



SHORT NOTE

A new species of *Borgatomelessa* Patiny, 2000 from eastern Morocco: *Borgatomelessa flavimaura* n. sp. (Hymenoptera, Andrenidae)

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(Accepted le 31 juillet 2019; publié en ligne le 25 septembre 2019)

Summary. Until now, two species of *Borgatomelessa* Patiny, 2000 have been described, both from *loci typici* located in the Near East and eastern Africa. *Borgatomelessa brevipennis* (Walker, 1871), the most widespread taxon, has also been found in the southern Sahelo-Sudanian belt of the Sahara. A third species from eastern Morocco is described in the present study: *Borgatomelessa flavimaura* n. sp. In addition to taxonomic insights, the new species sheds a new light on the biogeography of the genus.

Résumé. Une nouvelle espèce de *Borgatomelessa* Patiny, 2000 dans l’est du Maroc : *Borgatomelessa flavimaura* n. sp. (Hymenoptera, Andrenidae). Seules deux espèces de *Borgatomelessa* ont été décrites jusqu’à présent, toutes deux de *loci typici* situés au Proche-Orient et dans l’est de l’Afrique. *Borgatomelessa brevipennis*, l’espèce la plus commune, a aussi été identifiée dans la bordure sahélo-soudanienne du Sahara. Une troisième espèce de l’est marocain est décrite dans la présente étude: *Borgatomelessa flavimaura* n. sp. En plus de l’apport taxonomique, cette nouvelle espèce amène un éclairage nouveau sur la biogéographie du genre.

urn:lsid:zoobank.org:pub:D3414AC9-D7B0-4419-8E0B-B8154B0B1E7A

Keywords: taxonomy; morphology; biogeography; Palaearctic region

The genus *Borgatomelessa* was described on the basis of a single species, *Borgatomelessa brevipennis* (Walker, 1871) [*locus typicus*: Ethiopia, Harkeko], originally named *Andrena brevipennis* Walker (Patiny 2000). Since its first record, *Borgatomelessa brevipennis* has been reported from several regions of the Arabian Peninsula, as well as from the southern Sahelo-Sudanian fringe of the Sahara (Figure 1) (Patiny & Michez 2007; Patiny et al. 2008). A second species, *Borgatomelessa niveopilosa* Patiny, 2002, was described based on a female collected in “Saudi Arabia” (Patiny 2002) [*locus typicus*: Saudi Arabia, Lodar]. A junior synonym of *Borgatomelessa brevipennis* was created by Popov (1951), with the description of *Melitturgula arabica* Popov, 1951, based on material from Saudi Arabia [*locus typicus*: Saudi Arabia, Djeddah]. This latter description illustrates the conspicuous morphology of the species and constitutes its first association in the Panurginae (Hymenoptera, Andrenidae). Popov (1951) further highlights the morphological proximity to the *Melitturgula–Melitturga* group, which has been recognized as the tribe Melitturgini by several subsequent authors (Patiny 2001; Michener 2007; Hedtke et al. 2013). According to the current knowledge, morphological traits of both sexes of the described species – e.g. the structure of the male genitalia

and the morphology of mouthparts (Patiny 2000, 2002) – support a placement of *Borgatomelessa* as a distinct genus in the Melitturgini. However, the phylogenetic relationship of *Borgatomelessa* and the *Melitturgula–Melitturga* group is largely unresolved and requires further research. In the present study we describe a third species based on a female specimen from eastern Morocco.

Material and methods

Material

The description of *Borgatomelessa flavimaura* n. sp. is based on a female (holotype) caught in the area of Missouri al Baten, Morocco (area of Outat Oulad el Haj: 33°19'13.3"N 3°52'19.7"W). The specimen was collected in a pitfall trap in a stony steppe environment. Floral resources of the collection locality comprise scattered patches of *Lycium intricatum* (Solanaceae), *Launaea acanthoclada* (Asteraceae) and *Noaea mucronata* (Amaranthaceae), as well as several species of annual Asteraceae (Figure 2).

The holotype is deposited in the Biologiezentrum Linz of the Oberösterreichisches Landesmuseum (Linz, Austria).

The type material of *B. brevipennis* and *B. niveopilosa* is housed in the Natural History Museum (NHMUK, London), and was reviewed in Patiny (2000, 2002). Additional material from other museums was also reviewed and databased (Patiny 2000, 2002). The original labelling for *B. niveopilosa* mentions “Saudi

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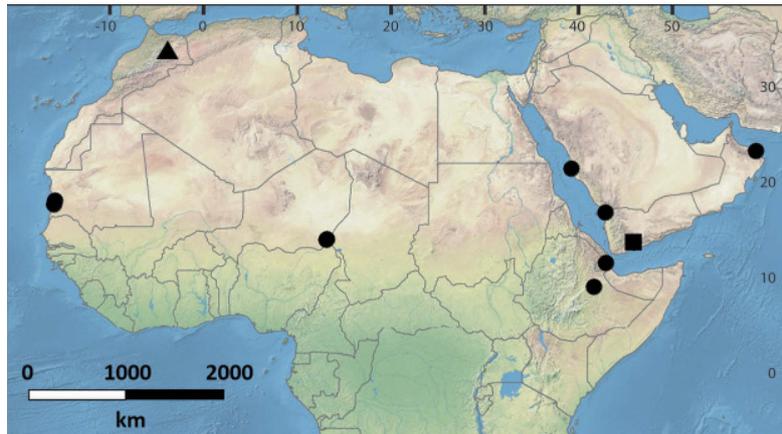


Figure 1. Geographical distribution of the known species of *Borgatomelissa* Patiny: (▲) *Borgatomelissa flavimaura* n. sp., (●) *B. brevipennis* (Walker), (■) *B. niveopilosa* Patiny.

Arabia, Lodar” (Patiny 2002). This has been interpreted as Yemen, Lawdar (Engel 2019) (Figure 1).

Databasing of the biogeographical information and design of the distribution maps

Records of the studied specimens were databased in the BDFGM (base de données fauniques Gembloux-Mons), which is hosted and maintained by the University of Mons, Laboratory of Zoology. The datasets were managed using DFF (Barbier et al. 2000–2015), and visualized using CFFedit 2.0 (Barbier & Rasmont 2000).

Abbreviations of morphological structures

Morphological terminology follows Michener (2007). The terminology of the microsculptures is based on Harris (1979). The following abbreviations are used: A = flagellomeres (counted from scape); S = metasomal sternum (numbering designating the segment proceeding from anterior to posterior); T = metasomal tergum (numbering as in S). The pictures presented in Figures 3–7 were realized using an Olympus OMD EM1 camera (Tokyo, Japan) mounted with a Zuiko Olympus 60mm f1/2.8 and apochromatic lens Raynox 250 (Yoshida Ind. Co., Tokyo, Japan). Light was supplied with three flashes GODOX TT350o (Shenzhen, China).

Results

Borgatomelissa flavimaura n. sp. (Figures 3–5)

Holotype. ♀, Missouri al Baten, 12.VI.2002, 33° 19'13.3"N 3°52'19.7"W, 963 m, J. Yvernault leg.

Diagnosis. Similar to the other species in the genus, but highly recognizable by the yellow metasomal cuticle. Small species (7 mm in length), head round, shorter than wide, the metasoma slightly flattened with thin hair bands at the apex of the terga. Cuticle almost entirely yellow (from head to pygidial plate), with a few dark ornamentations on the face, the mesonotum and the

proximal part of the terga. Pilosity whitish, locally dense, particularly on the head and mesonotum.

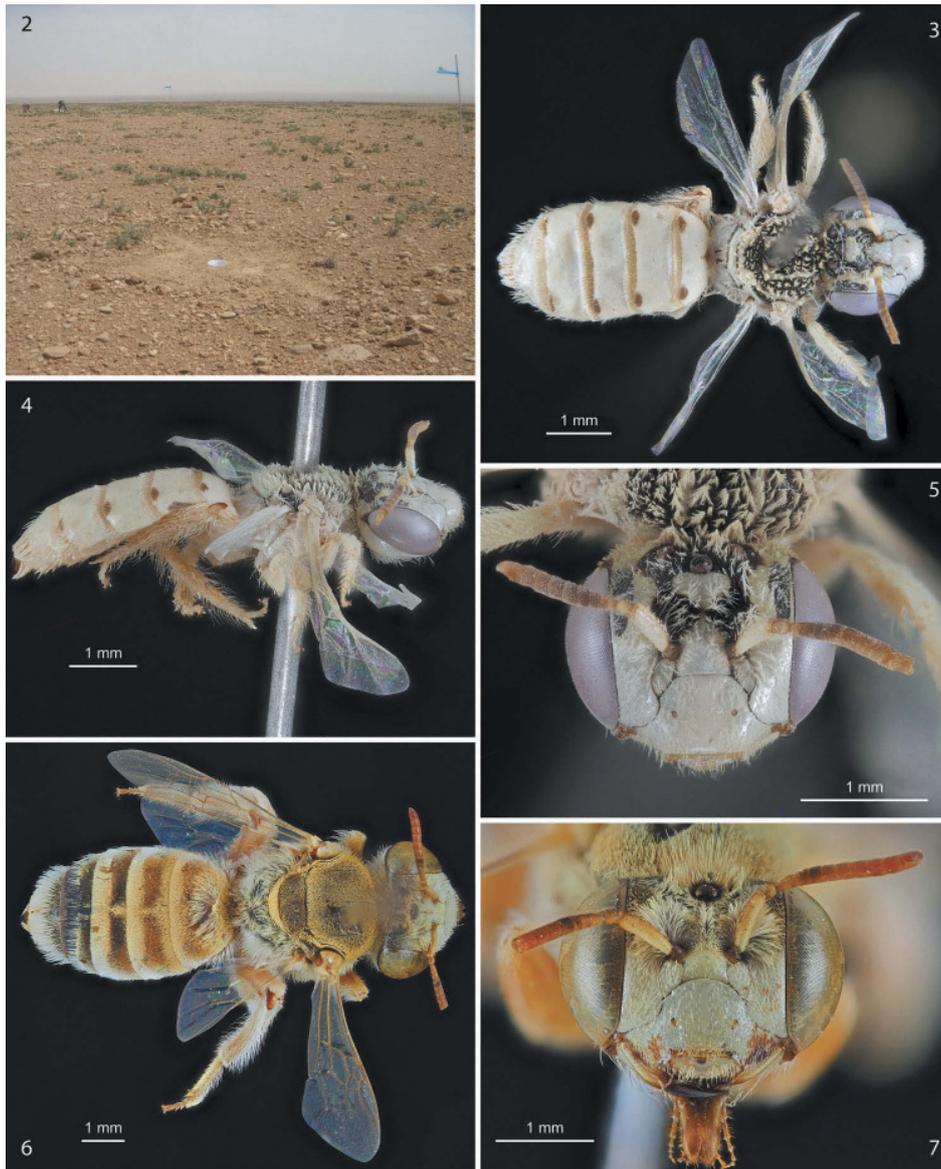
Description of the female.

Head. Labrum, mandibles (base), clypeus, frons, vertex and genae pale yellow. Black markings: tips of the mandibles, facial fovea, a spot at the dorsal margin of eyes, ocellar area and a wider zone behind antennal scapes. Scape, pedicel and A3 pale yellow; flagellum (A4–12) light orangish in ventral view. Cuticle of the face roughly punctate (dull), except the median part of the clypeus (shiny). Head sparsely covered with short white hairs. Vertex more densely covered with short yellowish hairs. Mouthparts are not visible in the holotype. Galea short.

Mesosoma. Yellow. Black markings: ventral side, the median part of the mesonotum and scutellum. Mesonotum with 2 longitudinal yellow stripes. Distal part of the scutellum yellow. Propodeum yellow with 2 dark (brownish) spots at each side of the propodeal area. Punctuation on the mesonotum, scutellum and mesopleurae fine and dense. Mesosoma covered with erected short white hairs. Legs entirely yellow (from coxae to tarsal claws). Mid-femur with the ventral edge sharply flattened and angular (at the basal articulation with the trochanter). Scopae sparse, hairs long, non-branched and whitish. Wings hyaline; veins clear, yellowish.

Metasoma. Terga and sterna dull (finely sculptured), entirely pale yellow. Tergal margins, lightly brownish, covered with a weak (T1–4) fringe of white hairs. Anal fringe white, rather dense. Pygidial plate reddish-brown, with a strong median ridge.

Derivatio nominis. The specific epithet *flavimaura* is derived from Latin *flavus* (yellow), describing the cuticle color of the new species, and *maura*, alluding to its Moroccan origin.



Figures 2–7. *Borgatomelissa* Patiny. 2–5, *B. flavimaura* n. sp.: 2, Locus typicus, 29.VII.2002; 3, dorsal habitus; 4, lateral habitus; 5, face. 6–7, *B. brevipennis* (Walker): 6, dorsal habitus; 7, face.

Key to the females of *Borgatomelissa*

Borgatomelissa, like the other Melitturgini, has three submarginal cells. The median submarginal cell is large and not narrow like in *Melitturgula* (e.g.). Moreover *Borgatomelissa* is readily recognizable from the other Melitturgini with a broad 2nd submarginal (i.e. *Melitturga*) thanks to the short mouthparts (shorter than clypeus length) and the shape of last sterna in male (T7 helmet shaped, vs T6 in *Melitturga*).

1. T1–2 partly to entirely red. T1–4 with a terminal fringe of white hair (Figure 6). Known from Saudi Arabia,

- Oman, Yemen, Eritrea, Somalia, Mauritania and Mali. *B. brevipennis* (Walker)
- None of the terga even partly red. Terminal fringes of the terga more developed or nearly absent 2
- 2. Terga all brownish black. Pilosity white, abundant over the whole body. Terminal fringes on the terga broad and dense (1/5 of the terga length). Yemen. *B. niveopilosa* Patiny
- Most of the body cuticle pale yellow. Pilosity whitish, less abundant and dense, more concentrated on the

mesonotum. Hair fringes of the terga notably weak, not visibly distinct on dorsal habitus (Figures 3, 4). Morocco..... *B. flavimaura* n. sp.

Comments on the males. Only the male of *Borgatmelissa brevipennis* has been described so far and the systematics of the group relies entirely on females. In *B. brevipennis*, the male is smaller than the female, with more abundant and longer hairs, and more extensive yellow markings (Patiny 2000, 2002). T7 is deeply helmet-shaped, the proximal part strongly convex and sheltering genitalia. The gonostyli are thin and weak, as long as the gonocoxites.

Discussion

The distribution of *Borgatmelissa* is best documented in the southern part of the Arabian Peninsula and the African side of the Gulf of Aden (Figure 1). A few isolated populations have been recorded in Oman (to the east) and in the vicinity of Lake Chad and Mauritania (to the west). The distribution of *Borgatmelissa* has supported the hypothesis of an Arabian–Sahelo–Sudanian distribution of the genus, similar to that observed in several other Old-World Panurginae (Patiny & Michez 2007; Patiny et al. 2008). The occurrence of *Borgatmelissa flavimaura* significantly changes this pattern. The expanded distribution of this genus shows that different species can locally be encountered at the periphery of the West-Palaearctic deserts (Arabian desert and Sahara). This distribution is comparable to the Saharan biogeographical dynamics previously described by Patiny and Michez (2007) and Patiny et al. (2008). Genera like *Promelitta* Warncke, 1977 and several Nomioiinae have comparable distribution patterns (Pesenko & Pauly 2005; Michez et al. 2007). It can be hypothesized that the currently observed populations of *Borgatmelissa* are relicts of a formerly broader distribution of the species, likely shaped by the last greening of the desert (Neolithic Subpluvial was the last event in date).

Acknowledgements

This work has been carried out partially thanks to the project *Etude des Hyménoptères Apidés des zones d'études de l'ECWP*, funded by the Emirates Center for Wildlife Propagation (Missour, Morocco), of which the first author is the main investigator (years 2011 and 2012). We further thank Dr Alexandre François, coordinator of the research program in which the above-mentioned project is included.

Additionally, the authors wish to thank warmly Prof. Pierre Rasmont and Denis Michez for making the photographs illustrating the present paper and support in the mapping of data. Lastly,

the authors want to thank Prof. Bryan Danforth, Silas Bossaert and Denis Michez for their kind comments on the original manuscript.

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