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Robber flies from mangroves in Hong Kong (Diptera: Asilidae)

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Front cover: The holotype of *Promachus hongkongensis* sp. nov. © Jérôme Constant (RBINS).

Robber flies from mangroves in Hong Kong (Diptera: Asilidae)

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Abstract

A survey of mangrove sites all around Hong Kong during Autumn 2017 and Spring 2018 revealed the presence of 12 species of robber flies. Only 38 specimens were found in a total of 103 Malaise trap samples operational during at least one month. The robber flies belong to five subfamilies. Two species are new to science and are described and illustrated: *Promachus hongkongensis* sp. nov. and *Ommatius guenardi* sp. nov. Based on the species accumulation curve, the total number of species is estimated to be around 16.

Keywords: robber flies, Hong Kong, mangrove, new species

Introduction

In the present paper we report on a survey of the Asilidae or robber flies in the mangroves around Hong Kong during 2017 and 2018. The survey was done with Malaise traps that were placed for at least one month in 24 sites all around Hong Kong in different periods of the year. Although only 38 specimens were recorded, they represented twelve species.

In general, robber flies do not thrive in humid habitats. They usually prefer dry sandy soils in which the larvae live. In addition, mangroves with their high salinity represent a harsh environment for most insects and thus it would not be a surprise that the diversity of robber flies is low. In an earlier short study in Singapore we found only four robber fly species in mangroves (TOMASOVIC & GROOTAERT, 2010) although further long term surveys indicated that many more species are present as can be seen on the website of BOS (Biodiversity of Singapore).

Hong Kong is situated at latitude 22° North. It has a seasonal subtropical climate and the seasons are more marked with a 'winter and a summer period'. Climate and weather information are monitored by the Hong Kong Observatory (2017). Mangroves reach their northern distribution limit in Hong Kong and they are composed of only eight mangrove tree species which is much poorer than around the equator. Among them *Bruguiera gymnorhiza* or Large-Leafed Orange Mangrove is fairly common. The fauna of Hong Kong belongs to the Oriental Realm although there are Palaearctic species present that are probably relics from the glaciations (Grootaert, unpublished).

In the present paper we give the records of the twelve species of robber flies and illustrate male and female of each species with stacked images. Among them two new species for science are described.

Material and methods

A survey was made from Autumn 2017 until Spring 2018 with Malaise traps in 24 mangrove sites all around Hong Kong (collected by C. Taylor, U. Chang, Cheung Shun Chi and B. Guénard). The traps were operational during at least 4 weeks per site. Two weeks in Autumn and early winter and two weeks in Spring. In total 103 samples were available, but robber flies were only found in 11 of the 24 sites (stations). Most of the sites were back mangroves (the traps were placed in the area covered with trees) and only a few were front mangroves (the traps were placed on the mud flats or sandy beaches in front of the mangrove forest). A code is attributed to each station e.g. 5BM1 in which 5B refers to the station and M1 to the period that the trap was operated at that station.

All specimens were conserved in 70% ethanol. Holotypes and paratypes are deposited in the collections of the Royal Belgian Institute of Natural Sciences in Brussels (RBINS) and some Voucher specimens in the Natural History Museum of the University of Hong Kong (HKU).

The habitus images were made with a Canon EOS 700 D camera with Sigma DG Macro lens, stacked with CombineZ software and optimized with Adobe Photoshop CS3.



Fig. 1. Distribution of the Malaise traps in mangrove around Hong Kong. © C. Taylor & U. Chang.

Taxonomy

Twelve species from 5 subfamilies have been collected in the mangroves around Hong Kong.

Family Asilidae Latreille, 1802

Subfamily Apocleinae Papavero, 1973

Genus *Irianjaya* Koçak & Kemal, 2009

The genus is Oriental and Australasian in distribution with 7 species (TOMASOVIC & VAN ACHTERBERG, 2011; TOMASOVIC, 2013a; TOMASOVIC & CONSTANT J., 2015). The genus name

Irianjaya was proposed by KOÇAK & KEMAL (2009) in replacement of *Amphiscolops* Hull, 1962.

***Irianjaya aquila* Tomasovic, 2013**

(Figs 2, 3)

Irianjaya aquila Tomasovic, 2013a: p. 78–79, Figs male p.79 n°8–10.

MATERIAL EXAMINED. Hong Kong: 1♂, Sha Tau Kok (Hoi Pui Leng, 1BM2), 10-24.V.2018, 22°31'46.52"N 114°12'28.19"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 1♂, Sha Tau Kok (1AM2), 10-24.V.2018, 22°32'5.14"N 114°12'39.47"E (C. Taylor, Cheung Shun Chi leg.; HKU); 1♂, Hong Kong (label of station missing, HKU01) 2018.

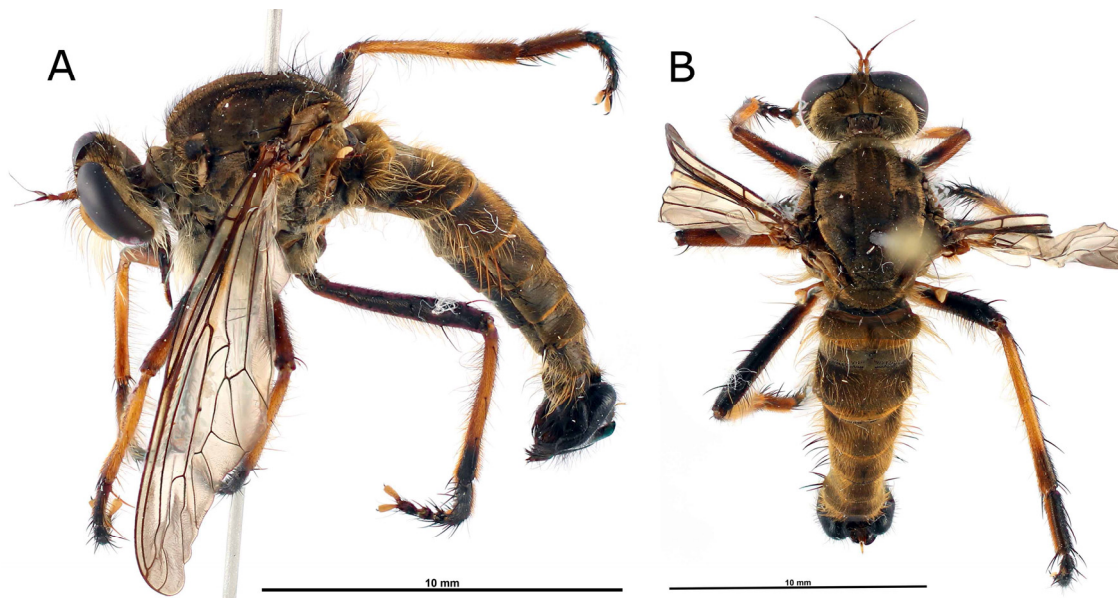


Fig. 2. *Irianjaya aquila* Tomasovic, 2013, male habitus. A, lateral view. B, dorsal view. Hong Kong, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

DISTRIBUTION. The species was previously only known from Vietnam (TOMASOVIC, 2013a) and is now also recorded from Hong Kong.

Genus *Philodicus* Loew, 1847

Type species: *Asilus javanus* Wiedemann, 1819.

This distinctive genus of the Old World tropics has a javanese type (*Asilus javanus*) OLDROYD (1972: 290). The genus is Afrotropical, Oriental & Palaearctic in distribution (TOMASOVIC, 2012). A key to the species from Southeast Asia and illustrations of the phallus can be found in TOMASOVIC & CONSTANT (2017: 7)

***Philodicus javanus* (Wiedemann, 1919)**

(Figs 4, 5)

An illustration of the phallus can be found in TOMASOVIC & CONSTANT (2017 p. 7, fig. 5C).

MATERIAL EXAMINED. Hong Kong: 2♂, 1♀, Shui Hau (19M2), 15-29.V.2018, 22°13'14.63"N 113°55'8.22"E (C. Taylor, Cheung Shun Chi, leg.; RBINS); 1♀, Sheung Pak Nai (10M5), 28.V-11.VI.2018, 22°27'5.44"N 113°57'43.67"E (C. Taylor, Cheung Shun Chi, leg.; RBINS).

DISTRIBUTION. Bangladesh, Borneo, India, Indonesia, Java, Pakistan (TOMASOVIC & CONSTANT, 2017).



Fig. 3. Distribution map of *Irianjaya aquila* Tomasovic, 2013, *I. areolaris* (Walker, 1860), *I. complens* (Walker, 1861), *I. halmeheraensis* Tomasovic & van Achterberg, 2010 and *I. impiger* (van der Wulp, 1872).

Genus *Promachus* Loew, 1848

The species of this genus fall into two main groups, the *fasciatus*-group with distinctive tufts of pale hairs on the first three abdominal segments and on the last tergite covering the male terminalia and the second group without these distinctive features (OLDROYD, 1972). For the Oriental species we refer to TOMASOVIC (2013b).

Promachus anicius (Walker, 1849)

(Fig. 6)

The phallus and epandrium have been illustrated by TOMASOVIC (2013b p. 20, figs. 10a,10b).

It is the only species of *Promachus* known at present from continental China and Taiwan. This species belongs to the *fasciatus*-group.

The phallus and epandrium have been illustrated by TOMASOVIC (2013b p. 20, figs. 10a,10b). It is the only species of *Promachus* known at present from continental China and Taiwan. This species belongs to the *fasciatus*-group.

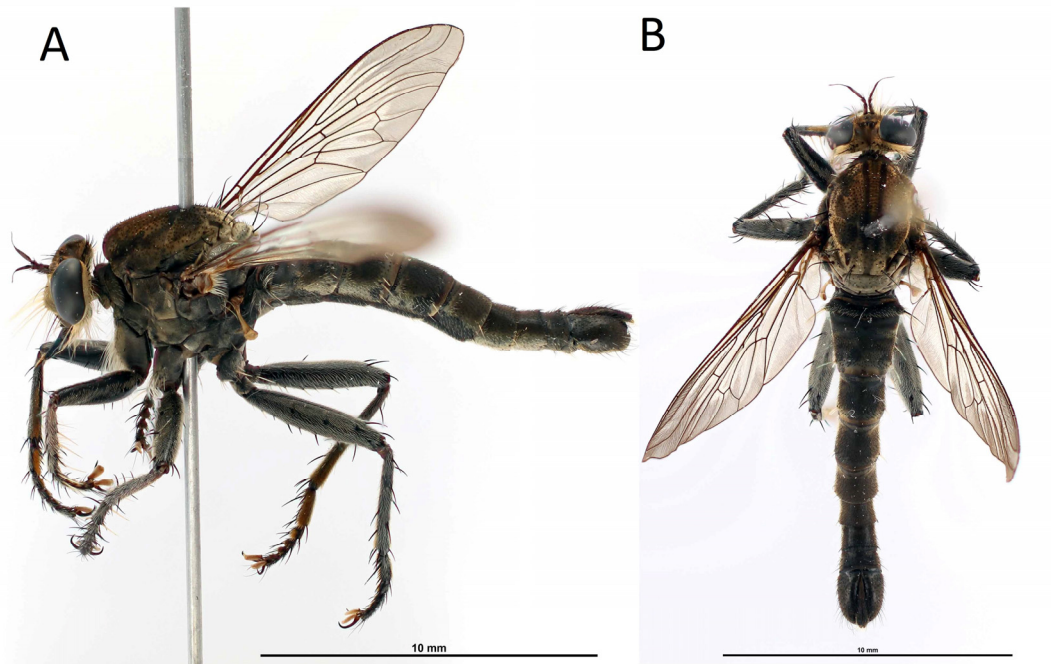


Fig. 4. *Philodicus javanus* (Wiedemann, 1919), male habitus. A, lateral view. B, dorsal view. To Kwa Peng, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

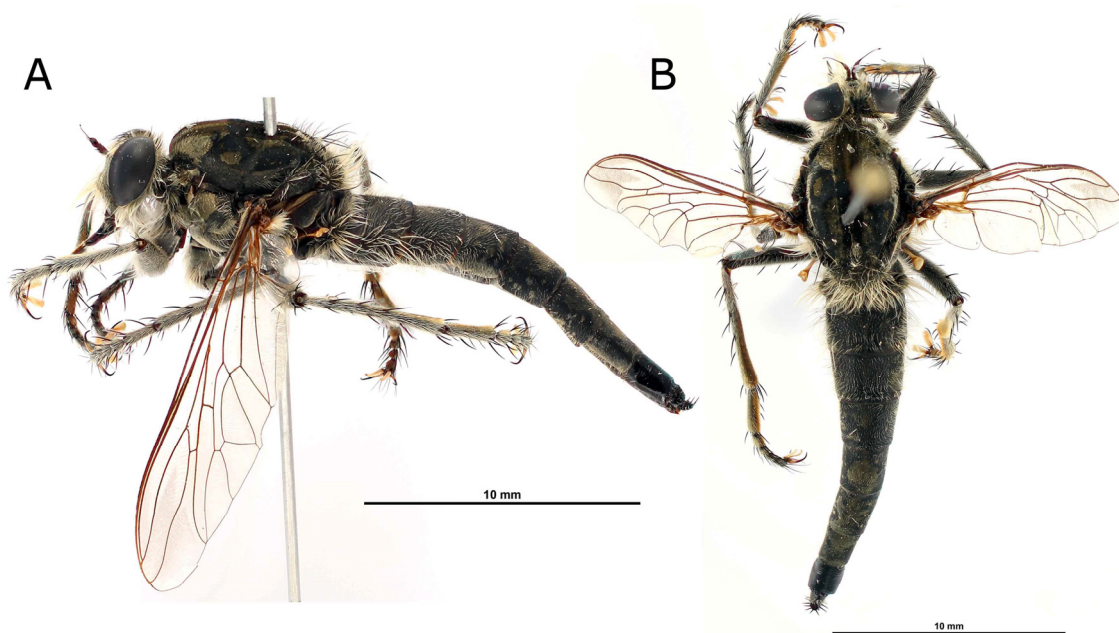


Fig. 5. *Philodicus javanus* (Wiedemann, 1919), female habitus. A, lateral view. B, dorsal view. Shui Hau, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

MATERIAL EXAMINED. Hong Kong: 2♂, Shui Hau (19M2), 15-29.V.2018, 22°13'14.63"N 113°55'8.22"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

DISTRIBUTION. China, Taiwan, Korea (GELLER-GRIMM, 2012b; TOMASOVIC, 2013b; YOUNG, 2008).

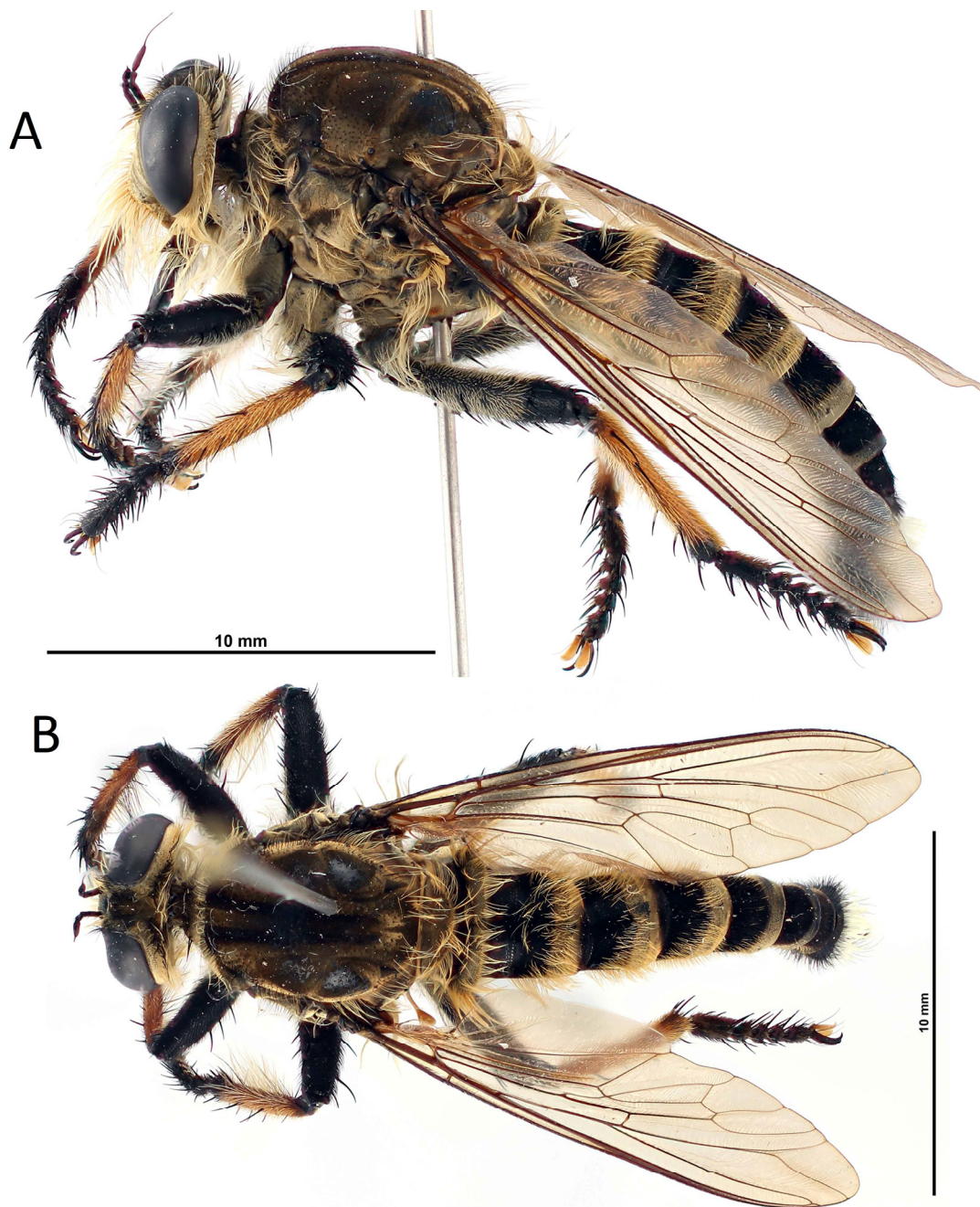


Fig. 6. *Promachus anicius* (Walker, 1849), male habitus A, lateral view. B, dorsal view. Shui Hau, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

***Promachus hongkongensis* sp. nov.**

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(Figs 7–9)

This species belongs to the second group of *Promachus*.

DIAGNOSIS. A medium-sized black species with white hairs. Face whitish, mystax formed by white and black setae. Wings brown. Legs wholly black with white hairs. Hind femur with strong black bristles on the ventral part.

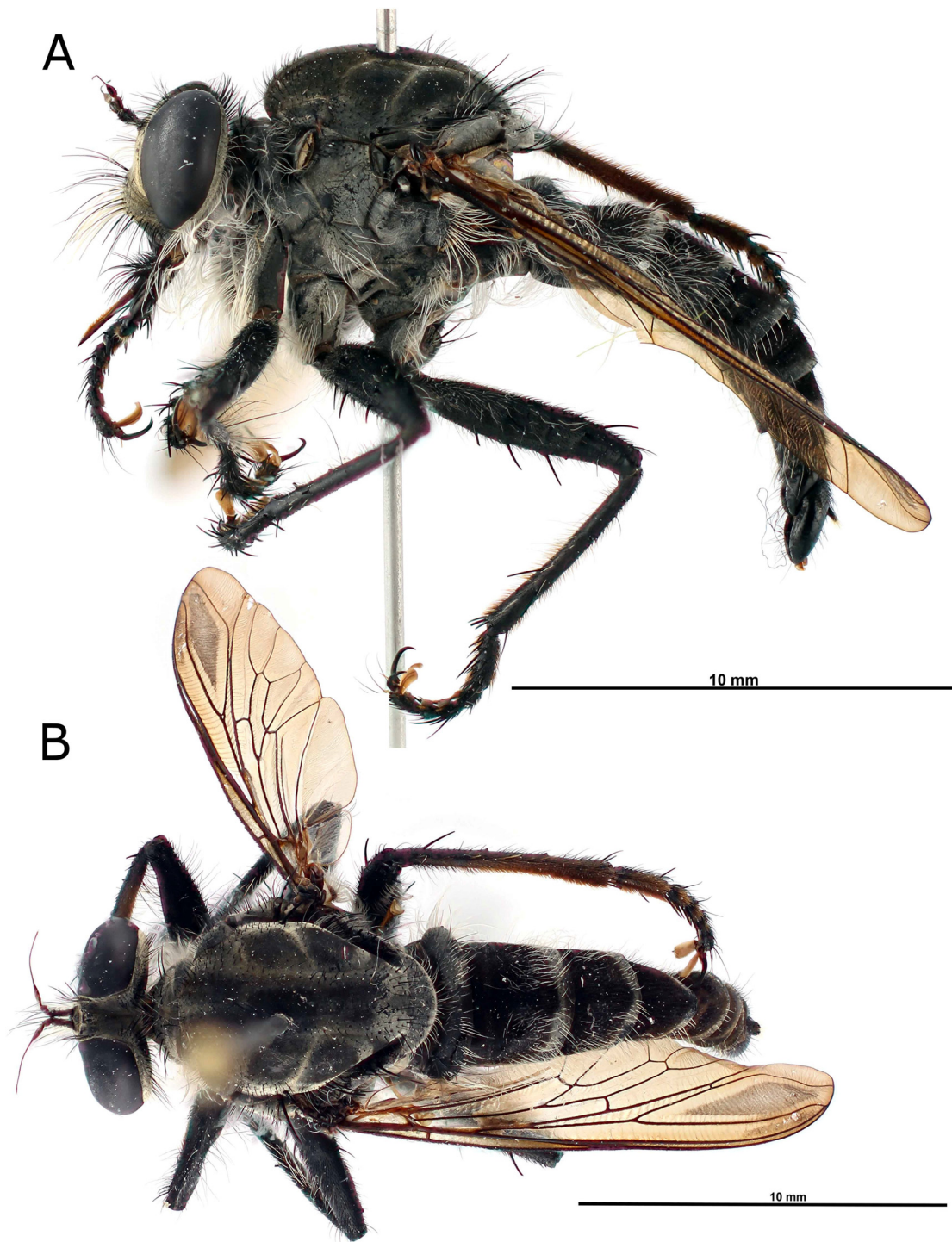


Fig. 7. *Promachus hongkongensis* sp. nov., male habitus. A, lateral view. B, dorsal view. Nam Chung, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

ETYMOLOGY. The species epithet refers to the type locality Hong Kong.

TYPE MATERIAL. Holotype male: Hong Kong, Nam Chung (2M2), 27.VI-11.VII.2018, 22°31'32.64"N 114°12'29.28"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

Paratypes: Hong Kong: 1♂, 3♀, same provenance as holotype; 1♀, Sha Tau Kok (1AM3), 10-24.V.2018, 22°32'6.45"N 114°12'39.47"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 1♀, So Lo Pun (4BM3), 29.VI-16.VII.2018, 22°32'17.20"N 114°15'21.49"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

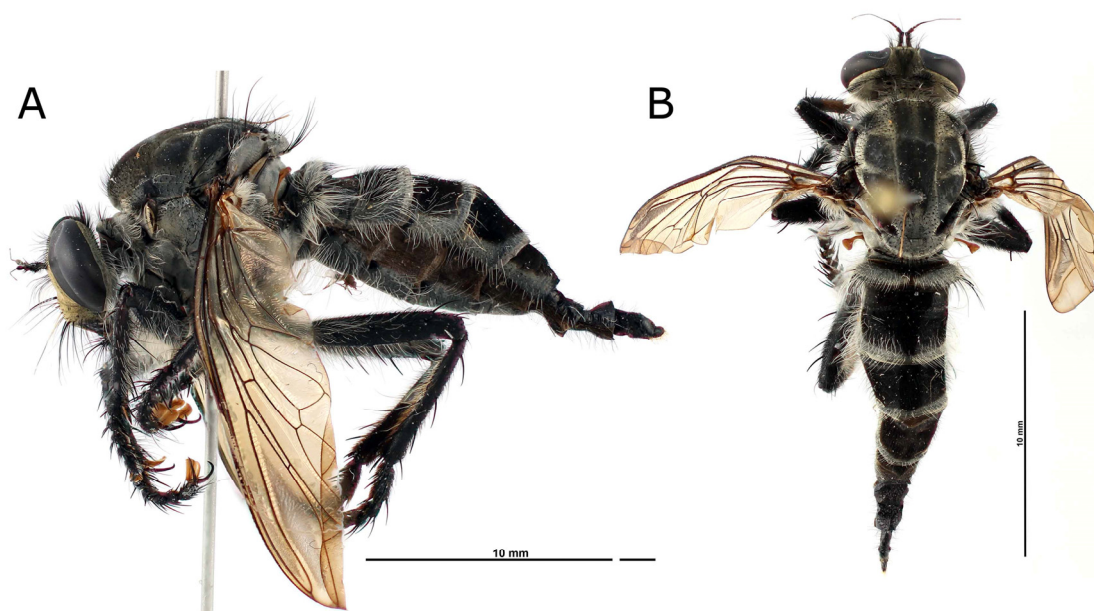


Fig. 8. *Promachus hongkongensis* sp. nov., female habitus. A, lateral view. B, dorsal view. So Lo Pun, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

DESCRIPTION. Male (Fig. 7). Body length: 20 mm.

Head: Face, frons, vertex and occiput covered with grey-white tomentum. Facial tubercle marked, mystax dense, with black and white setae. Frons with relatively long white hairs. Antenna black, scape with few short white and black setae, scape three times longer than pedicel, pedicel with some black setae, postpedicel as long as scape, style as long as the three basal segments combined. Ocellar bristles black, occipital hairs white. Palpus black with numerous black and yellow setae. Proboscis black with long fine setae as far as the middle ventral part they are white except the last who are black.

Thorax: Black with greyish tomentum. Anterior anteprepronotum with black setae and white hairs, posterior anteprepronotum laterally with long and fine white hairs. Postpronotal lobe and scutum with sparse, short black setae longer on the posterior part. Bristles black, long and stout: 2 notopleural, 2 supra-alar, 3 post-alar, 8-10 very fine dorsocentral bristles. Scutellum with white hairs on disc, 6-8 discal and 12 scutellar bristles. Pleura with sparse, fine black and white hairs. Katatergal setae numerous, long, fine, black and white. Metepisternal hairs white, long and fine.

Legs: Entirely black. Coxae with greyish tomentum and white hairs, mid coxa with 1 long, stout and black seta, hind coxa with black setae on tip. All femora swollen with long white and short black hairs; mid femur on sides with 4 black bristles, hind femur dorsally with 3 black

bristles at the tip and 3 ventral black bristles. Tibiae with white and black setae. Tarsi with black bristles. Hind tibia and tarsus with short brown brush.

Wing: Light brown with brownish marking in the 1st radial and 2nd+3rd radial cell. Haltere brown.

Abdomen: Tergites black with a posterior white stripe and sparse white hairs. Tergite I laterally with tuft of white hairs with 2 black setae. Sternites black with long and fine white hairs.

Male terminalia: (Fig. 9) Black with black setae and hairs. Epandrium long with rounded apex. Gonocoxite with 2 long black setae on the ventral and distal part. Dististylus wide, with narrow apical part with rounded apex (Fig. 9C). Phallus (Fig. 9 A) with long apodeme, sheath tubular and distiphallus indiscernible.

Female (Fig. 8). Body length: 19–21 mm. Similar to male, ovipositor telescopic.

REMARKS. Only two species of the Oriental region have the legs all black (OLDROYD, 1972: 299): *P. fulviventr* (BECKER, 1925: 72) and *P. indigenus* (BECKER, 1925: 74–75). The new species is distinct from these two species by the postpedicel that is shorter than the scape and pedicel together, by the coloration of the chaetotaxy and by the male terminalia.

The male terminalia of the new species resembles those of *P. nigribarbatus* (BECKER, 1925: 73) known from Korea, Taiwan and Vietnam that are as illustrated by TOMASOVIC (2013b: 5, phallus fig. 4a p. 18) and YOUNG (2008: 59–63 male terminalia figs 19–25 p.61) but they differ strongly by the shape of the phallus.

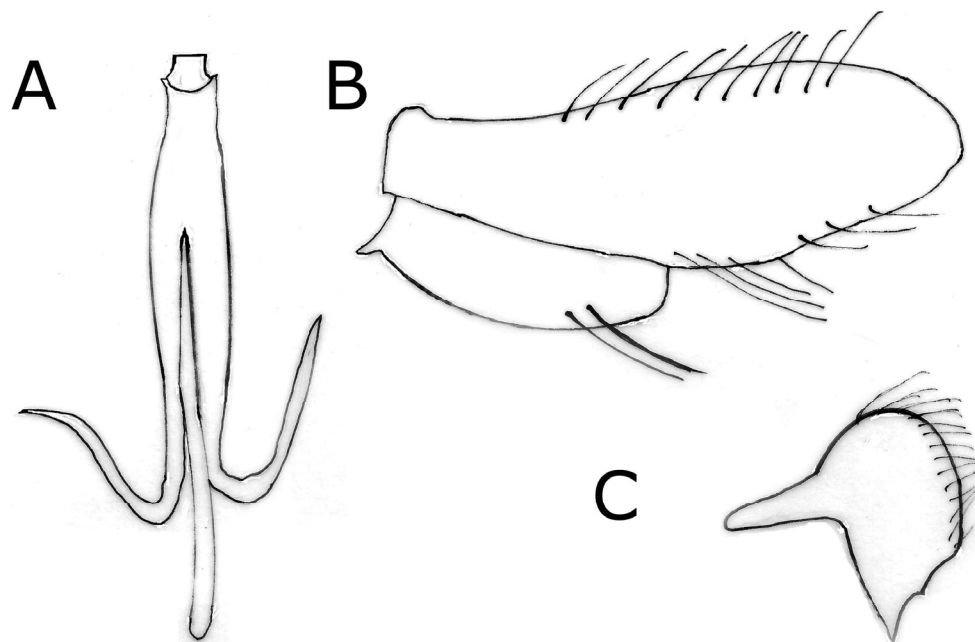


Fig. 9. *Promachus hongkongensis* sp. nov., male terminalia. A, phallus. B, epandrium and gonocoxite. C, dististylus. Shui Hau, leg. C. Taylor & Cheung Shun Chi; RBINS.

Subfamily Asilinae Latreille, 1802

Genus *Hoplopheromerus* Becker, 1925

The genus is Afrotropical, Oriental and Palearctic in distribution (GELLER-GRIMM 2003).

TOMASOVIC (2006) described *Hoplopheromerus guangdongi* from China and provided a key for the Oriental species of *Hoplopheromerus*.

***Hoplopheromerus armatipes* (Macquart, 1855)**

(Figs 10–12)

MATERIAL EXAMINED. Hong Kong: 1♂, Sha Tau Kok (Hoi Pui Leng, 1BM3), 10–24.V.2018, 22°31'46.52"N 114°12'28.19"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 1♂, Sam A Chung (5BM3), 17–30.V.2018, 22°30'31.90"N 114°16'23.09"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 1♀, Nam Chung (2M2), 27.VI–11.VII.2018, 22°31'32.64"N 114°12'29.28"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 1♂, So Lo Pun (4BM1), 10–23.V.2017, 22°32'15.76"N 114°15'22.00"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

DISTRIBUTION. China, Taiwan, Japan.

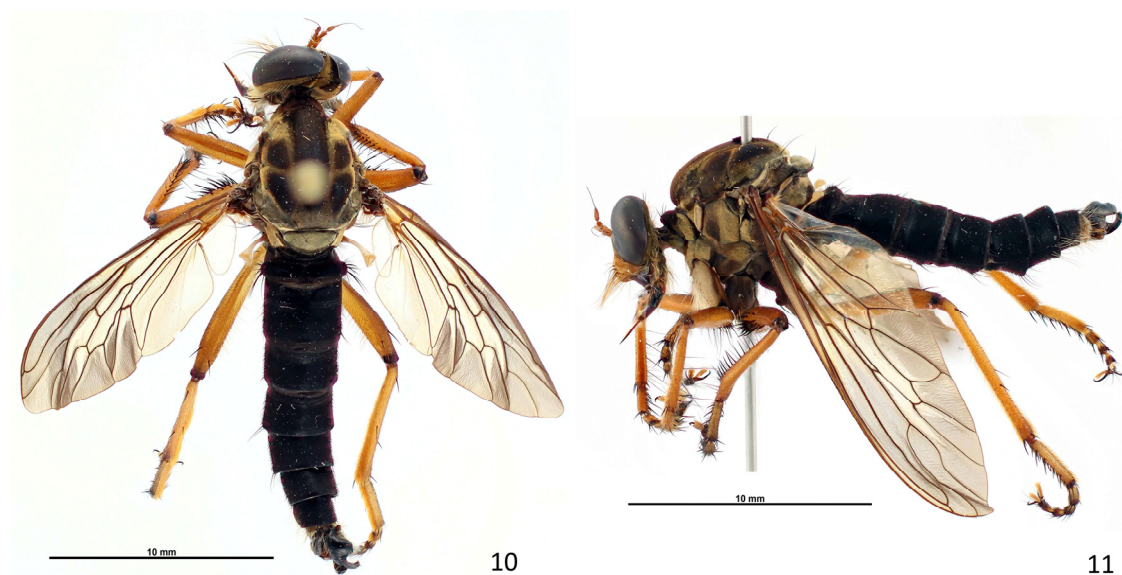


Fig. 10. *Hoplopheromerus armatipes* Macquart, 1855, male habitus, dorsal view, Hoi Pui Leng, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

Fig. 11. *Hoplopheromerus armatipes* Macquart, 1855, male habitus, lateral view. Hoi Pui Leng, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

Subfamily Laphriinae Macquart, 1838

Genus *Pogonosoma* Rondani, 1856

The genus is Australasian, Nearctic, Neotropical, Oriental and Palaearctic in distribution (GELLER-GRIMM, 2003). *Pogonosoma* is easily recognised, not only by the three submarginal cells, but also by the head structure: the vertex is well excavated, the frons broad, with sharply marked tubercle, and the proboscis and palpi of the same type as in *Andrenosoma* Rondani, 1856 (OLDROYD, 1972). To date, 6 species are known from the Oriental Region.

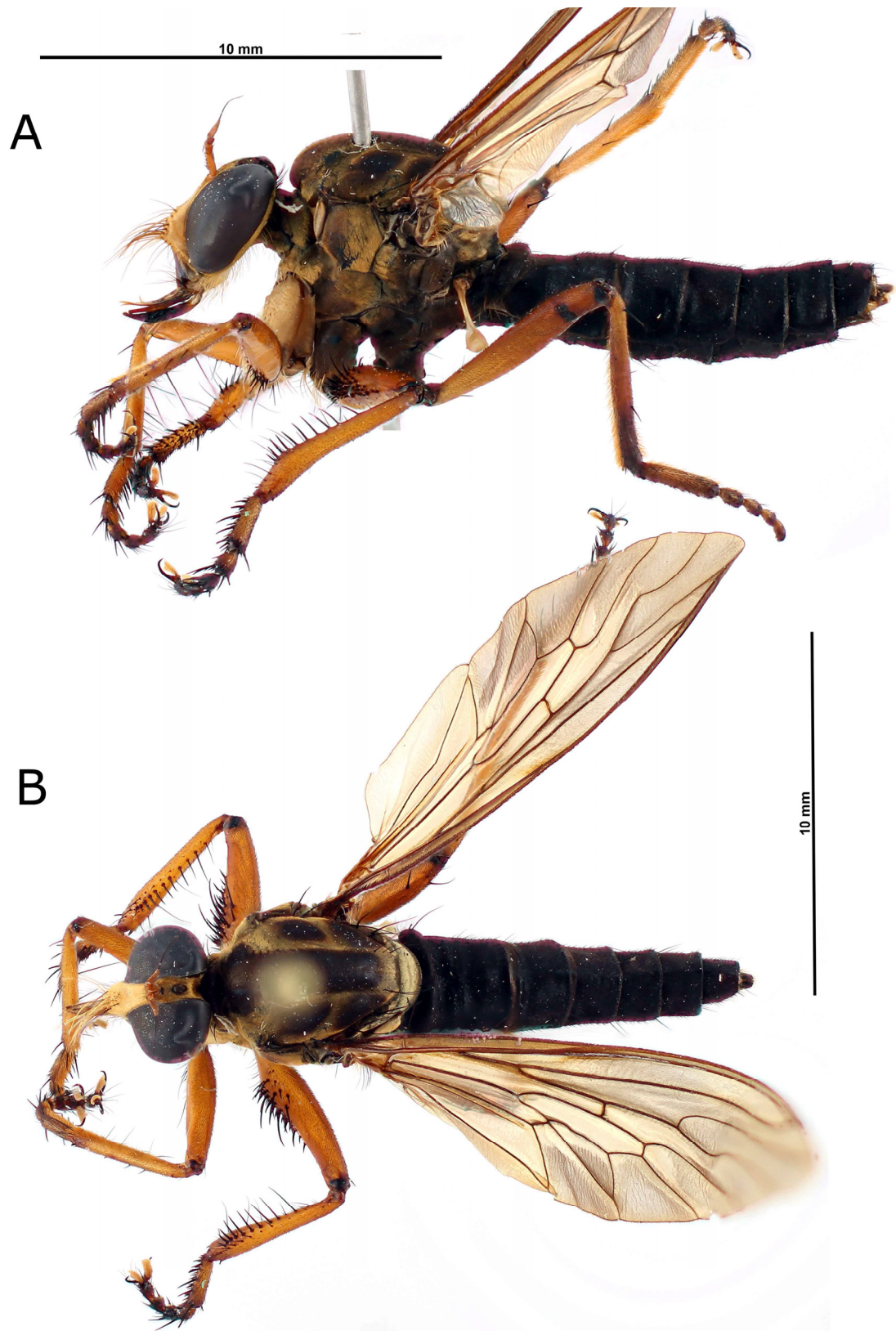
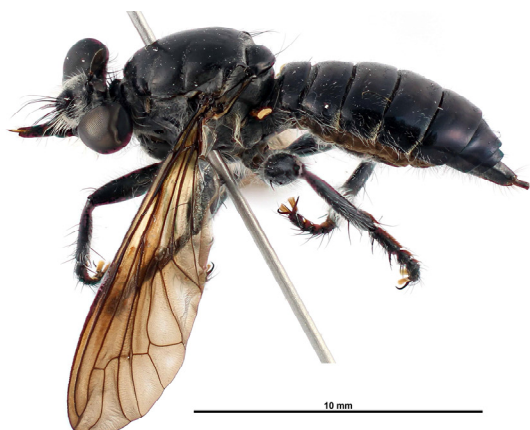


Fig. 12. *Hoplopheromerus armatipes* Macquart, 1855, female habitus. A, lateral view. B, dorsal view. So Lo Pun, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

***Pogonosoma* sp.**
(Fig. 13)

MATERIAL EXAMINED. Hong Kong: 1♀, To Kwa Peng (29M1), 29.XI-5.XII.2017, 22°25'43.07"N 114°19'59.30"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

The female is wholly shiny black and resembles to *Pogonosoma funebris* Hermann, 1914. Unfortunately, no male specimens were available to us for comparison.



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Fig. 13. *Pogonosoma* sp., female habitus, lateral view. To Kwa Peng, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

Fig. 14. *Leptogaster flaviventris* Hsia, 1948, male habitus, dorsal view. To Kwa Peng, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

Subfamily Leptogastrinae Schiner, 1862

The members of this subfamily are slender, bare, medium to large sized. The last recorded Leptogastrinae from China were by HSIA (1949) who recorded 37 species from China. To identify the genera of Chinese Leptogastrinae the key of HUA (1989) can be used.

Genus *Leptogaster* Meigen, 1803

The genus is common in all the zoogeographical regions of the world. In the Oriental region 46 species are known (OLDROYD, 1975). We refer to the keys of HSIA (1949 p. 29-30) and JOSEPH & PARUI (1983).

***Leptogaster flaviventris* Hsia, 1949**
(Fig. 14)

MATERIAL EXAMINED. Hong Kong: 2♂, To Kwa Peng (29M1), 29.XI-5.XII.2017, 22°25'43.07"N 114°19'59.30"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

DISTRIBUTION. Japan

REMARKS. The description of HSIA (1949: 36) is based on just one female. It seems to correspond to our male specimens.

***Leptogaster moluccana* (Doleshall, 1857)**
(Fig. 15)

MATERIAL EXAMINED. Hong Kong: 1♂, So Lo Pun (4BM2), 29.VI-16.VII.2018, 22°32'15.76"N 114°15'22.00"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

DISTRIBUTION. The species is known from India (West Bengal), Japan, Java, Sumatra, Taiwan and The Philippines (JOSEPH & PARUI, 1998).

REMARKS. Dr Torsten Dikow brought to our attention that the name *Leptogaster moluccana* (Doleshall, 1857) has priority on *L. basilaris* Coquillett, 1899. Unfortunately, we don't have an illustration of the male genitalia of the types for these species.

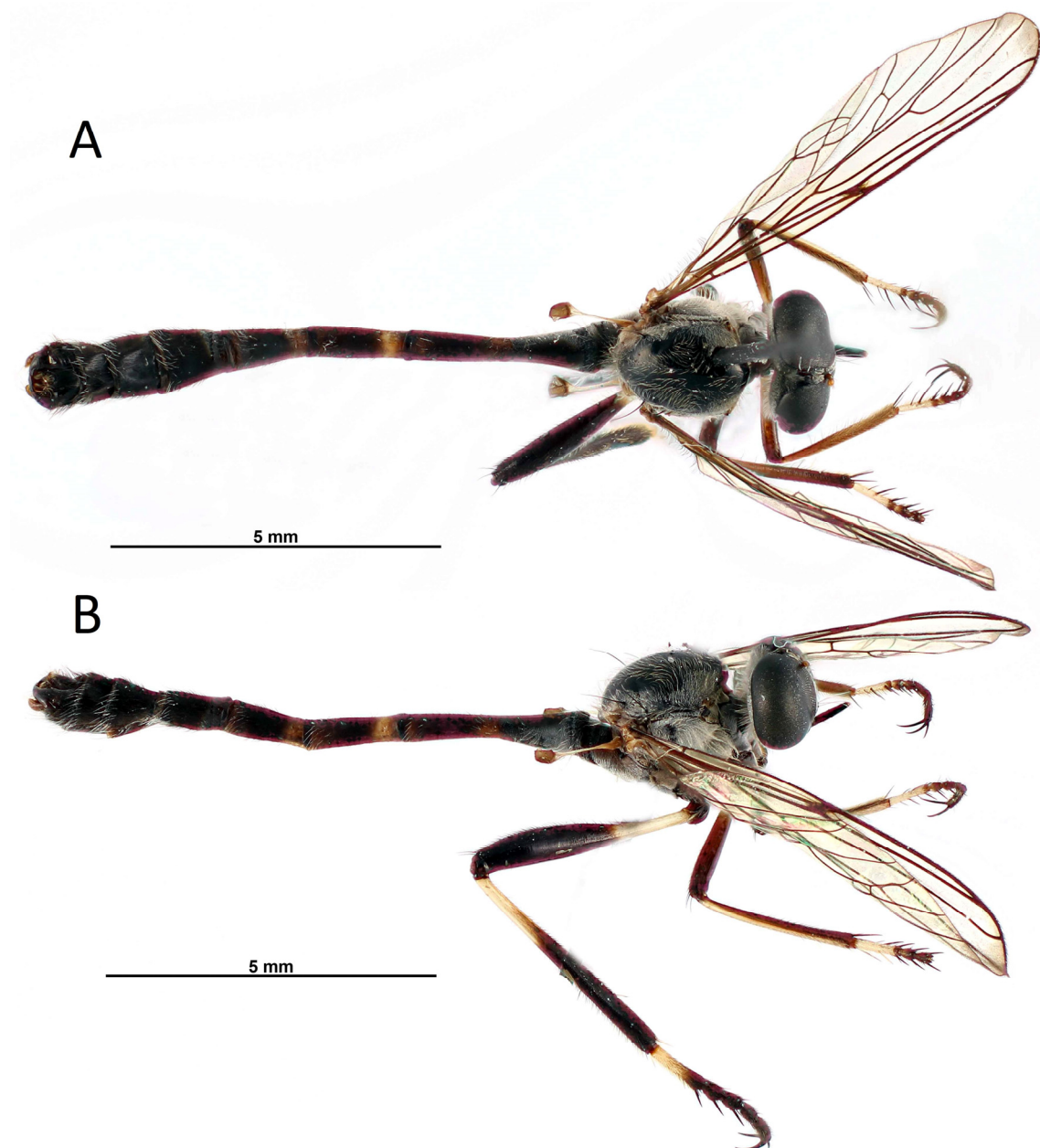


Fig. 15. *Leptogaster moluccana*, (Doleshall, 1857), male habitus. A, dorsal view. B, lateral view. So Lo Pun, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

Genus *Mesoleptogaster* Frey, 1937

For the genus we refer to the keys of HSIA (1949: 24) and of HUA (1989: 28). There are four species in the Oriental region with one species in Taiwan OLDROYD (1975).

Mesoleptogaster gracilipes Hsia, 1949

(Figs 16–17)

It is the only species known from Taiwan. We refer to the key provided by HSIA (1949).

MATERIAL EXAMINED. Hong Kong: 1♂, Sha Tau Kok (Hoi Pui Leng, 1BM2), 10-24.V.2018, 2°31'46.52"N 114°12'28.19"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 2♂, To Kwa Peng (29M1), 29.XI-5.XII.2017, 22°25'43.07"N 114°19'59.30"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 1♀, Sheung Pak Nai (10M5), 28.V-11.VI.2018, 22°27'5.44"N 113°57'43.67"E (C. Taylor, Cheung Shun Chi leg.; RBINS).



Fig. 16. *Mesoleptogaster gracilipes* Hsia, 1948, male habitus, lateral view. Sha Tau Kok, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

Fig. 17. *Mesoleptogaster gracilipes* Hsia, 1948, male. habitus lateral view. Sheung Pak Nai, leg.C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

Subfamily Ommatiinae Hardy, 1927

This subfamily is characterized by a plumose style of the antenna and have been recorded from all zoogeographical regions.

Genus *Emphysomera* Schiner, 1866

A key to the 16 species of *Emphysomera* from the Oriental and Australian regions is given by SCARBROUGH & MARASCIA (1999 p. 205-206). Among them, *E. jonesi* (Joseph & Parui, 1984) is known from China, while the following three species, *E. aequalis* Becker, 1925, *E. conopsoides* (Wiedemann, 1828) and *E. nigra* Schiner, 1868 are known from Taiwan SCARBROUGH & MARASCIA (1999).

Emphysomera conopsoides (Wiedemann, 1828)

(Figs 18–20)

The male genitalia have been illustrated by SCARBROUGH & MARASIA (1999: 213, fig. 45–48 & 49–52).

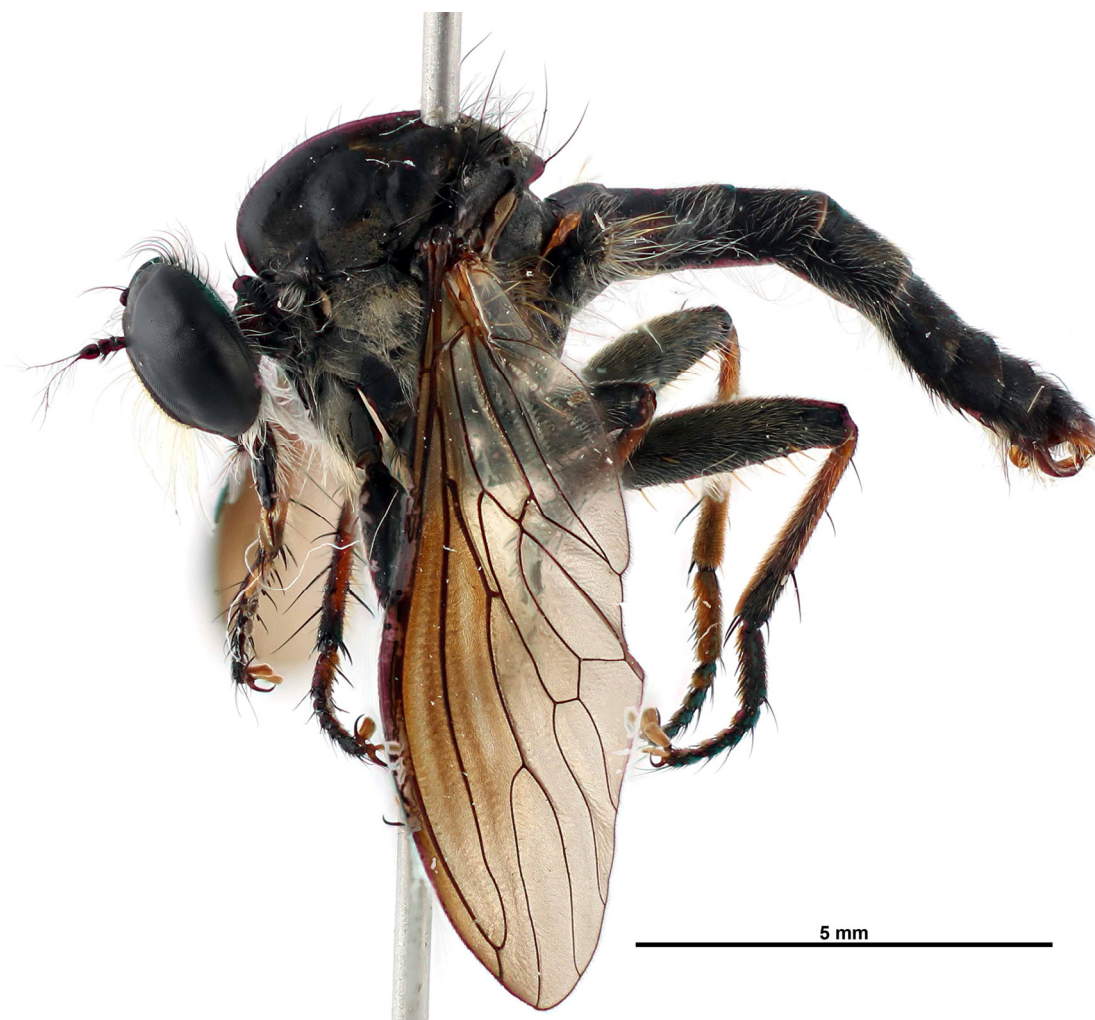


Fig. 18. *Empysomera conopsoides* (Wiedemann, 1828), male habitus, lateral view. To Kwa Peng, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

MATERIAL EXAMINED. Hong Kong: 2♂, Yim Tin Tsai (45AM5), 1-15.VI.2018, 22°22'31.66"N 114°18'3.71"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 1♂, To Kwa Peng (29M2), 8-25.V.2018, 22°25'43.07"N 114°19'59.30"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

DISTRIBUTION. The species is known from China, Indonesia, Malaysia, Laos and Taiwan.

Genus *Ommatius* Wiedemann, 1821

The genus is worldwide in distribution and more than hundred species of *Ommatius* are known from the Oriental region. The species can be identified with OLDROYD (1972), JOSEPH & PARUI (1998) and SCARBROUGH & COSTANTINO (2005).

***Ommatius tamenensis* Joseph & Parui 1998 (Fig. 21)**

A small black species with black and yellowish-brown legs and light brownish subcostal cell. It was described from Nord East India. The male genitalia are illustrated by JOSEPH & PARUI (1998a p. 241-242 fig. 140).

MATERIAL EXAMINED. Hong Kong: 3♂, 1♀, Yim Tin Tsai (45AM5), 1-15.VI.2018, 22°22'31.66"N 114°18'3.71"E (C. Taylor, Cheung Shun Chi leg.; RBINS); 1♂, To Kwa Peng (29M1), 29.XI-5.XII.2017, 22°25'43.07"N 114°19'59.30"E (C. Taylor, Cheung Shun Chi leg.; HKU); 1♂, To Kwa Peng (29M2), 8-25.V.2018, 22°25'43.07"N 114°19'59.30"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

REMARKS. The male genitalia readily distinguishes *Ommatius tamenensis* Joseph & Parui, 1983 (JOSEPH & PARUI 1998) from all the other known species.

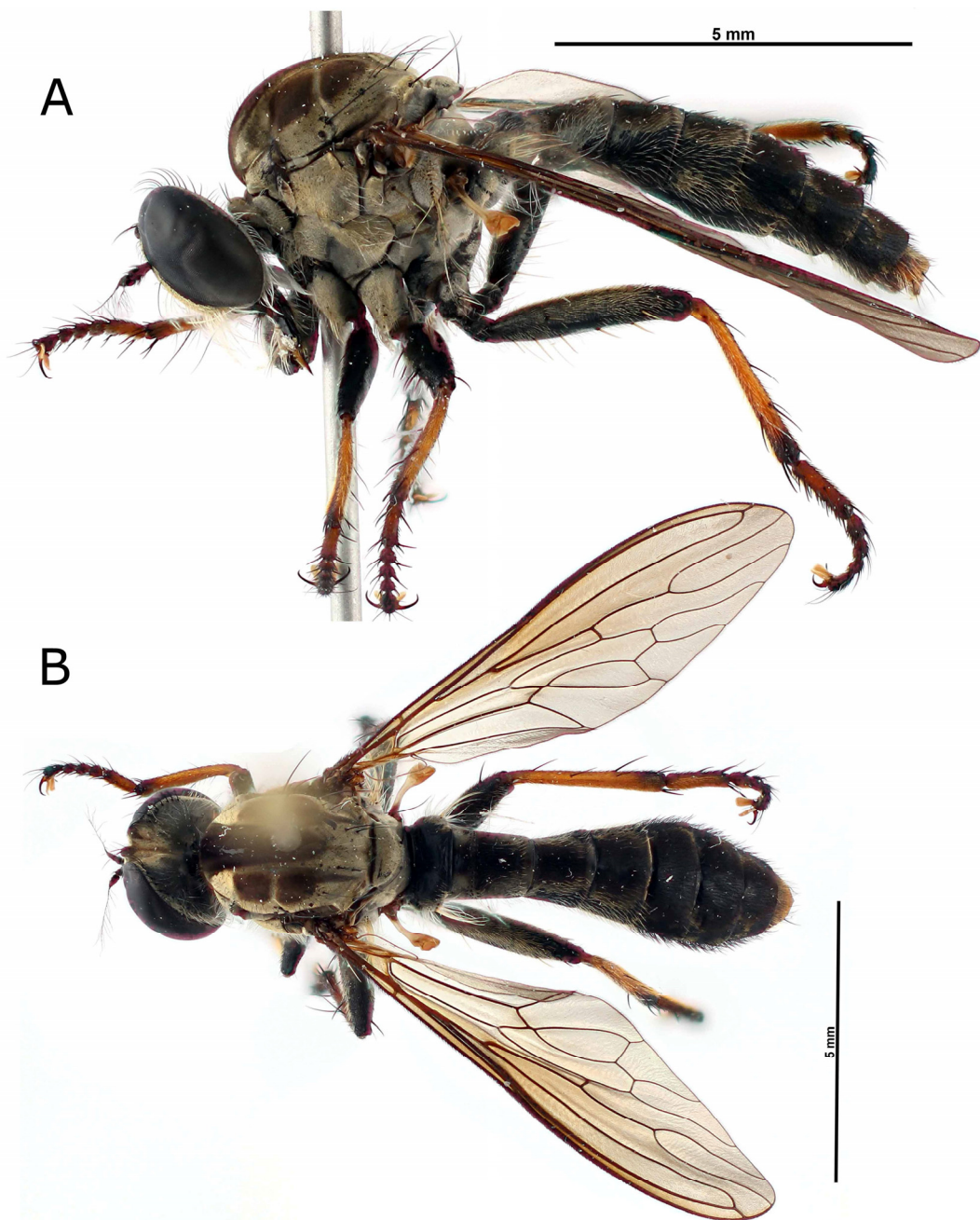


Fig. 19. *Emphysomera conopsoides* (Wiedemann, 1828), female habitus. A, lateral view. B, dorsal view. So Lo Pun, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.



Emphysomera conopsoides 176 specimens

Fig. 20. *Emphysomera conopsoides* (Wiedemann, 1828) distribution map.

***Ommatius guenardi* sp. nov.**

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(Fig. 22)

DIAGNOSIS. Small and slender black species with hyaline wings and yellow legs, hind femur dorsally brown on apical 1/3. Mystax with two long, strong and yellow setae with white setae below and above black setae. Thorax black with light brown-greyish tomentum.

ETYMOLOGY. The new species is dedicated to Prof. Benoit Guénard who kindly allowed us to study the robber flies from the insect survey of the mangroves in Hong Kong.

TYPE MATERIAL. Holotype male: Hong Kong: Tung Chung (14M5), 29.V-12.VI.2018, 22°16'55.34"N 113°55'43.39"E (C. Taylor, Cheung Shun Chi leg.; RBINS).

DESCRIPTION. Male: Body length: 10 mm

Head: (Fig. 22 A) Face with yellowish tomentum. Mystax with two long, strong and yellow setae and with white short setae below and long, fine and black setae above. Antenna black, scape, pedicel and postpedicel very short and of almost the same length; style very long with a line of long, fine and black hair (Fig. 22 A). Frons with fine and white orbital hairs. Ocellar tubercle with 2 fine, black setae. Postocular setae proclinate, black. Occiput with greyish tomentum, lower occipital hairs white. Palpus black with long, fine and white setae. Proboscis black.

Thorax: Black. Antepronotum with light brown tomentum and laterally short white hairs, Scutum and scutellum with brownish tomentum. Setae black and stout, 2 notopleural, 2 postalar bristles. Pleura with greyish tomentum. Katatergal setae white, long and fine.

Legs: Coxa with white tomentum; fore coxa with fine pale hairs. Fore femur yellow with a ventral row of yellow setae. Mid femur yellow with a ventral row of minute yellow setae and 1 to 2 black or yellow setae lateral. Hind femur yellow with one large brown patch on the distal ventral part, 1 long, black seta on the central ventral part and laterally 2 shorter black setae. Tibia yellow with pale chaetotaxy, hind tibia brown at the tip. Tarsi brownish with black setae

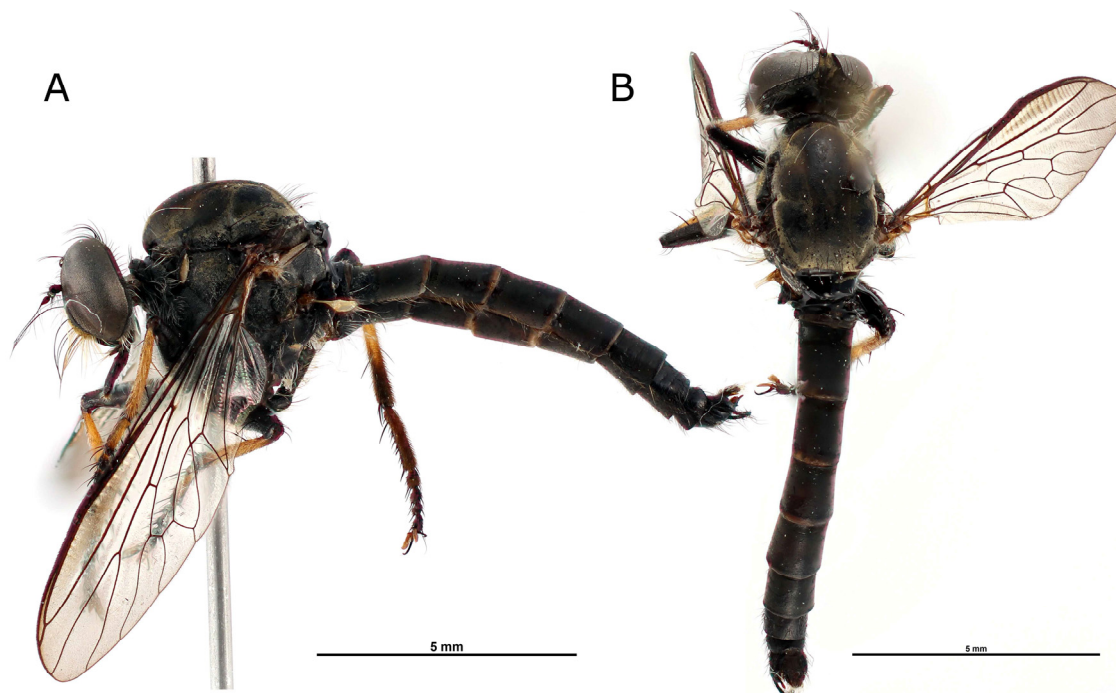


Fig. 21. *Ommatius tamenensis* Joseph & Parui 1998, male habitus. A, lateral view. B, dorsal view. Yim Tin Tsai, leg. C. Taylor, Cheung Shun Chi; RBINS. © Jérôme Constant.

Wing: Hyaline with tip smoky brown infuscated. Haltere white

Abdomen: Black. Tergite I laterally with clear, short setae. Sternites III-IV with 2-3 yellowish, fine setae.

Male terminalia: (Fig. 22 B, C).

REMARKS. This species can be easily differentiated from all the other known species of Ommatinae by the two long and strong setae on the lower fascial margin.

Discussion

To our knowledge few papers deal with robber flies in mangroves. TOMASOVIC & GROOTAERT (2010) recorded only four species in a survey of eleven mangrove sites all around the island of Singapore that were sampled during one month (5 May to 12 June 2009): *Promachus amorges* (Walker, 1849), *Maira aenea* (Fabricius, 1805), *Orthogonis scapularis* (Wiedemann, 1828) and *Leptogaster moluccana* (Doleshall, 1857). The latter species was the most common with 84 specimens recorded in the mangroves, but this species also occurs in swamp forest and thus it is not exclusive for mangroves. It is also the only species in common between Singapore and Hong Kong. In hybotid flies (Diptera: Hybotidae) as was shown by GROOTAERT (2019), none of the Singaporean hybotid fly species were found in Hong Kong.

During the survey of Hong Kong's mangroves, we found robber flies in only 11 of the 24 sampled sites. That is only 46% of the sites. This is a first indication that robber flies do not thrive in mangroves. Most of the traps were placed in back mangrove, but no relation was found between the soil type at the place of the traps that was either muddy or sandy. Robber flies can fly over long distances and indeed distance is not immediately a limiting factor as we could see in a mangrove on Coney Island (Pulau Serangoon) in Singapore where large numbers of robber flies were observed in true mangrove. However, there was a huge dry sandy area adjacent to

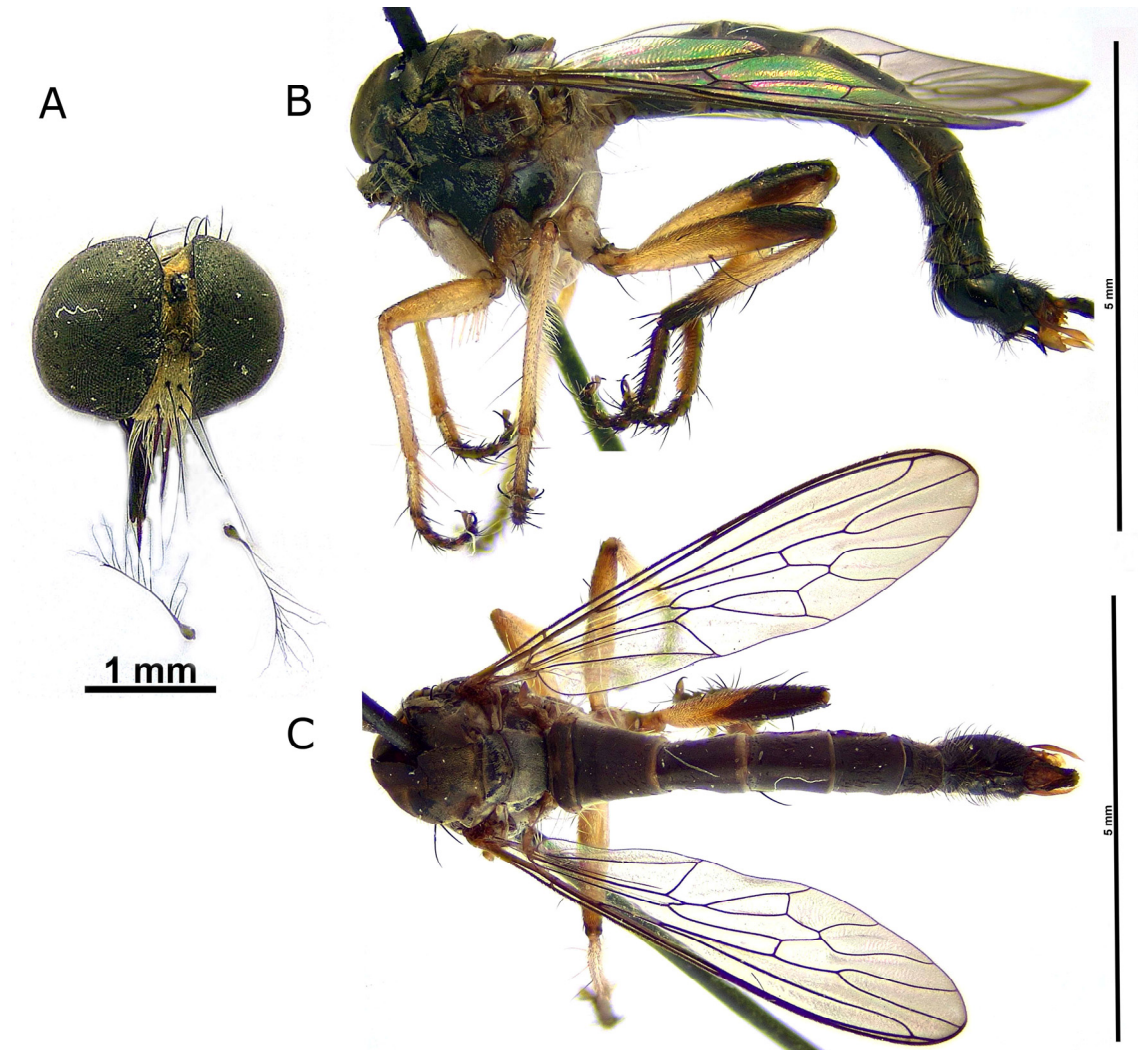


Fig. 22. *Ommatius guenardi* sp. nov. male holotype. A, head. B, habitus lateral view. C, dorsal view. Tung Chung, leg. C. Taylor & Cheung Shun Chi; RBINS. © Jérôme Constant.

this mangrove. The robber flies are supposed to breed there and the adults hunt in the insect rich mangrove (Grootaert & Lim, unpublished).

Moreover, robber flies were found in only 15% of the samples taken in the Hong Kong mangroves. In fact, only 38 specimens were recorded. Confirming the fact that robber flies are rare in mangrove. Nevertheless, the diversity is surprisingly high with 12 species. Many more species could be expected since the collection per site was only two weeks in Autumn and two weeks at the same site in Spring and in only a few cases the sampling was extended a few weeks.

Acknowledgements

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