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Two new species and some new records of the genus *Hylaeus* from Nepal (Hymenoptera: Apoidea, Colletidae)

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Abstract

The available data on the occurrence of *Hylaeus* species in the Himalayas are assessed, including new material from Nepal. Two new species are described: *Hylaeus* (*Dentigera*) *kumari* **sp. nov.** and *Hylaeus* (*Nesohylaeus*) *takeshii* **sp. nov.** The subgenus *Hylaeus* (*Nesoprosopis*) is recorded for the first time in Nepal, represented by the species *Hylaeus floralis* and *Hylaeus transversalis*, which are known from East Asia. A total of 15 *Hylaeus* species in 6 subgenera have thus now been documented from the high-montane Himalayas.

Key words: Nepal, bee taxonomy, new species, new records, distribution

Introduction

Asian high mountains are considered centres of biodiversity development (Michener 1979, Dathe & Proshchalykin 2018). Nepal is the highest country on earth. It extends along the southwestern slope of the Himalayan Mountains and includes the transition from lowlands to the highest regions. Special faunas have evolved here, which have repeatedly attracted biologists, especially during the last decades (Hartmann *et al*. 1998). Dathe (2009) worked on material yielded by such an expedition and found seven new *Hylaeus* species from western parts of Nepal. From the neighboring Kashmir four species were previously known, which Nurse (1903) had described as *Prosopis kashmirensis*, *P. vetusta*, *P. advocata* and *P. secreta*, so that from the Himalayas altogether 11 *Hylaeus* species were known. We recently received new material from an expedition of Dr. Takeshi Matsumura (Nasushiobara City, Japan) and from F. Creutzburg (Jena, Germany), giving us the opportunity to examine another 43 specimens, collected in the central and western areas of Nepal. The results are presented here.

Material and methods

Examined specimens are 43 individuals in total. Twenty-nine among them were collected by T. Matsumura, two by T. Kumata and 12 by F. Creutzburg. We use the following abbreviations for collectors and the institutes: FC – F. Creutzburg, TK – T. Kumata, TM – T. Matsumura, ELKU – Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan, NIAES – National Institute for Agro-Environmental Sciences, Tsukuba, Japan, SDEI – Senckenberg Deutsches Entomologisches Institut, BMNH – Natural History Museum [formerly British Museum (Natural History)], London.

The specimens were studied with an Olympus SZX12 microscope. Photos were taken with a system

comprising the Leica Z6 APO microscope camera, and the Leica Application Suite Version 4.12.0. Composite images were made using the software CombineZP by Alan Hadley.

For morphological concepts and terminology, we generally follow Michener (2007). The abbreviations used in the text are as follows: HL – head length, HW - head width, SL – scape length, SW – scape width, T – tergum (e.g. T1= 1st metasomal tergum), S – sternum (e.g. S7 = 7th metasomal sternum).

For specific details we use the definitions in Dathe (2014) as follows:

Punctation strength (relatively, in this order):

minute – fine – moderate – strong – coarse – very coarse

Punctation density (interval size in point diameter):

contiguous (0) – subcontiguous (0.25) – dense (0.3-0.7) – close (0.7-1.5) – sparse (2-3) – scattered (3-6)

The holotypes and paratypes of the new species described in this paper are deposited at ELKU.

Taxonomy

Hylaeus (Dentigera) kashmirensis (Nurse, 1903)

Prosopis kashmirensis Nurse, 1903: 534–535, ♀, ♂. Loc. Typ. India: Kashmir. Lectotype ♂ (Dathe 2010: 44), coll. BMNH.

Material examined. Nepal, Karnali Prov., Jumla Distr.: 1♂, Gothichaur, 29°14′55N 82°11′32E, 2620 m, 14.VI.1997; 2♂, Jumla, Talphi, 29°20′03N 82°22′34E, 3115 m, 15.VI.1997; 1♀, Lamri envir., 29°16′25N 82°16′23E, 2600 m, 21.VI.1997; 3♀, Jumla envir., 29°16′25N 82°11′32E, 2450 m, 22.VI.1997; 1♂, Jumla airport, 29°16′34N 82°16′23E, 23.VI.1997; 1♀, Jumla envir., 26.V.2007. – Humla Distr.: 1♂, Simikot ca. 10 km S., Karnali valley, 2000 m, 9.VII.2001; all FC leg.

Distribution

New to Nepal (Karnali Province).

Hylaeus (Dentigera) kumari Dathe & Ikudome sp. nov.

Figure 1 (A–G)

Diagnosis

Distinctive *Dentigera* species with strongly thickened, completely black pyriform scapes; underside of the metasoma flat, without callus. – The female is not known.

Description

Male. Total length 4.90 mm, wing length 3.25 mm.

Head outline rounded·trapezoidal, proportions HL:HW 0.97. Scapes expanded, pyriform, SL:SW 1.69; entirely black, with distinct dense punctation; flagella of medium length, black, brown below. Mask complete, ivory white, side patches expanded beyond upper margin of scapes bases, transversely truncated above, connected straight to orbits. Supraclypeal area with scattered shallow punctation, transition to the frons as a step. Clypeus surface finely shagreen, silky·shiny, with coarse shallow punctation. Foveae faciales short but distinct, close to the vertex. Frons and vertex smooth and shiny; scapus area with strong punctation as frons, upper frons and vertex with contiguous, strong punctation; vertex with sparse pilosity. Genae normal, longitudinally coarsely striate; occiput rounded; malae narrow. Labrum and bifid mandibles black.

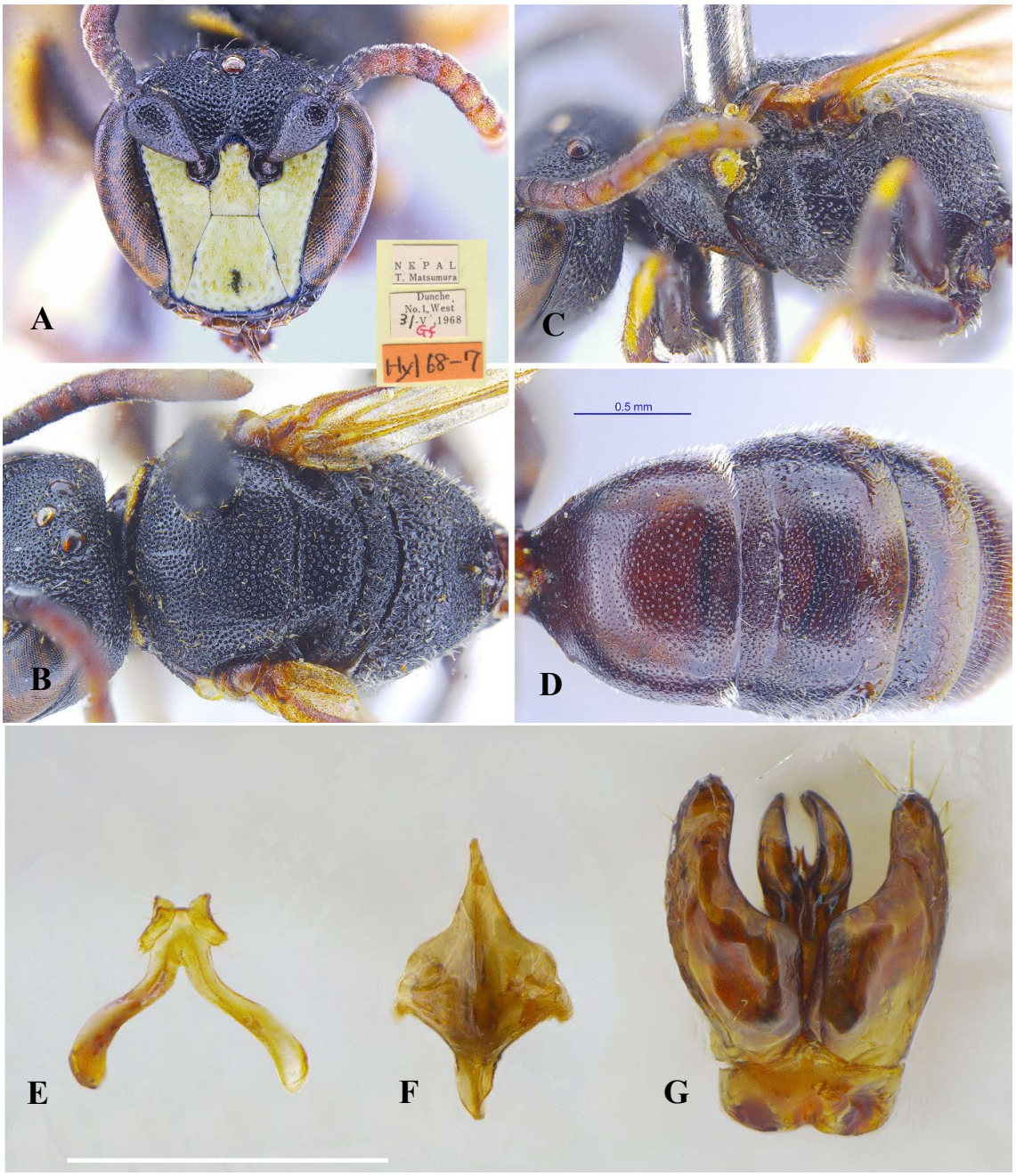

Figure 1. *Hylaeus (Dentigera) kumari* **sp. nov.** Holotype male: **A –** face, **B –** mesosoma dorsal, **C –** mesopleuron, **D –** metasoma dorsal, **E –** S7, **F –** S8, **G –** genital capsule. Scale bar 0.5 mm.

Mesosoma normal, compact; pilosity short, thorax and propodeum with scattered white hairs. Coloration black, pronotum laterally with two short yellow stripes, calli and tegulae black. Mesonotum and scutellum silky-shiny, with strong subcontiguous punctation; metanotum matt, with rugose punctation; mesopleura similar to mesonotum, but surface polished; anterior margin (omaulus) rounded. Legs black, base of tibiae yellow; wings hyaline, venation light brown. Propodeum short, rounded; medial area with coarse meshed surface, shiny; the remaining parts of the propodeum are more finely sculpted, but the transitions are not marked; terminal area matt, propodeal

furrow narrow and flat.

Metasoma narrow spindle-shaped, coloration black. Tl finely transverse shagreen, silky-shiny, punctation close, strong; with fine side fringes; T2 and following terga finely shagreen, with somewhat finer and denser punctation. Sternum 3 with only a slight transverse callosity. Terminalia (Fig. 1: E, F, G): genital capsule oval, with penis valves slightly curved with a narrow split in between; S8 apically elongated and gradually narrowing; S7 with long-elliptical, bent apical lobes, with few short, extremely fine bristles on the outer margin.

Type material

Holotype ♂ Nepal: Bagmati, Dhunche, 2000 m, 31.V.1968, TM leg. – coll. [ELKU].

Etymology

The epitheton of this new species is a name, which is translated "princess", but means in Nepal also the embodiment of a Hindu goddess.

Distribution

New to Nepal (Bagmati).

Hylaeus (Hylaeus) simikotalis Dathe, 2010

Hylaeus (Hylaeus) simikotalis Dathe, 2010: 48-50 (♂, ♀. Holotype: ♂, Nepal: Prov. Karnali, Distr. Humla: Simikot 14 km NW, Kermi Umgebung, 30°03'N 81°42'E, 2800 m, 19-–20.VI.2001, FC leg.)

Material examined. Nepal: 2♂, Dhaulagiri, Larjung, Palpa 2530 m, 7.V.1968, TK leg.; 5♂6♀, Dhaulagiri, Kagbeni-Jharkot, 2800-3500 m, 3.VIII.2004, TM leg.

Distribution

Nepal (Karnali, Dhaulagiri).

Hylaeus (Lambdopsis) karnaliensis Dathe, 2010

Hylaeus (Lambdopsis) karnaliensis Dathe, 2010: 58-59 (♂, ♀. Holotype: ♂, Nepal: Prov. Karnali, Distr. Jumla: Churta E Hochtal, 29°09'N 82°31'E, 3500–3800 m, 2.VI.2007, FC leg.)

Material examined. Nepal: 1♀, Sagarmatha, Namche, Bazaar, 3500–3600 m, 7.VII.1968, TM leg.; 1♀, Karnali, Gothichaur, 29°11'54N 82°18'36E, 6.VI.2007, FC leg.; 1♀, Karnali, Simikot, 20 km NW, 29°58'49N 81°38'23E, 28.VII.2001, FC leg.

Distribution

Nepal (Karnali, Sagarmatha).

Hylaeus (Nesohylaeus) takeshii Dathe & Ikudome sp. nov.

Figures 2 (A – G) & 3 (A – D)

Diagnosis

Dainty mountain species (1450–2500 m); male easily recognizable by its black face with white clypeus (subgenus *Nesohylaeus);* in the area habitually similar to *H. churtalis* and *H. nepalensis,* but clearly distinguished in both

sexes by details in the formation of the face, propodeum and in male terminalia.

Description

Male. Total length 4.80 mm, wing length 3.85 mm.

Head proportions HL:HW 0.96, outline transverse elliptic, face down strongly converging. Scapes black, slim, not expanded, about as wide as the flagella, SL:SW 2.21; flagella long, completely black. Mask white, with tiny side marks at the clypeus base. Paraocular areas glossy, without striking smooth surfaces on top, but there with

Figure 2. *Hylaeus (Nesohylaeus) takeshii* **sp. nov.** Holotype male: **A –** face, **B –** mesosoma dorsal, **C –** mesopleuron, **D –** metasoma dorsal, **E –** S7, **F –** S8, **G –** genital capsule. Scale bar 0.5 mm.

Figure 3. *Hylaeus (Nesohylaeus) takeshii* **sp. nov.** Paratype female: **A –** face, **B –** mesosoma dorsal, **C –** mesopleuron, **D –** metasoma dorsal. Scale bar 0.5 mm.

oblique furrows. Foveae faciales short, indistinct. Clypeus silky shining, finely shagreen with moderate punctation, middle pointless; anterior margin black. Supraclypeal area in the upper part raised, rhombic, lateral margins bent up. Frons and vertex smooth and shiny, with punctation strong and dense. Genae dilated, longitudinal stripes with fading coarse punctation; occiput rounded, malae normal. Labrum with semicircular callosity, mandibles completely black.

Mesosoma depress, prolonged; pilosity white, erect, especially ventrally, next to the metanotum and at posterior margins of pronotum and mesonotum. Pronotum and calli black; tegulae and wing sclerit brown. Mesonotum and scutellum finely shagreen, shiny, punctation strong, sparse; mesopleura as mesonotum, omaulus rounded. Legs completely black, except a brown stripe at foretibiae in front; wings hyaline, venation pale brown. Propodeum few edged, glossy; medial area clearly expanded, limited by a row of large shiny meshes, without a carina, area with rough wrinkled network; terminal area only at the bottom with sharp edges, surface somewhat finer sculpted, with markably deep shiny central furrow.

Metasoma outline elender spindle-shaped; black. T1 smooth and shiny, punctation fine, scattered, following terga similarly sculpted. T1 without lateral fringes or ciliary bands on the depressions. Terminalia (Fig. 2: E, F, G) corresponding to the basic pattern of the subgenus: genital capsule compact, distally converging; S8 with a two-part apical lobus with few short, fine bristles, S7 apical lobes on each side with about twelve flat hooked lamellae.

Female. Total length 5.20 mm, wing length 4.10 mm.

Head proportions HL:HW 0.96, outline transverse elliptic. Scapes black; flagellum short, entirely black. Face

with two tiny white flecks at the clypeal margin. Foveae faciales short but distinct. Clypeus finely shagreen, silky shining, with sparse shallow punctation. Supraclypeal area as in the male, upper lateral edges less bent up. Frons with punctation somewhat less dense and strong than in the male. Genae, occiput and malae normal. Labrum and mandibles black.

Mesosoma expanded, depress; with sparse erect white pilosity, preferably on the bottom. All black, except horn brown tegulae and wing sclerits. Mesonotum, scutellum and mesopleura with fine shagreen, silky shining, with strong close punctation, omaulus rounded. Legs black, only tibiae apically with yellow patch; wings hyaline, venation brown. Propodeum long, medial area delimited by a row of large meshes, the middle range with finer, contiguous meshes; terminal area shagreen, with subcontiguous punctation, propodeal furrow deep, smooth.

Metasoma spindle-shaped; black. Tl smooth and shining, punctation fine, scattered, following terga closer punctate. Tl without lateral fringes, end fringe pale.

Type material

Holotype ♂ Nepal: Janakpur, Laptsa, 2500 m, 15.VII.1968, TM leg.; Paratype ♀ Nepal: Bagmati, Godavari, Napal valley, 1450 m, 18.IV.1968, TM leg. - coll. [ELKU].

Etymology

The specific name, *takeshii*, is named after Dr. Takeshi Matsumura of NIAES as collector of the new species.

Distribution

New to Nepal (Janakpur, Bagmati).

Hylaeus (Nesohylaeus) nepalensis Dathe, 2010

Hylaeus (Hylaeus) nepalensis Dathe, 2010: 47–48 (♂, ♀. Holotype: ♀, Nepal: Prov. Karnali, Distr. Humla: Simikot 14 km NW, Kemi environment, 30°03'N 81°42'E, 2800 m, 19–20.VI.2001, leg. FC, coll. SDEI.)

Material examined. Nepal: 1♀, Dhaulagiri, Ghorepani, 2700 m, 2.V.1968, TM leg.; 2♀, idem, 11.V.1968, TM leg; 1♂, Dhaulagiri, Marpha, Palpa, 2700 m, 7.V.1968, TM leg.; l♂, Dhaulagiri, Thini, Mustang 2800 m, 7.VIII.2004, TM leg.

Distribution

Nepal (Karnali, Dhaulagiri).

Hylaeus (Nesoprosopis) floralis (Smith, 1873)

Prosopis floralis Smith, 1873: 199 (♂, ♀. Holotype: ♀, Japan: Honshu, Hyôgo Prefecture.)
Hylaeus (Nesoprosopis) floralis: Ikudome, 1989: 205; Proshchalykin 2003: 5; 2004: 3; 2007: 883; Chen & Xu 2009: 49; Proshchalykin & Dathe 2012: 20.

Material examined. Nepal: l♂, Bagmati, Kalimati, Kathmandu, 1300 m, 1.IV.2003, TM leg.; 4♂, idem, 18.X.2004, on the flower of Marigold, TM leg.

Distribution

Japan (Hokkaido, Honshu, Sadogashima, Shikoku, Kyushu), China (Anhui, Jiangsu, Zhejiang, Jiangxi, Fujian, Guangdong, Guangxi, Yunnan, Sichuan), Asian part of Russia (Sakhalin), Vietnam (Quang Binh), new to

Nepal (Bagmati).

Hylaeus (Nesoprosopis) transversalis Cockerell, 1924

Hylaeus transversalis Cockerell, 1924: 275. (♂. Holotype: Russia, Okeanskaya, Siberia [Vladivostok, Primorskiy Terr.]) – Proshchalykin & Dathe 2012: 23; Proshchalykin 2015: 7.

Prosopis transversalis Gussakovskij, 1932: 65. (♂. Holotype: Russia, Vladivostok, Sedanka [Primorskiy Terr.]). Synonymised by Proshchalykin & Dathe 2012: 23. – Osytshnjuk & Romankova 1995: 487; Proshchalykin 2003: 4.

Prosopis sericata Warncke, 1972: 748 (nomen novum for *Prosopis transversalis* Gussakovskij, 1932, nec Cockerell, 1924.) Synonymized by Proshchalykin & Dathe 2012: 23.

Hylaeus nippon Hirashima, 1977: 29–32. (♂, ♀. Holotype: ♀, Sumo, Tsushima, Japan.) Synonymized by Osytshnjuk & Romankova 1995: 486.

Hylaeus sericatus Quest, 2009: 133; Proshchalykin & Quest, 2009: 239.

Hylaeus (Nesoprosopis) dathei Chen & Xu, 2012: 63–64, 68. (♂. Holotype: Jirisan, South Korea.) Synonymized by Dathe, 2015: 234.

Material examined. Nepal: 1♂, Bagmati, Kalimati, Kathmandu, 1300 m, 1.IV.2003, TM leg.; 1♀, idem, 14.VIII.2004, TM leg.; 2♀, idem, 18.X.2004, on the flower of Marigold, TM leg.

Distribution

Japan (Hokkaido, Honshu, Sadogashima, Shikoku, Kyushu, Tsushima, Yakushima), Asian part of Russia (Primorskiy Terr., Kunashiri), South Korea (Gangwondo, Jirisan), China (Beijing, Henan), new to Nepal (Bagmati).

Discussion

The following *Hylaeus* species have been identified previously in the high mountain fauna of Nepal:

Hylaeus (*Hylaeus*) *churtalis* Dathe, 2010
Hylaeus (*Hylaeus*) *deviatus* Dathe, 2010
Hylaeus (*Hylaeus*) *persulcatus* Dathe, 2010
Hylaeus (*Hylaeus*) *simikotalis* Dathe, 2010*
Hylaeus (*Nesohylaeus*) *nepalensis* Dathe, 2010*
Hylaeus (*Lambdopsis*) *karnaliensis* Dathe, 2010
Hylaeus (*Patagiata*) *creutzburgi* Dathe, 2010

The species marked with * were found again in the present study, and the following species could be added:

Hylaeus (*Dentigera*) *kashmirensis* (Nurse, 1903)
Hylaeus (*Dentigera*) *kumari* Dathe & Ikudome **sp. n.**
Hylaeus (*Nesohylaeus*) *takeshii* Dathe & Ikudome **sp. n.**
Hylaeus (*Nesoprosopis*) *floralis* (Smith, 1873)
Hylaeus (*Nesoprosopis*) *transversalis* Cockerell, 1924

Nurse (1903) had described another three species from the western neighbouring region of Kashmir, *Hylaeus* (*Hylaeus*) *advocatus* (Nurse, 1903), *H.* (*Hylaeus*) *secretus* (Nurse, 1903) and *H.* (*Dentigera*) *vetustus* (Nurse,

1903), so that now 12 species in six subgenera have been identified from Nepal, and 15 species from the high Himalayas.

Remarkable is the occurrence of two species with new localities in the Himalayas, which are widely distributed in East Asia: *H.* (*Nesoprosopis*) *floralis* and *H.* (*Nesoprosopis*) *transversalis*.

The existence of a special group of forms, for which Ikudome (1989) established the subgenus *Nesohylaeus*, is confirmed here again. He separated *Hylaeus niger* Bridwell, 1919 (type species) from the nominal subgenus *Hylaeus*. Although Michener (2000) did not adopt this concept, Dathe then described three other species of the group, *Hylaeus sinensis* from Yunnan, China (2005), *Hylaeus churtalis* and *Hylaeus nepalensis* from Nepal (2010), and resurrected *Nesohylaeus* as a valid subgenus (2012). This is confirmed once again with the new species *Hylaeus takeshii* **sp. nov.** With it, five species of the subgenus *Nesohylaeus* from Asia are currently known. These species have mostly been found so far at higher altitudes in the high mountain regions of Japan, the Asian part of Russia, China and Nepal, with the exception of a single species (Maeta & Ikudome, 2009), which inhabits Iriomote Island of the Ryukyu Islands near Taiwan. This species, the genus type species *Hylaeus niger*, described from Japan, Chiuzenji, Tochigi Pref., from 4000–5000 ft (1200–1500 m), is at this place subtropical. The range of the species is remarkable and should be investigated further.

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