangladesh].

Bengalia melanocera Robineau-Desvoidy, 1830: 426. Type locality: "Bengal"[probably Bangladesh]

Bengalia pallens Robineau-Desvoidy, 1830: 416. Type locality: "Bengal"[probably Bangladesh].

Bengalia labiata: Senior-White, Aubertin & Smart, 1940: 85.

Bengalia labiata: James, 1977: 529.

Bengalia labiata: Inder Singh, Kurahashi & Kano, 1979: 8.

Length: 7.0-10.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male 3 females, Pahang, Gua' Che Yatim to Terenggan, 17 Dec.1958, T. C. Maa (BPBM); 1 male, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH). MALAYSIA (BORNEO): 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 1 female, Sabah, Sandakan Bay, Sapagaya Lumber Camp, 2-10 m, 2 Nov.1957, J. L. Gressitt (BPBM).

Bionomics. - Nothing is known.

Distribution. - Bangladesh, Thailand, Malaysia (Malaya, Borneo), Indonesia (Sumatra) and China (Yunnan, Hainan I.).

***Bengalia recurva* Malloch**

Bengalia recurva Malloch, 1927: 404. Type locality: Mount Makiling, Luzon, Philippines.

Bengalia recurva: Senior-White, Aubertin & Smart, 1940: 92.

Bengalia recurva: James, 1977: 529.

Length: 13.0-14.0 mm.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya) and Philippines (Luzon, Palawan, Mindanao, Tawi Tawi).

***Bengalia varicolor* (Fabricius)**

Musca varicolor Fabricius, 1850: 296. Type locality: Tranquebar, India.

Bengalia varicolor: James, 1977: 530.

Bengalia varicolor: Inder Singh, Kurahashi & Kano, 1979: 8.

Bengalia varicolor: Kurahashi & Thapa, 1994: 219.

Length: 12.0-13.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Bukit Mamdul, 20 km S of Kuala Lumpur, 1 Oct.1975, S. Shinonaga (NSMT).

Bionomics. - Adult flies over ants that are on the move and with great dexterity pounces on them and seizes their insect prey.

Distribution. - India (Madras), Thailand, Laos, Viet Nam, Taiwan, Malaysia (Malaya) and Indonesia (Java).

***Bengalia xanthopyga* Senior-White**

Bengalia xanthopyga Senior-White, 1924: 107. Type locality: Singapore.

Bengalia xanthopyga: Senior-White, Aubertin & Smart, 1940: 97.

Bengalia xanthopyga: James, 1977: 530.

Length: 13.0-15.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male 2 females, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - India, Malaysia (Malaya), Singapore, Indonesia (Java) and Philippines (Luzon).

Genus *Booponus* Aldrich

Booponus Aldrich, 1923: 141. Type species: *Booponus intonsus* Aldrich, 1923, mon.

***Booponus malayana*, new species**

(Fig. 4)

Material examined. - Holotype female, MALAYSIA (MALAYA): Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi.

Paratypes. 1 female, same data as holotype. MALAYSIA (BORNEO): 1 female, Sabah, Tawau, Quoin Hill, Cocoa Res. Sta., 225 m, 14 Sep.1962, K. J. Kuncheria; 1 female, Sabah, Forest Camp, 19

km N of Kalabakan, 27 Oct.1962, Y. Hirashima; 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi.

Type depository. Holotype (female) and paratypes (2 females) in the Reference Museum, Taxonomy and Ecology Laboratory, Department of Medical Entomology, The National Institute of Health, Tokyo (NIHJ); paratypes (2 females) in Bishop Museum, Honolulu (BPBM).

Description. - Male. - Head: eyes bare, dichoptic, separated at vertex by a distance equal to 0.34-0.35 head width; frontal stripe yellowish brown, broad, parallel-sided, slightly narrowed anteriorly and posteriorly, 4.0 X the width of one of parafrontalia just in front of anterior ocellus; parafrontalia yellowish brown, dull yellowish-brown dusted, with black setulae, provided with ca 8 pairs of strong *ori* and several interstitials; parafacialia yellowish brown, dully yellowish-brown dusted, with black setulae entirely along anterior eye margin; face yellowish brown; facialia yellowish brown, yellowish-brown dusted, with black setulae on lower 1/3; medianae indistinct from parafacialia, bare, yellowish brown, yellowish-brown dusted; vibrissaria narrow, yellowish brown, yellowish-brown dusted, with several black setulae; vibrissae strongly developed at the level of oral margin; epistome yellowish orange, not projecting forward; gena and postgena yellowish brown, yellowish-brown dusted, clothed with rather short black hairs; occiput fuscous on upper half, yellowish brown on lower 1/2, yellowish haired on central part, median occiput behind frons also yellowish brown; 2nd antennal segment yellowish brown, with black setulae and bristly one; 3rd antennal segment fuscous black except for reddish base, 2 X as long as 2nd; arista yellowish brown, darkened toward apex, plumose, but hairs on ventral side short, not longer than the maximum width of arista; palpus yellowish orange, with black setulae.

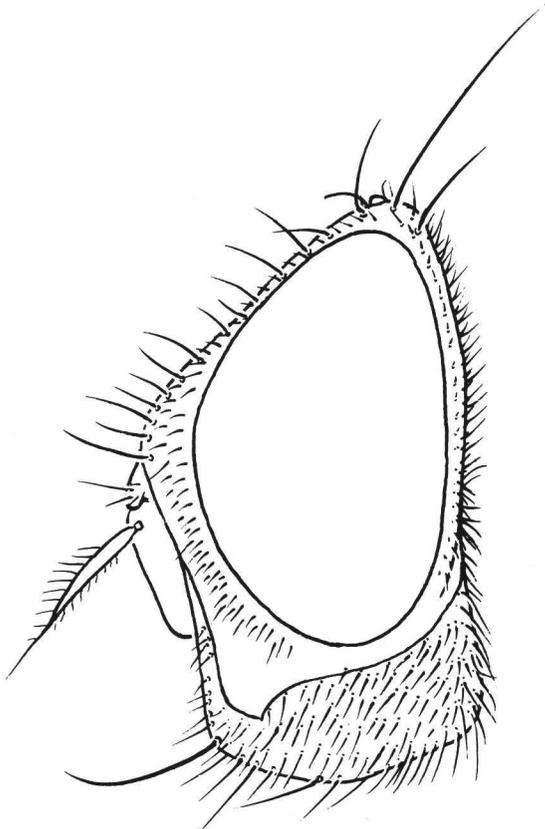


Fig. 4. *Booponus malayana*, new species, female, profile.

Thorax: entirely testaceous yellow, yellowish-brown dusted, black haired on dorsum; prescutum with narrow submedian and broad lateral yellowish brown longitudinal stripes; scutum with five indistinct longitudinal stripes visible when viewed from behind; humerus, postalar callus and scutellum concolorous with thoracic dorsum, black haired except for yellow hairs on anterior part of humerus; prosternum with yellow hairs along lateral margins; propleuron bare; supraspiracular convexity yellowish pubescent; no hypopleural hairs; mesopleuron and sternopleuron black haired; pteropleuron clothed with yellow soft hairs as well as 2-4 black bristly hairs; mesothoracic and metathoracic spiracles yellow; postalar declivity with several black setulae in central circle; tympanic tuft of a few black and yellow hairs, black ones rather strong; anterior parasquamal tuft absent. Chaetotaxy: *ac* 3+4; *dc* 2+4, one additional bristle more or less developed between prescutellar *dc* and inner margin of postalar callus; *ia* 1+2; *h* 3; *ph* 2; *prs* 1, one additional bristle present between inner *ph* and *prs*; *sa* 3, one additional bristle developed inside of prealar bristle; *pa* 3; *st* 1+1; *sc* 3-6+3, 3 marginals strong, 3 submarginals also developed; *n* 2; *pp* 1-2; *pst* 1-2.

Wings: brownish hyaline; veins brown; epaulet yellowish brown; basicosta reddish brown; subcostal sclerite yellowish brown, pubescent; node of 2nd and 3rd longitudinal veins setulose above and below, the setulae are extending to 2/3 way to cross vein r-m above; 4th longitudinal vein gently curved; section of the 4th vein from bend to wing edge slightly inflexed at apical 3/4; anal vein (the 6th vein) reaching wing margin; squamae entirely yellowish brown, thoracic one lobulated, bare on upper surface. Halteres yellowish brown.

Legs: entirely yellowish brown, black haired; fore and hind coxae with several fine yellow hairs; fore tibia with 1 *p* and 3-4 short *ad*; mid tibia with 2 *p* and 1 *v*; hind tibia with 1 *av* and a row of short *ad*, sometimes with 1 *p* on basal 1/3.

Abdomen: arched, largely yellowish brown, irregularly darkened posteriorly, more or less darkened and yellowish-brown dusted on tergites 3-5; tergites black-haired; tergites 1+2 with several decumbent lateral marginal bristles; tergites 3-5 with a row of decumbent marginal bristles; sternites 1-2 yellow haired, sternite 2 with marginal bristles; sternites 3-5 black haired, with marginal bristles.

Length: 6.5 mm.

Etymology. - The specific name is derived from the locality "Malaya".

Remarks. - *Booponus malayana*, new species, resembles *B. aldrichi* Senior-White, Aubertin et Smart, 1940, from Myanmar, but the thoracic dorsum is entirely yellow in the new species. It is also similar to *B. intonsus* Aldrich, 1923, from the Philippines, but *B. malayana*, new species, can be distinguished from it in having the 3rd antennal segment largely blackish with only extreme base reddish.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo: Sabah).

Genus *Verticia* Malloch

Verticia Malloch, 1927: 388. Type species: *Verticia orientalis* Malloch, 1927, orig. des.

KEY TO THE SPECIES OF *VERTICIA*

1. First longitudinal vein with a few long bristles on upper surface of basal half *V. orientalis* Malloch
- First longitudinal vein bare on upper surface 2
2. Dorsum of thorax and abdomen practically all black; mesopleuron and sternopleuron fuscous; femora usually entirely fuscous *V. nigra* Malloch
- Abdomen testaceous-yellow, with marginal band on tergites 3-5 3
3. Tergites 3-5 broadly marginal banded, the fuscous band broader than 1/2 the length of tergite; fore tibia with 3 *ad*; mid tibia with 1 *ad* in male *V. chani*, new species
- Tergites 3-5 narrowly banded, the fuscous band narrower than 1/2 the length of tergite; fore tibia with 1-2 *ad*; mid tibia without *ad* in male, with 1 *ad* in female *V. fasciventris* Malloch

***Verticia chani*, new species**

(Fig. 5)

Material examined. - Holotype male, MALAYSIA (BORNEO): Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, primary forest, light trap, 15 Oct.1962, K. J. Kuncheria.

Paratypes. MALAYSIA (BORNEO): 2 male, same locality as holotype, 30 Oct.1962, 9 Nov.1962, Y. Hirashima & K. J. Kuncheria.

Type depository. Holotype and 1 paratype are deposited in Bishop Museum, Honolulu (BPBM); 1 paratype in the Reference Museum, Taxonomy and Ecology Laboratory, Department of Medical Entomology, The National Institute of Health, Tokyo (NIHJ).

Description. - Male. - Head: eyes bare, dichoptic; frons index 0.35-0.36; frontal stripe brown, broad, parallel-sided, 4.0 X the width of one of parafrontalia just in front of anterior ocellus; parafrontalia brown, slightly brownish-grey dusted, with black setulae, provided with ca 5 strong *ori*; *ors* 1+1, strong; *oc* developed; *acco* absent; *poc* divergent; *ov* and *iv* strongly developed; *occ* absent; parafacialia narrower than the width of 3rd antennal segment, yellowish brown, slightly brown-dusted, with black setulae entirely; facialia yellowish orange, slightly yellowish-grey dusted, setulose on more than lower 1/2; epistome not projecting forward, pale yellow; face pale yellow, slightly yellowish-grey dusted, without median carina; mediana narrow, yellowish orange, bare; vibrissaria and gena yellowish orange, yellowish-grey dusted, clothed with black hairs; vibrissae very strong; postgena and lower 1/2 of occiput concolorous with gena, occiput clothed with yellow hairs on central part, postgena with 1 strong bristle on posterior inner edge; 1st and 2nd antennal segments reddish orange, with black setulae, 2nd segment with 1 bristle; 3rd antennal segment largely fuscous brown on outer surface, reddish orange on inner surface and base of outer surface, slightly more than 4 X as long as 2nd; arista brown, long plumose; palpus yellowish orange, with black setulae.

Thorax: yellowish brown, discs of dorsum and scutellum fuscous, slightly grey-dusted on dorsum, clothed with black hairs; humerus and postalar callus yellowish brown, humerus yellowish haired anteriorly; propleuron and prosternum bare; supraspiracular convexity bare; mesothoracic and metathoracic spiracles yellow; pleurotergite bare; postalar declivity bare

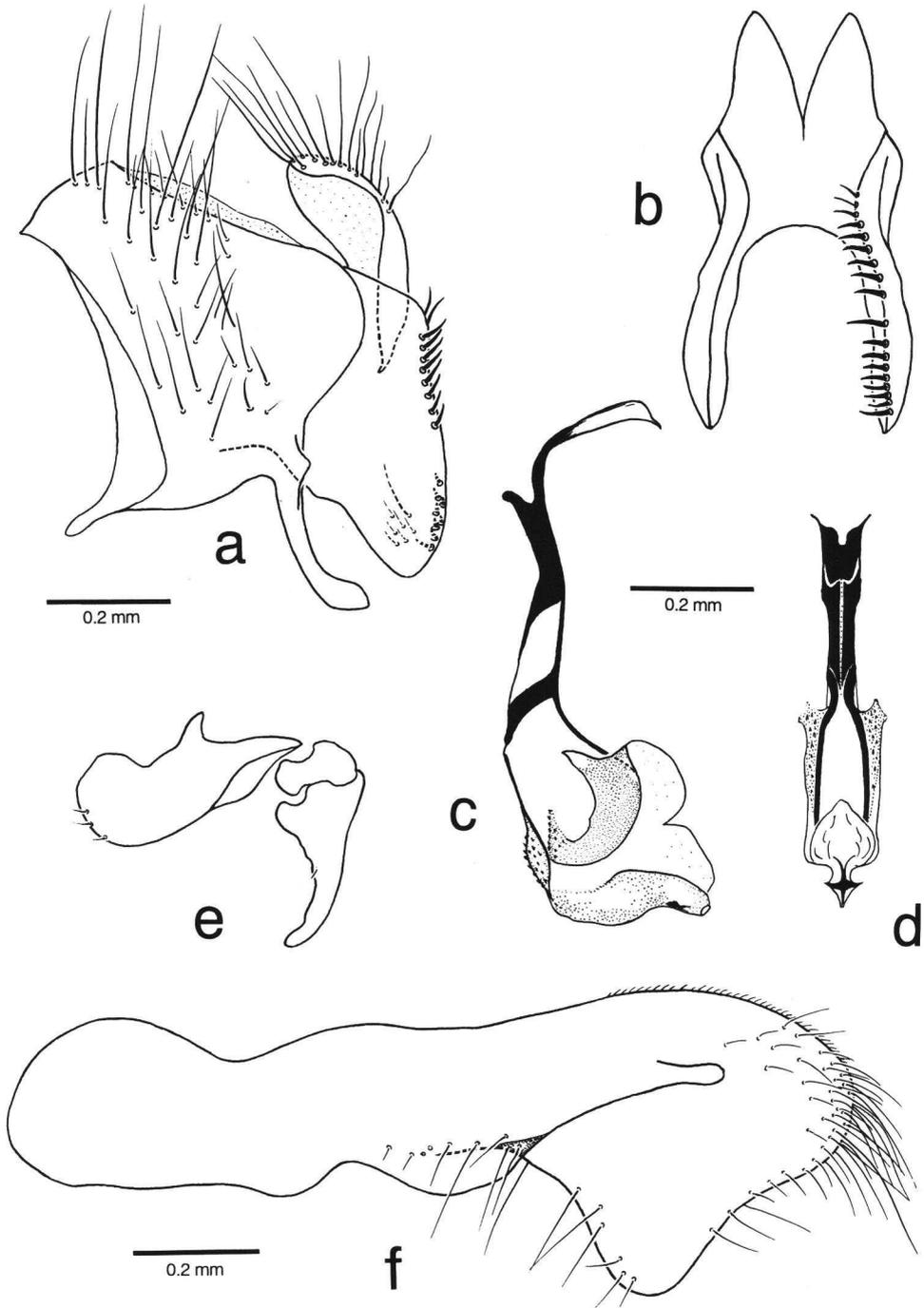


Fig. 5. *Verticia chani*, new species, male genitalia. a, epandrium, cercus and parolobus, lateral view; b, cerci and paralobi, caudal view; c, aedeagus, lateral view; d, aedeagus, posterior view; e, anterior and posterior parameres, lateral view; f, sternite 5, lateral view.

in central circle; no tympanic and anterior parasquamal tufts of hairs. Chaetotaxy: *ac* 2-3+3; *dc* 2-3+4; *ia* 1+3; *sa* 3-4; *prs* 1; *pa* 1-3; *h* 3-4; *ph* 2; *n* 2; *st* 1+1; *pp* 1; *pst* 1; *sc* 4+0, 1-2 additional bristles developed between rows of postsutural *ia* and *sa*.

Wings: yellowish brown; veins yellowish brown; epaulet and basicosta yellowish brown; subcostal sclerite yellowish brown, silver-dusted; node of 2nd and 3rd longitudinal veins (R_{2+3} and R_{4+5}) with a few black setulae below; 3rd longitudinal vein (R_{4+5}) setulose above in basal 1/5 of the section from r-m to wing margin; 4th longitudinal vein (M) bent with obtuse angle; section of M from bend to wing margin is slightly inflexed before wing margin; thoracic and alar squamae yellowish brown, bare on upper surface of thoracic one. Halteres yellowish orange.

Legs: yellowish brown, more or less silver-grey dusted on coxae and femora, black-haired, anterior surface of fore coxa also with fine yellow hairs at base; fore tibia with 1 *p* and 3 *ad*; mid tibia with 1 *ad* and 2 *pd*, without *v*; hind tibia with 3-4 *ad* and 2 *pd*.

Abdomen: yellowish brown, with broad, dark marginal bands on tergites 1+2-4; tergite 5 wholly blackish, black-haired; tergite 1+2 with row of fine decumbent marginal bristles, several of lateral ones being longer; tergites 3-5 with row of fine decumbent marginal bristles; sternites black-haired, sternite 5 with characteristic lateral lobe. Hypopygium reddish. Male genitalia is shown in Fig. 5.

Length: 5.0-5.7 mm.

Etymology. - The specific name is in honour of Prof. Chan Kai Lok, School of Biological Sciences, National University of Singapore.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Borneo: Sabah).

***Verticia fasciventris* Malloch**

Verticia fasciventris Malloch, 1927: 391. Type locality: Lubok, Kedongong, Mount Ophir, Malaya [Malaysia].

Verticia fasciventris: Senior-White, Aubertin & Smart, 1940: 77.

Verticia fasciventris: James, 1977: 541.

Length: 4.0-4.5 mm.

Specimens examined. - MALAYSIA (BORNEO): 8 males 12 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 19,23,29-31 Oct.1962, 1,4,7,9,10-13 Nov.1962, K. J. Kuncheria & Y. Hirashima (BPBM).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo).

***Verticia nigra* Malloch**

Verticia nigra Malloch, 1927: 391. Type locality: Singapore, Malaya [Singapore].

Verticia nigra: Senior-White, Aubertin & Smart, 1940: 77.

Verticia nigra: James, 1977: 541.

Length: 6.0-6.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, King Geo. V. Nat. Park, Kuala Tahan, 12-15 Dec.1958, T. C. Maa (BPBM); 1 female, Pahang, Cameron Highland, nr Tanah Rata, 800 m, 16 Mar.1990, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 2 males 5 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 18 Oct.1962, 1,9,13 Nov.1962, K. J. Kuncheria & Y. Hirashima (BPBM).

Bionomics. - Nothing is known.

Distribution. - Singapore and Malaysia (Malaya, Borneo).

***Verticia orientalis* Malloch**

Verticia orientalis Malloch, 1927: 390. Type locality: Kuala Taku, Pahang, Malaya [Malaysia].

Verticia orientalis: Senior-White, Aubertin & Smart, 1940: 75.

Verticia orientalis: James, 1977: 541.

Length: 5.5-6.0 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 male, Sabah, Tawau Residency, Kalabakan R., Tawau, 30 mi, primary forest, malaise trap, 9-18 Nov.1958, L. W. Quate (BPBM); 6 males 2 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 17,19,23,27 Oct.1962, 1,10 Nov.1962, K. J. Kuncheria & Y. Hirashima (BPBM); 1 male, Sabah, Tawau Residency, 30 mi W of Tawau, Kalabakan R., primary forest, 9-18 Nov.1958, L. W. Quate & T. C. Maa (BPBM).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo).

SUBFAMILY CHRYSOMYINAE

TRIBE CHRYSOMYINI

Genus *Chrysomya* Robineau-Desvoidy

Chrysomya Robineau-Desvoidy, 1830: 444. Type species: *Chrysomya regalis* Robineau-Desvoidy, 1830, des. by Coquillett (1910: 523).

KEY TO THE SPECIES OF *CHRYSOMYA*

- 1. Prothoracic spiracle white; aedeagus with orifice funnel-shaped and hypophallus sclerotized, but without spreading lobes 2
- Prothoracic spiracle dark; aedeagus with apical tubular orifice, hypophallus membranous and with broadly rounded, spreading lobes 3

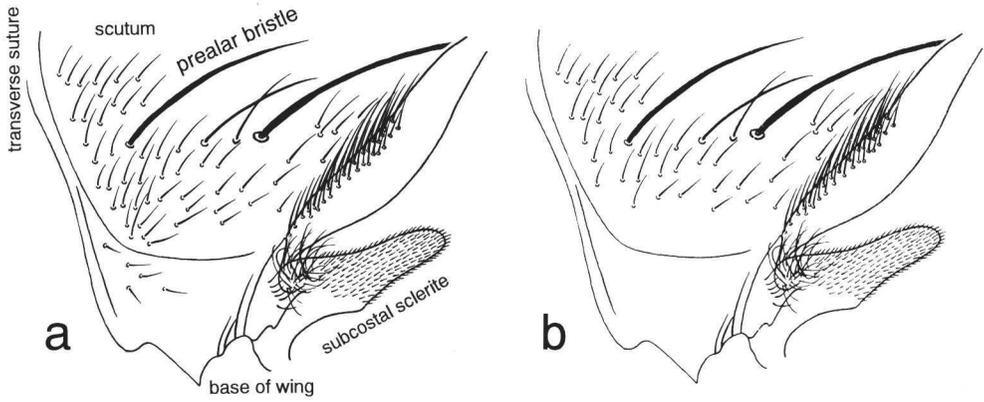


Fig. 6. Edge below prealar bristle, ventrolateral view. a, *Chrysomya thanomthini* Kurahashi et Tumrasvin; b, *C. pinguis* (Walker).

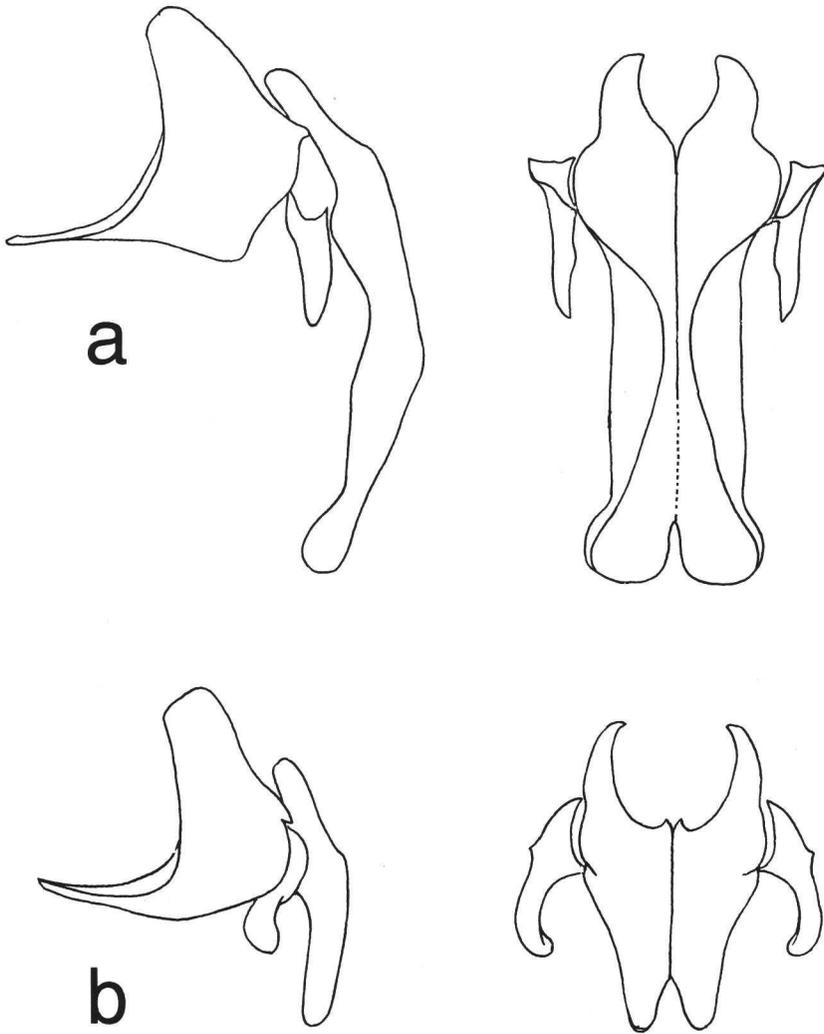


Fig. 7. Cerci and paralobi, lateral (left) and caudal (right) views. a, *Chrysomya pinguis* (Walker); b, *C. defixa* (Walker).

2. Tergite 5 with all hairs blackish; *st* 0+1; male with 1 prescutellar *dc*; eyes broadly separated in male and female; aedeagus very slender with hook-like paraphallus; hypophallus not broadly lobulate and without posterior projection *C. nigripes* Aubertin
- Tergite 5 with some pale hairs laterally among the black ones; *st* 1+1; male with 3-4 postsutural *dc* in a complete row as in female; eyes closely approximated in male; aedeagus broadly expanded from base to apex, apical portion of paraphallus covered by lobulate hypophallus; posterior margin of hypophallus with a projection directed toward base *C. rufifacies* (Macquart)
3. Gena and postgenal area entirely orange-yellow and clothed with pale yellow hairs, except immediately around vibrissae 4
- Gena and postgenal area entirely fuscous or somewhat rufous anteriorly, entirely clothed with black hairs or with very few pale hairs posteriorly 5
4. Upper and lower squamae entirely white except for yellowing of fringe; prothoracic spiracle small, not longer than the length of 3rd antennal segment; upper eye facets not conspicuously larger than lower in male; parafrontalia not obliterated in male; eyes separated by slightly less than the width of 3rd antennal segment in male [myiasis-producing species rarely seen except by rearing from host] *C. bezziana* Villeneuve
- At least the lower squama distinctly infuscated posteriorly; prothoracic spiracle large, much longer and broader than 3rd antennal segment in profile; male with upper eye facets conspicuously enlarged and with sharp transition to small facets in lower 1/3; parafrontalia almost obliterated and eyes virtually touching above in male [common synanthropic species] *C. megacephala* (Fabricius)
5. Basal part of alar squama opaque white, bare ventrally except for fringe; prothoracic spiracle small, long axis not longer than 3rd antennal segment; head hemispherical in profile; male cercus short, acute, little longer than paralobus, weakly sclerotized, orange-yellow; female 5th sternite subequal to 4th in length; female 8th tergite with a few marginal setulae on each side; lingula of subanal plate not free in female *C. chani* Kurahashi
- Basal part of alar squama not opaque white, fuscous and with black hairs ventrally; prothoracic spiracle large, longer and much broader than the 3rd antennal segment; male head distinctly flattened in profile; male cercus much longer than paralobus, blunt at apex, brown; female 5th sternite longer than 4th; female 8th tergite bare; lingula free from subanal plate in female 6
6. Body purple; length usually more than 11 mm; gena sometimes reddish, clothed with golden hairs; no *ph*, sometimes weakly developed in female; edge just below prealar bristle with a patch of rather long black hairs which often extends on to suture (Fig. 6a) *C. thanomthini* Kurahashi et Tumrasvin
- Body blue to green, sometimes with purple tinge; length usually less than 11 mm; gena fuscous, with fuscous hairs; *ph* usually present; edge below prealar bristle sparsely haired, bare on suture (Fig. 6b) 7
7. Body bluish, sometimes with purple tinge; eye brown in live specimens; postgenal area covered with yellowish hairs; gena about 3/10 in male, 4/10 in female of total head height when viewed laterally; male cercus elongate, lobulate at apex (Fig. 7a) [montane forest species] *C. pinguis* (Walker)
- Body greenish; eye reddish violet in live specimens; postbuccal area with black and brown hairs; gena about 2/10 in male, 3/10 in female of total head height when viewed laterally; male cercus stout (Fig. 7b) [lowland forest species] *C. defixa* (Walker)

***Chrysomya bezziana* Villeneuve**

Chrysomya bezziana Villeneuve, 1914: 430. Type locality: "Africa".

Chrysomya bezziana: Kurahashi, 1971: 3.

Chrysomya bezziana: James, 1977: 541.

Length: 10.0-12.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Singapore to Kuala Tembeling, 11-12 Dec.1958, L. W. Quate (BPBM); 1 female, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 1 female, Sabah, Sandakan Bay, Sepilok For. Res., 1-10 m, 29 Oct.1957, J. L. Gressitt (BPBM); 1 male, Sarawak, Matang, 450-894 m, 15 Sep.1958, J. L. Gressitt & T. C. Maa (BPBM).

Bionomics. - This is an obligatory parasite and one of the most important producers of myiasis in man and domestic animals in the Old World tropical countries (Spradbery & Vanniasingham, 1980; Zahedi & Jeffery, 1982; Bakar et al., 1983; Vellayan et al., 1984). Adults are very rarely taken except when bred from actual cases of myiasis.

Distribution. - Widely distributed through the Afrotropical and Oriental Regions, including New Guinea (Irian Jaya and PNG) and Bismarck Arch.

Chrysomya chani Kurahashi

Chrysomya chani Kurahashi, 1979: 288. Type locality: Bukit Timah Nature Reserve, Singapore.

Chrysomya chani: Tumrasvin, Kurahashi & Kano, 1979: 264.

Chrysomya sp. 1: Inder Singh, Kurahashi & Kano, 1979: 11.

Chrysomya pinguis: Kurahashi, 1971: 3 (in part), misid.

Chrysomya chani: Kurahashi & Thapa, 1994: 221.

Length: 7.5-8.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 7 males 2 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 7 females, Selangor, Ulu Langat, 300-390 m, 13-14 Nov.1958, T. C. Maa (BPBM); 2 females, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 5 males 2 females, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 5 females, Sabah, Kalabakan, 10-19 Nov.1958, T. C. Maa (BPBM); 14 females, Sabah, Forest Camp, 19 km N of Kalabakan, 15,17,21 Oct.1962, Y. Hirashima, T. C. Maa & K. J. Kuncheria (BPBM); 1 male 1 female, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 24,29 Oct.1962, Y. Hirashima & K. J. Kuncheria (BPBM); 10 females, Sabah, Kalabakan, 10-19 Nov.1958, T. C. Maa & L. W. Quate (BPBM); 4 females, Sabah, Tawau District, Kalabakan, primary forest, 8-15 Nov.1958, T. C. Maa (BPBM).

Bionomics. - Adults are found on decomposing animal matter in tropical rain forests.

Distribution. - Thailand, Malaysia (Malaya, Borneo), Singapore and Philippines.

Chrysomya defixa (Walker)

Musca defixa Walker, 1857: 24. Type locality: Singapore, Malaya [Singapore].

Chrysomya combrea: Patton, 1922: 112 (in part), misid.

Chrysomya pinguis: Kurahashi, 1971: 3 (in part), misid.

Chrysomya defixa: Senior-White, Aubertin & Smart, 1940: 145.

Chrysomya defixa: James, 1977: 542.

Chrysomya defixa: Inder Singh, Kurahashi & Kano, 1979: 12.

Chrysomya defixa: Kurahashi, 1979: 287.

Length: 9.5-12.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 14 males 10 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 15 males 13 females, Pahang, Fraser's Hill, Jerian W. Fall, 18-20 Apr.1979, H. Kurahashi (NIHJ); 6 females, Pahang, Cameron Highlands, 700-1,300 m, 27 Oct.1975, S. Shinonaga (NSMT); 2 females, Pahang, Ulogombach Rd., 30 km E Kuala Lumpur, 30 Oct.1975, S. Shinonaga (NSMT); 1 female, Pahang, Bukit Mandul, 20 km W Kuala Lumpur, 1 Nov.1975, S. Shinonaga (NSMT); 5 males 3 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 2 females, Pahang, Cameron Highlands, 700-1,000 m, 23-24 Oct.1975, S. Shinonaga (NSMT); 20 females, Pahang, Ulogombach Rd., 80 km E of Kuala Lumpur, 30 Oct.1975, S. Shinonaga (NSMT); 3 females, Selangor, Bukit Mandul, 20 km W of Kuala Lumpur, 1 Nov.1975, S. Shinonaga (NSMT); 1 male 3 females, Singapore to Kuala Tembeling, 11-12 Dec.1958, L. W. Quate (BPBM); 1 female, Pahang, Kuala Tahan, 15-16 Dec.1958, L. W. Quate (BPBM); 1 male, Selangor, Kepong, 130-300 m, 13-21 Mar.1966, J. & M. Sedlacek (BPBM); 11 females, Selangor, Ulu Langat, 300-380 m, 13-14 Jun.1958, T. C. Maa (BPBM). MALAYSIA (BORNEO): 11 males 2 females, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 3 males 4 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 1 male 18 females, Sabah, Forest Camp, 19 km N of Kalabakan, 15-28 Oct.1962, Y. Hirashima (BPBM); 1 male 1 female, Sabah, Tawau Dist., Kalabakan, primary forest, 8-15 Nov.1958, T. C. Maa (BPBM); 1 female, Sabah, Tawau Dist., Kalabakan, 10-19 Nov.1958, L. W. Quate (BPBM). SINGAPORE: 3 females, Botanic Gardens, 25 m, 11 Dec.1958, T. C. Maa (BPBM).

Bionomics. - Adults are found on decaying animal matter in tropical forests at low and median elevations.

Distribution. - Singapore and Malaysia (Malaya, *Borneo).

Chrysomya megacephala (Fabricius)

Musca megacephala Fabricius, 1794: 317. Type locality: "Guinea" probably error, according to Senior-White et al., 1940.

Musca dux Eschscholtz, 1822: 114 (1823: 171). Type locality: Guam.

Chrysomya duvaucelii Robineau-Desvoidy, 1830: 451. Type locality: Bengal [probably Bangladesh].

Chrysomya gratiosa Robineau-Desvoidy, 1830: 451. Type locality: "doit être originaire d'Afrique," probably in error.

Lucilia flaviceps Macquart, 1843: 302 (145). Type locality: Coromandel, India.

Musca remuria Walker, 1849: 871. Type locality: China.

Musca bata Walker, 1849: 875. Type locality: not stated, probably Oriental.

Musca combra Walker, 1849: 876. Type locality: not stated, probably Oriental.

Somomyia dives Bigot, 1887: 600. Type locality: Calcutta, India.

Somomyia cyaneocincta Bigot, 1887: 604. Type locality: Java [Indonesia].

Chrysomya megacephala: Senior-White, Aubertin & Smart, 1940: 138.

Chrysomya megacephala: Kurahashi, 1971: 3.

Chrysomya megacephala: James, 1977: 542.

Chrysomya megacephala: Inder Singh, Kurahashi & Kano, 1979: 11.

Chrysomya megacephala: Kurahashi & Thapa, 1994: 221.

Length: 6.5-9.4 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 males 1 female, Pahang, Fraser's Hill, Jerian W. Fall, 18-20 Apr.1979, H. Kurahashi (NIHJ); 2 males, Pahang, Kuala Tahan, 15-16 Dec.1958, L. W. Quate (BPBM); 1 male, Kuala Lumpur, 24-31 Dec.1958, L. W. Quate (BPBM); 6 females, Selangor, Ulu Langat, 300-390 m, 13-14 Feb.1958, T. C. Maa (BPBM); 2 males 4 females, Pahang, Mt. Berinchang, 2,110 m, natural forest, 15 Mar.1990, H. Kurahashi (NIHJ); 1 male, Kuala Lumpur, 90 m, 7 Jun.1962, E. S. Ross & D. G. Cavagnaro (CAS); 1 male, Perak, Penang Hill, 100 m, 26 Jun.1962, E. S. Ross & D. G. Cavagnaro (CAS); 2 males 2 females, Pahang, Bukit Fraser (Fraser's Hill), 10-11 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH); 17 males 18 females, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH); 2 males 3 females, Selangor, 22 km NNE K. Lumpur, Templar Park, 29 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH).

MALAYSIA (BORNEO): 14 males 12 females, Sabah, Poring, 700 m, 29-30 Apr.1979, 15 Nov.1995, H. Kurahashi & T. Hayashi (NIHJ); 1 female, Mamut Copper Mine, nr Ranau, 600 m, ex. human feces, 15 Nov.1995, T. Hayashi(NIHJ); 1 male 2 females, Sabah, Ranau Dist., Kinabalu National Park, 29 Apr.1969, Talib (NIHJ); 4 males 7 females, Sabah, Kalabakan, 10-19 Nov.1958, L. W. Quate & T. C. Maa (BPBM); 2 males 3 females, Sabah, Ranau, W. Coast Residency, 500 m, 22-25 Jan.1959, T. C. Maa (BPBM); 5 males 4 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 15-31 Oct.1962, 7-10 Nov.1962, 19 Nov.1962, Y. Hirashima & K. J. Kuncheria (BPBM); 2 females, Sabah, Tawau District, Kalabakan, primary forest, 8-15 Nov.1958, L. W. Quate (BPBM); 14 females, Sabah, Sandakan, rain forest, 5 May.1979, H. Kurahashi (NIHJ); 5 females, Sabah, Labuk Rd., 2 mi of Sandakan, 7 May.1979, R. Yoshii (NIHJ); 3 males 3 females, Sabah, Tambunan, 1,700 m, 10,12 Nov.1995, M. Iwasa(OU); 5 males 2 females, Sarawak, Mentoa, 10 km S of Sebuyau, 23 Jan.1979, Gaerdenfors et al. (LU); 1 male 1 female, Sarawak, Serian, 24 Mar.1995, M. Iwasa (OU).

Bionomics. - This blow fly is a common scavenger and sometimes produces myiasis in man and domestic animals. A case of traumatic myiasis with numerous maggots on the dorsum of the right foot of a man from India was reported in Malaysia (Bakar et al., 1983). Adults are commonly found on garbage and very often attracted to decaying meat and human excrement in natural forest in New Guinea. Records are at hand for all months of the year and at elevations from sea level to 2,000 m (Kurahashi, 1987b).

Distribution. - Widely distributed throughout the Oriental and Australasian Regions and recently introduced into the Afrotropical and Neotropical Regions (Kurahashi, 1987b).

Chrysomya nigripes Aubertin

Chrysomya nigripes Aubertin, 1932: 26. Type locality: Trincomalee, Ceylon [Sri Lanka].

Chrysomya nigripes: Kurahashi, 1971: 3.

Chrysomya nigripes: James, 1977: 542.

Chrysomya nigripes: Inder Singh, Kurahashi & Kano, 1979: 10.

Chrysomya nigripes: Kurahashi & Thapa, 1994: 222.

Length: 5.2-6.7 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 1 female, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 1 male, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 1 female, Sabah, Labuk Rd., ML. 2 Sandakan, 7 May.1979, R. Yoshii (NIHJ); 1 female, Sabah, Labuk Rd., 25 mi of Sandakan, 2 May.1979, R. Yoshii (NIHJ); 17 males 26 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 19-28 Oct.1962, 7-10 Nov.1962, Y. Hirashima & K. J. Kuncheria (BPBM); 3 males 7 females, Sabah, Sandakan, rain forest, 5 May.1979, H. Kurahashi (NIHJ); 4 males 1 female, Sabah, Poring, 500 m, 13 Nov.1995, M. Iwasa (OU).

Bionomics. - Adults are attracted to decaying meat in natural forest (Kurahashi,1987b).

Distribution. - Widely distributed through Southeast Asia, New Guinea (PNG), Bismarck Arch., Bougainville I., Espiritu Santo and Efate (Kurahashi, 1987b).

Chrysomya pinguis (Walker)

Lucilia pinguis Walker, 1858: 213. Type locality: India.

Chrysomya nigriceps Patton, 1922: 558. Type locality: Kallar, Coonoor Ghat, India.

Chrysomya combrea: Patton, 1922 (in part): 112, nec. Walker.

Chrysomya pinguis: Senior-White, Aubertin & Smart, 1940: 144.

Chrysomya pinguis: James, 1977: 542.

Chrysomya pinguis: Inder Singh, Kurahashi & Kano, 1979: 12.

Chrysomya pinguis: Kurahashi & Thapa, 1994: 223.

Length: 7.0-9.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 7 males 1 female, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 1 male, Pahang, Genting Highlands, 1,700 m, 20-21 Apr.1979, H. Kurahashi (NIHJ); 9 females, Pahang, Cameron Highlands, 700-1,300 m, 27 Oct.1975, S. Shinonaga (NSMT); 27 females, Pahang, Cameron Highlands, 700-1,000 m, 23-24 Oct.1975, S. Shinonaga (NSMT); 1 female, Pahang, Cameron Highlands, 700-1,800 m, 27 Oct.1975, S. Shinonaga (NSMT); 2 females, Pahang, Cameron Highlands, Mt. Brinchang, 2,300 m, 25 Oct.1975, S. Shinonaga (NSMT); 2 females, Pahang, Ulogombach Rd., 80 km E Kuala Lumpur, 30 Oct.1975, S. Shinonaga (NSMT); 2 females, Pahang, Mt. Berinchang, 2,110 m, natural forest, 15 Mar.1990, H. Kurahashi (NIHJ); 4 males 2 females, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 3 males 2 females, Pahang, Fraser's Hill, Jerian W. Fall, 18-20 Apr.1979, H. Kurahashi (NIHJ); 1 male, Pahang, Gua' Che Yatim to Terenggan, 17 Dec.1958, L. W. Quate (BPBM); 1 female, Perak, Maxwell Hill, 1,350 m, 17-20 Mar.1958, T. C. Maa (BPBM); 1 male, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH); 2 females, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH). MALAYSIA (BORNEO): 12 males 9 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 12 May.1979, H. Kurahashi (NIHJ); 1 male, Sabah, Mt. Kinabalu, 2,300 m, moss forest, 1-2 May.1979, H. Kurahashi (NIHJ); 3 males 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 1 female, Sabah, Mt. Kinabalu, Bundu, 1,000 m, 2-3 May.1979, H. Kurahashi (NIHJ); 10 males 7 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 3 males 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 2 males 5 females, Sabah, Kinabalu N. P., 1,500 m, 14 Nov.1995, M. Iwasa (OU); 4 females, Sabah, Tambunan, 1,700 m, 10, 12 Nov.1995, M. Iwasa (OU); 5 males 11 females, Sabah, Mt. Kinabalu, National Park, 2-5 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - The larvae of this species have been found breeding in the dead bodies of birds and other small animals. The adult rarely enters houses in search of food (Senior-White et al., 1940).

Distribution. - India (Simla, Darjeeling, N. Khasi Hills, Shillong, Mishmi Hills, Dalai V., Coonor), Sri Lanka (Nuwara Eliya, Nalande, Peradeniya), Thailand, Malaysia (Malaya, Borneo), China, Hong Kong, Philippines (Palawan, Tawi Tawi) and Indonesia (Java).

Chrysomya rufifacies (Macquart)

Lucilia rufifacies Macquart, 1843: 303 (146). Type locality: "Nouvelle-Hollande" [Australia].

Lucilia orientalis Macquart, 1843: 302 (145). Type locality: Pondicherry, India.

Lucilia pavonina Schiner, 1868: 305. Type locality: Kar Nicobar and Tellnschong.

Somomyia barbata Bigot, 1877: 39. Type locality: India.

Chrysomya cordieri Séguy, 1925: 303. Type locality: Sockaboemi, Java [Indonesia].

Chrysomya rufifacies Senior-White, Aubertin & Smart, 1940: 141.

Chrysomya albiceps rufifacies: Kurahashi, 1971: 3.

Chrysomya rufifacies James, 1977: 542.

Chrysomya rufifacies Inder Singh, Kurahashi & Kano, 1979: 11.

Chrysomya rufifacies Kurahashi & Thapa, 1994: 224.

Length: 6.0-9.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male 1 female, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 2 males 5 females, Sabah, Labuk Rd., Mile 2 Sandakan, 7 May.1979, R. Yoshii (NIHJ); 13 males 27 females, Sabah,

Sandakan, rain forest, 5 May.1979, H. Kurahashi (NIHJ); 3 females, Sabah, Tawau Dist., Kalabakan, primary forest, 8-15 Nov.1958, L. W. Quate (BPBM); 2 females, Sabah, Tawau Dist., Kalabakan, primary forest, 9 Oct.1958, L. W. Quate (BPBM); 1 female, Sarawak, Kuching, Matang, 450-894 m, 15 Sep.1952, J. L. Gressitt (BPBM); 2 females, Sabah, Kalabakan, 10-19 Nov.1958, L. W. Quate (BPBM); 3 males 1 female, Sabah, Kota Kinabalu, 5 m, 20 Nov.1995, M. Iwasa (OU); 1 male, Sabah, 10 km N. of Ranau, 700 m, 15 Nov.1995, M. Iwasa (OU); 1 male, Sabah, Poring, 500 m, 13 Nov.1995, M. Iwasa (OU). SINGAPORE: 1 female, Botanic Gardens, 25 m, 11 Dec.1958, T.C. Maa (BPBM).

Bionomics. - Larvae are predacious and attack other larvae of Calliphoridae, Sarcophagidae and Muscidae found in the same breeding place. *Chrysomya rufifacies* is known to be involved in secondary myiasis, but no investigation has been done on the general biology in Malaysia and Singapore.

Distribution. - Widespread in the Oriental Region: Nepal, India, Sri Lanka, S. China, Thailand, Malaysia (Malaya, *Borneo), *Singapore, Indonesia (Java, Maluku), Philippines (Palawan, Tawi Tawi). Palearctic Region: China, Korea and Japan (Ryukyu). Australian and Oceanian Regions: Guam, Marshall Is., Hawaii Is., Palao, Indonesia (Irian Jaya), PNG (New Guinea, Bismarck Arch., Bougainville I.), Vanuatu, New Caledonia, Fiji and Australia (Queensland, New South Wales).

****Chrysomya thanomthini* Kurahashi et Tumrasvin**

Chrysomya thanomthini Kurahashi et Tumrasvin, 1977: 243. Type locality: Doi Inthanon, Thailand.

Length: 11.5-12.5 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 female, Sarawak, Kuching, Santubong, 797-1,500 m, 26 Jun.1958, T.C. Maa (BPBM); 4 males 10 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 5 females, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 2 males 13 females, Sabah, Kinabalu N. P., 1,500 m, 14,16 Nov.1995, M. Iwasa (OU); 5 females, Sabah, Tambunan, 1,700 m, 10 Nov.1995, M. Iwasa (OU); 2 males 9 females, Sabah, Mt. Kinabalu, National Park, 2-5 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - Adults are usually found in mountainous forests more than 1,000 m above sea level.

Distribution. - Nepal, Myanmar, Thailand, *Malaysia (Borneo) and S. China (Yunnan).

***Chrysomya villeneuvi* Patton**

Chrysomya villeneuvi Patton, 1922: 567. Type locality: S. India.

Chrysomya villeneuvi: Senior-White, Aubertin & Smart, 1940: 147.

Chrysomya villeneuvi: Kurahashi, 1971: 3.

Chrysomya villeneuvi: James, 1977: 543.

Chrysomya villeneuvi: Inder Singh, Kurahashi & Kano, 1979: 11.

Chrysomya villeneuvi: Kurahashi & Thapa, 1994: 225.

Length: 7.5-9.2 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 5 males 3 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 female, Pahang, Cameron Highlands, 700-1,000 m, 23-24 Oct.1975,

S. Shinonaga (NIHJ); 2 males 5 females, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ); 2 females, Perak, Bukit Larut, 800 m, natural forest, 18 Mar.1990, H. Kurahashi (NIHJ); 1 male 3 females, Selangor, Ulu Langat, 300-390 m, 13 Jun.1958, T. C. Maa (BPBM). MALAYSIA (BORNEO): 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 7 males 7 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 1 male 4 females, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 10 males 1 female, Sabah, Poring, 500 m, 13 Nov.1995, M. Iwasa (OU); 2 males, Sabah, Tambunan, 1,700 m, 10 Nov.1995, M. Iwasa (OU); 3 males 1 female, Sabah, Kinabalu N. P., 1,500 m, 14 Nov.1995, M. Iwasa (OU); 4 males 1 female, Sabah, 10 km N of Ranau, 700 m, 15 Nov.1995, M. Iwasa (OU); 20 males 6 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 17-29 Oct.1962, Y. Hirashima & K. J. Kuncheria (BPBM); 2 females, Sabah, Tawau District, Kalabakan, primary forest, 8-15 Nov.1958, L. W. Quate & T. C. Maa (BPBM); 2 females, Sabah, Tawau District, Kalabakan, 10-19 Nov.1958, L. W. Quate (BPBM); 1 female, Sabah, Mt. Kinabalu, National Park, 2-5 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - The second and third instar larvae are predaceous, even attacking other predatory larvae, like *C. rufifacies*. Adult habits are unknown, but it is not encountered indoors (Senior-White et al., 1940).

Distribution. - Nepal, India, Sri Lanka, Thailand, S. China (Yunnan, Hainan Is.), Malaysia (Malaya, Borneo) and Indonesia (Sumatra).

SUBFAMILY RHINIINAE

KEY TO THE GENERA OF RHINIINAE

1. Arista pectinate; *ac* and *dc* not distinguishable from the general vestiture, the prescutellars at most weakly developed; suprasquamal ridge bare Tribe Rhiniini 2
- Arista pubescent or plumose, not pectinate Tribe Cosminini 5
2. Outer *ph* absent; R_5 petiolate; male eyes holoptic, female dichoptic; body metallic green or dark blue *Chlororhinia* Townsend
- Outer *ph* present 3
3. Hind tibia without a conspicuous row of *ad*, but with 2-3 *ad* as long or longer than the tibial diameter; R_5 open; body slender, parallel-sided; abdomen mostly testaceous *Idiella* Brauer et Bergenstamm
- Hind tibia with a conspicuous row of subequal setae on anterodorsal surface, longer than the general vestiture, sometimes 2-3 rather strong *ad* developed among them; fore tibia with 1 *pv*; body rather stout with ovate abdomen and usually of a dark coloration 4
4. R_5 petiolate; sternopleuron brassy, without dusting; mesopleuron without setigerous spots; mesopleural row of setae incomplete; legs entirely yellow; tergite 1+2 with rather long marginal bristles in male *Rhinia* Robineau-Desvoidy
- R_5 open at wing margin or closed; if petiolate then sternopleuron heavily dusted *Stomorphina* Rondani
5. Arista plumose, the rays at least as long as the width of 3rd antennal segment in anterior view; fore tibia without or with *p* 6
- Arista pubescent, the longest hairs never exceeding 1.5 X the width of 3rd antennal segment; fore tibia with 1 *p* 8
6. Outer *ph* absent; fore tibia without *p* 7
- Outer *ph* present; fore tibia sometimes with 1 *p* in *Malayomyza* 9

7. Prostigmatal bristles absent; two longitudinal silver white stripes present on dorsum *Borbororhinia* Townsend
- Prostigmatal bristles present; yellowish brown dorsum with or without three fuscous longitudinal stripes; fuscous dorsum with two longitudinal silver white to grey stripes *Sumatria* Villeneuve
8. Propleuron hairy *Metallea* van der Wulp
- Propleuron bare *Rhyncomyia* Robineau-Desvoidy
9. Presutural *ac* absent or indistinct; *dc* and postsutural *ac* usually indistinct except for the prescutellars; if 1-2 postsutural *ac* developed as the prescutellars, then the propleuron hairy *Cosmina* Robineau-Desvoidy
- Presutural *ac* well developed at least in one pair; *dc* also well developed; propleuron bare ... 10
10. Fore tibia without *p*; a smaller fly, less than 4 mm in length, blackish shining, with bronzy tinge; humerus, propleuron, upper and anterior part of thorax reddish brown; abdomen reddish brown in part on tergites 1+2-3; male eyes dichoptic *Malayomyza* Malloch
- Fore tibia with 1 *p*; a medium and large-sized fly having thorax usually metallic green, blue and purple, more or less dusted; humerus, propleuron and mesopleuron concolorous with thoracic dorsum; abdomen concolorous with thoracic dorsum, also dusted, sometimes tessellated; male eyes usually holoptic to subholoptic *Isomyia* Walker

TRIBE RHINIINI

Genus *Chlororhinia* Townsend

Chlororhinia Townsend, 1917: 191. Type species: *Chlororhinia virides* Townsend, 1917, orig. des.(= *Musca exempta* Walker, 1857).

KEY TO SPECIES OF *CHLORORHINIA*

1. Body metallic green with coppery reflections; hairs on mesopleuron, sternopleuron, postgena and prosternum pale to golden yellow; *pst* usually absent; mid and hind tarsal segments light brown except for fuscous apical one *C. exempta* Walker
- Body metallic purple and blue; hairs on mesopleuron, sternopleuron, postgena and prosternum brown to black; *pst* always present; mid and hind tarsal segments usually light brown entirely *C. fuscohirta* Malloch

Chlororhinia exempta (Walker)

Musca exempta Walker, 1856: 128. Type locality: Sarawak, Borneo [Malaysia].

Chlororhinia viridis Townsend, 1917: 191. Type locality: Shillong, Khasi Hills, Assam, India.

Chlororhinia viridis: Malloch, 1926: 498.

Chlororhinia exempta: Senior-White, Aubertin & Smart, 1940: 206.

Chlororhinia exempta: James, 1977: 544.

Length: 4.0-4.2 mm.

Specimens examined. - MALAYSIA (BORNEO): 2 females, Sarawak, Bau Dist., Pangkalan Tabang, 100-450 m, 5-8 Sep.1958, T. C. Maa (BPBM); 3 females, Sabah, Tenompok, 29 Feb.1959, T. C. Maa (BPBM); 3 females, Sabah, W. Coast Residency, Ranau, 8 mi N Paring Hot Springs, 500 m, 9-18 Oct.1958, T. C. Maa (BPBM); 1 female, Sabah, Paring, Ranau, light trap, 10 Oct.1958, L. W. Quate (BPBM); 2 males, Sabah, Ranau, 500-1,100 m, 9-10 Nov.1975, S. Shinonaga (NSMT); 1 female, Mamut Copper Mine, nr Ranau, 600 m, ex. human feces, 15 Nov.1995, T. Hayashi (NIHJ); 1 male

1 female, Sabah, 10 km N of Ranau, 700 m, 15 Nov.1995, M. Iwasa (OU).

Bionomics. - Nothing is known.

Distribution. - ?Nepal, India (Assam), Laos, Malaysia (Borneo), Philippines (Palawan) and Australia (Queensland, New South Wales).

Chlororhinia fuscohirta Malloch

Chlororhinia viridis var. *fuscohirta* Malloch, 1926: 498. Type locality: Lubok Tamang, Pahang, Malaya [Malaysia].

Chlororhinia fuscohirta: Senior-White, Aubertin & Smart, 1940: 206.

Chlororhinia fuscohirta: James, 1977: 544.

Chlororhinia fuscohirta: Dear, 1977: 783.

Length: 5.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 1 male, Sarawak, Gunong Matang, 120 m, malaise trap, 15 Sep.1958, J. L. Gressitt & T. C. Maa (BPBM); 5 females, Sabah, Sandakan Bay, Sapagaya Lumber Camp, 2-20 m, nr dead giant ant, 3 Nov.1957, J. L. Gressitt (BPBM); 6 females, Sabah, Tenompok, 30 mi E of Jesselton, 1,460 m, 26-31 Jan.1959, 13 Feb.1959, T. C. Maa (BPBM); 2 females, Sarawak, Bau Dist., Pangkalan Tebang, 300-450 m, 6 Sep.1958, T. C. Maa (BPBM); 1 female, Tawau, Quoin Hill, 8-14 Jul.1962, malaise trap, 8-14 Jul.1962, H. Holtmann (BPBM).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Borneo, Malaya) and Australia (Queensland).

Genus *Rhinia* Robineau-Desvoidy

Rhinia Robineau-Desvoidy, 1830: 422. Type species: *Rhinia testacea* Robineau-Desvoidy, 1830 (= *Idia apicalis* Wiedemann, 1830), mon.

Beccarimya Rondani, 1873: 287. Type species: *Beccarimya glossina* Rondani, 1873 (= *Idia apicalis* Wiedemann, 1830).

Rhinia apicalis (Wiedemann)

Idia apicalis Wiedemann, 1830: 354. Type locality: Tenerife [Canary Is.].

Idia flavipennis Macquart, 1843: 282 (125). Type locality: Java [Indonesia].

Idia pleuralis Thomson, 1869: 542. Type locality: Keeling Islands [Indian Ocean].

Rhinia fulvipes Bigot, 1874: 239. Type locality: Ceylon [Sri Lanka].

Rhinia apicalis: James, 1977: 552.

Rhinia apicalis: Inder Singh, Kurahashi & Kano, 1979: 14.

Length: 5.2-6.2 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 males 3 females, Perak, Sungkai, 136 km N of Kuala Lumpur, 20 m, 14 Mar.1990, H. Kurahashi (NIHJ); 1 female, Perak, Penang, N. Hills, 9 May.1977, T. Yamasaki (NIHJ). MALAYSIA (BORNEO): 2 females, Sarawak, Kuching, Santubong, 797-1,500 m, 3-18 Jun.1958, T. C. Maa (BPBM).

Bionomics. - Nothing is known.

Distribution. - Oriental Region: Sri Lanka, Keeling Islands, Thailand, Malaysia (Malaya, Borneo), Philippines and Indonesia (Java). Australasian and Oceanian Regions: Australia (Northern Territory, Queensland) and Hawaii. Palaearctic Region: Canary Islands and Near East. Widely distributed in Afrotropical Region.

Genus *Stomorhina* Rondani

Idia Wiedemann, 1820: 21; nec *Idia* Hübner, 1809, Lepidoptera. preocc.

Stomorhina Rondani, 1861: 9, n. name for *Idia* Wiedemann. Type species: *Musca lunata* Fabricius, 1805, des. by Brauer & Bergenstamm (1889: 86, 154).

Idiellopsis Townsend, 1917: 190. Type species: *Idiellopsis similis* Townsend, 1917, orig. des.(= *Idia xanthogaster* Wiedemann, 1820).

Euidiella Townsend, 1917: 192. Type species: *Musca discolor* Fabricius, 1794, orig. des.

KEY TO THE SPECIES OF *STOMORHINA*

1. Mesopleuron with 1-2 bristles on the upper corner of posterior margin 2
- Mesopleuron with a complete row of black bristles on posterior margin 6
2. Mesopleuron without distinct piliferous spots 3
- Mesopleuron with distinct piliferous spots 4
3. Sternopleuron densely yellow pruinose as the mesopleuron; thoracic squama with lobulate inner border; R₅ closed, petiolate *S. xanthogaster* (Wiedemann)
- Sternopleuron and hypopleuron glossy black, not pruinose; R₅ open; abdomen dark, violet
..... *S. melastoma* (Wiedemann)
4. Legs wholly testaceous [No record from Malaysia and Singapore] ... *S. luteigaster* (de Meijere)
- Legs at least partly black 5
5. Abdomen with tergite 1+2 yellow except a black or brown posterior border; R₅ open
..... *S. discolor* (Fabricius)
- Abdominal tergite 1+2 black or brown, but never with testaceous spots; R₅ closed
..... *S. townsendi* Kurahashi
6. Wing strongly infuscated along the costal border and with a distinct apical suffusion; fore tibia blackish *S. veterana* Villeneuve
- Wing subhyaline; fore tibia reddish 7
7. Thorax and abdomen dark metallic green; abdomen with fine pruinosity regularly spread
..... *S. unicolor* (Macquart)
- Thorax and abdomen black or blue grey, thorax without dark longitudinal stripe, conspicuous black setigerous spots instead; abdominal pruinosity forming lateral spots
..... *S. procula* (Walker)

Stomorhina discolor (Fabricius)

Musca discolor Fabricius, 1794: 320. Type locality: "Ind. Or."

Idia metallica Macquart, 1835: 246. Type locality: Bengal [probably Bangladesh].

Idia quadrimaculata Macquart, 1851: 213 (240). Type locality: Java [Indonesia].

Idia aequalis Walker, 1859: 103. Type locality: Aru Islands, Moluccas [Indonesia].

Idia cincta Bigot, 1874: 238. Type locality: Ceylon [Sri Lanka].
Stomorhyna muscina Rondani, 1875: 429. Type locality: Sarawak, Borneo [Malaysia].
Stomorhina scalaris Bigot, 1887: 591. Type locality: Ternate [Indonesia].
Stomorhina discolor: Senior-White, Aubertin & Samart, 1940: 192.
Stomorhina discolor: James, 1977: 555.
Rhinia discolor: Inder Singh, Kurahashi & Kano, 1979: 14.
Stomorhina discolor: Kurahashi & Thapa, 1994: 247.

Length: 4.5-6.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 5 males, Selangor, Kuala Lumpur, 24-31 Dec.1958, L. W. Quate (BPBM); 2 males, Selangor, Gomak For. Res. nr Kuala Lumpur, 28 Dec.1958, L. W. Quate (BPBM); 1 female, Selangor, Bukit Mandul, 20 km W Kuala Lumpur, 1 Nov.1975, S. Shinonaga (NSMT); 1 female, Perak, Sungkai, 136 km N of Kuala Lumpur, 20 m, 14 Mar.1990, H. Kurahashi (NIHJ); 1 male, Kuala Lumpur, 24-31 Dec.1958, L. W. Quate (BPBM). MALAYSIA (BORNEO): 4 males 1 female, Sabah, Ranau, 500-1,100 m, 9-10 Nov.1975, S. Shinonaga (NSMT); 5 females, Sabah, Paper, 5 km SW Kota Kinabalu, 13-15 Nov.1975, S. Shinonaga (NSMT); 15 females, Sarawak, Balai Ringgin, 100 km N Kuching, 22-24 Nov.1975, S. Shinonaga (NSMT); 1 male 14 females, Sabah, Tawau District, Kalabakan, primary forest, fish bait trap, 8-15 Nov.1958, T. C. Maa (BPBM); 1 female, Sabah, Mt. Kinabalu, Bundu Tuhan, 1,000 m, 23 May.1979, H. Kurahashi (NIHJ); 1 female, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 2 females, Sabah, Sepilok Compound Coll., 19 Jul.1978, F. E. Date (NIHJ); 1 female, Sabah, W. Coast Residency, Ranau, 8 mi N Paring Hot Springs, 500 m, light trap, 9-18 Oct.1958, T. C. Maa (BPBM); 1 female, Sabah, Ranau, 11 Oct.1958, L. W. Quate (BPBM); 2 females, Kalabakan, 10-19 Nov.1958, primary forest, T. C. Maa (BPBM); 3 females, Sabah, Tawau, Quoin Hill, Cocoa Res. Sta., primary forest, 6 Sep.1962, Y. Hirashima (BPBM); 2 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 27 Oct.1962, 21 Nov.1962, Y. Hirashima (BPBM); 7 males 5 females, Sabah, Keningau, 400 m, 19 Nov.1995, M. Iwasa (OU); 2 males 3 females, Sabah, 10 km N of Ranau, 700 m, 15 Nov.1995, M. Iwasa (OU); 1 male 3 females, Sabah, Poring, 500 m, 13 Nov.1995, M. Iwasa (OU).

Bionomics. - Larvae are predacious (Kurahashi & Fauran, 1980). The adult is a flower visitor (Kurahashi, 1987b).

Distribution. - Widely distributed in the Oriental, Australasian and Oceanic Regions, from Sri Lanka to the Marquesas Is. and Australia (Queensland, New South Wales: Peris, 1952; Dear, 1977), New Guinea and New Britain (Kurahashi, 1987b).

Stomorhina melastoma (Wiedemann)

Idia melastoma Wiedemann, 1830: 253. Type locality: Java [Indonesia].
Euidiella purpurea Townsend, 1917: 193. Type locality: Madras and E. Himalayas, India.
Idiella bipartita Malloch, 1929: 335. Type locality: Bettotan, nr Sandakan, N. Borneo [Malaysia].
Stomorhina bipartita: Senior-White, Aubertin & Smart, 1940: 203.
Rhinia melastoma bipartita: James, 1977: 553.

Length: 7.5-9.2 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 male 2 females, Sabah, Tawau Dist., Kalabakan, 8-15,10-19 Nov.1958, T. C. Maa (BPBM).

Bionomics. - Males often swarm under the shade of trees in forests.

Distribution. - Oriental Region: Nepal, India (Himachal Pradesh, Madras), Sri Lanka, Malaysia (Borneo) and China. Australasian Region: PNG (New Guinea) and Australia (Queensland).

***Stomorphina procula* (Walker)**

Idia procula Walker, 1849: 808. Type locality: ?Africa.

Idia quadrinotata Bigot, 1874: 238. Type locality: Sarawak, Borneo [Malaysia].

Euidiella nila Senior-White, 1922: 168. Type locality: Coonoor, Nilgiri Hills, India.

Stomorphina quadrinotata: Senior-White, Aubertin & Smart, 1940: 194.

Stomorphina procula: James, 1977: 555.

Stomorphina procula: Kurahashi & Thapa, 1994: 249.

Length: 5.4-8.0 mm.

Bionomics. - Adults frequent blossoms and flowers in mountainous areas.

Distribution. - Nepal, India (Madras, Coonoor), Myanmar and Malaysia (Malaya, Borneo).

***Stomorphina townsendi*, new name**

Euidiella unicolor Townsend, 1917: 193. Type locality: Mujang, Sarawak, Borneo. Junior secondary homonym of *Stomorphina unicolor* (Macquart, 1851).

Rhinia unicolor: Peris, 1952: 35.

Rhinia unicolor: James, 1977: 553.

Length: 5.3-5.9 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Cameron Highlands, nr Tanah Rata, 800 m, 16 Mar.1990, H. Kurahashi (NIHJ); 1 female, Pahang, Rompin Mining Co., 42 m, railway track, 26 Feb.1961, K. J. Kuncheria (BPBM). MALAYSIA (BORNEO): 1 female, Sarawak, Nanga Pelagus, nr Kapit, 180-585 m, 7-14 Aug.1958, T. C. Maa (BPBM); 1 female, Sarawak, Bau Dist., Pangkalan Tebang, 300-450 m, 6 Sep.1958, T. C. Maa (BPBM); 1 female, Sarawak, Sarikei Dist., Rejang Delta, 15-25 Jul.1958, T. C. Maa (BPBM); 3 females, Sabah, Ranau, 500-1,100 m, 9-10 Nov.1975, S. Shinonaga (NSMT); 1 male 29 females, Sabah, Tawau District, Kalabakan, primary forest, 8-15,10-19 Nov.1958, T. C. Maa (BPBM); 14 females, Sabah, Tawau, Tawau Residency, Kalabakan R., 48 km W, primary forest, 9-18 Nov.1958, T. C. Maa (BPBM); 4 females, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 15,27 Oct.1962, 9,12 Nov.1962, K. J. Kuncheria & Y. Hirashima (BPBM); 152 females, Sabah, Tawau, Quoin Hill, Cocoa Res. Stat., primary forest, 6 Sep.1962, 4 Dec.1962, Y. Hirashima (BPBM); 11 females, Sabah, Sandakan Bay, Sepilok F. Res., 1-10 m, 28,31 Oct.1957, J. L. Gressitt (BPBM); 2 females, Sabah, Sandakan Bay, Sapangaya Lumber Camp, 2-20 m, 2 Nov.1957, J. L. Gressitt (BPBM); 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ); 1 male 1 female, Sabah, Keningau, 400 m, 19 Nov.1995, M. Iwasa (OU); 1 female, Sabah, Poring, 500 m, 13 Nov.1995, M. Iwasa (OU).

Bionomics. - Nothing is known.

Distribution. - India (Kerala, Assam), Malaysia (Malaya, Borneo) and Indonesia (Sumatra).

***Stomorphina unicolor* (Macquart)**

Idia unicolor Macquart, 1851: 213 (240). Type locality: Java [Indonesia].

Stomorphina unicolor: James, 1977: 555.

Length: 4.8-5.6 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, SE. Pahang, Rompin Mining Co., Railway Track, 42 m, 26 Feb.1961, K. J. Kuncheria (BPBM); 10 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 18 females, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Unknown.

Distribution. - Malaysia (Malaya) and Indonesia (Java, Sumatra).

Stomorhina veterana Villeneuve

Stomorhina veterana Villeneuve, 1927: 395. Type locality: Chip-Chip, Formosa [Taiwan].
Stomorhina veterana: James, 1977: 555.

Length: 7.7 mm.

Specimens examined. - MALAYSIA (MALAYA): 7 males, Pahang, Cameron Highlands, Gunung Jasar, 15-27 Nov.1994, 25 Nov.1994, T. Pape (SMNH). MALAYSIA (BORNEO): 1 female, Sabah, Mt. Kinabalu, Paka Cave, 2,980 m, 25-28 Oct.1958, L. W. Quate (BPBM); 1 female, Sabah, Mt. Kinabalu, Kamaranga, 22-30 Oct.1958, L. W. Quate (BPBM); 1 male 35 females, Sabah, Mt. Kinabalu, 1,300-2,600 m, 6-7,9-11.Nov.1975, S. Shinonaga & H. Shima (NSMT); 1 female, Sabah, Mt. Kinabalu, Poring, 500 m, 8 Nov.1975, H. Shima (NSMT); 1 male 1 female, Sabah, Mt. Kinabalu, National Park, 2-5 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH); 1 female, Sabah, Ranau, 500-1,100 m, 9-10 Nov.1975, H. Shima (NSMT); 7 females, Sabah, Tenompok, 48 km E of Jesselton, 1,460 m, 17-21,20 Oct.1958, 26-31 Jan.1959, 10-14 Feb.1959, T. C. Maa & L. W. Quate (BPBM); 3 females, Sabah, Tenompok, 30 mi E of Jesselton, 1,400 m, 26-31 Jan.1959, 10-19 Feb.1959, T. C. Maa (BPBM).

Bionomics. - Nothing is known.

Distribution. - Taiwan, Malaysia (Malaya, Borneo) and Indonesia (Sumatra, Java).

Stomorhina xanthogaster (Wiedemann)

Idia xanthogaster Wiedemann, 1820: 21. Type locality: Java [Indonesia].
Idia australis Walker, 1849: 208. Type locality: Australia.
Idiellopsis similis Townsend, 1917: 190. Type locality: Dhikala, Naini Tal District, India.
Rhinia majuscula Villeneuve, 1932: 245. Type locality: Kosempo, Formosa [Taiwan].
Idiellopsis xanthogaster: James, 1977: 546.
Stomorhina xanthogaster: Kurahashi & Thapa, 1994: 250.

Length: 9.0-9.5 mm.

Bionomics. - Nothing is known.

Distribution. - Nepal, India (Assam, Bihar, Madhya Pradesh, Uttar Pradesh), Sri Lanka, Malaysia (Malaya), Taiwan, Indonesia (Java). Australasian and Oceanian Regions: Indonesia (Maluku), PNG (New Guinea, Bismarck Arch., Bougainville I.), Vanuatu, New Caledonia (NC, Loyalty Is.) and Australia (Northern Territory, Queensland).

Genus *Idiella* Brauer et Bergenstamm

Idiella Brauer et Bergenstamm, 1889: 154. Type species: *Idia mandarina* Wiedemann, 1830, orig. des.

KEY TO THE SPECIES OF *IDIELLA*

1. Basicosta black: occipital dilatation, mesopleuron and sternopleuron with distinct piliferous spots 2
- Basicosta brown; occipital dilatation, mesopleuron and sternopleuron without distinct piliferous spots 3
2. Tergite 1+2 without lateral bristle among yellow fine general vestiture; male hind tibia with fine long hairs on posteroventral surface, the length of hairs more than tibial diameter *I. divisa* (Walker)
- Tergite 1+2 with 1 to several black lateral bristles among yellow fine general vestiture; male hind tibia without fine long hairs on posteroventral surface, the tibial hairs not exceeding tibial diameter *I. euidielloides* Senior-White
3. Second antennal segment reddish; mid tibia with 2 *p* and a brush of hairs in male; male frons usually broader than the width of ocellar triangle *I. mandarina* (Wiedemann)
- Second antennal segment fuscous; mid tibia with 1 *p*, but without a brush of hairs on inner surface of apex in male; male frons variable in width *I. tripartia* (Bigot)

***Idiella divisa* (Walker)**

Idia divisa Walker, 1861: 267. Type locality: East India.

Idiella divisa: Inder Singh, Kurahashi & Kano, 1979: 13.

Idiella divisa: Kurahashi & Thapa, 1994: 231.

Length: 6.5-7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Perak, Maxwell Hill, 1,350 m, 17-20 Mar.1958, T. C. Maa (BPBM); 2 males 1 female, Selangor, Bukit Mandul, 20 km W Kuala Lumpur, 1 Nov.1975, H. Shima (NSMT); 1 male, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ); 2 males 2 females, Pahang, Romping R., Taman, 5-20 m, ex fresh human excrement, 19 Sep.1960, J. L. Gressitt (BPBM); 1 male, Pahang, Rompin Mining Co., railway track, 42 km, 24 Feb.1961, K. J. Kucheria (BPBM); 7 males 2 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 19 males 9 females, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 2 females, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH). MALAYSIA (BORNEO): 1 male, Sarawak, Lundu Dist., Kampong Pueh, 690-1,500 m, 6-12 Jun.1958, T. C. Maa (BPBM); 1 male, Sabah, Forest Camp, 19 km N of Kalabakan, 21 Oct.1962, Y. Hirashima (BPBM); 1 male, Sandakan Bay, Sepilok For. Res., 1-10 m, 26 Oct.1957, J. L. Gressitt (BPBM); 1 female, Ranaw, 500 m, 28 Sep.-7 Oct.1958, T. C. Maa (BPBM); 1 female, Sabah, Kinabalu N. P., 1,500 m, 16 Nov.1995, M. Iwasa (OU).

Bionomics. - Adults are commonly found in the tropical rain forests and are attracted to decaying meat and fresh excrements.

Distribution. - Nepal, India, Thailand, Viet Nam, S. China, Malaysia (Malaya, Borneo) and Indonesia (Sulawesi).

Idiella euidielloides Senior-White

- Idiella euidielloides* Senior-White, 1923: 166. Type locality: Shillong, Assam, India.
Idiella nigritiba Malloch, 1926: 509. Type locality: Pahang, Malaya [Malaysia].
Idiella pilitibia Malloch, 1926: 508. Type locality: Tjibodas, Java [Indonesia].
Idiella pleurofoveolata Villeneuve, 1927: 395. Type locality: Kanshirei, Koshun, Tainan, and Chip-Chip, Formosa [Taiwan].
Idia divisa Walker, 1861: 267 (in part, Peris, 1952: 51).
Stomorhina euidielloides: Senior-White, Aubertin & Smart, 1940: 545.
Idiella euidielloides: James, 1977: 545.

Length: 5.0-7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Genting Highlands, 1,700 m, 20-21 Apr.1979, H. Kurahashi (NIHJ); 3 females, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 2 females, Pahang, Bukit Fraser (Fraser's Hill), 22 Feb.1991, 10-11 Nov.1994, RMexped, Gustafsson, Heinakroon & Pape (SMNH); 1 female, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH). MALAYSIA (BORNEO): 1 female, Sarawak, Kapit Dist., Merirai V., 30-300 m, 1-6 Aug.1958 (BPBM); 1 female, Mt. Kinabalu, Kambaranja, 2,140 m, ex. human excrement, 22-30 Oct.1958, T. C. Maa (BPBM); 2 females, Sabah, Tenompok, 10-14 Feb.1959, T. C. Maa (BPBM); 3 females, Forest Camp, 19 km N of Kalabakan, 11 Oct.1962, Y. Hirashima (BPBM); 1 female, Sabah, Forest Camp, 9.8 km SW of Tenom, 19 Dec.1962, Y. Hirashima (BPBM); 1 female, Sabah, Papar, 18 Aug.1969, A. Tanaka (MNHA); 1 male 3 females, Sabah, Mt. Kinabalu, 1,300 m, 9-11 Nov.1975, S. Shinonaga & H. Shima (NSMT); 2 females, Sabah, Mt. Kinabalu, 1,300-2,600 m, 6-7 Nov.1975, S. Shinonaga (NSMT); 3 females, Sabah, Mt. Kinabalu, Poring, 500 m, 8 Nov.1975, S. Shinonaga (NSMT); 3 females, Sabah, Poring, 700 m, 29-30 May.1979, H. Kurahashi (NIHJ); 4 females, Sabah, Mt. Kinabalu, P. Head Q., 1,600 m, 1-2 May.1979, H. Kurahashi (NIHJ); 1 male, Keningau, 350 m, ex. human feces, 18-19 Nov.1995, T. Hayashi (NIHJ); 1 male 6 females, Sabah, 10 km N of Ranau, 700 m, 15 Nov.1995, M. Iwasa (OU); 14 females, Sabah, Kinabalu N. P., 1,500 m, 16 Nov.1995, M. Iwasa (OU); 3 females, Sabah, Poring, 500 m, 13 Nov.1995, M. Iwasa (OU); 4 females, Sabah, Keningau, 400 m, 19 Nov.1995, M. Iwasa (OU); 2 males 1 female, Sabah, Mt. Kinabalu, National Park, 2-5 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH).

Bionomics. - Adults are attracted to flowering trees (Senior-White et al., 1940).

Distribution. - Sri Lanka, India (Assam), Thailand, Taiwan, Malaysia (Malaya, Borneo), Indonesia (Java) and Philippines (Palawan).

Idiella mandarina (Wiedemann)

- Idia mandarina* Wiedemann, 1830: 350. Type locality: China.
Idia bengalensis Robineau-Desvoidy, 1830: 421. Type locality: Bengal [Bangladesh].
Idia nigricauda Bigot, 1874: 237. Type locality: Burma [Myanmar].
Idia tricolor Bigot, 1874: 236. Type locality: Unknown.
Stomorhina bivittata Bigot, 1887: 592. Type locality: "Hindustan" [India].
Idiella floccosa Villeneuve, 1927: 395. Type locality: Kanshirei, Suikenkayaku, Tainan, Takao, Polisha, Kosempo and Chip-Chip, Formosa [Taiwan].
Idiella mandarina: James, 1977: 546.

Length: 7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - Sri Lanka, India, Myanmar, Taiwan, S. China, Thailand, Malaysia (Borneo, Malaya), Indonesia (Sumatra, Timor) and PNG.

TRIBE COSMIINI

Genus *Cosmina* Robineau-Desvoidy

Cosmina Robineau-Desvoidy, 1830: 423. Type species: *Cosmina fuscipennis* Robineau-Desvoidy, 1830, des. by Brauer & Bergenstamm, 1889: 153.

Synamphoneura Bigot, 1886: 14. Type species: *Synamphoneura cuprina* Bigot, 1886, mon. (= *Idia limbipennis* Macquart, 1848).

Idiopsis Brauer et Bergenstamm, 1889: 153. Type species: *Idiopsis prasina* Brauer et Bergenstamm, 1889, orig. des.

Synamphoneuropsis Townsend, 1817: 199. Type species: *Synamphoneuropsis viridis* Townsend, 1917, orig. des.

KEY TO THE SPECIES OF *COSMINA*

1. Palpus yellowish brown at least on basal 1/3; mesopleuron with yellow fine hairs along posterior margin; tibia reddish brown 2
- Palpus entirely black; mesopleuron with black fine hairs along posterior margin; femur and tibia blackish *C. biplumosa* (Senior-White)

2. Epaulet reddish brown; propleuron hairy 3
- Epaulet black; propleuron bare in center *C. limbipennis* (Macquart)

3. Male eyes separated by more than diameter of anterior ocellus; mid tibia with 1 *v* in male; hind tibia with 2 *av* in male [No record (?) from Malaysia and Singapore] .. *C. simplex* (Walker)
- Male eyes closely approximated, separated by less than the width of anterior ocellus; mid tibia without *v* in male; hind tibia without *av* in male *C. bicolor* (Walker)

Cosmina bicolor (Walker)

Idia bicolor Walker, 1856: 23. Type locality: Malacca [?Malaysia].

Cosmina pinangiana Bigot, 1874: 241. Type locality: Paolo, Pinang, Java [Indonesia].

Cosmina coomani Séguy, 1946: 88. Type locality: Hoa Bin, Viet Nam [Synonymy with a query].

Cosmina bicolor: Senior-White, Aubertin & Smart, 1940: 173.

Cosmina bicolor: James, 1977: 544.

Cosmina bicolor: Inder Singh, Kurahashi & Kano, 1979: 12.

Length: 6.5-8.9 mm.

Specimens examined. - MALAYSIA (MALAYA): 4 males 2 females, Pahang, King Geo. V Nat. Park, Kuala Trangen, 15,17 Dec.1958, T. C. Maa (BPBM); 1 male 3 females, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ); 2 males, Perak, Sungkai, 136 km N of Kuala Lumpur, 20 m, 14 Mar.1990, H. Kurahashi (NIHJ); 12 males 11 females, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - Nothing is known.

Distribution. - India, Myanmar, Thailand, Viet Nam, Malaysia (Malaya) and Indonesia (Sumatra, Java).

Cosmina biplumosa (Senior-White)

- Stomorphina biplumosa* Senior-White, 1924: 110. Type locality: Doi Chum Chang, nr. Chengmai(=Chiangmai), N. Siam [Thailand].
Cosmina nigrocoerulea Malloch, 1926: 519. Type locality: Kuala Tahan, Pahang, Malaya [Malaysia].
Cosmina biplumosa: Senior-White, Aubertin & Smart, 1940: 175.
Cosmina biplumosa: Kurahashi, 1971: 3.
Cosmina biplumosa: James, 1977: 544.

Length: 9.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 3 males 2 females, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - Nothing is known.

Distribution. - Thailand, Malaysia (Malaya) and Indonesia (Sumatra).

Cosmina limbipennis (Macquart)

- Idia limbipennis* Macquart, 1848: 214. Type locality: Java [Indonesia].
Synamphoneura cuprina Bigot, 1886: 14. Type locality: Java [Indonesia].
Cosmina confusa Malloch, 1929: 339. Type locality: Langkawi Island, W. Coast, Malaya [Malaysia].
Cosmina confusa: Senior-White, Aubertin & Smart, 1940: 175.
Cosmina limbipennis: James, 1977: 545.
Cosmina limbipennis: Inder Singh, Kurahashi & Kano, 1979: 12.

Length: 5.0-6.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 3 females, Kuala Trengganu, King Geo. V. Nat. Park, 15, 17 Dec.1958, J. L. Gressitt & T. C. Maa (BPBM).

Bionomics. - Adults are collected by sweeping grass along forest margin.

Distribution. - India, Malaysia (Malaya) and Indonesia (Java, Bali).

?*Cosmina simplex* (Walker)

- Idia simplex* Walker, 1858: 212. Type locality: Hindustan [India].
Cosmina simplex: James, 1977: 545, error.

James's record of *C. simplex* from Malaysia and Indonesia seems to be erroneous because this species apparently is indigenous to the Indian subcontinent and Sri Lanka.

Length: 7.0-7.5 mm.

Bionomics. - Adults are found on flowering grasses in India.

Distribution. - India, Sri Lanka, ?Malaysia (Malaya) and ?Indonesia (Sumatra).

Genus *Borbororhinia* Townsend

Borbororhinia Townsend, 1917: 188. Type species: *Borbororhinia pubescens* Townsend, 1917, orig. des.(= *Idia bivittata* Walker, 1856).

KEY TO THE SPECIES OF *BORBORORHINIA*

1. Mesonotum testaceous, more or less fuscous brown; notopleuron wholly fuscous brown; sternopleuron and hypopleuron testaceous in male; frons index 0.26-0.29 in female *B. bivittata* (Walker)
- Mesonotum blackish; lower half of notopleuron yellow, concolorous with mesopleuron; sternopleuron and hypopleuron largely fuscous in male; frons index 0.22-0.26 in female *B. nigridorsum*, new species

***Borbororhinia bivittata* (Walker)**

Idia bivittata Walker, 1856: 128. Type locality: Sarawak, Borneo [Malaysia].

Borbororhinia pubescens Townsend, 1917: 188. Type locality: Param-bikulam, Cochin, India.

Alikangia pulchella Villeneuve, 1927: 390. Type locality: Alikang and Toyenmongai, Formosa [Taiwan].

Borbororhinia bivittata: Senior-White, Aubertin & Smart, 1940: 187.

Borbororhinia bivittata: James, 1977: 544.

Borbororhinia bivittata: Inder Singh, Kurahashi & Kano, 1979: 13.

Length: 5.5-7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ); 11 males 3 females, Pahang, Rompin Mining Co., 42 km, railway track, 24,26 Feb.1961, 7 Apr.1961, 24 Nov.1961, K. J. Kuncheria (BPBM); 1 female, Pahang, Romping R., Taman, 5-20 m, 19 Sep.1960, J. L. Gressitt (BPBM); 17 males 9 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 female, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 3 males 1 female, Sarawak, Kapit Dist., Merirai V., 30-300 m, 1-6 Aug.1958, T. C. Maa (BPBM); 1 male, Sarawak, Sadong, Kampong Tapuh, 300-450 m, 10 Jul.1958, T. C. Maa (BPBM); 1 male, Sarawak, Bau Dist., Pangkalan Tebang, 300-450 m, 7 Sep.1958, T. C. Maa (BPBM); 1 male 2 females, Sarawak, Nanga Pelagus nr Kapit, 180-585 m, 7-14 Aug.1958, T. C. Maa (BPBM); 6 males 3 females, Sarawak, Gunong Matang, 120 m, 13 Sep.1958, J. L. Gressitt (BPBM); 14 males 11 females, Sarawak, Balai Ringgin, 100 km N Kuching, 22-24 Nov.1975, S. Shinonaga & H. Shima (NSMT); 2 males, Sarawak, Semongok, 20 km S Kuching, 18,21 Nov.1975, S. Shinonaga & H. Shima (NSMT); 5 males, Sabah, Sandakan Bay, Sepilok For. Res., 1-10 m, 26,28,30,31 Oct.1957, J. L. Gressitt (BPBM); 3 males 3 females, Sabah, Sandakan Bay, Sapagaya Lumber Camp, 2-20 m, 2 Nov.1957, J. L. Gressitt (BPBM); 1 female, Sabah, W. Coast Residency, Ranau, 500 m, 22-25 Jan.1959, T. C. Maa (BPBM); 1 female, Sabah, Tawau, Quoin Hill, 15-20 Jul.1962, H. Holtmann (BPBM); 1 female, Sabah, Tawau Dist., Kalabakan, primary forest, attracted to decaying fish, 8-15 Nov.1958, T. C. Maa (BPBM); 1 male 2 females, Sabah, Ranau, 500-1,100 m, 9-10 Nov.1975, S. Shinonaga (NSMT); 3 males 3 females, Mamut Copper Mine, nr Ranau, 600 m, ex. human feces, 15 Nov.1995, T. Hayashi (NIHJ); 3 males 3 females, Sabah, 10 km N of Ranau, 700 m, 15 Nov.1995, M. Iwasa (OU); 3 females, Sabah, Paper, 50 km SW Kota Kinabalu, 13-15 Nov.1975, S. Shinonaga (NSMT); 1 female, Sabah, Semporna City, 8 Aug.1967, S. Hayashida (NSMT); 11 males 7 females, Sarawak, Balai Ringgin, 100 km N Kuching, 22-24 Nov.1975, S. Shinonaga (NSMT); 1 male, Sarawak, Semongok, 20 km S Kuching, 18 Nov.1975, 21 Nov.1975, S. Shinonaga (NSMT); 1 male 1 female, Sabah, Paper, 5 km SW Kota Kinabalu, 13-15 Nov.1975, S. Shinonaga (NSMT); 2 males 3 females, Sabah, Forest Camp, 19 km N of Kalabakan, 17,21,24 Oct.1962, 19 Nov.1962, Y. Hirashima (BPBM); 1 female, Sabah, Forest Camp, 9.8 km SW of Tenom, 19 Dec.1962, Y. Hirashima (BPBM); 2 males 3 females, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - In Sri Lanka and the various hills of southern India, the species can be obtained in quantity at any time by cutting into the nest of any of the mound-building termites. In the previous records the genus *Eutermes* is specially mentioned. Otherwise it is only obtained as a great rarity at flowers. When opening a termitarium males are chiefly attracted, but with them come a few females, which are quickly seized by the males. They fly readily in cop. The species is oviparous, the eggs white and large for the size of the fly, hatching in 24 hours, indicating considerable embryonic development prior to oviposition. The larvae have not been induced to feed, and no trace of larvae or puparia have been found in the fungus combs or galleries of the termites. After a few hours the exposed combs and fresh-cut earth cease to attract flies, but if a further fresh layer of the termitarium be exposed by further digging flies appear again in quantity (Senior-White et al. 1940).

Distribution. - India (Assam, Kerala), Sri Lanka, Thailand, Laos, S. China, Taiwan, Philippines (Mindoro, Palawan, Tawi Tawi), Malaysia (Malaya, Borneo) and Indonesia (Java, Buru I.).

***Borbororhinia nigradorsum*, new species**

(Fig. 8)

Material examined. - Holotype male, MALAYSIA (BORNEO): Sarawak, Balai Ringgin, 100 km N of Kuching, 22-24 Nov.1975, S. Shinonaga.

Paratypes. MALAYSIA (BORNEO): 3 males 7 females, same data as holotype.

Type depository. Holotype male and 1 male 1 female paratypes are deposited in the Reference Museum, Department of Medical Entomology, The National Institute of Health, Tokyo (NIHJ). Paratypes also in NSMT (1 male 4 females), BPBM (1 male 1 female) and BMNH (1 female).

Description. - Male. - Head: eyes bare, subholoptic, separated at narrowest point by slightly more than the width of ocellar triangle; frons index 0.08-0.10; frontal stripe reddish brown, darkened toward vertex, widened anteriorly and posteriorly, slightly more than 1.5 X the width of anterior ocellus; parafrothalia narrow, fuscous brown, subshining, bare, snowy-white dusted in part, provided with ca 6 pairs of *ori*; parafacialia brown, snowy-white dusted above, black shining below; face yellowish brown, transparent in median and upper parts, black shining on lateral sides on lower half, without median carina; facialia black shining, with a few minute setulae just above vibrissa; mediana narrow, black shining, bare; vibrissaria vestigial, black shining; vibrissa well developed; epistome black shining except for median yellowish brown portion, projecting forward; gena black shining, with black hairs anteriorly, yellow, yellow-dusted, clothed with yellow hairs on posterior 1/2; postgena and lower 1/2 of occiput concolours with posterior 1/2 of gena, clothed with yellow hairs, central part of occiput also with yellow hairs; occiput with broad black shining submarginal band; 2nd antennal segment reddish brown, with black setulae and 1 bristle; 3rd antennal segment largely reddish brown on ventral and basal portions, fuscous on dorsal surface, about 4 X as long as 2nd; arista brown, yellowish on basal 1/3, long plumose; palpus fuscous, brownish on apical margins.

Thorax: yellow except for blackish dorsum and anterior surface of sternopluron; black dorsum with two broad silver grey stripes, inner margin of humerus silver-grey dusted; hypopluron, suprspiracular convexity and pleurotergite blackish in part; humerus largely yellow except for dorsal surface black, yellowish haired, black portion and posterior margin

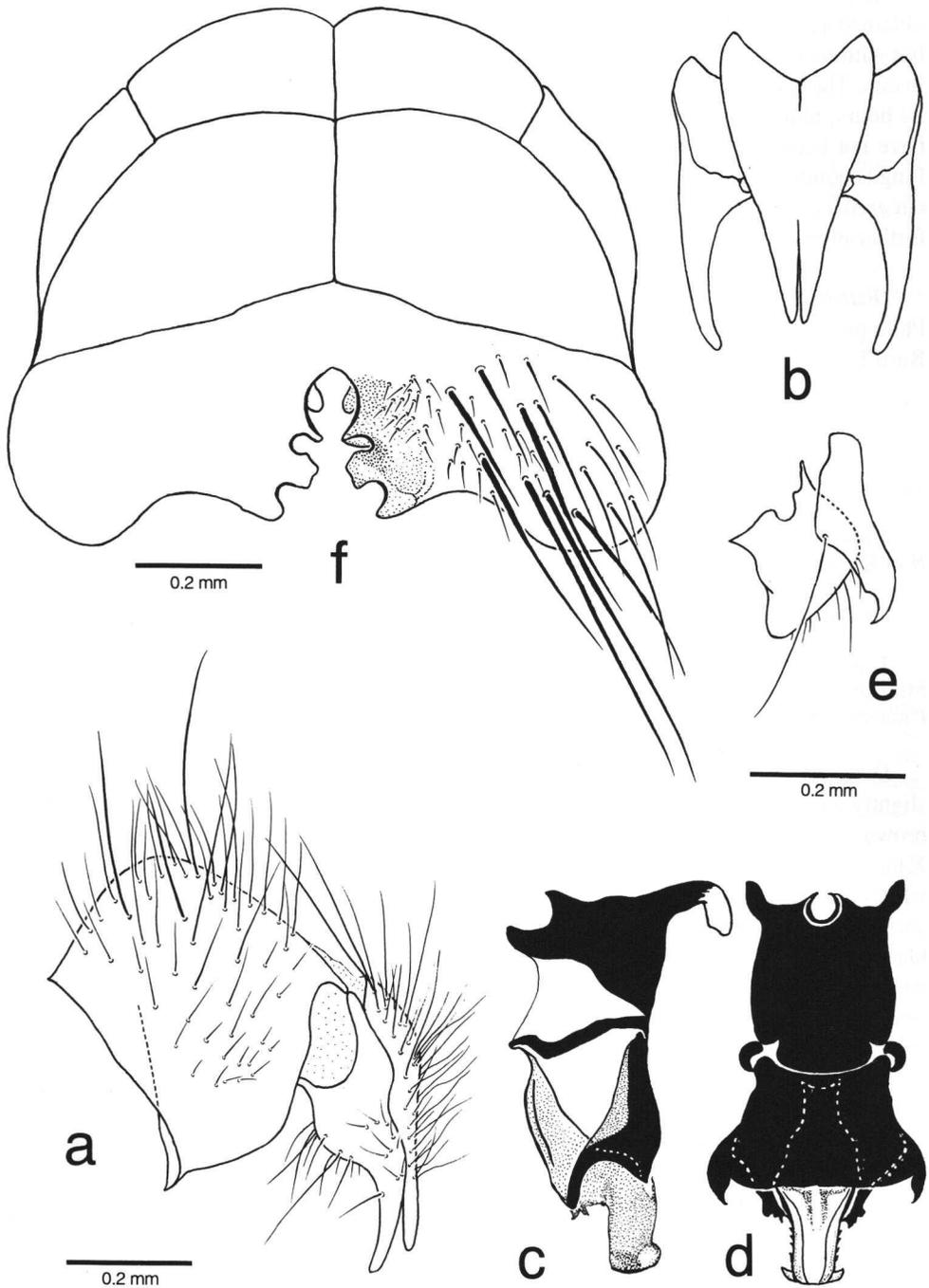


Fig. 8. *Borbororhinia nigradorsum*, new species, male genitalia. a, epiandrium, cercus and parolobus, lateral view; b, cerci and paralobi, caudal view; c, aedeagus, lateral view; d, aedeagus, posterior view; e, anterior and posterior parameres, lateral view; f, sternite 5, ventral view.

of yellow portion with black hairs; postalar callus fuscous, with a few black hairs; scutellum concolorous with thoracic dorsum; prosternum yellow-haired; propleuron bare; supraspiracular convexity yellowish pubescent; hypopleural hairs yellow, sparsely present along margin; mesopleuron clothed with fuscous hairs on upper and posterior parts; sternopleuron clothed with black hairs on black portion; pleural hairs on yellow portion mainly yellow; mesothoracic and metathoracic spiracles yellow; postalar declivity bare; tympanic tuft absent; anterior parasquamal tuft absent. Chaetotaxy: *ac* 0+1, as prescutellars; *dc* 1+2; *ia* 1+1; *h* 1; *ph* 1, no external *ph*, 1 additional *ph* present on pale portion inner *ph* region of anterior extremity of prescutum; *prs* 1; *sa* 2; *pa* 2; *st* 1+1; *sc* 3+2, submarginal ones fine; *n* 2; *pp* 1; *pst* 0.

Wings: brownish hyaline, more brownish tinged along costal margin; veins brown; epaulet yellow; basicosta blackish; subcostal sclerite yellowish brown, brownish pubescent; node of 2nd and 3rd longitudinal veins (R_{2+3} and R_{4+5}) with a few black setulae; 4th longitudinal vein (M) gently curved; section of M from bend to wing margin inflexed on apical 2/3; R_5 open; squamae brownish, thoracic one not lobulated, bare on upper surface. Halteres yellow.

Legs: testaceous except for fuscous hind tibia, apical 3-4 tarsal segments darkened; fore tibia with fine 1 *ad*; mid tibia with 1 *ad*, 1 *pd* and 1 *p*, without *v*; hind tibia with 2 *ad*, 2 *pd* and 1 *av*.

Abdomen: black shining on disc of tergites 1+2-5, lateral and ventral sides of tergites yellowish brown, largely clothed with black hairs; lateral sides of tergite 1+2-3 clothed with yellow hairs; tergites 1+2 with 3 bristles on lateral sides, also with a row of fine marginal bristles; tergites 3-4 with a row of decumbent marginal bristles; tergite 5 with a row of erect marginal bristles; hairs on sternites 1-3 and lateral sides of tergites 1+2-3 yellow. Hypopygium rather prominent, tergite 6 fuscous, GS_1 yellowish brown; epandrium (GS_2) black shining. Male genitalia as shown in Fig. 8.

Female.-Head: eyes bare, dichoptic, separated at vertex by a distance equal to 0.24-0.26 of head width; frontal stripe reddish orange to reddish brown, parallel-sided, slightly narrowed posteriorly, 3.0 X the width of 1 of parafrontalia just in front of anterior ocellus; parafrontalia black shining, with snowy white dusted spot on anterior 1/4-2/4, provided with 8 pairs of *ori*; *ors* 1+1; *oc* developed; *acoc* weak; *pooc* not developed; *ov* and *iv* well developed; *poc* divergent; *occ* absent.

Thorax: reddish brown medially between silver grey stripes; mesopleuron largely clothed with yellow hairs except for several black ones.

Legs: mid tibia with 1 *v*; hind tibia with 1 *ad*, 1 *pd*, 0-1 *p* and 1-2 *av*.

Abdomen: compressed vertically, flat; abdominal bristles more fine and decumbent than those of male; ventral margin of tergite 3 with yellow hairs anteriorly; sternites 3-4 clothed with yellow hairs. Ovipositor moderate in length. Otherwise same as for male.

Length: 7.0-8.5 mm.

Etymology. - The specific name is derived from the black colouration of thoracic dorsum.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Borneo: Sarawak).

Genus *Sumatria* Malloch

Sumatria Malloch, 1926: 512. Type species: *Sumatria latifrons* Malloch, 1926, orig. des.
Alikangiella Villeneuve, 1927: 389. Type species: *Alikangiella flava* Villeneuve, 1927, mon.

KEY TO THE SPECIES OF *SUMATRIA*

1. Arista shortly pilose on ventral side; femur predominantly brownish 2
- Arista distinctly and symmetrically plumose, hairs equi-long on both dorsal and ventral sides; femur predominantly testaceous 3

2. Humerus, propleuron, prosternum and parts around mesothoracic spiracle testaceous; two broad longitudinal stripes of bluish grey pruinosity present on dorsum; femur brownish black
..... *S. vittigera* (Malloch)
- Thorax wholly brownish black: pruinose stripes limited to pronotum and gradually disappearing; femur partly testaceous *S. latifrons*

3. Thorax wholly testaceous reddish without fuscous stripes; abdomen concolorous with thorax except for the last segments darkened *S. rufithorax* (Malloch)
- Thoracic dorsum brownish with three dark longitudinal stripes which are separated by silver-grey dusted areas more distinct on scutum; abdomen with only tergite 1+2 testaceous, other tergites at least dorsally darkened *S. chiekoae* Kurahashi et Tumrasvin

**Sumatria chiekoae* Kurahashi et Tumrasvin

Sumatria chiekoae Kurahashi et Tumrasvin, 1992: 42. Type locality: Doi Inthanon, Thailand.

Length: 4.5-6.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 5 females, Cameron Highlands, Robinson Fall, 600 m, 25 Oct.1991, R. Kano (NIHJ); 2 females, Cameron Highlands, Tanah Rata, 1,300 m, 25 Oct.1991, R. Kano (NIHJ); 1 male 7 females, Cameron Highlands, Mt. Jasar, 2,100 m, 26 Oct.1991, R. Kano & K. Inder Singh (NIHJ); 1 female, Pahang, Bukit Fraser (Fraser's Hill), 10-11 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH).

Bionomics. - Adults are attracted to decaying meat in native forests.

Distribution. - Thailand and *Malaysia (Malaya).

Sumatria latifrons Malloch

Sumatria latifrons Malloch, 1926: 512. Type locality: Sumatra [Indonesia].
Sumatria latifrons: Senior-White, Aubertin & Smart, 1940: 186.
Sumatria latifrons: James, 1977: 556.

Length: 4.0-4.5 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 male, Sabah, Tenompok, 15 Feb.1959, T. C. Maa (BPBM); 2 females, Sabah, Mt. Kinabalu, 1,300 m, 6-7,11 Nov.1975, S. Shinonaga (NSMT).

Bionomics. - Adults are attracted to decaying animal matter in mountainous areas.

Distribution. - Malaysia (Borneo, Malaya) and Indonesia (Sumatra).

Sumatria rufithorax (Malloch)

Eucosmina rufithorax Malloch, 1935: 236. Type locality: Kamboangah Pass, Mount Kinabalu, British N. Borneo [Malaysia].

Alikangiella rufithorax: Senior-White, Aubertin & Smart, 1940: 178.

Sumatria rufithorax: Peris, 1952: 123.

Alikangiella rufithorax: James, 1977: 543.

Length: 5.5-6.0 mm.

Specimens examined. - MALAYSIA (BORNEO): 4 males 4 females, Sabah, Mt. Kinabalu, 1,300-2,600 m, 6-7 Nov.1975, 9-10 Nov.1975, S. Shinonaga & H. Shima (NSMT); 1 male 8 females, Sabah, Kinabalu N. P., 1,500 m, 14,16 Nov.1995, M. Iwasa (OU).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Borneo: Sabah).

Sumatria vittigera (Malloch)

Eucosmina vittigera Malloch, 1928: 493. Type locality: Bukit Kutu, Selangor, Malaya [Malaysia].

Stomorphina fulvohumera Senior-White, Aubertin & Smart, 1940: 195. Type locality: Mount Dulit, Sarawak, Borneo [Malaysia].

Alikangiella vittigera: Senior-White, Aubertin & Smart, 1940: 177.

Sumatria vittigera: Peris, 1952: 123.

Alikangiella vittigera: James, 1977: 543.

Length: 6.0 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 female, Sabah, Ranau, 500 m, 8-18 Oct.1958, T. C. Maa (BPBM); 1 female, Sabah, Mt. Kinabalu, 1,300 m, 11 Nov.1975, S. Shinonaga (NSMT); 1 female, Sabah, Bundu Tukan, 18 Feb.1959, T. C. Maa (BPBM); 1 female, Sabah, Tenompok, 30 mi E Jesselton, 1,460 m, 17-21 Oct.1958, L. W. Quate (BPBM).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo: Sabah).

Genus *Malayomyza* Malloch

Malayomyza Malloch, 1928: 491. Type species: *Malayomyza humeralis* Malloch, 1928, orig. des.

***Malayomyza humeralis* Malloch**

Malayomyza humeralis Malloch, 1928: 492. Type locality: Gombak Valley, Kuala Lumpur, Selangor, Malaya [Malaysia].

Malayomyza humeralis: Senior-White, Aubertin & Smart, 1940: 169.

Malayomyza humeralis: James, 1977: 551.

Length: 3.5-4.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 6 males 24 females, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 3 females, Pahang, Fraser's Hill, Jerian W. Fall, 18-20 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 1 male, Sabah, Tawau, Quoin Hill, light trap, 3-7 Jul.1962, H. Holtmann (BPBM); 1 female, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo: Sabah).

Genus *Isomyia* Walker

Musca, subg. *Isomyia* Walker, 1860: 134. Type species: *Musca delectans* Walker, 1860, mon.

Thelychaeta Brauer et Bergenstamm, 1891: 390. Type species: *Thelychaeta chalybea* Brauer et Bergenstamm, 1891, mon., orig. des. (= *Musca viridaurea* Wiedemann, 1819).

Apollonia Bezzi, 1911: 79. Type species: *Pollenia nudiuscula* Bigot, 1888, sensu Bezzi, nec. Bigot, orig. des. (= *Curtonevra tristis* Bigot, 1888).

Strongyloneuropsis Townsend, 1927: 376. Type species: *Strongyloneuropsis malayensis* Townsend, 1927, orig. des.

Pachycosmina Séguy, 1934: 18. Type species: *Pachycosmina oestracea* Séguy, 1934, orig. des.

Isomyia (*Thelychaetopsis*) Séguy, 1949: 140. Type species: *Strongyloneura pseudolucilia* Malloch, 1928, orig. des.

Strongyloneura authors, nec. Bigot.

KEY TO THE SPECIES OF *ISOMYIA*

1. Subcostal sclerite next to humeral cross vein setulose below 20
- Subcostal sclerite next to humeral cross vein bare below (*I. chalconotum* excepted) 2
2. Thoracic squama strongly lobulate (weakly developed in *I. chrysoidea* excepted, its longitudinal diameter subequal to the transverse); body very stout 3
- Thoracic squama generally not lobulated and not reaching the base of scutellum, its longitudinal diameter longer than the transverse; body usually slender 16
3. Lunule with several short black setulae; tergite 5 green dorsally, with dense, ashy dusting, which, at least in posterior view, largely conceals the ground colour, preceding tergites dark blue to purple and almost devoid of conspicuous dusting *I. chalconotum* James
- Lunule bare of setulae; tergite 5, if densely dusted, not contrasting with preceding tergites either in dusting or in colouration; colour predominantly green or blue 4
4. Mesopleural hairs and hairs of other pleural areas as well, soft and yellow to golden, except for usual black setulae just below notopleural suture; mesothoracic spiracle yellow 5
- Mesopleural hairs more extensively black than indicated above, with some soft black hairs on mesopleuron, sometimes remote from notopleural suture, and on sternopleuron 8

5. Basicosta bright yellow; epaulet yellowish 6
- Basicosta black; epaulet black 7

6. Thoracic squama not lobulate; upper facets of male eyes strikingly enlarged; abdominal dusting usually not visible except from posterior view *I. chrysoides* (Walker)
- Thoracic squama lobulate; upper facets of male eyes only slightly larger than lower ones, not demarcated; pleura and abdomen densely dusted in male, less so in female, but dorsal parts of tergite 5, when viewed laterally at an angle, with a tessellated pattern of dusting which in the proper light, obscures, or virtually obscures; black bristles of lateral slopes of tergite 1+2 surrounded, at least on three sides, by pale hairs *I. viridaurea* (Wiedemann)

7. Tergites 3-4 without marginal band; wing hyaline, sometimes slightly infuscated apically in female; parafrontalia in female subequal to frontal stripe at middle of frons; hind tibia without *av* in male *I. electa* (Villeneuve)
- Tergites 3-4 distinctly marginal banded and with median stripe in male, broadly metallic banded with copper tinge in female; wing hyaline in male, with a distinct fuscous cloud apically in female; parafrontalia in female about 1/2 as wide as frontal stripe at middle of frons; hind tibia with 1 *av* in male *I. borneensis* James

8. Four strong lateral scutellar bristles, the last three spaced at closer intervals than the basal one 9
- Three strong lateral scutellars, spaced at approximately equal intervals 11

9. Both alar and thoracic squamae pale yellow; posterior mesopleural fringe yellow; some hairs on notopleuron, lower part of mesopleuron, and part of sternopleuron yellow to yellowish brown *I. pseudolucilia* (Malloch)
- At least thoracic squama mostly brown; hairs of notopleuron and of pleura wholly black or dark brown 10

10. Gena, parafrontalia and parafacialia black; lower part of parafacialia and part of gena devoid of dusting, and shining; squamae whitish on basal part *I. ceballosi* (Peris)
- Gena golden to brownish yellow; gena and parafacialia wholly dusted; squamae entirely brown to blackish brown; lunule submetallic anteriorly; dusting of parafrontalia and parafacialia not uniformly coloured, cinereous to brownish *I. perisi* James

11. Pleura with extensive yellow hairs, at least around stigmatal and propleural bristles and on part of sternopleuron; posterior mesopleural fringe golden 12
- Pleural hairs entirely black or virtually so; posterior mesopleural fringe brown to black 14

12. Mesothoracic spiracle entirely bright yellow to golden 13
- Mesothoracic spiracle dark brown to black *I. delectans* (Walker)

13. Tergites 3-4 without marginal band; wings hyaline, sometimes slightly infuscated apically in female; parafrontalia in female subequal to frontal stripe at middle of frons; hind tibia without *av* in male *I. electa* (Villeneuve)
- Tergites 3-4 with distinct marginal bands and with median stripe in male, broadly metallic banded with copper tinge in female; wing hyaline in male, with a distinct fuscous cloud apically in female; parafrontalia in female about 1/2 as wide as frontal stripe at middle of frons; hind tibia with 1 *av* in male *I. borneensis* James

14. Alar and thoracic squamae wholly dark brown to black *I. oestracea* (Séguy)
- Alar and thoracic squamae white, at least at base 15

15. Alar squama, in both sexes, white on basal half or more; thoracic squama white at base; larger species, 10.0-11.0 mm in length *I. pictifacies* (Bigot)
- Alar and thoracic squamae wholly white in female, alar one white only anteroventrally in male; smaller species, 7.0-9.0 mm in length [No record from Singapore and Malaysia] *I. facialis* James

16. Basicosta yellow; male sternite 5 with normal shaped lobes
 *I. pseudonepalana* (Senior-White, Aubertin et Smart)
 - Basocosta fuscous to black 17
17. Mesopleuron entirely or largely covered with black hairs except for several yellow ones on lower margin 18
 - Mesopleuron largely clothed with yellow hairs on lower 1/3 to 1/2 and along posterior margin before a row of yellow pilosity 19
18. Mesopleuron entirely covered with black hairs, with a row of long black pilose hairs along posterior margin [No record from Singapore and Malaysia] *I. pseudoviridana* Peris
 - Mesopleuron clothed with yellow hairs on lower small part, with a row of yellow pilosity. [No record from Singapore and Malaysia] *I. versicolor* (Bigot)
19. Parafacialia in profile narrower than the width of 3rd antennal segment width; parafacial setulae fine, white, shorter than the width of 3rd antennal segment *I. fulvicornis* (Bigot)
 - Parafacialia in profile 1.5-2.0 X as the width of 3rd antennal segment; parafacial setulae usually black, if partially white, the longest ones exceeding the width of 3rd antennal segment
 *I. hetauda* Kurahashi
20. Thorax rather densely dusted with three broad black stripes *I. malayensis* (Townsend)
 - Thorax inconspicuously dusted, with indistinct dark spots, but no stripes 21
21. Thoracic squama lobulate inwards; setulae of the subcostal sclerite white below, very fine; mesopleural and pteropleural hairs yellow *I. cupreoviridis* (Malloch)
 - Thoracic squama not lobulate; setulae of the subcostal sclerite below black; mesopleural and pteropleural hairs black to fuscous *I. dotata* (Walker)

***Isomyia borneensis* (Peris)**

Thelychaeta borneensis Peris, 1951: 247. Type locality: Mount Dulit, Sarawak, Borneo [Malaysia].

Isomyia borneensis: James, 1970: 13.

Isomyia borneensis: James, 1977: 547.

Isomyia electa: Inder Singh, Kurahashi & Kano, 1979: 13, misid.

Isomyia electa: Kurahashi & Thapa, 1994: 233, misid.

Length: 10.0-11.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 female, Pahang, Fraser's Hill "Corona", 1,200 m, light, 6 Apr.1992, Gustafsson, Hippa & Sellerholm (SMNH). MALAYSIA (BORNEO): 1 male, Sarawak, Kuala Bok, 2 Mar.1969, Y. Arita (NIHJ).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo: Sarawak) and Indonesia (Sumatra).

***Isomyia ceballosi* (Peris)**

Thelychaeta ceballosi Peris, 1951: 246. Type locality: Mount Dulit, Sarawak, Borneo [Malaysia].

Thelychaeta ceballosi: Peris, 1952: 161,

Isomyia ceballosi: James, 1970: 9.

Isomyia ceballosi: James, 1977: 547.

Length: 11.0-14.0 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 female, Sarawak, Bau Dist., Pangkalan Tebang, 300-450 m, 5-8 Sep.1958, T. C. Maa (BPBM).

Bionomics. - Nothing is known.

Distribution. - Myanmar and Malaysia (Borneo: Sarawak).

***Isomyia chalconotum* James**

Isomyia chalconotum James, 1970: 4. Type locality: Fraser's Hill, Pahang, Malaya [Malaysia].
Isomyia chalconotum: James, 1977: 547.

Length: 12.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 22 males, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya).

***Isomyia chrysoides* (Walker)**

Musca chrysoides Walker, 1856: 23. Type locality: Malacca, Malaya [Malaysia].
Thelychaeta chrysoides: Peris, 1952: 158.
Isomyia chrysoides: James, 1970: 8.
Isomyia chrysoides: James, 1977: 547.

Length: 8.5-9.0 mm.

Specimens examined. - MALAYSIA (BORNEO): 2 males, Sabah, Forest Camp, 19 km N of Kalabakan, 60 m, 27 Oct.1962, K. J. Kuncheria (BPBM).

Bionomics. - Nothing is known.

Distribution. - Viet Nam, Malaysia (Malaya, Borneo) and Indonesia (Java).

***Isomyia confixa* (Walker)**

Musca confixa Walker, 1856: 26. Type locality: (Westkoust Res.), Mount Ophir, Malaya [Malaysia].
Thelychaeta confixa: Peris, 1952: 182.
Isomyia confixa: James, 1977: 547.

Length: ?.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo).

***Isomyia cupreoviridis* (Malloch)**

Strongyloneura Malloch, 1928: 480. Type locality: Gombak Valley, Kuala Lumpur, Selangor, Malaya [Malaysia].

Thelychaeta cupreoviridis: Peris, 1952: 144.

Isomyia cupreoviridis: James, 1977: 548.

Length: 8.0-9.0 mm.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Thailand and Malaysia (Malaya).

****Isomyia delectans* Walker**

Isomyia delectans Walker, 1860: 134. Type locality: Makasar, Celebes [Indonesia].

Musca conflagrans Walker, 1861: 261. Type locality: Menado, Celebes [Indonesia].

Length: 10.0-10.5 mm.

Specimens examined. - MALAYSIA (BORNEO): 1 male 1 female, Sabah, Sandakan Bay, Sapangaya Lumber Camp, 2-20 m, 2 Oct.1957, 8 Nov.1957, J. L. Gressitt (BPBM); 1 female, Sabah, Keningan, 12-17 Jan.1959, T. C. Maa (BPBM); 1 female, Sabah, Gomantong Caves, ex. fresh human excrement, 26 Nov.1958, L. W. Quate (BPBM).

Bionomics. - Female flies are attracted to decaying animal matter and human excrement.

Distribution. - India (Mussoorie, Assam), Myanmar, Laos, *Malaysia (Borneo), Indonesia (Sulawesi) and Philippines (Mindanao).

***Isomyia dotata* (Walker)**

Musca dotata Walker, 1856: 25. Type locality: Singapore, Malaya [Singapore].

Cosmina micans Bigot, 1874: 241. Type locality: Paolo, Pinang, Java [Indonesia].

Strongyloneura apicipennis Senior-White, 1924: 116. Type locality: Calayan, Philippines.

Strongyloneura philippinensis Malloch, 1928: 482. Type locality: Los Banos, Luzon, Philippines.

Strongyloneura dotata: Senior-White, Aubertin & Smart, 1940: 155.

Thelychaeta dotata: Peris, 1952: 144.

Isomyia dotata: James, 1977: 548.

Length: 7.0-9.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male 3 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 male, Pahang, Kuala Lumpur, 24-31 Dec.1958, L. W. Quate (BPBM); 1 female, Selangor, 22 km NNE K. Lumpur, Templar Park, 29 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH); 1 male, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - Nothing is known.

Distribution. - Myanmar, Thailand and Malaysia (Malaya, Borneo), Singapore, Indonesia (Java) and Philippines (Mindano, Mindoro, Luzon).

***Isomyia electa* Villeneuve**

Thelychaeta electa Villeneuve, 1927: 217. Type locality: Kosempo, Taihorinsho, and Tappani, Formosa [Taiwan].

?*Thelychaeta pellita* Séguy, 1949: 140. Type locality: Trichinopoly, India [Synonymy by Peris (1951), with a query].

Thelychaeta electa: Peris, 1952: 168.

Isomyia electa: James, 1977: 548.

Length: 9.0-13.0 mm.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Nepal, India (Madras), Myanmar, Taiwan and Malaysia (Malaya).

***Isomyia fulvicornis* (Bigot)**

Phumosia fulvicornis Bigot, 1887: 611. Type locality: Java [Indonesia].

Strongyloneura pseudonebulosa Senior-White, Aubertin & Smart, 1940: 163. Type locality: Trincomalee, Ceylon [Sri Lanka].

Strongyloneura nebulosa: Senior-White, 1923: 47, nec. Townsend.

Thelychaeta fulvicornis: Peris, 1952: 182.

Isomyia fulvicornis: James, 1977: 548.

Length: 8.0-9.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male 11 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - India, Sri Lanka, Malaysia (Malaya, Borneo) and Indonesia (Java).

****Isomyia hetauda* Kurahashi et Thapa**

Isomyia hetauda Kurahashi et Thapa, 1994: 234. Type locality: Hetauda to Bharatpur, Nepal.

Length: 7.0-10.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Kuala Lumpur, Klang gates, 31 Dec.1958, L. W. Quate (BPBM); 4 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - Nepal and *Malaysia (Malaya).

***Isomyia malayensis* (Townsend)**

Strongyloneura malayensis Townsend, 1927: 376. Type locality: Singapore, Malaya [Malaysia].

Strongyloneura vittigera Malloch, 1928: 482. Type locality: Kuala Taku, Pahang, Malaya [Malaysia].

Strongyloneura malayensis: Senior-White, Aubertin & Smart, 1940: 152.

Isomyia malayensis: James, 1977: 549.

Length: 7.0-8.5 mm.

Specimens examined. - SINGAPORE: 3 females, Bukit Timah, Bukit Panjan, 3-4 Dec.1975, S. Shinonaga (NIHJ); 1 female, Bukit Timah forest, low foliage, 7 Apr.1974, D. H. Murphy (NIHJ). MALAYSIA (MALAYA): 7 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 1 female, Sabah, Forest Camp, 19 km N of Kalabakan, 21 Oct.1962, Y. Hirashima (BPBM).

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya, Borneo: Sabah) and Singapore.

?*Isomyia mallochi* James

Isomyia mallochi James, 1977: 549. n. n. for *Strongyloneura micans* Malloch, 1928.

Strongyloneura micans Malloch, 1928: 481, not Bigot. Type locality: Kuala Lumpur, Selangor, Malaya [Malaysia].

Length: ?.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Malaya), Indonesia (Java) and Philippines (Luzon, Mindanao).

***Isomyia oestracea* (Séguy)**

Pachycosmina oestracea Séguy, 1934: 18. Type locality: Kou-Ling, China.

Strongyloneura oestracea: Senior-White, Aubertin & Smart, 1940: 161.

Isomyia oestracea: James, 1977: 550.

Isomyia oestracea: Kurahashi & Thapa, 1994: 237.

Length: 9.5-12.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 21 males, Pahang, Fraser's Hill, 1,300 m, 18-20 Apr.1979, H. Kurahashi (NIHJ); 3 males, Pahang, Genting Highlands, 1,700 m, 20-21 Apr.1979, H. Kurahashi (NIHJ); 1 female, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 female, Pahang, Cameron Highlands, 700-1,300 m, 27 Oct.1975, S. Shinonaga (NSMT). MALAYSIA (BORNEO): 1 female, Sabah, Ranau, 16 Oct.1958, L. W. Quate (BPBM).

Bionomics. - Nothing is known.

Distribution. - India, China, Laos, Malaysia (Malaya, Borneo) and Indonesia (Java).

****Isomyia perisi* James**

Isomyia perisi James, 1970: 10. Type locality: Kadamparai, Anamali Hills, Madras, India.

Length: 12.0 mm.

Specimen examined. - MALAYSIA (BORNEO): 1 male, Sabah, Poring, 700 m, 29-30 Apr.1979, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - India (Madras) and *Malaysia (Borneo: Sabah).

****Isomyia pictifacies* (Bigot)**

Somomyia pictifacies Bigot, 1877: 45. Type locality: Java [Indonesia].

Length: 10.0-12.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 males, Pahang, Kuala Tahan, 15-16 Dec.1958, L. W. Quate (BPBM); 6 females, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 female, Pahang, Tanah Rata nr Cameron Highlands, 28 Feb.1970, S. Suzuki (MUEL); 1 female, Pahang, Ulogombach Rd., 30 km E Kuala Lumpur, 30 Oct.1975, S. Shinonaga (NSMT); 1 female, Pahang, Bukit Mandul, 20 km W Kuala Lumpur, 1 Nov.1975, H. Shima (NSMT). MALAYSIA (BORNEO): 1 female, Sabah, Ranau, 14 Oct.1958, L. W. Quate (BPBM); 1 male, Sabah, Mt. Kinabalu, Bundu Tuhan, 1,000 m, 2-3 May.1979, H. Kurahashi (NIHJ).

Bionomics. - Nothing is known.

Distribution. - *Malaysia (Borneo: Sabah) and Indonesia (Java).

****Isomyia pseudonepalana* (Senior-White, Aubertin et Smart)**

Strongyloneura pseudonepalana Senior-White, Aubertin et Smart, 1940: 162. Type locality: Kekirawa, Ceylon [Sri Lanka].

Strongyloneura nepalana Senior-White, 1922: 100, nec.Townsend.

Length: 7.0-8.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 male, Pahang Sta., Cameron Highlands, 700-1,300 m, 27 Oct.1975, S. Shinonaga (NIHJ); 1 male 1 female, Pahang, Taman Negara, K. Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ); 1 male, Pahang, Fraser's Hill, 18-20 Apr.1979, H. Kurahashi (NIHJ); 1 male, Pahang, Gua 'che Yatim to Terenggan, 17 Dec.1958, T. C. Maa (BPBM); 1 female, Perak, Lubok Merbau, nr Kuala Kansar, 100 m, 17 Mar.1990, H. Kurahashi (NIHJ); 1 male, Kelantan, nr Gua Musang, 11-13 Nov.1994, Pape, Gustafsson & Heinakroon (SMNH).

Bionomics. - Nothing is known.

Distribution. - Sri Lanka, India, Myanmar and *Malaysia (Malaya).

Isomyia viridaurea (Wiedemann)

Musca viridaurea Wiedemann, 1819: 22. Type locality: Java [Indonesia].

Musca munda Wiedemann, 1830: 398. Type locality: Java [Indonesia].

Rutilia dubia Macquart, 1846: 311 (183). Type locality: Manila, Philippines.

Musca reflectans Walker, 1856: 24. Type locality: Malacca.

Somomyia rubiginosa Bigot, 1877: 41. Type locality: Burma [Myanmar].

Thelychaeta chalybea Brauer et Bergenstamm, 1891: 390. Type locality: Borneo.

Thelychaeta (?) *viridana* Séguy, 1946 (nec. Wiedemann): 85, probably error for *viridaurea* Wiedemann, 1819.

Strongyloneura viridaurea: Senior-White, Aubertin & Smart, 1940: 157.

Isomyia viridaurea: James, 1970: 8.

Isomyia viridaurea: James, 1977: 551.

Isomyia viridaurea: Inder Singh, Kurahashi & Kano, 1979: 13.

Length: 10.0-12.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 6 females, Pahang, Taman Negara, Kuala Tahan, 60 m, 22-26 Apr.1979, H. Kurahashi (NIHJ). MALAYSIA (BORNEO): 1 male, Sarawak, Gunong Matang, 120 m, m. v. light trap, 15 Sep.1958, J. L. Gressitt & T. C. Maa (BPBM); 2 males, Sarawak, Santuboung, 30 km N Kuching, 19-20 Nov.1975, H. Shima (NSMT); 3 females, Sarawak, Balai Ringgin, 100 km N Kuching, 22-24 Nov.1975, S. Shinonaga (NSMT); 1 male 1 female, Sabah, Sandakan Bay, Sapagaya Lumber Camp, 2-20 m, 5,6 Nov.1957, J. L. Gressitt (BPBM); 1 female, Tawau Dist., Kalabakan, primary forest, ex. decaying fish, 8-15 Nov.1958, T. C. Maa (BPBM); 1 female, Tawau, Quoin Hill, Forest Camp 1, 3-5 km WSW of Cocoa Res. Sta., 9-20 Jul.1962, Y. Hirashima (BPBM); 1 female, W. Coast Residency, Ranau, 8 mi N Paring Hot Springs, 500 m, 8-11 Oct.1958, L. W. Quate (BPBM); 1 female, Ranau, 11 Oct.1958, L. W. Quate (BPBM); 1 female, Sabah, Papar, 50 km SW Kota Kinabalu, 13-15 Nov.1975, S. Shinonaga (NSMT); 1 male, Sabah, Poring, 9 mi N of Ranau, 1,600 m, 26-29 Apr.1970, T. W. & M. C. Davies (CAS); 2 females, Sabah, Keningau, 400 m, 18 Nov.1995, M. Iwasa (OU); 1 male, Sabah, Poring, Hot Springs, 1 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH).

Bionomics. - Male adult flies are found hovering in small swarms under trees.

Distribution. - India, Myanmar, Thailand, Laos, Viet Nam, S. China, Taiwan, Philippines (Luzon), Malaysia (Malaya, Borneo) and Indonesia (Sumatra, Java).

Genus *Strongyloneura* Bigot

Strongyloneura Bigot, 1886: 14. Type species: *Strongyloneura prasina* Bigot, 1886, mon.

Chloroidia Townsend, 1917: 196. Type species: *Idia prolata* Walker, 1860.

Strongyloneura prolata (Walker)

Idia prolata Walker, 1860: 133. Type locality: Makasar, Celebes [Indonesia].

Idia flavifrons Townsend, 1917: 196. Type locality: Chalakudi, Cochin State, Burma [Myanmar].

Strongyloneura formosae Villeneuve, 1927: 391. Type locality: Formosa (no localities: "commune à formose") [Taiwan].

Strongyloneura prolata: James, 1977: 555.

The first author (H. K.) has examined the type of *Strongyloneura formosae* Villeneuve, 1927, which is preserved in the Deutsches Entomologisches Institut, Berlin-Friedrichshagen. The type showed that Villeneuve's species is identical with *S. prolata* (Walker, 1860) and James (1977) was mistaken when he included it in the synonymic list of *S. prasina* Bigot, 1886.

Length: 5.0-6.0 mm.

Specimens examined. - No available material.

Bionomics. - Adults are found on blossoms and flowers. Female flies are often attracted to spoiled meat baited for collecting.

Distribution. - Nepal, India, Myanmar, China (Hainan, Tibet), Japan (Ryukyu), Malaysia (Malaya) and Indonesia (Sulawesi).

Genus *Rhyncomya* Robineau-Desvoidy

Rhyncomya Robineau-Desvoidy, 1830: 424. Type species: *Musca felina* Robineau-Desvoidy, 1794, mon.

Rhynchomyiopsis Townsend, 1917: 195. Type species: *Rhynchomyiopsis indica* Townsend, 1917, orig. des. (= *Rhyncomya townsendi* James, 1977, n. n. for *indica* Townsend, 1917).

Trichometallea Townsend, 1917: 194. Type species: *Trichometallea pollinosa* Townsend, 1917, orig. des.

**Rhyncomya divisa* (Walker)

Musca divisa Walker, 1856: 333. Type locality: "East Indies".

Rhyncomya palliceus Bigot, 1887: 594. Type locality: Hindustan [India].

Metallea nigrofemorata Senior-White, 1923: 46 (female in part). Type locality: Suduganga, Matale, Ceylon [Sri Lanka].

Length: 6.0-7.0 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Perak, Sungkai, 136 km N of Kuala Lumpur, 20 m, 14 Mar. 1990, H. Kurahashi (NIHJ); 2 females, Perak, Penang, Universiti Sains, 27,31 May. 1975, R. A. Beaver (CAS).

Bionomics. - Nothing is known.

Distribution. - Sri Lanka, India, *Malaysia (Malaya) and Indonesia (?Java).

?*Rhynchomyia indica* Rondani

Rhynchomyia indica Rondani, 1875: 424. Type locality: Borneo [probably Malaysia].

Length: Nothing is known.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Malaysia (Borneo).

Genus *Metallea* van der Wulp

Metallea van der Wulp, 1880: 174. Type species: *Metallea notata* van de Wulp, 1880, mon.
Metalliopsis Townsend, 1917: 198. Type species: *Metalliopsis setosa* Townsend, 1917, orig. des.
Chlorrhynchomyia Townsend, 1932: 440. Type species: *Chlorrhynchomyia clausa* Townsend, 1932,
orig. des.

KEY TO THE SPECIES OF *METALLEA*

1. Arista long pubescent, the longest hairs more than twice the width of arista at base; R_{2+3} slightly curved at apex; mid tibia with 1 *ad* 2
- Arista short pubescent, the longest hairs not exceeding the width of arista at base 3

2. Parafacialia with black shining spot below, clothed with 2-3 irregular rows of black setulae in both sexes; 3rd antennal segment largely fuscous except for venter at base *M. setosa* (Townsend)
- Parafacialia testaceous, subshining below, without black spot, virtually bare in male, with minute fuscous to black setulae in female; 3rd antennal segment largely orange except for fuscous dorsum *M. erinacea* Fang et Fan

3. Abdomen testaceous with tergite 5 wholly dark metallic green, this colour sometimes extending over tergites 3-4 forming lateral and central rounded spots; mesopleuron paractically not pruinose in the middle *M. notata* van der Wulp
- Abdomen without metallic colour, usually with dark brown transverse patches; mesopleuron wholly and uniformly pruinose; male sternite 5 with short spinulose setae at the base of the lateral branches; female femur dark brown, basally testaceous *M. flavibasis* Senior-White

**Metallea erinacea* Fang et Fan

Metallea erinacea Fang et Fan, 1984: 262. Type locality: Zhejiang Prov., China.

Metallea setosa: Kurahashi & Thapa, 1994: 245, misid.

Length: 6.3-6.7 mm.

Specimens examined. - SINGAPORE: 1 male, Seletar, 24 Jul.1971, H. Ikeda (MNHA).
MALAYSIA (MALAYA): 1 male, Pahang, Kuala Tahan, 15-16 Dec.1958, L. W. Quate (BPBM); 2 females, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH). MALAYSIA (BORNEO): 1 female, Sarawak, Santubong, 30 km N of Kuching, 19-20 Nov.1975, H. Shima (NIHJ); 1 female, Sabah, Papar, 50 km SW of Kota Kinabalu, 13-15 Dec.1975, S. Shinonaga (NSMT).

Bionomics. - Nothing is known.

Distribution. - China (Zhejiang Prov.), Singapore and Malaysia (Malaya, Borneo).

****Metallea flavibasis* Senior-White**

Metallea flavibasis Senior-White, 1922: 168. Type locality: Suduganga, Matale, Ceylon [Sri Lanka].
Metallea nigrofemorata Senior-White, 1923: 46 (male in part). Type locality: Suduganga, Matale, Ceylon [Sri Lanka].

Length: 5.0-6.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 2 females, Penang, University Sains, 27 May.1975, Rab (CAS).

Bionomics. - Nothing is known.

Distribution. - Sri Lanka, India (Uttar Pradesh) and *Malaysia (Malaya).

***Metallea notata* van der Wulp**

Metallea notata van der Wulp, 1880: 175. Type locality: Java [Indonesia].
Metallea notata: Peris, 1952: 70.
Metallea notata: James, 1977: 552.

Length: 7.0 mm.

Specimens examined. - No available material.

Bionomics. - Nothing is known.

Distribution. - Sri Lanka, India, China, Malaysia (Malaya), Singapore and Indonesia (Java).

***Metallea setosa* (Townsend)**

Metalliopsis setosa Townsend, 1917: 198. Type locality: Kurseong, Darjeeling, India.
Metalliopsis setosa: Senior-White, Aubertin & Smart, 1940: 179.
Metallea setosa: James, 1977: 552.

Length: 7.0-7.5 mm.

Specimens examined. - MALAYSIA (MALAYA): 1 female, Pahang, Cameron Highlands, nr Tanah Rata, 15-27 Nov.1994, Gustafsson, Heinakroon & Pape (SMNH).

Bionomics. - Nothing is known.

Distribution. - Nepal, India (W. Bengal) and Malaysia (Malaya).

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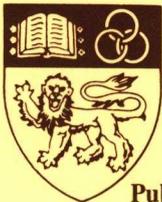
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