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# NEW RECORDS OF SOCIAL WASPS (HYMENOPTERA: VESPINAE: *VESPA* AND *PROVESPA*) FROM BHUTAN

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**Abstract:** A total of eight species and subspecies of the genus *Vespa*, namely *V. velutina nigrithorax* du Buysson, 1905, *V. basalis* Smith, 1852, *V. affinis affinis* (Linnaeus, 1764), *V. affinis indosinensis* Pérez, 1910, *V. mandarinia magnifica* Smith, 1852, *V. tropica leefmansii* van der Vecht, 1957, *V. bicolor* Fabricius, 1787, *V. analis nigrans* du Buysson, 1903 along with *Provespa barthelemyi* (du Buysson, 1905) is recorded for the first time in Bhutan. The current number of species in the genus *Vespa* and *Provespa* found in Bhutan stands at 14. The records for *V. mandarinia bellona* Smith, 1871 and *V. tropica tropica* (Linnaeus, 1758) previously reported as from Maria Basti, Bhutan, must be confirmed.

**Key words:** *Provespa*, *Vespa*, Padong, Maria Basti, Bhutan, new record

**Abbreviation:** NBCB – National Biodiversity Centre, Bhutan.

Hornets are the largest known social wasps in the family Vespidae. *Vespa* Linnaeus, 1758, and *Provespa* Ashmead, 1903 are two of the four genera in the subfamily Vespinae; the other two genera being *Dolichovespula* Rohwer, 1916, and *Vespula* Thomson, 1869 (Archer 1989; Das & Gupta 1989; Carpenter & Kojima 1997; Carpenter & Nguyen 2003). There are 22 species in the genus *Vespa* recorded worldwide (Archer 2012), which can be distinguished from the other vespine genera by the proportionally wider vertex, whereas only

three species are recorded for the genus *Provespa*. The species of the genus *Provespa* are nocturnal and can be recognized by their yellow-brown coloured body and enlarged ocelli (Archer 1989, 2012; Carpenter & Nguyen 2003; Saito & Kojima 2011; Madl 2012). The adult hornets feed on nectar and sugar-rich materials such as rotting sweet fruits, sap of trees, and honey; they pollinate flowers. They also kill insects, masticate and feed them to their developing larvae.

*Vespa mandarinia* Smith, 1852, *V. tropica* Linnaeus, 1758 (Carpenter & Kojima 1997), *V. mandarinia magnifica* Smith, 1852 (Archer 1989; Das & Gupta 1983, 1989), *V. mandarinia bellona* Smith, 1871 (Das & Gupta 1983, 1989) and *V. tropica tropica* Linnaeus, 1758 (Das & Gupta 1983) were reported from Maria Basti, Bhutan. From Padong, the following species were recorded: *V. velutina nigrithorax* du Buysson, 1905, *V. bicolor* Fabricius, 1787 (Carpenter & Kojima 1997; Archer 2012) and *V. fumida* van der Vecht, 1959 (Carpenter & Kojima 1997). *Vespa vivax* Smith, 1870, *V. velutina variana* van der Vecht, 1957 and *V. fumida* van der Vecht, 1956 (Dorji et al. 2017) were also reported from different parts of the country. Since Maria Basti is located in the

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**Competing interests:** The authors declare no competing interests.

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Indian state of West Bengal (Madl 2012) and Padong in Sikkim, India (Dorji et al. 2017), Bhutan was removed from the distribution list of *Provespa barthelemyi* (du Buysson 1905), *Vespa mandarinia magnifica*, *V. velutina nigrithorax* & *V. bicolor*. The present study confirms the presence of *V. velutina nigrithorax*, *V. mandarinia magnifica*, *V. bicolor* and *P. barthelemyi* in Bhutan with four new records for these two genera. The number of species in the genus *Vespa* and *Provespa* known from the present day Bhutanese territory stands at 14 (Table 1).

## MATERIALS AND METHODS

The surveys were conducted in 2014 and 2015 throughout Bhutan and only adult wasps were collected with the help of sweep nets, killed with ethyl acetate and preserved as dry specimens. Morphological studies were done using a stereo microscope (CSM2, Labomed). All the studied specimens were deposited in the National Biodiversity Centre, Bhutan (NBCB).

The species were identified according to van der Vecht (1957), Yamane (1974), Archer (1989, 2012), Das & Gupta (1989), Carpenter & Nguyen (2003), Nguyen et al. (2006), Dubatolov & Dolgikh (2009), Madl (2012), Mahmood et al. (2012), and Siddiqui et al. (2015). The distribution ranges for *V. mandarinia bellona* and *V. tropica tropica* in Maria Basti, Bhutan were corrected based on Madl (2012), and *V. velutina nigrithorax* and *V. bicolor* in Padong, Bhutan were corrected as not in Bhutan based on Dorji et al. (2017).

## RESULTS AND DISCUSSION

### 1. *Vespa mandarinia magnifica* Smith, 1852 (Image 1 A, B & C)

Diagnosis: Head orange red and strongly widened; gena enlarged behind the eyes; at least 1.8 x as wide as the eye in female; thorax black and abdomen reddish-brown with narrow yellowish apical bands on 1<sup>st</sup>–5<sup>th</sup> terga, and last tergum orange-yellow; length: 31.25–33.80 mm, 6 females.

Material examined: NBCB-00062, NBCB-00063, NBCB-00064, NBCB-00065 & NBCB-00066, 28.ix.2014, 5 females, Kanglung, Trashigang, Bhutan (Sherubtse College Campus, 27°17'07.47"N & 91°31'18.68"E, 1,823m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00067, 17.vi.2015, 1 female, Radhi, Trashigang, Bhutan (evergreen forest, 27°21'57.08"N & 91°43'59.66"E, 1,763m), coll. Phurpa Dorji & party.

Distribution: Bhutan (Trashigang), India, Nepal, Sri Lanka, China, Taiwan, Japan, Thailand, Myanmar, Laos, Peninsular Malaysia, Russia, Korea (Das & Gupta 1989;

Carpenter & Kojima 1997; Nguyen et al. 2006; Dubatolov & Dolgikh 2009; Archer 2012)

Remarks: Since Maria Basti is in West Bengal, India (Madl, 2012) and not in Bhutan, this species is also treated as a new record for Bhutan.

### 2. *Vespa analis nigrans* du Buysson, 1903 (Image 1 D, E & F)

Diagnosis: A rather blunt, triangular tooth present on the anterior margin of clypeus; head largely yellow to orange-yellow; thorax darker; metasoma largely blackish-brown; 6<sup>th</sup> tergum and sternum yellow; other terga with yellowish apical bands; length: 22–30 mm, 2 females.

Material examined: NBCB-00068, 14.x.2015, 1 female, Tingtibi, Zhemgang, Bhutan (around village, 27°08'33"N & 90°41'31"E, 631m), coll. Tshering Nidup & Wim Klein; NBCB-00069, 14.x.2015, 1 female, Ossey, Sarpang, Bhutan (Evergreen forest, 26°57'16"N & 90°32'53"E, 780m), coll. Tshering Nidup and Wim Klein.

Distribution: Bhutan (Zhemgang, Sarpang), India, Nepal, Myanmar, Thailand, Malaysia, Singapore, China, Taiwan, Korea, Japan, Laos, Tenasserim, Russia, Indonesia, (Yamane 1974; Das & Gupta 1989; Carpenter & Kojima 1997; Dubatolov & Dolgikh 2009; Archer 2012)

Remarks: A new record for Bhutan.

### 3. *Vespa velutina nigrithorax* du Buysson, 1905 (Image 1 G, H & I)

Diagnosis: The Upper part of the head and temple black; femora I black; 3<sup>rd</sup> tergum brownish in front of apical narrow band; visible part of 4<sup>th</sup> tergum orange-yellow; 5<sup>th</sup> and 6<sup>th</sup> terga yellowish-brown; thorax entirely brown; clypeus with broadly rounded apical teeth; length: 17.41–22.05 mm, 12 females.

Material examined: NBCB-00070, NBCB-00071, NBCB-00072, NBCB-00073, NBCB-00074 & NBCB-00075, 28.ix.2014, 6 females, Kanglung, Trashigang, Bhutan (Sherubtse College campus, 27°17'07.47"N & 91°31'18.68"E, 1,823m), coll. Tshering Nidup and Phurpa Dorji; NBCB-00076, 12.x.2015, 1 female, Sithikhet & Ninzoergang, Tsirang, Bhutan (Evergreen forest, 27°00'24"N & 90°08'24"E, 1,256m), coll. Tshering Nidup and Wim Klein; NBCB-00077 & NBCB-00078, 17.vi.2015, 2 females, Radhi, Trashigang, Bhutan (Evergreen forest, 27°14'14"N & 90°36'47"E, 1,841m), coll. Phurpa Dorji & party; NBCB-00079, 20.x.2015, 1 female, Motithang, Thimphu, Bhutan (Town, 27°12'30.4"N & 89°37'27.3"E, 2,479m), coll. Phurpa Dorji; NBCB-00080, 26.x.2015, 1 female, Kapatapsa, Wangdiphodrang, Bhutan (around village, 27°42'39"N & 89°45'54"E, 1,476m), coll. Phurpa





Image 1. A, B & C - Dorsal, lateral and frontal view of *Vespa mandarina magnifica*; D, E & F - Dorsal, lateral and frontal view of *Vespa analis nigrans*; G, H & I - Dorsal, lateral & frontal view of *Vespa velutina nigrithorax*

Dorji and Wim Klein; NBCB-00081, 22.x.2015, 1 female, Kafu near Yadi, Mongar, Bhutan (around village, 27°19'19"N & 91°21'53"E, 885m), coll. Phurpa Dorji & Wim Klein.

Distribution: Bhutan (Trashigang, Tsirang, Thimphu, Wangdiphodrang, Mongar), India, China, Korea, Vietnam, France, Spain, Portugal (Das & Gupta 1989; Archer 2012).

Remarks: Since Padong is in Sikkim, India and not in Bhutan, this species is treated as a new record for Bhutan.

#### 4. *Vespa affinis affinis* (Linnaeus, 1764) (Image 2 A, B & C)

Diagnosis: Head red with a dark patch between antennae and at the base of clypeus; tergum 1 and 2 orange-yellow with brown at the base of tergum 1; sternum 1 dark brown; length: 19mm, 1 female.

Material examined: NBCB-00401, 07.x.2015, 1 female, Rinchending, Chukha, Bhutan (College of Science and Technology campus, 26°51'01"N & 89°23'45"E, 405m), coll. Tshering Nidup & Wim Klein.

Distribution: Bhutan (Chukha), India, Nepal, Myanmar, Sri Lanka, China, Taiwan (Das & Gupta 1989; Archer 2012)

Remarks: A new record for Bhutan.





Image 2. A, B & C - Dorsal, lateral and frontal view of *Vespa affinis affinis*; D, E & F - Dorsal, lateral and frontal view of *Vespa affinis indosinensis*; G, H & I - Dorsal, lateral & frontal view of *Vespa tropica leefmansi*

**5. *Vespa affinis indosinensis* Pérez, 1910** (Image 2 D, E & F)

Diagnosis: First tergum widely orange-yellow with reddish-brown or black base; head black with slight reddish-brown on the front, vertex and temple; thorax entirely black or with very faint reddish-brown marks on pronotum; length: 20mm, 2 females.

Material examined: NBCB-00402, 19.vii.2015, 1 female, Bangtar, Samdrup Jongkhar, Bhutan (Evergreen forest, 26°53'16.90"N & 91°41'37.04"E, 250m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00403, 18.vii.2015, 1 female, Dewathang, Samdrup Jongkhar, Bhutan (Evergreen forest, 26°51'26.67"N & 91°27'27.53"E, 877m), coll. Tshering Nidup & Phurpa Dorji.

Distribution: Bhutan (Samdrup Jongkhar), Thailand, Laos, Cambodia, Vietnam, Malaysia, Sumatra, Java, Indochina, Myanmar, India (Das & Gupta 1989; Archer 2012).

Remarks: A new record for Bhutan.

**6. *Vespa tropica leefmansi* van der Vecht, 1957** (Image 2 G, H & I)

Diagnosis: Head and thorax black; metasoma black with 2<sup>nd</sup> tergum and sternum more extensively orange, darker at base not reaching the middle of the segment; base of forewing infuscate extensively with 1<sup>st</sup> discoidal cell almost entirely black; hindwing fuscous; length: 23.80–29.95 mm, 7 females.





Image 3. A, B & C - Dorsal, lateral and frontal view of *Vespa basalis* (worker); D, E & F - Dorsal, lateral & frontal view of *Vespa bicolor*; G, H & I - Dorsal, lateral and frontal view of *Provespa barthelemyi*

Material examined: NBCB-00404, NBCB-00405, NBCB-00406 & NBCB-00407, 28.ix.2014, 4 females, Kanglung, Trashigang, Bhutan (Sherubtse College campus, 27°17'07.47"N & 91°31'18.68"E, 1,823m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00408, 19.vii.2015, 1 female, Bangtar, Samdrup Jongkhar, Bhutan (evergreen forest, 27°53'00"N & 91°41'00"E, 258m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00410, 09.x.2015, 1 female, Rinchening, Chukha, Bhutan (26°51'24"N & 89°24'18"E, 600m), coll. Tshering Nidup & Wim Klein; NBCB-00409, 12.x.2015, 1 female,

Tsholingkhar, Tsirang, Bhutan (from paddy field, 27°00'27"N & 90°05'55"E, 1,159m), coll. Tshering Nidup & Wim Klein.

Distribution: Bhutan (Trashigang, Samdrup Jongkhar, Chukha, Tsirang), India, Myanmar, Thailand, Vietnam, Laos, Cambodia, Malaysia, Singapore, Brunei, Philippines, Indonesia (Das & Gupta 1989; Archer 2012).  
Remarks: A new record for Bhutan.

### 7. *Vespa basalis* Smith, 1852 (Image 3 A, B & C)

Diagnosis: Female and worker: Clypeus apically smooth, almost impunctate; postscutellum brown; middle tibiae with long hairs which is longer than the width of tibiae; metasoma almost entirely black with first tergum apically marked; length: 15.31–20.24 mm, 6 females; 24.31mm, one queen.

Queen: The metasoma black with first tergum marked with yellowish-brown; length: 24mm.

Material examined: NBCB-00411, NBCB-00412, NBCB-00413 & NBCB-00414, 28.ix.2014, 4 females, Kanglung, Trashigang, Bhutan (Sherubtse College campus, 27°17'07.47"N & 91°31'18.68"E, 1,823m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00415, 19.vii.2015, 1 female, Bangtar, Samdrup Jongkhar, Bhutan (Evergreen forest, 27°53'00"N & 91°41'00"E, 258m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00416 & NBCB-00417, 15.v.2015, 1 queen & 1 worker, Wokhuna, Punakha, Bhutan (Grassland, 27°38'26"N & 89°47'19.9"E, 1,362m), coll. Tshering Nidup & party.

Distribution: Bhutan (Trashigang, Samdrup Jongkhar, Punakha), India, Nepal, Pakistan, China, Myanmar, Laos, Malaysia, Indonesia, Taiwan, Thailand, Vietnam, Korea, Sumatra, Sri Lanka (Das & Gupta 1989; Carpenter & Kojima 1997; Archer 2012; Siddiqui et al. 2015)

Remarks: A new record for Bhutan.

### 8. *Vespa bicolor* Fabricius, 1787 (Image 3 D, E & F)

Diagnosis: Body color predominantly yellow with head and thorax black dorsally; body covered with blackish hairs; antenna black and legs brownish dorsally; wings flavor-hyaline, darker along costal margin of fore wing; length: 15 – 17 mm, 8 females.

Material examined: NBCB-00418 & NBCB-00419, 14.x.2015, 2 females, Tingtibi, Zhemgang, Bhutan (around village, 27°08'33"N & 90°41'31"E, 631m), coll. Tshering Nidup & Wim Klein; NBCB-00420 & NBCB-00421, 19.vii.2015, 2 females, Bangtar, Samdrup Jongkhar, Bhutan (Evergreen forest, 26°61'23"N & 90°18'46"E, 253m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00422, 18.vii.2015, 1 female, Dewathang, Samdrup Jongkhar, Bhutan (Evergreen forest, 26°51'26.67"N & 91°27'27.53"E, 877m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00423 & NBCB-00424, 12.x.2015, 2 females, Tsholingkhar, Tsirang (paddy field, 27°00'27"N & 90°05'55"E, 1,159m), coll. Tshering Nidup & Wim Klein; NBCB-00425, 15.x.2015, 1 female, Berti near Tingtibi, Zhemgang, Bhutan (evergreen forest, 27°09'26"N & 90°40'03"E, 531m), coll. Tshering Nidup & Wim Klein.

Distribution: Bhutan (Zhemgang, Samdrup Jongkhar,

Table 1. Checklist of *Vespa* and *Provespa* species and subspecies

Order: Hymenoptera
Family: Vespidae
Sub-family: Vespinae
<i>Vespa binghami</i> du Buysson, 1905
* <i>Vespa velutina nigrithorax</i> du Buysson, 1905 <i>Vespa velutina variana</i> van der Vecht, 1957 <i>Vespa vivax</i> Smith, 1870 <i>Vespa fumida</i> van der Vecht, 1956
* <i>Vespa basalis</i> Smith, 1852 * <i>Vespa affinis indosinensis</i> Pérez, 1910 * <i>Vespa affinis affinis</i> (Linnaeus, 1764)
* <i>Vespa mandarinia magnifica</i> Smith, 1852
* <i>Vespa tropica leefmansi</i> van der Vecht, 1957
<i>Vespa tropica haematodes</i> Bequaert, 1936
* <i>Vespa bicolor</i> Fabricius, 1787
* <i>Vespa analis nigrans</i> du Buysson, 1903
* <i>Provespa barthelemyi</i> (du Buysson, 1905)

\* - New records from Bhutan during the present study

Tsirang), India, Nepal, China, Japan, Myanmar, Vietnam, Laos, Cambodia, Thailand (Das & Gupta 1989; Carpenter & Kojima 1997; Archer 2012).

Remarks: Since Padong is in Sikkim, India and not in Bhutan, this species is also treated as a new record for Bhutan.

### 9. *Provespa barthelemyi* (du Buysson, 1905) (Image 3 G, H & I)

Diagnosis: *Provespa*: Small head with short vertex and narrow temple; ocelli very large, posterior ocelli much closer to the eyes than to each other; fore wing with large stigma; first cubital cell very long, as long as the distance of its apex to the tip of the wing; first gaster tergum cup-shaped; nocturnal wasps.

*P. barthelemyi*: Clypeus pale yellow, darker along the margin; anterior margin of clypeus slightly emarginated medially, almost truncate; Male genitalia: ventral margin of parameres with a distinct blunt tooth before the apex; length: 20.12–22.23 mm, 5 females.

Material examined: NBCB-00426, NBCB-00427, NBCB-00428 & NBCB-00429, 28.ix.2014, 4 females, Kanglung, Trashigang, Bhutan (Sherubtse College campus, 27°17'07.47"N & 91°31'18.68"E, 1,823m), coll. Tshering Nidup & Phurpa Dorji; NBCB-00430, 13.x.2015, 1 female, Thakorling, Tsirang, Bhutan (evergreen forest, 26°57'40"N & 90°10'35"E, 1,690m), coll. Tshering Nidup & Wim Klein.

Distribution: Bhutan (Trashigang, Tsirang), India, Myanmar, Thailand, Laos, Cambodia, Malaysia, Vietnam,

China (Das & Gupta 1989; Archer 2012; Madl 2012)

Remarks: As *Maria Basti* is situated in West Bengal, Madl (2012) removed Bhutan from the distributional range. It is, therefore, treated as a new record for Bhutan.

### 9. *Vespa mandarinia bellona* Smith, 1871 and *V. tropica tropica* (Linnaeus, 1758)

Distribution: Das & Gupta (1983) reported *V. mandarinia bellona* and *V. tropica tropica* from Maria Basti, Bhutan which according to present day geography is located in West Bengal (Madl 2012). Therefore, the presence of the above species has to be confirmed in Bhutan.

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**Articles**

**Distribution and population status assessment of the endemic grass-like palm *Butia marmorii* (Arecaceae) in Paraguay**

-- Irene Gauto, Fernando Palacios, Pamela Marchi, Nelson Silva & Gloria Céspedes, Pp. 10021–10034

**Conservation of the Southern River Terrapin *Batagur affinis* (Reptilia: Testudines: Geoemydidae) in Malaysia: a case study involving local community participation**

-- Pelf Nyok Chen, Pp. 10035–10046

**Butterflies associated with major forest types in Arunachal Pradesh (eastern Himalaya), India: implications for ecotourism and conservation planning**

-- Arun P. Singh, Pp. 10047–10075

**Communication**

**Traditional home garden agroforestry systems: habitat for conservation of Baya Weaver *Ploceus philippinus* (Passeriformes: Ploceidae) in Assam, India**

-- Yashmita-Ulman, Awadhesh Kumar & Madhubala Sharma, Pp. 10076–10083

**Peer Commentary**

**Livestock and wild herbivores in the western Himalaya: competition or co-existence?**

-- Zarreen Syed & Mohd Shahnawaz Khan, Pp. 10084–10088

**Short Communications**

**Conservation status assessment and new population record of the threatened Golden Himalayan Spike**

***Phlomoides superba* (Royle ex Benth.) Kamelin & Makhm. from Jammu & Kashmir, India**

-- Amber Srivastava, Yash Pal Sharma, O.P. Sharma Vidyarthi & Sunil Kumar Srivastava, Pp. 10089–10095

**Host specificity of some wood-decaying fungi in moist deciduous forests of Kerala, India**

-- A. Muhammed Iqbal, Kattany Vidyasagaran & Narayan Ganesh, Pp. 10096–10101

**New records of social wasps (Hymenoptera: Vespinae: *Vespa* and *Provespa*) from Bhutan**

-- Phurpa Dorji, Thinley Gyeltshen, Wim Klein & Tshering Nidup, Pp. 10102–10108

**Butterfly diversity (Lepidoptera: Rhopalocera) associated with nectar feeding on *Ziziphus mauritiana* Lamarck (Rosales: Rhamnaceae) flowers in Chuadanga, Bangladesh**

-- Tahsinur Rahman Shihan, Pp. 10109–10114

**First record of a Wrinkle-lipped Free-tailed Bat *Chaerephon plicatus* Buchannan, 1800 (Mammalia: Chiroptera: Molossidae) colony in Sri Lanka, with notes on echolocation calls and taxonomy**

-- Tharaka Kusuminda & Wipula B. Yapa, Pp. 10115–10120

**Density and obligatory feeding habits of an isolated Golden Jackal *Canis aureus* L. (Mammalia: Carnivora: Canidae) population in Pirotan Island, Gulf of Kachchh, India**

-- Kamaraj Ramkumaran, Rethnaraj Chandran, Chowdula Satyanarayana, Kailash Chandra & Tikadar Shyamal, Pp. 10121–10124

**Notes**

**The seasonal occurrence of the Whale Shark *Rhincodon typus* (Smith, 1828) (Orectolobiformes: Rhincodontidae) along the Odisha coast, India**

-- Shesdev Patro, Biraja Kumar Sahu, Chandanlal Parida, Madhusmita Dash & K.C. Sahu, Pp. 10125–10129

**A new record of Gunther's Waspfish *Snyderina guentheri* (Boulenger, 1889) (Scorpaeniformes: Tetrarogidae) from Visakhapatnam, India**

-- Muddula Krishna Naranji & Sujatha Kandula, Pp. 10130–10132

**First record of *Neojurtina typica* from India (Hemiptera: Heteroptera: Pentatomidae)**

-- S. Salini, Pp. 10133–10137

***Xenomerus orientalis* Walker (Hymenoptera: Platygasteridae): a new distribution record for India**

-- Kalmesh Managanvi, A.K. Karnatak & M.A. Khan, Pp. 10138–10140