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New *Andrena* species from Central Asia (Hymenoptera, Andrenidae)

Thomas WOOD

A b s t r a c t : Central Asia is a vast area hosting a diverse variety of habitats, but it remains undersampled and understudied. This imperfect study is true for members of the enormous bee genus *Andrena* that is known to speciate rapidly and show high levels of local adaptation and endemism; a surprisingly small regional total is known from Central Asia despite its suitable *Andrena* habitats. Recent documentation of important type material and ongoing studies have facilitated renewed study of this fauna. *Andrena* (*Ulandrena*) *discus* nov.sp. is described from Tajikistan, southern Turkmenistan, and north-eastern Iran, and *Andrena* (*Habromelissa*) *sanguinea* nov.sp., *Andrena* (incertae sedis) *fumea* nov.sp., and *Andrena* (incertae sedis) *invisibilis* nov.sp. are described from Kyrgyzstan. It is likely that many additional new species for science will be discovered in these regions following renewed collecting efforts and study of museum material.

Key words : alpha taxonomy, new species, Kyrgyzstan, Iran.

Introduction

The bee genus *Andrena* is the second most speciose globally, with almost 1,700 species following recent revisions (GUSENLEITNER & SCHWARZ 2002; ASCHER & PICKERING 2020; PISANTY et al. 2022a; WOOD & MONFARED 2022; WOOD 2023a; 2023b). It is known for its taxonomic complexity (PISANTY et al. 2022b), in part due to its rapid speciation rate (BOSSERT et al. 2022) which means that *Andrena* lineages often do not accumulate distinctive morphological differences, even if they can be well-separated genetically and behaviourally (e.g. PRAZ et al. 2022).

Andrena shows the highest species richness in areas with Mediterranean to xeric climates, and consequently have very high species richness in countries such as Turkey, Spain, Israel, and Iran (PISANTY et al. 2022a; WOOD & MONFARED 2022; WOOD 2023a; 2023b). It might therefore be expected that Central Asia, a vast area of dry deserts, steppe, and mountains, would also host a rich *Andrena* fauna. However, as defined as comprising Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan, and Kyrgyzstan, Central Asia surprisingly has a relatively mediocre *Andrena* fauna, with around 230 species considered present in the published literature (e.g. OSYTSHNJUK et al. 2005; 2008; ASCHER & PICKERING 2020). For comparison, this is only slightly more than the 228 species known from the Iberian Peninsula (WOOD 2023a), and marginally more than the 197 species known from neighbouring Iran (WOOD & MONFARED 2022). For individual countries, the results are even more mediocre – for example, only 43 *Andrena* species are listed from Kyrgyzstan (TADAUCHI 2008; ASCHER & PICKERING 2020), reflecting its lack of study. Only three *Andrena* species have been described from Kyrgyzstan (OSYTSHNJUK 1986;

1994; GRÜN WALDT et al. 2005), with essentially no historical taxonomic work compared to other Central Asian countries (e.g. MORAWITZ 1876; OSYTSHNJUK 1983a; 1983b; 1984; 1993).

Recent photographic documentation of important type material for *Andrena* species described from Central Asia by Ferdinand MORAWITZ (ASTAFUROVA et al. 2021; 2022) combined with the partially published monograph of Anna OSYTSHNJUK (OSYTSHNJUK et al. 2005; 2008) has facilitated a renewed study of Central Asian *Andrena* and their relationship with *Andrena* taxa in other biogeographic regions (WOOD & MONFARED 2022; WOOD 2023b). The current work continues to build on these previous contributions with the description of four new species from this understudied part of the world.

Materials and Methods

Morphological terminology follows MICHENER (2007). The following abbreviations are used in the species descriptions: A = antennal segments, S = metasomal sterna, and T = metasomal terga. Subgeneric concepts follow PISANTY et al. (2022b). Specimens were measured from the centre of the clypeus at the front of the head to the apical tip of the metasoma to the nearest 0.5 mm. Photographs were taken using an Olympus E-M1 Mark II with a 60 mm macro lens. Additional close-ups were taken with the addition of a Mitutoyo M Plan Apo 5X infinity corrected objective lens. Photographs were stacked using Helicon Focus B (HeliconSoft, Ukraine) and plates were prepared in GNU Image Manipulation Program (GIMP) 2.10. Post-processing of some images was made in Photoshop Elements (Adobe Systems, USA) in order to improve lighting to highlight specific characters.

Taxonomy

Andrena (Habromelissa) sanguinea nov.sp. (Figs 1-6)

Material examined: Holotypes: Kyrgyzstan: Terskej Mt.R., 15 km SSE Kotchorka vill. [Kochkor], 42.1003°N, 75.8336°E, 20.xiii.1994, 1♀, leg. D. Milko, coll. Biologiezentrum Linz; Paratypes: Kyrgyzstan: Terskej Mt.R., 15 km SSE Kotchorka vill. [Kochkor], 20.xiii.1994, 1♀, leg. D. Milko, coll. T.J. Wood.

Diagnosis. *Andrena sanguinea* is challenging to recognise, as most of the characters defining the subgenus *Habromelissa* are found in the male sex (see discussion in WOOD 2023b). They can be recognised by their relatively small body size, their slim appearance, pronotum with weak humeral angle, foveae occupying more than half of space between lateral ocellus and compound eye (Figure 4), foveae not extending ventrally below the level of the antennal insertions, clypeus slightly domed, process of the labrum with strong 90° angle separating frontal and ventral parts, long A3 exceeding length of A4+5 (Figure 2), terga extensively red-marked (Figure 6), and summer to autumn emergence. They are closest to *A. qinhaiensis* XU, 1994 (China: Gansu, Qinghai) and *A. angustula* WOOD, 2023 (Mongolia).

They can be separated from *A. qinhaiensis* by the dull clypeus which is shagreened over the majority of its area and covered in weakly raised but distinct latitudinal striations (Figure 3; in *A. qinhaiensis* with clypeus shining over the majority of its area, without



Figs 1-6: *Andrena (Habromelissa) sanguinea* nov.sp. female (1) profile; (2) face, frontal view; (3) clypeus detail, frontal view; (4) frons and vertex, dorsofrontal view; (5) scutum, dorsal view; (6) terga, dorsal view.

latitudinal striations), ocelloccipital distance slightly exceeding the diameter of a lateral ocellus, vertex clearly punctate and weakly shining (Figure 4; in *A. qinhaiensis* with ocelloccipital distance equalling 0.5 times the diameter of a lateral ocellus, vertex shagreened and dull, with obscure punctures), scutum and scutellum smooth and shining over the majority of their area, with only small shagreened areas anteriorly and laterally (Figure 5; in *A. qinhaiensis* with the scutum and scutellum more extensively shagreened, with only a small smooth and shining area medially), and foveae filled with white hairs (Figure 4; in *A. qinhaiensis* foveae filled with dark brown hairs).

They can be separated from *A. angustula* due to the wider facial foveae which occupy essentially the entire space between the compound eye and a lateral ocellus (Figure 4; in *A. angustula* occupying 3/4rds of the space between the compound eye and a lateral ocellus), by the sculpture of the frons which is covered with dense longitudinal striations, these somewhat obscure the underlying surface so that the punctures of the underlying integument are partially obscured (Figure 4; in *A. angustula* with the frons lacking clear longitudinal striations, the surface of the integument of the frons visible along with its clear and unobscured punctures), by the orange hind tibiae and tarsi (Figure 1; in *A. angustula* with hind legs dark), and by the sculpture of the clypeus which has very weakly but distinctly raised latitudinal ridges giving a sculptured appearance (Figure 3; in *A. angustula* with the clypeus evenly shagreened, without such latitudinal ridges).

It is important to note that an additional specimen from Kyrgyzstan (see below) could not be confidently placed into either this new species or any of the existing species concepts, as whilst it is closest to *A. sanguinea*, the sculpture of the frons is quite different with clear visible interspaces between the longitudinal striations of the frons, in which deep punctures can be seen. This approaches the condition seen in *A. angustula*. This specimen was also collected in mid-July, a full month before the late August capture date of the *A. sanguinea* type series. All three specimens display relatively unabraded wings; it is difficult to conclude further with such limited material. Until more material is available, particularly male material, this specimen is best referred to as *A. aff. sanguinea*, and it is not included in the type series.

Description.

Female. Body length: 10 mm (Figure 1). Head: Dark, 1.2 times wider than long (Figure 2). Clypeus weakly elevated, more or less flattened medially; surface with fine granular shagreen, dull to weakly shining along apical margin, in basal 3/4rds with weakly but distinctly raised ridges which form pattern of latitudinal striations (Figure 3). Clypeal surface punctate, punctures separated by 0.5 puncture diameters laterally, becoming sparser medially, here separated by 1-2 puncture diameters, some punctures latitudinally elongate due to presence of latitudinal striations. Process of labrum unusual, with strong 90° angle separating frontal and ventral parts; viewed frontally process of labrum short, three times wider than long, rectangular; viewed ventrally, forming rounded semi-circular shape, slightly wider than long. Gena slightly exceeding diameter of compound eye; ocelloccipital distance slightly exceeding diameter of lateral ocellus, vertex behind ocellar triangle weakly shining, densely punctate, punctures separated by 0.5-1 puncture diameters. Foveae broad, occupying almost entire space between compound eye and lateral ocellus, ventrally slightly narrowing at level of antennal insertions; foveae filled with white hairs (Figure 4). Frons covered with dense longitudinal striations, underlying integument punctate, punctures separated by 1-2 puncture diameters, partially obscured by overlying network of striations. Face, gena, frons, and scape with short white hairs, none approaching length of scape. Antennae dark, A5-12 ventrally lightened by presence of brownish-orange scales. A3 clearly exceeding length of A4+5, slightly shorter than A4+5+6.

Mesosoma: Scutum and scutellum polished and shining over majority of surface, with weak shagreenation only in apical ¼ of scutum (Figure 5); surface irregularly punctate, punctures separated by 0.5-2 puncture diameters. Pronotum with weak but distinct humeral angle. Mesepisternum with fine reticulation, weakly shining. Dorsolateral parts of propodeum reticulate, some reticulation forming weakly raised latitudinal ridges; propodeal

triangle weakly defined by lateral carinae, internal surface covered with raised reticulation, not strongly differentiated from dorsolateral parts of propodeum; medially with distinct longitudinal impression. Mesepisternum with whitish hairs; scutum and scutellum laterally with shorter whitish hairs, hairs slightly thickened but not squamous. Propodeal corbicula incomplete, dorsal fringe very sparse, composed of very weakly plumose white hairs, internal surface with short simple white hairs. Legs dark basally, tarsi and hind tibiae lightened orange, pubescence light brown. Flocculus weak, composed of white plumose hairs; femoral and tibial scopae with white simple hairs. Hind tibial claws with small inner tooth. Wings hyaline, stigma and venation orange, nervulus antefurcal.

Metasoma: Terga extensively red-marked (Figure 6), red markings present on T1 (apical half), T2 (entirely with exception of two small black spots laterally), T3 (entirely to predominantly), and T4 (laterally). Terga with very faint sculpture, more or less polished and shining, tergal discs punctate, punctures separated by 0.5-2 puncture diameters, marginal areas more sporadically punctate, punctures separated by 0.5-3 puncture diameters. Terga with scattered short whitish hairs; apical fringe of T5 composed of golden hairs overlain by longer white hairs, hairs flanking pygidial plate golden. Pygidial plate triangular with narrowly truncate apical margin and raised margins laterally, internal surface with strongly elevated triangular area medially.

Male. Unknown.

Distribution: North-eastern Kyrgyzstan.

Derivatio nominis: Feminine singular nominative form of the Latin adjective *sanguineo* meaning 'blood-stained', in reference to the red-marked metasoma.

Other material examined: (*A. aff. sanguinea*): Kyrgyzstan: vlakte bergen riv. Teyeksu [35 km E Bokonbayevo], 42.0761°N, 77.3781°E, 17.vii.2019, 1♀, leg. M. Jacobs & K. Janssen, coll. T.J. Wood.

***Andrena (Ulandrena) discus* nov.sp. (Figs 7-15)**

Material examined: Holotypes: Tajikistan: Vose, 120 km SE Dushanbe, 37.8080°N, 69.6354°E, 12-13.v.1991, 1♂, leg. J. Halada, coll. Biologiezentrum Linz; Paratypes: Tajikistan: Vose, 120 km SE Dushanbe, 12-13.v.1991, 3♂♂, 2♀♀, leg. J. Halada, coll. Biologiezentrum Linz; coll. T.J. Wood; Iran: North Khorasan, Bojnurd, 15.v.2018, 1♀, leg. M. Allahverdi, coll. M. Allahverdi, Gorgan; Iran: Razavi Khorasan, 5 km E of Bazangan [5 km E of Bazangan], 20.iv.2018, 1♂, leg. M. Allahverdi, coll. M. Allahverdi, Gorgan; Turkmenistan: Sandikatzi env. [Sandykgacy], 3-13.v.1993, 1♂, leg. J. Halada, coll. Biologiezentrum Linz.

Diagnosis. *Andrena discus* can be recognised as part of the subgenus *Ulandrena* in the female sex due to the hind tibial spur which is broadened submedially, the lack of a raised latitudinal carina on the posterior face of the hind femur, the extremely dense, fine, and regular punctation of the scutum (Figure 9), the weakly and obscurely plumose hairs of the tibial scopae, and in the male sex due to the extensive yellow facial markings (Figure 12; covering the clypeus and the lower paraocular areas) combined with the genital capsule that has the penis valves broadened, forming a more or less rounded disc (Figure 15).

Its moderate body size (7-8 mm), dark female face (Figure 8; without yellow markings), dark terga with hints of weak metallic green reflections (Figure 10; without red markings), and female hind tibial claws with a clear inner subapical tooth allow the female to be separated from all *Ulandrena* species currently known from Central Asia, which are either much larger (>12 mm in length, *A. elegans* GIRAUD, 1863, *A. fedtschenkoi* MORAWITZ, 1876), have yellow facial markings (*A. fedtschenkoi*, *A. eburneoclypeata* LEBEDEV, 1929),

have red-marked terga (*A. leucorhina* MORAWITZ, 1876, *A. mikhaili* OSYTSHNJUK, 1982, *A. nesterovi* OSYTSHNJUK, 1982), or lack an inner subapical tooth on the hind tarsal claws (*A. elegans*, *A. fedtschenkoi*, *A. eburneoclypeata*, *A. mikhaili*, and *A. nesterovi*).

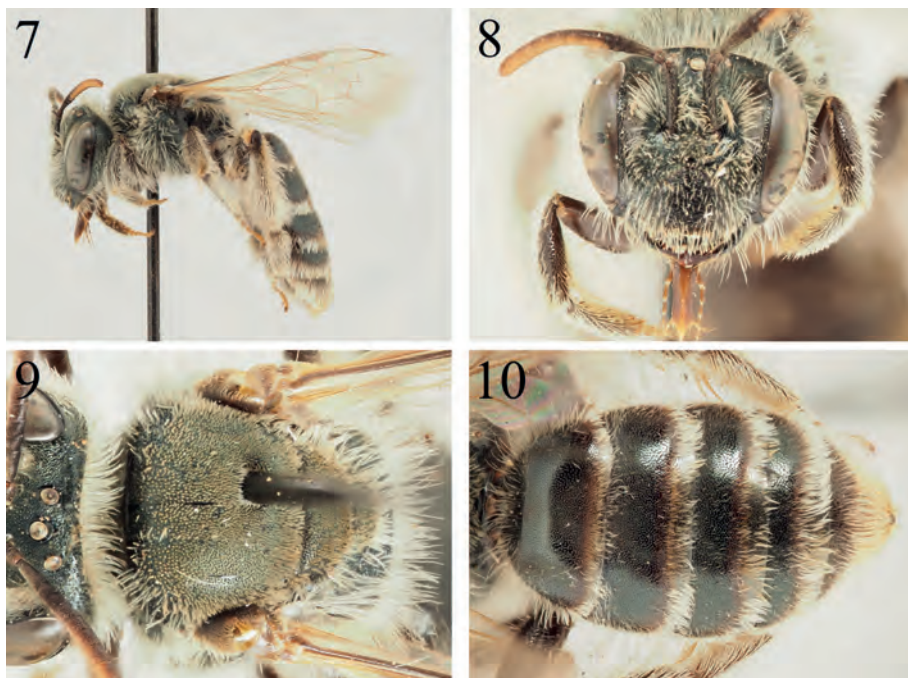
The genital capsule of the male is unusual since due to the penis valves forming a rounded disc shape (Figure 15) it resembles a form found more commonly in the Mediterranean species, most pertinently *A. neocyprica* MAVROMOUSTAKIS, 1956 (Bulgaria, Greece, Cyprus, Turkey, Syria). *Andrena discus* can be easily separated from *A. neocyprica* because the gonostyli are produced into rounded but clearly projecting teeth, whereas in *A. neocyprica* the gonostyli are truncate, with their inner margins forming 90° angles (Figure 16). Additionally, A3-7 of *A. neocyprica* also show bulbous projections ventrally, giving the antennae a distinctly serrate appearance in their basal half; all antennal segments are parallel-sided in *A. discus*.

Finally, *A. discus* males are very similar in appearance to the males of *A. satellita* NURSE, 1904 which is known only from the type series collected around Peshin in western Pakistan (Figures 17-20). This species was described only from the male sex, without description of the genital capsule (NURSE 1904), and none of the inspected specimens at the Natural History Museum, London, had their genital capsule visible. However, the two species can be separated by the antennal ratios. In *A. discus*, A3 is long, almost equalling the length of A4+5; A4 is short and subquadrate, measured along its ventral surface it is shorter than broad, and clearly shorter than A5, A5-13 all rectangular and longer than broad (Figure 13). In *A. satellita*, A3 is also long, equalling A4+5, but A4 and A5 are short and subquadrate, at most as long as broad, and A6-13 are only slightly longer than broad (Figure 19).

Description.

Female. Body length: 7-8 mm (Figure 7). Head: Dark, 1.2 times wider than long (Figure 8). Clypeus weakly domed, surface finely microreticulate, weakly shining; surface punctate, punctures with weakly raised rims, separated by 0.5-2 puncture diameters. Clypeus dark over majority of surface, with weak but distinct metallic green reflections along its lateral and dorsal margins. Process of labrum trapezoidal, twice as broad as long, apical margin with faint shallow emargination. Gena slightly exceeding diameter of compound eye; ocelloccipital distance equalling diameter of lateral ocellus. Foveae occupying ½ space between compound eye and lateral ocellus; foveae filled with light whitish-brown hairs. Frons and lower paraocular areas with weak but distinct metallic green reflections. Face, gena, frons, and scape with light whitish-brown hairs, none approaching length of scape. Antennae basally dark, A5-12 ventrally strongly lightened due to presence of orange scales. A3 slightly exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum extremely densely punctate, punctures almost confluent, separated by <0.5 puncture diameters; interspaces shining (Figure 9). Pronotum rounded. Mesepisternum microreticulate; dorsolateral parts of propodeum more strongly microreticulate, forming network of raised reticulation. Propodeal triangle weakly defined by lateral carinae, internal surface with raised reticulation, not strongly differentiated from dorsolateral parts of propodeum. Mesepisternum with long white hairs, approaching length of scape; scutum and scutellum with very short almost squamous light brown hairs, not obscuring underlying surface. Propodeal corbicula incomplete, dorsal fringe strong, composed of long plumose light brown hairs, internal surface with occasionally simple yellowish hairs. Legs dark, apical tarsal segments lightened orange, pubescence whitish.



Figs 7-10: *Andrena (Ulandrena) discus* nov.sp. female (7) profile; (8) face, frontal view; (9) scutum, dorsal view; (10) terga, dorsal view.

Flocculus strong, composed of white plumose hairs; femoral and tibial scopae with white hairs, those of tibial scopa weakly but distinctly plumose. Hind tibial claws with inner tooth. Wings hyaline, stigma and venation orange, nervulus interstitial.

Metasoma: Tergal discs dark, with weak hints of metallic blue-green colouration; tergal margins broadly lightened hyaline-white apically to brownish basally (Figure 10). Terga with very weak microsculpture, more or less shining. Terga densely punctate, punctures separated by 0.5-1 puncture diameters. Tergal discs with scattered short hairs, T1-4 with apical hair bands of white hairs, complete in fresh individuals, obscuring underlying surface when fresh.; apical fringe of T5 composed of golden hairs overlain by longer white hairs, hairs flanking pygidial plate golden. Pygidial plate narrowly triangular, apex rounded, surface with weakly raised longitudinal rounded area medially.

Male. Body length: 7-8 mm (Figure 11). Head: Dark, 1.3 times wider than long (Figure 12). Clypeus weakly domed, surface finely microreticulate, weakly shining; surface regularly punctate, punctures separated by 0.5-1 puncture diameter. Clypeus entirely and lower paraocular areas with pale ivory colouration. Process of labrum trapezoidal, twice as broad as long, apical margin with shallow emargination, surface smooth and shining. Gena equalling diameter of compound eye; ocelloccipital distance slightly exceeding diameter of lateral ocellus. Face, gena, frons, and scape with long white hairs, longest slightly exceeding length of scape. Antennae basally dark, A5-13 ventrally strongly lightened due to presence of orange scales. A3 exceeding length of A4, slightly shorter than length of A4+5, A4 subquadrate, slightly shorter than broad, clearly shorter than A5;



Figs 11-16: *Andrena (Ulandrena) discus* nov.sp. male (11) profile; (12) face, frontal view; (13) antennae detail, frontal view; (14) terga, dorsal view; (15) genital capsule, dorsal view. *Andrena (Ulandrena) neocyprica* nov.sp. male (16) genital capsule, dorsal view.

A5 rectangular, slightly longer than broad, A6-13 clearly longer than broad (Figure 13). Mesosoma: Scutum and scutellum clearly punctate, punctures separated by 0.5-1 puncture diameters, sparser medially; underlying surface laterally shagreened and dull, medially smooth and shining. Pronotum rounded. Mesepisternum and propodeum structurally as in female. Mesosoma with long white hairs, longest equalling length of scape. Legs dark, apical tarsal segments lightened orange-brown, pubescence whitish. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange, nervulus weakly postfurcal.



Figs 17-20: *Andrena (Ulandrena) satellita* NURSE, 1904 male syntype (17) label details; (18) profile; (19) face, frontal view; (20) terna, dorsal view.

Metasoma: Tergal discs dark, with weak hints of metallic blue-green colouration; tergal margins broadly lightened hyaline-white apically to brownish basally (Figure 14). Terga predominantly with weak microsculpture, more or less shining, tergal discs shagreened basally, here dull. Terga punctate, punctures separated by 1-2 puncture diameters. Tergal discs with scattered short hairs; T1-4 with apical hair bands of white hairs, complete in fresh individuals, obscuring underlying surface when fresh. S8 columnar, apical margin truncate with shallow emargination, ventral surface covered with short whitish hairs. Genital capsule moderately elongate, gonocoxae apically produced into rounded projecting teeth, gonostyli apically broadened, flattened, and spatulate, inner margin raised, dorsal surface covered with short golden hairs. Penis valves broad, lateral hyaline extensions forming rounded elongate disc, occupying majority of space between penis valves.

Distribution: North-eastern Iran (provinces of North Khorasan, Razavi Khorasan), southern Turkmenistan, and Tajikistan. Probably present also in northern Afghanistan and southern Uzbekistan.

Derivatio nominis: From the Latin *discus* meaning a disc, in reference to the round shape formed by the penis valves. It is a noun in apposition.

Other material examined: (*Andrena satellita* NURSE, 1904): Pakistan: Peshin, iv.[19]03, 1♂, leg. C.G. Nurse, coll. Natural History Museum, London (syntype; Figures 17-20).

***Andrena (incertae sedis) fumea* nov.sp. (Figs 21-26)**

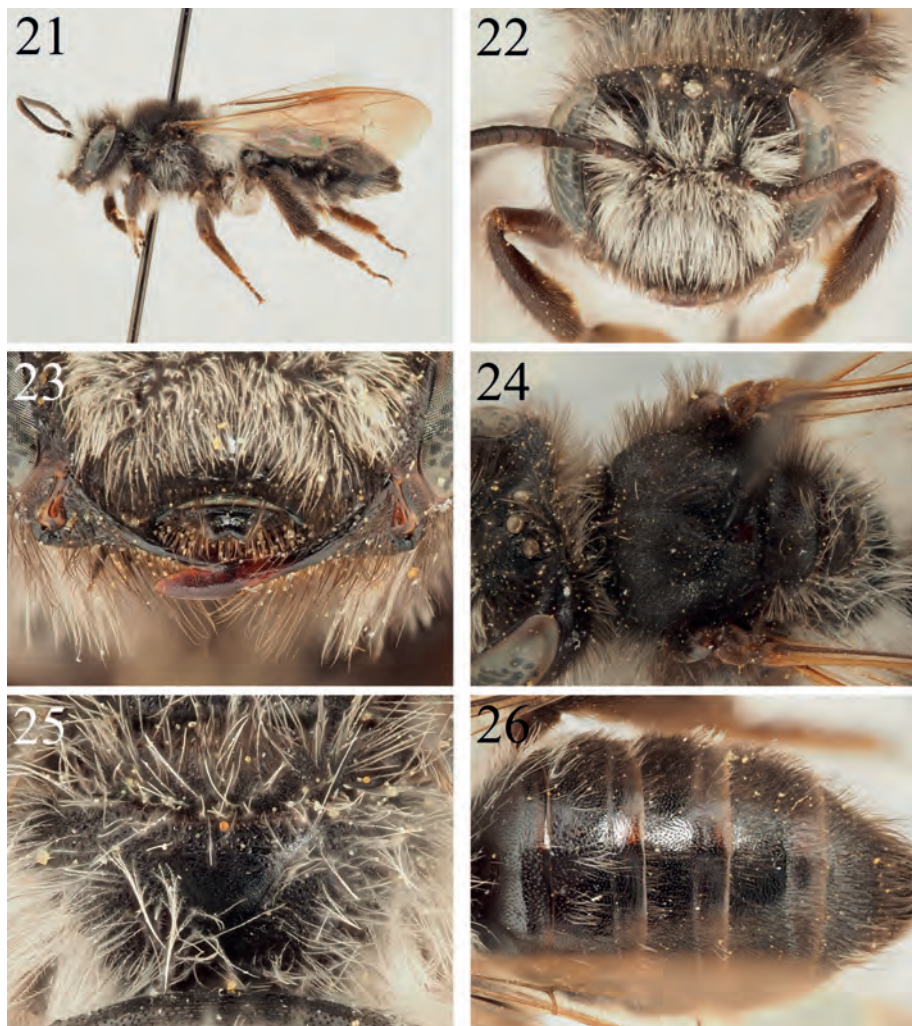
Material examined: Holotypes: Kyrgyzstan: sept. Čon Aryk [Chong-Aryk] (Frunze) [Bishkek], cca 1050 m, 42.8119°N, 74.5844°E, 5.vii.1983, 1♀, leg. B. Tkalců, coll. Biologiezentrum Linz.

Diagnosis. *Andrena fumea* is part of an undescribed subgenus best referred to as the *relata*-group (see PISANTY et al. 2022b; WOOD 2023a; 2023b) that does not display clear defining or distinctive characters, leading to its lack of historical recognition. This group is incompletely characterised, but can predominantly be recognised by the relatively short and compact head with the fore margin of the clypeus slightly raised and forming a ‘J’ shape (Figures 22-23), by the often weak and poorly defined propodeal triangle (Figure 25, though this is less applicable in the case of *A. fumea*), by the ovoid metasoma (Figure 26), and the lack of any distinctive derived characters. It is best diagnosed against the most morphologically similar species which is *A. melanota* Warncke, 1975 (Turkey) due to its similar structure, size, and pubescence (pubescence including scopae predominantly dark with white hairs on the face, mesepisternum, and forming apical white patches laterally on the terga, Figures 21-22; 26).

The two species are very close, but *A. fumea* can be separated by the structure of the clypeus which is evenly punctate, without a slightly raised impunctate mid-line (in *A. melanota* with a clear and slightly raised impunctate mid-line), by the scutum which is more finely and densely punctate, punctures separated by 0.5-1 puncture diameters, underlying surface finely shagreened and weakly shining (Figure 24; in *A. melanota* with the scutum more strongly punctate, punctures separated by 1-2 puncture diameters, underlying surface polished and shining), by the structure of the propodeum which is covered with coarse raised rugae over its basal 1/3rd and with fine granular shagreen over the remaining area, thus strongly contrasting both the sculpture of the basal half and the dorsolateral parts of the propodeum (Figure 25; in *A. melanota* the sculpture of the propodeum is more consistent, with fine raised rugae in its basal half, these becoming weaker but the remaining area finely reticulate, not strongly contrasting the dorsolateral parts of the propodeum), and by the pubescence of the terga, with T2-3 only forming weak and sparse apical hair fringes of white hairs that do not obscure the underlying surface (Figure 26; in *A. melanota* with T2-4 laterally with strong and thick white hair patches that obscure the underlying surface).

Description.

Female. Body length: 13 mm (Figure 21). Head: Dark, 1.3 times wider than long (Figure 22). Clypeus very weakly domed, surface very densely punctate, punctures separated by 0.5 puncture diameters, interspaces weakly shining. Fore margin of clypeus distinctly upturned, forming shallowly rounded semicircle (Figure 23). Process of labrum trapezoidal, twice as broad as long, apical margin with angular emargination. Gena slightly exceeding diameter of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Foveae occupying slightly more than ½ space between compound eye and lateral ocellus; foveae filled with dark brown hairs. Head with intermixed black and white hairs, black hairs covering majority of gena, vertex, dorsal part of frons, and fore margin of clypeus narrowly; white hairs covering majority of lower part of frons, antennal insertions, paraocular areas, and clypeus. Antennae dark, A5 ventrally weakly lightened by presence of grey-brown scales. A3 slightly exceeding A4+5, clearly shorter than A4+5+6.



Figs 21-26: *Andrena* (incertae sedis) *fumea* nov.sp. female (21) profile; (22) face, frontal view; (23) process of the labrum, fronto-ventral view; (24) scutum, dorsolateral view; (25) propodeal triangle, dorsal view; (26) terga, dorsal view.

Mesosoma: Scutum and scutellum finely and densely punctate, punctures separated by 0.5-1 puncture diameters, underlying surface finely shagreened and weakly shining (Figure 24). Pronotum with strong humeral angle. Mesepisternum with fine microreticulation, surface with shallow punctation, punctures separated by 0.5-1 puncture diameters. Dorsolateral parts of propodeum reticulate, forming dense network of raised reticulation. Propodeal triangle broad, in basal 1/3rd covered with coarse raised rugae, in apical 2/3rds with fine granular shagreen, strongly contrasting dorsolateral parts of propodeum (Figure 25). Mesepisternum with predominantly white hairs, scutum and

scutellum with black hairs; metanotum and propodeum with predominantly white hairs. Propodeal corbicula incomplete, but with small and weak apical fringe composed of black plumose hairs; dorsal fringe strong, composed of long white plumose hairs, internal surface with scattered long white hairs. Legs dark, apical tarsal segments slightly lightened brownish, pubescence predominantly dark brown to black, ventral margin of fore femur with long fringe of white hairs. Flocculus moderately weak, composed of white and black plumose hairs; femoral scopae composed of long white simple hairs, tibial scopae composed of shorter black simple hairs. Hind tibial claws with strong inner tooth. Wings weakly brownish-infumate, stigma and venation orange, nervulus antefurcal.

Metasoma: Tergal discs dark, tergal margins narrowly lightened brownish (Figure 26). Terga with weak sculpture, more or less polished and shining; terga punctate, punctures separated by 1-2 puncture diameters. Discs of T1-2 with sparse white hairs, discs of T3-5 with dense short black hairs; T1-3 laterally with obscure patches of whitish hairs. Apical fringe of T5 medially and hairs flanking pygidial plate dark brown; apical fringe of T5 laterally with white hairs. Pygidial plate triangular with rounded apex, lateral margins weakly raised, medially with raised triangular area.

Male. Unknown.

Distribution: Northern Kyrgyzstan.

Derivatio nominis: Feminine singular nominative form of the Latin adjective *fumeus* meaning 'smoky, in reference to its dark pubescence, integument, and slightly infumate wings.

Other material examined: (*Andrena melanota* WARNCKE, 1975): Turkey: Erzurum, 28.v.1970, 1♀, leg. H. Ozbek, coll. Biologiezentrum Linz (holotype); Turkey: Erzurum, 26.vii.1966, 1♂, leg. H. Ozbek, coll. Biologiezentrum Linz (paratype); Turkey: Erzurum, 31.viii.1937, 1♂, leg. O. Ecevit, coll. Biologiezentrum Linz (paratype); Turkey: Hakkari, S. Vargös/Mt. Sat, 2000 m, 18.vi.1984, 2♀♀, leg. K. Warncke, coll. Biologiezentrum Linz; Turkey: Hakkari, S. Vargös/Mt. Sat, 2100 m, 14.vi.1984, 1♀, leg. K. Warncke, coll. Biologiezentrum Linz.

***Andrena (incertae sedis) invisibilis* nov.sp. (Figs 27-32)**

Material examined: Holotypes: Kyrgyzstan: Alish, W from Narin [Naryn], 2000-2500 m, 41.4254°N, 75.8580°E, 26.vii.1991, 1♀, leg. S. Bečvář, coll. Biologiezentrum Linz; Paratypes: Kyrgyzstan: Alish, W from Narin [Naryn], 2000-2500 m, 26.vii.1991, 3♀♀, leg. S. Bečvar, coll. Biologiezentrum Linz/ coll. T.J. Wood.

Diagnosis. *Andrena invisibilis* is also part of the undescribed subgenus best referred to as the *relata*-group. This group is incompletely characterised, but can predominantly be recognised by the relatively short and compact head with the fore margin of the clypeus slightly raised and forming a 'J' shape (Figures 28-29), by the ovoid metasoma (Figure 26), and the lack of any distinctive derived characters. Given these problems of recognition, it is best recognised by diagnosis against its most morphologically similar species which is *A. hibernica* WARNCKE, 1975 (Turkey, newly reported for Jordan), specifically *A. hibernica caucasica* WARNCKE, 1975 (Turkey, Azerbaijan, newly reported from Turkmenistan). Both species differ from some of the species placed in the *relata*-group because the propodeal triangle is not weak and poorly defined due to being smooth, but instead is covered with reticulation (Figure 31). *Andrena invisibilis* can be separated by its dense scutal punctures, punctures separated by 0.5-1 puncture diameters (Figure 30; in *A. hibernica caucasica* with punctures sparser and more irregular, separated by 1-3 puncture diameters), by it relatively sparsely punctate terga, punctures separated by 1-2



Figs 27-32: *Andrena* (incertae sedis) *invisibilis* nov.sp. female (27) profile; (28) face, frontal view; (29) process of the labrum, fronto-ventral view (30) scutum, dorsal view; (31) propodeal triangle, dorsal view; (32) terga, dorsal view.

puncture diameters (Figure 32; in *A. hibernica caucasica* with tergal punctures much denser, punctures separated by 0.5-1 puncture diameters), and by its relatively shorter clypeus that only slightly exceeds a line drawn between the lower margins of the compound eyes, the surface of the clypeus evenly punctate, without a longitudinal impunctate mid-line (in *A. hibernica caucasica* with the clypeus more elongate, more clearly exceeding a line drawn between the lower margins of the compound eyes, the surface of the clypeus with a clear, weakly elevated longitudinal impunctate mid-line).

Description.

Female. Body length: 9 mm (Figure 27). Head: Dark, 1.4 times wider than long (Figure 28). Clypeus weakly domed evenly and densely punctate, punctures separated by 0.5-1 puncture diameters, interspaces weakly shining. Fore margin of clypeus distinctly upturned, forming shallowly rounded semicircle (Figure 29). Process of labrum trapezoidal, slightly broader than long, apical margin truncate. Gena slightly exceeding diameter of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Foveae occupying slightly less than $\frac{1}{2}$ space between compound eye and lateral ocellus; foveae filled with light brown hairs. Face, gena, vertex, and scape covered with dense whitish hairs, becoming light brownish on gena posteriorly, none equalling length of scape. Antennae dark, A5-12 ventrally lightened by presence of grey scales. A3 subequal to A4+5.

Mesosoma: Scutum and scutellum densely punctate, punctures separated by 0.5-1 puncture diameters, underlying surface smooth and shining over majority of area, anteriorly shagreened (Figure 30). Pronotum more or less rounded, with at most obscure faint humeral angle. Mesepisternum and dorsolateral parts of propodeum reticulate, forming dense network of raised reticulation; propodeal triangle finely delineated laterally by raised carinae, internal surface with sparser network of raised reticulation, not strong differentiated from dorsolateral parts of propodeum (Figure 31). Mesepisternum ventrally with long whitish hairs, becoming light brownish dorsally, hairs not equalling length of scape. Scutum, scutellum, and propodeum dorsally with light brownish hairs. Propodeal corbicula incomplete, dorsal fringe strong, composed of long whitish plumose hairs, internal surface with long white simple hairs. Legs dark, tarsal segments apically lightened brownish, pubescence whitish to light brownish. Flocculus moderately weak, composed of white plumose hairs; femoral and tibial scopae composed of white simple hairs. Hind tibial claws with strong inner tooth. Wings hyaline, stigma and venation orange, nervulus interstitial.

Metasoma: Tergal discs dark, tergal margins narrowly lightened hyaline-brown (Figure 32). Terga with weak sculpture, more or less polished and shining; terga punctate, punctures separated by 1-2 puncture diameters. Tergal discs with moderately long scattered light brownish hairs, T1 long hairs forming weak loose apical hair fringe, T2-4 with dense narrow apical hair fringes, hairs obscuring underlying surface. Apical fringe of T5 medially and hairs flanking pygidial plate whitish golden. Pygidial plate triangular with rounded apex, lateral margins weakly raised, medially with raised triangular area.

Male. Unknown.

Distribution: Central Kyrgyzstan.

Derivatio nominis: Feminine singular nominative form of the Latin adjective *invisibilis* meaning 'invisible', in reference to its lack of discovery or recognition by previous authors.

Other material examined (*Andrena hibernica* WARNCKE, 1975): Jordan: 30 km N Tafila [At-Tafilah], 2.v.1996, 1♀, leg. Ma. Halada, coll. Biologiezentrum Linz; Jordan: Petra, 800 m, 28.ii-4.iii.1986, 1♀, leg. K.M. Guichard, coll. Natural History Museum, London; Turkey: Yeşilhisar, 27.v.1972, 1♀, leg. K. Warncke, coll. Biologiezentrum Linz (holotype); Turkey: 60 km E Birczik [Birecik], 2.v.1994, 1♀, leg. K. Deneš, coll. Biologiezentrum Linz; Turkey: Maras [Kahramanmaraş] 700 m, 2.vi.1983, 2♀♀, leg. leg. K. Warncke, coll. Biologiezentrum Linz; Turkey: Silifke, Goksu [Göksu] Canyon, 25.iv.2015, 1♀, leg. M. Snižek, coll. Biologiezentrum Linz; (*Andrena hibernica caucasica* WARNCKE, 1975): Azerbaijan: Araxesthal [near Ordubad],

1890, 1♂, leg. Reitter, coll. Biologiezentrum Linz (holotype); Turkey: ~~Harpost Turkey 15-20 July~~ [striketrough present on collecting label] 1919, 1♀, L.H. MacDaniels, coll. Biologiezentrum Linz (paratype); Turkey: 110 km E Mardin, Hasankeyf, 9.v.2002, 1♀, leg. F. Kantner, coll. Biologiezentrum Linz; Turkmenistan: Firjuza-Vanovski, 23-26.iv.1989, 1♂, leg. S. Bečvář, coll. Biologiezentrum Linz.

Discussion

The new species presented here illustrate the extent to which alpha taxonomic work remains to be carried out on the *Andrena* fauna of Central Asia. These four species belong to groups that were either thought not to be present in Central Asia (*Habromelissa*, the *relata*-group) or which are thought to be species-poor (*Ulandrena*). In the case of *A. discus*, *A. fumea*, and *A. invisibilis*, the closest comparison species have distributions restricted to the West Palaearctic or with an eastern range limit on the Turkmenistan side of the Kopet Dag mountains. As our understanding of how *Andrena* lineages relate to one another improves (PISANTY et al. 2022b), so does our understanding of how groups should be recognised, permitting improved placement of obscure species described in the 19th and 20th centuries, and facilitating the description of new species and synonymies of older names (e.g. PISANTY et al. 2022a; WOOD 2020a; 2023b; WOOD & MONFARED 2022). It may be that the mountains of Kyrgyzstan host isolated representatives of more western *Andrena* lineages, and that their lack of recognition simply reflects the lack of collecting effort and taxonomic work the bees of this country.

In this context, it is clear that the *Andrena* fauna of the southern and eastern parts of Central Asia are those in most need of attention. Though receiving attention from several authors (e.g. RADOSZKOWSKI 1886; MORAWITZ 1894; LEBEDEV 1929; POPOV 1940; OSYTSJNIUK 1983a; 1984; 1986; 1993), Turkmenistan remains incompletely studied, in particular its extreme southern fringes which continue to produce small numbers of distinctive *Andrena* species (e.g. SCHÖNITZER 1997; DUBITZKY 2006), as well as unusual species from other bee groups (e.g. KASPAREK 2022). A contributing factor to this lack of study is that the southern part of Central Asia borders Afghanistan, a region with a volatile history that has inhibited scientific study; only one focused study has described new species from this country (WARNCKE 1974). It is highly likely that there is a shared fauna between northern Afghanistan and the southern part of Central Asia, but until study of the Afghan bee fauna is possible, this will remain obscure.

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Zusammenfassung

Zentralasien ist ein riesiges Gebiet mit einer großen Vielfalt an Lebensräumen, das jedoch nur unzureichend erfasst und erforscht ist. Diese unvollkommene Studie gilt für die Vertreter der

artenreichen Bienengattung *Andrena*, die dafür bekannt ist, dass sie sich schnell spezifiziert und ein hohes Maß an lokaler Anpassung und Endemismus aufweist. Trotz geeigneter *Andrena*-Habitate ist aus Zentralasien nur eine überraschend kleine regionale Gesamtmenge bekannt. Jüngste Dokumentationen von wichtigem Typenmaterial und laufende Studien haben eine erneute Untersuchung dieser Fauna ermöglicht. *Andrena (Ulandrena) discus* nov.sp. wird aus Tadschikistan, dem südlichen Turkmenistan und dem nordöstlichen Iran beschrieben, und *Andrena (Habromelissa) sanguinea* nov.sp., *Andrena (incertae sedis) invisibilis* nov.sp. und *Andrena (incertae sedis) fumea* nov.sp. werden aus Kirgisistan beschrieben. Es ist wahrscheinlich, dass in diesen Regionen nach erneuten Sammlungsbemühungen und der Untersuchung von Museumsmaterial viele weitere neue Arten für die Wissenschaft entdeckt werden.

References

- ASCHER J.S. & J. PICKERING (2020): Discover Life bee species guide and world checklist (Hymenoptera: Apoidea: Anthophila).
http://www.discoverlife.org/mp/20q?guide=Apoidea_species
- ASTAFUROVA Y.A., PROSHCHALYKIN M.Y., SIDOROV D.A. & A.Z. OSYTSJNJK (2021): The type specimens of bees (Hymenoptera, Apoidea) deposited in the Zoological Institute of the Russian Academy of Sciences, St. Petersburg. Contribution IV. Family Andrenidae, genus *Andrena* Fabricius, 1775, species described by F. Morawitz. — *Zootaxa*. **5037**: 1-78.
- ASTAFUROVA YA., PROSHCHALYKIN MY. & SIDOROV DA. (2022) The bees of the genus *Andrena* Fabricius, 1775 (Hymenoptera, Andrenidae) described by Ferdinand Morawitz from the collection of Aleksey Fedtschenko. — *ZooKeys*. **1120**: 105-176.
- BOSSERT S., WOOD T.J., PATINY S., MICHEZ D., ALMEIDA E.A.B., MINCKLEY R.L., PACKER L., NEFF J.L., COPELAND R.S., STRAKA J., PAULY A., GRISWOLD T., BRADY S.G., DANFORTH B.N. & MURRAY E.A. (2022) Phylogeny, biogeography and diversification of the mining bee family Andrenidae. — *Syst. Entomol.* **47**: 283-302.
- DUBITZKY A. (2006): New palearctic species of the bee genus *Andrena* (Insecta: Hymenoptera: Andrenidae). — *Zootaxa* **1284**: 1-27.
- GRÜNVALDT W., OSYTSJNJK A.Z. & E. SCHEUCHL (2005): Neue *Andrena*-Arten aus der Paläarktis (Hymenoptera: Apidae: Andreninae). — *Entomofauna* **26**: 349-368.
- GUSENLEITNER F. & M. SCHWARZ (2002) Weltweite Checkliste der Bienengattung *Andrena* mit Bemerkungen und Ergänzungen zu paläarktischen Arten (Hymenoptera, Apidae, Andreninae, *Andrena*). — *Entomofauna, Supplement* **10**: 1-1280.
- KASPAREK M. (2022): A new species of *Anthidium* bee with an armed sternum from Turkmenistan (Apoidea, Anthidiini). — *Linzer biol. Beitr.* **54** (1): 195-201.
- LEBEDEV AG. (1929): Neue Bienen-Arten aus S.S.S.R. — *Konowia* **8**: 268-272.
- MICHENER CD. (2007): The bees of the world. 2nd edition. — Johns Hopkins University Press, Baltimore, 972 pp.
- MORAWITZ F. (1876): Bienen (Mellifera). II. Andrenidae. In: FEDTSCHENKO A.P. Reisen in Turkestan II. — *Izv. imp. Obshch. Ljubit. Estest. Antrop. Etnog.* **21**: 161-303. [in Russian]
- MORAWITZ F. (1894): Beitrag zur Bienenfauna Turkmeniens. — *Hor. Soc. ent. Ross.* **29**: 1-76.
- NURSE CG. (1904) New species of Indian Hymenoptera. Apidae. — *J. Bombay nat. Hist. Soc.* **15**: 557-585.
- OSYTSJNJK A.Z. (1983a): A new subgenus and new species of bees of the genus *Andrena* F. (Hymenoptera, Andrenidae) from the Asiatic part of the USSR. — *Ent. Obozr.* **62**: 794-799. [in Russian]
- OSYTSJNJK A.Z. (1983b): Three new species of *Andrena* (Hymenoptera, Andrenidae) from Kazakhstan. — *Vest. Zool.* **1**: 20-27. [in Russian]
- OSYTSJNJK A.Z. (1984): Four new species of the genus *Andrena* (Hymenoptera, Andrenidae) from Middle Asia. In: SAVCHENKO E.N. (Ed.), *Taxonomy and Zoogeography of Insects. A Collection of Papers*. — *Naukova Dumka, Kiev*, pp. 89-94. [in Russian]

- OSYTSHNJUK A.Z. (1986): New palaearctic species of the subgenus *Euandrena* HED. (Hymenoptera, Andrenidae, genus *Andrena* F.). — Ent. Obozr. **65**: 407-418. [in Russian]
- OSYTSHNJUK A.Z. (1993): New Palaearctic species of bees of the subgenus *Micrandrena* Ashmead (Hymenoptera, Andrenidae, Genus *Andrena* Fabr.). — Ent. Obozr. **72**: 401-409. [in Russian]
- OSYTSHNJUK A.Z. (1994): New subgenera and new species of Palaearctic *Andrena* bees (Hymenoptera, Andrenidae). Communication 3. — Vest. Zool. **1994** (4-5): 17-23, 34. [in Russian]
- OSYTSHNJUK A.Z., ROMASENKO L., BANASZAK J. & T. CIERZNIAK (2005): Andreninae of the Central and Eastern Palaearctic. Part 1. — Polish Entomological Monographs II. Polish Entomological Society, Poznań: 235 pp.
- OSYTSHNJUK A.Z., ROMASENKO L., BANASZAK J. & E. MOTYKA (2008): Andreninae of the Central and Eastern Palaearctic. Part 2. — Polish Entomological Monographs II. Polish Entomological Society, Poznań: 233 pp.
- PISANTY G., SCHEUCHL E., MARTIN T., CARDINAL S. & T.J. WOOD (2022a): Twenty-five new species of mining bees (Hymenoptera: Andrenidae: *Andrena*) from Israel and the Levant. — Zootaxa. **5185**: 1-109.
- PISANTY G., RICHTER R., MARTIN T., DETTMAN J. & S. CARDINAL (2022b): Molecular phylogeny, historical biogeography and revised classification of andrenine bees (Hymenoptera: Andrenidae). — Mol. Phylogenet. Evol. **170**: 107151.
- POPOV V. (1940): Contributions to the knowledge of the palaearctic species of the genus *Andrena* F. (Hymenoptera, Apoidea). — Trudy zool. Inst. Leningr. **6**: 252-262. [in Russian]
- PRAZ C., GENOUD D., VAUCHER K., BÉNON D., MONKS J. & T.J. WOOD (2022): Unexpected levels of cryptic diversity in European bees of the genus *Andrena* subgenus *Taeniandrena* (Hymenoptera, Andrenidae): implications for conservation. — J. Hymenopt. Res. **91**: 375-428.
- RADOSZKOWSKI O. (1886): Fauna Hyménoptérologique Transcaspienne. — Hor. Soc. ent. Ross. **20**: 3-56.
- SCHÖNITZER K. (1997): Eine neue Sandbiene aus Zentralasien, die der *Andrena* (*Carandrena*) *subsmaragdina* Osytszhnjuk ähnlich ist: *Andrena ledermanni*, spec. nov. — Spixana **20**: 309-316.
- TADAUCHI O. (2008): The genus *Andrena* from Kazakhstan and Kyrgyzstan (Hymenoptera, Andrenidae) (2). Esakia **48**: 1-18.
- WARNCKE K. (1974): Beiträge zur Kenntnis der Fauna Afghanistans. (Sammelergebnisse von O. Jakeš 1963–64, D. Povolný 1965, D. Povolný & Fr. Tenora 1966, J. Šimek 1965–66, D. Povolný, J. Gaisler, Z. Šebek & Fr. Tenora 1967.) Colletidae & Andrenidae, Apoidea, Hym. — Cas. morav. Mus. Brně. **58**: 159-170.
- WOOD T.J. & A. MONFARÉD (2022): A revision of the *Andrena* (Hymenoptera: Andrenidae) fauna of Iran, with the description of 16 new species. — Eur. J. Taxon. **843**: 1-136.
- WOOD T.J. (2023a): The genus *Andrena* FABRICIUS, 1775 in the Iberian Peninsula. — J. Hymenopt. Res. **96**: 241-484.
- WOOD T.J. (2023b): New Old World *Andrena* species, with a focus on Turkey (Hymenoptera: Andrenidae). — Zootaxa **5266**: 1-72.

Author's address:

Dr. Thomas WOOD
Laboratory of Zoology, University of Mons,
Avenue du Champs de Mars 6, Bâtiment Pentagone,
7000, Mons, Belgium
E-mail: thomasjames.wood@umons.ac.be

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