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## Description of a remarkable new *Andrena* species (Hymenoptera: Andrenidae) from Syria

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As part of an ongoing revision of the *Andrena* fauna of Syria, a remarkable new species *Andrena (incertae sedis) antilibanotica* sp. n. was discovered in material collected from the arid Anti-Lebanon mountain chain in southern Syria. It has a combination of characters that defy current subgeneric conventions, but can be broadly placed close to the *Cryptandrena* due to its overall similarity to other Middle Eastern *Cryptandrena* taxa *A. aruana* Warncke, 1967 and *A. monacha* Warncke, 1965.

<http://www.zoobank.org/urn:lsid:zoobank.org:pub:88D5EAA7-9154-4743-BD5A-588E44D4D629>

**Keywords:** Levant; endemic species; solitary bees; taxonomy; alpine, *Cryptandrena*

### Introduction

*Andrena* are a species-rich genus of bees found primarily in the Holarctic with the greatest diversity in areas with a Mediterranean or desert climate (Gusenleitner & Schwarz, 2002). As a region containing many such habitats, the Near East is naturally a hotspot of *Andrena* diversity (Pisanty, Scheuchl, & Dorchin 2016, 2018). The *Andrena* fauna of the Middle East was extensively revised by Klaus Warncke, with a particular focus on Israel (Warncke 1969a) and Turkey (Warncke 1965; 1969b; 1975), and new species continue to be described from across this region (Scheuchl, Schindler, & Al-Ghawi, 2004; Scheuchl & Hazir, 2012; Pisanty et al., 2016; 2018). In contrast to Israel and Turkey, the *Andrena* faunas of other countries in the Levant are comparatively poorly known. The fauna of Syria has received little dedicated attention, with only a few older papers (e.g. Magretti, 1890) and some references made as part of a works focusing largely elsewhere (e.g. Warncke, 1969a). More recent papers also present very limited data on the Syrian fauna, highlighting our lack of knowledge (Pisanty et al., 2018).

As part of ongoing efforts to improve the knowledge of the *Andrena* faunas of Jordan, Lebanon, and Syria, a remarkable new species from southern Syria was detected in undetermined museum material. It possesses a combination of characters that that defy current subgeneric conventions, but it shows the greatest affinity to *Cryptandrena* Pittioni, 1948 because of its overall similarity to other Near Eastern members of this subgenus despite its divergent nature, particularly in the female sex. The subgenus *Cryptandrena* was described by Pittioni (1948) and initially applied only to *A. ventricosa* Dours, 1873 and *A. brumaniensis* Friese, 1899 (as *A. clypeata* Brullé, 1832). Warncke later described two species *A. aruana* Warncke, 1967 and *A. monacha* Warncke, 1965 and included them in *Cryptandrena* along with *A. rotundata* Pérez, 1895, listing five species in total (Warncke 1968, Table 1). The subgenus is difficult to define

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in the female sex, as three species possess thorn-like projections on the rear face of the hind femora (*A. brumaniensis*, *A. rotundata*, and *A. ventricosa*), and the remaining two species do not (*A. aruana* and *A. monacha*), though they share a similarly wide labral process, several times wider than long. In the male sex, the subgenus is easier to define because of the convergent male genitalia, typically with weakly produced gonocoxal teeth and gonostyli with a pronounced inner angle resulting in a shovel-like appearance (Pittioni, 1948; Warncke, 1968).

## Methods

Morphological terminology follows Michener (2007). The abbreviations A, T, and S are used for antennal segments, metasomal terga and metasomal sterna respectively. Specimens were measured from the vertical plane of the front of the head to the tip of the metasoma. Photographs were taken using an Olympus E-M1 Mark II with a 60 mm macro lens and were stacked using Zerene Stacker 1.04 (Zerene Systems, USA) and plates were prepared in GNU Image Manipulation Program (GIMP) 2.10.

## Description of the new species

*Andrena (incertae sedis) antilibanotica* sp. n. (Figures 1–2)

Material. Holotype: SYRIA: Rankos, 40 km N Damascus [33.7583°N, 36.3873°E], 23.v.1996, 1♂, leg. Ma. Halada. Deposited at the Oberösterreich Landesmuseum, Linz, Austria. – Paratypes: SYRIA: 40 km NE Damascus, 13.v.1996, 1♂, 14♀, leg. Ma. & Mi. Halada; Maalula [Maaloula], 17.v.1995, 6♂, leg. K. Deneš. Paratypes are deposited at Linz and in the personal collection of TJW.

Diagnosis: Affinities are best seen in the male sex for the Middle Eastern taxa *Andrena aruana* and *A. monacha* where both the clypeus and the head are clearly broader than long (Figures 1A–C), the clypeus has yellow markings (Figures 1A–C), the gena is widened and exceeds the width of the compound eye (Figures 1D–F), the episternum and propodeum are strongly rugose-areolate (Figures 1G–I), and the metasomal terga are strongly punctate and glossy (Figures 1J–L).

Against this context, the differences in genital structure (Figures 1M–O) may be less important because of the broader picture of overall similarity. Given the problems in defining the subgenus itself, particularly in the female sex, I take the position that *A. antilibanotica* is broadly affiliated with *A. aruana* and *A. monacha*, but should not be formally placed in the *Cryptandrena* until more evidence comes to light, preferably through a molecular revision.

For species specific diagnosis, the male of *A. antilibanotica* can be easily separated from *A. aruana* and *A. monacha* (alternative character state in parentheses) by the genitalia with thin and elongate gonostyli (gonostyli short and broadly triangular), but also by the orange tarsi of all legs including the basitarsi (apical tarsal segments lightened but not the basitarsi), the lateral clypeal margins which are at most weakly curved, essentially straight (clearly angulate, forming two kinks that approach 120°), the entirely yellow clypeus (partly darkened basally and laterally), and by the structure of the propodeal triangle which is comparatively large and clearly sunken below the rest of the level of the dorsal surface of the propodeum (relatively small and not differentiated by a change in vertical level).

In the female, in addition to the colouration of the basitarsi and the structure of the propodeal triangle, the latitudinally striate clypeus (clypeus without striations) that are reminiscent of those seen in the unrelated *A. combinata* (Christ, 1791) and

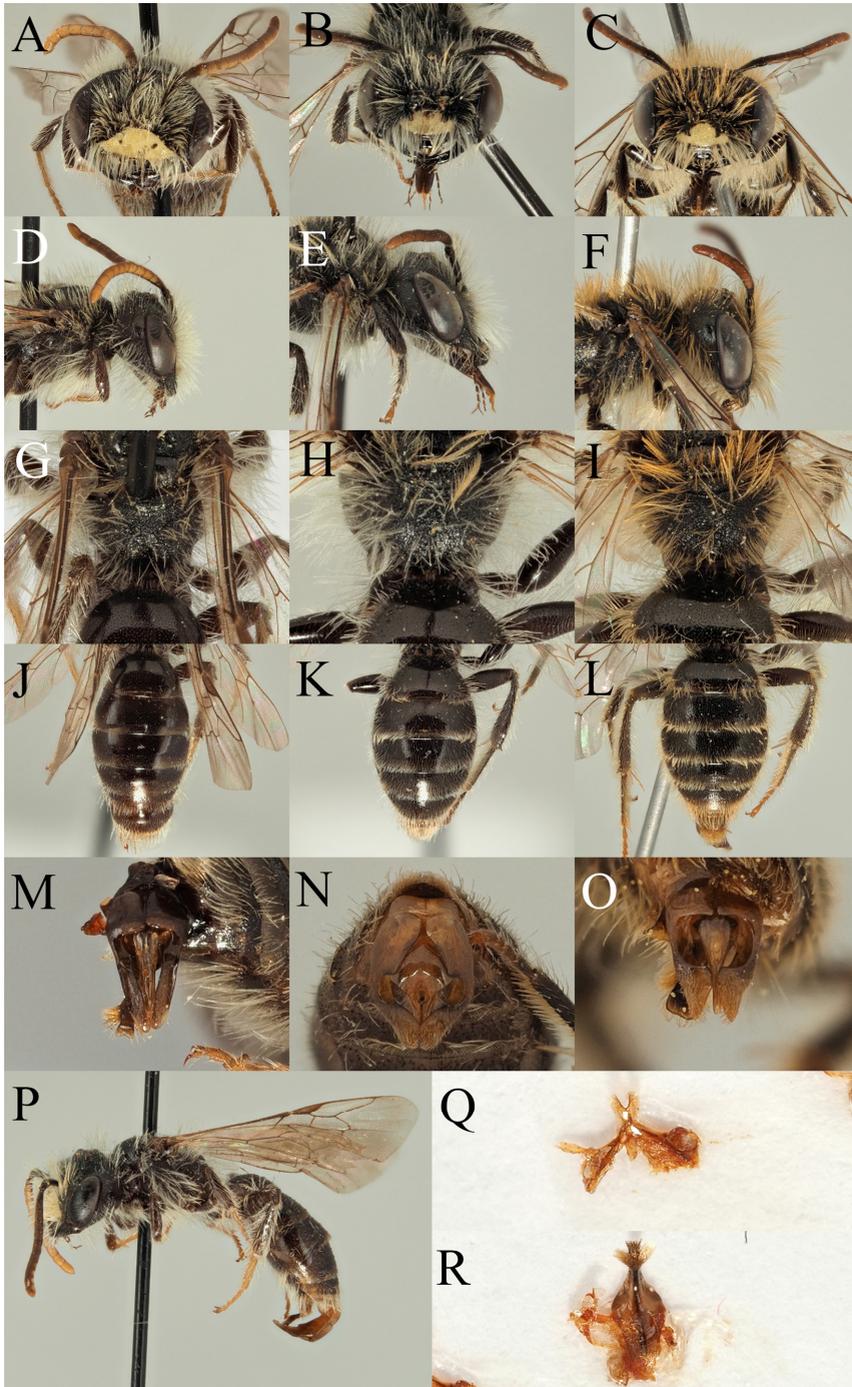


Figure 1. *Andrena antilibanotica* sp. n., male, holotype. A. face; D. head in profile; G. propodeum; J. terga; M. genitalia; P. profile; Q. sternum 7; R. sternum 8. – *Andrena aruana* Warncke, 1967, male. B. face; E. head in profile; H. propodeum; K. terga; 14. genitalia. – *Andrena monacha* Warncke, 1965, male. C. face; F. head in profile; I. propodeum; L. terga; O. genitalia.

Table 1. The species of *Cryptandrena* Pittioni, 1948 and their global distributions.

Species	Distribution	Reference
<i>Andrena aruana</i> Warncke, 1967	Israel, Lebanon, and probably Syria	Gusenleitner & Schwarz (2002); Warncke (1967); TJW unpubl. data
<i>Andrena brumaniensis</i> Friese, 1899	Southern Europe from France to Turkey and the Levant	Gusenleitner & Schwarz (2002)
<i>Andrena monacha</i> Warncke, 1965	Cyprus, Greece, Lebanon, Syria, and Turkey	Gusenleitner & Schwarz (2002); TJW unpubl. data
<i>Andrena rotundata</i> Pérez, 1895	Morocco, Algeria, Tunisia, Italy [Sardinia]	Gusenleitner & Schwarz (2002); TJW unpubl. data
<i>Andrena ventricosa</i> Dours, 1873	Morocco, southern Europe, Turkey, the Caucasus, Cyprus, and the Levant	Gusenleitner & Schwarz (2002)

*A. simontornyella* Noskiewicz, 1939, the short and triangular labral process (clearly wider than long, Figures 2C-D), the sunken propodeal triangle (propodeal triangle at the same level as the rest of the propodeum, Figures 2E-F), the very finely and densely punctate terga (punctures larger and less dense, Figure 2G-H), and the remarkable long, stiff hairs on the inner face of the flattened fore basitarsi (hairs on the rounded fore basitarsi normal, not noticeably longer than those on the external face) allow for instant recognition.

Description: Female: Body length 8 mm. *Head*: Dark, clearly wider than long (Figure 2B). Clypeus arched, with shallow punctures separated by half a puncture diameter laterally, by 1-1.5 diameters medially. Clypeus medially with subtly raised lateral striations between punctures, underlying surface shagreened, weakly shining. Process of labrum narrow, triangular, as broad as long (Figure 2C). Gena and clypeus with moderately long whitish hairs, becoming longer and yellowish on vertex, scape, and frons, in length approaching length of scape. Antennae dark, A4-A12 extensively orange coloured below, segment 12 almost entirely orange, A3 equal to A4+5 in length. – *Mesosoma*: Scutum and scutellum densely punctured, punctures almost confluent laterally, separated by a puncture diameter medially. Underlying surface microreticulate and dull laterally, becoming shagreened medially as punctures become more dispersed, weakly shining. Episternum and lateral faces of propodeum rugose-areolate, reticulation forming a raised network, underlying surface dull. Propodeal triangle clearly visible both through a change in surface sculpture, becoming more finely reticulate, and also because surface of propodeal triangle is slightly sunken below level of remaining dorsal surface of propodeum (Figure 2E). Episternum, propodeum, scutum, and scutellum with moderately long yellowish hairs, longest hairs approaching length of scape, hairs becoming whitish towards ventral part of episternum, propodeal corbiculae only weakly formed. Excluding tarsi, legs predominantly dark, strongly contrasting with uniformly orange tarsi, hind tibia slightly lightened, particularly apically, but not orange coloured. Fore basitarsi flattened, on inner face with long, stiff, well-differentiated hairs, clearly longer than those on exterior face (Figure 2C). Pubescence of legs yellow, pubescence of hind coxae, flocculus, and femoral scopa white, tibial scopa whitish-yellow. Wings hyaline, venation dark brown, nervulus clearly postfurcal. – *Metasoma*: Terga dark, apical margins slightly lightened brown, both discs and margins uniformly very densely and finely punctate, punctures separated by a puncture diameter, underlying surface without shagreenation, shiny (Figure 2G). T2-4 with thin white hairbands, those on T2

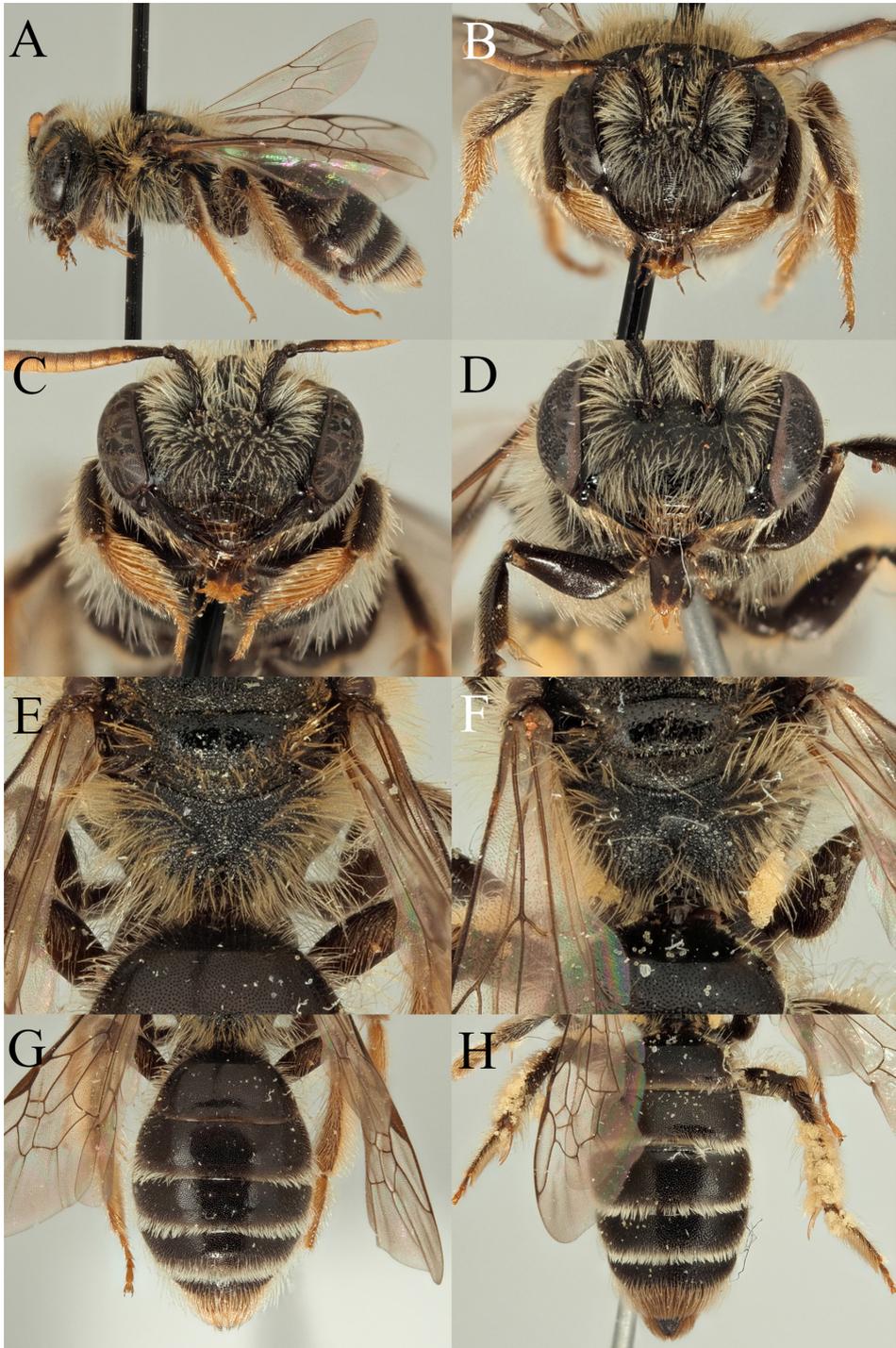


Figure 2. *Andrena antilibanotica* sp. n., female. A. profile; B. face; C. labrum; E. propodeum; G. terga. – *Andrena monacha* Warncke, 1965, female. D. labrum; F. propodeum; G. terga.

very widely interrupted, those on T3-4 complete though medially narrowed on T3. T5 and hairs flanking pygidial plate golden.

Male: Body length 7 mm. *Head*: Dark, clearly wider than long (Figure 1A). Clypeus flat, twice as wide as long, entirely yellow marked except for two dark spots laterally. Shallowly punctured, punctures laterally separated by a puncture diameter, medially very sparse, separated by 3-4 puncture diameters, underlying surface finely shagreened, weakly shining. Process of labrum short, slightly wider than long, broadly emarginate apically. Gena enlarged, clearly wider than compound eye (Figure 1D). Gena, vertex, face, and scape with long white hairs, equalling length of scape. Antenna dark, A4-A13 extensively orange coloured below. A3 slightly longer than A4, clearly shorter than A4+A5. – *Mesosoma*: Sculpture, leg colouration, and wing venation as in the female (Figure 1G). Pubescence paler, white throughout. – *Metasoma*: Terga dark brown, finely punctate, punctures separated by 1–2 puncture diameters, underlying surface without shagreenation, shiny and glossy (Figure 1J). T2–T4 with weak lateral patches of white hair, very broadly interrupted. S7 deeply emarginate (Figure 1Q), S8 columnar, with two lateral tufts of golden hair, apically slightly widened and weakly emarginate, resembling a fishtail (Figure 1R). Genitalia elongate, gonocoxal teeth truncate, penis valve and gonostyli long, gonostyli with slight outward kink along their internal margin basally, otherwise unmodified (Figure 1M).

*Etymology*: The name *antilibanotica* was chosen because all specimens come from the Anti-Lebanon mountain range that straddles the border between Lebanon and Syria.

## Discussion

The placement of *Andrena antilibanotica* close to the *Cryptandrena* would suggest that the Middle East may be the centre of diversity for this subgenus, containing four of the five described species (Table 1). However, given the currently outstanding issues in *Andrena* subgeneric classification it is hard to draw firm conclusions until a robust molecular phylogeny is available.

All specimens were collected from a small region immediately east of the Anti-Lebanon mountain range between Rankos and Maaloula which are some 20 km apart. Whilst elevation in the Anti-Lebanon mountains proper can exceed 2,500 m, the collection areas themselves are around 1,500 m in elevation and generally arid. *Andrena antilibanotica* sp. n. females are remarkable for the structure of the fore basitarsi which are flattened and which have long, stiff hairs on their internal face (Figures 2B-C). The purpose of these hairs is unknown, but it is possible that they may somehow be involved in pollen collection. Morphological adaptations for pollen collection have only been infrequently documented in *Andrena* (Dubitzky, Plant, & Schönitzer, 2010), and this potential adaptation is worthy of future study. Very little has been published on the pollen preferences of *Cryptandrena*. Kocourek (1963) reported *A. ventricosa* collecting pollen from Apiaceae and Lamiaceae, and analysis of eight pollen loads from *A. ventricosa* from southern France were 99.6% composed of Fabaceae (*Ononis* and *Medicago*, unpubl.).

## Disclosure Statement

No potential conflict of interest was reported by the author.

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