

The Eumeninae (Hymenoptera, Vespidae) of Hong Kong (China), with description of two new species, two new synonymies and a key to the known taxa

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Abstract

A total of 38 species belonging to 26 genera of Eumeninae are recorded from Hong Kong, among which two new species, namely *Allorhynchium radiatum* **sp. nov.** and *Orientalicesa nigra* **sp. nov.** are described and illustrated. *Symmorphus tsushimanus* Yamane, 1990 is newly recorded from China and its female is firstly described. Eighteen species are newly recorded for Hong Kong. *Antepipona ferruginea* Kim & Yamane, 2003 is synonymized with *Antepipona rufescens* (Smith, 1857) (**syn. nov.**) and *Eumenes quadratus obsoletus* Dover, 1926 is synonymised with *Eumenes quadratus quadratus* Smith, 1852 (**syn. nov.**). A checklist, a key and illustrations to Hong Kong Eumeninae are also provided.

Keywords

Hymenoptera, Vespidae, Eumeninae, new species, Hong Kong, China

Introduction

The Hong Kong Special Administrative Region of the People's Republic of China (HK-SAR), covers an area of 1076 km², of which about 40% is urbanized (430 km²), while the rest (645 km²) comprises undeveloped land. The topography of the HKSAR is extremely rugged and consists essentially of a series of hills and ridges of igneous or vol-

canic origin, the highest point culminating at ca 950m asl. Historically the landscape of Hong Kong has been greatly modified by human activity and in the late 1940's hardly any forest cover remained. Today the North facing slopes are forested while the south facing ones are generally covered in grasses, shrubs and low bushes. The low lying areas were historically farmland, now abandoned, and those areas not occupied by human activities are now composed of seasonal or perennial wetlands/marshes and/or covered in dense and mature secondary forests. The climate is tropical with clear summer (wet) and winter (dry) monsoons, the latter can bring short-lived surges of cold Siberian air. Zero or sub-zero Celsius temperatures are regularly recorded (Dudgeon and Corelett 1994).

The Eumeninae are all solitary wasps, although some species display behaviours that are considered precursors of eusociality in Vespidae, such as communal nesting and progressive provisioning of food for the brood. The subfamily contains about 3800 valid species worldwide, in 204 extant genera (Carpenter 1986; Yamane 1990; Zhou et al. 2011; Tan et al. 2018; Pannure et al. 2016; Ferreira et al. 2018; Li and Carpenter 2018; Selis 2018; Carpenter unpubl.). They are usually predators of Lepidoptera or Coleoptera larvae, although predation on larvae of sawflies is also recorded. The preys are fed to the wasp brood, the adults feeding on body fluids of the prey and plant nectar only. The eumenine wasps are difficult taxonomically, partially because no recent global revision of the subfamily exists although recent regional revisions are clarifying the picture, partially because of the past creation of many new names; a consequence of the extreme colour variability intraspecifically in many taxa (e.g. *Delta*, *Phimenes*, *Pseumenes*, *Anterhynchium*) and a wealth of synonyms that has confused nomenclature.

Asian species have been partially reviewed in the last decade or so and we will refer the reader to the works of Yamane 1990, Nugroho et al. 2013, Nguyen et al. 2014, Girish Kumar and Sharma 2014, 2015, Pannure et al. 2016, Tan et al. 2018b, and Li and Carpenter 2018, 2019 for additional and comparative information. Prior to this study, 22 species in 15 genera of the subfamily Eumeninae were fragmentarily reported in the literature from Hong Kong. Dover (1926) described 14 species from the HKSAR, *Labus exiguus* Sauss., [misidentification, = *Labus edenticulus* Li & Carpenter, 2018], *Eumenes petiolata* Fabr. [= *Delta pyriforme pyriforme* Fabricius, 1781], *Eumenes gracilis* var. *esuriens* Fabr. [misidentification, = *Delta campaniforme campaniforme* (Fabricius, 1775)], *Eumenes arcuata* Fabr. [= *Phimenes flavopictus flavopictus* (Blanchard, 1849)], *Eumenes architectus* Sm. [misidentification], *Eumenes coarctata* var. *punctata* Sauss. [= *Eumenes punctatus* de Saussure, 1852], *Eumenes quadrata* var. *obsoleta* Dover, 1926 [= *Eumenes quadratus quadratus* Smith, 1852, Syn. nov.], *Pareumenes quadrispinosa* Sauss. [= *Pareumenes quadrispinosus acutus* Liu, 1941 (?)], *Pareumenes depressa* Sauss. [= *Pseumenes depressus depressus* (de Saussure, 1855)], *Odynerus* (*Rygchium*) *flavomarginatum* Sauss. [= *Anterhynchium flavomarginatum flavomarginatum* (Smith, 1852)], *Odynerus* (*R.*) *haemorrhoidalis* var. *quinquecincta* Fabr. [= *Rhynchium quinquecinctum quinquecinctum* (Fabricius, 1787)], *Odynerus* (*R.*) *flavopunctatum* Smith [= *Rhynchium flavopunctatum flavopunctatum* (Smith, 1852)], *Odynerus bipustulatus* Sauss. [probable misidentification (see below), = *Antepipona bipustulata* (de Saussure, 1855)], *Odynerus trilobus* Fabr. [= *Euodynerus trilobus* (Fabricius, 1787)]. Of these 14 species three are misidentifications

and therefore Dover's list only contains 10 traceable species for Hong Kong. Later in 1941 Giordani Soika recorded *Eumenes citreolineatus* Giordani Soika, 1941 [= *Eumenes atrophicus* (Fabricius, 1798)] and in 1986 *Antepipona menkei* Giordani Soika, 1986, and Gusenleitner in 2002 described *Parancistrocerus hongkongensis* Gusenleitner, 2002. In 2012 Barthélémy recorded an additional six species, *Allorhynchium* sp.1 [= *Allorhynchium chinense* (Saussure, 1862)], *Anterhynchium* sp.1 [= *Anterhynchium* (*Dirhynchium*) *flavolineatum* (Smith, 1857)], *Xenorhynchium* sp.1 [misidentification, = *Anterhynchium flavomarginatum flavomarginatum* (Smith, 1852)], *Apodynerus* sp.1 [= *Apodynerus troglodytes troglodytes* (de Saussure, 1855)], *Pararrhynchium* sp.1 [misidentification, = *Orancistrocerus aterrimus erythropus* (Bingham, 1897)] and *Zethus* sp.1 [= *Zethus dolosus* Bingham, 1897]. Li and Carpenter described *Labus edenticulus* Li & Carpenter, 2018. Dover, by all accounts was the most prolific author in terms of describing local species, however his material from Hong Kong is most likely lost: no specimens are deposited; as he suggests in his paper (Dover 1926), in the NHMUK under his name and those allegedly deposited at HK University have indeed been lost, as checked by CB. In addition, it seems that Dover's species concepts may have been at times rather broad as is suggested by dubious local records of taxa such as *Labus exiguus* or *Eumenes architectus*.

From the study of material collected by Barthélémy in Hong Kong (over 300 specimens) and the historical literature of the subfamily we can confirm that the local fauna comprises at least 38 species in 26 genera, of which two species are new to science; *Allorhynchium radiatum* sp. nov. and *Orientalicesa nigra* sp. nov., which we describe and illustrate in detail. The genus *Allorhynchium* van der Vecht, 1963 contains 19 species worldwide; it was revised by Tan et al. (2018a). The genus *Orientalicesa* Koçak & Kemal, 2010 has all six known species occurring only in the Oriental Region; it was revised by Giordani Soika (1994). Eighteen species recorded here are new to the territory, nearly doubling the known number of species and two are new records for China. We propose to synonymise *Antepipona ferruginea* Kim & Yamane, 2003 with *Antepipona rufescens* (Smith, 1857) and *Eumenes quadratus obsoletus* Dover, 1926, with *E. quadratus quadratus* Smith, 1852. We also provide the first description of the female of *Symmorphus tsushimanus* Yamane, 1990, a new record for China. Six species only were recorded in Hong Kong from the literature which are not in our collected material: *Eumenes atrophicus* (Fabricius, 1798), *Antepipona menkei* Giordani Soika, 1986, *Eumenes architectus* Smith, 1859, *Labus exiguus* (de Saussure, 1855), *Antepipona bipustulata* de Saussure, 1855 and *Anterhynchium flavopunctatum flavopunctatum* (Smith, 1852), the last four recorded by Dover (1926) are unlikely occurrences in Hong Kong and we recognise only two species recorded in the literature but not collected by us. *Paraleptomenes miniatus miniatus* (de Saussure, 1855) is recorded on i-Naturalist but we have not examined specimens. It can be expected that additional species either new to science or Hong Kong and China will be described in the future.

In addition, both a checklist and a key to the 38 species are given along with plates illustrating the 36 collected species. We also give locally occurring colour variants of *Eumenes quadratus quadratus* Smith, 1852, *E. punctatus* de Saussure, 1852 and *Anterhynchium flavomarginatum flavomarginatum* (Smith, 1852).

Materials and methods

Specimens were obtained from Hong Kong mainly by C. Barthélémy but also from C. Taylor (Hong Kong University) and John X. Q. Lee, as noted. The chief mode of acquisition was through active hand netting (sampling around 200 specimens), Malaise traps where also extensively used, and set in various locations for varying periods of time depending on the location (1 month to 10 years) and the collecting bottle changed on average every two weeks; the more common species were sampled through nest trapping and rearing, with results published by Barthélémy (2012).

Identifications were made using a stereomicroscope (Nikon SMZ1500), according to the descriptions or keys of Schulthess (1934), Yamane (1990), Giordani Soika (1994), Girish Kumar et al. (2013), Girish Kumar and Sharma (2013), Nguyen (2015), Nguyen and Carpenter (2016), Girish Kumar et al. (2016), Girish Kumar et al. 2017, Li and Chen (2014a, b, 2016a, b), Nugroho et al. (2016), Li and Carpenter (2018), Ma et al. (2017), Tan et al. (2018a), Tan et al. 2018b and Li and Carpenter 2019 and comparing the Hong Kong material with specimens deposited in the American Museum of Natural History (USA).

The specimens examined are deposited in the American Museum of Natural History, and in the second author's collection in Hong Kong, the holotypes of the two new species are kept at the American Museum of Natural History. Descriptions and measurements of the two new species were made under a stereomicroscope (Nikon SMZ1500), and the corresponding figures were taken with Microptics-USA/Visionary Digital photomicrographic system developed by Roy Larimer and multiple layers stacked using Helicon Focus. All other habitus illustrations were made with a Leica M205 C stereomicroscope and stacking software LAS v.4. at increments of 20–50 steps. For the larger specimens and those live, images were taken using a Nikon D200 camera equipped with a Nikkor 60 mm macro-lens and Sunpak D12 ring flash. The ratios used throughout the descriptions were measured in the same magnification of the stereomicroscope. All measurements were taken as the maximal length of body parts measured. Body length was measured from the anterior margin of the head to the posterior margin of metasomal tergum 2. For the density description of punctures, “sparsely” means that interspaces are larger than punctures diameter, “moderately” means equal to the diameter, and “densely” means less than the diameter.

The abbreviations used in the text are shown as follows:

A1	for antennal segment 1,	T2	for metasomal tergum 2,
A2	for antennal segment 2,	S1	for metasomal sternum 1,
T1	for metasomal tergum 1,	S2	for metasomal sternum 2, and so on.

AMNH American Museum of Natural History, New York, USA

CBC Christophe Barthélémy's collection, Hong Kong

CQNU Chongqing Normal University, Chongqing

HUM	Hokkaido University, Matsumura, Japan
LACM	Los Angeles County Museum, Los Angeles, USA
MHNG	Museum d'Histoire Naturelle, Genève, Switzerland
MNHN	Museum National d'Histoire Naturelle, Paris, France
MRSN	Museo Regionale di Scienze Naturali, Torino, Italy
MSNV	Museo di Storia Naturale di Venezia, Venice, Italy
NMW	Naturhistorisches Museum Wien, Vienna, Austria
NHMUK	The Natural History Museum, London, UK
OCMNH	Osaka City Museum of Natural History, Osaka, Japan
OUM	Oxford University Museum, Hope Entomological Collections, Oxford, UK
RMNH	Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden, Netherland
USNM	National Museum of Natural History, Washington, D.C., USA
UZH	Zoological Museum, University of Zurich, Switzerland
ZMUC	Universitets København, Zoologisk Museum, København, Denmark

In the list below we do not show the complete synonymy of each taxon as this information is readily available and we follow here the format proposed by Tan et al. 2018, however we give details of the type species at generic and specific levels.

The UTM references on labels of material examined refer to grid reference WGS 84/HK 1980 datum and new records are asterisked (*).

Species list

Tribe EUMENINI

1. Genus *Delta* de Saussure, 1855

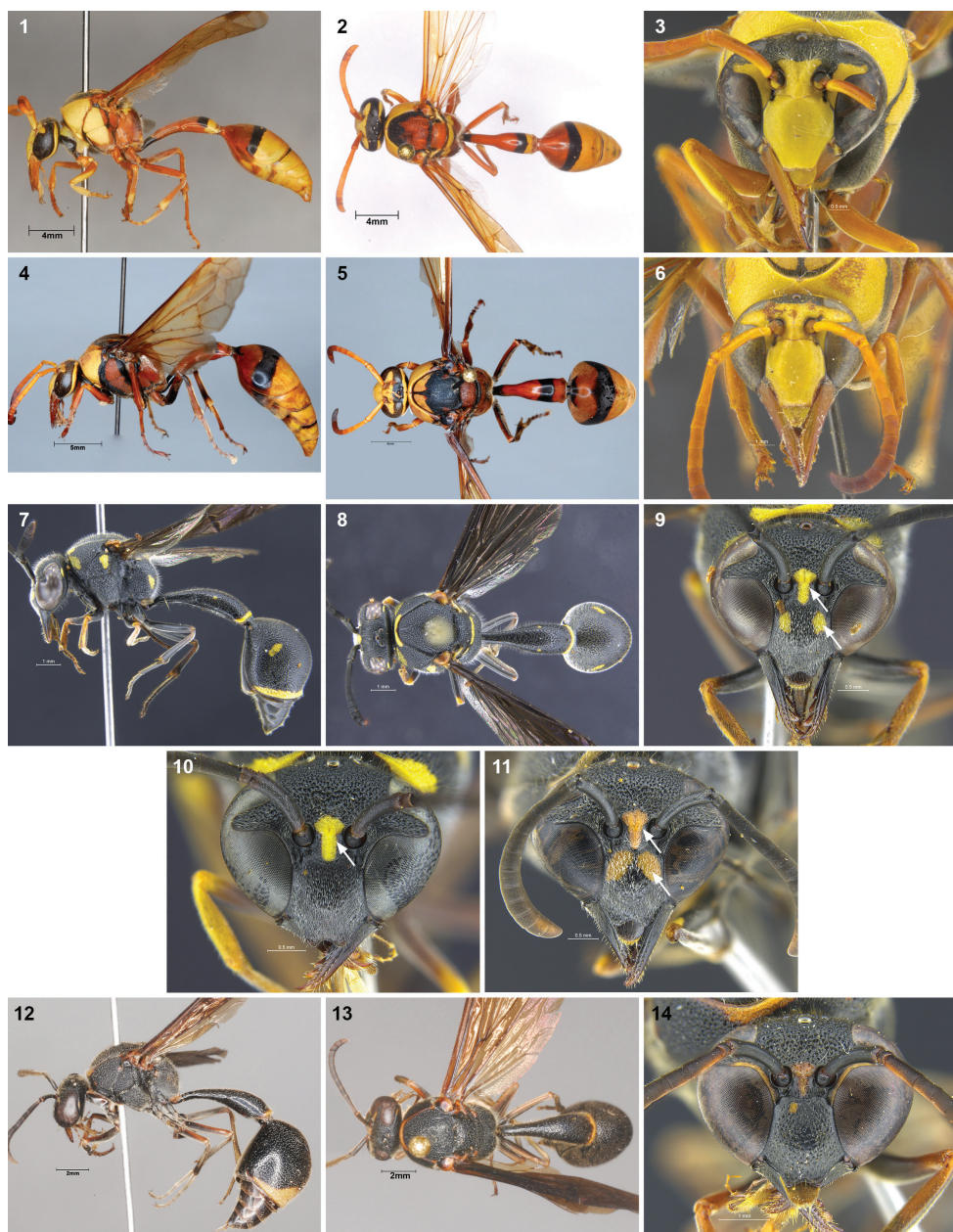
Delta de Saussure, 1855: 130, 132, 143. Type species: *Vespa maxillosa* DeGeer, 1773, by subsequent designation of Bequaert, 1925: 137.

(1) *Delta campaniforme campaniforme* (Fabricius, 1775)

Figs 1–3

Vespa campaniformis Fabricius, 1775: 371, “Nova Hollandia”, NHMUK. Type: female.

Material examined. CHINA: Hong Kong: 1♀, Lantau Isl., Tai O, hand net, 25.xi.2008, UTM: 49Q GE 949 638, 4m, ref.: 0306.S.Hy.1 [CBC]; 1♀, Ping Shan Chai, 140m, Malaise trap, 22.xi–20.xii. 2014, UTM: 50Q KK 106 893, 140m, ref.: M186.D.Hy.6 [CBC].



Figures 1–14. *Delta campaniforme campaniforme*, female **1** habitus (lateral view) **2** habitus (dorsal view) **3** head (frontal view) **4–6** *Delta pyriforme*, female **4** habitus (lateral view) **5** habitus (dorsal view) **6** head (frontal view) **7–11** *Eumenes punctatus*, female **7** habitus (lateral view) **8** habitus (dorsal view) **9** head (frontal view) **10–11** variation of face markings **12–14** *Eumenes quadratus quadratus*, female **12** habitus (lateral view) **13** habitus (dorsal view) **14** head (frontal view).

Distribution. China (Fujian, Guangdong, Guangxi, Hainan, Hong Kong, Jiangxi, Sichuan, Yunnan, Zhejiang); Nepal; Thailand; Cambodia; Vietnam; India; Indonesia; Papua New Guinea; Australia; Philippines; adventive in U. S. A.: Hawaii.

Remarks. A common wasp in Hong Kong. First recorded from Hong Kong by Dover (1926) as *Eumenes gracilis* var. *esuriens* Dover, 1926.

(2) *Delta pyrifforme pyrifforme* (Fabricius, 1775)

Figs 4–6, 130–131

Vespa pyriformis Fabricius, 1775: 371, “in China”, type repository unknown. Type: Sex not stated.

Material examined. CHINA: Hong Kong: 1♀, Pak Sha O, hand net, 02.x.2012, UTM: 50Q KK 242 849, 70m, ref.: 0489.A.Hy.1, leg. C. Barthélémy [AMNH]; 1♀, Lantau isl., Tai O, hand net, 25.xi.2008, UTM: 49Q GE 949 638, 4m, ref: 0306.S.Hy.2 [CBC]; 2♂, Pak Sha O, hand net, 24. ix.2012 & 25.xi.2012, UTM: 50Q KK 242 849, 70m, refs.: 0487.A.Hy.1 & 0493.A.Hy.1 [CBC].

Distribution. China (Fujian, Guangdong, Guangxi, Hainan, Yunnan, Hong Kong); Pakistan; India; Sri Lanka; Bhutan; Nepal; Myanmar; Thailand; Laos; Vietnam.

Remarks. A common wasp in Hong Kong. First recorded from Hong Kong by Dover (1926) as *Eumenes petiolata* Latreille, 1802.

2. Genus *Eumenes* Latreille, 1802

Eumenes Latreille, 1802: 360. Type species: “*Eumenes coarctata* Fab.” [= *Vespa coarctata* Linnaeus, 1758], by subsequent designation of Latreille, 1810: 438.

(3) *Eumenes (Eumenes) atrophicus* (Fabricius, 1798)

Vespa atrophica Fabricius, 1798: 264, “In India orientali”, ZMUC. Type: female.

Material examined. No specimens, known from the literature only.

Distribution. China (Hong Kong); India; Nepal; Myanmar; Thailand; Laos.

Remarks. Described previously by Giordani Soika from Hong Kong as *Eumenes citreolineatus* Giordani Soika, 1941. Not observed by the authors, probably scarce in Hong Kong.

(4) *Eumenes (Eumenes) punctatus* de Saussure, 1852

Figs 7–11, 132–133

Eumenes punctata de Saussure, 1852: 37, “La Chine”, NHMUK. Type species: female, male.

Material examined. CHINA: Hong Kong: 6♀, Ping Shan Chai, Malaise trap, 26.iv.–05.v.2006, 10–25.x.2015, 12–26.v.2018 & 26.v.–14.vii.2018, UTM: 50Q KK 106 893, 140m, refs: M038.A.Hy.9, M223.D.Hy.1, M348.C.Hy.4 & M351.D.Hy.5 [CBC], same location 21–26.vi.2006 & 30.vii.–03.ix.2016, refs.: M044.A.Hy.11, M258.D.Hy.2, leg. C. Barthélémy [AMNH], 1♀, same location, hand net, 04.vi.2016, ref.: 0592.B.Hy.8 [CBC]; 2♀, Pak Sha O, 20.vi.2009 hand net & 05.iv.2010 reared, UTM: 50Q KK 242 849, 70m, ref.: 0347.A.Hy.1 & 0391.A.Hy.1 [CBC], 1♂ same location, 01.vii.2011 reared, ref.: 0443.A.Hy.1 [CBC]; 2♂, Mang Kung Wo, Malaise trap, 07–21.vii.2018 & 21.vii.–04.viii.2018, UTM: 50Q KK 174 760, 60m, refs.: M353.C.Hy.1 & M356.C.Hy.2 [CBC].

Distribution. China (Hebei, Hong Kong, Inner Mongolia, Kiangsu, Sichuan); India; Sri Lanka; Korea; Japan; Russia.

Remarks. An abundant wasp in Hong Kong with Palearctic affinities. First recorded by Dover (1926) as *Eumenes coarctatus punctatus* Sauss. In our collected material we have at least three colour variants of this species, which are illustrated in figures 10–14.

(5) *Eumenes (Eumenes) quadratus quadratus* Smith, 1852

Figs 12–20, 134

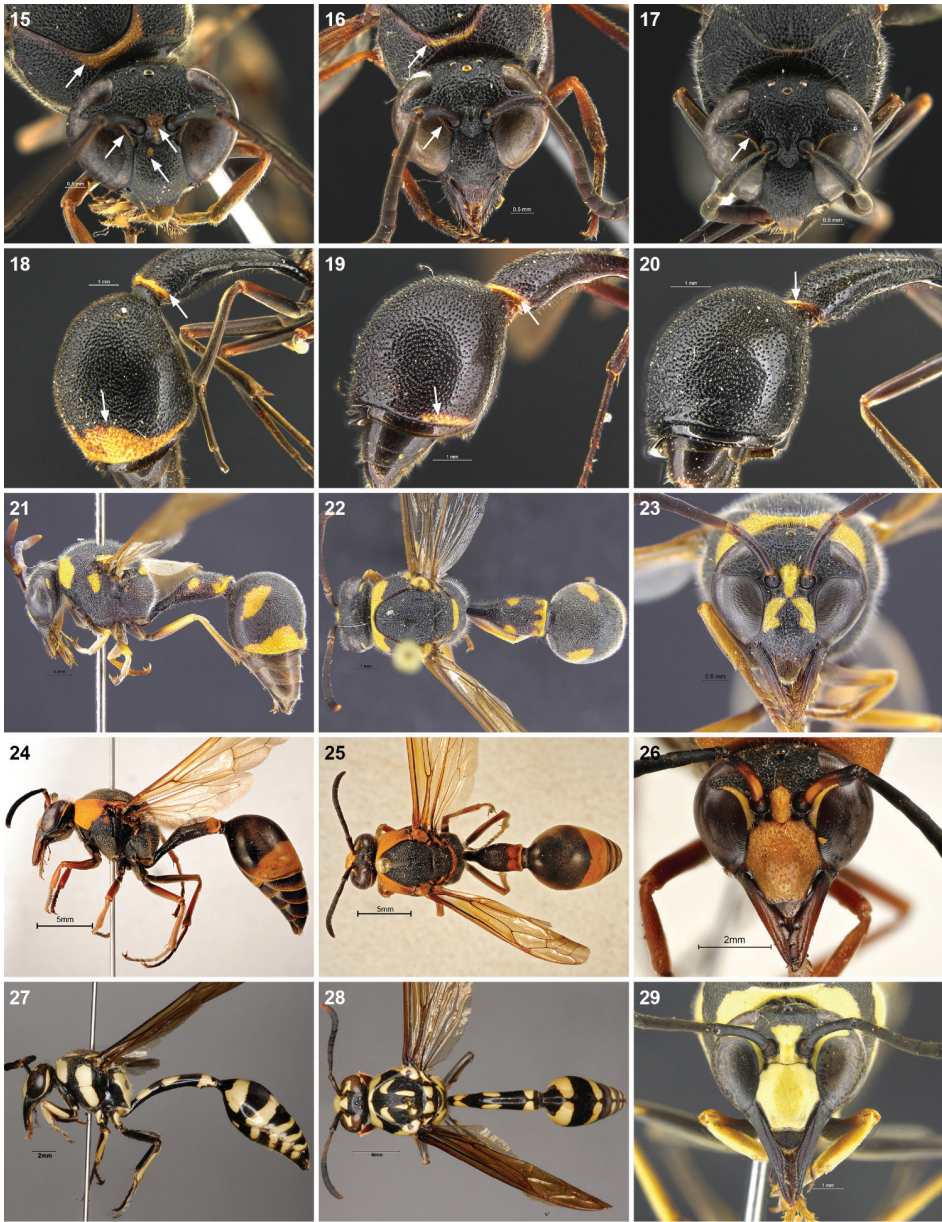
Eumenes quadratus Smith, 1852: 37, “near Ning-po-foo” (China), NHMUK. Lectotype: female.

Eumenes quadratus obsoletus Dover, 1926: 233, female, “Hong Kong”, Type depositary unknown, specimen lost. Syn. nov.

Material examined. CHINA: Hong Kong: 1♀, Pak Sha O, hand net, 20.vi.2006, 50Q KK 242 849, 70m, ref.: 0199.A.Hy.1, leg. C. Barthélémy [AMNH]; 3♀, Mang Kung Wo, hand net, 17.vii.2012, 22.v.2016 & 28.iv.2018, UTM: 50Q KK 174 760, 60m, refs.: 0477.A.Hy.1, 0597.A.Hy.1 & 0650.A.Hy.1 [CBC]; 1♂, Mang Kung Wo, hand net, 23.iv.2016, same UTM references, refs.: 0597.A.Hy.1 [CBC]; 1♀, Ping Shan Chai, Malaise trap, 30.vii.–03.ix.2015, UTM: 50Q KK 106 893, 140m, ref.: M258.D.Hy.2 [AMNH].

Distribution. China (Beijing, Hong Kong, Shanghai); Laos; Vietnam.

Remarks. Dover (1926) listed *Eumens quadratus* var. *obsoletus* from Hong Kong, however, as he recognized himself the justification for this new subspecies lied in the distinct color difference albeit identical structural features between his subspecies and the nominate type species deposited in NHMUK. In our collected material we can recognize at least three color forms of the same species (figs 14–20), these variations are particularly notable on the face, pronotum and T1–T2; the darker form; basis of



Figures 15–29. *Eumenes quadratus quadratus*, female **15–17** variations of face markings **18–20** variations of T1 & T2 markings **21–23** *Eumenes rubronatus*, female **21** habitus (lateral view) **22** habitus (dorsal view) **23** head (frontal view) **24–26** *Oreumenes decoratus*, female **24** habitus (lateral view) **25** habitus (dorsal view) **26** head (frontal view) **27–29** *Phimenes flavopictus flavopictus*, female **27** habitus (lateral view) **28** habitus (dorsal view) **29** head (frontal view).

Dover's new subspecies, is less common locally than the distinctly marked one. Given the identical structural characters of the various colors forms and the evidence presented by Dover, we propose to synonymise *Eumenes quadratus obsoletus* Dover, 1926

with *E. quadratus quadratus* Smith, 1852. It is a common wasp in Hong Kong and has Palearctic affinities. Dissected cells were mass-provisioned with caterpillars in the family Erebidæ (CB pers. obs., det. Dr. Roger Kendrick, Hong Kong)

(6) *Eumenes (Eumenes) rubronotatus* Pérez, 1905

Figs 21–23

Eumenes rubronotatus Pérez, 1905: 25, 85, “Yokohama, Japon” (Japan), MNHN. Type species: male.

Material examined. CHINA: Hong Kong: 1♀, Sai Kung Town, hand net, 26.xi.2008, 3m, ref.: 0307.M.Hy.1 [CBC].

Distribution. China (Beijing, Fujian, Guangxi, Guangdong, *Hong Kong, Jiangsu, Zhejiang); Russia; Vietnam; Korea; Japan.

Remarks. Known from a single record. Scarce in Hong Kong.

3. Genus *Oreumenes* Bequaert, 1926

Oreumenes Bequaert, 1926: 488. Type species: *Eumenes harmandi* Perez, 1905 [= *Eumenes decoratus* Smith, 1852], by original designation and monotypy.

(7) *Oreumenes decoratus* (Smith, 1852)

Figs 24–26

Eumenes decoratus Smith, 1852: 36, “Tein-tung” (China), NHMUK. Type species: female.

Material examined. CHINA, 1♀, Hong Kong: Ping Shan Chai, hand net, 21.x.2017, UTM: 50Q KK 104891, 140m, ref.: 0641.B.Hy.1 [CBC].

Distribution. China (Chongqing, Guangxi, Guizhou, Hebei, *Hong Kong, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang); Japan; Korea.

Remarks. Known from a single specimen. This is a species with Palearctic affinities.

4. Genus *Phimenes* Giordani Soika, 1992

Phimenes Giordani Soika, 1992: 41, 66, replacement name for *Phi* de Saussure, 1855, non de Saussure, 1854. Type species *Vespa arcuata* Fabricius, 1775, by subsequent designation of Bequaert, 1926: 487, as type species of *Phi* de Saussure, 1855.

(8) *Phimenes flavopictus flavopictus* (Blanchard, 1849)

Figs 27–29

Eumenes flavopictus Blanchard, 1849: 8, pl. 2 figs. 2, 6, type locality unknown, MNHN.
Type species.

Material examined. CHINA: Hong Kong: 1♀, Sha Lo Tong, hand net, 26.vii.2014, UTM: 50Q KK 101886, 160m, ref.: 0531.B.Hy.1, leg. C. Barthélémy [AMNH]; 1♀, Pak Sha O, hand net, 14.v.2009, UTM: 50Q KK 242 849, 70m, ref.: 0335.C.Hy.2 [CBC].

Distribution. China (Fujian, Guangdong, Guangxi, Hong Kong, Shichuan, Yunnan, Zhejiang); India; Sri Lanka; Nepal; Myanmar; Thailand; Laos; Vietnam; Malaysia; Singapore; Indonesia.

Remarks. An abundant wasp in Hong Kong. First recorded from Hong Kong by Dover (1926) as *Eumenes arcuata* Fabr.

Tribe ODYNERINI**5. Genus *Allorhynchium* van der Vecht, 1963**

Allorhynchium van der Vecht, 1963: 57, 58. Type species: *Vespa argentata* Fabricius, 1804, by original designation.

(9) *Allorhynchium chinense* (Saussure, 1862)

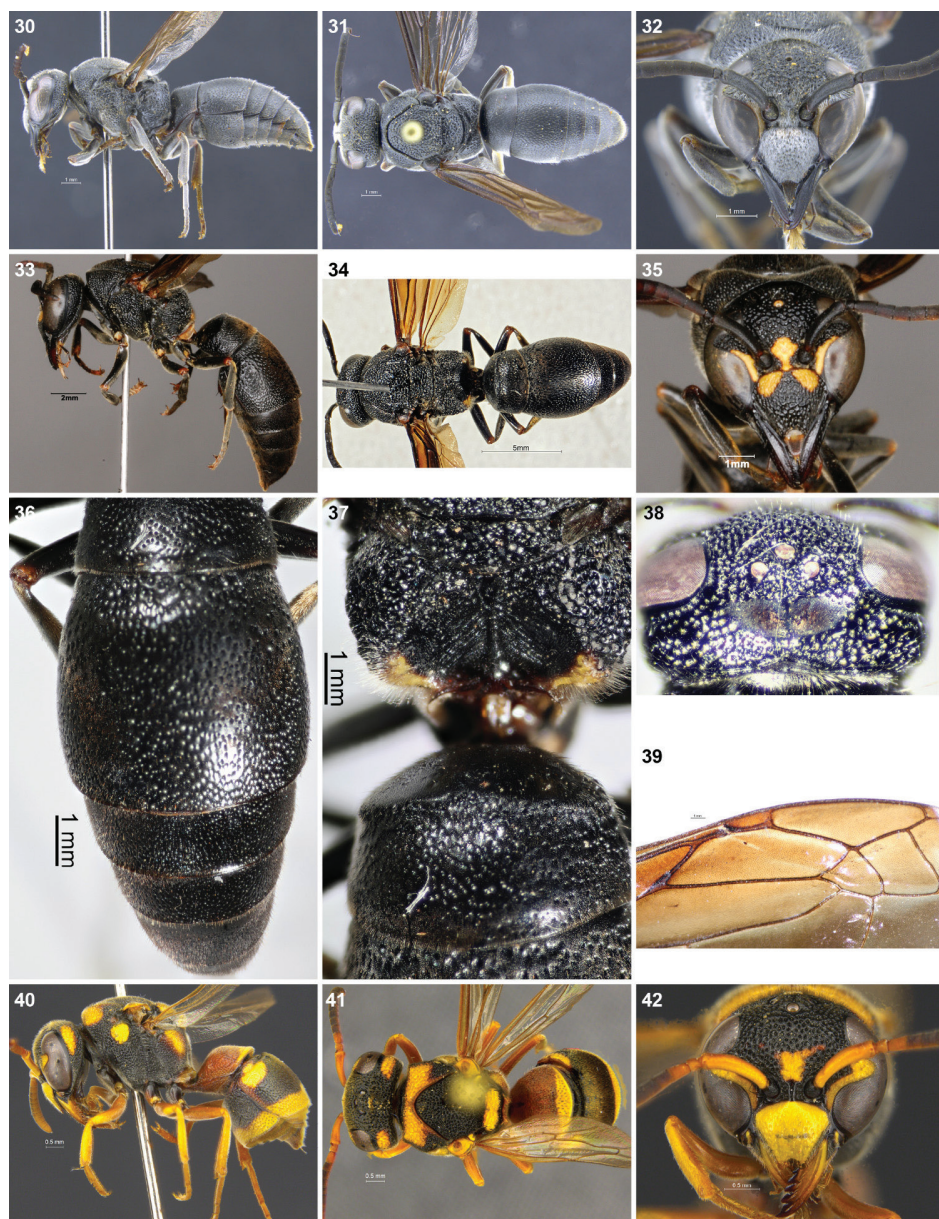
Figs 30–32, 135–138

Rhynchium chinense de Saussure, 1862: 186, “La Chine”, MHNG. Type.

Material examined. CHINA: Hong Kong: 1♂, Pak Sha O, Malaise trap, 03–14.v.2011, UTM: 50Q KK 242 852, 70m, ref.: M091.C.Hy.1, leg. C. Barthélémy [AMNH]; 1♀, same locality, reared, 09.vii.2010, UTM: 50Q KK 242 852, 70m, ref.: 0420.A.Hy.1, leg. C. Barthélémy [AMNH]; 2♀, Pak Sha O, reared, 07.xii.2010 & 04.viii.2018, UTM: 50Q KK 242 849, 70m, refs.: 0380.A.Hy.2 & 0656.C.Hy.1 [CBC]; 2♂, same locality, 13.iv.2010 & 14.viii.20014, refs.: 0393.A.Hy.1 & 0530.A.Hy.1 [CBC]; 1♀, same locality, Malaise trap, 01–10.vi.2010, ref.: M077.C.Hy.1 [CBC]; 3♂, same locality, Malaise trap, 16.vi–03.vii.2010, 10–24.viii.2013 & 19.v–08.vii.2018, refs.: M078.C.Hy.1, M137.C.Hy.2 & M350.C.Hy.1 [CBC]; 2♀, Ping Shan Chai, Malaise trap, 26.v–14.vii.2018, UTM: 50Q KK 106 893, 140m, ref: M351.D.Hy.6 [CBC].

Distribution. China (Fujian, Guangdong, Guangzhou, Guangxi, Henan, Hong Kong, Jiangxi, Macao, Sichuan, Shanghai, Taiwan, Yunnan); Vietnam; Philippines.

Remarks. Displays elaborate nesting biology, particularly progressive provisioning. Construct cell partitions and entrance collar with resinous material (likely as an ant



Figures 30–42. *Allorhynchium chinense*, female **30** habitus (lateral view) **31** habitus (dorsal view) **32** head (frontal view) **33–39** *Allorhynchium radiatus* sp. nov., female **33** habitus (lateral view) **34** habitus (dorsal view) **35** face (frontal view) **36** metasoma (dorsal view) **37** propodeum (dorsal view) **38** vertex (dorsal view) **39** part of fore wing **40–42** *Antepipona rufescens*, female **40** habitus (lateral view) **41** habitus (dorsal view) **42** head (frontal view).

repellent). Recorded by Barthélémy (2012) as *Allorhynchium* sp.1. Cells are progressively-provisioned with caterpillars belonging to the family Tortricidae (Barthélémy, 2012). An abundant wasp in Hong Kong.

(10) **Allorhynchium radiatum* sp. nov.

<http://zoobank.org/A2171C9D-0B32-4AF1-86A3-F4EB581F3B64>

Figs 33–39

Material examined. CHINA: Hong Kong: HOLOTYPE, ♀, Mang Kung Wo, Malaise trap, 11.viii.2015, UTM: 50Q KK 174 760, 60m, M060, C.Hy.2, leg. C. Barthélémy [AMNH].

Description. Female (Figs 33–34): body length 13.0 mm; fore wing length 13.5 mm. Black, with the following parts yellow: two separated spots of clypeus basally (Fig. 35), a band of ocular sinus lower, inter-antennal spot, and border between posterior and dorsa-lateral surfaces of propodeum (Fig. 37); mandible mostly, A3–A12, tegula exclude inner side, apex of parategula, and terminal tarsi dark ferruginous. Wings darkly infuscated.

Head. Head in frontal view wider than long. In frontal view, clypeus (Fig. 35) coarsely punctate, interspaces carinate and irregularly reticulate, swollen in the middle, clypeal maximum width $1.19\times$ its length, apical width $1.30\times$ distance between antennal sockets (Fig. 35), width of clypeus $2.82\times$ apical width, apex deeply emarginated medially and forming acute tooth on each lateral side; frons coarsely punctate, interspaces carinate and reticulate; vertex punctate, punctures a little sparser than frons and clypeus, with two small separated cephalic foveae somewhat bigger than surrounding punctures, depression for cephalic foveae absent, area behind posterior ocelli depression (Fig. 38); occipital carina complete; interocular distance on vertex $1.06\times$ that at clypeus in frontal view.

Mesosoma. Mesosoma much longer than wide in dorsal view. Pronotal carina complete; pronotum, mesoscutum, scutellum and metanotum coarsely punctate, these punctures very similar to those on frons; mesoscutum slightly convex, about as long as wide between tegulae; scutellum almost flat; metanotum convex and sloping down to apical margin; mesopleuron coarsely punctate, punctures denser than mesoscutum except large area of epicnemium coriaceous; epicnemial carina present and strong; metapleuron coriaceous and with few minute punctures; propodeum (Fig. 37) without lateral carina, dorsal face coarsely punctate, interspaces between punctures carinate and reticulate, lateral face coarsely and irregularly striate and with a few sparse and shallow punctures, posterior face deeply excavated, basal triangular area with a deep fovea, about $1/3$ of length of medio-longitudinal carina, with strong median carina connecting a few oblique striae; border between posterior and dorsa-lateral surfaces round (Fig. 37). Parastigma of fore wing much more than half as long as stigma (Fig. 39); tegula not reaching parategula.

Metasoma. T1 in dorsal view slightly more than twice as wide as ($2.12\times$) long (Fig. 37), and slightly narrower than T2 (Fig. 36), basally with transverse carina interrupted mesally; anterior vertical surface of T1 convex, coriaceous, with a few sparse shallow punctures, and obviously separating from dorsal horizontal part; dorso-lateral area behind transverse carina with a few coarse punctures similar to those of mesoscutum, interspaces between punctures slightly carinate; dorsal surface except apex densely punctate, interspaces between punctures not reticulate, and punctures much smaller and sparser than those of head and mesosoma; T2 slightly wider than ($1.08\times$) long, densely punctate, punctures at the base relatively bigger and sparser than those

in other part of T2; S2 coarsely punctate and slightly lowered basally; visible parts of T3–T5 minutely punctate, punctures much smaller than those of T2 (Fig. 36).

Male. Unknown.

Distribution. *China (*Hong Kong).

Remarks. This species is related to *A. diffinis* (Giordani Soika, 1986) by T1 with distinct transverse carina (Fig. 37), a yellow band at lower part of ocular sinus, and a yellow inter-antennal spot. It can be distinguished from the related species and other members of the genus by following combination of characters: punctures of T1 basally sparser than *A. diffinis*, clypeus basally with two separated yellow spots (Fig. 35), and pronotum, mesepisternum, metanotum and metasoma wholly black (Figs 33–34).

Etymology. The specific name *radiatum* is Latin for radiation, referring to the notable marking on the face of the holotype resembling that of the infamous Nuclear Radiation pictogram.

6. Genus *Antepipona* de Saussure, 1855

Antepipona de Saussure, 1855: 244. Type species: *Odynerus silaos* de Saussure, 1853, by subsequent designation of van der Vecht, 1967: 30.

(11) *Antepipona menkei* Giordani Soika, 1986

Antepipona menkei Giordani Soika, 1986: 130–131, “Cina: Hong Kong, Is. Lantau”, USNM. Type: female.

Material examined. No specimens.

Distribution. China (Hong Kong).

Remarks. Described from Hong Kong by Giordani Soika, 1986.

(12) *Antepipona rufescens* (Smith, 1857)

Figs 40–42

Odynerus rufescens Smith, 1857: 61, “Ceram”, NHMUK. Type: female.

Antepipona ferruginea Kim & Yamane, 2003: 287, 291, figs 9–16, “Jansui, Formosa”, HUM. Syn. nov.

Material examined. CHINA: Hong Kong: 1♀, Kam Tin, hand net, 25.viii.2006, UTM: 50Q JK 975 843, 10m, ref.: 0227.G.Hy.2 [CBC].

Distribution. China (Hong Kong, Shanghai, Sichuan, Taiwan); India; Thailand; Myanmar; Laos; Malaysia; Indonesia.

Remarks. First recorded from Hong Kong by Giordani Soika 1986. Comparing the specimen from Hong Kong and other specimens of *A. rufescens* in the AMNH with the description of *A. ferruginea* shows that they are identical in the features cited as diagnostic by Kim and Yamane (2003). Accordingly, the species *A. ferruginea* Kim & Yamane, 2003 from Taiwan is synonymized with *A. rufescens* (Smith, 1857).

7. Genus *Anterhynchium* de Saussure, 1863

Anterhynchium de Saussure, 1863: 205. Type species: *Rygius synagroides* de Saussure, 1852, by subsequent designation of van der Vecht, 1963: 73.

(13) *Anterhynchium* (*Anterhynchium*) *mellyi* (Saussure, 1852)

Figs 43–45

Rygius mellyi de Saussure, 1852: 116, “Les Indes, La Chine”, MHNG. Type: female.

Material examined. CHINA: Hong Kong: 3♀, Sha Lo Tong, hand net, 29.vi.2014, 18.vi.2016, UTM: 50Q KK101886, 160m, 50Q KK 100 883180m & 50Q KK 101 887, ref. 0526.E.Hy.1, leg. C. Barthélémy [AMNH], 0524.N.Hy.2 [CBC] & 0598.B.Hy.10 [CBC]; 1♀, Pak Sha O, hand net, 10.vi.2005, UTM: 50Q KK 242 849, 70m, ref.: 0134.A.Hy.1.

Distribution. China (Fujian, *Hong Kong, Yunnan); India; Myanmar; Thailand; Vietnam.

Remarks. An occasional wasp in Hong Kong.

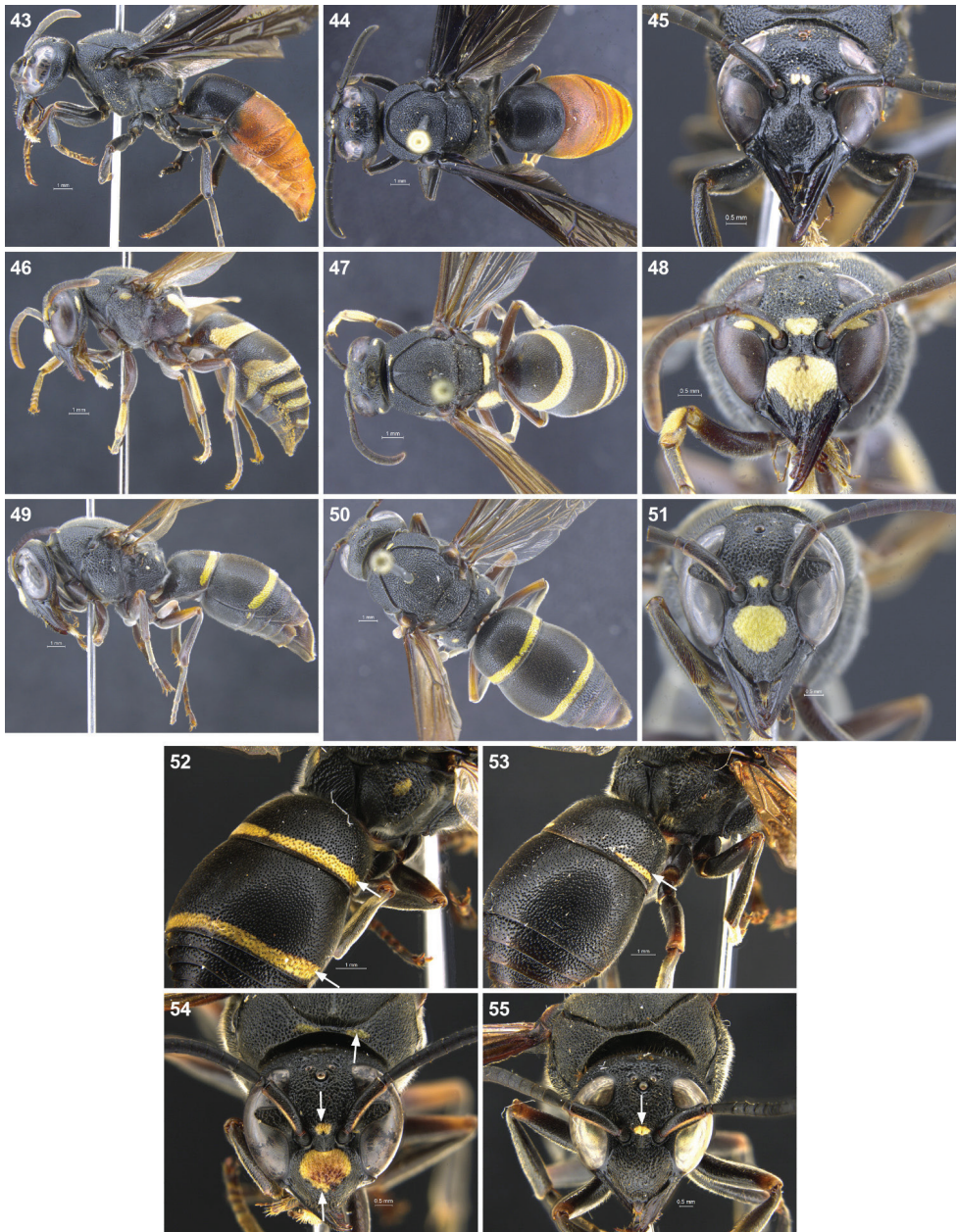
(14) *Anterhynchium* (*Dirhynchium*) *flavolineatum flavolineatum* (Smith, 1857)

Figs 46–48, 139–142

Odynerus flavo-lineatus Smith, 1857: 60, “Java”, NHMUK. Type: female.

Material examined. CHINA: Hong Kong: 1♂, Pak Sha O, hand net, 21.iv.2009, UTM: 50Q KK 242 849, 70m, ref.: 0323.E.Hy.1, leg. C. Barthélémy [AMNH]; 1♀, Pak Sha O, reared, 12.vi.2010, UTM: 50Q KK 242 849 70m, ref.: 0413.A.Hy.1, leg. C. Barthélémy [AMNH]; 4♀, same location, 09.v.2006, 06.vi.2010, 28.vi.2010 & 08.vii.2010; refs.: 0183.C.Hy.1 hand net, 0409.A.Hy.2 reared, 0418.A.Hy.1 reared & 0419.A.Hy.1 reared, [CBC]; 1♀, Ping Shan Chai, Malaise trap, 08–21.v.2016, UTM: 50Q KK 106 893, 140m, ref.: M245.D.Hy.1 [CBC].

Distribution. China (Hong Kong, Yunnan); India; Myanmar; Vietnam; Malaysia; Indonesia.



Figures 43–55. *Anterhynchium mellyi*, female **43** habitus (lateral view) **44** habitus (dorsal view) **45** head (frontal view) **46–48** *Anterhynchium flavolineatum*, female **46** habitus (lateral view) **47** habitus (dorsal view) **48** head (frontal view) **49–55** *Anterhynchium flavomarginatum flavomarginatum*, female **49** habitus (lateral view) **50** habitus (dorsal view) **51** head (frontal view) **52–53** variation of markings on propodeum, T1 & T2 **54–55** variation of face markings.

Remarks. A frequent wasp in Hong Kong. Its nesting biology was described by Barthélémy (2012) as *Antherychium* sp.1. Cells are mass-provisioned with caterpillars belonging to the family Crambidae (Barthélémy, 2012).

(15) *Anterhynchium* (*Dirhynchium*) *flavomarginatum flavomarginatum* (Smith, 1852)

Figs 49–55, 143–146

Rhynchium flavo-marginatum Smith, 1852: 35, type locality: not indicated although probably North China, NHMUK. Type: female.

Material examined. CHINA: Hong Kong: 4♀4♂, Pak Sha O, reared, 20.iv.2010, 01.v.2010, 19.v.2010, 19.v.2013 & 11.vi.2016, UTM: 50Q KK 242 852, 70m, refs.: 0395.A.Hy.1, 0403.A.Hy.1, 0502.A.Hy.1 & 0596.G.Hy.1 [CBC]; 1♀, High Island Reservoir, Sai Kung, hand net, 28.viii.2012, UTM: 50Q KK 269 786, 150m, ref.: 0482.B.Hy.6 [CBC]; 1♀, Ping Shan Chai, hand net, 04.vi.2016, UTM: 50Q KK 106 893, 140m, ref.: 0592.B.Hy.7 [CBC]; 13♂, Pak Sha O, reared, 22.vi.2009, 11.viii.2009, 25.iv.2010, 22.vii.2010, 24.vii.2010, 29.vii.2010, 28.iv.2011, 15.vi.2011, 12.v.2013, 17.v.2013 & 24.iv.2016, UTM: 50Q KK 242 849, 70m, refs.: 0349.A.Hy.2 [CBC], 0369.A.Hy.1 [CBC], 0398.A.Hy.1 [CBC], 0422.A.Hy.1, leg. C. Barthélémy [AMNH], 0424.A.Hy.1 & 2 [CBC], 0425.A.Hy.1 & 2 [CBC], 0438.A.Hy.1 [CBC], 0441.A.Hy.1 [CBC], 0498.A.Hy.1 [CBC], 0501.A.Hy.1 [CBC] & 0583.C.Hy.1, leg. C. Barthélémy [AMNH]; 6♀, same location, Malaise Trap, 14–31.v.2009, 31.v.–23.vi.2009, 21.xi.–26.xii.2010, 03–24.vii.2011 & 29.ix.–14.x.2012, refs.: M062.C.Hy.10 [CBC], M063.C.Hy.1 [CBC], M085.C.Hy.1 & 2, leg. C. Barthélémy [AMNH], M095.C.Hy.2, leg. C. Barthélémy [AMNH] & M116.C.Hy.1 [CBC].

Distribution. China (Chongqing, Fujian, Guangxi, Hong Kong, Jiangxi, Shanghai, Sichuan, Zhejiang); Pakistan; India; Nepal; Laos; Vietnam, Mongolia; Korea; Japan.

Remarks. An abundant wasp in Hong Kong. Dover (1926) first recorded this species from Hong Kong as *Odynerus* (*Rygius*) *flavomarginatus* Sauss. Its nesting biology was described by Barthélémy (2012) and erroneously identified as *Xenorhynchium* sp.1. Cells are mass-provisioned with caterpillars belonging to the family Crambidae (Barthélémy, 2012). There are two colour forms locally (see Figs 52–55). In fact this taxon is known for its colour variability and the nominotypical species has no less than 11 recognised subspecies, which is far from being satisfactory, further elucidation of this taxon is needed.

8. Genus *Apodynerus* Giordani Soika, 1993

Apodynerus Giordani Soika, 1993: 155. Type species: *Odynerus troglodytes* de Saussure, 1855, by original designation and monotypy.

(16) *Apodynerus formosensis formosensis* (von Schulthess, 1934)

Figs 56–58

Odynerus formosensis von Schulthess, 1934: 101, “Formosa, Kankau, Kosempo, Taihorin, Taihorinsho”, UZH. Type: Female & Male.

Material examined. CHINA: Hong Kong: 3♀, Ping Shan Chai, hand net, 04.v.2006, 08.vii.2006 & 12.v.2018, UTM: 50Q KK 104 891, 50Q KK 104 889 & 50Q KK 103 890, 180m, refs.: 0182.B.Hy.2 [CBC], 0210.B.Hy.2, leg. C. Barthélémy [AMNH] & 0651.B.Hy.7 [CBC]; 1♀, Kam Tin (Wetland), hand net, 25.viii.2006, UTM: 50Q JK 975 843, 10m, ref.: 0227.G.Hy.3 [CBC]; 1♀, Yuen Long, hand net, 28.viii.2007, UTM: 50Q JK 975 843, 20m, ref.: 0280.N.Hy.2 [CBC]; 1♀, Lamma Island, Hung Shing Ye, 03.v.2008, UTM: 50Q KK 031 600, 15m, ref.: 0288.N.Hy.6 [CBC]; 1♀, Ha Tin Liu Ha, hand net, 01.v.2009, UTM: 50Q KK 058 849, 60m, ref.: 0328.J.Hy.3 [CBC]; 1♀, Mai Po Nature Reserve, hand net, 02.viii.2014, UTM: 50Q JK 959 903, 1m, ref.: 0528.G.Hy.2 [CBC]; 1♀, Sha Lo Tong, hand net, 18.vi.2016, UTM: 50Q KK 101 887, 160m, ref.: 0598.B.Hy.11 [CBC]; 4♀, Pak Sha O, Malaise trap, 31.v.–06.vi.2004, 04–11.x.2004, 26.iv.–02.v.2005 & 15–31.v.2010, UTM: 50Q KK 242 849, 70m, refs.: M017.C.Hy.24, M025.C.Hy.2, M028.C.Hy.1 & M076.C.Hy.1 all [CBC]; 1♂, same location, Malaise trap, 19.vi.–03.vii.2011, ref.: M094.C.Hy.2, leg. C. Barthélémy [AMNH].

Distribution. China (*Hong Kong, Taiwan).

Remarks. An abundant wasp in Hong Kong.

(17) *Apodynerus troglodytes troglodytes* (de Saussure, 1855)

Figs 59–61, 147–149

Odynerus troglodytes de Saussure, 1855: 249, “le Sénégal” (likely an error), MRSN. Type: male.

Material examined. CHINA: Hong Kong: 5♀, Pak Sha O, Malaise trap, 27.ix.–04.x.2004, 26.ix.–18.x.2009, 30.iv.–15.v.2010, 15–31.v.2010 & 05–18.v.2018, UTM: 50Q KK 242849, 70m, refs.: M024.C.Hy.3 [CBC], M067.C.Hy.13 [CBC], M075.C.Hy.7, leg. C. Barthélémy [AMNH], M076.C.Hy.2 [CBC] & M346.C.Hy.2 [CBC]; 3♀, Mang Kung Wo, Malaise trap, 14–28.iv.2018, 12–26.v.2018 & 21.vii.–04.viii.2018, UTM: 50Q KK 174 760, 60m, refs.: M342.C.Hy.2, M348.C.Hy.6 & M356.C.Hy.1 all [CBC]; 1♀, Ping Shan Chai, Malaise trap, 14–28.vii.2018, UTM: 50Q KK 106 893, 140m, ref.: M354.D.Hy.1 [CBC].

Distribution. China (Guangdong, Guangxi, Hainan, Hong Kong, Yunnan); India; Myanmar; Thailand; Laos; Vietnam; Malaysia; Singapore; Indonesia; Philippines.

Remarks. A frequent wasp in Hong Kong. It is a tube renter; Barthélémy (2012) reported on its nesting biology as *Apodynerus* sp.1.



Figures 56–70. *Apodynerus formosensis formosensis*, female **56** habitus (lateral view) **57** habitus (dorsal view) **58** head (frontal view) **59–61** *Apodynerus troglodytes troglodytes*, female **59** habitus (lateral view) **60** habitus (dorsal view) **61** head (frontal view) **62–64** *Coeleumenes burmanicus*, female **62** habitus (lateral view) **63** habitus (dorsal view) **64** head (frontal view) **65–67** *Ectopioglossa ovalis*, female **65** habitus (lateral view) **66** habitus (dorsal view) **67** head (frontal view) **68–70** *Epsilon dyscherum*, female **68** habitus (lateral view) **69** habitus (dorsal view) **70** head (frontal view).

9. Genus *Coeleumenes* van der Vecht, 1963

Coeleumenes van der Vecht, 1963: 45. Type species: *Montezumia impavida* Bingham, 1897: 351, by original designation.

(18) *Coeleumenes burmanicus* (Bingham, 1897)

Figs 62–64

Montezumia burmanica Bingham, 1897: 350, fig. 101, “Tenasserim” (Myanmar), NHMUK. Type: female.

Material examined. CHINA: Hong Kong: 1♀, Sha Lo Tong, hand net, 11.vii.2015, UTM: 50Q KK 100 886, 160m, Ref.: 0553 C.Hy.6, leg. C. Barthélémy [AMNH]; 1♀, Ping Shan Chai, hand net, 28.vii.2018, UTM: 50Q KK 102 895, 180m, ref.: 0654.B.Hy.1 [CBC]; 3♀, Ping Shan Chai, Malaise trap, 21.v.–04.vi.2016, 16–30.vii.2016 & 21.x.–18.xi.2017, UTM: 50Q KK 106 893, 140m, refs. M247.D.Hy.1, M255.D.Hy.2 & M319.D.Hy.1 all [CBC].

Distribution. China (Guangxi, *Hong Kong, Zhejiang); India; Myanmar; Thailand; Laos; Vietnam; Malaysia.

Remarks. An occasional wasp in Hong Kong.

10. Genus *Ectopioglossa* Perkins, 1912

Ectopioglossa Perkins, 1912:118. Type species: *Ectopioglossa australensis* Perkins, 1912 by monotypy.

(19) *Ectopioglossa ovalis* Giordani Soika, 1993

Figs 65–67

Ectopioglossa ovalis Giordani Soika, 1993: 160, “Cina: IS. Hainan, Ta Hian”, RMNH. Type: female.

Material examined. CHINA: Hong Kong: 1♀, Pak Sha O, Malaise trap, 03–24.vii.2011, UTM: 50Q KK 242 849, 70m, ref.: M095.C.Hy.3 [CBC].

Distribution. China (Guangdong, Hainan, *Hong Kong).

Remarks. Known from a single specimen, scarce in Hong Kong.

11. Genus *Epsilon* de Saussure, 1855

Epsilon de Saussure, 1855: 229, 252. Type species: *Odynerus dyscherus* de Saussure, 1852, by subsequent designation of van der Vecht, 1967: 31.

(20) *Epsilon dyscherum* (Saussure, 1852)

Figs 68–70

Odynerus dyscherus de Saussure, 1852: 175, “La Chine. Manilla?”, MNHN. Type: male.

Material examined. CHINA: Hong Kong: 1♀, Ping Shan Chai, hand net, 30.v.2015, UTM: 50Q KK 106883, 140m, ref.: 0546.B.Hy.2 [CBC].

Distribution. *China (*Hong Kong); Philippines.

Remarks. Known from a single specimen.

12. Genus *Euodynerus* Dalla Torre, 1904

Euodynerus Dalla Torre, 1904: 38. Type species: *Vespa dantici* Rossi, 1790: 89, by subsequent designation of Blüthgen, 1938 (1937): 277.

(21) *Euodynerus (Euodynerus) dantici violaceipennis* Giordani Soika, 1973

Figs 71–73

Euodynerus dantici violaceipennis Giordani Soika, 1973: 124, “China: Canton”, MSNV. Type: female.

Material examined. CHINA: Hong Kong: 1♀, Sha Lo Tong, hand net, 16.vii.2016, UTM: 50Q KK101 887, 160m, ref.: 0606.B.Hy.2 [CBC].

Distribution. China (Guangdong, *Hong Kong, Jiangsu, Taiwan); Vietnam; Korea; Japan.

Remarks. Known from a single specimen; it has Palearctic affinities.

(22) *Euodynerus (Pareuodynerus) trilobus* (Fabricius, 1787)

Figs 74–76

Vespa triloba Fabricius, 1787: 290, “China”, ZMUC. Type: sex unknown.

Material examined. CHINA: Hong Kong: 1♀, Wang Tong, Lantau Isl., hand net, 05.vii.2016 UTM: 49Q HE 087 660, 10m, leg. Paul Aston [CBC].



Figures 71–85. *Euodynerus dantici violaceipennis*, female **71** habitus (lateral view) **72** habitus (dorsal view) **73** head (frontal view) **74–76** *Euodynerus trilobus*, female **74** habitus (lateral view) **75** habitus (dorsal view) **76** head (frontal view) **77–79** *Labus edenticulus*, female **77** habitus (lateral view) **78** habitus (dorsal view) **79** head (frontal view) **80–82** *Lisodynerus septemfasciatus feanus*, female **80** habitus (lateral view) **81** habitus (dorsal view) **82** head (frontal view) **83–85** *Orancistrocerus aterrimus erythropus*, female **83** habitus (lateral view) **84** habitus (dorsal view) **85** head (frontal view).

Distribution. China (Anhui, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hong Kong, Jiangsu, Jiangxi, Shanghai, Sichuan, Taiwan, Zhejiang); British Indian Ocean Territories; Mauritius; Réunion; Vietnam; Malaysia; Indonesia; Japan.

Remarks. Known from a single specimen. Firstly recorded from Hong Kong by Dover (1926) as *Odynerus trilobus* Fabr. This species has Palearctic affinities.

13. Genus *Labus* de Saussure, 1867

Labus de Saussure, 1867: 3. Type species: Male, *Labus spiniger* de Saussure, 1867, by subsequent designation of Bingham, 1897: 348.

(23) *Labus edenticulus* Li & Carpenter, 2018

Figs 77–79

Labus edenticulus Li & Carpenter, 2018, Hong Kong, AMNH. Type: female.

Material examined. CHINA: Hong Kong: 1♀, Hung Fa Leng, Malaise trap, 16.iv.–16.v.2014, UTM: 50Q KK 108 854, 435m, Yiu Vor, Ref.: HFL-M001.F.Hy.9, leg. C. Barthélémy [AMNH]; 1♂, Yung Shue O, hand net, 18.x.2012, ref.: JXQL001-Hy.1, leg. John X.Q.Lee [CBC].

Distribution. China (Hong Kong).

Remarks. A scarce species in HK. Described from Hong Kong by Li and Carpenter (2018).

14. Genus *Lissodynerus* Giordani Soika, 1993

(24) *Lissodynerus septemfasciatus feanus* (Giordani Soika, 1941)

Figs 80–82, 150–154

Ancistrocerus septemfasciatus var. *feanus* Giordani Soika, 1941: 239, “Carin Cheba, Burma” (Myanmar), MHNG. Lectotype: female.

Material examined. CHINA: Hong Kong: 4♀, Pak Sha O, reared, 23.v.2013, 28.v.2013 & 08.viii.2014, UTM: 50Q KK 242 849 70m, refs.: 0519.A.Hy.1 [CBC], 0521.A.Hy.2 [CBC], 0521.A.Hy.3 [CBC] & 0529.A.Hy.1, leg. C. Barthélémy [AMNH]; 1♀, Sha Lo Tong, hand net, 16.vii.2016, UTM: 50Q KK 101 887, 160m, ref.: 0606.B.Hy.1 [CBC]; 1♀3♂♂, Guangdong Prov., Shaoguan City, Shixing County, Chebaling National Nature Reserve, V. 6. 2017, leg. Fei-Yue Dou (CQNU).

Distribution. China (Guangxi, *Guangdong, *Hong Kong); India; Myanmar; Vietnam; Malaysia.

Remarks. An occasional wasp in Hong Kong. Nests are constructed inside cavities and the species readily accepts bamboo segments as nesting site. Cell partitions are constructed with a resinous material (Figs 150–154). Dissected cells were mass-provisioned with caterpillars in the family Geometridae and probably also Erebidae (CB pers. obs., det. Dr. Roger Kendrick, Hong Kong).

15. Genus *Orancistrocerus* van der Vecht, 1963

Orancistrocerus van der Vecht, 1963: 58. Type species: *Odynerus drewseni* de Saussure, 1857: 318, by original designation.

(25) *Orancistrocerus aterrimus erythropus* (Bingham, 1897)

Figs 83–85, 155–158

Rhynchium erythropus Bingham, 1897: 352, 353, “Tenasserim” (Myanmar), NHMUK. Type: male.

Material examined. CHINA: HONG KONG: 3♀, Pak Sha O, reared, 04.v.2009, 05.v.2009 & 28.v.2013, UTM: 50Q KK 242 849, 70m, refs.: 0331.A.Hy.1 [CBC], 0332.A.Hy.1, leg. C. Barthélémy [AMNH], 0521.A.Hy.1 [CBC]; 2♂, same location, reared, 17.iv.2009 & 19.iv.2009, refs.: 0319.A.Hy.1, leg. C. Barthélémy [AMNH] & 0321.A.Hy.2 [CBC]; 2♀, same location, hand net, 01.xi.2003 & 19.v.2018, refs.: 0101.C.Hy.1 & 0652.C.Hy.1 both [CBC].

Distribution. China (Guangdong, Guangxi, Hong Kong, Sichuan, Yunnan, Zhejiang); Myanmar; Laos; Thailand.

Remarks. Barthélémy (2012) reported on the nesting biology of this species under the erroneous name *Pararrhynchium* sp.1. Dissected cells were mass-provisioned with caterpillars in the subfamily Spilomelinae (Crambidae) (Barthélémy 2012).

16. Genus *Orientalicesa* Koçak & Kemal, 2010

Kennethia Giordani Soika, 1994: 4, 289.

Kennetia Giordani Soika, 1994: 289. Incorrect original spelling of *Kennethia* Giordani Soika.

Orientalicesa Koçak & Kemal, 2010: 4, replacement name for *Kennethia* Giordani Soika, 1994, non De Dekker, 1979.

Type species. *Odynerus unifasciatus* von Schulthess, 1934, by original designation.

(26) **Orientalicesa nigra* sp. nov.

<http://zoobank.org/F1D39412-263A-466D-9390-601FADE7E897>

Figs 86–91

Material examined. CHINA: Hong Kong, HOLOTYPE, ♀, Park Sha O, hand net, 15–27.iv.2008, UTM: 50Q KK 242 849, 70m, 0554.C.Hy.1, leg. C. Barthélémy [AMNH].

Description. Female (Figs 86–91): body length 9.0 mm; fore wing length 10.5 mm. Black, with the following parts yellow: two small interantennal spots (Fig. 88), scape ventrally, a small spot on base of mandible, and a small band of fore tibia inside; antenna except scape, mandible except a spot, all legs except the band of fore tibia, tegula, and apex of parategula dark ferruginous. Wings brown, infusate, veins dark brown.

Head. Clypeus (Fig. 88) 1.02× as wide as long, medially convex, coarsely punctate, interspaces between punctures more or less reticulate; apex slightly emarginated medially and forming blunt tooth on each lateral side, total width 3.29× apical width, apical width 7× emargination depth and as wide as interantennal space; interantennal carina prominent; frons slightly convex and coarsely punctate, distinctly carinate and reticulate between punctures; vertex (Fig. 89) with two large cephalic foveae, brown pubescence inserted mesally, depression for cephalic foveae distinctly concave, and with a medio-longitudinal carina from anterior ocellus to occipital carina and connecting occipital carina, punctures on other parts of vertex and gena relatively sparser; occipital carina complete.

Mesosoma. Mesosoma not visibly depressed; pronotal carina complete and strong, anterior sloping face of pronotum obviously polished; pronotum, mesoscutum, mesepisternum, scutellum, and metanotum coarsely and deeply punctate, interspaces between punctures with distinct carinae and reticulate, epicnemial carina present, not strong; mesoscutum weakly convex, scutellum flat, in lateral view at same level as mesoscutum, strongly depressed along anterior margin with some short longitudinal carinae, and without a medial longitudinal furrow from middle to apex; metanotum sloping down to apical margin; propodeum (Fig. 90) without horizontal area behind midline of metanotum, dorsal face of propodeum coarsely punctate, punctures large, shallow, flat bottomed and interspaces with reticulate carinate, superior carinae (Fig. 90) of propodeum well developed and on top forming a pair of large triangular teeth behind metanotum, carinae curved, posterior surface distinctly concave, with few faint striae, and bordered by superior carina with wide V-shaped incision in middle above; tegula shorter than parategula posteriorly.

Metasoma. T1 wider than long, width 1.63× its length and 0.83× width of T2, vertical anterior faces distinctly coriaceous and separated from horizontal surface, horizontal surface without transverse carina and moderately punctate, punctures much sparser and smaller than those of head and mesosoma, apex with a wide, smooth and shiny preapical band (Fig. 91); T2 1.29× as wide as long, with a row of larger and denser punctures at about 1/5 of their length from apical margin and forming a broad



Figures 86–97. *Orientalicesa nigra* sp. nov., female **86** habitus (lateral view) **87** habitus (dorsal view) **88** head (frontal view) **88** face (frontal view) **89** dorsal view of vertex **90** propodeum (dorsal view) **91** metasoma (dorsal view) **92–94** *Paraleptomenes kosempoensis*, female **92** habitus (lateral view) **93** habitus (dorsal view) **94** head (frontal view) **95–97** *Parancistrocerus hongkongensis*, female **95** habitus (lateral view) **96** habitus (dorsal view) **97** head (frontal view).

smooth and shiny preapical band (Fig. 91) and with another row of sparse punctures close to the apical edge, other punctures of T2 slightly sparser than those of T1, sub-apex of T2 not swollen; S2 sparsely punctate and regularly convex; visible apices of T3–T5 with the similar preapical bands to that of T2; lateral margins of T2–T4 clearly marginalized.

Male. Unknown.

Distribution. *China (*Hong Kong).

Remarks. This species is similar to *O. bicolorata* (Giordani Soika, 1994) from Indonesia in superior carinae of propodeum well developed and forming a pair of large triangular teeth behind metanotum, punctures of T2 moderately dense and not larger than those of mesoscutum, and apex of T2 with another row of sparse punctures close to the apical edge. It can be distinguished from the related species and all other members of the genus by the combination of following characters: mesosoma not visibly depressed, and the body (Figs 86–87) almost wholly black and without yellowish or reddish-ferruginous spots or bands.

Etymology. The specific name refers to the body almost wholly black.

17. Genus *Paraleptomenes* Giordani Soika, 1970

Paraleptomenes Giordani Soika, 1970. Type species: *Paraleptomenes nurseanus* Giordani Soika, 1970: 79, Fig.16, pl.V, by original designation and monotypy.

(27) *Paraleptomenes kosempoensis* (von Schulthess, 1934)

Figs 92–94

Odynerus kosempoensis von Schulthess, 1934: 102, “Formosa”, NMW. Type: male.

Material examined. CHINA: Hong Kong: 2♀, Tai Tam, Malaise trap, 23–30.x.2017, 22.24614N, 114.22334E, 2m, ref.: 0682.Y.Hy.1, leg. C. Taylor [CBC].

Distribution. China (*Hong Kong, Taiwan).

Remarks. Species collected in mangroves.

18. Genus *Parancistrocerus* Bequaert, 1925

Parancistrocerus Bequaert, 1925: 64. Type species: *Odynerus flavipes* de Saussure, 1855: 205 [= *O. “flavipes* Fabricius” *sensu* de Saussure, 1852, non *Vespa flavipes* Fabricius, 1775], by original designation.

(28) *Parancistrocerus hongkongensis* Gusenleitner, 2002

Figs 95–97

Parancistrocerus hongkongensis Gusenleitner, 2002: 1091, 1095, “Hong Kong, Lantau I., Shui Hau, 20–50 m, 22.22N, 113.92E”, LACM. Type: Holotype female, male.

Material examined. CHINA: Hong Kong: 2♀, Sha Lo Tong & Pak Sha O, hand net, 01.v.2006 & 01.v.2009, UTM: 50Q KK 101 884 & 50Q KK 242 849, 160 m & 70m, refs.: 0177.B.Hy.1, leg. C. Barthélémy [AMNH] & 0328.E.Hy.2 [CBC]; 1♀, Pak Sha O, Malaise trap, 23.viii.–12.ix.2014; UTM: 50Q KK 242 849, 70m, ref.: M173.C.Hy.4 [CBC]; 2♀, Mang Kung Wo, hand net, 21.viii.18 & 02.ix.18, UTM: 50Q KK 174 760, 60m, Refs.: 0659.C.Hy.3 & 0662.C.Hy.1 [CBC].

Distribution. China (Hong Kong).

Remarks. A frequent wasp in Hong Kong, known to visit flowers of *Vitex negundo* Linn.

(29) *Parancistrocerus yachowensis* Giordani Soika, 1986

Figs 98–100

Parancistrocerus yachowensis Giordani Soika, 1986: 125, figs. 31, 33, “Cina: Szechuan, Tachow”, USNM. Type: female.

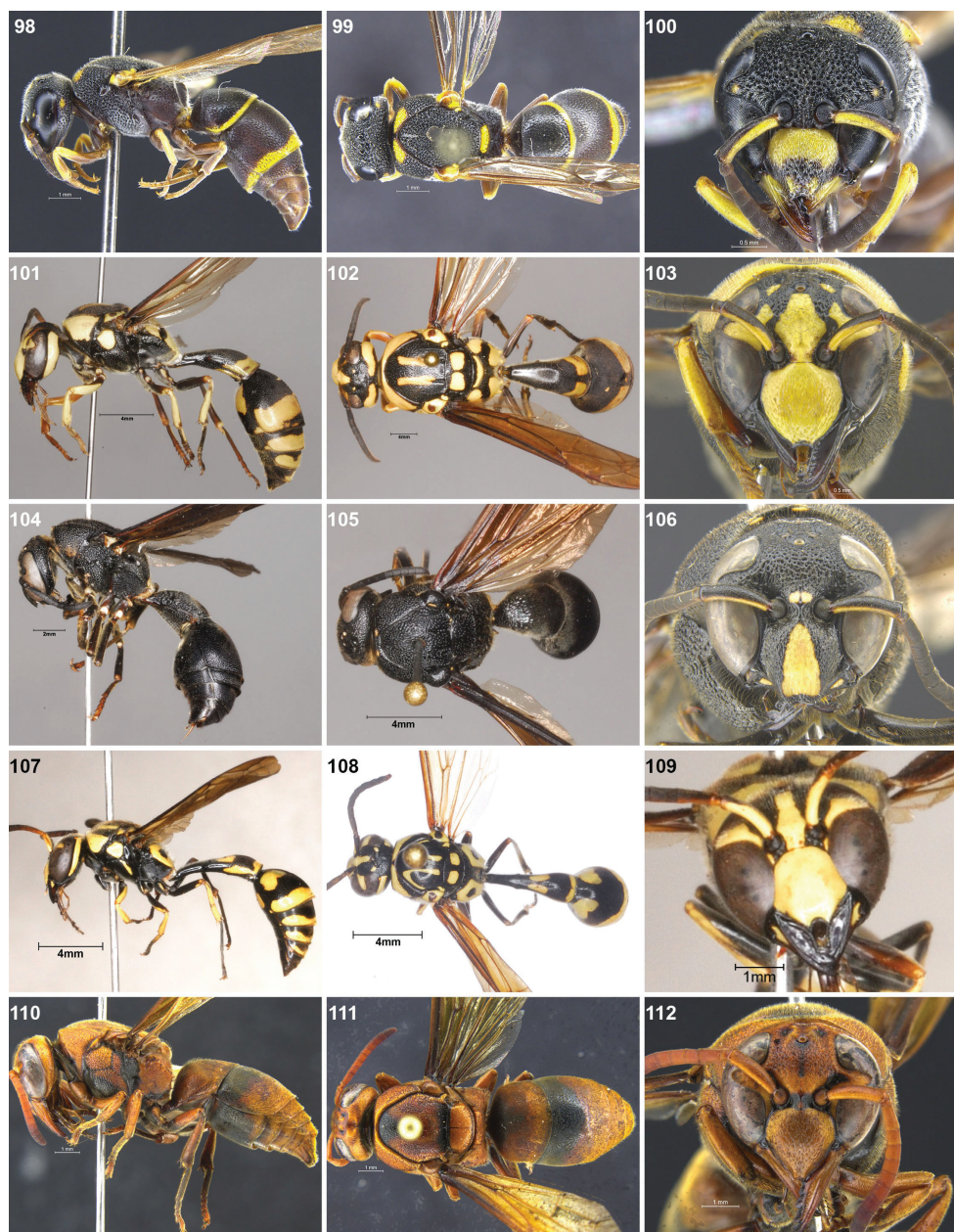
Material examined. CHINA: Hong Kong: 2♀, Fung Yuen Li & Pak Sha O, hand net, 31.viii.2006 & 17.iv.2011, UTM: 50Q KK 097 873 & 50Q KK 242 849, 30m & 70m, Refs.: 0228.E.Hy.4 & 0435.A.Hy.1 [CBC]; 1♀, Pak Sha O, Malaise trap, 27.iv.–14.v.2009, UTM: 50Q KK 242 849, 70m, Ref.: M061.C.Hy.13 [CBC]. INDONESIA: North Sulawesi: 1♀, Tomohon, hand net, 08.vi.2008, 01°20'N, 124°50'E, 720m, Ref.: 0290.C.Hy.1 [CBC].

Distribution. China (*Hong Kong, Sichuan, Taiwan); *Indonesia (North Sulawesi: Tomohon); Laos.

Remarks. Two subspecies are recognized, *P. y. konkunesis* Giordani Soika, 1994 and *P. y. yachowensis* Giordani Soika, 1986. The Hong Kong material shows a mix of characters used by Giordani Soika (1994) and Li and Carpenter (2018) between the nominotypical form and *P. y. konkunesis* which does not allow us to conclude the sub-specific placement of our Hong Kong material. In addition, a specimen from Sulawesi collected by CB and examined by JC, is recognized as similar to the Hong Kong material, increasing substantially the biogeographic range of this taxon.

19. Genus *Pareumenes* de Saussure, 1855

Pareumenes de Saussure, 1855. Type species: *Eumenes quadrispinosus* de Saussure, 1855: 133, by subsequent designation of Bequaert, 1918: 271.



Figures 98–112. *Parancistrocerus yachowensis*, female **98** habitus (lateral view) **99** habitus (dorsal view) **100** head (frontal view) **101–103** *Pareumenes quadrispinosus acutus*, female **101** habitus (lateral view) **102** habitus (dorsal view) **103** head (frontal view) **104–106** *Pseudozumia indica indica*, female **104** habitus (lateral view) **105** habitus (dorsal view) **106** head (frontal view) **107–109** *Pseumenes depressus depressus*, male **107** habitus (lateral view) **108** habitus (dorsal view) **109** head (frontal view) **110–112** *Rhynchium brunneum brunneum*, female **110** habitus (lateral view) **111** habitus (dorsal view) **112** head (frontal view).

(30) *Pareumenes (Pareumenes) quadrispinosus acutus* Liu, 1941

Figs 101–103

Pareumenes acutus Liu, 1941: 255, 262, “South China”, Coll. Liu. Type: female.

Material examined. CHINA: Hong Kong: 3♀, Pak Sha O, hand net, 19.ix. 2001, 27.vi.2006 & 29.vi.2009, UTM: 50Q KK 242 849 70m, refs.: 0058.A.Hy.1, 0203.B.Hy.2 [CBC] & 0351.A.Hy.1, leg. C. Barthélémy [AMNH]; 1♂, same location, reared, 13.iv.2009, ref.: 0317.A.Hy.7 [CBC]; 2♀, same location, Malaise trap, 26.iv.–03.v.2004 & 2–14.v.2011, refs.: M012.C.Hy.22 & M091.C.Hy.3 both [CBC]; 2♀, Ping Shan Chai, hand net, 27.vi.2006 & 27.vi.2015, UTM: 50Q KK 104 891, 180m & 140m, refs.: 0203.B.Hy.1 & 0550.B.Hy.2 both [CBC].

Distribution. China (Guangdong, Guangxi, Hong Kong, Yunnan); India; Bhutan; Vietnam.

Remarks. A frequent wasp in Hong Kong, known to visit flowers of *Vitex negundo* Linn. Nesting biology was reported by Barthélémy (2012). Dover (1926) recorded *Pareumenes quadrispinosus* Sauss. from the SAR, however, as mentioned in the introduction, none of his examined material survives today, in consequence we are unable to ascertain that he saw *P. q. acutus*, but because no other subspecies have been collected from Hong Kong since then, there is great probability that it was in fact *P. q. acutus*. Dissected cells were mass-provisioned with caterpillars in the family Thyrididae (CB pers. obs., det. Dr. Roger Kendrick, Hong Kong).

20. Genus *Pseudozumia* de Saussure, 1875

Pseudozumia de Saussure, 1875: 128. Type species: *Montezumia indica* de Saussure, 1855: 167, by monotypy.

(31) *Pseudozumia (Pseudozumia) indica indica* (Saussure, 1855)

Figs 104–106

Montezumia indica de Saussure, 1855: 167, pl. 9 figs. 4, 4a, “Java”, MRSN. Lectotype: female.

Material examined. CHINA: Hong Kong, 1♀, Sha Lo Wan, Lantau Isl., hand net. 30.xii.2015, 22.17N 113.54E, 60m, ref.: 0582.B.Hy.1, leg. C. Barthélémy [AMNH]; 1♀, Ping Shan Chai, Malaise trap, 30.v.–13.vi.2015, UTM: 50Q KK 106 893, 140m, ref.: M206.D Hy.1 [CBC].

Distribution. China (Guangxi, *Hong Kong, Taiwan); India; Sri Lanka; Malaysia; Vietnam; Indonesia.

Remarks. A scarce wasp in Hong Kong.

21. Genus *Pseumenes* Giordani Soika, 1935

Pseumenes Giordani Soika, 1935: 145. Type species: *Eumenes eximius* Smith, 1861: 126, by original designation.

(32) *Pseumenes depressus* (Saussure, 1855)

Figs 107–109

Eumenes depressus de Saussure, 1855: 135, “Les Indes Orientales”, MNHN. Type: female.

Material examined. CHINA: Hong Kong: 1♀, Pak Sha O, hand net, 14.viii.2009, UTM: 50Q KK 242849, 70m, ref.: 0371.C.Hy.1 [CBC]; 1♀, same location, Malaise trap, 1–24.vii.2011, ref.: M095.C.Hy.1, [CBC]; 1♀, Sha Lo Tong, hand net, 29.vi.2014, UTM: 50Q KK 102 883, 180m, ref.: 0524.B.Hy.3 [CBC].

Distribution. China (Anhui, Fujian, Guangxi, Hong Kong, Jiangsu, Taiwan, Yunnan, Zhejiang); India; Myanmar; Thailand; Malaysia; Vietnam.

Remarks. A frequent wasp in Hong Kong. Firstly recorded from Hong Kong by Dover (1926) as *Pareumenes depressa* Sauss.

22. Genus *Rhynchium* Spinola, 1806

Rhynchium Spinola, 1806: 84. Type species: *Rygchium europaeum* Spinola, 1806 [= *Vespa oculata* Fabricius, 1781], by monotypy.

(33) *Rhynchium brunneum brunneum* (Fabricius, 1793)

Figs 110–112

Vespa brunnea Fabricius, 1793: 264, “Tranquebariae” (Tharangambadi, Tamil Nadu, India), ZMUC. Type: sex not stated.

Material examined. CHINA: Hong Kong: 2♀, Pak Sha O, hand net, 11.vii.03 & 12.vi.2011, UTM: 50Q KK 242852, 70m, refs.: 0091.A.Hy.1 [CBC] & 0440.A.Hy.1, leg. C. Barthélémy [AMNH]; 1♂1♀, Mai Po Nature Reserve, hand net, 19.vii.2014, UTM: R. 50Q JK959903, 1m, refs.: 0527.G.Hy.3 & 0527.G.Hy.6 both [CBC].

Distribution. China (Guangdong, *Hong Kong, Taiwan, Yunnan); Pakistan; Seychelles; India; Bangladesh; Myanmar; Thailand; Cambodia; Laos; Vietnam; Malaysia; Indonesia; New Britain; Marianas; Palau.

Remarks. An occasional wasp in Hong Kong. Easily confused with *Rhynchium quinquecinctum quinquecinctum* and only minor colour differences of the scutellum permit differentiation.

(34) *Rhynchium quinquecinctum quinquecinctum* (Fabricius, 1787)

Figs 113–115

Vespa quinquecincta Fabricius, 1787: 288, “in China”, ZMUC. Type: sex not indicated.

Material examined. CHINA: Hong Kong: 1 ♀, Mang Kung Wo, hand net, 29.v.2017, UTM: 50Q KK 174 760, 60m, ref.: 0629.A.Hy.1 [CBC].

Distribution. China (Hong Kong, Shaanxi, Sichuan, Taiwan, Yunnan); Pakistan; Bhutan.

Remarks. A scarce wasp in Hong Kong. First recorded from Hong Kong by Dover (1926) as *Odynerus haemorrhoidalis* var. *quinquecincta* Fabr. Known from a single specimen.

23. Genus *Subancistrocerus* de Saussure, 1855

Subancistrocerus de Saussure, 1855: 206. Type species: *Odynerus sichelii* de Saussure, 1855, by subsequent designation of Bequaert 1925: 61.

(35) *Subancistrocerus camicrus* (Cameron, 1904)

Figs 116–118

Odynerus camicrus Cameron, 1904a: 259, in “Darjeeling”, NHMUK. Type: male.

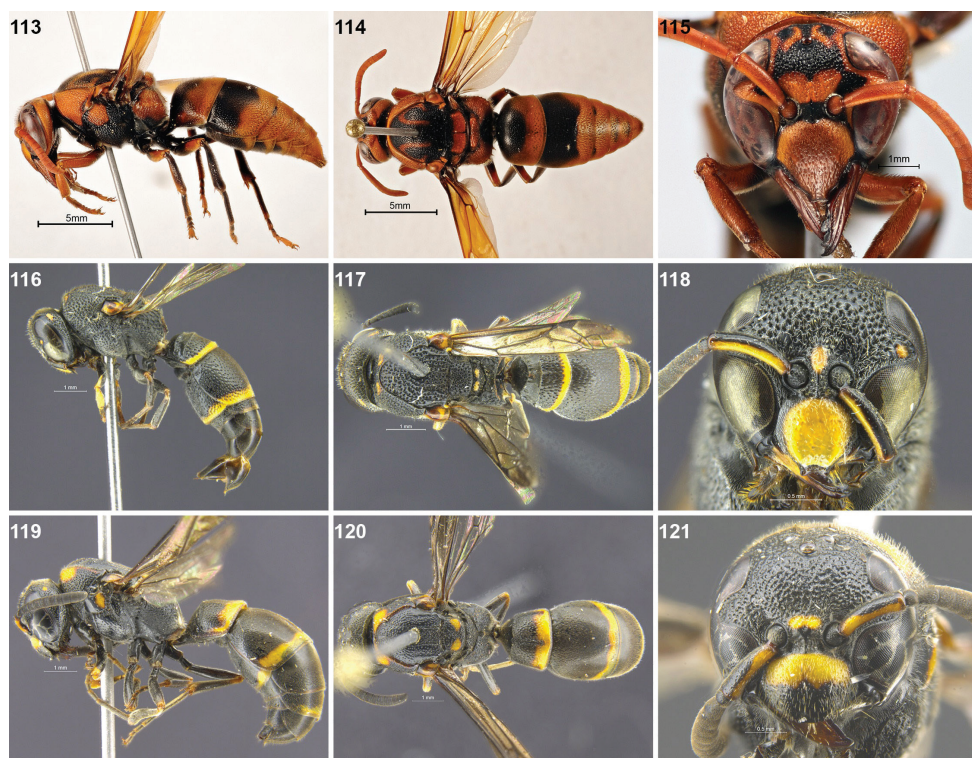
Material examined. CHINA: Hong Kong: 1 ♀, Mang Kung Wo, hand net, 15.ix.2018, UTM: 50Q KK 174 760, 60m, ref.: M365.C.Hy.1 [CBC]

Distribution. China (Chongqing, *Hong Kong, Sichuan, Yunnan); India; Nepal; Thailand; Myanmar; Laos; Malaysia.

Remarks. A scarce wasp in Hong Kong.

24. Genus *Symmorphus* Wesmael, 1836

Symmorphus Wesmael, 1836: 45. Type species: *Odynerus elegans* Wesmael, 1833, by subsequent designation of Richards, 1935: 162.



Figures 113–121. *Rhynchium quinquecinctum quinquecinctum*, female **113** habitus (lateral view) **114** habitus (dorsal view) **115** head (frontal view) **116–118** *Subancistrocerus camicrus*, female **116** habitus (lateral view) **117** habitus (dorsal view) **118** head (frontal view) **119–121** *Symmorphus tsushmanus*, female **119** habitus (lateral view) **120** habitus (dorsal view) **121** head (frontal view).

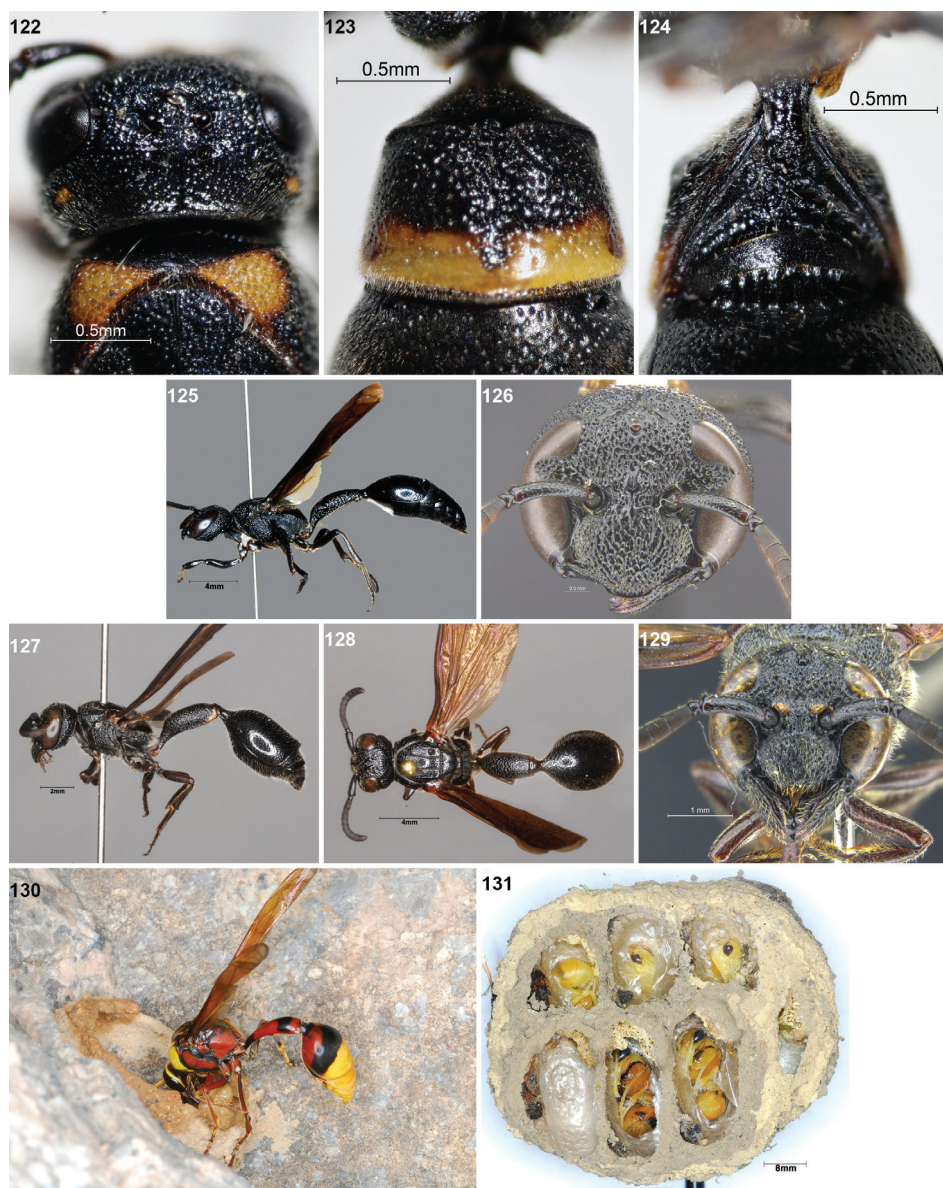
(36) *Symmorphus tsushmanus* Yamane, 1990

Figs 119–124

Symmorphus tsushmanus Yamane, 1990: 1, 115, “top of Ariake-san (558 m. alt.), Tsushima Is.” [Japan], OCMNH. Type: male.

Material examined. CHINA: Hong Kong: 1♀, Pak Sha O, Malaise trap, 08–21. iv.2018, UTM: 50Q KK 242 849, 70m, ref.: M340.C.Hy.4 [CBC].

First description of female. Body length 7.5 mm, fore wing length 8.5 mm. Black (Figs 119–120), with yellow to orange yellow markings as follows: basal half of clypeus (Fig. 121), a spot above interantennal space, a large band on antennal scape ventrally, a small spot on upper part of gena, a pair of big triangular spots on pronotum anteriorly, a spot on dorsal mesepisternum, a pair of spots on scutellum, wide apical band of T1 (laterally narrower and mesally with anterior incision), wide apical band of T2 (somewhat sinuate), medially interrupted apical band on S2, a narrow apical band on



Figures 122–131. *Symmorphus tsushmanus*, female **122** vertex (dorsal view) **123** T1 (dorsal view) **124** S1 (ventral view) **125–126** *Calligaster himalayensis*, female **125** habitus (lateral view) **126** head (frontal view) **127–129** *Zethus dolosus*, female **127** habitus (lateral view) **128** habitus (dorsal view) **129** head (frontal view) **130–131** *Delta pyriforme* **130** female constructing a cell **131** ventral side of a nest showing seven cells with brood, most at advanced pupal stage.

T4 (not extending to lateral margin), apices of fore and mid femur, ventral face of fore tibia, and a spot of tegula posteriorly; mandible and tegula (except yellow spot) dark ferruginous; legs except yellow parts blackish brown.

Head about as wide as long in front view; clypeus (Fig. 121) wider than long, minutely and sparsely punctate, apical margin almost truncated, apical width equal to interantennal distance; frons coarsely punctuate, interspaces between punctures reticulate; punctures on vertex and gena slightly sparser than those of frons; two cephalic foveae (Fig. 122) right behind posterior ocelli, just a little smaller than posterior ocelli and bearing brownish setae; occipital carina complete, without incision. Pronotal carina (Fig. 122) complete, front corner slightly produced, pronotum coarsely punctate and somewhat striate on lateral side; punctures on mesoscutum and scutellum sparsely bigger and a little sparser than those of pronotum, interspaces between punctures with minute punctures, notaulices of mesoscutum complete and median scutalline present at base; scutellum with a median furrow; epicnemial carina present and strong; mesopleuron just obviously with a few sparse punctures, interspaces between punctures polished; metanotum coarsely punctate in basal half and coriaceous in apical part; metapleuron finely striate; propodeal shelf narrow and indistinct, and with a deep median orifice; dorsal face of propodeum coarsely punctate, punctures large, shallow, flat bottomed and interspaces between punctures obviously with reticulate carinae; posterior side of propodeum finely striate and with strong median carina; lateral side of propodeum striate, sparsely with a few large punctures posteriorly. Anterior vertical face of T1 with ill-defined punctures except for upper part, without vertical carina; transverse carina mesally with a deep U-formed incision; dorsal horizontal part of T1 (Fig. 123) distinctly wider than long, coarsely punctate excluding apical yellow, smooth band; without apical lamella as that of Japanese male (Yamane 1990); S1 (Fig. 124) punctate and carinate almost as that in male (Kim and Lee 2006); other tergites and sternites much more finely punctate. Anterior faces of coxae and femora below with silver setae.

Distribution. *China (*Hong Kong); South Korea; Japan.

Remarks. A scarce wasp in Hong Kong, known from a single specimen. The species has Palearctic affinities.

Tribe ZETHINI

25. Genus *Calligaster* de Saussure, 1852

Calligaster de Saussure, 1852. Type species: *Calligaster cyanoptera* de Saussure, 1852: 22, by subsequent designation of Ashmead, 1902: 205.

(37) *Calligaster himalayensis* (Cameron, 1904)

Figs 125–126, 159–160

Type species: female, *Zethus himalayensis* Cameron, 1904b: 13, “Sikkim”, NHMUK.

Material examined. CHINA: Hong Kong: 1♀, High Island Reservoir, Sai Kung, hand net, 01.viii.2012, UTM: 50Q KK 266 791, ref.: 0655.B.Hy.1, leg. John X.Q. Lee [CBC].

Distribution. China (Guangdong, *Hong Kong); India; Laos; Vietnam.

Remarks. A scarce wasp in Hong Kong, it also probably has a restricted distribution in the territory. Nesting sites have been observed over several years in the same location(s).

26. Genus *Zethus* Fabricius, 1804

Zethus Fabricius, 1804. Type species: *Zethus coeruleo-pennis* Fabricius, 1804: 282, [= *Vespa coeruleopennis* Fabricius, 1798: 263], by subsequent designation of Latreille, 1810: 328, 438.

(38) *Zethus dolosus* Bingham, 1897

Figs 127–129, 161–164

Zethus dolosus Bingham 1897: 332, 333 “Burma (Pegu Hills); Tenasserim”, NHMUK. Type: female.

Material examined. CHINA: Hong Kong: 1♀, Pak Sha O, hand net, 11.vii.2007, UTM: 50Q KK 242852 70m, ref.: 0267.C.Hy.2 [CBC]: same location, 1♂, hand net, 27.vii.2009, ref.: 0366.C.Hy.3 [CBC]; same location, 5♀, reared, 07.xii.2010, 21.iv.2010, 19.v.2013, 24.iv.2016 & 28.iv.2016, refs.: 0380.A.Hy.1 [CBC], 0396.A.Hy.1 leg. C. Barthélémy [AMNH], 0503.A.Hy.1 [CBC], 0584.C.Hy.1 [CBC] & 0585.C.Hy.1 [CBC]; same location, 10♂, 22.iv.2010, 27.iv.2010, 27.vii.2011, 31.v.2013, 16.iv.20016, 17.iv.2016 & 23.iv.2016, refs.: 0397.A.Hy.1 [CBC], 0399.A.Hy.1 [CBC], 0445.A.Hy.1 leg. C. Barthélémy [AMNH], 0505.A.Hy.1 [CBC], 0576.C.Hy.1 (2 Nos.) [CBC], 0577.C.Hy.1 (3 Nos.) [CBC] & 0580.C.Hy.1 [CBC].

Distribution. China (Guangdong, Hong Kong); India; Bhutan; Myanmar; Thailand; Vietnam.

Remarks. A frequent wasp in Hong Kong. Barthélémy (2012) reported on the nesting biology of this species under the name of *Zethus* sp.1. Cells are mass-provisioned with caterpillars belonging to the family Geometridae and Noctuidae (Barthélémy, 2012). It is expected that *Zethus malayanus* Gusenleitner, 2010 distributed from Malaysia to Guangdong will also be recorded in Hong Kong.

SPECIES DUBIAE

Eumenes architectus Smith, 1859

Eumenes architectus Smith, 1859: 20, “Celebes”, NHMUK (?). Type: female.

Distribution. China (Hong Kong [?]); India[?]; Myanmar; Malaysia; Singapore; Indonesia; Philippines.

Remarks. Reported by Dover (1926) from Hong Kong. In the past 92 years, no specimen has been found in Hong Kong or even other areas of China, but it has been recorded from Myanmar so it may still be discovered from China, but its presence in Hong Kong is doubtful. Additionally, the name has been previously used erroneously by some workers (Yasumatsu 1936; Schulz 1912) and this may have been the case for Dover.

***Antepipona bipustulata* (de Saussure, 1855)**

Odynerus bipustulatus de Saussure, 1855: 277, pl. XII fig. 10, locality unknown, MNHN. Type: Male & Female.

Distribution. China (Hong Kong [?]); India; Sri Lanka; Myanmar; Thailand; Laos; Malaysia; Singapore; Indonesia.

Remarks. Reported from Hong Kong by Dover (1926) as *Odynerus bipustulatus* Sauss. Giordani Soika (1982) in his revision of the genus does not list this taxon from Hong Kong nor does he mention Dover. Also, according to the latter the taxon is “Common”, yet we have not collected it and we suspect that Dover may have misidentified this species, probably with the superficially similar (colour markings) *Apodynerus formosensis formosensis*.

***Anterhynchium flavopunctatum flavopunctatum* (Smith, 1852)**

Ancistrocerus flavo-punctatus Smith, 1852: 36, “Ning-po” (China), NHMUK. Type: female.

Distribution. Laos; China (Hong Kong [?]); Taiwan; Korea; Japan

Remarks. Reported from Hong Kong by Dover (1926) as *Odynerus* (R.) *flavopunctatum* Smith, however, this species is very similar to one of the colour variants of *Anterhynchium flavomarginatum* (Smith 1852) and we believe Dover may have identified a color variant of this species as *Anterhynchium flavopunctatum flavopunctatum*.

***Labus exiguus* (de Saussure, 1855)**

Eumenes exiguus de Saussure, 1855: 150, “Les Indes-Orientales” (? OUM). Type: male.

Distribution. China (Hong Kong [?]); Singapore; Malaysia.

Remarks. This species was recorded by Dover (1926) from Hong Kong, however the concept of this species in this author's publications was rather broad and we believe that Dover actually saw *Labus edenticulus* Li & Carpenter, 2018 but misidentified his material.

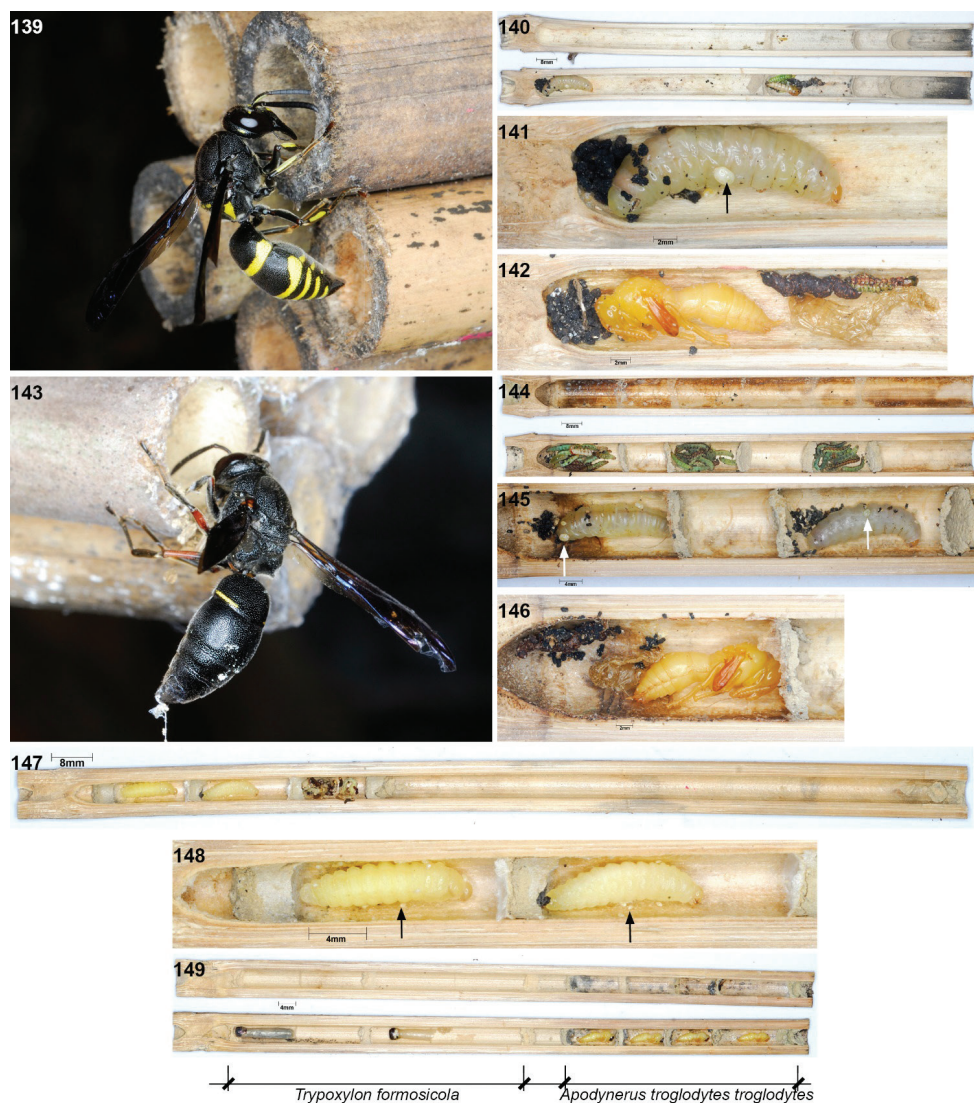


Figures 132–138. *Eumenes punctatus* **132** female collecting construction material **133** group of cells on a branch of Rosemary **134** *Eumenes quadratus quadratus* **134** female completing a brood cell **135–138** *Allorhynchium chinense* **135** female at nest building the resin collar at the entrance **136** typical nest in a bamboo segment showing two cells. The first cell with post feeding larva, the second cell with feeding larva with prey, cell un-closed **137** a pupa **138** cocoon of a Chrysididae inside a nest.

***Paraleptomenes miniatus miniatus* (de Saussure, 1855)**

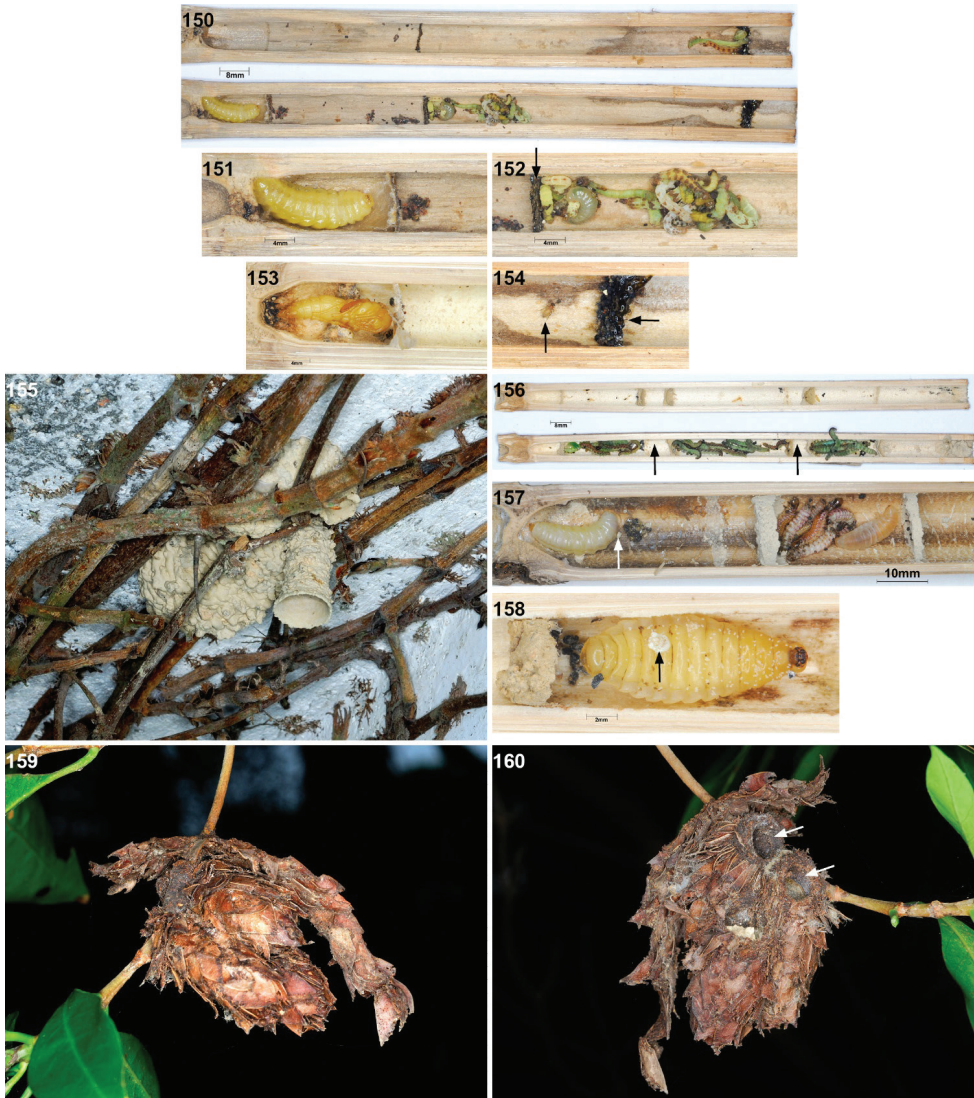
Odynerus miniatus de Saussure, 1855: 249, pl. XI fig. 6, “Les Indes orientales”, NHMUK. Type: female.

Distribution. China (Taiwan, Hong Kong [?]); India; Pakistan; Iran; Mauritius.

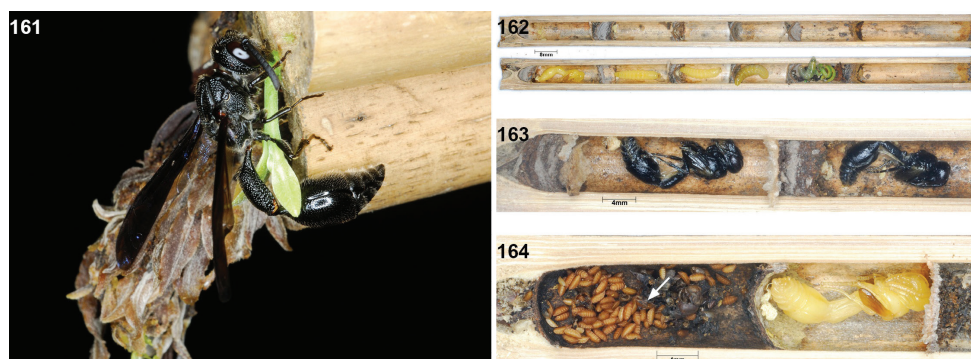


Figures 139–149. *Anterhynchium flavolineatum* **139** female at nest **140** typical nest containing two cells two vestibular cells. Cell 1 with post-feeding larvae. Cell 2 with feeding larva and prey **141** post feeding larva with gravid female symbiotic mite **142** pupa **143–146** *Anterhynchium flavomarginatum flavomarginatum* **143** female at nest **144** typical nest showing three cells, and 2 intercalary cells. All cells with early instar boor and preys **145** two post feeding larvae, with gravid female symbiotic mites **146** pupa **147–149** *Apodynerus troglodytes troglodytes*, nest contents **147** bamboo nest-trap at opening, containing three cells with two post feeding larva and a fully provisioned cell **148** the post feeding larvae with symbiotic mite nymphs **149** superseedure of a nest of *Trypoxylon petiolatum* Smith, 1858 by *A. t. troglodytes*.

Remarks. Species recorded on i-Naturalist only at: <https://www.inaturalist.org/observations/8916317> and <https://www.inaturalist.org/observations/2603869>. Accessed on 17 March 2019. Without a voucher specimen we cannot ascertain the existence of this taxon locally and we place it in *Species dubiae* until further elucidation.



Figures 150–160. *Lissodynerus septemfasciatus feanus*, nest content **150** typical nest in a bamboo nest-trap, showing two cells partitioned with a resin operculum containing one post-feeding larva and a feeding larva with mass provision of preys **151** post-feeding larva and silk pupal chamber, the meconium is not yet voided **152** resin cell partition and feeding larva and mass prey provision **153** pupa **154** entrance resin plug and Phorid fly **155–158** *Orancistrocerus aterrimus erythropus*, nest and nest contents **155** nest affixed on the underside of a roof showing a tubular entrance vestibule to a cell under provisioning **156** typical nest in bamboo nest-trap showing three cells with fully provisioned cells and feeding larvae and the two intercalary cells **157** post-feeding larva with symbiotic mite **158** diapausing post-feeding larva with gravid symbiotic mite and numerous nymphs **159–160** *Calligaster himalayensis*, nest affixed to a hanging substrate **159** normal view, in **160** nest is rotated approximately 180 degree to show two new cell entrances.



Figures 161–164. *Zethus dolosus* **161** female at nest fixing plant material on the vicinity of the nest entrance **162** typical nest in a bamboo segment showing five cells. The first four cells with post-feeding larvae and the fifth cell with a feeding larvae **163** two advanced pupae **164** cell attacked by Phorid flies with numerous fly cocoons.

Key to the species of the subfamily Eumeninae from Hong Kong

- 1 Mid tibia apically with two spurs **2**
- Mid tibia apically with one spur..... **3**
- 2 Width of T1 in dorsal view more or less constant; dorsal part with faint longitudinal groove, T1 rounded dorsally..... ***Zethus dolosus* Bingham**
- T1 in dorsal view wider at level of spiracles than apically; no groove dorsally, T1 flattened dorsally..... ***Calligaster himalayensis* (Cameron)**
- 3 T1 slender, distinctly petiolate, distinctly more than 2× as long as wide (Figs 1–2, 4–5, 7–8, 12–13, 24–25, 27–28, 62–63, 65–66, 77–78, 101–102, 104–105, 107–108)..... **4**
- T1 short and robust, not petiolate, usually less than wide (all other figs.)..... **17**
- 4 Mesepisternum with epicnemial carina **5**
- Mesepisternum without epicnemial carina or epicnemial carina obsolete **7**
- 5 T1 basally with transverse carina (Fig. 66).... ***Ectopioglossa ovalis* Giordani Soika**
- T1 basally without transverse carina..... **6**
- 6 Apical half of S1 densely punctuate and small area post medio-basally with small transverse striae; mesoscutum with prescutal grooves..... ***Pseudozumia indica indica* (Saussure)**
- S1 basally smooth, and with rather regular and transverse striae at 2/3 apex; mesoscutum without prescutal grooves..... ***Coeleumenes burmanicus* (Bingham)**
- 7 Propodeal valvula elongate, or more or less rectangular; metanotum with a single medial tooth dorsally second submarginal cell of fore wing basally truncate ***Labus edentatus* Li & Carpenter**
- Propodeal valvula rounded, short; metanotum non-dentiform; second submarginal cell of fore wing basally acute..... **8**

- 8 Propodeum dorsally with elongate fovea mesally..... **9**
- Propodeum dorsally without elongate fovea mesally..... **10**
- 9 Prestigma of fore wing shorter than stigma; female without cephalic foveae; mesoscutum without prescutal grooves..... *Pseumenes depressus* (Saussure)
- Prestigma of fore wing longer than stigma; female with cephalic foveae; mesoscutum with deep prescutal grooves *Pareumenes quadrispinosus acutus* Liu
- 10 T1 impunctate or sparsely with small punctures (Figs 2, 5); T2 without lamella (Figs 1, 4)..... **11**
- T1 coarsely and densely punctate (Figs 8, 22); T2 with apical lamella (Figs 19–20, 24) **13**
- 11 T1 less than 1.5× mesosomal length; propodeum laterally more or less punctate, not shining; terminal sternum with a longitudinal furrow in male **12 Delta de Saussure**
- T1 1.5× or more mesosomal length; lateral part of propodeum almost impunctate, shining; terminal sternum without longitudinal furrow in male *Phimenes flavopictus* (Blanchard)
- 12 Body relatively smaller than the below species; T2 in dorsal view gradually diverging from base to the middle and gradually narrowing to the apical margin (Fig. 2); S2 without longitudinal depression in the middle..... *D. campaniforme campaniforme* (Fabricius)
- Body bigger; T2 in dorsal view abruptly diverging from base to the middle and strongly narrowing to the apical margin (Fig. 5); S2 with shallow longitudinal depression mesally..... *D. pyriforme pyriforme* (Fabricius)
- 13 Apical margin of clypeus truncated in female (Fig. 26); lateral side of propodeum clearly separated from its posterior face; A13 small and straight in male..... *Oreumenes decoratus* (Smith)
- Apical margin of clypeus emarginated in female (Figs 9–11, 14, 23); lateral margin of propodeum rounded, without an edge between lateral and posterior faces; A13 medium-sized and forming a recurved hook in male..... **14 Eumenes Latreille**
- 14 T1 in dorsal view long, triangular, more than 4× as long as wide, basal ½ of lateral margins sub-parallel, widening gradually toward apex (Fig. 13)..... *E. quadratus quadratus* Smith
- T1 in dorsal view shorter, thread-like at base, less than 3× as long as wide, then visibly widening sharply toward the middle, the lateral post-medial margins being parallel (Figs 8, 22) **15**
- 15 T1 in dorsal view more elongate; T2 in lateral view basally acute; apical margin of T2 almost straight..... *E. atrophicus* (Fabricius)
- T1 in dorsal view stumpy; T2 in lateral view basally right angle or obtuse; apical margin of T2 emarginated..... **16**
- 16 Mesoscutum and mesopleuron with dense punctures, interspaces between punctures less than puncture diameter and slightly carinate; tibiae dark but often partly ferruginous, apical end darker *E. punctatus de Saussure*
- Mesoscutum and mesopleuron with large, deep, round punctures, interspaces between punctures more than or at least equal to puncture diameter; hind tibia

- always black *E. rubronotatus* Pérez
- 17 T1 basally with transverse carinae close to edge of declivity (Figs 37, 81, 84, 95, 116) 18
- T1 basally without transverse carinae 24
- 18 T1 basally with two transverse carinae (Figs 116–117), both transverse carinae close to each other at the crest of the declivity *Subancistrocerus camicrus* (Cameron)
- T1 basally with one transverse carina 19
- 19 Vertex with a pair of cephalic foveal pits behind posterior ocelli in female; T2 with a median longitudinal depression or furrow (Fig. 120) *Symmorphus tsushimanus* Yamane
- Vertex with or without cephalic foveal pits behind posterior ocelli in female; T2 without a median longitudinal depression or furrow 20
- 20 Anterior sloping face of pronotum mesally with two impressed foveae 21 *Parancistrocerus* Bequaert
- Anterior sloping face of pronotum mesally without impressed foveae 22
- 21 Apex of T3 prolonged mesally *P. yachowensis* Giordani Soika
- Apex of T3 not prolonged mesally *P. hongkongensis* Gusenleitner
- 22 T2–T4 apically with well developed lamella (Fig. 80) *Lissodynerus septemfasciatus feanus* (Giordani Soika)
- T2–T4 apically without lamella 23
- 23 Apex of clypeus widely emarginated, lip wide and covered with long brown bristles (Fig. 85) *Orancistrocerus aterrimus erythropus* (Bingham)
- Apex of clypeus narrowly emarginated, lip narrower and without long brown bristles (Fig. 35) *Allorhynchium radiatum* sp. nov.
- 24 T1 obviously narrower than T2 and much wider at the apex than at the base (Figs 41, 57) 25
- T1 slightly narrower than T2 and a little wider at the apex than at the base (Figs 31, 44, 47, 69, 72, 91, 111) 27
- 25 Pronotal carina widely arched on shoulder *Paraleptomenes kosempoensis* (von Schulthess)
- Pronotal carina sharply angled on shoulder 26 *Apodynerus*
- 26 S2 largely depressed basally and with a thin, more or less developed median furrow; clypeus higher than wide; often with yellow spot on baso-lateral sides of T2 *A. formosensis formosensis* (von Schulthess)
- S2 distinctly convex basally and not crossed baso-medially; clypeus wider or subequal to height; no yellow spot on baso-lateral sides of T2 *A. troglodytes troglodytes* (de Saussure)
- 27 Metanotum dorsally with two distinct sharp teeth (Fig. 41) 28 *Antepipona*
- Metanotum dorsally without sharp teeth or just with tiny teeth 29
- 28 T1 except yellow apical band and S1 ferruginous *A. rufescens* (Smith)
- T1 and S1 black *A. menkei* Giordani Soika

- 29 Propodeum with well developed superior carinae (Fig. 90); each of T2–T5 with a row of large and dense punctures at a certain distance from the apical margin and forming a broad smooth and shiny preapical band, and with another row of sparser punctures close to the apical edge, respectively (Fig. 91) *Orientalicesa nigra* sp. nov.
- Propodeum without superior carinae; T2–T5 without above apical band.....30
- 30 Axillary fossa in dorsal view at least as wide as long, oval.....31 *Euodynerus*
- Axillary fossa in dorsal view much narrower than long, often slit-like.....32
- 31 Posterior margin of horizontal surface of metanotum with large denticles; dorsal surface of propodeum behind metanotum without teeth; ocellar triangle without tubercles (Fig. 73)*E. (Euodynerus) dantici violaceipennis* Giordani Soika
- Posterior margin of horizontal surface of metanotum with small denticles; dorsal surface of propodeum behind metanotum with two teeth; ocellar triangle with three bifid tubercles (Fig. 76)*E. (Pareuodynerus) trilobus* (Fabricius)
- 32 T2 apically with a transparent lamella (Fig. 68) .. *Epsilon dyscherum* (de Saussure)
- T2 apically without a transparent lamella.....33
- 33 Propodeum nearly at level of metanotum; body wholly black (Figs 30–32) *Allorhynchium chinense* (de Saussure)
- Propodeum below level of metanotum; body with colorful marks (Figs 43–55, 110–115).....34
- 34 Scutellum and posterior part of mesoscutum finely and sparsely punctate, slightly polished; in male mid femur distinctly emarginated basally..... 35 *Rhynchium*
- Scutellum and posterior part of mesoscutum coarsely and densely punctate, dull; in male mid femur not emarginated basally.....36 *Anterhynchium*
- 35 Mesoscutum mostly to entirely reddish brown (Fig. 111) *R. brunneum* (Fabricius)
- Mesoscutum mostly to entirely black (Fig. 114) *R. quinquecinctum quinquecinctum* (Fabricius)
- 36 Narrow basal part of S1 smooth; gastral tergites only finely punctate at base; mandibles of male deeply emarginate on inner side near the middle; metasomal terga except T1 and basal part of T2 ferruginous (Figs 43–44)..... *A. (Anterhynchium) mellyi* (de Saussure)
- Narrow basal part of S1 densely transversely striate over almost its entire width; third and following gastral tergites very coarsely punctate at base (visible only when the segments are unusually extended); mandibles of male not deeply emarginate on inner side; metasomal terga without ferruginous marks37
- 37 Mesoscutum posteriorly weakly punctate, interspaces not carinate; each of T1–T5 with a yellow complete apical band (Figs 46–47) *A. (Dirhynchium) flavolineatum flavolineatum* (Smith)
- Mesoscutum posteriorly very densely punctate, interspaces with distinct irregular longitudinal carinae; metasoma black except T1 or T1–T2 with narrow pale yellow apical band (Figs 49–50, 52–53) *A. (Dirhynchium) flavomarginatum flavomarginatum* (Smith)

Conclusion

This study produces some remarkable additions; besides the two new species, to the local and Chinese hymenopterous fauna such as *Symmorphus tsushmanus* Yamane, 1990 and *Epsilon dyscherum* (Saussure, 1852) both new to China or occurrences that expand the known geographical distribution of the taxon as with *Calligaster himalyensis* or *Parancistrocerus yachowensis*. These results show the persistence of Palearctic elements in the fauna of Hong Kong, such as three out of four recorded *Eumenes* spp., the two *Euodynerus* listed below or *Symmorphus tsushmanus* and 11 other species. Whilst Hong Kong lies well inside the geographical tropical zone it is influenced by surges of northern cold air, and this may partially explain the presence of species that are known to cross the climatological divide between Palearctic and tropical Oriental regions.

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