

PARACLIUS (DIPTERA: DOLICHOPODIDAE: DOLICHOPODINAE) OF SINGAPORE, WITH NEW SPECIES FROM MANGROVES

Lili Zhang

Institute of Zoology, Chinese Academy of Sciences, Beijing 100080, P. R. China

Ding Yang

*Department of Entomology, China Agricultural University, Beijing 100094, P. R. China
(Corresponding author)*

Patrick Grootaert

*Department of Entomology, Royal Belgian Institute of Natural Sciences,
Vautierstraat 29, B-1000 Brussels, Belgium*

ABSTRACT. – Nine species of *Paraclius* are reported from Singapore. The following seven *Paraclius* species are described as new to science: *P. asiobates* new species, *P. crassatus*, new species, *P. digitatus*, new species, *P. obtus*, new species, *P. polychaetus*, new species, *P. serratus*, new species and *P. singaporensis*, new species. All these new species were collected in mangrove habitats and are assigned to a new species group: the *singaporensis*-group. *P. adligatus* Becker, 1922, is recorded from Singapore for the first time and re-described. The presence of *P. abbreviatus* Becker, 1922, originally described from Singapore could not be confirmed. A key to the males of the nine Singaporean *Paraclius* is provided.

KEY WORDS. – Diptera, Dolichopodidae, *Paraclius*, new species, mangrove, Singapore.

INTRODUCTION

Paraclius Loew, 1864, is a cosmopolitan genus of the subfamily Dolichopodinae, with highest species diversity in the tropics. The number of *Paraclius* species in the Palearctic Region and the Australian Region remained stable during recent years, with respectively one and 22 species (Negrobov, 1991; Bickel & Dyte, 1989). Brooks (2005) transferred all 75 Afrotropical *Paracleius* (Grichanov, 2004) to *Pelastoneurus* according to the case 3130 of I. C. Z. N. (2004). Grichanov (pers. comm.) however, questions this transfer and he suggests that *Paraclius* and *Pelastoneurus* should be revised in detail. Presently, there are fifteen species known from the Nearctic Region (Pollet et al., 2004) and 55 species from the Neotropical Region (Robinson, 1970). Thirty-five species are known from the Oriental Region (Becker, 1922; Dyte, 1975; Lin & Chen, 1999; Olejníček, 2003). In addition to the six species already known from Taiwan (Becker, 1922), fifteen *Paraclius* were recently described from Oriental China (Henan, Sichuan, Guizhou, and Yunnan provinces) by Yang (1996, 1998), Yang & Li (1998), Yang & Grootaert (1999), and Yang & Saigusa (1999a, b, 2001). Finally, Zhang *et al.* (2004) recently reported *Paraclius planitarsis* from Hainan Island (China). Major parts of the Oriental Region are still poorly investigated and many undescribed species are

supposed to live there as is shown by the present study of a small area like Singapore.

Evenhuis & Grootaert (2002) found five *Paraclius* species from Singapore in the collections of the Raffles Museum for Biodiversity Research, but only one species was bearing a name: *P. abbreviatus* Becker. All have been revised here.

In the present paper we mainly focused on *Paraclius* from mangroves in Singapore. Seven species are described as new to science. *Paraclius adligatus* Becker, 1922, is recorded from Singapore for the first time. The presence of *P. abbreviatus*, originally described by Becker (1922) from Singapore, is not confirmed. A key to the males of the nine species of *Paraclius* of Singapore is presented.

MATERIAL AND METHODS

Material was collected by sweep netting (5–13 October 2000, 4–13 December 2002, 19 November–11 December 2003 and March–July 2005) and with Malaise traps (November–December 2003 and a 10-month period in 2005: March–December 2005). The Malaise traps were operated at following sites in Singapore: Bukit Timah (secondary rain

forest at site of sampling), Sime forest (rain forest), Nee Soon (swamp forest), Sungei Buloh (mangroves) and Pulau Ubin (mangroves).

The material is stored in alcohol in the collections of the Raffles Museum for Biodiversity Research (ZRC: Zoological Reference Collection), Singapore, the Royal Belgian Institute of Natural Sciences (RBINS), Brussels and voucher specimens are kept in the Institute of Zoology (IOZ), Beijing. For each record a register number is given (register number in database linked to collection data such as locality, date, collector, habitat). In addition, an inventory number (e.g. Si200) indicates where the specimens can be found in the wet collection.

All fresh material was collected by Patrick Grootaert (coll. PG) and specimens were identified either by Lili Zhang (det. LZ), or P. Grootaert (det. PG.). A few specimens present in the dry collection of the Raffles Museum have been included as well.

The following abbreviations are used: acr-acrostichal bristles, ad-anterodorsal bristle(s), av-anteroventral bristle(s), dc-dorsocentral bristles, LI-fore leg, LII-mid leg, LIII-hind leg, pd-posterodorsal bristle(s), pv-posteroventral bristle(s), v-ventral bristle(s).

Key to *Paraclius* (males) of Singapore

1. Scutellum with 4 bristles; hind femur with 2 preapical, anterodorsal bristles (freshwater habitats) *P. abbreviatus* Becker
- Scutellum with 6 bristles; hind femur with 1 preapical, anterodorsal bristle 2
2. Femora entirely black (freshwater habitats) *P. adligatus* Becker
- Femora at most with black tip (mangrove) 3
3. Cercus with a subapical notch (Fig. 11), bearing a long curved bristle *P. crassatus*, new species
- Cercus without subapical notch, bearing bristles of subequal size 4
4. Cercus yellow, elongate triangular with brown, clavate marginal bristles (Fig. 6) *P. asiobates* new species
- Cercus mainly brown to black, without clavate bristles 5
5. First flagellomere elongated, at least twice as long as wide ... 6
- First flagellomere not elongated, at most 1.5 times as long as wide 8
6. Mid femur with row of 8 ventral bristles; cercus with long basoventral process (Fig. 15); aedeagus without denticles (Fig. 16) *P. digitatus*, new species
- Mid femur with 1-4 long ventral bristles near base; cercus without basoventral process; aedeagus with denticles 7
7. Hind femur with 5 ventral bristles; mid femur with 1 long ventral bristle on basal third and no spinules at base; fore tarsus completely yellow *P. polychaetus*, new species
- Hind femur without ventral bristles; mid femur with 3-4 long ventral bristles in basal quarter and a row of minute spinules near base (Fig. 19); fore tarsomeres 3-5 black *P. obtus*, new species
8. Mid and hind femur with respectively with 5 and 4 ventral bristles near base; aedeagus without denticles (Fig. 33); cercus

- club-shaped (Fig. 32) *P. singaporensis*, new species
- Mid and hind femur with a row of 10 ventral bristles; aedeagus with denticles (Fig. 29); cercus ovoid (Fig. 28) *P. serratus*, new species

TAXONOMY

Paraclius abbreviatus Becker, 1922

Paraclius abbreviatus Becker, 1922: 15. Type localities – 2 females : Assam, Sylhet (West Pakistan); Nepal, Tharbari (in Ind. Mus. Calcutta); 1 male, Singapore (Hung. Nat. Hist. Mus.).

Remarks. – Following diagnosis is compiled according to Becker’s description: Frons and face wide, latter not wider than first flagellomere. Antenna yellowish brown, first flagellomere 1.5 times as long as wide with apical half darkened. Postocular bristles yellowish. Legs including all coxae yellowish; hind femur with 2 preapical bristles. Vein M_{1+2} with apical bent convex toward wing border and running parallel to it. Hypopygium small, yellowish brown, with 2 long strap-shaped appendages (cercus?). Length 3.5–4.0 mm.

We did not see the type material and suppose that the single male known, recorded from Singapore, is lost (pers. comm. by L. Papp). Evenhuis and Grootaert (2002) quote a number of specimens from Singapore identified as *P. abbreviatus* by D. H. Murphy (ZRC). However none of these specimens fit to the description of Becker (1922) compiled above. They most probably represent a yet undescribed species and their revision is pending on the collection of fresh material.

Paraclius adligatus Becker, 1922

(Figs. 1–4)

Paraclius adligatus Becker, 1922: 13 (type locality: Taiwan).

Material examined. – SINGAPORE: 2 males, 2 females, Nee Soon, 19 Apr.2005, swamp forest, sweep netting (25070, coll. PG, det. LZ, Si721, ZRC); 4 males, Clementi Woods, 15 Mar.2005, park, sweep netting (25014, coll. PG, det. LZ, Si453); 1 male, 1 female, Nee Soon, 4 Dec.2002, swamp forest, sweep netting (22054, coll. PG, det. LZ, Si304).

CHINA: 1 male, Hainan: Baihe, 2 Mar.1959 (coll. Gentao Jin, det. LZ).

The male type conserved in the Hungarian Natural History Museum is presumed to be lost (L. Papp pers. comm.). The other syntypic material are females.

Diagnosis. – Antenna black, first flagellomere twice as long as wide; arista with basal segment 0.25 times as long as apical segment. All coxae and femora black. Apex of hind tibia and entire hind tarsus black. Mid and hind femora with black ventral bristles (shorter than femur is wide). Female with first flagellomere 1.1 times as long as wide.

Description. – Male: Body length 4.0–4.1 mm, wing length 3.9–4.0 mm.

Head metallic green with pale grey pollen. Face narrowing downward, distinctly narrower than first flagellomere. Upper postocular bristles black, mid and lower postocular bristles (including posteroventral hairs) pale. Antenna (Fig. 2) black, first flagellomere twice as long as wide; arista black, apicodorsal, with short basal segment and microscopic pubescence. Proboscis brown with black hairs, palpus black with black hairs and black apical bristle.

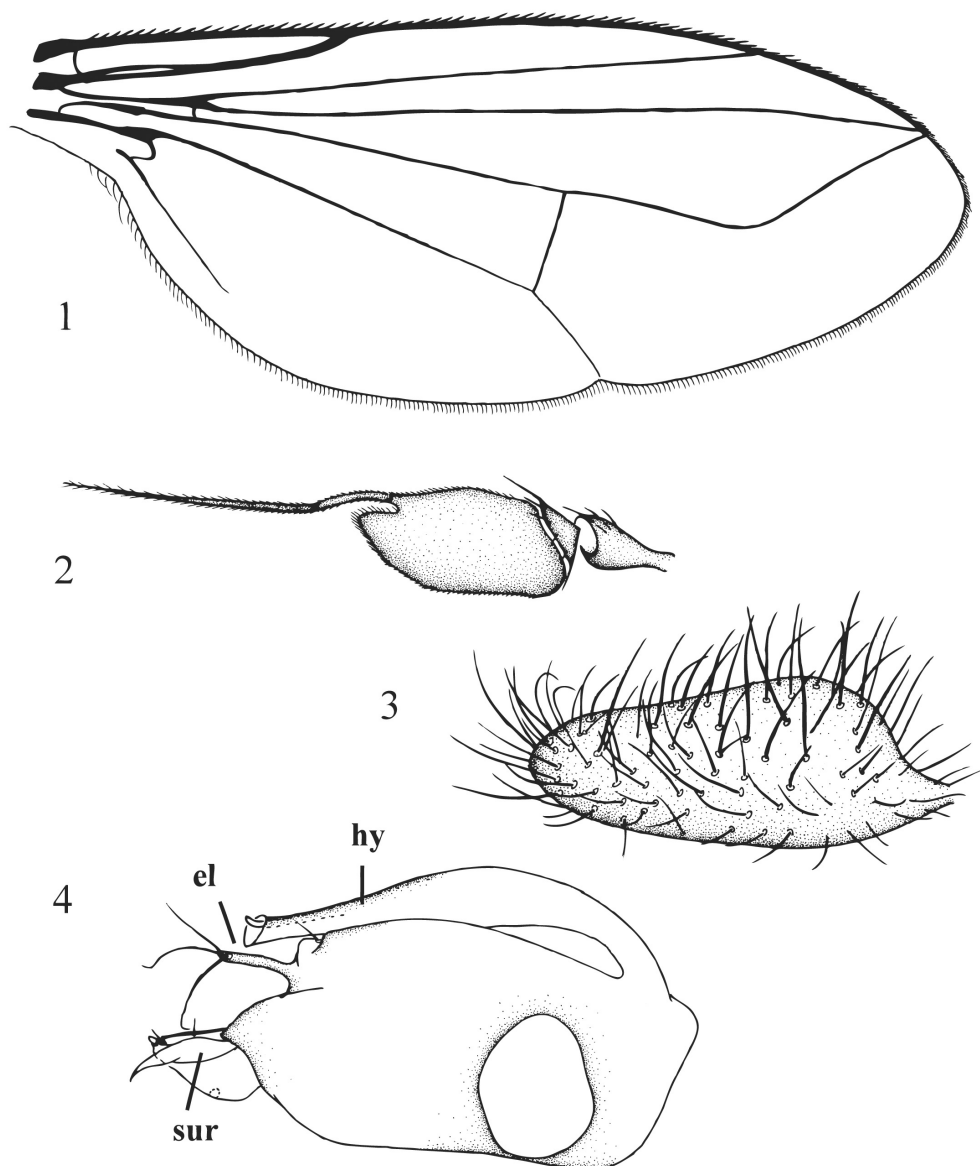
Thorax metallic green with pale grey pollen. Hairs and bristles black. Six strong dc, 7 pairs of acr; scutellum with 6 bristles (lateral pair longest). Propleuron with 1 black bristle on lower part. Legs largely yellow, with all coxae and femora black. All hairs and bristles black. Fore tarsus from tip of tarsomere 1 onward brown; mid tarsus from tip of tarsomere 1 onward black; apical third of hind tibia and hind tarsus black. Mid and hind coxae each with 1 exterior bristle. Mid and hind femora each with 1 ad preapical bristle. Mid and hind femora with short ventral bristles (less than half width of femur). Fore tibia with 3 ad and 3 pd, apically with 3 short bristles;

mid tibia with 4 ad, 3 pad, 1 av and 2 pv, apically with 5 bristles; hind tibia with 4 ad and 4 pd, apically with 3 bristles. Mid tarsomere 1 with 1 v near base. Relative lengths of tibia and 5 tarsomeres LI 1.5 : 0.65 : 0.3 : 0.25 : 0.15 : 0.15; LII 2.1 : 0.9 : 0.65 : 0.5 : 0.3 : 0.2; LIII 2.55 : 0.75 : 1.0 : 0.8 : 0.5 : 0.3. Wing (Fig. 1) hyaline, veins brown, R_{4+5} and M distinctly convergent; CuAx ratio 1.0. Squama yellow with black hairs. Halter yellow.

Abdomen metallic green with pale grey pollen. Hairs and bristles black. Male genitalia (Fig. 3–4): Epandrium longer than wide, lateral epandrial lobe finger-like with 3 apical bristles; cercus somewhat long oval; hypandrium straight.

Female: Body length 4.0–4.3 mm, wing length 3.1–3.3 mm. Similar to male, except first flagellomere as long as wide, and the arista with shorter basal segment.

Distribution and bionomics. – China (Taiwan, Hainan), Pakistan, Singapore. *P. adligatus* is found in swampy areas



Figs. 1–4. *Paraclius adligatus* Becker: 1, wing; 2, antenna; 3, cercus; 4, male genitalia. Legend: el – epandrial lobe; hy – hypandrium; sur – surstylus.

and in the rainwater drains in parks in Singapore. It seems to be a freshwater species.

***Paraclius asiobates*, new species**
(Figs. 5–7)

Material examined. – Holotype: male, Sungei Buloh, 18 May 2005, mangrove, Mal. 1 (25161, coll. PG, Si1192, det. PG, ZRC).

Paratypes: 1 male, Sungei Buloh, 25 May 2005, mangrove, Mal. 2 (25164, coll. PG, Si1215, det. PG, RBINS).

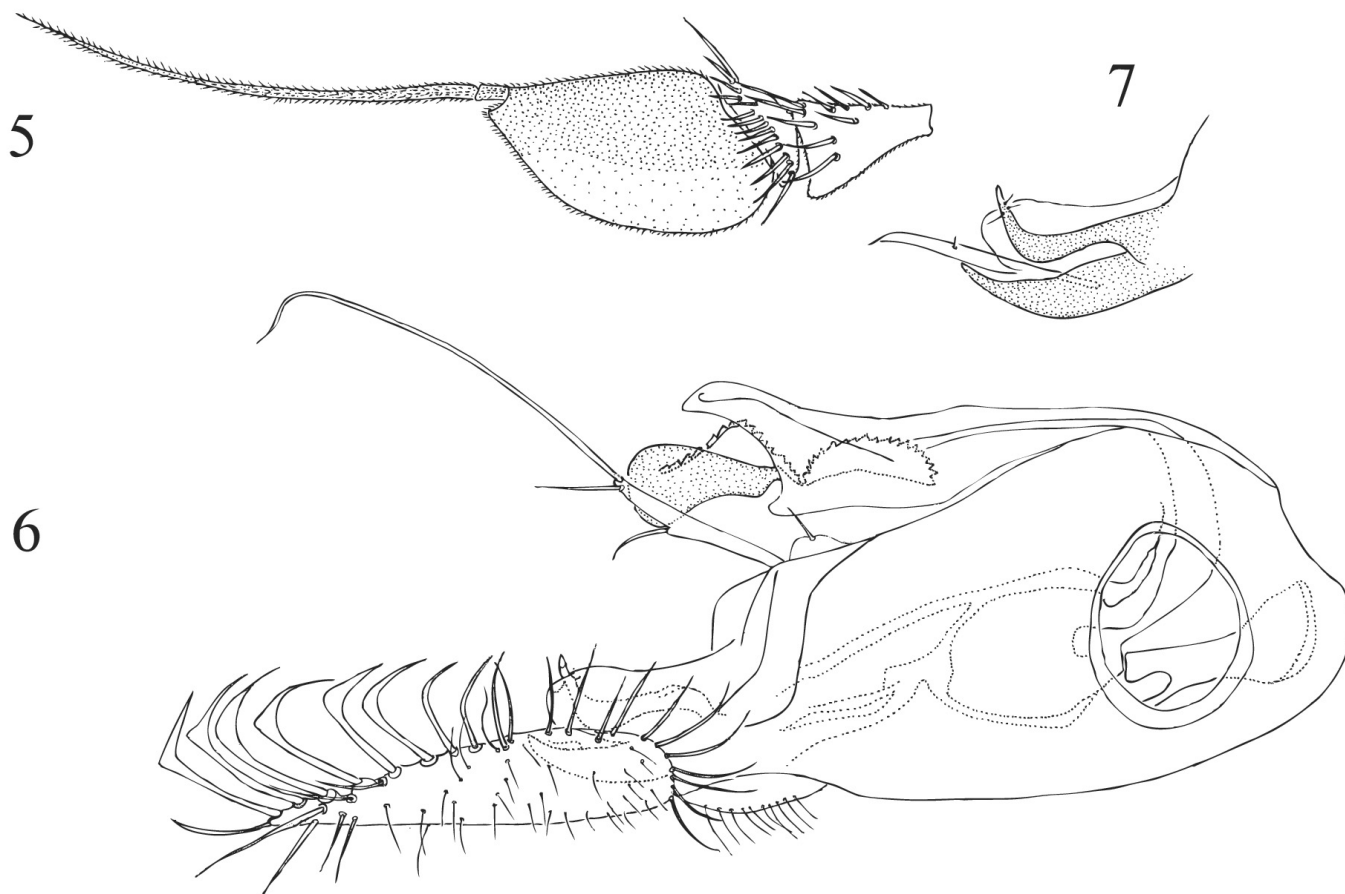
Diagnosis. – Antenna dark yellow, first flagellomere brown on upper half, yellowish on lower half, 1.7 times as long as wide. Mid femur with 5 to 7 ventral bristles (shorter than width of femur); hind femur with row of black ventral bristles. Aedeagus with denticles. Cercus elongate triangular in lateral view, yellow, with brown marginal clavate bristles.

Description. – Male: Body length 6.6 mm, wing length 4.5 mm.

Head metallic green with pale grey pollen. Face narrowing downward, distinctly narrower than first flagellomere. Hairs and bristles black. Upper 5 postoculars black, mid and lower postocular bristles (including posteroventral hairs) white. Antenna (Fig. 5) dark yellowish brown, first flagellomere brown on upper half, yellowish on lower half, 1.7 times as

long as wide; arista apicodorsal, minutely pubescent with very short basal segment. Proboscis brown with black hairs, palpus brown with black hairs and black apical bristle.

Thorax metallic green with pale grey pollen. Hairs and bristles black. Six strong dc, 6 pairs of acr; scutellum with 6 bristles (lateral pair longest). Propleuron with 1 long black bristle (as long as first flagellomere) on lower part among 7 smaller pale hairs; 1 long black bristle in upper part also among 7–8 hairs. Legs yellow, fore coxa yellow including base, mid coxa anteriorly yellow, exteriorly brown; hind coxa mainly brownish. Hind femur with a small black anterior spot at tip. Fore tarsomeres completely yellow; mid tarsomeres 3–5 brownish, hind tarsus completely brownish black. Hairs and bristles black. Mid and hind coxae each with 1 exterior bristle. Mid and hind femora each with 1 preapical bristle. Fore femur with 3 pv in apical quarter. Mid femur with 5 to 7 v (as long as femur is wide) in basal half; hind femur with row of black v (shorter than femur is wide) on the entire length. Fore tibia with 3 ad and 2 pd, apically with 2 short bristles; mid tibia with 4 ad, 3 pd and 1 av, apically with 4 bristles; hind tibia with 4 ad, 5 pd and a row of thin v over the entire length (as long as tibia is wide), apically with 4 bristles. Relative lengths of tibia and 5 tarsomeres LI 1.3 : 0.63 : 0.23 : 0.18 : 0.15 : 0.15; LII 1.8 : 0.75 : 0.50 : 0.35 : 0.25 : 0.18; LIII 2 : 0.58 : 0.85 : 0.63 : 0.38 : 0.2. Wing greyish, veins black; R_{4+5} and M distinctly convergent, apical part of M concave towards wing border. CuAx ratio 0.7. Squama white with black hairs. Halter white.



Figs. 5–7. *Paraclius asiobates*, new species: 5, antenna; 6, male genitalia; 7, surstyli.

Abdomen metallic green with pale grey pollen. Hairs and bristles black. Tergite 4 and 5 with long black bristles ventrally at side. Male genitalia (Figs. 6–7): Epiandrium longer than wide; lateral lobe long finger-like with 3 bristles; cercus clear yellow; elongate triangular with a row of brown marginal bristles, those on apical half with a clavate tip. Hypandrium thick; aedeagus denticulate.

Female: Unknown.

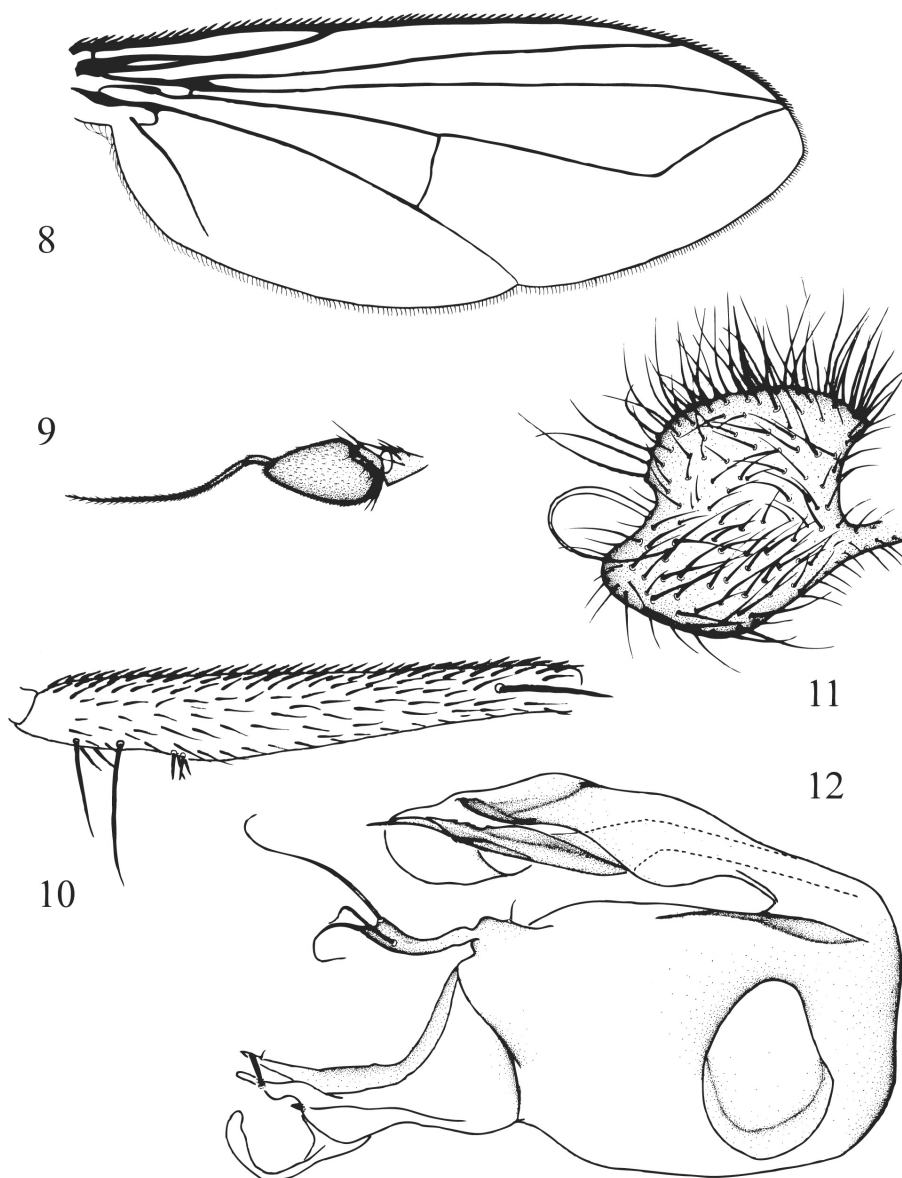
Etymology. – The name *asiobates* comes from the Greek *asis*, mud, slime, and *bates*, one that walks: referring to its occurrence on the mud flats in the mangrove.

Distribution. – Singapore, mangrove.

***Paraclius crassatus*, new species**
(Figs. 8–12)

Material examined. – Holotype: male, Sungei Buloh, 11 May.2005, Mal. 1 (25159, coll. P. Grootaert, det. LZ, Si815, ZRC).

Paratypes: SINGAPORE: 1 male, Sungei Buloh, 27 Apr.2005, Mal. 2 (25096, coll. PG, det. PG, Si1235), 1 male, Sungei Buloh, 11 May.2005, Mal. 1 (25159, coll. P. Grootaert, det. LZ, Si815); 2 males, 11 May.2005, Mal. 2, (25160, coll. PG, det. LZ, Si1242; deposited in IOZ); 1 male, 25 May.2005, Mal 1 (25164, det. PG, Si1214); 1 male, 10 Jun.2005, Mal. 2 (25168, coll. PG, det. PG, Si1228); 1 male, 15 Jun.2005, Mal. 2 (25170, coll. PG, det. PG, Si1251); 1 male, 6 Jul.2005, Mal. 1 (25197, coll. PG, det. PG, Si1294); 1 male, 3 females (not sure if females are conspecific), 5 Aug.2005, Mal. 1 (25284, coll. PG, det. PG, Si1264); 1 male, 5 Aug.2005, Mal. 2 (25285, coll. PG, det. P.G., Si1266); 1 male, 14 Oct.2005, Mal. 1 (25393, coll. PG, det. PG, Si1273); 1 male, 28 Oct.2005, Mal. 1 (25406, coll. PG, det. PG, Si1221).



Figs. 8–12. *Paraclius crassatus*, new species: 8, wing; 9, antenna; 10, mid femur, anterior view; 11, cercus; 12, male genitalia.

Diagnosis. – Antenna with first flagellomere 1.6–1.7 times as long as wide. Mid femur with 2 long av (longer than femur is wide) and 3 ventral bristles basally, and 4 short spine-like short ventrals. Cercus with subapical notch bearing a strong pale bristle.

Description. – Male: Body length 4.0–4.2 mm, wing length 3.9–4.0 mm.

Head metallic green with pale grey pollen. Face narrowing downward, distinctly narrower than first flagellomere. Mid and lower postocular bristles (including posteroventral hairs) pale. Antenna (Fig. 9) dark brown except scape somewhat pale, first flagellomere 1.6–1.7 times as long as wide; arista apicodorsal, minutely pubescent with very short basal segment. Proboscis blackish brown with black hairs, palpus blackish brown with black hairs and black apical bristle.

Thorax metallic green with pale grey pollen. Hairs and bristles black. Six strong dc, 8 pairs of acr; scutellum with 6 bristles (lateral pair longest). Propleuron with 1 black bristle at lower part. Legs yellow, fore coxa yellow, mid and hind coxae black except narrow apex. Mid femur slightly concave basally. Hind femur with black tip. Fore tarsus from tip of tarsomere 3 onward brown; mid tarsus from tip of tarsomere 1 onward black; hind tarsus black except basal half of tarsomere 1. Hairs and bristles black. Mid and hind coxae each with 1 exterior bristle. Mid and hind femora each with 1 preapical bristle. Mid femur (Fig. 10) with 2 long black av (longer than femur is wide) and 3 short v basally, and 4 short spine-like v. Fore tibia with 3 ad and 2 pd, apically with 2 short bristles; mid tibia with 4 ad, 3 pad and 1 av, apically with 4 bristles; hind tibia with 4 ad and 4 pd, apically with 3 bristles. Hind tarsomere 1 with 1 v at base. Relative lengths of tibia and 5 tarsomeres LI 1.6 : 0.9 : 0.35 : 0.25 : 0.2 : 0.2; LII 2.4 : 1.0 : 0.75 : 0.65 : 0.35 : 0.2; LIII 2.5 : 0.7 : 1.5 : 0.6 : 0.4 : 0.25. Wing (Fig. 8) hyaline, veins brown, R_{4+5} and M distinctly convergent; CuAx ratio 0.7. Squama yellow with black hairs. Halter yellow.

Abdomen metallic green with pale grey pollen. Hairs and bristles black. Male genitalia (Fig. 11–12): Epandrium longer than wide, lateral lobe with 3 bristles; cercus large, with weak subapical notch, bearing a strong pale bristle; aedeagus with denticles; hypandrium thick.

Female: Unknown.

Distribution. – Singapore.

Etymology. – The specific name refers to the pale strong bristle in the subapical notch of the cercus.

Remarks. – *Paraclius crassatus* is somewhat similar to *P. incisus* Yang & Grootaert, 1999, from Yunnan having the cercus with an apical notch, but may be separated from the latter by the scutellum with 6 bristles (the lateral pair longest) and the cercus has a pale strong bristle in the subapical notch. In *P. incisus*, the scutellum has only one pair of strong bristles,

and the cercus has no pale strong bristle in the sunapical notch (Yang & Grootaert, 1999).

Paraclius digitatus, new species

(Figs. 13–16)

Material examined. – Holotype: male, Chek Jawa, 2 Dec.2003, mangrove, Mal. (23097, coll. P. Grootaert, Si112, ZRC).

Paratypes: 3 females, same data as holotype; 5 males, Sungei Buloh, 11 May.2005, Mal. 1 (25156, coll. PG, det. LZ, Si818, deposited in IOZ); 13 males, Sungei Buloh, 11 May.2005, Mal. 2, (25160, coll. PG, det. LZ, Si1238); 1 male, 1 female, (25230, coll. PG, det. PG, Si1247); 2 males, 3 females, Chek Jawa, 2 Dec.2003, (23097, coll. PG, det. PG, Si112); 1 male, Pulau Ubin, Chek Jawa, 11 Oct.2005 Mal., (25380, coll. PG, det. PG, Si1302); 1 male, 2 females, Pulau Ubin, 26 Oct.2005 Mal., (25399, coll. PG, det. PG, Si1134); 5 males, 5 females, Sungei Buloh, 22 April.2005, Mal. 2, (25078, coll. PG, det. PG, Si773); 3 males, 9 females, Sungei Buloh, 27 Apr.2005, Mal. 2, (25096, coll. PG, det. PG, Si1233); 5 males, Sungei Buloh, 11 May.2005, Mal. 1, (25159, coll. PG, det. LZ, Si818); 17 males, Sungei Buloh, 11 May.2005, Mal. 2, (25160, coll. PG, det. LZ, Si1238); 2 males, Sungei Buloh, 18 May.2005, Mal. 1, (25161, coll. PG, det. PG, Si1191); 2 males, Sungei Buloh, 18 May.2005, Mal. 2, (25162, coll. PG, det. PG, Si1201); 2 males, Sungei Buloh, 25 May.2005, Mal. 1, (25163, coll. PG, det. PG, Si1208); 2 males, Sungei Buloh, 25 May.2005, Mal. 2, (25164, coll. PG, det. PG, Si1212); 5 males, Sungei Buloh, 1 Jun.2005, Mal. 1, (25165, coll. PG, det. PG, Si1224); 2 males, 1 female, Sungei Buloh, 1 Jun.2005, Mal. 2, (25166, coll. PG, det. PG, Si1285); 3 males, Sungei Buloh, 10 Jun.2005, Mal. 2, (25168, coll. PG, det. PG, Si1227); 1 male, 2 females, Sungei Buloh, 15 Jun.2005, Mal. 2, (25170, coll. PG, det. PG, Si1253); 1 male, 5 females, Sungei Buloh, 22 Jun.2005, Mal. 2, (25172, coll. PG, det. PG, Si1298); 2 males, 4 females, Sungei Buloh, 6 Jul.2005, Mal. 1, (25197, coll. PG, det. PG, Si1296); 1 male, 4 females, Sungei Buloh, 27 Jul.2005, Mal. 1, (25272, coll. PG, det. PG, Si1291); 2 males, 5 females, Sungei Buloh, 27 Jul.2005, Mal. 2, (25273, coll. PG, det. PG, Si1283); 3 males, 4 females, Sungei Buloh, 5 Aug.2005, Mal. 1, (25284, coll. PG, det. PG, Si1261); 1 male, 2 females, Sungei Buloh, 5 Aug.2005, Mal. 2, (25285, coll. PG, det. PG, Si1265); 2 males, 9 females, Sungei Buloh, 26 Aug.2005, Mal. 1, (25319, coll. PG, det. PG, Si1270); 4 males, Sungei Buloh, 7 Sep.2005, Mal. 1, (25336, coll. PG, det. PG, Si1196); 1 male, Sungei Buloh, 7 Sep.2005, Mal. 2, (25337, coll. PG, det. PG, Si1189); 3 males, Sungei Buloh, 16 Sep.2005, Mal. 2, (25355, coll. PG, det. PG, Si1198); 2 males, Sungei Buloh, 28 Sep.2005, Mal. 1, (25431, coll. PG, det. PG, Si1175); 2 males, 1 female, Sungei Buloh, 28 Sep.2005, Mal. 2, (25432, coll. PG, det. PG, Si1172); 3 males, 1 female, Sungei Buloh, 14 Oct.2005, Mal. 1, (25393, coll. PG, det. PG, Si1274); 1 male, Sungei Buloh, 14 Oct.2005, Mal. 2, (25394, coll. PG, det. PG, Si1223); 1 male, Sungei Buloh, 28 Oct.2005, Mal. 1, (25406, coll. PG, det. PG, Si1220); 2 males, Sungei Buloh, 28 Oct.2005, Mal. 1, (25406, coll. PG, det. PG, Si1182); 1 male, 2 females, Sungei Buloh, 18 Nov.2005, Mal. 1, (25425, coll. PG, det. PG, Si1277).
1 male, [no further locality data], 20/6-33, coll. D. H. Murphy, 20 Jun.1975 (on pin, ZRC, det. PG), quoted in Evenhuis & Grootaert as species B.

Diagnosis. – Antenna dark yellow, first flagellomere brown, 2.0 times as long as wide. Mid femur with 8 v (shorter than femur is wide); hind femur with row of black v. Cercus with a long digitiform process near its base.

Description. – Male: Body length 4.6–4.8 mm, wing length 3.8–4.0 mm.

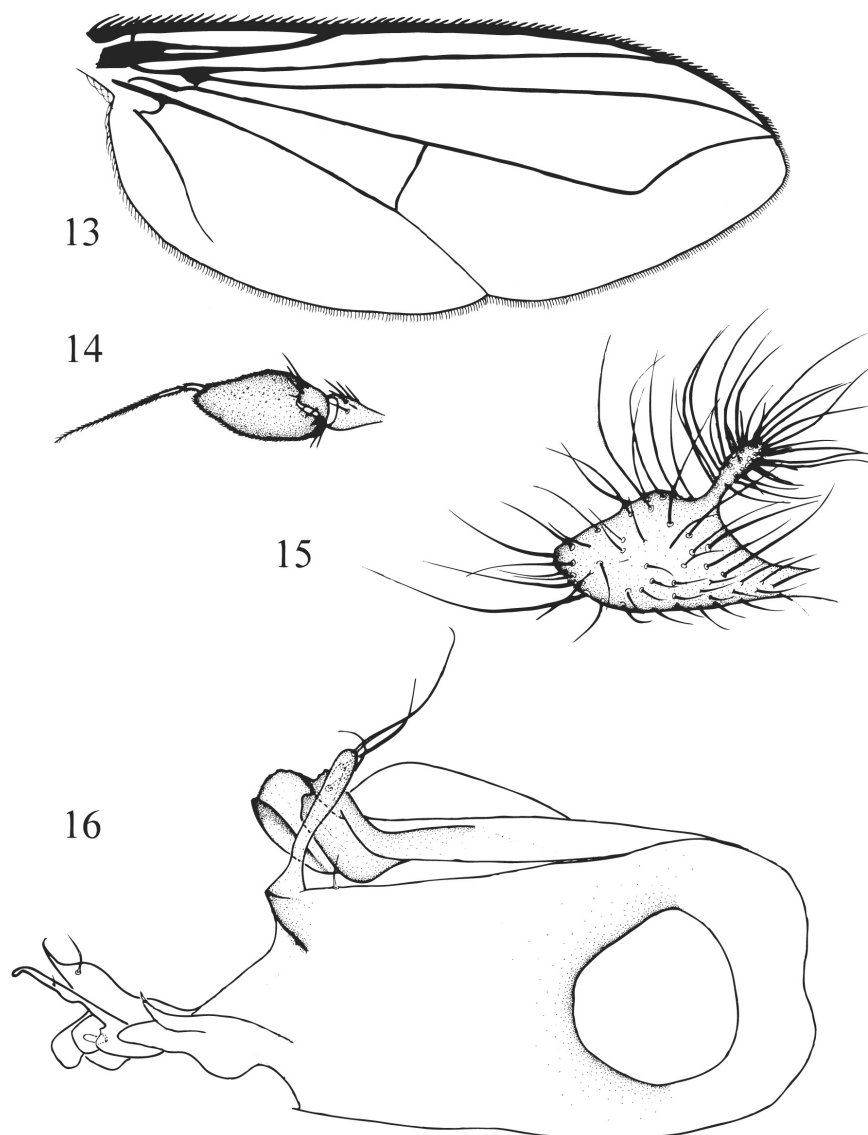
Head metallic green with pale grey pollen. Face narrowing downward, distinctly narrower than first flagellomere. Hairs and bristles black. Mid and lower postocular bristles (including posteroventral hairs) pale. Antenna (Fig. 14) dark yellow, first flagellomere brown, 2.0 times as long as wide; arista upper-apical, minutely pubescent with very short basal segment. Proboscis blackish brown with black hairs, palpus brown with black hairs and black apical bristle.

Thorax metallic green with pale grey pollen. Hairs and bristles black. Six strong dc, 6 pairs of acr; scutellum with 6 bristles (lateral pair longest). Propleuron with 1 black bristle on lower part. Legs yellow, fore coxa yellow with blackish base, mid coxa black with yellow apex, hind coxa mainly blackish. Hind femur with the most tip blackish. Fore tarsomeres 4–5 brownish, mid tarsus from tip of tarsomere 1 onward black, hind tarsus black. Hairs and bristles black. Mid and hind coxae

each with 1 exterior bristle. Mid and hind femora each with 1 preapical bristle. Mid femur with 8 v (shorter than femur is wide); hind femur with row of black v. Fore tibia with 3 ad and 2 pd, apically with 2 short bristles; mid tibia with 4 ad, 3 pd and 1 av, apically with 4 bristles; hind tibia with 5 ad, 4 pd and 8 thin v, apically with 4 bristles. Hind tarsomere 1 with 4 v. Relative lengths of tibia and 5 tarsomeres LI 1.8 : 1.0 : 0.35 : 0.25 : 0.15 : 0.2; LII 2.35 : 1.2 : 0.7 : 0.5 : 0.3 : 0.2; LIII 2.5 : 0.9 : 1.4 : 0.9 : 0.4 : 0.25. Wing (Fig. 13) hyaline, veins black; R_{4+5} and M distinctly convergent, CuAx ratio 0.6. Squama yellow with black hairs. Halter yellow.

Abdomen metallic green with pale grey pollen. Hairs and bristles black. Male genitalia (Figs. 15–16): Epandrium longer than wide; lateral lobe long finger-like with 3 bristles; cercus with long digitiform process near its base, bearing long bristles; hypandrium thick.

Female: Similar to male except the first flagellomere shorter and 1.1 times as long as wide.



Figs. 13–16. *Paraclius digitatus*, new species: 13, wing; 14, antenna; 15, cercus; 16, male genitalia.

Distribution. – Singapore.

Etymology. – The specific name refers to the digitiform process of the cercus near the ventral apex.

Remarks. – *Paraclius digitatus* can be distinguished from other species by the cercus having a long digitiform process at its base.

***Paraclius obtus*, new species**
(Figs. 17–21)

Material examined. – Holotype: male, Sungei Buloh, 11 May.2005, Mal. 1, (25159, coll. P. Grootaert, Si814, ZRC).

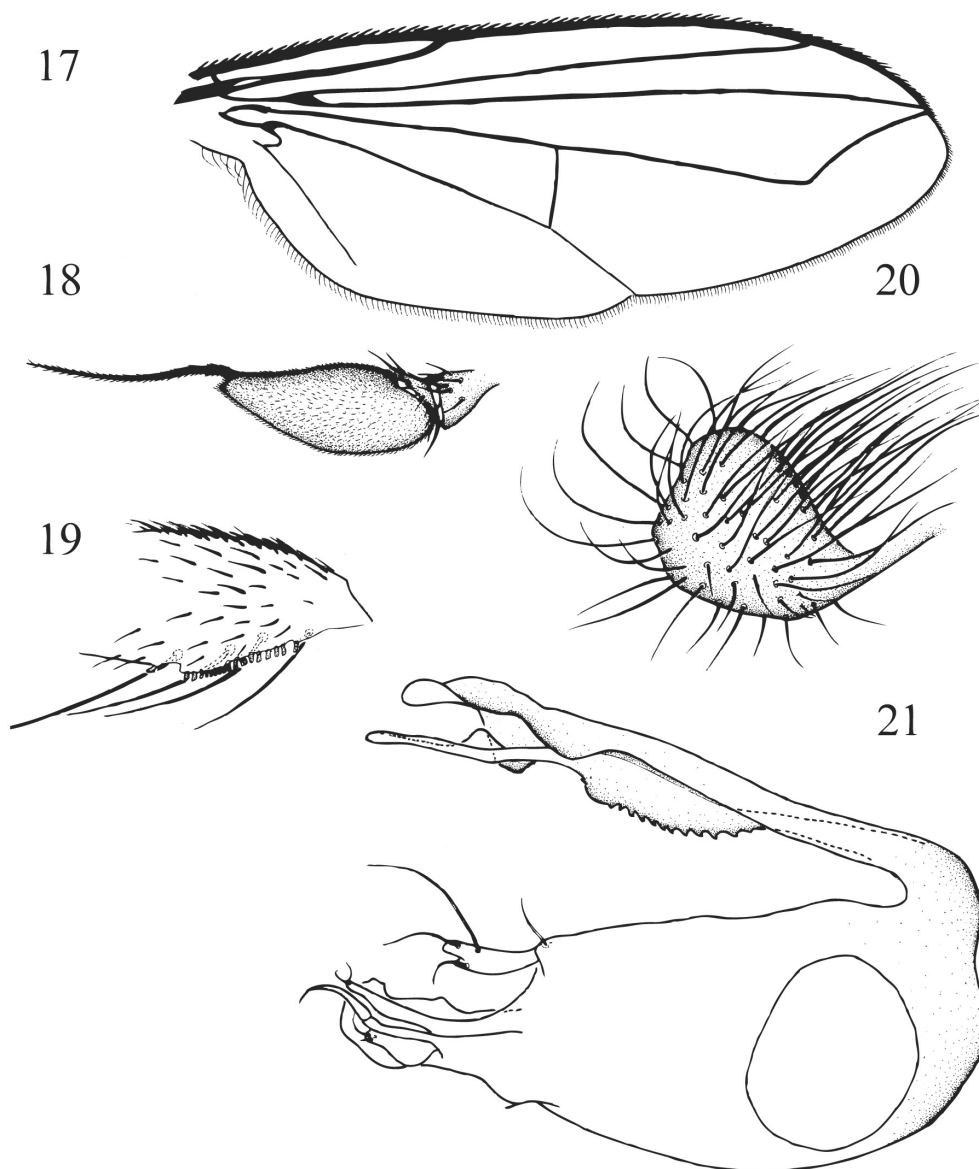
Paratypes: 1 male, Sungei Buloh, 22 Apr.2005, Mal. 2, (25078, coll. PG, det. PG, Si772); 2 males, Sungei Buloh, 11 May.2005, Mal. 1, (25159, coll. PG, Si819); 1 male, Sungei Buloh, 11 May.2005, Mal. 1, (25159, coll. PG, det. LZ, Si814); 1 male, Sungei Buloh, 11

May.2005, Mal. 2, (25160, coll. PG, det. PG, Si1239, deposited in IOZ); 3 males, Sungei Buloh, 22 Apr.2005, Mal. 2, (25078, coll. PG, det. PG, Si775); 1 male, Sungei Buloh, 22 Apr.2005, Mal. 2, (25078, coll. PG, det. PG, Si1216).

Diagnosis. – Antenna dark yellow, first flagellomere with narrow dark dorsal margin, ventral margin yellowish, 2.3 times as long as wide. Mid femur at its base with 3–4 black v (slightly longer than femur is wide) and with a row of 14 spinules on posterior ventral margin.

Description. – Male: Body length 4.7–4.8 mm, wing length 3.9–4.0 mm.

Head metallic green with pale grey pollen. Face narrowing downward, almost touching just below middle, distinctly narrower than first flagellomere. Hairs and bristles black. Mid and lower postocular bristles (including posteroventral hairs) pale. Antenna (Fig. 18) dark yellow, first flagellomere with



Figs. 17–21. *Paraclius obtus*, new species: 17, wing; 18, antenna; 19, apex of mid femur, posterior view; 20, cercus; 21, male genitalia.

dark brown dorsal margin, 2.3 times as long as wide; arista black, minutely pubescent with very short basal segment. Proboscis black with black hairs, palpus black with black hairs and black apical bristle.

Thorax metallic green with pale grey pollen. Six strong dc, 5 pairs of acr; scutellum with 6 bristles (lateral pair longest). Propleuron with 1 black bristle at lower part. Legs yellow, fore coxa yellow, mid coxa black with yellow apex, hind coxa mainly dark yellow with black spot. Fore tarsomeres 3–5 black, mid and hind tarsi from tip of tarsomere 1 onward blackish to black. Hairs and bristles black. Mid and hind coxae each with 1 exterior bristle. Mid and hind femora each with 1 preapical bristle. Mid femur (Fig. 19) with 3–4 v (slightly longer than femur is wide) basally and Mid femur at its base with 3–4 black v (slightly longer than femur is wide) and with a row of 14 spinules on posterior ventral margin. Fore tibia with 3 ad and 2 pd, apically with 2 short bristles; mid tibia with 4 ad, 3 pd and 1 av, apically with 5 bristles; hind tibia with 4 ad, 4 pd and one row of thin v, apically with 4 bristles. Relative lengths of tibia and 5 tarsomeres LI 1.75 : 1.0 : 0.5 : 0.3 : 0.17 : 0.2; LII 2.5 : 1.2 : 0.8 : 0.6 : 0.4 : 0.23; LIII 2.75 : 0.9 : 1.5 : 1.0 : 0.5 : 0.25. Wing (Fig. 17) hyaline, veins black; R_{4+5} and M distinctly convergent apically, CuAx ratio 0.8. Squama yellow with black hairs. Halter yellow.

Abdomen metallic green with pale grey pollen. Hairs and bristles black. Male genitalia (Figs. 20–21): Epandrium longer than wide, lateral lobe short with 3 bristles; cercus black, obtuse apically, with long bristles; hypandrium obtuse apically; aedeagus with small denticles at middle.

Female: Unknown.

Distribution. – Singapore.

Etymology. – The specific name refers to the obtuse ventral apex of cercus.

Remarks. – *Paraclius obtus* is similar to *P. polychaetus*, new species, in having the first flagellomere elongated, more than two times as long as wide, and the aedeagus with denticles, but may be separated from the latter by the cercus with the obtuse ventral apex, the mid femur with a row of spinules at its base, and the hind femur without the ventral bristles. In *P. polychaetus*, the antenna is completely black, mid femur has no denticle-like spines on the posterior ventral margin, but the hind femur has 5 v in the basal half.

Paraclius polychaetus, new species

(Figs. 22–25)

Material examined. – Holotype: male, Sungei Buloh, 11 May.2005, Mal. 1, (25159, coll. P. Grootaert, Si816, ZRC).

Paratypes: 1 male, same data as holotype; 2 males, Si830 (deposited in IOZ); 2 males, Sungei Buloh, 11 May.2005, Mal. 1, (25159, coll. PG, det. LZ, Si816); 1 male, Sungei Buloh, 10 Jun.2005, Mal. 2, (25168, coll. PG, det. PG, Si1229); 1 male, Sungei Buloh, 27 Jul.2005, Mal. 2, (25273, coll. PG, det. PG, Si1282); 1 male, Sungei

Buloh, 16 Sep.2005, Mal. 1, (25354, coll. PG, det. PG, Si1186); 1 male, Sungei Buloh, 16 Sep.2005, Mal. 1, (25163, coll. PG, det. PG, Si1209); 1 male, Sungei Buloh, 28 Oct.2005, Mal. 1, (25406, coll. PG, det. PG, Si1219); 1 male, Sungei Buloh, 18 Nov.2005, Mal. 1, (25425, coll. PG, det. PG, Si1276).

Diagnosis. – Antenna brownish; first flagellomere black, 2.2 times as long as wide. Mid femur with 1 black v at basal third (longer than femur is wide), hind femur with 5 black v (slightly shorter than femur is wide) on basal half.

Description. – Male: Body length 5.4–5.5 mm, wing length 4.3–4.5 mm.

Head metallic green with pale grey pollen. Face narrowing downward, distinctly narrower than first flagellomere. Hairs and bristles black. Mid and lower postocular bristles (including the posteroventral hairs) pale. Antenna (Fig. 23) brownish, first flagellomere black, 2.2 times as long as wide; arista black, apicodorsal, minutely pubescent with very short basal segment. Proboscis brown with black hairs, palpus dark yellow with black hairs and black apical bristles.

Thorax metallic green with pale grey pollen. Six strong dc, 6 pairs of acr; scutellum with 6 bristles (lateral pair longest). Propleuron with 1 black bristle at lower part. Legs yellow, all coxae black with yellow apex. Hind femur with extreme tip black. Fore tarsomeres 3–5 brownish; mid tarsus from tip of tarsomere 1 onward black; hind tarsus black. Hairs and bristles black. Mid and hind coxae each with 1 exterior bristle. Mid and hind femora each with 1 preapical bristle. Mid femur with 1 v at basal third (longer than femur is wide), hind femur with 5 black v (slightly shorter than thickness of femur) on basal half. Fore tibia with 4 ad and 2 pd, apically with 2 bristles; mid tibia with 5 ad, 4 pd and 1 av, apically with 4 bristles; hind tibia with 6 ad and 4 pd, apically with 3 bristles. Hind tarsomere 1 with 3 v. Relative lengths of tibia and 5 tarsomeres LI 1.9 : 1.1 : 0.4 : 0.25 : 0.24 : 0.26; LII 3.0 : 1.3 : 0.85 : 0.65 : 0.4 : 0.25; LIII 3.25 : 1.0 : 1.5 : 1.0 : 0.5 : 0.25. Wing (Fig. 22) hyaline, tinged with greyish, veins black; R_{4+5} and M distinctly convergent apically, CuAx ratio 0.6. Squama yellow with black hairs. Halter yellow.

Abdomen metallic green with pale grey pollen. Hairs and bristles black. Male genitalia (Figs. 24–25): Epandrium longer than wide, lateral lobe with 3 bristles; cercus with dark brown tip, base yellowish brown; triangular with long bristles; hypandrium with small denticles near base; aedeagus with denticles near apex.

Female: Unknown.

Distribution. – Singapore.

Etymology. – The specific name refers to the hind femur with numerous ventral bristles.

Remarks. – *Paraclius polychaetus* is similar to *P. obtus*, new species, by the elongated first antennal flagellomere and the aedeagus with denticles. It may be separated from the latter

by the triangular cercus and the hind femur bearing 5 ventral bristles on basal half. In *P. obtus*, the cercus is rounded with an obtuse ventral apex, and the hind femur bears no ventral bristles.

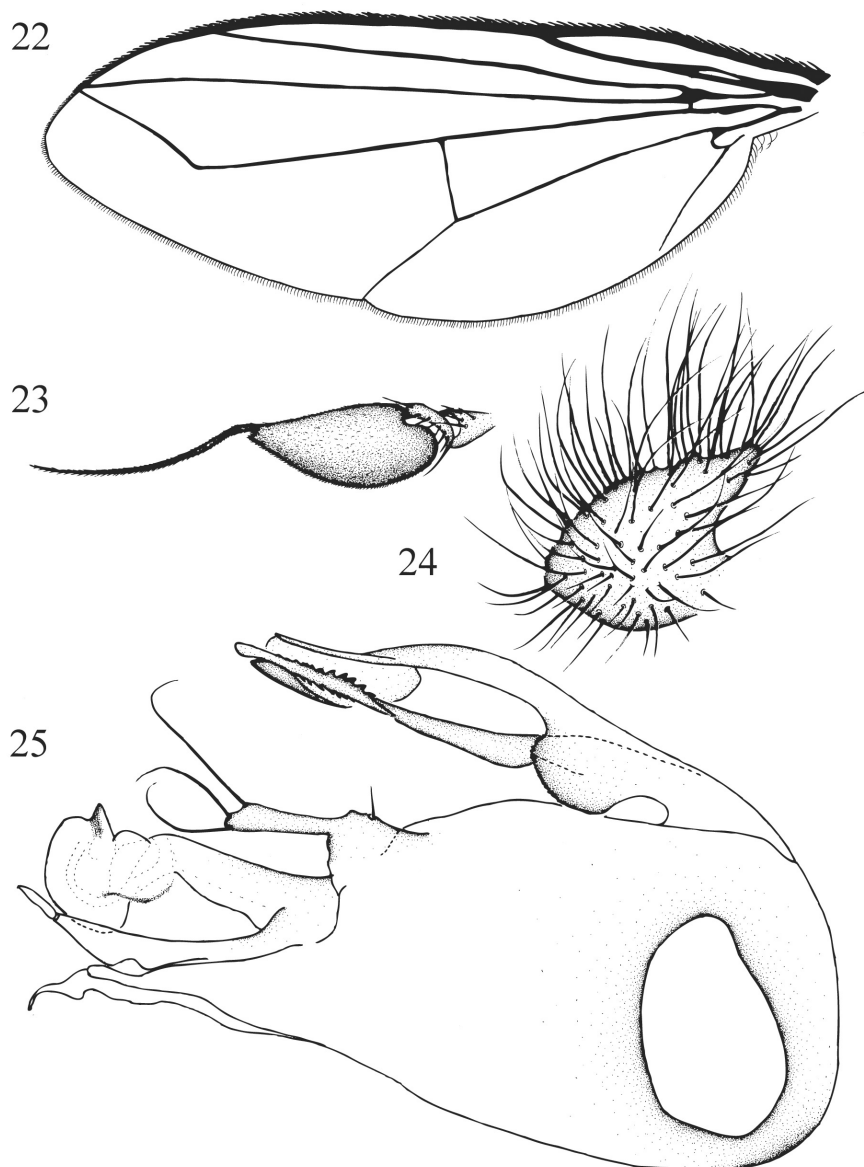
***Paraclius serratus*, new species**

(Figs. 26–29)

Material examined. – Holotype: male, Sungei Buloh, 11 May 2005, Mal. 1, (25159, coll. P. Grootaert, Si818, ZRC).

Paratypes – 4 males, Lim Chu Kang, 9 Dec.2002 (22056, coll. PG, det. LZ, Si358, deposited in IOZ); 1 male, 1 female, Pulau Ubin, Chek Jawa, 1 Dec.2003 (Si132, coll. PG, det. LZ, 23119); 2 males, 2 females, (25230, coll. PG, det. PG, Si1246); 1 male, 1 female, Chek Jawa, 11 Dec.2003, (23119, coll. PG, det. PG, Si132); 4 males, Lim Chu Kang, 9 Dec.2002, (22056, coll. PG, det. LZ, Si358); 2 males, Pulau Ubin, 26 Oct.2005 mal, (25399, coll. PG, det. PG, Si1133); 3 males, 2 females, Sungei Buloh, 22 Apr.2005, Mal. 2,

(25078, coll. PG, det. PG, Si774); 2 males, 6 females, Sungei Buloh, 27 Apr.2005, Mal. 2, (25096, coll. PG, det. PG, Si1234); 3 males, Sungei Buloh, 11 May.2005, Mal. 1, (25159, coll. PG, det. LZ, Si817); 17 males, Sungei Buloh, 11 May.2005, Mal. 2, (25160, coll. PG, det. LZ, Si1240); 1 male, Sungei Buloh, 18 May.2005, Mal. 2, (25162, coll. PG, det. PG, Si1203); 2 males, Sungei Buloh, 25 May.2005, Mal. 2, (25164, coll. PG, det. PG, Si1213); 4 males, 1, Sungei Buloh, 1 Jun.2005, Mal. 2, (25166, coll. PG, det. PG, Si1284); 1 male, 5 females, Sungei Buloh, 10 Jun.2005, Mal. 1, (25167, coll. PG, det. LZ, Si1243); 1 male, 5 females, Sungei Buloh, 10 Jun.2005, Mal. 1, (25167, coll. PG, det. PG, Si827); 3 males, Sungei Buloh, 10 Jun.2005, Mal. 2, (25168, coll. PG, det. PG, Si1231); 2 males, 1 female, Sungei Buloh, 15 Jun.2005, Mal. 2, (25170, coll. PG, det. PG, Si1254); 1 female, Sungei Buloh, 22 Jun.2005, Mal. 2, (25172, coll. PG, det. PG, Si1299); 2 females, Sungei Buloh, 6 Jul.2005, Mal. 1, (25197, coll. PG, det. PG, Si1297); 2 females, Sungei Buloh, 20 Jul.2005., Mal. 1, (25264, coll. PG, det. PG, Si1257); 2 females, Sungei Buloh, 27 Jul.2005., Mal. 1, (25272, coll. PG, det. PG, Si1292); 1 female, Sungei Buloh, 5 Aug.2005., Mal. 1, (25284, coll. PG, det. PG, Si1263); 1 male, 2 females, Sungei Buloh, 5 Aug.2005, Mal. 2, (25285, coll. PG, det. PG, Si1264); 1 male, 5 females, Sungei Buloh, 26 Aug.2005, Mal. 1, (25319, coll. PG, det. PG, Si1269); 1



Figs. 22–25. *Paraclius polychaetus*, new species: 22, wing; 23, antenna; 24, cercus; 25, male genitalia.

male, Sungei Buloh, 7 Sep.2005, Mal. 1, (25336, coll. PG, det. PG, Si1197); 13 females, Sungei Buloh, 7 Sep.2005, Mal. 2, (25337, coll. PG, det. PG, Si1188); 13 females, Sungei Buloh, 16 Sep.2005, Mal. 1, (25354, coll. PG, det. PG, Si1185); 1 male, 16 females, Sungei Buloh, 28 Sep.2005, Mal. 1, (25431, coll. PG, det. PG, Si1176); 2 males, 13 females, Sungei Buloh, 28 Sep.2005, Mal. 2, (25432, coll. PG, det. PG, Si1171); 6 females, Sungei Buloh, 14 Oct.2005, Mal. 1, (25393, coll. PG, det. PG, Si1275); 1 male, 14 females, Sungei Buloh, 28 Oct.2005, Mal. 1, (25406, coll. PG, det. PG, Si1181); 3 males, 7 females, Sungei Buloh, 9 Nov.2005, Mal. 1, (25417, coll. PG, det. PG, Si1232); 2 females, Sungei Buloh, 18 Nov.2005, Mal. 1, (25425, coll. PG, det. PG, Si1278).

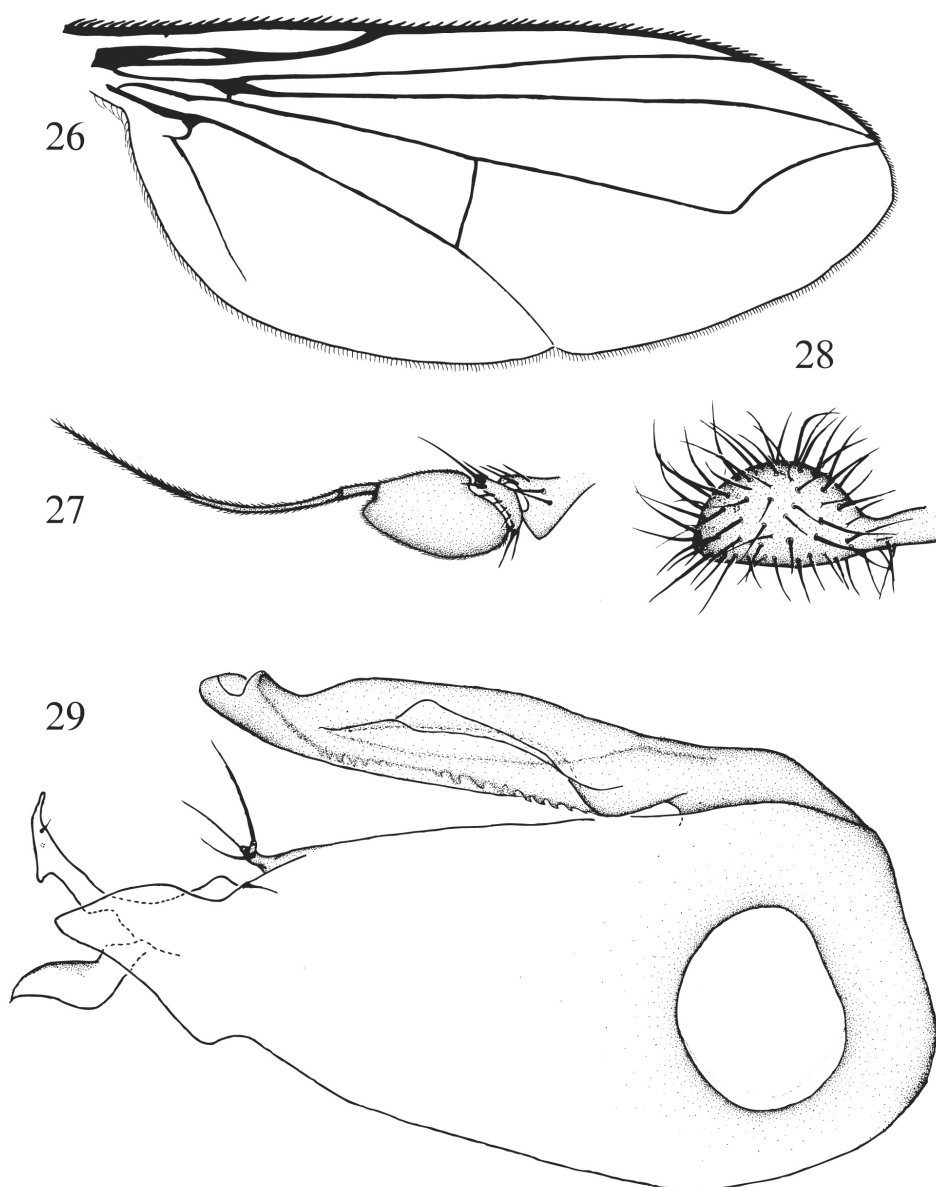
1 male, Kranji mangrove, coll. D.H. Murphy, 16 Oct.1984 (on pin, ZRC, det. PG, quoted in Evenhuis & Grootaert as *Paraclius* sp. C); 1 male, Mandai mangrove coll. D.H. Murphy, 7 Jun.1977 (moulded, on pin, ZRC, det. PG, quoted in Evenhuis & Grootaert as *Paraclius* sp. C).

Diagnosis. – Antenna with first flagellomere 1.5 times as long as wide. Mid and hind femora with row of 10 v (shorter than femur is wide). Cercus with a round ventral margin.

Description. – Male: Body length 4.6–5.2 mm, wing length 3.9–4.2 mm.

Head metallic green with pale grey pollen. Face narrowing downward, distinctly narrower than first flagellomere. Hairs and bristles black. Mid and lower postocular bristles (including the posteroventral hairs) black. Antenna (Fig. 27) dark yellow, with first flagellomere blackish brown. First flagellomere 1.5 times as long as wide, obtuse apically; arista black, minutely pubescent with very short basal segment. Proboscis black with black hairs, palpus black with black hairs and black apical bristle.

Thorax metallic green with pale grey pollen. Six strong dc, 6 pairs of acr; scutellum with 6 bristles (lateral pair longest). Propleuron with 1 black bristle on lower part. Legs yellow, fore coxa yellow with blackish base, mid and hind coxae black with yellow apex. Hind femur with black apex. Mid tarsi from



Figs. 26–29. *Paraclius serratus*, new species: 26, wing; 27, antenna; 28, cercus; 29, male genitalia.

tip of tarsomere 1 onward blackish to black, hind tarsus black. Hairs and bristles black. Mid and hind coxae each with 1 exterior bristle. Mid and hind femora each with 1 preapical bristle. Mid and hind femora with row of 10 v (shorter than femur is wide). Fore tibia with 3 ad, 3 pd and 1 pv, apically with 2 short bristles; mid tibia with 4 ad, 2 pd and 1 av, apically with 4 bristles; hind tibia with 4 ad, 4 pad and one row of v. Relative lengths of tibia and 5 tarsomeres LI 1.6 : 0.65 : 0.3 : 0.25 : 0.15 : 0.15; LII 2.3 : 1.0 : 0.5 : 0.5 : 0.25 : 0.2; LIII 2.65 : 0.7 : 1.0 : 0.75 : 0.45 : 0.25. Wing (Fig. 26) hyaline, veins brown; R_{4+5} and M distinctly convergent, CuAx ratio 0.7. Squama yellow with black hairs. Halter yellow.

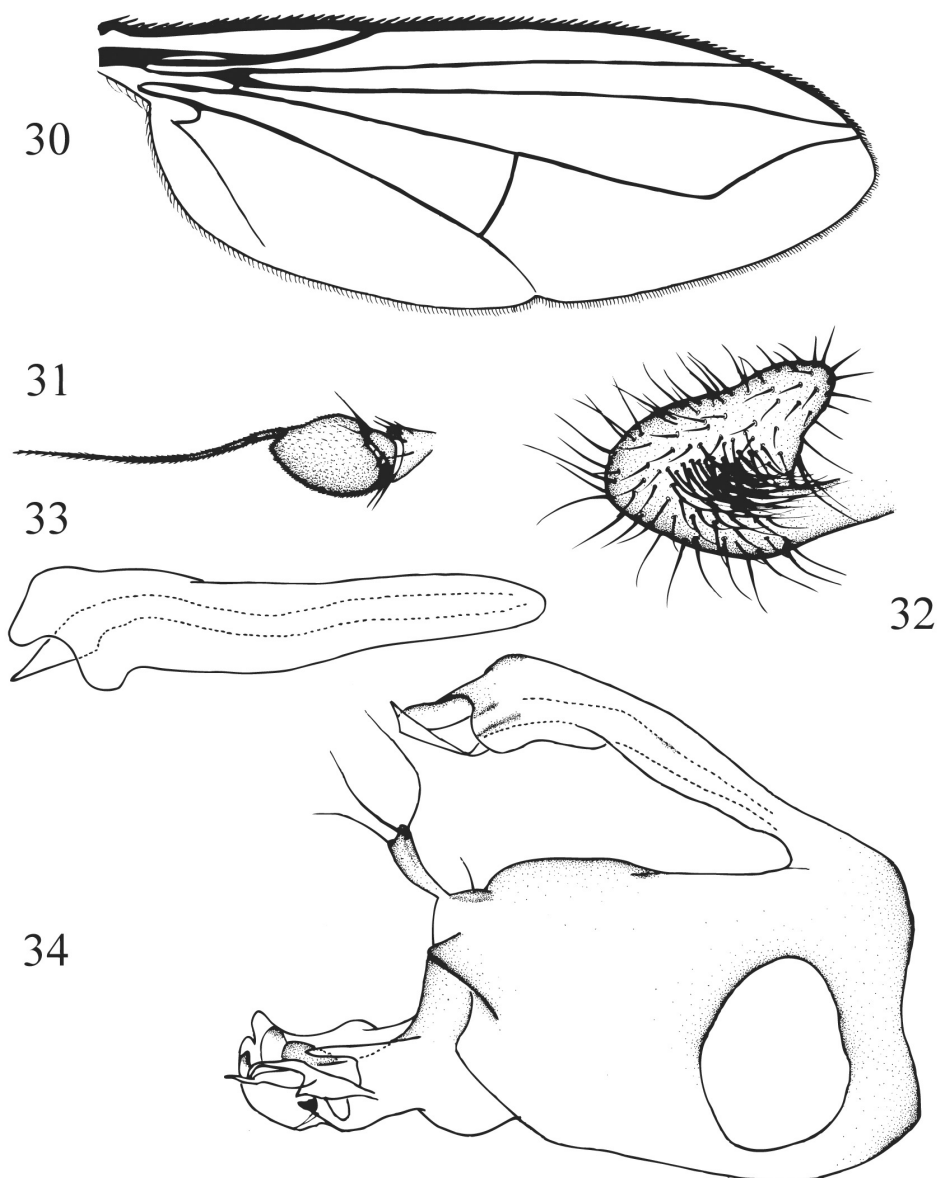
Abdomen metallic green with pale grey pollen. Hairs and bristles black. Male genitalia (Figs. 28–29): Epaudrium longer than wide with hyaline apical process, lateral epandrial lobe rather short with 3 apical bristles; cercus black, with a round ventral margin; hypandrium thick with apical notch; aedeagus with distinct denticles.

Female: Similar to male except first flagellomere 1.1 times as long as wide.

Distribution. – Singapore.

Etymology. – The specific name refers to the serrate margin of the aedeagus.

Remarks. – *Paraclius serratus* is similar to *P. singaporensis*, new species, in having the first flagellomere rather short, but may be separated from the latter by the cercus having a round ventral margin and the aedeagus with denticles. In *P. singaporensis*, the cercus is nearly triangular in lateral view, and the aedeagus bears no denticles.



Figs. 30–34. *Paraclius singaporensis*, new species: 30, wing; 31, antenna; 32, cercus; 33, hypandrium in ventral view; 34, male genitalia.

Paraclius singaporensis, new species
(Figs. 30–34)

Material examined. – Holotype: male, Sungei Buloh, 22 Apr. 2005, Mal. 2 (25078, coll. PG, Si771, ZRC).

Paratypes – 1 male, Sungei Buloh, 22 Apr. 2005, Mal. 2 (25078, coll. PG, det. LZ, Si771, ZRC). 2 males, Sungei Buloh, 11 May. 2005, Mal. 2, (25160, coll. PG, det. LZ, Si1241, deposited in IOZ); 2 males, Sungei Buloh, 11 May. 2005, Mal. 2, (25160, coll. PG, det. PG, Si1241); 2 males, Sungei Buloh, 11 May. 2005, Mal. 2, (25160, coll. PG, det. PG, Si830); 1 male, Sungei Buloh, 1 Jun. 2005, Mal. 2, (25166, coll. PG, det. PG, Si1286); 2 males, Sungei Buloh, 10 Jun. 2005, Mal. 2, (25168, coll. PG, det. PG, Si1230); 1 male, 2 females, Sungei Buloh, 15 Jun. 2005, Mal. 2, (25170, coll. PG, det. PG, Si1255); 1 male, 2 females, Sungei Buloh, 20 Jul. 2005, Mal. 1, (25264, coll. PG, det. PG, Si1256); 1 male, Sungei Buloh, 28 Sep. 2005, Mal. 1, (25431, coll. PG, det. PG, Si1177).

Diagnosis. – Antenna with first flagellomere with narrow black dorsal margin, 1.3 times as long as wide. Mid femur with 5 v at base (5th shortest and others slightly shorter than femur is wide), hind femur with 4 v at base (shorter than femur is wide).

Description. – Male: Body length 4.5–4.8 mm, wing length 3.7–4.0 mm.

Head metallic green with pale grey pollen. Face narrowing downward, distinctly narrower than first flagellomere. Hairs and bristles black. Mid and lower postocular bristles (including posteroventral hairs) pale. Antenna (Fig. 31) dark brown except scape somewhat pale, first flagellomere with narrow black dorsal margin, 1.2–1.3 times as long as wide; arista apicodorsal, minutely pubescent with very short basal segment. Proboscis black with black hairs, palpus black with black hairs and black apical bristles.

Thorax metallic green with pale grey pollen. Hairs and bristles black. Six strong dc, 7–8 pairs of acr; scutellum with 6 bristles (lateral pair longest). Propleuron with 1 black bristle on lower part. Legs yellow; fore coxa yellow, mid coxa black with yellow apex, hind coxa mainly black with yellow apex. Hind femur with extreme tip black. Mid tarsus from tip of tarsomere 2 onward blackish to black; hind tarsus blackish to black. Hairs and bristles black. Mid and hind coxae each with 1 exterior bristle. Mid and hind femora each with 1 preapical bristle. Mid femur with 5 v at base (5th shortest and others slightly shorter than femur is wide), hind femur with 4 v at base (shorter than femur is wide). Fore tibia with 3 ad and 2 pd, apically with 2 short bristles; mid tibia with 4 ad, 3 pd and 1 av, apically with 5 bristles; hind tibia with 4 ad, 5 pd and one row of 12 thin v. Hind tarsomere 1 with 3 v. Relative lengths of tibia and 5 tarsomeres LI 1.65 : 0.85 : 0.25 : 0.25 : 0.15 : 0.15; LII 2.35 : 1.0 : 0.8 : 0.5 : 0.35 : 0.2; LIII 2.6 : 0.8 : 1.35 : 1.0 : 0.5 : 0.2. Wing (Fig. 30) hyaline, tinged with greyish, especially along anterior apical part; R₄₊₅ and M convergent apically. CuAx ratio 1.0. Squama yellow with black hairs. Halter yellow.

Abdomen metallic green with pale grey pollen. Hairs and

bristles black. Male genitalia (Figs. 32–34): Epandrium longer than wide, lateral lobe with 3 apical bristles; cercus black, nearly triangular in lateral view, with obtuse apex; hypandrium with apical incision in ventral view.

Female: Unknown.

Distribution. – Singapore.

Etymology. – The specific name refers to the type locality–Singapore.

Remarks. – *Paraclius singaporensis* is similar to *P. serratus*, new species, having the first flagellomere less than 1.5 times as long as wide, but may be separated from the latter by the cercus being nearly triangular in lateral view and the aedeagus without denticles. In *P. serratus*, the cercus has a rounded ventral margin, and the aedeagus bears denticles.

DISCUSSION

The seven new species recorded here all possess six scutellar bristles and live in mangroves. They differ in those characteristics from all other known Oriental *Paraclius*. In order to emphasize this relationship, we assign them to a new species group: the *singaporensis*-group. *Paraclius adligatus*, although yet only known from freshwater habitat in Singapore, also belongs to this group. All other Oriental species have only four scutellar bristles. Chinese *Paraclius* (except those from Taiwan that are poorly described and illustrated) have a lateral epandrial lobe bearing branched hairs and the surstylus is usually very large and complicated in structure. Most of these species occur in montane forest. Another group of species, including most Afrotropical species, are mainly characterized by a simple finger-like lateral lobe bearing simple, apical bristles. It is clear that a global revision of *Paraclius* is necessary to see whether the genus can be divided into at least these three major groups.

In their annotated checklist of the Dolichopodidae of Singapore, Evenhuis & Grootaert (2002) found five *Paraclius* species from Singapore in the collections of the Raffles Museum for Biodiversity Research, but only one species was bearing a name: *P. abbreviatus* Becker. In fact these specimens do not fit to Becker's description and new material is needed to eventually describe them. *Paraclius* sp. B quoted by Evenhuis and Grootaert (l.c.) is *P. digitatus*, new species. *Paraclius* sp. C is *P. serratus*, new species. *Paraclius* sp. D is identified here as *Tachytrechus tessellatus* Macquart, 1842. This large species was found quite often in drains and marshland during the survey of Singapore in 2005 by PG. Under *Paraclius* sp. E was a *T. tessellatus* without head. The three males and four females from Seletar Park, stream and canal, coll. H. K. Lua, 19 Aug. 1990 and conserved in alcohol were not found back.

ACKNOWLEDGEMENT

The third author thanks Prof. Dr. Peter Ng, director of Raffles

Museum for Biodiversity Research, and Prof. Dr. Rudolf Meier, head of the Evolutionary laboratory, for hosting him during his sabbatical stay at NUS. Mr. K. L. Yeo assisted in the field. The authorities of National Parks are thanked for issuing the research permits to collect in the National Parks. P.G. also acknowledges a grant in the Action 4 programme of the Belgian Science Policy. This research is supported partly by the National Natural Science Foundation of China (No. 30225009). Finally the authors thank Marc Pollet and Daniel Bickel for critically reviewing the manuscript.

LITERATURE CITED

- Becker, T. H., 1922. Dipterologische Studien Dolichopodidae der Indo-Australischen Region. *Capita Zoologica*, **1**: 1-247.
- Bickel, D. J. & C. E. Dyte, 1989. Family Dolichopodidae. In: Evenhuis, N. (ed.), *Catalog of Australasian and Oceanian Diptera*. Bishop Museum Press, Honolulu. Pp. 393-418.
- Brooks, S., 2005. Systematics and phylogeny of Dolichopodinae (Diptera: Dolichopodidae). *Zootaxa*, 857: 1-158.
- Dyte, D. E., 1975. Family Dolichopodidae. In: Delfinado, M. D. & D. E. Hardy (eds.), *A Catalog of the Diptera of the Oriental Region 2*. The University Press of Hawaii, Honolulu. Pp. 212-258.
- Evenhuis, N. L. & P. Grootaert, 2002. Annotated checklist of the Dolichopodidae (Diptera) of Singapore, with descriptions of a new genus and new species. *Raffles Bulletin of Zoology*, **50**(2): 301-316.
- Grichanov, I. Ya. 2004. Review of Afrotropical Dolichopodinae. *Plant Protection News Supplement*: 1-245.
- I. C. Z. N. [International Commission on Zoological Nomenclature], 2004. Opinion 2087 (Case 3130). *Pelastoneurus* Loew, 1861 (Insecta, Diptera): conserved. *Bulletin of Zoological Nomenclature*, **61**(3): 200-201.
- Lin, F. J. & C. S. Chen, 1999. The name list of Taiwan Diptera. *The Taiwan Fauna*, **1**: 1-124.
- Negrobov, O. P., 1991. Family Dolichopodidae, In: Sóos, Á. & L. Papp (eds.), *Catalogue of Palaearctic Diptera*. **7**: 11-139.
- Dolichopodidae–Platyppezidae*. Akadémiai Kiadó, Budapest.
- Olejníček, J. 2003. Some Dolichopodidae (Diptera) from Laos. *Biologia*, Bratislava, **58**: 191-200.
- Pollet, M. A., S. T. Brooks. & J. M. Cumming, 2004. *Catalog of the Dolichopodidae (Diptera) of America North of Mexico*. Bulletin of the American Museum of Natural History, New York.
- Robinson, H., 1970. Family Dolichopodidae. *Catalogue of the Diptera of the Americas South of the United States*, **40**: 1-92. Secretaria da Agricultura, Sao Paulo.
- Yang, D., 1996. Six new species of Dolichopodinae from China (Diptera, Dolichopodidae). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Entomologie*, **66**: 85-89.
- Yang, D., 1998. New and little known species of Dolichopodidae from China (I). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Entomologie*, **68**: 151-164.
- Yang, D. & P. Grootaert, 1999. Dolichopodidae (Diptera: Empidoidea) from Xishuangbanna (China, Yunnan Province): the Dolichopodinae and the genus *Chaetogonopteron* (I). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Entomologie*, **69**: 251-277.
- Yang, D. & Z. Li, 1998. Diptera: Dolichopodidae. In: Wu, H. (ed.), *Insects of Longwangshan Nature Reserve*. China Forestry Publishing House, Beijing: 318-323.
- Yang, D. & T. Saigusa, 1999a. New species of Dolichopodidae from Henan (Diptera: Empidoidea). In: Shen, X. & H. Pei (eds.), *Insects of the Mountains Funiu and Dabie Regions*. China Agricultural Sciencetech Press, Beijing: 189-210.
- Yang, D. & T. Saigusa, 1999b. New and little known species of Dolichopodidae from China (VI): Diptera from Emei Mountain (1). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Entomologie*, **69**: 233-250.
- Yang, D. & T. Saigusa, 2001. New and little known species of Dolichopodidae (Diptera) from China (XI). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Entomologie*, **71**: 237-256.
- Zhang, L., D. Yang & K. Masunaga, 2004. Notes on species of *Paraclius* from continental China (Diptera: Dolichopodidae). *Transactions of the American Entomological Society*, **130**(4): 493-497.