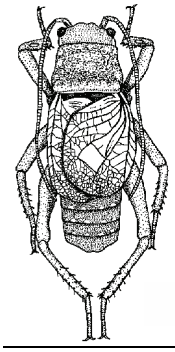

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TWO NEW SPECIES OF *HEDYCHRUM* LATREILLE (HYMENOPTERA: CHRYSIDIDAE) FROM INDIA AND NEPAL WITH REVIEW OF THE GENUS DISTRIBUTION IN ASIA

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Summary. Two new species *Hedychrum crassitarse* **sp. n.** (India: Tamil Nadu) and *H. migliaccioi* **sp. n.** (Nepal: Janakpur) are described and illustrated. New distributional records for the genus *Hedychrum* in Asia are given.

Key words: cuckoo-wasp, Elampini, new species, new records, Palaearctic, Oriental region.

П. Роза. Два новых вида *Hedychrum* Latreille (Hymenoptera: Chrysididae) из Индии и Непала с обзором распространения рода в Азии // Дальневосточный энтомолог. 2019. N 385. С. 1-11.

Резюме. Описаны и проиллюстрированы два новых для науки вида: *Hedychrum crassitarse* **sp. n.** (Индия: Тамил Наду) и *H. migliaccioi* **sp. n.** (Непал: Джанакпур). Приведены новые данные о распространении рода *Hedychrum* в Азии.

INTRODUCTION

The genus *Hedychrum* Latreille, 1802 includes about 130 species with conservative habitus and morphological features (Kimsey & Bohart, 1991; Rosa, 2019). Most members of this genus are characterized by large and robust habitus; scapal

basin deeply concave, with transverse cross-ridges; metanotum usually rounded, rarely mucronate; mesopleuron rounded, with indistinct omaulus and short scrobal sulcus; mid- and hind tibial pits; enlarged hind femur, sexually dimorphic, with anterior surface reticulate and non-metallic brown in males, and shiny metallic in females; tarsal claws apically bifid, because of a subsidiary inner tooth, subparallel to apex; fore wing medial vein slightly curved, stigma apically acute; third metasomal tergum with lateral tooth, apically swollen and only rarely with median notch or teeth; third metasomal sternum apico-medially more or less modified in females.

Hedychrum species have been revised for Europe (Linsenmaier, 1959), North America (French in Bohart & Kimsey, 1982) and southern Africa (Edney, 1940). The Asian species, both from the Palaearctic (about 30 species) and the Oriental region (about 10 species) are still in need of revision. Most Oriental species and a few Palaearctic ones (e.g. *H. simile* Mocsáry, 1889), are more or less uniformly blue to green, as in the majority of Nearctic, Neotropical and Afrotropical species. Palaearctic species are usually bicoloured, with blue or green head and mesosoma, and red metasoma, and sexually non-dimorphic. However, exceptions are known. Some species have females with red pronotum (*H. aureicolle* Mocsáry, 1889) or also mesoscutum (e.g. *H. nobile* (Scopoli, 1763)), or have wholly blue males and largely red females (e.g. *H. chalybaeum* Dahlbom, 1854). Other non-dimorphic species may be red to coppery (e.g. *H. cirtanum* Gribodo, 1874), or with head and mesosoma varying from green and blue to red-coppery and greenish (*H. rutilans* Dahlbom, 1854). Species with non-metallic metasoma (e.g. *H. zenobia* Rosa, 2019), as in the *H. roseum* species group, are also known.

The two new species here described are easily recognizable, because show some unique features. The holotypes of the newly described species, formerly in the author's private collection, are deposited in Museo di Storia Naturale, Milan, Italy (MSNM), other material in NaturMuseum Luzern, Switzerland (NMLS). Morphological terminology follows Kimsey & Bohart (1991), methods and abbreviations used in the descriptions see Rosa (2018).

TAXONOMY

Tribe Elampini

Genus *Hedychrum* Latreille, 1802

Hedychrum Latreille, 1802: 317. Type species: *Chrysis lucidula* Fabricius, 1775 (= *Sphex nobilis* Scopoli, 1763), by monotypy.

***Hedychrum crassitarse* Rosa, sp. n.**

http://zoobank.org/NomenclaturalActs/F4D9EE74-2282-4703-9700-B6085264B533

Figs 1–7

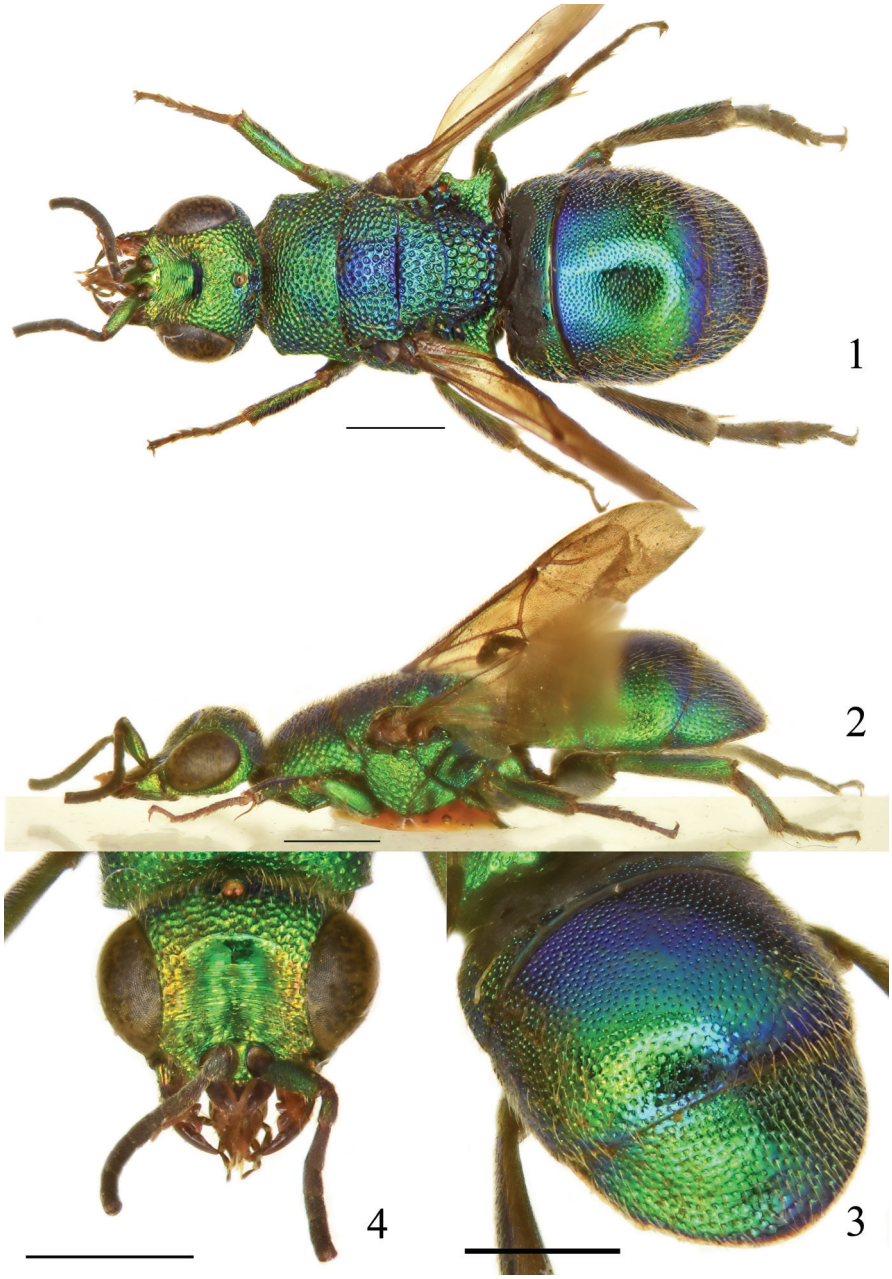
TYPE MATERIAL. Holotype – ♀, **India**: Tamil Nadu, Kumili, VI.1986, leg. T. Nathan [MSNM].

DIAGNOSIS. *Hedychrum crassitarse* **sp. n.** is easily recognizable among *Hedychrum* species by extremely broad and stocky hind tarsomeres (Figs 6–7). Although tarsomeres of *Hedychrum* species are somewhat enlarged, when compared to other Elampini (Kimsey & Bohart, 1991), none shows so highly modified tarsomeres as this species. *Hedychrum crassipes* Bischoff, 1910 from South Africa (type examined in MNHU), according to its name ("with enlarged feet"), has exceedingly enlarged hind femora, yet tarsi are unmodified. Other diagnostic features *H. crassitarse* **sp. n.** are: the extremely short, narrow clypeus; long, white metasomal setae; second metasomal sternum with large median green spot; third sternum with small green spot apico-medially and unmodified apico-median margin. It is unknown how many of these features are also to be found in the male.

DESCRIPTION. *Female* (Figs 1–7). Body length 6.5 mm, forewing 3.6 mm.

Head. Face in frontal view (Fig. 3) length 1.2 mm, width 1.7 mm. Clypeus shortened, reduced to a small area around toruli; subantennal distance very short, about 0.1 MOD. Scapal basin transversely and finely striated medially; upper scapal basin impunctate and polished. Brow and face between compound eye and scapal basin with deep, subcontiguous, medium-sized punctures (around 0.5 MOD), smaller around midocellus and ocellar area, with two impunctate areas laterally to ocelli; genae very thin, 0.1 MOD in the narrower point beneath compound eye; genal carina hardly visible; malar space short, 0.2 MOD; mandible large and elongate, ending in a curved tooth, with two sub-basal lobes on inner side. Ocellar triangle isosceles, the sides much shorter than the base; postocellar line indistinct. Relative lengths of P:F1:F2:F3:F4 = 1.0:1.1:0.9:08:0.8; F5 and following slightly subsquare; both antennae of type broken, the last 3 flagellomeres of the right and the last 6 of the left missing. Head with sparse, short (1.0 MOD), and erect white hairs, covering the face laterally.

Mesosoma: length 2.5 mm; width (PPW) 1.9 mm. Pronotum elongate (0.7 mm), 1.3 times as long as metanotum; pronotum with deep, even, and small punctures (0.3 MOD), with narrow interstices, 0.1–1.0 PD apart; very tiny and shallow dots on interstices; larger punctures somehow transversely aligned and subcontiguous. Mesoscutum with large punctures (0.5 MOD); on lateral lobes of mesoscutum smaller and denser; notauli hardly visible anteriorly, as thin lines; parapsidal lines almost complete; mesoscutellum with rounded and smaller punctures anteriorly, compared to those on median lobe of mesoscutum, and larger posteriorly with tiny and shallow dots on interstices; metanotum sub-trapezoidal with large (0.8 MOD) foveate-reticulate punctures; mesopleuron with antero-ventral margin curved, with medium-sized punctures close to wing fossa and larger on ventral margin (Fig. 2); propodeal angles triangular, outwards directed. Mid tibial pit deep and broadly oval, somehow like the mid tibia of *H. niemelai* Linsenmaier, 1959 male; hind tibial pit deep, small and elliptical (Fig. 7); hind tarsi 1–4 enlarged, at least three times larger than usual tarsal width (Figs 6–7). Wing venation unmodified, with fore wing medial vein slightly curved and radial sector stub a little longer than stigma; wings brownish. Setae short, light brown.



Figs 1–4. *Hedychrum crassitarse* **sp. n.**, female holotype. 1 – habitus, dorsal view; 2 – habitus, lateral view; 3 – head, frontal view; 4 – metasoma, postero-lateral view.

Metasoma: length 2.6 mm. First tergum with small, dense punctures, with narrow interstices (0.1–1.0 PD), and with a narrow, polished strip along posterior margin; second tergum with small, even and dense punctures anteriorly, becoming scattered posteriorly; punctation on third metasomal tergum similar to that of the second one posteriorly. Lateral margin of the third tergum with small lateral tooth (Fig. 2). First metasomal sternum almost impunctate; second sternum densely and minutely punctate, anteromedially polished; third sternum with dense and tiny punctures. Third sternum apico-medially simple, without tooth or projection. Metasomal terga overall with long (1.5–2.0 MOD), brownish hairs.

Figs 5–7. *Hedychrum crassitarse* **sp. n.**, female holotype. 5 – metasoma, ventral view; 6 – hind leg, anterior view; 7 – hind leg, posterior view.

Colour. Green, blue on: ocellar area, two rounded patches on pronotum, median lobe of mesoscutum, along metanotal margins, anterior and posterior margins of second metasomal tergum. Metasoma ventrally black, with postero-median green spot on second sternum and small median green spot on third one. Scape and pedicel green, flagellum black. Mandible brown, darker at apex, latero-basally metallic green. Legs with metallic green femora and tibiae, except for reddish brown distal end of both, dark brown on inner side of hind leg; fore tarsi reddish brown, mid and hind tarsi dark brown. Tegulae brown.

Male. Unknown.

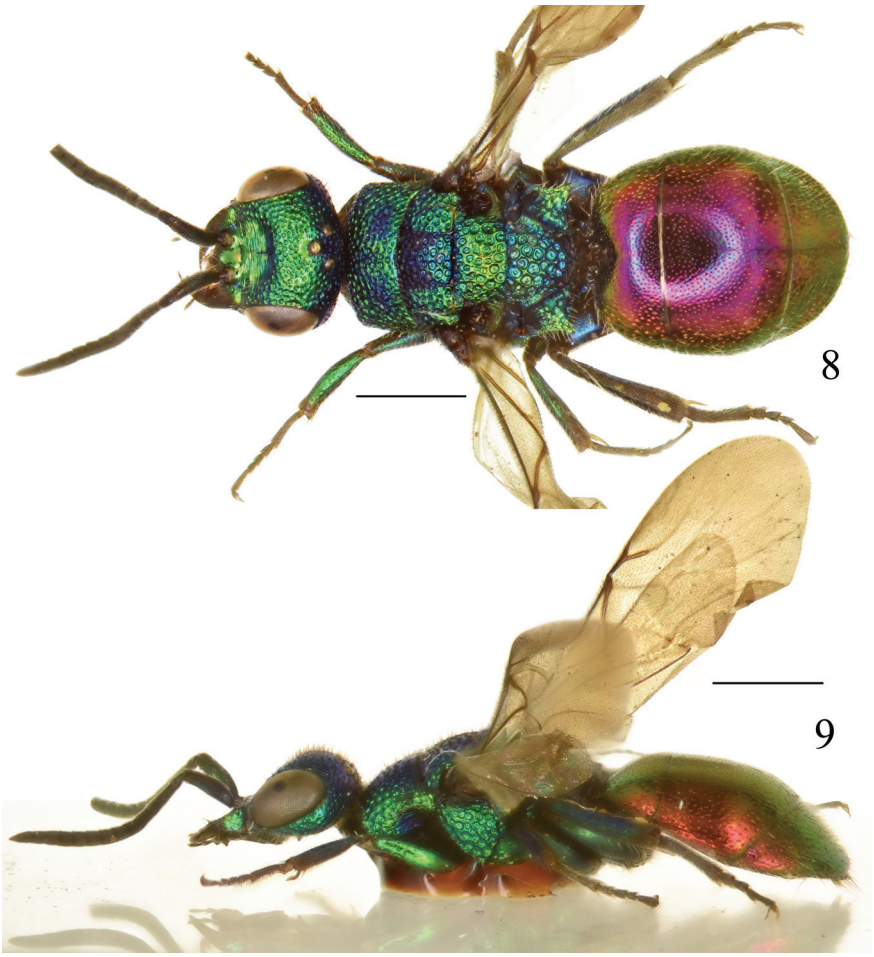
ETYMOLOGY. The specific epithet *crassitarse* (adjective) derives from the Latin adjective *crassus* (= broad) and the name *tarsus*; it refers to the broad, modified tarsomeres.

***Hedychrum migliaccioi* Rosa, sp. n.**

http://zoobank.org/NomenclaturalActs/4650C2A4-9E8B-4986-BE62-75A759DCCC21

Figs 8–12

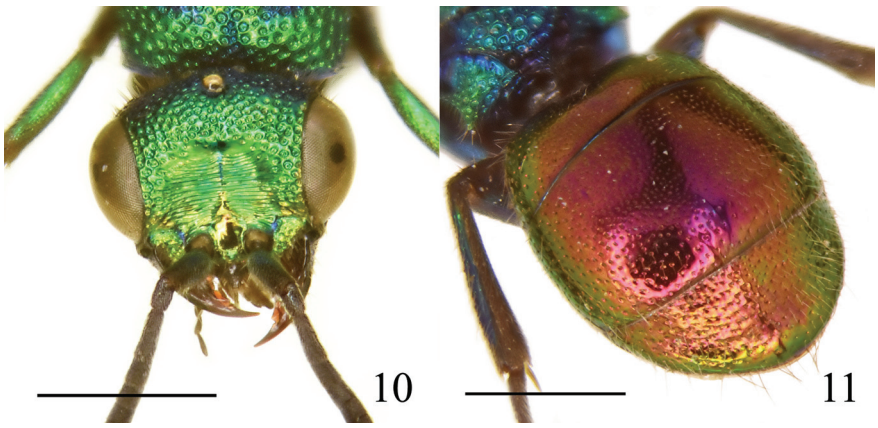
TYPE MATERIAL. Holotype – ♀, **Nepal**: Janakpur Zone, Jiri, 1850 m, 20.V 1980, leg. E. Migliaccio [MSNM].



Figs 8–9. *Hedychrum migliaccioi* **sp. n.**, female holotype. 8 – habitus, dorsal view; 9 – habitus, lateral view.

DIAGNOSIS. *Hedychrum migliaccioi* **sp. n.** is recognizable among other Asian *Hedychrum* species mainly for the following combination of metasomal features: the metasomal punctation is minute, scattered and shallow; in dorsal view, the shape of metasoma is distinctly ovoidal; in lateral view, it is flattened, as in other alpine cuckoo wasps; in posterior view, the apical margin of the third tergum bears long brownish setae; in ventral view, the third sternum has a large, rounded, apico-medial projection. A similar ovoidal morphology of metasoma is found in the Oriental species *H. striatum* Mocsáry, 1911, yet the latter is easily recognisable by: body colouration entirely blue; pronotum distinctly elongate, subcylindrical; ocelli closer each other; denser metasoma punctation, with large punctures at sides. The wing length is also diagnostic, being almost 0.7 times as long as body length. Moreover, the female of

H. migliaccioi **sp. n.** can be separated from other bicoloured Palaearctic females by the combination of the following characters: third metasomal sternum with a large, rounded apicomedial tooth; dark brown, thick and long setae on the apical margin of the third tergum and on third sternum (2.0–2.5 MOD); hind tibial pit deep, small and elliptical; ovoidal metasoma. Apparently the closer species is the Chinese *H. gracile* Semenov, 1967, whose metasomal punctation is laterally denser and coarser to subcontiguous and the pronotum is more elongate (see pictures of the type in Rosa *et al*., 2017a).



Figs 10–11. *Hedychrum migliaccioi* **sp. n.**, female holotype. 10 – head, frontal view; 11 – metasoma, postero-lateral view.

DESCRIPTION. *Female* (Figs 8–13). Body length 5.9 mm, forewing 3.9 mm.

Head. Face in full view (Fig. 10), length 1.1 mm, width 1.5 mm. Clypeus apically dark brown, straight; subantennal distance about 1.0 MOD. Scapal basin medially transversely striate; upper scapal basin impunctate and polished. Brow and face between compound eye and scapal basin with small to medium-sized punctures (0.3–0.5 MOD), smaller and scattered on vertex, around ocellar area, and occiput; genae very thin, 0.1 MOD in the narrower point beneath compound eye; genal carina indistinct; malar space short, 0.2 MOD; mandible falcate and pointed. Ocellar triangle isosceles, the sides much shorter than the base; postocellar line indistinct. Relative lengths of P:F1:F2:F3:F4 = 1.0:1.6:0.9:0.7:0.7; F3 and following subsquare, the last flagellomere elongate. Brow and vertex with thick, erect, and short (1.0 MOD) brown hairs.

Mesosoma: length 2.2 mm; width (PPW) 1.3 mm. Pronotum with deep and irregular, small to medium sized punctures (up to 0.5 MOD), with narrow to large interstices, 0.1–1.0 PD apart; very tiny and shallow dots on interstices. Mesoscutum with larger punctures (0.7 MOD) concentrated postero-medially between notauli; on lateral lobes of mesoscutum smaller; notauli visible as thin lines; parapsidal lines almost complete; mesoscutellum with rounded punctures (0.7 MOD) along margins,

with small and shallow punctures on interstices; metanotum subtrapezoidal with large (1.0 MOD) foveate-reticulate punctures; mesopleuron with antero-ventral margin slightly curved, with medium-sized punctures close to wing fossa and larger on ventral margin (Fig. 9); propodeal angles small and triangular, outwards directed. Mid tibial pit deep almost indistinct, very small and oval, smaller than 1.0 MOD; hind tibial pit deep, small, and elliptical, similar to Fig. 7. Wing venation unmodified, with fore wing medial vein almost straight and radial sector stub as long as 0.5 times the stigma; wings brow. Setae throughout short (1.0 MOD) and brown, slightly erected.

Metasoma: length 2.3 mm. First tergum with small and sparse punctures medially, and with larger, deeper and scattered punctures laterally, 1–3 PD apart; second tergum with small, even and dense punctures anteriorly, becoming larger and scattered posteriorly. Punctation on third tergum similar, denser, with smaller punctures, and rugose interstices. Lateral margin of the third tergum almost continuous, with small lateral tooth (Fig. 9). First metasomal sternum almost impunctate; second sternum minutely punctate, with scattered punctures; third sternum with dense and tiny punctures bearing brown, long setae; apico-medially with a large, rounded projection, somehow similar to the one of *H. nobile* (Scopoli, 1763), yet apically rounded. Metasomal terga overall with short (1.0 MOD), whitish hairs, on the apical margin of the third tergum and on third sternum with very long (2.0–2.5 MOD), thick and dark brown setae.

Colour. Head and mesosoma green, with blue colour on ocellar area, occiput, two rounded patches on pronotum, median lobe of mesoscutum anteriorly; metasoma red to purple dorsally, fully black ventrally. Scape and pedicel matt black; scape with weak green reflections; flagellum black. Mandible dark brown, green metallic baso-laterally. Legs with metallic femora and tibiae, both brownish at distal end; tarsi dark brown. Tegulae dark brown.

Male. Unknown.

ETYMOLOGY. The species is named after Enrico Migliaccio (Rome, Italy), who friendly donated the specimen to my father, Vittorio Rosa.

DISTRIBUTION OF *HEDYCHRUM* IN ASIA

Asian *Hedychrum* are poorly known. In India only four species have been recorded so far: *H. flammulatum* Smith, 1858, *H. lugubre* Cameron, 1897, *H. timidum* Dahlbom, 1854 (du Buysson, 1896; Bingham, 1903) and *H. gracilentum* Mocsáry, 1911. In Pakistan only two species are known: *H. linsenmaieri* Rosa, 2019 (*H. timidum* sensu Bingham (1903) and du Buysson (1904)), and *H. lama* du Buysson, 1891 (Nurse, 1904), whereas any species was recorded for Nepal. Kimsey and Bohart (1991) listed nine species for the Oriental region: *H. flammulatum* Smith, 1858, *H. formosanum* Mocsáry, 1911, *H. lugubre* Cameron, 1897, *H. philippinum* Mocsáry, 1913, *H. stantoni* Ashmead, 1904, *H. striatum* Mocsáry, 1911, *H. taiwanense* Tsuneki, 1970, *H. takasago* Tsuneki, 1970, and *H. timidum* Dahlbom, 1854.

More recently, Rosa *et al.* (2014) listed twelve species for the Palaearctic part of China (*H. chalybaeum* Dahlbom, 1854, *H. davidi* du Buysson, 1900, *H. gerstaeckeri* Chevrier, 1869, *H. gracile* Semenov, 1967, *H. japonicum* Cameron, 1887, *H. latitudum* Linsenmaier, 1959, *H. longicolle* Abeille de Perrin, 1877, *H. manchurianum* Tsuneki, 1950, *H. niemelai* Linsenmaier, 1959, *H. nobile* (Scopoli, 1763), *H. simile* Mocsáry, 1889, *H. sinicum* Semenov, 1967) and only three for the Oriental part (*H. formosanum*, *H. taiwanense*, *H. takasago*).

The scarcity of known species from the Oriental region is related to limited and incomplete collecting as well as to distributional and ecological reasons; in fact *Hedychrum* are more abundant in temperate, xerothermic and semi-desert regions than in tropical and subtropical regions, reflecting the great quantity of their hosts (Hymenoptera Crabronidae) in these areas (Rosa *et al*., 2016).

For Palaearctic Asia, five species were listed by Ha *et al.* (2008) for Korea, all already known for China excluding *H. japonicum* Cameron and *H. okai* Tsuneki, 1954. Seven species were listed for Siberia (Rosa *et al.* 2017c) and six for Russian Far East (Rosa *et al*., 2017b), all already known for China but *H. virens* Dahlbom, 1854 (identification of the latter is however in need or confirmation), *H. rutilans ermak* Semenov, 1967 (Siberia) and *H. viridilineolatum* Kilimnik, 1993 (Primorski Terr.).

The Central Asian fauna is better known, thanks to the works of Mocsáry (1889, 1909), Semenov (1967) and Semenov & Nikol'skaya (1954). Twenty species have been here recorded: *H. alexii* Semenov, 1967, *H. cholodkovskii* Semenov, 1967, *H. concinnum* (Mocsáry, 1909), *H. cribratum* Mocsáry, 1909, *H. cribricolle* Semenov, 1967, *H. frivaldszkyi* Mocsáry, 1889, *H. gerstaeckeri* Chevrier, 1869, *H. jakobsoni* Semenov, 1954, *H. kozhantshikovi* Semenov, 1954, *H. longicolle* Abeille de Perrin, 1877, *H. niemelai* Linsenmaier, 1959 (Almaty, Kazakhstan, first record for Central Asia [NMLS]), *H. nobile* (Scopoli, 1763) (Almaty, first record for Kazakhstan [NMLS]), *H. phoebus* Semenov, 1967, *H. punctigerum* Mocsáry, 1909, *H. rutilans* Dahlbom, 1854, *H. sapphirinum* Semenov, 1954, *H. semicyaneum* Mocsáry, 1889 (Baygakum, first record for Kazakhstan [NMLS]), *H. severtzovi* Semenov, 1967, *H. simile* Mocsáry, 1889, *H. virens* Dahlbom, 1854.

The number of currently known Asian species is no doubt underestimated. Examination of specimens deposited in some of the largest museum collections (Guangzhou, Luzern, St. Petersburg) shows that several undescribed species are still waiting for description as well as a generic revision. Linsenmaier (NMLS) labelled some Oriental specimens Indonesia, Malaysia and Myanmar as types yet their descriptions were never published, and several other species from India, Malaysia and Nepal are still unidentified and considered as possibly undescribed. None of these species is matching the two new ones described in the present paper.

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