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Colletes kinabalu n. sp., first record of the genus for the Malay Archipelago and Southeast Asia (Hymenoptera: Anthophila: Colletidae)

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Abstract. A new species from Mt. Kinabalu, Borneo (Malaysia), ***Colletes kinabalu*** Kuhlmann, new species, is described and illustrated. This is the first record of a species of *Colletes* from Southeast Asia and its biogeographical implications are discussed.

INTRODUCTION

The bee genus *Colletes* Latreille (1802) is characterized by the outwardly arcuate posterior part of the second recurrent vein, the bilobate glossa, and by the base of the propodeum that has a short subhorizontal to vertical basal zone, usually limited posteriorly by a carina or sharp change in slope or sculpture, and divided by a longitudinal carina (Michener, 1989, 2007). *Colletes* currently includes about 500 described species with an estimated total of more than 700 species worldwide (Kuhlmann, unpubl. data) from all continents except Antarctica, Australia, and Madagascar (Michener, 2007). About 220 species have been described from the Palearctic region (Kuhlmann, unpubl. data) with their center of diversity in Central Asia (Kuhlmann, 2005, 2006).

For the Oriental zoogeographical region *Colletes* was first recorded in 2003 while previously it was only known from its western and northern margins that form a broad transitional zone with the Palearctic region (Kuhlmann, 2003). At present only six species of *Colletes* are known from the entire region but none of them from Southeast Asia and the Malay Archipelago (Noskiewicz, 1936; Kuhlmann, 2003, 2010; Dubitzky & Kuhlmann, 2004): *Colletes brumalis* Noskiewicz (southern China), *C. dudgeonii* Bingham (western and northern India), *C. gandhi* Kuhlmann (southern India), *C. indicus* Kuhlmann (southern India), *C. taiwanensis* Dubitzky & Kuhlmann (Taiwan), and *C.*

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westghats Kuhlmann (western India). Thus, the record of a species of *Colletes* from Mt. Kinabalu, Borneo, came as a surprise, raising questions about the origin of the species and its closest relatives.

Mount Kinabalu (4095 m) is the highest mountain between the Himalayas and New Guinea, and known for the isolated occurrence of species of Himalayan or north temperate origin (Holloway 1970, 1996). Because of its biogeographical significance and the morphological distinctiveness the species of *Colletes* is described here based on the single known male.

MATERIAL AND METHODS

A single male specimen of the new species was available for study and is housed in the Academy of Natural Sciences, Philadelphia, USA (ANSP). Terminology for the description of species is based on Michener (2007) for general morphology. Puncture density is expressed as the relationship between puncture diameter (d) and the space between them (i), such as i = 1.5d or i < d. The following abbreviations were used for morphological structures: T—metasomal tergum, S—metasomal sternum. Body length was measured from the vertex to the apex of the body. The definition of species groups in *Colletes* follows Kuhlmann *et al*. (2009).

SYSTEMATICS

Genus *Colletes* Latreille, 1802

Colletes kinabalu Kuhlmann, new species

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(Figs. 1–2)

DIAGNOSIS: *Colletes kinabalu* belongs to the widespread Palearctic *C. cunicularius* species-group that comprises *C. cunicularius* (Linnaeus), *C. armeniacus* (Friese), and *C. caskanus* (Strand). The males of this group are characterized by their large body size (> 1 cm), malar area at least half as long as width of mandibular base, broad facial fovea, metasomal terga densely covered with light brown long erect hairs, lack of white apical tergal hair bands, and trilobate S7. *Colletes kinabalu* differs from the other species of the group by its smaller size, the dark brown to blackish pilosity on the dorsal side of the body (Fig. 1a) (yellowish to reddish-brown in the other species), apical sternal hair fringes generally short and slightly longer medially (Fig. 2e) (much longer in the other species), the unusually long gonostylus (Fig. 2a), and the characteristic shape of S7 (Fig. 2c–d) [for shape of S7 in related species see Noskiewicz (1936) and Stephen (1954)]. The female of *C. kinabalu* is unknown.

DESCRIPTION: ♂: Body length 11.0 mm. Head slightly wider than long (width:length 1.04). Integument black except part of mandible, clypeus, and malar area partly dark reddish-brown. Face except clypeus densely covered with long, dark brown, erect hairs. Lower face laterally densely covered with short whitish-grey hairs (Fig. 1b–c). Malar area medially about 1.2 times as long as width of mandible base, finely punctured (Fig. 1c). Facial fovea broad, about twice as broad as width of antenna. Antenna black, ventrally dark reddish-brown.

Mesosoma integument black. Mesoscutal disc between punctures smooth and shiny; disc densely punctate (i = 0.5d). Mesoscutellum densely punctate but anteriorly less so, surface smooth and shiny (Fig. 1d); mesoscutum, mesoscutellum, metanotum,

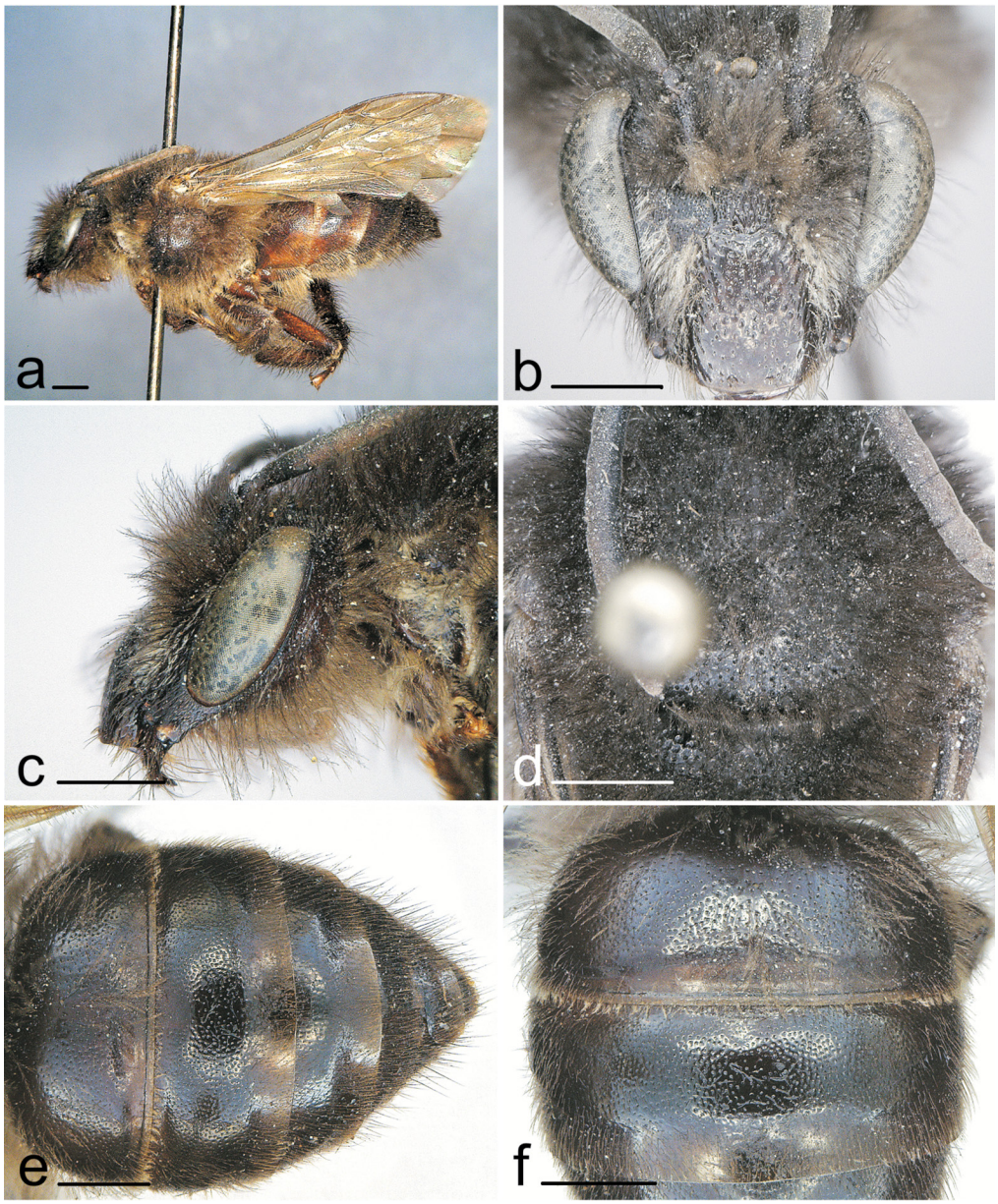

Figure 1. *Colletes kinabalu*, new species, male. **a.** Lateral habitus. **b.** Face. **c.** Head lateral view. **d.** Mesoscutum and mesoscutellum. **e.** Metasoma (dorsal view). **f.** Metasomal terga 1 and 2. Scale bars = 1 mm.

mesepisternum, and propodeum covered with long, erect dark brown to blackish hairs (Fig. 1a, d). Wings distinctly yellowish-brown; wing venation brown (Fig. 1a). Legs with integument black to dark reddish-brown. Vestiture dark brown. Hind basitarsus as in figure 2f.

Metasoma integument blackish to dark reddish-brown, depressed apical tergal margins reddish to yellowish translucent (Fig. 1e–f). T1 sparsely covered with long, erect dark brown to blackish hairs (Fig. 1f); remaining terga covered with short, erect

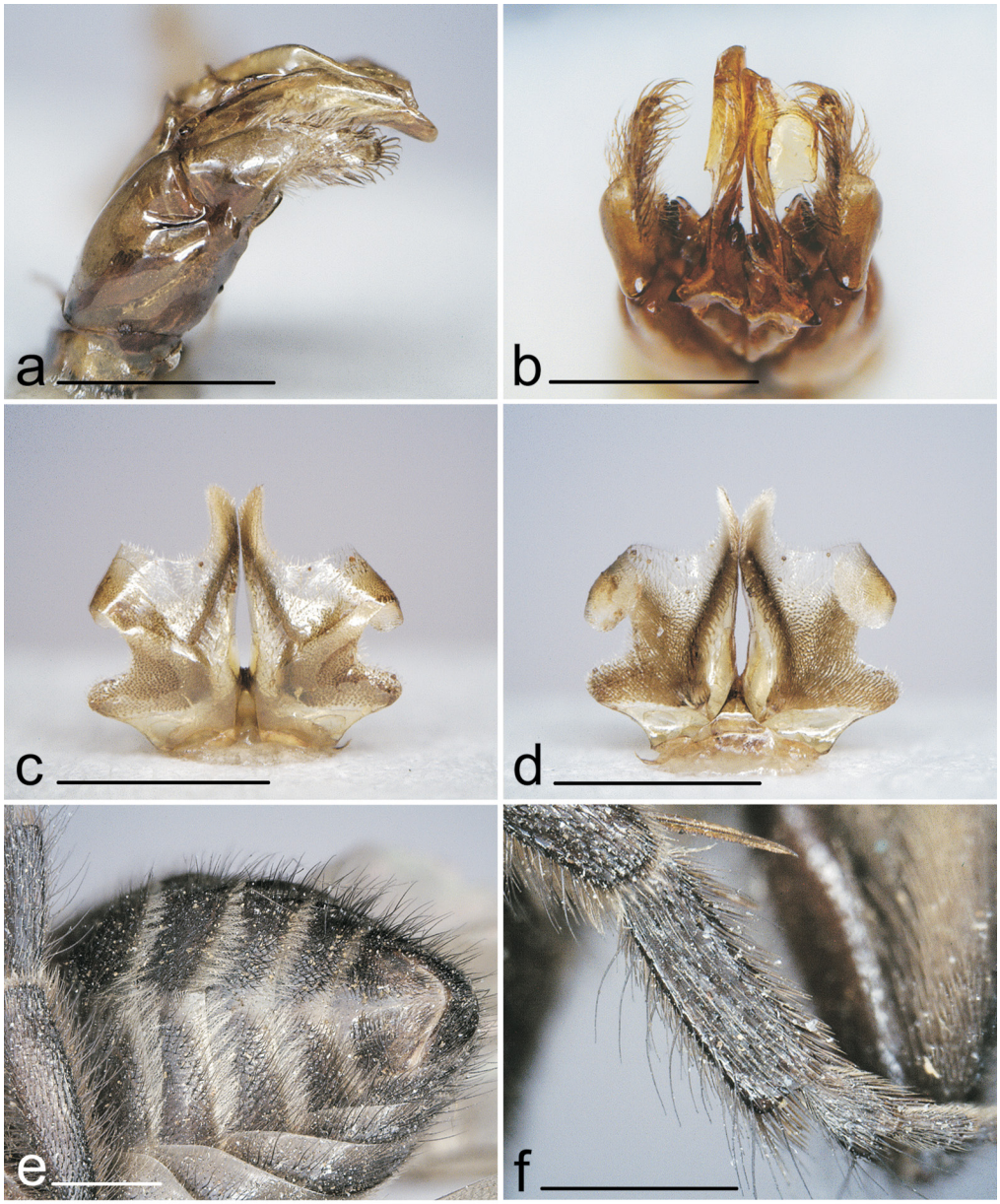

Figure 2. *Colletes kinabalu*, new species, male. **a.** Gonostylus. **b.** Penis valves. **c.** Metasomal sternum 7 (dorsal view). **d.** Metasomal sternum 7 (ventral view). **e.** Metasoma (ventral view). **f.** Hind basitarsus. Scale bars = 1 mm.

blackish hairs; T1 apico-laterally with narrow and thin hair band. Apical tergal depressions broad and deeply depressed, on T1 medially about three times as wide as laterally (Fig. 1f). T1 with dense and relatively coarse, irregular punctation (i = 0.5d), between punctures smooth and shiny, on following terga puncture of disc successively smaller (Fig. 1e–f). T7 broadly rounded, without emargination or spines. Sterna with dense apical hair bands, medially broadened (Fig. 2e). Genitalia and S7 as illustrated (Figs. 2a–d).

♀: Unknown.

Holotype: ♂, "Kinabalu, BrNo [British North] Borneo" (ANSP).

Distribution: Only known from Mount Kinabalu, Sabah, Malaysia.

Etymology: The species is named after Mt. Kinabalu (noun in apposition), the only known locality where it has been found so far.

DISCUSSION

The discovery of a species of *Colletes* on Mt. Kinabalu is surprising and raises questions about the origin of the species. The closest relative of *C. kinabalu* is *C. cunicularius*, which has a transpalearctic distribution occurring from southern Scandinavia, Great Britain, and the northern Mediterranean region in the west to northern Mongolia, China, and the Far East of Russia in the east (Kuhlmann & Dorn, 2002; Kuhlmann & Proshchalykin, 2011). The populations of this species nearest to Mt. Kinabalu are about 4500 km away in the vicinity of Vladivostok (Russia) and Harbin (China). The nearest records of the other two related species, *C. armeniacus* (Asia Minor, Central Asia, Iran) and *C. caskanus* (Balkans, Asia Minor to Iran), are even further away indicating that *C. kinabalu* might be an isolated ancient taxon of this species-group and a relict of a more widespread distribution in the past. This is supported by the fact that bees of the *C. cunicularius*-group seem to belong to a relatively old clade of Holarctic distribution (Kuhlmann *et al*., 2009) including three North American species of the *C. inaequalis*-group (*C. inaequalis* Say, *C. thoracicus* Smith, *C. validus* Cresson) as the closest relatives of the Palearctic taxa (Stephen, 1954) and the endemic and morphologically isolated *C. latipes* Friese from the Ethiopian highlands (Kuhlmann & Pauly, 2013).

Unfortunately, there is no information available about the elevation, exact collection locality, nor the date or the collector of this specimen, making an interpretation of the record difficult. Given that "BrNoBorneo" (= British North Borneo, today's Sabah and Labuan in Malaysia) is mentioned as the collecting area, the specimen must be old as the Crown Colony of British North Borneo only existed from 1946 to 1963 before it became part of modern Malaysia. Presumably the specimen was collected along the South Ridge Route that is the oldest, easiest and most popular way up to the summit of Mt. Kinabalu (New, 1996). Generally, bees of the genus *Colletes* prefer open vegetation types with sparsely vegetated soil for nesting. The habitat requirements in combination with the climate conditions preferred by the relatives of *C. kinabalu* suggest that it might have been collected in the upper montane zone (2000–2800 m) (Kitayama, 1992) that is known to have a high proportion of butterflies and moths of Himalayan or north temperate derivation (Holloway, 1970, 1996).

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