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## NOTE

### NEW RECORDS OF HOVERFLIES OF THE GENUS *VOLUCELLA* GEOFFROY (DIPTERA: SYRPHIDAE) FROM PAKISTAN ALONG WITH A CHECKLIST OF KNOWN SPECIES

Muhammad Asghar Hassan, Imran Bodlah, Anjum Shehzad & Noor Fatima

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## New records of hoverflies of the genus *Volucella* Geoffroy (Diptera: Syrphidae) from Pakistan along with a checklist of known species

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The genus *Volucella* Geoffroy, 1762 belongs to the tribe Volucellini of the subfamily Eristalinae, which appears to mimic bumblebees or wasps. The adults are characterized by their large, broad and robust body, extended downward face and plumose arista, feathered with long hairs and cell R1 closed before the wing border (van Veen 2010). This genus comprises of three species groups—Bombylans, Pellucens, and Zonaria—based on their colouration and external body appearance (Barkalov 2003). The members of bombylans group are long-haired bumblebee mimic hoverflies, the pellucens group are mostly black species with short hair that have their second abdominal tergites completely pale or with at least a pair of yellow to pale brown spots, and the zonaria group have striped abdomens (wasp mimics). So far known, their larvae have different modes of feeding: first those larvae obtained from wounds caused by goat moths on old deciduous trees feed on wet material accumulated by the action of moths. The second type inhabit the nests of social wasps and bumble bees and are detritivores and larval predators, (except *Volucella inflata*, that appears to live in tunnels made by other insects in which sap and insect faeces/

tree humus provide a sub-aqueous mix). The third type are scavengers and facultative or obligatory predators or ectoparasitoids (Rotheray 1999; Speight 2003).

In the process of compiling the checklist of the family Syrphidae, 81 species under 42 genera of hoverflies are recorded from Pakistan (Shehzad et al. 2017; Hassan et al. 2018a,b, 2019, 2020) in comparison with Indian hoverflies which are 357 species in 69 genera (Ghorpadé 2015). The genus *Volucella* Geoffroy, 1762 is recently reported from Pakistan (Shehzad et al. 2017) and the current study aims to update the list of known and new records of this genus.

### Material and Methods

The adult specimens of the new country records were collected from the flowers of *Buddleja davidii* at Kuldana, Murree, Punjab, Pakistan. The photographs of the previously known species (*V. ruficauda*) were obtained from the National Insect Museum, Islamabad, Pakistan. The collected specimens were identified by using Choi et al. (2006) and further details are provided in remarks. The specimens were photographed using Olympus SZX7 stereomicroscope attached with a Sony CCD digital

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camera. The identified specimens are deposited in the insect collection at National Insect Museum, Islamabad and Laboratory of Biosystematics, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan. The list of all known species is compiled from Ghorpadé (2015) and Shehzad et al. (2017).

## Results

The present study was conducted to update the genus *Volucella* from Pakistan based on previous literature. As a result, *Volucella pellucens tabanoides* Motschulsky, 1859 is a new record.

## Taxonomy

### Genus *Volucella* Geoffroy, 1762

**Diagnostic characters:** *Volucella* are large, broad-bodied hoverflies. They can easily be diagnosed by the downwardly extended face, with moderately long third antennal segment with basal arista, arista plumose; abdomen oval in shape; legs simple; wings with marginal cell closed, anterior cross-vein distinctly before middle of discal cell; apical portion of fourth vein distinctly recurrent; second vein bristle at base.

### *Volucella peleterii* (Macquart, 1834) (Image 1A–C)

Material examined: #103, 1 male, PMAS-Arid Agriculture University, Rawalpindi, Punjab, Pakistan (33.647°N & 73.083°E, 511m).

Diagnostic characters: Pubescence on the body usually short, not dense; antennae and head wholly orange; epistome produced with short yellowish, with some black hairs, central bump distinct (Image 1C); thorax brownish-orange, scutellum orange with golden hairs sometime mixed with black hairs; wings brownish (Image 1A); legs orange with short orange pubescence (Image 1B); abdomen with tergite 1 and base of second grey livid, tergite with three largely triangular spot in the centre, tergite 4 with a little tinged with brown towards the tip (Image 1A).

Distribution: Pakistan: Azad Jammu & Kashmir: Muzaffarabad; Gilgit-Baltistan: Gilgit; Punjab: Murree

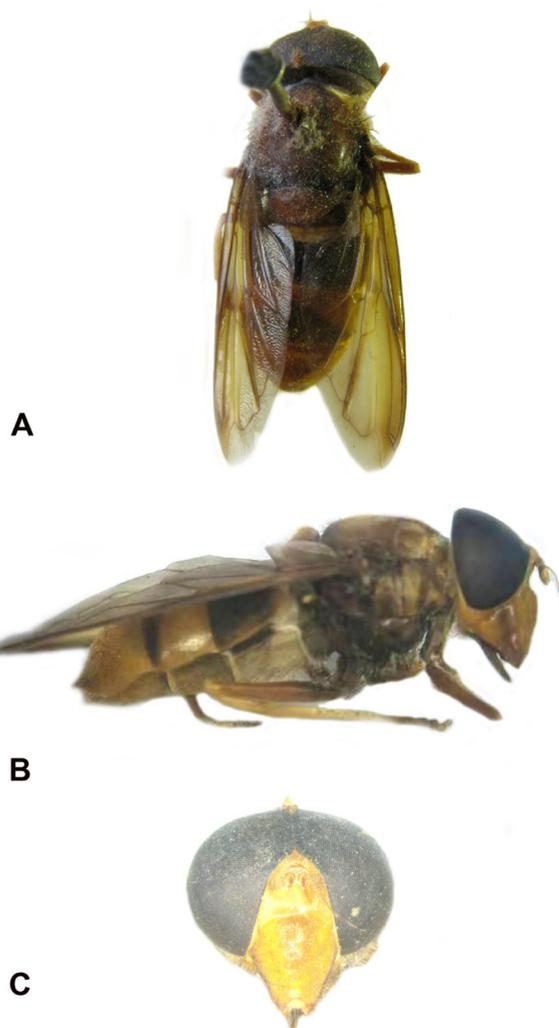


Image 1. *Volucella peleterii*: A—dorsal habitus | B—lateral habitus | C—frontal view. © Shakeel Ahmed

(Shehzad et al. 2017). India: Jammu & Kashmir (Ghorpadé 2015). A single male specimen of this species at Department of Entomology, PMAS-Arid Agriculture University and possibly collected from Punjab province of Pakistan [deposited at Department of Entomology, PMAS-Arid Agriculture University].

## Key to the species of genus *Volucella* for Pakistan

1. Body densely pubescent (Image 3A–B); face black (Image 3C) ..... *ruficauda*
- Body bare; face yellowish-orange ..... 2
2. Abdominal tergite 2 wholly yellowish-white (Image 2A); thoracic dorsum shining black, brownish along humeri and along the side margins (Image 2A) ..... *pellucens*
- Abdominal tergite 2 almost entirely black (Image 1A); thoracic dorsum brownish-orange (Image 1A) .....  
..... *peleterii*

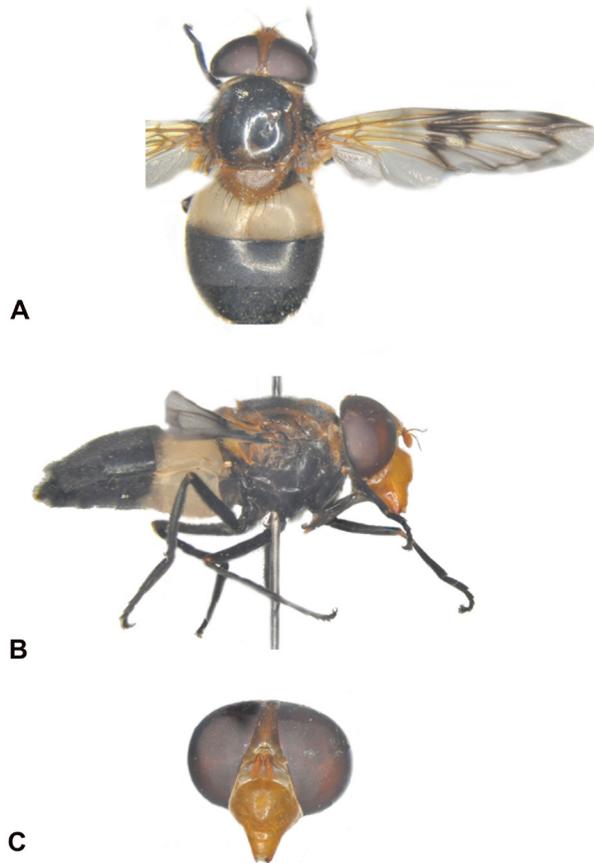


Image 2. *Volucella pellucens tabanoides*: A—dorsal habitus | B—lateral habitus | C—frontal view. © Imran Bodlah

***Volucella pellucens tabanoides* Motschulsky, 1859 (Image 2A–C)**

Material Examined: #104, 2 males, 1 female, 18.vii.2018, Kuldana, Murree, Rawalpindi, Punjab, Pakistan (33.925°N & 73.405°E, 1,928m), leg. M.A. Hassan.

Diagnostic characters: Pubescence on the body usually short, not dense; head tawny, frons little produced, antennae orange (Image 2C). Thorax shining black, brownish along humeri and along the side margins, scutum posteriorly with distinct brown triangular macula (*V. pellucens tabanoides* Motschulsky); scutellum tawny with long black bristles along margin (Image 2A); pleuron black; legs black, knees a little brownish-orange (Image 2A-B). Abdomen short-ovate, second segment wholly yellowish-white remaining black, pubescence on abdomen black except along the basal margin of second abdominal segment white; wings, veins on basal half pale orange, a distinct black marks in middle and at tip, the veins along hind margins blackish, squamae brownish with orange margins and fringe, halter brown (Image 2A).

Remarks: Coi et al. (2006) remarked that there is a clear difference between Far Eastern and European subspecies of *V. pellucens* especially in females. Females of *V. p. tabanoides* (Russian far east, Mongolia, China, Korea, and Japan; Oriental region) can be distinguished from those of *V. p. pellucens* (widespread in western Palaearctic region) by their scutum with distinct brown triangular prescutellar macula. Based on this remarks about *V. p. tabanoides* on distribution probably present in the Oriental region and scutum posteriorly with distinct brown triangular macula; the Pakistani *V. pellucens* species should be *V. p. tabanoides*. We are, however, not sure about the subspecies status of the Indian *V. pellucens* reported from Jammu & Kashmir and Uttarakhand.

Host plant: *Buddleja davidi* Franch.

***Volucella ruficauda* Brunetti, 1907 (Image 3A–C)**

Diagnostic characters: This species can easily be diagnosed by body with densely covered pubescence

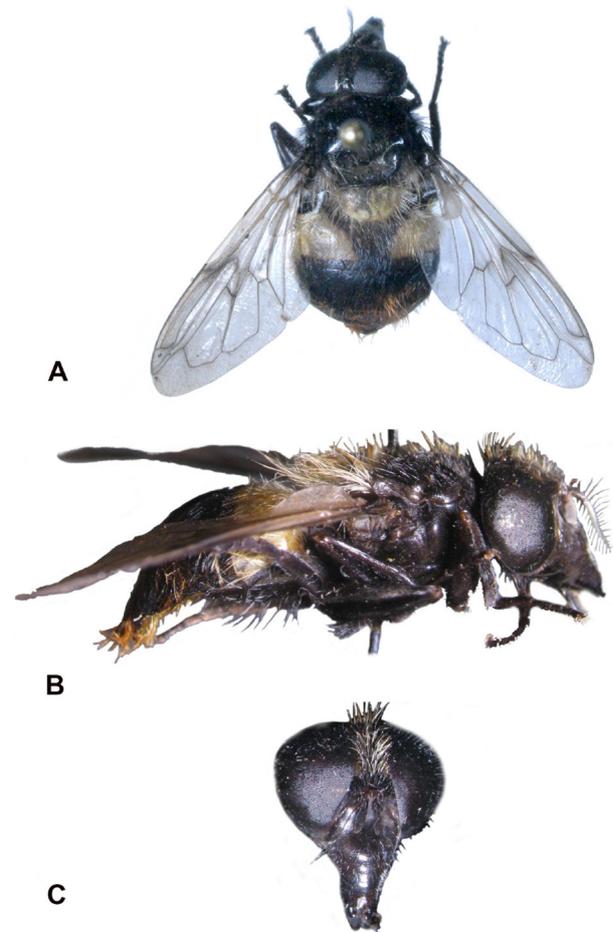


Image 3 . *Volucella ruficauda*: A—dorsal habitus | B—lateral habitus | C—frontal view. © Anjum Shehzad

(Image 3A–B); head black, vertex in female with yellow bristles, epistome produced with short black pubescence (Image 3C); thorax black with mixed yellowish and black bristles, scutellum orange with long yellowish bristles; wings yellowish grey with brownish suffusion in middle (Image 3A); legs brownish (Image 3B); abdominal tergite 2 with large triangular spots on lateral sides, remaining black (Image 3A), abdominal tergite 3–5 with red hairs (Image 3B).

Distribution: Pakistan: Gilgit-Baltistan, Deosai (Shehzad et al. 2017). India: Jammu & Kashmir and Sikkim (Ghorpadé 2015).

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