Review of the species of *Pseudovolucella* Shiraki, 1930 (Diptera: Syrphidae)

Menno Reemer & Heikki Hippa

The species of the genus *Pseudovolucella* Shiraki, 1930 are reviewed. *Pseudovolucella sinepollex* sp. n. is described from Burma and Vietnam. The females of *P. apiformis* De Meijere, 1919 and *P. apimima* Hull, 1941 are described for the first time. Lectotypes and paralectotypes are designated for *P. malayana* Curran, 1928 and *P. mimica* Shiraki, 1930. *Sericomyia eristaloides* Brunetti, 1913 and *S. himalayensis* Brunetti, 1907 are transferred to *Pseudovolucella*. The male genitalia are figured and a key to the species is given. The genus contains ten described species, excluding one taxon of uncertain status. Its distribution ranges from the Himalaya and its eastern offshoots to the Sunda region, the Russian Far East and Japan. All species seem to be mountain species.

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**Introduction**

*Pseudovolucella* Shiraki, 1930 is a genus of fairly large (11–18 mm) and broadly built hoverflies, with a more or less bee-like appearance. When Shiraki described the genus in 1930 he included three species. Curran (1931) quickly added two more, and Hull (1941, 1944) added another two species. Coe (1964) was the last author to describe a new species in the genus. So, in total eight species of *Pseudovolucella* have been known so far. All but one, an East-Palaearctic species, occur in the Oriental region.

Coe (1964) provided a key to all seven Oriental species, but for some species he only had the opportunity to study the descriptions, which in many cases are not illustrated. Therefore it was unclear if the key contained good characters. A series of unidentified *Pseudovolucella* specimens from Burma and Vietnam could not be identified satisfactorily using this key. Besides, some species which had originally been described in the genus *Sericomyia* Meigen, 1803 actually appeared to belong in *Pseudovolucella*, judging from the figures in Brunetti (1908, 1923).

Moreover, the key did not take into account the intraspecific sexual dimorphism in colouration which occurs in some of the species. These findings prompted us to review the species of *Pseudovolucella*, in order to provide clarity in their identification.

**Material and methods**

Specimens from the following collections have been examined:

- BMNH The Natural History Museum, London, Great Britain
- CAS California Academy of Sciences, San Francisco, U.S.A.
- ITLJ Laboratory of Insect Systematics, National Institute of Agro-Environmental Sciences, Kannondai, Tsukuba, Ibaraki Pref., Japan
- JTS John T. Smit, Utrecht, the Netherlands
- MCZ Museum of Comparative Zoology, Harvard University, Cambridge Massachusetts, U.S.A.
- NHRS Swedish Museum of Natural History, Stockholm, Sweden
- RMNH Nationaal Natuurhistorisch Museum, Naturalis, Leiden, the Netherlands
- ZMAN Zoölogisch Museum Amsterdam, the Netherlands

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Unfortunately, we did not have the opportunity to study the types of Sericomyia eristaloides Brunetti, 1913 and S. himalayensis Brunetti, 1907, which are kept in the collection of the Zoological Survey of India (ZSI) in Calcutta.

Male genitalia have been dissected, macerated in a cold 10% KOH solution for approximately 12 hours and stored in glycerol. The drawings have been made with the aid of photographs produced by Analysis Extended Focal Imaging Software, using an Olympus motorised stereozoom microscope SZX12. Terminology of external morphology is based on Speight (1987).

**Pseudovolucella Shiraki**

*Pseudovolucella* Shiraki, 1930: 39. Type-species: *Pseudovolucella mimica* Shiraki, 1930 (by original designation).

**Diagnosis**

Generic characters are given by Shiraki (1930) and Hull (1949), who emphasize the relatively flattened head (dorsal and lateral view) and the swollen hind femur. As to the shape of the head, we found this to be a very constant character within the genus. As to the swollen hind femur, this may not always be a clear character compared with certain species of other genera, like *Arctophila* Schiner, 1860. We felt the need to search for additional generic characters and found the following, which distinguish *Pseudovolucella* from other Sericomyiini (for group-defining characters see Hull 1949).

Face very wide and of characteristic shape: at least half width of head occupied by face at its widest level, eye margins strongly oblique but straight (Fig. 1, 2). Orbital strips about as wide as height of 3rd antennal segment (Fig. 3) (much narrower in *Arctophila* and *Sericomyia*). Facial knob in lateral view clearly below ventral margin of eye (Fig. 3). Radial–median cross-vein (rm) of wing located proximally to middle of discal cell (Fig. 4). Apical vein (tm) of posterior wing cell recurrent apically, posterior cell with obtuse or rectangular apex (Fig. 4, 5). Vein R4+5 more or less straight, not sinuate (Fig. 4, 5). Male: sternite 3 obviously shorter than sternite 4 (these sternites about as long in *Arctophila* and *Sericomyia*). Male: hind femur swollen, often with apicoventral knob (Figs 39–47).

**Classification**

The genus *Pseudovolucella* is related to the genera *Arctophila* Schiner, 1860, *Conosyrphus* Frey, 1915, *Pararctophila* Hervé-Bazin, 1914, *Pyritis* Hunter, 1897 and *Sericomyia* Meigen, 1803. Shared characters are given by e.g. Hull (1949). Several earlier authors classified these genera in a separate subfamily, which was called both (!) Arctophilinae and Ciniinae by Sack (1928, 1932), and Sericomyinae by Hull (1949) and Coe (1964). Nowadays it is usual to consider the group as a tribe (Sericomyini Rondani, 1845) within the subfamily Milesiinae Rondani, 1845 (Knutson et al. 1975, Peck 1988). Although the subfamily Milesiinae probably is polyphyletic (Stähls et al. 2003), we see no reason to question the supposed common ancestry of the genera within the Sericomyini.

Based on the description by Curran (1929), it could not be excluded that *Sericomyia completa* Curran, 1929 from Taiwan belongs to *Pseudovolucella*. It seemed unlikely that Curran (1931) would have overlooked his “own” species while writing a key to *Pseudovolucella* species only two years after the description of *S. completa*. To be sure, pictures of the holotype of *S. completa*, a male in the CAS collection, have been examined. These pictures made clear that *S. completa* is no *Pseudovolucella*, because it lacks the characters of the head and wing venation described as diagnostic for *Pseudovolucella* in this paper.

**Infrageneric relationships and biogeography**

*Pseudovolucella* is restricted to mountainous areas in South- and Southeast-Asia and the Far Eastern Palaearctic (Fig. 22). The species of *Pseudovolucella* are very similar in external morphological characters. In several species the only external characters are found in colouration of hairs, tergites or legs. Most of these external characters provide insufficient basis for the determination of infrageneric relationships. The best method for a phylogenetic assessment would be a comparison of DNA-sequences, but some characters of the male genitalia suggest relationships between species. For instance, there are obvious similarities in the male genitalia of the four species known from the Sunda-region: *P. apiformis*, *P. apimima*, *P. fasciata* and *P. malayana* (Figs 23, 24, 26, 28). In these species the right surstylus has a long, “thumb-like” inner lobe and the shape of the left surstylus is similar in all four species. In the hypandrium in dorsal view the median part is rather wide in all four species, when compared with *P. decipiens*, *P. hingstoni*, *P. mimica* and *P. sinepollex*. These strong similarities suggest that the species of this “Sunda-group” share a common ancestor from which they have diverged quite recently. Possibly this common ancestor has colonized the Sunda region from Indochina during the last ice age, when sea levels had dropped and the Sunda islands, including Peninsular Malaysia, became temporarily connected by land bridges. After the sea levels rose again, about 10,000 years ago, the islands became isolated from
<table>
<thead>
<tr>
<th>Couplet</th>
<th>Description</th>
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<tbody>
<tr>
<td>1. Males (eyes touching on top of the head)</td>
<td>2</td>
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<tr>
<td>2. Females (eyes separated)</td>
<td>11</td>
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<tr>
<td>3. Hind femur without apicoventral knob (Fig. 46). Hind tibia about ¾ of the length of hind femur (Fig. 46). Posterior margins of tergites 2 and 3 only with black hairs. Genitalia as in Fig. 30</td>
<td>P. ochracea</td>
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<tr>
<td>4. Hind femur with medioventral knob (Fig. 43)</td>
<td>P. hingstoni</td>
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<tr>
<td>5. Terrigites uniformly reddish brown, without fasciae (Fig. 20). Genitalia as in Fig. 28</td>
<td>P. malayana</td>
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<tr>
<td>6. Terrigites reddish brown, with not strongly contrasting pale fasciae (Figs 12, 16, 18)</td>
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<td>7. Terrigites 5 with orange brown pale fascia on posterior margin (Figs 16, 18)</td>
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<tr>
<td>8. Fore femur entirely orange</td>
<td>P. fasciata</td>
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<tr>
<td>9. Terrigites 2 orange except for black fascia along posterior margin (figs. in Brunetti 1907, 1923)</td>
<td>P. himalayensis</td>
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<tr>
<td>10. Terrigites with fringes of pale hairs (often most obvious on terrigite 4)</td>
<td>P. sinepollex</td>
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<tr>
<td>11. Hind femur without medioventral knob (Fig. 43)</td>
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<td>12. Hind femur partly dark</td>
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<td>13. Terrigitesblackish brown with strongly contrasting pale fasciae (Figs 12, 16, 18)</td>
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<tr>
<td>14. Terrigites dark or pale brown, with at least one terrigite 4 black. Hind femur ventrally more or less straight from base to apicoventral knob (Fig. 40). Genitalia as in Fig. 24: inner lobe of right surstylus narrower than in P. apiformis. Java</td>
<td>P. apiformis</td>
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<td>15. Hind femur with medioventral knob (Fig. 43)</td>
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<tr>
<td>16. Hind femur without medioventral knob</td>
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<tr>
<td>17. Terrigites uniformly reddish brown, without fasciae (Fig. 20). Genitalia as in Fig. 28</td>
<td>P. malayana</td>
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<tr>
<td>18. Terrigites reddish brown, with not strongly contrasting pale fasciae (Figs 12, 16, 18)</td>
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<tr>
<td>19. Terrigites 5 with orange brown pale fascia on posterior margin</td>
<td>P. himalayensis</td>
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<tr>
<td>20. Terrigites with fringes of pale hairs (often most obvious on terrigite 4)</td>
<td>P. sinepollex</td>
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<tr>
<td>21. Hind femur partly dark</td>
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<tr>
<td>22. Hind femur partly dark</td>
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<tr>
<td>23. Hind femur without medioventral knob</td>
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<tr>
<td>24. Hind femur without medioventral knob</td>
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<td>25. Hind femur partly dark</td>
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<td>26. Hind femur partly dark</td>
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<td>27. Hind femur partly dark</td>
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<tr>
<td>28. Hind femur partly dark</td>
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**Biology**

No notes on habitat or behaviour of *Pseudovolucella* species have been published, probably because none of the authors who described the species have actually collected the specimens themselves. The label data indicate that *Pseudovolucella* species are very much mountain species, since all specimens have been found at high altitudes. The label of the female paratype of *P. hingstoni* reads “damp evergreen forest”. The specimens of *P. mimica* and *P. sinepollex* from Burma have been collected in montane cloudforest, containing swampy areas and streams, judging from the notes published by Malaise (1945). At least some of the species (e.g. *P. decipiens*) seem to have a long flight period.

**Key to the species of Pseudovolucella**

Note that the females of *P. himalayensis*, *P. malayana* and *P. ochracea* are not yet known and therefore are not included in the key. We have indicated in which couplets the females of these species will presumably key out. *Pseudovolucella eristaloides* Brunetti is not included at all, because of its uncertain status and because no characters are known to separate it from *P. mimica*.
13. Tergites 3 and 4 only with black hairs, also on the pale fasciae. ..................  P. fasciata
[Additional characters: no fringes of pale hairs along posterior margins of tergites, posterior part of tergite 5 black.]
– Tergites 3 and 4 with yellow hairs on the pale fasciae. .............................  14
[Probably the unknown female of P. malayana will also key out in this couplet.]
14. Tergite 5 entirely orange brown. Posterior margin of tergites without fringes of pale hairs. Hairs on posterior coxae mostly black ..................  P. apiformis
– Tergite 5 orange brown only anteriorly, black posteriorly. Posterior margin of tergite 2 (possibly also other tergites) with a fringe of pale hairs (as P. mimica in Fig. 49). Hairs on posterior coxae all yellow ............ P. apimima
15. Coxae entirely black. Femora almost entirely black or blackish brown, at most pale coloured on apical part ..................  P. hingstoni
– Coxae brownish to orange. Femora orange at least on posterior part of on basal half .......  16
16. Posterior margins of tergites with fringes of pale hairs (often most obvious on tergite 4) (Fig. 49). Apex of posterior wing cell clearly obtuse (Fig. 4) ..................  P. mimica
– Posterior borders of tergite without fringes of pale hairs. Apex of posterior wing cell more or less rectangular (Fig. 5) ...............  P. sinepollex

The species of Pseudovolucella

Pseudovolucella apiformis (De Meijere)

Figs 1–3, 6, 7, 23, 32–34, 39

Arcuphila apiformis De Meijere, 1919; 27. Holotype


Pseudovolucella apiformis; Shiraki, 1930: 40.

Synonymy

Study of the holotype of P. apiformis and the syntypes of P. crassipes revealed that P. crassipes has all characters which are considered to be diagnostic for P. apiformis (as described below), which confirms the synonymy of these names as proposed by Shiraki (1930).

Diagnosis

Body length: 14–16 mm.

Male. Tergites reddish brown with paler orange brown, weakly contrasting fasciae (Fig. 6) (similar to P. apimima). No fringes of pale hairs along posterior margins of tergites. Hairs on tergites and pregenital segments entirely yellow, a character shared with P. himalayensis and P. malayana, from which it can be separated by the abdominal colour pattern and the largely blackish brown anterior femora. In anterior
view, hind femur ventrally straight in the basal part, then somewhat concave in the part proximal to the apicoventral knob (Fig. 39, compare with \textit{P. apimima} in Fig. 40). Genitalia as in Figs 23, 32–34.

**Female** (Fig 7). Abdominal colour pattern more contrasting, dark parts darker than in male. No fringes of pale hairs along posterior margins of tergites. Tergite 5 entirely pale coloured, while in other species (except possibly \textit{P. malayana}) at least the posterior half is blackish brown. Legs entirely orange brown, hind legs somewhat darker. Hairs on posterior coxae mostly black.

In order to prevent possible confusion with the yet unknown female of \textit{P. malayana}, a description of the female is given below.

**Description of female**

Based on one specimen (see Material examined).

**Head.** (Fig. 2, 3). Eyes bare, separated over distance of about \(1/6\) of total head width. Face yellowish brown, with wide, darker median stripe and laterally also with darker stripes. Yellow parts and lateral dark parts with thin yellow pollinosity. Frons, orbital strips and face immediately below antennae with denser yellow pollinosity. Frons and ocellar triangle with dark hairs. Vertex and postocular orbits with yellow hairs (longest at top of head). Median part of face, including facial knob, bare. Lateral parts of face, genae, orbital strips and oral margins with yellow hairs, with patch of black hairs laterally on upper part of face. Lunula orange brown. Ocellar triangle with frontal angle of approximately 60°.

Antenna: dark brown, 3rd segment 1.3–1.5 times as long as wide. Arista pale brown, about 2.5 times as long as 3rd antennal segment, strongly plumose, with longest hairs longer than length of 3rd antennal segment.

**Thorax.** Mesoscutum greyish black, entirely covered with yellow hairs and with thin greyish pollinosity, which is a little denser along the transverse mesonotal suture and in median part on anterior half. Postpronotol sclerites, postalar calli and scutellum yellow and entirely with yellow hairs. Pleura mostly greyish black, narrowly orange along sutures, covered with grey pollinosity, except on posterior parts of meropleuron. Pleura mostly with long yellow hairs, except on proepimeron, mesepisternum 1, middle part of katepimeron, meropleuron, barrette and posterior part of mesepimeron. Metasternum with yellow hairs.

**Legs.** Anterior coxae orange brown, dark grey pollinoso and with yellow hairs. Middle coxa orange brown, with black hairs. Posterior coxae orange brown, grey pollinoso with mostly black and some yellow hairs. All femora and tibiae orange brown, femora somewhat darker than tibiae and posterior legs somewhat darker than anterior and middle legs. Legs almost entirely with yellow hairs, middle femora also with some black, bristly hairs towards apex, posterior femora and tibiae also with short black hairs. Tarsi orange brown (anterior and middle) to brown (posterior), with darker last two tarsomeres. Wing clear, with brown blotch posterior to stigma; entirely covered with microtrichiae. Calypterae and halteres orange brown; calypterae covered with short yellow hairs and with long yellow hair fringes along margins.

**Abdomen** (Fig. 7). Tergite 1 orange with blackish brown lateral corners, with yellow hairs. Tergite 2 blackish brown with narrowly orange anterior margain and transverse, slightly curved orange fascia on anterior half, which medially narrowly joins the orange anterior margin; covered with yellow hairs on anterior half (on orange parts) and with short black hairs on posterior (black) half. Tergite 3 blackish brown with transverse, slightly curved orange fascia on anterior half, with short yellow hairs on orange parts and short black hairs on black parts. Tergite 4 with same colour pattern as tergite 3, but dark

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**Figs 4–5.** Wing of \textit{Pseudovolucella} species. – 4, \textit{P. mimica} Shiraki; 5, \textit{P. sinepollex} sp. n. (apex).
Figs 6–21. Habitus of *Pseudovolucella* species. – 6, *P. apiformis*, male (holotype); 7, *P. apiformis*, female (RMNH); 8, *P. apimima*, male (holotype); 9, *P. apimima*, female (RMNH); 10, *P. decipiens*, male; 11, *P. decipiens*, female (JTS); 12, *P. fasciata*, male (holotype); 13, *P. fasciata*, female (paratype); 14, *P. hingstoni*, male (holotype); 15, *P. hingstoni*, female (paratype); 16, *P. mimica*, male (RMNH); 17, *P. mimica*, female (RMNH); 18, *P. sinepollex*, male (RMNH); 19, *P. sinepollex*, female (RMNH); 20, *P. malayana*, male (lectotype); 21, *P. ochracea*, male (holotype).
posterior half slightly paler in colour, and with some black hairs in middle part of the orange fascia. Tergite 5 entirely orange brown, only posterior margin a little darker; entirely covered with short black hairs. Sternite 1 orange anteriorly, blackish posteriorly, with long yellow hairs. Sternites 2 and 3 blackish brown, with long yellow and short black hairs. Sternites 4 and 5 orange brown. Sternite 4 with long yellow and short black hairs, sternite 5 only with short black hairs.

**Distribution**

*Pseudovolucella apiformis* seems to be restricted to the mountain range along the western coast of Sumatra. The specimens have been collected between 2190 and 3500 m in the months February and May.

**Material examined.** Indonesia: Sumatra: Atjeh, Mt. Leuser, Ngl Lemboek, 3000 m, ii-1937, A. Hoogerwerf, 2♂ (RMNH); Atjeh, Mt. Leuser, 3300–3500 m, ii.1937, A. Hoogerwerf, 4♂ 1♀ (RMNH); Gun. Teleman 1917, E. Jacobson, 1♂ (ZMAN).

**Pseudovolucella apimima** Hull

Figs 8, 9, 24, 40

*Pseudovolucella apimima* Hull, 1941: 154. Holotype ♂:


**Holotype labels**

The holotype carries the somewhat confusing label “Pseudovolucella mimica F.M.H. Hull”, written in what seems to be Hull’s hand. This type had been registered under this name in the type database of the MCZ. However, *P. mimica* was described by Shiraki, and Hull never described a species under this name, while he did describe *P. apimima*. Besides, the data on the label are the same as those mentioned in the original description by Hull (1941). The names *apimima* and *mimica* are quite similar, so it seems likely that the person who wrote the label (probably Hull himself) mixed the two names up by accident.

**Diagnosis**

Body length: 13–14 mm.

**Male.** Tergites reddish brown with paler orange brown, weakly contrasting fasciae (Fig. 8) (similar to *P. apiformis*). Hairs on posterior half of tergite 4 and on pregenital segments black. With fringe of pale hairs along posterior margin of tergite 2. In anterior view, hind femora ventrally straight from base to just before apicoventral knob (Fig. 40), compare to *P. apiformis* in Fig. 39). Male genitalia as in Fig. 24.

**Female** (Fig. 9). Tergites black and pale fasciae contrasting stronger than in male. With fringe of pale hairs along posterior margin of tergite 2 (possibly also on other tergites). Hairs on pale fasciae of all tergites yellow, while hairs on dark parts of tergites black. Tergite 5 orange brown on anterior part and black on posterior part. All hairs on posterior coxae yellow.

**Fig. 22.** Distribution of known records of *Pseudovolucella* species. – 1, *P. apiformis*; 2, *P. apimima*; 3, *P. decipiens*; 4, *P. faciata*; 5, *P. himalayensis*; 6, *P. hingstoni*; 7, *P. malayana*; 8, *P. mimica*; 9, *P. ochracea*; 10, *P. sinepollex*. 
In order to prevent possible confusion with the yet unknown female of *P. malayana*, a description of the female is given below.

**Description of female**

Based on one specimen (see Material examined).

**Head.** Eyes bare, separated over distance of about 1/6 of total head width. Face yellowish brown, with wide, darker median stripe which leaves centre of facial knob yellowish, and laterally also with darker stripes. Yellow parts and lateral dark parts with thin yellow pollinosity. Frons, orbital strips and face immediately below antennae with denser yellow pollinosity. Frons and ocellar triangle with dark hairs. Vertex and postocular orbits with yellow hairs (longest at top of head). Median part of face, including facial knob, bare. Lateral parts of face, genae, orbital strips and mouth edges with yellow hairs, with patch of black hairs laterally on upper part of face. Lunula blackish brown. Ocellar triangle with frontal angle of approximately 60°. Antenna: dark brown, 3rd segment 1.3–1.5 times as long as wide. Arista pale brown, about 2.5 times as long as 3rd antennal segment, strongly plumose, with longest hairs longer than length of 3rd antennal segment.

**Thorax.** Mesoscutum greyish black, entirely covered with yellow hairs and with thin greyish pollinosity. Postpronotol sclerites, postalar calli and scutellum yellow and entirely with yellow hairs. Pleura mostly greyish black, narrowly orange along sutures, covered with grey pollinosity, except on posterior parts of meropleuron. Pleura mostly with long yellow hairs, except on propemiperon, mesepisternum 1, middle part of katepimeron, meropleuron, barrette and posterior part of mesepimeron. Metasternum with yellow hairs.

**Legs.** Anterior coxae orange brown, grey pollinose and with yellow hairs. (Middle coxae not visible in studied specimen). Posterior coxae orange brown, grey pollinose with yellow hairs. All femora orange brown, anterior and mid tibiae orange brown, posterior tibiae blackish brown. Legs almost entirely with yellow hairs, posterior femora and tibiae also with some black, bristly hairs towards apex, posterior femora and tibiae also with short black hairs. Tarsi orange brown (anterior and middle) to blackish brown (posterior), with darker last two tarsomeres. Wing clear, with brownish blotch posterior to stigma; entirely covered with microtrichiae. Calypterae and halteres orange brown; calypterae covered with short yellow hairs and with long yellow hair fringes along margins.

**Abdomen** (Fig. 9). Tergite 1 orange, with yellow hairs. Tergite 2 blackish brown with narrowly orange anterior margin and transverse, slightly curved orange fascia on anterior half; covered with yellow hairs on most of surface and with short black hairs on posterior third; with fringe of pale hairs along posterior margin. Tergite 3 and 4 blackish brown with transverse, slightly curved orange fascia on anterior half, with short yellow hairs on orange parts and short black hairs on black parts. Tergite 5 orange brown anteriorly, blackish posteriorly; entirely covered with short black hairs. Sternite 1 orange with yellow hairs. (Other sternites missing in studied specimen).

**Distribution**

All four known specimens have been collected in mountainous areas on Java, at altitudes around 2400 m. The exact date is known of only one specimen, which was found on June 29.

**Material examined.** Indonesia: Java: Gedeh Tjibodas, Lebaksait, 2400 m, 29.vi.1937, M.A. Lieftinck, 1♀ (RMNH); Blume, ex. col. Van der Wulp, 1♂ 1♀ (RMNH).

**Pseudovolucella decipiens** (Hervé-Bazin)

Figs 10, 11, 25, 41, 48

*Arctophila decipiens* Hervé-Bazin, 1914: 410. Holotype ♀: Japan, Kumanotaira, near Karuizawa (MNHNP) [not examined].


**Synonymy**

Shiraki (1930) considered *Arctophila jozana* Matsumura, 1916 as a junior synonym of *P. decipiens*. This synonymy has been ignored by Peck (1988), but this seems more likely to be the result of overlooking Shiraki’s opinion than of a new consideration of the case. We see no reason to reconsider this synonymy.

**Diagnosis**

Body length: 14–18 mm.

Tergite 4 entirely black, a character only shared with *P. ochracea* (Fig. 10, 11). Tergite 2 with extensive yellow markings, tergite 3 sometimes with vague, narrow, medially interrupted fascia, which is always much narrower than the pale markings on tergite 2. Male can be distinguished from *P. ochracea* by presence of (not very pronounced) apicoventral knob on hind femur (Fig. 41), as well as by white hair fringes along posterior margins of tergites 2 and 3 (Fig. 48). Characters for separating females of these two species cannot be given, because the female of *P. ochracea* is unknown. Possibly, the character of the hair fringes along the posterior margins of the tergites also applies to the females.
**Distribution**
This is the only known non-Oriental species of *Pseudovolucella*. Its distribution is East-Palaearctic, ranging from southern Sakhalin and the southern Kuril Islands in the Russian Far East to Japan and Korea. In Japan *P. decipiens* has been found in September and October (Shiraki 1930, studied specimens). In South-Korea the species has been found from May to September, without any clear peaks in abundance (Han & Choi 2001).


**Pseudovolucella fasciata** Curran


**Diagnosis**
Body length: 13–15 mm.
Tergites blackish brown, with clearly contrasting orange brown fasciae. Posterior margins of all tergites (except tergite 1) entirely dark and lacking fringes of pale hairs. Fore- and middle legs and coxae entirely orange.

**Male.** Hind femora with apicoventral, but without mediocentral knob, somewhat concave in anterior view (Fig. 42). Tergites 2–4 covered with yellow hairs on pale fasciae, and black hairs on dark parts. Genitalia as in Fig. 42.

**Female.** Tergite 2 with yellow hairs on the pale fascia, while tergites 3, 4 and 5 entirely covered with black hairs. Tergite 5 with orange-brown fascia on anterior half; posterior half blackish brown.

**Distribution**
All known specimens have been collected on Mount Kinabalu on Malaysian Borneo, at altitudes ranging from 1500 to 2100 m.

**A female from Java**
A female collected by Blume on Java (RMNH) is very similar to the female paratype of *P. fasciata*. Unfortunately this specimen is not in very good condition and not all characters can be assessed reliably, so it seems better to wait with recording *P. fasciata* from Java until more material (preferably males) becomes available for study.


Curran (1931) mentions approximately 20 additional paratypes from the same locations, including a female “allosotype”, which are kept in the collection of the BMNH (pers. comm. N. Wyatt). These specimens have not been studied.

**Pseudovolucella himalayensis** (Brunetti) comb. n.

*Sericomyia himalayensis* Brunetti, 1907: plate xiii, figs. 6–8. Holotype: India, Sikkim (ZSI) [not examined].

**Taxonomy**
The figures and description of *Sericomyia himalayensis* in Brunetti (1907, 1908, 1923) clearly indicate that this species should be regarded as a *Pseudovolucella* species. Some of the described and figured characters also indicate that it is probably not synonymous with another species. Most notable are the largely yellow tergite 2, with a black posterior margin but without black markings on the anterior half, and the entirely yellow pubescent abdomen, including the long hairs on the pregenital segments.

Some of the information provided by Brunetti (1907, 1908, 1923) is confusing. On the one hand he states that the “central bump on snout [is] barely perceptible”, while on his drawing in dorsal view it is clearly visible. There is also a puzzling difference in the drawings of the habitus as printed in the 1907 publication and the one from 1923. Both figures seem to be based on exactly the same drawing as far as the black lines are considered, but in the 1923 version (which is a little less in quality of print) other shades of grey seem to have been applied. In the 1907 version there is only a dark blotch on the wing anteromedially (posterior to the pterostigma), while in the 1923 the entire anterior part of the wing has been drawn grey. The 1907 version, however, appears to be more truthful, since the description says: “Wings pale grey, a dark brown moderately broad band from beyond the tip of the costal cell, reaching from the fore border to the upper part of the discal cell and the lower transverse vein”.

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**Diagnosis**
Body length: 12 mm.
Only male known. Tergite 2 largely yellow except for posterior 1/3. Tergites 3 and 4 with yellow fasciae. Abdomen entirely yellow pubescent (a character shared with *P. apiformis* and *P. malayana*), long hairs on pregenital segments also yellow. Hind femur with apicoventral knob.

**Distribution**
Only known from Sikkim, a region in the Indian part of the eastern Himalaya.

*Pseudovolucella hingstoni* Coe
Figs 14, 15, 27, 43

*Pseudovolucella hingstoni* Coe, 1964: 270. Holotype δ:


**Diagnosis**
Body length: 14–15 mm.

**Both sexes.** Tergites blackish brown with narrow, pale orange fasciae (Fig. 14, 15). Posterior parts of tergites and pregenital segments with black hairs. Posterior margins of tergites without fringes of pale hairs. All coxae and femora black (although femora paler apically).

**Male.** Hind femur with medioventral knob (Fig. 43). Genitalia as in Fig. 27.

**Distribution**
All three known specimens have been collected in the eastern Himalaya (Nepal and India), at altitudes ranging from 2700 to 3100 m.

**Pseudovolucella malayana** (Curran)

Figs 20, 28, 44


**Lectotype designation**

Although one of the syntypes carries a red label stating “Type Pararctophila malayana Curran” and the other syntypes carry yellow or white labels stating “paratype”, no designation of a holotype has been published by Curran (1928), nor has a lectotype been designated later. This means that so far, all four specimens had the status of syntypes. To assure the stability of this taxon, a lectotype is designated here. The specimen labelled as “type” has been chosen for this purpose.

**Diagnosis**

Body length: 15–16 mm.

Male. Unique in unicolourous orange brown tergites, sometimes with narrow line along posterior margins somewhat darker and sometimes with barely perceptible notion of paler fascia on 2nd tergite (Fig. 20). Tergites and pregenital segments entirely covered with yellow hairs, a character shared with *P. apiformis* and *P. himalayensis*, from which it can be separated by the absence of fasciae on the abdomen and the entirely orange anterior femora.

**Note on female.** The female is unknown. Because *Pseudovolucella* females of some species tend to be somewhat darker in colouration, it is conceivable that the female of *P. malayana* has a more contrasting abdominal colour pattern than the male. So any female specimens from Peninsular Malaysia with a colour pattern reminiscent of that of *P. apiformis* or *P. apimima* should be examined as possible females of *P. malayana*.

**Distribution**

All four known specimens have been collected in the Cameron Highlands, Peninsular Malaysia. The altitudes given on the labels indicate that the specimens have been found between 1440 and 2130 m asl.


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**Pseudovolucella mimica** Shiraki

Figs 4, 16, 17, 29, 35, 36, 45, 49

**Pseudovolucella mimica** Shiraki, 1930: 40. Lectotype ♂ (here designated): **Taiwan**: “Asahi, 13 V, Karenko [?], 1919, Col. T. Shiraki”, “Pseudovolucella mimica n.sp.; Det. T. Shiraki”, “Type” (ITLJ) [examined].

**Lectotype designation**

The male syntype of Shiraki is here designated as lectotype, which makes the female a paralectotype. A male lectotype is desirable to avoid future confusion with the strongly similar *P. sinepollex*, which can most reliably be recognized by the male genitalia.

**Diagnosis**

Body length: 13–14 mm.

Both male and female have strongly contrasting orange fasciae on the black tergites 2, 3 and 4 (Figs 16, 17). In the male there is no medioventral knob on the posterior femur (Fig. 45), the anterior and middle tibiae and femora are partly dark and the hairs on the postalar calli are all yellow. *Pseudovolucella mimica* can be distinguished from *P. sinepollex* by the male genitalia (Figs 29, 35, 36), the presence of fringes of pale hairs along the posterior margins of the tergites, the clearly obtuse apex of the posterior wing cell (somewhat variable) and the slightly more swollen posterior femora of the male (Fig. 45).

**Distribution**

Known from northern Burma, northern Vietnam and Taiwan. It has been found in mountainous areas at altitudes from 1900 to 2100 m.

**Material examined.** Paralectotype: **Taiwan**: Tamaru (Rato), 1.ix.1923, T. Shiraki (ITLJ). **Burma**: all specimens collected at Mt. Kambaiti by R. Malaise at 7000 ft.: 27.iv.1934, 1 ♂ 1 ♀ (NHRS); 12.v.1934, 1 ♂ (RMNH); 14.v.1934, 1 ♂ (RMNH); 1.vi.1934, 1 ♂ (RMNH); 9.vi.1934, 1 ♂ (RMNH); [without date] 1 ♂ (NHRS). **Vietnam**: NW-Vietnam, Tonkin, Hoang Lien N.R., 15 km W Sa Pa, c. 1900 m., 15–21.x.1999, Malaise traps, C. van Achterberg, 1 ♂ 4 ♀ (RMNH).

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**Pseudovolucella ochracea** Hull

Figs 21, 30, 46

**Pseudovolucella ochracea** Hull, 1944: 32. Holotype ♂: **Burma**: “Holotype”, “Burma, Lt.-Col. Bingham, B.M. 1896 281”, “Holotype *Pseudovolucella ochracea* Hull” (BMNH) [examined].
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Diagnosis

Body length: 14 mm. Tergite 4 entirely black, a character only shared with P. decipiens (Fig. 21). Tergite 2 with extensive yellow markings, tergite 3 with vaguely, narrow, medially interrupted fascia, which possibly lacks in some specimens (as it does in P. decipiens). Male can be distinguished from P. decipiens by absence of apicoventral knob on hind femur (Fig. 46) and absence of white hair fringes along posterior margins of tergites 2 and 3. The female is unknown. The character of the hair fringes along the posterior margins of the tergites may also apply to the females.

Pseudovolucella sinepollex sp. n.

Figs 18, 19, 31, 37, 38, 47


Paratypes: Burma: same locality and leg. as holotype: 31.iii.1934, 1 ♂ (NHRS); 6800 ft, 7.iv.1934, 1 ♂ 2 ♀ (NHRS); 15.iv.1934, 2 ♂ 2 ♀ (NHRS); 19.iv.1934, 1 ♂ 1 ♀ (RMNH); 23.iv.1934, 1 ♀ (RMNH); 25.iv.1934, 1 ♂ (NHRS); 30.iv.1934, 2 ♂ 2 ♀ (BMNH); 5.v.1934, 1 ♂ (BMNH); 9.v.1934, 1 ♀ (BMNH); 12.v.1934, 1 ♂ (RMNH); 14.v.1934, 1 ♂ (RMNH); [without date] 1 ♀ (NHRS).


Description of male

Head. Eyes bare, contiguous over distance of about height of ocellar triangle (dorsal view). Face yellowish brown, with wide, darker median stripe and laterally also with darker stripes. Yellow parts and lateral dark parts with thin yellow pollinosity. Frons, orbital strips and face immediately below antennae with denser yellow pollinosity. Frons and ocellar triangle with long black hairs. Vertex and postocular orbits with yellow hairs (longest at top of head). Median part of face, including facial knob, bare. Lateral parts of face, genae, orbital strips and mouth edges with yellow hairs, with patch of black hairs laterally on upper part of face. Lunula orange brown to black. Ocellar triangle with frontal angle of approximately 50°.

Antenna: first and second segments dark brown, third segment orange brown, 1.3–1.5 times as long as wide. Arista orange, about 2.5 times as long as 3rd antennal segment, strongly plumose, with longest hairs longer than length of 3rd antennal segment.

Diagnosis

Body length: 11–13 mm. Male and female with strongly contrasting orange fasciae on otherwise black tergites 2, 3 and 4 (Fig. 18, 19). Male without medioventral knob on hind femur (Fig. 47). Fore and middle tibiae and femora partly dark and hairs on postalar calli all yellow.

Distinguished from P. mimica by male genitalia (Fig. 31, 37, 38), absence of fringes of pale hairs along posterior margins of tergites, more or less rectangular apex of posterior wing cell (somewhat variable) and slightly less swollen hind femur of male (Fig. 47).

Description of male

Head. Eyes bare, contiguous over distance of about height of ocellar triangle (dorsal view). Face yellowish brown, with wide, darker median stripe and laterally also with darker stripes. Yellow parts and lateral dark parts with thin yellow pollinosity. Frons, orbital strips and face immediately below antennae with denser yellow pollinosity. Frons and ocellar triangle with long black hairs. Vertex and postocular orbits with yellow hairs (longest at top of head). Median part of face, including facial knob, bare. Lateral parts of face, genae, orbital strips and mouth edges with yellow hairs, with patch of black hairs laterally on upper part of face. Lunula orange brown to black. Ocellar triangle with frontal angle of approximately 50°.

Antenna: first and second segments dark brown, third segment orange brown, 1.3–1.5 times as long as wide. Arista orange, about 2.5 times as long as 3rd antennal segment, strongly plumose, with longest hairs longer than length of 3rd antennal segment.

Thorax. Mesoscutum greyish black, entirely covered with yellow hairs and with greyish pollinosity, which is a little denser along transverse mesonotal suture and in median part on anterior half, where vaguely two greyish stripes can be distinguished when light falls on it from the right angle. Postpronotal sclerites, postalar calli and scutellum yellow and entirely with yellow hairs. Pleura mostly greyish black, narrowly orange along sutures, covered with grey pollinosity, except on posterior parts of mesepimeron, barrette and meropleuron. Pleura mostly with long yellow hairs, except on proepmineron, mesanepisternum 1, middle part of katepimeron, meropleuron, barrette and posterior part of mesepimeron. Metasternum with yellow hairs. Legs. Anterior coxae black, grey pollinose and with yellow hairs. Middle coxa black or orange, with yellow hairs. Posterior coxae black or orange, with mostly yellow and some black hairs. Anterior and middle femora orange brown to black, most pale near the apex, largely covered with yellow hairs, which are longest posteriorly and ventrally. Middle femora also with some black, bristly hairs towards apex. Hind femur swollen, slightly curved and with apicoventral knob (Fig. 47); blackish, but orange basally and (narrowly) apically; mostly with long yellow hairs, ventrally also with black hairs. Tibiae orange-brown to dark brown, darker on apical half, middle tibia sometimes entirely orange; entirely with yellow hairs. Anterior and posterior tarsae entirely brown to black; middle tarsae orange to orange brown, last two tarsomeres blackish. Wing clear, in some specimens with brown blotch posterior to stigma; entirely covered with microtrichiae, except for apical part of first and basal part of second costal cell, basal part of first basal cell and a narrow strip along the posterior margin of anal cell. Calypterae and halteres orange brown; calypterae covered with short yellow hairs and with long yellow hair fringes along margins. Abdomen. (Fig. 18) Tergite 1 orange, with yellow hairs. Tergite 2 blackish brown with anterior margin narrowly orange, anterolateral corners more broadly orange; with transverse orange fascia in middle and sometimes with posterior margin narrowly orange; covered with yellow hairs on anterior 2/3 (longest at anterolateral corners) and with short black hairs on posterior 1/3. Tergites 3 and 4 with same colour pattern, fasciae of more or less equal width; entirely with short black hairs, only some yellow hairs laterally on tergite 4. No posterior fringes of pale hairs present. Sternites from entirely yellow to blackish, with yellow hairs. Sternite 4 about 1.5 times as long as sternite 3. Pregenital segments with long black hairs. Genitalia as in Figs 31, 37, 38.

Description of female (Fig. 19) Differing from male as follows. Head. Eyes separated over distance of about 1/6 of total head width. Frons pollinated, with narrow transverse fascia of denser pollination. Hairs on frons dark brown, entirely yellow on rest of head. Ocellar triangle with frontal angle of approximately 60°. Legs. Posterior femora not swollen and without apicoventral knob. Abdomen. Hairs on tergites shorter and with yellow hairs on orange fasciae of tergites 3 and 4.

Etymology The name *sinepollex* (Latin) means “without a thumb”. This name was chosen because in the male of this species the right surstylus (Fig. 31, 37) lacks the “thumb-like” lobe which is present in most other species of *Pseudovolucella*.

Distribution All known specimens have been found in northern, mountainous areas of Burma and Vietnam, at altitudes ranging from 1900 to 2100 m. The specimens from Burma were found from 31 March till 14 May, the Vietnamese specimen has been collected between 15 and 21 October.

Species of uncertain status


Taxonomy Brunetti’s description, based on one female, strongly indicates that it is a *Pseudovolucella* species. All characters in the description apply also to *P. mimica*, while no differences between these taxa can be derived from it. Until the type can be studied, the question whether *P. eristaloides* and *P. mimica* are names for the same species has to remain unanswered.

Distribution The type specimen has been collected in northwestern India at an altitude of 2200 ft (=660 m.) (Brunetti 1923).
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