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Additions, corrections, and other changes to the hyper-diverse bee genus *Andrena* Fabricius, 1775 (Hymenoptera: Andrenidae)

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ABSTRACT

The bee genus *Andrena* is one of the largest genera of animals, with more than 1,700 species known globally. Despite the description of approximately 200 new species in the past decade, much work remains to be carried out on this rapidly speciating genus. The present work contributes to this ongoing revisionary process. Lectotypes are designated for 21 species. Missing sexes are described or diagnosed for ten species. Neotypes are designated for two species. Two names are considered as ***nomina dubia***. The following 16 synonymies are proposed (senior name first): *A.* (*Andrena*) *valentinae* Osytshnjuk, 1993 = *Andrena* (*Andrena*) *cephalgia* Wood, 2023 **syn. nov.**, *A.* (*Andrena*) *gracillima* Cameron, 1897 = *A.* (*Andrena*) *gilvithoracica* Xu & Tadauchi, 2012 **syn. nov.**, *A.* (*Callandrena*) *uyacensis* Cockerell, 1949 = *A.* (*Callandrena*) *hondurasica* Cockerell, 1949 **syn. nov.**, *A.* (*Campylogaster*) *chengtehensis* Yasumatsu, 1935 = *A.* (*Campylogaster*) *kintschouensis* Hedicke, 1940 **syn. nov.**, *A.* (*Cnemidandrena*) *mephistophelica* Cameron, 1897 = *A.* (*Cnemidandrena*) *kishidai* Yasumatsu, 1935 **syn. nov.**, *A.* (*Euandrena*) *alijevi* Osytshnjuk, 1986 = *Andrena* (*Euandrena*) *sani* Wood & Monfared, 2022 **syn. nov.**, *A.* (*Melandrena*) *barbareae* Panzer, 1805 = *A.* (*Melandrena*) *basifusca* Cockerell, 1930 **syn. nov.**, *A.* (*Micrandrena*) *sedentaria* Warncke, 1975 = *A.* (*Micrandrena*) *dmitrii* Osytshnjuk, 1993 **syn. nov.**, *A.* (*Plastandrena*) *balucha* Nurse, 1904 = *A.* (*Plastandrena*) *quettensis* Cockerell, 1917 **syn. nov.**, *A.* (*Plastandrena*) *leucomelaena* Hedicke, 1940 = *A.* (*Plastandrena*) *magnipunctata* Kim & Kim, 1989 **syn. nov.**, *A.* (*Simandrena*) *combinata* (Christ, 1791) = *A.* (*Simandrena*) *cryptodonta* Cockerell, 1922 **syn. nov.**, *A.* (*Taeniandrena*) *kozlovi* Osytshnjuk, 1994 **stat. nov.** = *A.* (*Taeniandrena*) *xuanzangi* Tadauchi & Xu, 2003 **syn. nov.**, *A.* (*Taeniandrena*)

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zachroa Cockerell, 1930 **sp. resurr.** = *A.* (*Taeniandrena*) *prazi* Wood, 2023 **syn. nov.**, *A.* (*Troandrena*) *praecocella* Cockerell, 1917 = *A.* (*Troandrena*) *saettana* Warncke, 1975 **syn. nov.**, *A.* (*Truncandrena*) *combusta* Morawitz, 1876 = *A.* (*Truncandrena*) *subspinigera* Cockerell, 1917 **syn. nov.**, and *A.* (incertae sedis) *leaena* Cameron, 1907 = *A.* (incertae sedis) *punjabensis* Cameron, 1908 **syn. nov.** The following additional taxa are elevated to species rank: *A.* (*Micrandrena*) *trigona* Warncke, 1968 **stat. nov.**, *A.* (incertae sedis) *emigrata* Warncke, 1975 **stat. nov.**, and *A.* (incertae sedis) *sculpturata* Warncke, 1975 **stat. nov.** Finally, the following 21 new species are described: *A.* (*Micrandrena*) *stiletto* **spec. nov.**, *A.* (*Nobandrena*) *dubitzkyi* **spec. nov.**, *A.* (*Taeniandrena*) *tianshanica* **spec. nov.**, *A.* (*Ulandrena*) *rubescens* **spec. nov.**, *A.* (incertae sedis) *pilosidorsum* **spec. nov.**, and *A.* (incertae sedis) *laticincta* **spec. nov.** from Central Asia, *A.* (incertae sedis) *spirantha* **spec. nov.** from China (Yunnan), *A.* (*Euandrena*) *binghami* **spec. nov.** and *A.* (*Lepidandrena*) *arunachala* **spec. nov.** from India, *A.* (*Micrandrena*) *yazdi* **spec. nov.** from Iran, *A.* (*Longandrena*) *relicta* **spec. nov.** from Israel, *A.* (incertae sedis) *mysteria* **spec. nov.** from Lebanon, Israel, and Turkey, *A.* (*Ulandrena*) *robertsi* **spec. nov.** from Libya, *A.* (incertae sedis) *rubricincta* **spec. nov.** from Morocco, *A.* (*Margandrena*) *maxillaris* **spec. nov.** from Nepal and India, *A.* (*Andrena*) *holzschuhi* **spec. nov.** and *A.* (*Simandrena*) *patera* **spec. nov.** from Pakistan, *A.* (incertae sedis) *viridella* **spec. nov.** from Syria and Turkey, and *A.* (incertae sedis) *arabissos* **spec. nov.**, *A.* (incertae sedis) *brunnescens* **spec. nov.**, and *A.* (incertae sedis) *eborifacies* **spec. nov.** from Turkey. These revisions bring the size of the genus to 1,738 species, with likely several hundred species remaining to be described.

KEYWORDS

hyper-diverse, Palaearctic, new species, largest animal genera, synonymy, neotype

INTRODUCTION

Mining bees of the genus *Andrena* are largely restricted to the Holarctic biogeographic region, with only a miniscule fraction of species found elsewhere, yet they are enormously speciose with 1,738 species known globally (e.g. Gusenleitner & Schwarz 2002, Gusenleitner et al. 2005, Dubitzky 2006, Scheuchl & Gusenleitner 2007, 2009, Tadauchi & Matsumura 2007, Xu & Tadauchi 2009, 2011, 2012a, 2012b, Dubitzky et al. 2010, Schwenninger 2015, Pisanty et al. 2016, 2018, 2022a, 2022b, Praz et al. 2019, 2022, Wood et al. 2020a, 2020b, 2023, 2024, Wood 2020, 2021a, 2021b, 2023a, 2023b, 2023c, 2024a, 2024b, Bossert et al. 2022, Wood & Monfared 2022, Astafurova et al. 2023, Schwenninger 2023, Ascher & Pickering 2024, Gautam et al. 2024, Neff 2024, Pisanty & Wood 2024, Zabinski 2024, *further revisions presented here*). These citations are not exhaustive, and it is hoped that in the near future, a formal update to the work of Gusenleitner and Schwarz (2002) can be made to produce a fully updated global *Andrena* checklist.

With such a large number of species, *Andrena* have been argued to be one of the largest genera of animals (Dubitzky et al. 2010, Minelli 2015). Although genera are subjective constructs, comparisons between them can be informative if the genera considered are monophyletic. In a biological sense, genuinely dense clusters of biotic diversity exist as a result of differential speciation rates across space and time (Minelli 1993), and the recognition of such clusters is useful for investigating the question as to why such clusters are species-rich relative to other groupings. As large genera can be unwieldy, some have advocated for breaking them up. For example, Mayr (1942: 283) wrote "Genera with 500, 1,000, or even 2,000 species are very inconvenient, and any excuse for breaking them up into smaller units should be good enough". However, *Andrena* is

exceedingly difficult to find a good place to split, and its monophyly is now very well established (Michener 2007, Dubitzky et al. 2010, Bossert et al. 2022, Pisanty et al. 2022b). This demonstrated monophyly allows for meaningful comparisons with other large monophyletic bee genera such as *Lasioglossum* Curtis, 1833, which although containing a greater number of species (Landaverde-González et al. 2023, Ascher & Pickering 2024), is a slightly older genus and hence has a slightly lower speciation rate (Bossert et al. 2022). *Andrena* can hence be considered as one of if not the most rapidly speciating groups of bees (Bossert et al. 2022).

Concerning the size of the genus, in order to update the synthesis of Minelli (2015), a search of the literature was made, suggesting that *Andrena* remain within the top 10 most species-rich animal genera at the present time (Table 1). Searches were made using the Integrated Taxonomic Information System (ITIS) and Global Biodiversity Information Facility (GBIF) species name datasets, before then searching the primary literature to find up to date modern publications or online checklists to support these positions. Concerning the genera themselves, unsurprisingly the list is dominated by the four mega-diverse insect orders Coleoptera, Diptera, Lepidoptera, and Hymenoptera (Forbes et al. 2018). Whilst future species counts within genera are likely to change enormously once other hyper-diverse groups and genera receive appropriate taxonomic attention (e.g. Srivathsan et al. 2023, Doan et al. 2024), this result further emphasises the high species richness of *Andrena* at a global scale against all other animal genera.

When conducting taxonomic revision at a species-level, *Andrena* workers in the 21st century have benefited enormously from the comprehensive type catalogue produced by Gusenleitner and Schwarz (2002) and its subsequent amendment (Gusenleitner et al. 2005). This catalogue focused most strongly on the Palaearctic fauna, drawing on the revisionary work of Klaus Warncke (1937–1993) who is the most prolific describer of *Andrena* globally (e.g. Warncke 1967, 1968a, 1968b, 1969, 1974, 1975, 1980, 1988; see Discussion). Warncke received much

Table 1. The 10 largest animal genera by number of described species

Order	Genus	No. species	References
Coleoptera	*Agrilus*	3341	Kelnarova et al. (2018), Jendek and Grebennikov (2023)
Coleoptera	*Stenus*	c. 3200	Newton (2022), Shaw and Reid (2024)
Diptera	*Tipula*	2428–2781	Evenhuis and Pape (2024), Oosterbroek (2024)
Coleoptera	*Euconnus*	c. 2500	Jałoszyński (2012) to Jałoszyński (2022), Caterino (2022)
Coleoptera	*Onthophagus*	2238	Schoolmeesters (2024)
Lepidoptera	*Eupithecia*	2098	Rajaei et al. (2022)
Diptera	*Simulium*	1954–1979	Adler (2022), Evenhuis and Pape (2024)
Hymenoptera	*Lasioglossum*	1841–c. 1900	Landaverde-González et al. (2023), Ascher and Pickering (2024)
Diptera	*Megaselia*	1767–1896	PCAT (2024), Evenhuis and Pape (2024)
Hymenoptera	*Andrena*	1738	Gusenleitner and Schwarz (2002), Gusenleitner et al. (2005), Ascher and Pickering (2024), *current work*

guidance from Robert W. Grünwaldt (1909–2003; Zoologische Staatssammlung München, ZSM), who mentored him and provided context with his unpublished knowledge of the genus (Kraus & Blank 1994). Whilst Warncke's *Andrena* revisions focused predominantly on the West Palaearctic, Grünwaldt was also in contact with Anna Z. Osytshnjuk (1926–1998) who was based in Kyiv, and who was revising *Andrena* in the Central and Eastern Palaearctic with a focus on the Soviet fauna (e.g. Osytshnjuk 1979, 1982, 1983a, 1983b, 1984a, 1984b, 1984c, 1986, 1993a, 1993b, 1994, 1995). She was working on an *Andrena* key for the ZSM at the time of her death, some of which has been published posthumously (Osytshnjuk et al. 2005, 2008). Although sharing a mutual connection, Osytshnjuk and Warncke did not really deal with each other's taxa fully, partly because most of Osytshnjuk's species description work was published after 1980, and Warncke only published two additional papers on *Andrena* during this period. There has therefore been a need to clarify some taxon names across the West and Central Palaearctic (e.g. Wood & Monfared 2022).

In the East Palaearctic, Osamu Tadauchi & Han-Li Xu worked extensively on the East Asian fauna in recent decades, drawing on the legacy of Yasumatsu (e.g. Yasumatsu 1935) and the more extensive work of Hirashima (e.g. Hirashima 1952, 1957, 1963, 1966, Hirashima & Tadauchi 1975) who more or less fully revised the *Andrena* of Japan. These two authors made great efforts to revise Asian *Andrena* types in overseas institutions (e.g. Xu & Tadauchi 1997, 1998, Tadauchi & Xu 1999, Tadauchi & Matsumura 2007), but inevitably this work was incomplete given the huge diversity of Asian *Andrena* and the unhelpfully scattered nature of the non-Asian type depositories, predominantly in Germany, European Russia, the United Kingdom, and the United States. As such, several of their revisions simply do not deal with many taxa present (at least in principle, pending modern revision of their true statuses) in East Asia. For example, this would include the species described from China in the subgenus *Plastandrena* Hedicke, 1933 by Popov (1949, see Astafurova et al. 2023) which are absent from their revision of East Asian *Plastandrena* (Xu & Tadauchi 2011) or several species of *Euandrena* Hedicke, 1933 which are absent from their revision of East Asian *Euandrena* (Xu & Tadauchi 2012a).

One worker whose type material has not been well investigated is that of Hans Franz Paul Hedicke. Hedicke (1891–1949) was a German entomologist who worked on several groups of bees, amongst other insects. He was most closely associated with the Berlin museum, but he is not well known due to his premature death during the difficult post-war years in Germany, and a general lack of writing about his life and works (Königsmann 1971). During his life, he worked on bees including *Andrena*, publishing an important work on their subgeneric classification (Hedicke 1933) which established many subgenera in current use (Pisanty et al. 2022b). He described or provided replacement names for nine *Andrena* taxa in a series of publications (Hedicke 1923, 1933, 1934, 1938, 1940, 1942), but other than for the replacement names (see Table 2), the location of the type material is unclear. Gusenleitner and Schwarz (2002) gave the Berlin museum (ZMHB) as the type depository for his material, but repeated searches (in 2020 and 2023) have not been able to locate these specimens (see also Pisanty et al. 2018). Some of Hedicke's type material has been discovered in other collections, for example the type specimens for the *Anthophora* species described by Hedicke (1931) have recently been discovered in the Naturalis Biodiversity Center collection (RMNH) via the Oskar Vogt collection (T.J. Wood, *unpublished data*). However, none of Hedicke's *Andrena* types could be found there. There is therefore an opportunity to conclusively deal with his specific names in more detail here.

Table 2. The nominal *Andrena* taxa described by Hedicke and their current statuses

Species	Status	Senior taxon or status	Type depository
Andrena atrotegularis Hedicke, 1923 (nom. nov. pro *Andrena ephippium* var. *macedonica* Friese, 1923)	Valid		ZMHB
Andrena aerinifrons levantina Hedicke, 1938	Valid		Lost
Andrena foveolata Hedicke, 1940	Invalid	***nomen dubium***	Lost
Andrena gemmea Hedicke, 1933 (nom. nov. pro *Andrena smaragdina* Schmiedeknecht, 1900)	Invalid	*Andrena nigroviridula* Dours, 1873	ZSM
Andrena kintschouensis Hedicke, 1940	Invalid	*Andrena chengtehensis* Yasumatsu, 1935	RMNH, **neotype**
Andrena leucomelaena Hedicke, 1940	Valid		RMNH, **neotype**
Andrena paraulica Hedicke, 1940	Invalid	***nomen dubium***	Lost
Andrena sphecodimorpha Hedicke, 1942	Valid		Lost
Andrena thoracica melanoptera Hedicke, 1934	Invalid	*Andrena thoracica* (Kirby, 1802)	Lost

As more *Andrena* type material is decisively located (e.g. Wood 2023a, 2023b, 2024b) and high-quality images of type material can be shared around the world instantly (e.g. Astafurova et al. 2022, 2023, 2024), it is becoming possible to clarify the relationships between taxa described by different authors who have approached the Palaearctic members of this genus from the west, the east, or the south. In addition to the points outlined above, the most obvious areas across which there has been a mutual lack of understanding have been i) the Himalayan region between British India (e.g. Cameron 1897) and Chinese Tibet (e.g. Wu 1982) and ii) the contrast between Central Asia, Siberia, the Russian Far East, and Mongolia (e.g. Osytshnjuk 1994, 1995), versus northern China and Xinjiang (e.g. Tadauchi & Xu 2003, Xu & Tadauchi 2005). This process of clarification is ongoing, and is continued in the present work.

Concerning type material and its decisive location, Donald B. Baker (1922–2004) worked extensively on the bee material housed in the Hope Entomological Collections at the Oxford University Museum of Natural History (OUMNH). This work produced a Phd thesis (Baker 1993, O'Toole 2006) which has remained unpublished and under-read. The title of the thesis was: "The Type Material of the Nominal Species of Exotic Bees described by Frederick Smith (Hymenoptera, Apoidea)". As well as dealing with this material directly, Baker also provided historical context surrounding the type material housed both in the OUMNH, but also in the Natural History Museum in London (NHMUK). Type catalogues have not always correctly traced the location of bee types, in part due to the often mixed history of how material has been dealt with. In the case of Smith, his British material eventually went to the OUMNH in 1930, but species described from foreign material came from a number of different sources and were dispersed, with much but not all remaining in or going to the NHMUK. The literature and specimens must be examined on a case-by-case basis to determine the correct type repository for each taxon (Baker 1993).

From the perspective of *Andrena*, confusion between the NHMUK and OUMNH as a type depository has been made. Workers (including myself) have often assumed that species described from British India by British authors would be found in the NHMUK collection (Gusenleitner & Schwarz 2002). This is frequently the case (e.g. Nurse 1903, 1904, Cameron 1907, 1908) but sometimes material is present in India such as in the Zoological Survey of India (Bingham 1908, Gautam et al. 2024; see Lieftinck 1983 for a non-*Andrena* example). Most importantly for *Andrena* are the species described by Cameron (1897), many of which remain obscure due to an inability to locate type material in the NHMUK (Gautam et al. 2024), the listed type repository (Gusenleitner & Schwarz 2002). However, Baker (1993) explains that Cameron described material from the G.A.J. Rothney (1849–1922) collection which was presented (in large part) to the OUMNH in 1910. Cameron (1897: 112 and subsequent pages) indeed indicates Rothney as the collector of the material for the specimens in question. In this context, many of the "holotypes" or "syntypes" examined by Gautam et al. (2024) from the NHMUK collection were not correctly judged as such, and hence the opportunity is taken here to designate lectotypes from the Rothney collection in order to correctly define these species in line with Cameron's original descriptions.

Due to the difficulties outlined above, current revisionary efforts must balance not only the fundamentally taxonomically challenging nature of the genus *Andrena* and its often subtle morphological and genetic species boundaries (Gueuning et al. 2020, Praz et al. 2019, 2022, Pisanty et al. 2022a, Wood 2023a, 2023b), but also their long and complex history of study, and integrate what is currently known with what was known by authors at the time they wrote their nomenclatural works and revisions. This current work aims to continue this process, decisively locating and clarifying the identity of type material, and continuing to describe *Andrena* specimens stored in unidentified material in museum collections. Geographically, this work focuses predominantly on the continent of Asia away from the Mediterranean basin, as huge steps have recently been made elsewhere in improving our understanding of *Andrena* in this region, including the Asiatic part of the East Mediterranean (e.g. Pisanty et al. 2022a, Wood 2023a, 2023b). Additional focused efforts will be made in the near future on the fauna of the East Mediterranean with a focus on the southern Balkans, Turkey, and the Levant.

METHODS

Some recently captured *Andrena* specimens were sent for genetic barcoding: a single midleg was removed from pinned specimens and sent to the Canadian Center for DNA barcoding (CCDB) in Guelph, Canada, for DNA extraction and sequencing; specimens were sequenced following standardised high-throughput protocols (Ivanova et al. 2006). BeeCox1F1/BeeCox1R2 primers (Bleidorn & Henze 2021) were used to target the COI-5 region. All sequences are published on the Barcode of Life Database (BOLD) website under the dataset dx.doi.org/10.5883/DS-PALAND. Where appropriate, reference to individual barcodes is made in the text using the BOLD accession number, e.g. five letters forming a prefix such as "WPATW".

Morphological terminology follows Michener (2007). Specimens were measured from the centre of the clypeus at the front of the head to the apical tip of the metasoma and rounded 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 10X

infinity corrected objective lens in combination with an Olympus M.Zuiko 2x teleconverter lens, a 10 mm Kenko DG extension tube, and a Meike MK-P-AF3B 10 mm extension tube. 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) to improve lighting to highlight specific characters.

The results are presented in six sections. 1) Lectotype designations and new synonymies; 2) *Andrena* taxa described by Hans Hedicke; 3) Description of missing sexes; 4) Additional taxa newly elevated to species status; 5) Description of new species; and 6) Correct spelling of *Andrena* names. Within each section, species are listed alphabetically by subgenus, and then alphabetically by species. Species currently considered as *incertae sedis* are placed last within each section. Full chresonymy is not given for each species, only those names relevant for the current issue in hand; this can be seen in Gusenleitner and Schwarz (2002). For species distributions, countries marked with an "*" indicate the first published record for that country, or province/subdivision within that country for larger nations. All specimens were identified by myself, unless explicitly stated in the examined material sections. The following abbreviations are used in the species descriptions and diagnoses: A = antennal segments, S = metasomal sterna, and T = metasomal terga. Subgeneric concepts follow Pisanty et al. (2022b). In diagnoses, the defining characters of a species are given, with those of the indicated comparison species given in parentheses. Finally, in the analysis of authorship, species jointly authored count as a full species for each author, i.e. *Andrena kumbhuensis* Tadauchi & Matsumura, 2007 is counted as a name for Tadauchi, and a name for Matsumura. This means that the total number of authorships exceeds the number of valid species due to species with multiple authors.

ABBREVIATIONS USED:

CSE	Personal collection of Christian Schmid-Egger, Berlin, Germany
DEI	Deutsches Entomologisches Institut, Eberswalde, Germany
EKU	Entomological Institute, Korean University, Seoul, South Korea
ELKU	Entomological Laboratory, Kyushu University, Fukuoka, Japan
IZAS	Zoological Institute, Chinese Academy of Sciences, Beijing, China
JSPC	Collection of Jakub Straka, Charles University, Prague, Czechia
MNHN	Muséum national d'Histoire naturelle, Paris, France
MSCA	Personal collection of Maximillian Schwarz, Ansfelden, Austria
MSVI	Personal collection of Marco Selis, Viterbo, Italy
NMINH	National Museum of Ireland, Natural History, Dublin, Ireland
NHMUK	Natural History Museum, London, United Kingdom
NHRS	Naturhistoriska Riksmuseet, Stockholm, Sweden
NMNHS	National Museum of Natural History, Sofia, Bulgaria
NMPC	National Museum Natural History, Prague, Czechia
OÖLM	Oberösterreiches Landesmuseum, Linz, Austria
OUMNH	Oxford University Museum of Natural History, Oxford, United Kingdom
SEMC	Snow Entomological Museum Collection, University of Kansas Natural History Museum, Lawrence, Kansas, USA
RMNH	Naturalis Biodiversity Center, Leiden, the Netherlands

SIZK	Scientific Collections of the Schmalhausen Institute of Zoology, Kyiv, Ukraine
SMFD	Naturmuseum Senckenberg, Frankfurt am Main, Germany
SMNHTAU	Steinhardt Museum of Natural History, Tel-Aviv University, Tel-Aviv, Israel
SNMS	Staatliches Museum für Naturkunde Stuttgart, Stuttgart, Germany
TJWC	Personal collection of Thomas J. Wood, Leiden, the Netherlands
TUZ	Zoological Museum of the University of Tartu, Tartu, Estonia
USNM	Smithsonian National Museum of Natural History, Washington D.C., USA
VLC	Personal collection of Vincent Leclercq, Aix-en-Provence, France
WHLC	Personal collection of Wolf-Harald Liebig, Bad Muskau, Germany
ZISP	Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia
ZMHB	Museum für Naturkunde, Berlin, Germany
ZMMU	Zoological Museum of Moscow University, Moscow, Russia
ZSI	Zoological Survey of India, Kolkata, India
ZSM	Zoologische Staatssammlung München, Germany

RESULTS

Family Andrenidae

Genus *Andrena* Fabricius, 1775

Andrena Fabricius, 1775: 376.

Type species: *Apis helvola* Linnaeus, 1758, by original designation.

1. LECTOTYPE DESIGNATIONS AND NEW SYNONYMIES

Andrena (*Andrena*) *gracillima* Cameron, 1897

Andrena gracillima Cameron, 1897: 118, ♀ [India: Uttarakhand, OUMNH, lectotype by present designation] (Fig. 1)

Andrena (*Andrena*) *gilvithoracica* Xu & Tadauchi, 2012b: 102, ♀ [China: Xizang, IZAS, examined by photograph] **syn. nov.**

Material examined. INDIA • 12♀; Mussouri [Mussoorie]; G.A.J. Rothney leg.; OUMNH (one female designated as **lectotype** of *A. gracillima*, remaining **paralectotypes**).

Distribution. India (Uttarakhand) and China (Xizang). Likely present also in Nepal.

Remarks. The identity of *A. gracillima* has been obscure since its description (Gusenleitner & Schwarz 2002, Wood 2024a). Examination of the Rothney collection reveals that *A. gracillima* is part of the subgenus *Andrena* s. str. The collection contained 12 females, and one well-preserved individual is selected as the lectotype. Cameron (1897: plate 4: fig. 19) provides an illustration of the dorsal habitus of *A. gracillima*, and the specimens in the Rothney collection perfectly match it. The head is given as presenting long fulvous hairs on the gena, with the "*clypeus shining, the punctures close at the base, becoming more widely separated towards the apex; which is in the*

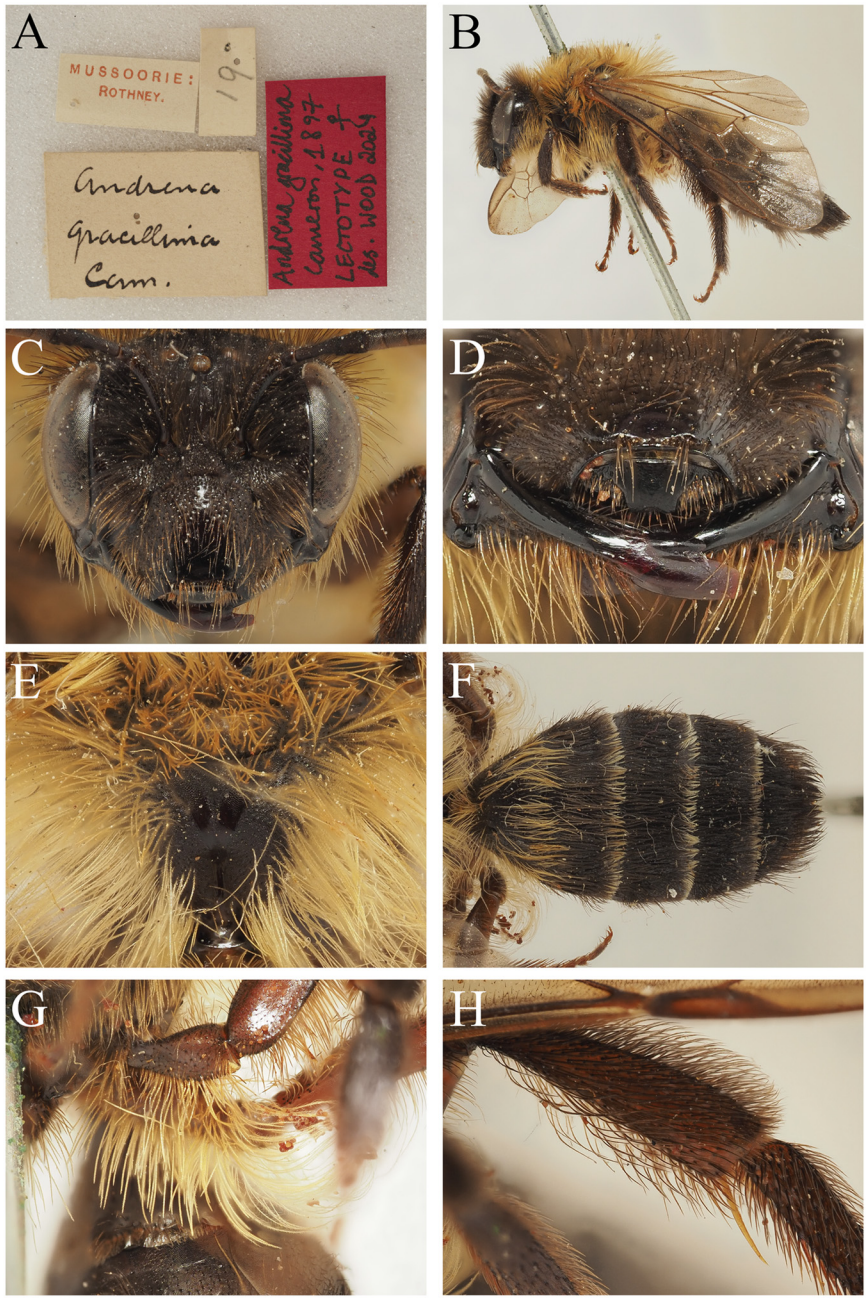

Fig. 1. Andrena (*Andrena*) *gracillima* Cameron, 1897 lectotype female (OUMNH). A. Label information; B. Habitus, profile view; C. Face, frontal view; D. Process of labrum, ventral view; E. Propodeum, dorsal view; F. Terga, dorsal view; G. Flocculus, ventral view; H. Tibial scopa, frontal view

middle almost free from them; the apex slightly projecting" (Fig. 1C), and the "*Abdomen shining; the segments fringed with white pubescence, above and beneath*" (Fig. 1F). All of this closely matches the specimens, and they are considered to be genuine syntypes. Due to the broad facial foveae, pronotum with a humeral angle, clypeus with punctures becoming sparser apically with an inverted T-shaped puncture free zone (not a subgeneric character, but often present in *Andrena* s. str.), strongly developed flocculus (Fig. 1G), and non-triangular hind tibia with simple tibial scopa (Fig. 1H; hind tibia triangular or otherwise broadened apically and presenting a tibial scopa composed of very short hairs in subgenus *Cnemidandrena* Hedicke, 1933), *A. gracillima* can be placed into the *Andrena* s. str. contrary to the speculation of Wood (2024a) that it might be a senior name for one of the Himalayan *Cnemidandrena* species.

This placement means that *A. gracillima* is the oldest available name for *Andrena* s. str. in the Himalayan region. It can be recognised as the senior synonym of *A. gilvithoracica* Xu & Tadauchi, 2012 **syn. nov.** which was described from a single female from Xizang (Cayu = Zayu county). The two taxa can be recognised as conspecific due to the clypeus weakly convex, surface weakly tessellate, with median smooth shiny impunctate line, surface finely punctate with punctures sparser at the apical margin, dark hairs on the head with fuscous hairs on the gena, gena exceeding the width of the compound eye, yellow-brown mesosomal hairs, labral process with apical margin entire, flocculus strongly developed and composed of yellow hairs, tibial scopa composed of moderately long simple black hairs, metasoma with long yellowish hairs on T1, black hairs on T2–4, apical margins of T2–4 with apical hair fringes (note, the holotype of *A. gilvithoracica* is somewhat abraded, including the apical hairbands on the metasoma; see photographs in Xu & Tadauchi 2012b), and terminal fringe black.

Andrena (*Andrena*) *rupshuensis* Cockerell, 1911

Andrena rupshuensis Cockerell, 1911: 243, ♀ [India: Ladakh, USNM, lectotype by present designation] (Fig. 2)

Material examined. INDIA • 1♀; Kashmir, Rupshu, Ladak; 16,000 ft. a.s.l.; 22 Jul. 1897; Dr. W.L. Abbott leg.; USNM (**lectotype**).

Distribution. India (Ladakh) (Gautam et al. 2024).

Remarks. Gautam et al. (2024) listed *A. rupshuensis* as *incertae sedis*, but examination of the type material shows that it is best placed in the *Andrena* s. str. due to the strongly produced trochanteral flocculus (Fig. 2E), the pronotum with a slight humeral angle, the broad facial foveae (Fig. 2C), the pygidial plate with a raised area medially, and the tibial scopae with long hairs (not composed of short hairs as in subgenus *Cnemidandrena*). As noted by Wood and Jacobs (2024), it is similar to but distinct from *Andrena* (*Andrena*) *ladakha* Wood, 2024, with these key characters highlighted. Only one specimen could be found in the USNM collection. The species may have been described from a single specimen, but Cockerell writes that it was collected between 21 and 22 July, suggesting that potentially additional specimens were collected. Consequently, the sole specimen in the USNM is designated as a lectotype for certainty. The species is notable for being collected at 16,000 feet above sea level (approximately 4,900 m), the highest recorded *Andrena* specimen to date.

Fig. 2. Andrena (*Andrena*) *rupshuensis* Cockerell, 1911 lectotype female (USNM). A. Label information; B. Habitus, profile view; C. Face, frontal view; D. Head, profile view; E. Flocculus, ventral view; F. Terga, dorsal view

Andrena (*Andrena*) *valentinae* Osytshnjuk, 1993

Andrena (*Andrena*) *valentinae* Osytshnjuk, 1993a: 65, ♀♂ [Tajikistan, SIZK, not examined]
Andrena (*Hoplandrena*) *cephalgia* Wood, 2023c: 12, ♀♂ [Tajikistan, OÖLM, examined] **syn. nov.**

Material examined. TAJIKISTAN • 1♂, 1♀; Гармский р-н. [Garminsky rayon, =Gharm/Rasht], К. ГанишоУ [Ganishaw]; 1,700–2,000 m a.s.l.; 15–17 Jun. 1987; A. Osytshnjuk leg.; A. Osytshnjuk det.; ZSM (**paratypes**). For more examined material, see Wood (2023c).

Distribution. Kazakhstan, Tajikistan, Kyrgyzstan (Osytshnjuk et al. 2005, Wood 2023c).

Remarks. It has not been possible to examine the holotype of *A. valentinae*, but a male and female paratype are present in the ZSM collection (Fig. 3). They are clearly conspecific with and senior to *A. cephalgia* which was original described in the subgenus *Hoplandrena* Pérez, 1890. This is immediately evident through comparison of the male genital capsules (Fig. 3F), as well as other morphological characters. The characteristic genital capsule of *A. valentinae* is also illustrated in Osytshnjuk et al. (2005: figure 204). The lack of recognition of *A. cephalgia* as an *Andrena* s. str. is due to the unusual morphology presented by this species (see discussion in Wood 2023c), but as noted by Wood and Jacobs (2024), *A. cephalgia* is actually placed into the *Andrena* s. str. genetically (Bossert et al. in prep.). *Andrena valentinae* is clearly a montane species; specimens for which altitudinal information is available were collected between 1,200 and 2,500 m a.s.l., with an average of around 1,800 m a.s.l. Osytshnjuk et al. (2005) also make this point, considering it a high mountain species found between 1,300 and 3,000 m.

Andrena (*Callandrena*) *uyacensis* Cockerell, 1949

Andrena uyacensis Cockerell, 1949: 434, ♀ [Honduras, USNM, examined] (Fig. 4)

Andrena hondurasica Cockerell, 1949: 434, ♂ [Honduras, USNM, examined] (Fig. 5) **syn. nov.**

Material examined. HONDURAS • 1♀; Honduras, Uyaca peak [14.0234°N, −87.0761°W]; 9 Feb. 1947; T.D.A. Cockerell & W.P. Cockerell leg.; USNM (**holotype** of *A. uyacensis*) • 1♂; Honduras, Uyaca peak [14.0234°N, −87.0761°W]; 9 Feb. 1947; T.D.A. Cockerell & W.P. Cockerell leg.; USNM (**holotype** of *A. hondurasica*).

Distribution. Honduras (Cockerell 1949, LaBerge 1967).

Remarks. Cockerell (1949) published several descriptions of new bee species from Central America, including four *Andrena* species. Cockerell died in 1948, and this was one of his final works; the degradation in the clarity of his handwriting of the type labels can be plainly seen compared to earlier species (Figs 4A and 5A; compare with other Cockerell type labels written in earlier years that are presented below). Both *A. uyacensis* and *A. hondurasica* were collected from the peak of Uyaca Mountain at an altitude of over 5,000 feet [c. 1,500 m a.s.l.] (Cockerell 1949).

LaBerge (1967) revised this material, placing both *A. uyacensis* and *A. hondurasica* into the subgenus *Callandrena* Cockerell, 1898. LaBerge considered *A. hondurasica* (male only) to be closest to *Andrena agilis* Smith, 1879 and *A. uyacensis* (female only) to be closest to *Andrena simulata* Smith, 1879. Since both *A. uyacensis* and *A. hondurasica* were collected at the same place on the same day, it is perplexing why neither Cockerell nor LaBerge thought that they might be the different sexes of the same species. LaBerge further noted that *A. hondurasica* may be the male of *Andrena amarilla* Cockerell, 1949 (described in the same publication but from Agua Amarilla at an altitude of approximately 400 m a.s.l.).

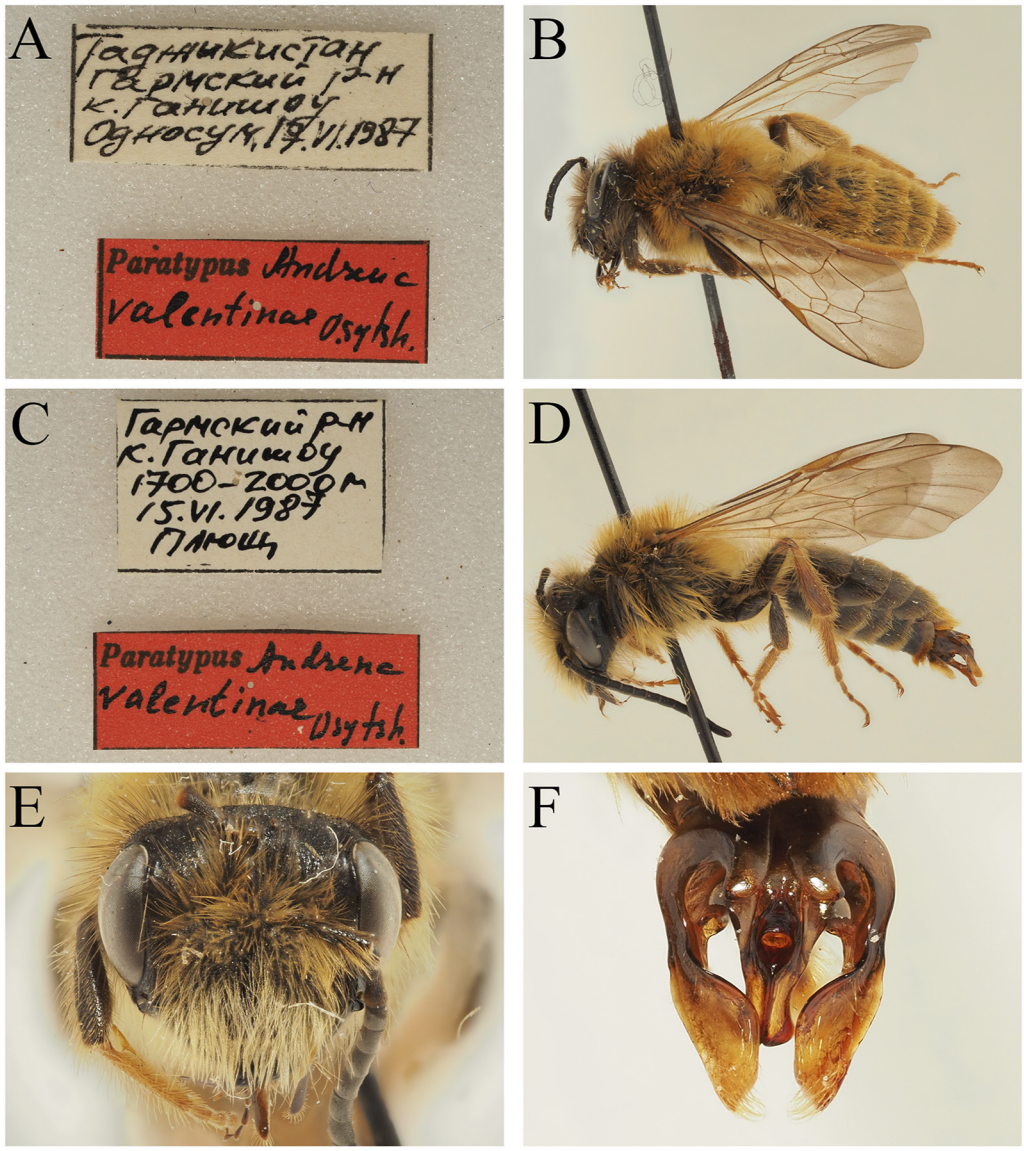

Fig. 3. Andrena (*Andrena*) *valentinae* Osytshnjuk, 1993 paratype female (A–B) and male (C–F) (ZSM). A. Label information; B. Habitus, profile view; C. Label information; D. Habitus, profile view; E. Head, frontal view; F. Genital capsule, dorsal view

Examination of the types of *A. uyacensis* and *A. hondurasica* shows that they correspond well to each other, specifically in the long ocelloccipital distance (Fig. 4A, exceeding the diameter of a lateral ocellus in the female and greatly exceeding the diameter of a lateral ocellus in the male), the orange-hyaline tegulae, and the lightened legs (Figs 4B and 5B; most clearly seen on the male hind tarsi and

Fig. 4. Andrena (*Callandrena*) *uyacensis* Cockerell, 1949 holotype female (USNM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Head, dorsal view; E. Scutum, dorsal view; F. Terga, dorsal view

female hind tibiae and basitarsi). The concurrent activity at high altitude and the clearly more faded condition of the male (consistent with protandrous behaviour and earlier male emergence) strongly suggests that the two taxa are conspecific, and I synonymise *A. hondurasica* **syn. nov.** under

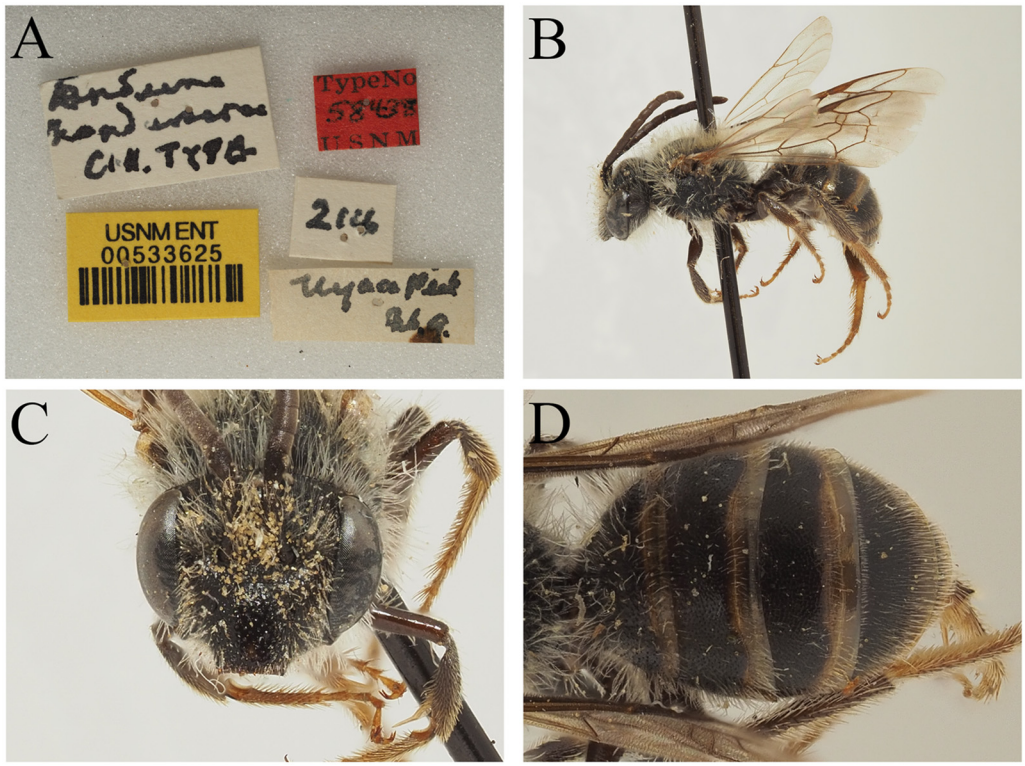

Fig. 5. Andrena (*Callandrena*) *hondurasica* Cockerell, 1949 holotype male (USNM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

A. uyacensis. I select the name supported by the female specimen as the senior synonym as this specimen is in better condition, and more aesthetically pleasing.

Andrena (*Chlorandrena*) *curtivalvis* Morice, 1899

Andrena curtivalvis Morice, 1899: 252, ♀♂ [Algeria, OUMNH, lectotype by present designation] (Fig. 6)

Material examined. ALGERIA • 2♀; Algiers; 1–30 Apr. 1898; F.D. Morice leg.; OUMNH (**syntypes**) • 2♀; Algiers; 6 Apr. 1898; F.D. Morice leg.; OUMNH (**syntypes**) • 1♀; Algiers; 23 Mar. 1898; F.D. Morice leg.; OUMNH (**syntype**) • 1♂, 1♀; Algiers; 29 Mar. 1898; F.D. Morice leg.; OUMNH (male designated as **lectotype**; female syntype) • 3♀; Algiers; 31 Mar. 1898; F.D. Morice leg.; OUMNH (**syntypes**); **SPAIN** • 1♀; Cádiz, Parque Natural Los Alcornocales, Las Algamitas, Finca Murtas; 18 Mar. 2023; T.J. Wood leg.; TJWC.

Distribution. Spain, Morocco, Algeria, and Tunisia (Schwenninger 2015).

Remarks. The morphological concepts used for members of the *taraxaci*-group of species have remained stable, even if they have been variably treated at subspecies or specific level

Fig. 6. Andrena (*Chlorandrena*) *curtivalvis* Morice, 1899 lectotype male (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Sternum 8, dorsal view

(Warncke 1967, Gusenleitner & Schwarz 2002, Schwenninger 2015). This is true for *A. curtivalvis*; due to a lack of labels, it is not clear if Warncke ever actually examined this material in the OUMNH, but his morphological concept (as a subspecies of *A. taraxaci* Giraud, 1861) was consistent with Morice's. Morice (1899) indicated that he caught "*1♂ and many* ♀♀" at Algiers in the spring of 1898, and the examined material is consistent with this. The male (Fig. 6) is hereby designated as the lectotype to fix and confirm the concept in line with its current use (Schwenninger 2015). An additional female of *A. curtivalvis* was collected in the province of Cádiz in 2023, supporting the marginal occurrence of this species in the extreme south of Spain (Schwenninger 2015).

Andrena (*Chlorandrena*) *stabiana* Morice, 1899

Andrena stabiana Morice, 1899: 252, ♀♂ [Italy, OUMNH, lectotype by present designation] (Fig. 7)

Material examined. ITALY • 1♂; Cast. [Castellammare di Stabia, Napoli]; 1–31 Mar. 1895; F.D. Morice leg.; OUMNH (**paralectotype**) • 2♀; Cast. [Castellammare di Stabia, Napoli]; 4 Apr. 1895; F.D. Morice leg.; OUMNH (one female designated as **lectotype**; remaining **paralectotype**) • 1♂; Cast. [Castellammare di Stabia, Napoli]; 20 Mar. 1895; F.D. Morice leg.; OUMNH

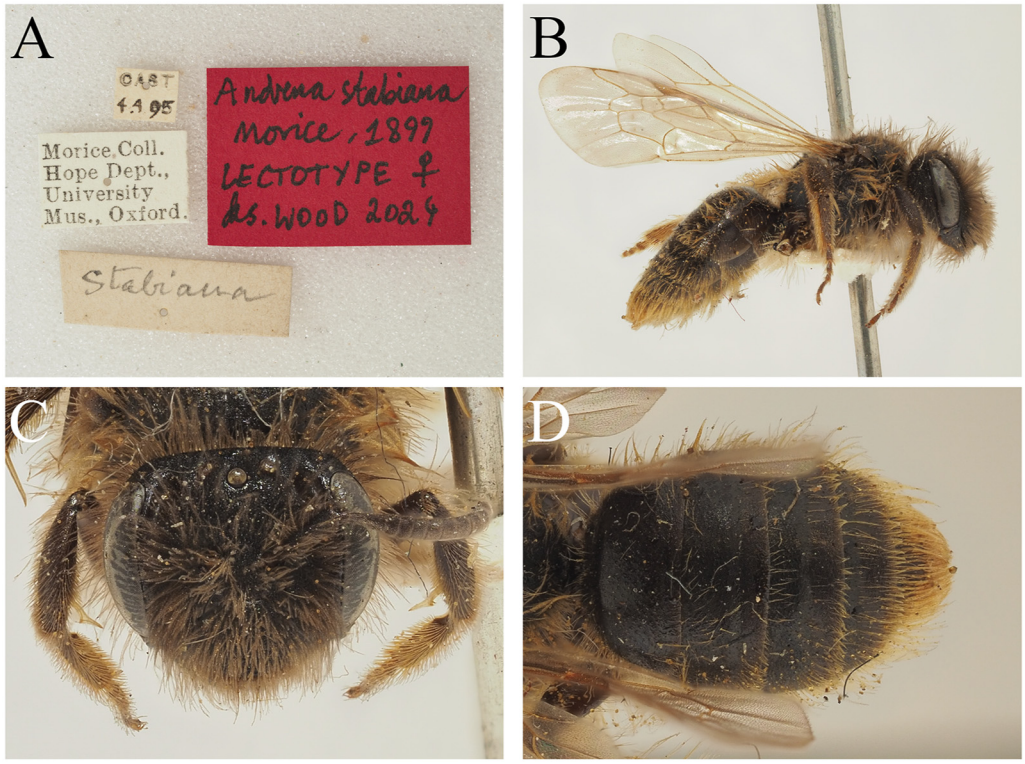

Fig. 7. Andrena (*Chlorandrena*) *stabiana* Morice, 1899 lectotype female (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

(**paralectotype**) • 1♂; Cast. [Castellammare di Stabia, Napoli]; 22 Mar. 1895; F.D. Morice leg.; OUMNH (**paralectotype**) • 4♂; Cast. [Castellammare di Stabia, Napoli]; 25 Mar. 1895; F.D. Morice leg.; OUMNH (**paralectotypes**) • 1♀; Cast. [Castellammare di Stabia, Napoli]; 29 Mar 1895; F.D. Morice leg.; OUMNH (**paralectotype**).

Distribution. France (Corsica) and Italy. The possible presence of this species in Switzerland (Schwenninger 2007, 2015) is excluded following the position of Praz et al. (2023).

Remarks. Morice (1899: 248) wrote that he had "*several of both sexes from Castellamare near Naples, the ancient Stabiae*". Examination of the Morice collection in the OUMNH found seven males and three females labelled "*Cast.*" which is consistent with this information. As for *A. curtivalvis*, it is unclear which previous workers have actually examined this material, but due to the clear description of Morice, the concept is stable. A female is newly designated as a lectotype (Fig. 7) to fix and confirm the concept in line with its current use (Schwenninger 2015).

Andrena (*Cnemidandrena*) *mephistophelica* Cameron, 1897

Andrena mephistophelica Cameron, 1897: 117, sex not specified [India: Uttarakhand, OUMNH, lectotype by present designation] (Fig. 8)

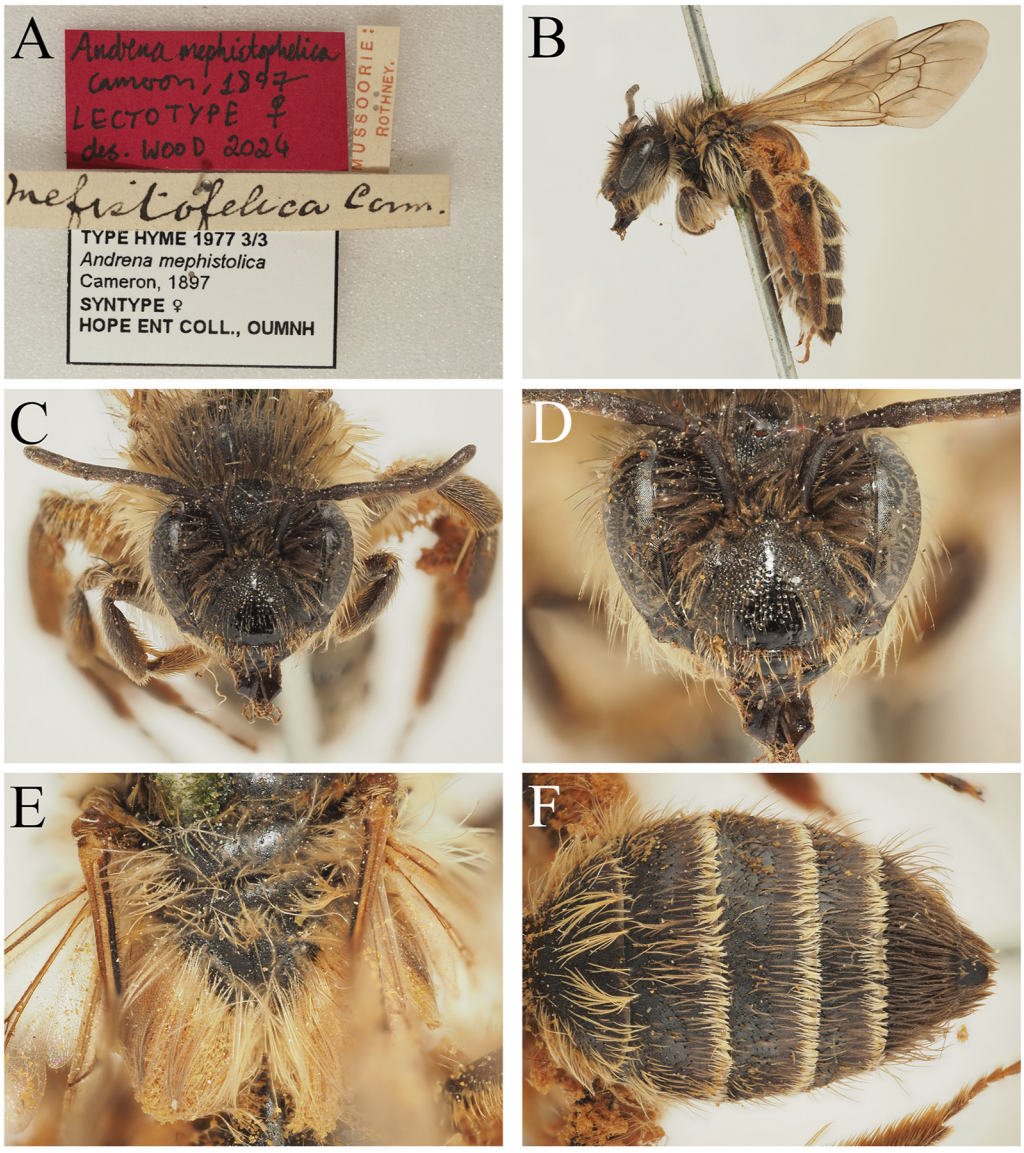

Fig. 8. Andrena (*Cnemidandrena*) *mephistophelica* Cameron, 1897 lectotype female (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Head, frontal view, detail; E. Propodeum, dorsal view; F. Terga, dorsal view

Andrena kishidai Yasumatsu, 1935: 42, ♀ [China: Hebei, ELKU, not examined] **syn. nov.**

Andrena zonativentris Alfken, 1936: 13, ♀♂ [China: Qinghai, ZMHB, examined] (Fig. 9) **syn. nov.**

Andrena chagyabensis Wu, 1982: 389, ♀♂ [China: Tibet, IZAS, not examined] **syn. nov.**

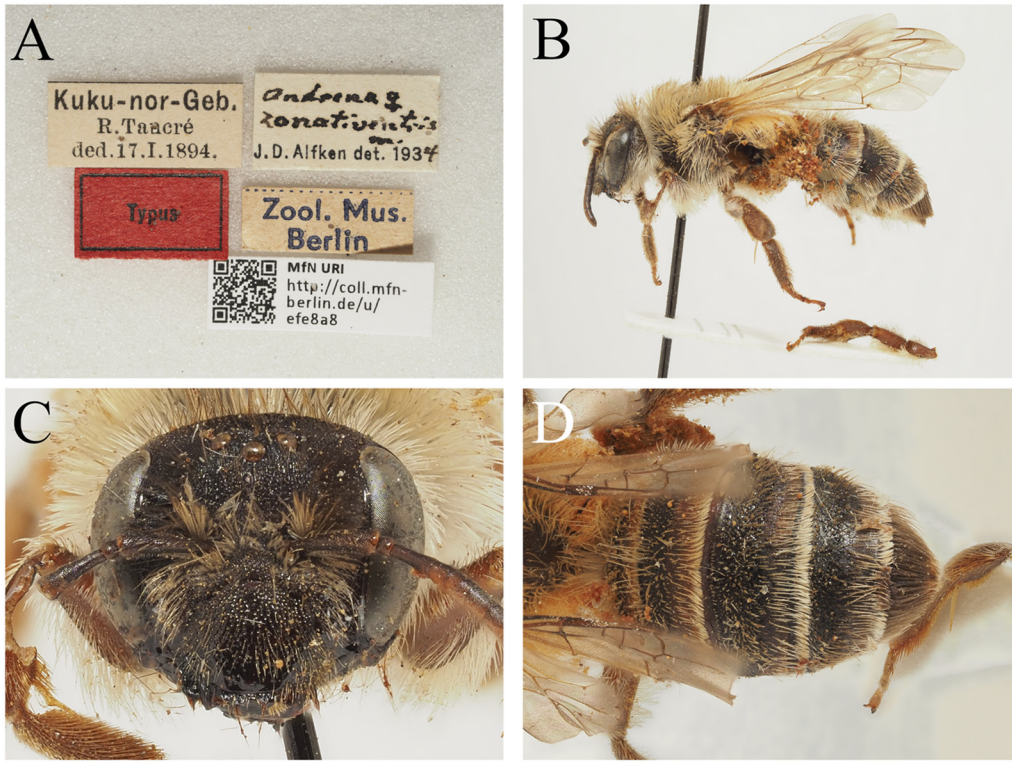

Fig. 9. Andrena (*Cnemidandrena*) *zonativentris* Alfken, 1936 holotype female (ZMHB). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Material examined. BHUTAN • 5♂; (West), Cheri monastry [Chagri Dorjeden Monastery], 20 km from Thimbu; 24 Nov. 1994; G.G.M. Schulten leg.; RMNH; ZMA.INS.5103717–ZMA.INS.5103721; **CHINA** • 1♀; Kuku-Nor-Geb [=Koko Nor, Qinghai Mountains]; date unclear (see remarks); R. Tancré; J.D. Alfken det.; ZMHB (**holotype** of *A. zonativentris*) • 1♂, 3♀; Szechuen, O-Er 26 mi N LiFan [Li County, Lixian]; 9,000 ft a.s.l.; 6–16 Aug. 1933; D.C. Graham leg.; USNM; **INDIA** • 2♀; Mussouri [Mussoorie]; G.A.J. Rothney leg.; OUMNH (one female designated as **lectotype** of *A. mephistophelica*). For additional examined material, see Wood (2024a).

Distribution. (*A. mephistophelica* s. str.) India, Bhutan, Nepal, China (Xizang, Yunnan); (*kishidai*) China (Qinghai, Gansu, Hebei, Beijing) (Tadauchi & Xu 2002, as *A. kishidai*; Wood 2024a, as *A. kishidai*).

Remarks. This taxon has been deeply confused since its original description. Cameron (1897: 117) wrote that it is close to *Andrena saevissima* Cameron, 1897 which is actually a junior synonym of *Colletes reticulatus* (Cameron, 1897) which was also originally described as an *Andrena* (Kuhlmann 1998). Cameron states that *A. mephistophelica* was collected from

Mussourie, and comes from the Rothney collection. Immediately after its description, Bingham (1897), in his key to the bees of India, indicated that *A. mephistophelica* is very close to *A.* (*Euandrena*) *communis* Smith, 1879 but presented tergal margins and bases that were only lightened, rather than the red markings also covering the disc of T2 (as in *A. communis*). On this basis, Gautam et al. (2024) suggested that *A. mephistophelica* might be the oldest available name for one of the partially red-marked *Euandrena* species present in the Himalayas.

In the OUMNH collection, it was possible to find three females labelled as syntypes of *A. mephistophelica* that were standing over a handwritten label "*mephistophelica* Cam." (Fig. 8A). Two of the specimens were *A.* (*Cnemidandrena*) specimens, and one was an *A.* (*Euandrena*) specimen, suggesting a polytypic type series. Reading the description with these specimens at hand, it is clear that the name *A. mephistophelica* can only apply to the two *Cnemidandrena* specimens, for several reasons. Cameron gives the body length as 11–12 mm, whereas the *Euandrena* specimen is under 10 mm in length. The head is described as: "*Head, except on the clypeus, covered thickly with long hairs, pale beneath, darker on the front and vertex. Clypeus with large punctures, which are much sparser on the apex, its apex being almost clear of them and fringed with dark fulvous hairs; the base of the mandibles aciculate*" (Fig. 8B–D). This captures the pubescence of the head (with pale hairs on the gena, and dark hairs on the face), as well as the apical part of the clypeus which is almost impunctate. The propodeum is described as: "*median segment, except a triangular space in the middle at the base, thickly covered with rufo-fulvous hairs, which completely hide the texture; the triangular bare space at the base opaque, rugosely aciculated; with an indistinct keel down its centre*" (Fig. 8E). This clearly describes the state of the propodeal triangle which has a visible longitudinal carina placed medially, and abundant hairs completely obscuring the remaining dorsolateral parts of the propodeum. Finally, Cameron write that: "*The first and second dorsal segments of the abdomen are covered with long pale fulvous hairs; the others have the hairs darker and shorter, and the second, third, and fourth are fringed at the apex with glistening white hairs*" (Fig. 8F). This clearly and unambiguously matches the state presented by the *Cnemidandrena* specimens, particularly in the apical margins of T2–4 which show clear hairbands which if not 'glistening' *per se* clearly contrast the rest of the metasoma.

As such, only one of the *Cnemidandrena* specimens can be selected as the lectotype on the basis of this description, and the better preserved specimen is consequently designated as such. The implications of this action are meaningful. Whilst Wood (2024a) speculated that, given the location of specimens of *A. kishidai chagyabensis* in northern India (Himachal Pradesh), one of the poorly understood *Andrena* names described from northern India may actually have priority over the name *A. kishidai*. The name *A. gracillima* was suggested based on the description and illustration, but it is actually *A. mephistophelica* which has priority over *A. kishidai*, and it and its junior synonyms are duly synonymised under *A. mephistophelica* **syn. nov.**

Whilst it would be beneficial to retain the name *A. kishidai*, *A. mephistophelica* does not meet the conditions laid out under Article 23.9 Reversal of Precedence (ICZN 1999), as whilst the name has not been used as a valid species after 1899 (following a reading of the code which treats the listing of a name in a catalogue such as Gusenleitner & Schwarz 2002 to not meet the definition of "use", since a simple listing without an associated species concept can be argued not to constitute "use"), this is not pertinent since *A. kishidai* has not been used as a valid name in at least 25 works published by at least 10 authors in the past 50 years and encompassing a span of not less than 10 years. *Andrena mephistophelica* cannot therefore be treated as a *nomen oblitum*.

The synonymy of *A. kishidai* under *A. mephistophelica* can be made due to the key characters given by Tadauchi and Xu (2002), and as illustrated by Wood (2024a), specifically the shining clypeus with narrow longitudinal midline and with punctures sparse apically, the body length, the very short and dense hairs of the tibial scopa, the extremely long and thick hairs comprising the propodeal corbicula, the generally light haired mesosoma with dark hairs intermixed on the scutum, and the dark terga with strongly contrasting narrow apical hairbands on T2–4. It is important to note that there is variation in the colouration of the scutal hairs in specimens from the Himalayas; Tadauchi and Xu (2002) discriminate between *A. kishidai sensu lato* and *A. carinigena* Wu, 1982 based on this colouration, but both *A. kishidai chagyabensis* (=*A. mephistophelica*) and *A. carinigena* were described from Xizang (Tibet) in the same publication. It remains to be seen if *A. carinigena* is a distinct species or another synonym of *A. mephistophelica*, although I suspect it will turn out to be conspecific.

Although I have not yet been able to examine the type of *A. kishidai*, I have seen its junior synonym. One specimen of *A. zonativentris* was examined in the ZMHB collection which is labelled as type (Fig. 9). This must be the holotype; Alfken (1936: 15) writes: "*Mir lagen 2♀ vom Kuku-nor-Gebirge, R. Tancré, aus meiner Sammlung vor; eins davon wurde als Typus, das andere als Paratypus bezeichnet*" [I have two females in my collection from Kuku-nor-mountain from R. Tancré; one was designated as type, the other as paratype]. He then notes that three additional paratypes are placed in the NHRS (collected in "S. Kansu" between 16 and 28 September 1930 by Dr. Hummel). The holotype specimen has the collecting date of 17.I.1894, but this seems impossible since in January the mountains in north-western China will be extremely cold and there will be no bee activity. Based on the known summer flight period of this species (typically August–September, but extending as late as November), a more likely would be September, and this may have been a typographical error (I instead of IX). Alfken does not mention the collecting date of this specimen. In any case, the morphology of the specimen is quite clear.

The recognition of *A. mephistophelica* as the oldest name that can be applied to this species, the subspecific structure used by Tadauchi and Xu (2002) is retained, with *A. mephistophelica* s. str. found in the Himalayas, and *A. mephistophelica kishidai* **comb. nov.** found further north on the Tibetan plateau across to Beijing. *Andrena mephistophelica kishidai* can be separated by the paler hairs on the discs of T3–4 (dark brown in *A. mephistophelica*).

Andrena (*Cnemidandrena*) *simillima* Smith, 1851

Andrena simillima Smith, 1851: 122, ♀♂ [England, OUMNH, lectotype by present designation] (Fig. 10)

Anthrena bremensis Alfken, 1900: 6, ♀♂ [Germany, MNHN, lectotype by present designation] (Fig. 11)

Andrena simillima sischkai Warncke, 1988: 102, ♀♂ [Greece, OÖLM, examined]

Material examined. BULGARIA • 1♂, 2♀; Pirin, Popina Luka; 1,350 m a.s.l.; 23 Jul. 1974; A. Hoffer leg.; OÖLM (**paratypes** of *A. simillima sischkai*) • 1♀; Rhodopi, Stoikite [Stoykite]; 26 Jul. 1965; N. Atanassov leg.; NMNHS • 2♀; Slivenski v. Balgarka; 22 Aug. 1969; N. Atanassov leg.; NMNHS • 1♀; Stoikite [Stoykite]; 8 Aug. 1963; N. Atanassov leg.; NMNHS; **FRANCE** • 1♀; Bordeaux; J. Pérez leg.; MNHN; **GERMANY** • 1♀; Achim; 13 Aug. 1892; MNHN (**lectotype** of *Andrena bremensis*) • 1♂; Ganderkesee; 27 Jul. 1900; J.D. Alfken det. (as *A. bremensis*); MNHN; **GREECE** • 1♀; Epirus, Ioannina, NE Metsovo; 1,600–1,730 m a.s.l.; 24 Jul. 1990; H. Rausch leg.;

Fig. 10. Andrena (*Cnemidandrena*) *simillima* Smith, 1851 lectotype female (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

TJWC • 2♂, 1♀; Epirus, Ioannina, NE Skamneli; 1,500–1,700 m a.s.l.; 28 Jul. 1990; H. Rausch leg.; OÖLM/TJWC • 1♂; Makedonien, Pieria, Olympus; 2,200 m a.s.l.; 31 Jul. 1990; H. Rausch leg.; OÖLM • 1♀; Olymp.; 2,000–2,200 m a.s.l.; 18 Aug. 1973; K. Warncke leg.; OÖLM (**holotype** of *A. simillima sischkai*) • 1♀; Olympos, Spilios Agapilos; 2,100 m a.s.l.; 28 Jul. – 5 Aug. 1965; L. Blommers leg.; RMNH; ZMA.INS.5102644; **NETHERLANDS** • 1♀; Amsterdam, Oost; 22 Aug. 1937; D. Piet leg.; RMNH; ZMA.INS.5103981 • 1♀; Venlo [Limburg]; 9 Jul. 1877; v.d. Brandt leg.; RMNH; **ITALY** • 1♀; Abruzzo, Campo Felice (AQ); 8 Jul. 1996; G.G.M. Schulten leg.; RMNH; ZMA.INS.5103922; **MONGOLIA** • 1♀; 145 km NW Tsetserleg, Tariat env.; 2,160 m a.s.l.; 18 Jul. 2002; J. Straka leg.; JSPC • 3♀; 15 km S Ulaanbaatar, Zuunmod env. Bogd Han Uul mts [Bogd Khan Uul]; 2,200 m a.s.l.; 29 Jul. 2002; J. Straka leg.; JSPC/TJWC; **SLOVAKIA** • 1♀; Hačava - Jeleni vrch [Jeleni mountain]; 500–950 m a.s.l.; 31 Jul. 1968; B. & O. Tkalců leg.; OÖLM; **TURKEY** • 1♀; Bitlis, Tatvan; 1,750 m a.s.l.; 16 Aug. 1985; R. Hensen leg.; RMNH; ZMA.INS.5104308 • 1♂, 1♀; Hakkari, Tal S Gevria-Pass; 3,000 m a.s.l.; L. Blank & K. Warncke leg.; OÖLM; **UNITED KINGDOM** • 1♀; no specific information; OUMNH (**lectotype**) • 1♀; Devon, Branscombe; 29 Jul. 1928; J.F.P. leg.; NMINH • 1♂; St. Mary's Bay; 27 Jul. 1898; NMINH • 1♀; Weston Cliff NT, Branscombe, Devon; 23 Jul. 1992; M. Edwards leg.; TJWC.

Fig. 11. Andrena (*Cnemidandrena*) *bremensis* Alfken, 1900 lectotype female (MNHN). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Distribution. In a broad sense, across Europe, from the United Kingdom and France in the west (not Iberia, see Wood 2023a) to Siberia, Mongolia, the Caucasus, Turkey, and Iran (Gusenleitner & Schwarz 2002, Osytshnjuk et al. 2005, Wood & Monfared 2022, Wood 2023a).

Remarks. *Andrena simillima* has been and continues to be a complex taxon to interpret. There have been multiple interpretations ranging from that of Warncke who considered a broad *A. simillima* with multiple subspecies including *A. freygessneri* Alfken, 1904 (see Gusenleitner & Schwarz 2002) to other workers who considered *A. simillima* in a narrower sense, including treating *A. bremensis* as a distinct species (e.g. Schmid-Egger & Scheuchl 1997).

Our understanding of the status of *A. bremensis* (currently not considered a valid species at a European level; Ghisbain & Rosa et al. 2023) is limited by two major factors. The first is that the taxon is extremely rare if not extinct in northern Germany and surrounding areas, making genetic investigation challenging. Secondly, the type material for this taxon has not actually been decisively located. Gusenleitner and Schwarz (2002) list the SMFD as the type depository for *A. bremensis*, but searches there were unable to locate any material. Alfken (1900: 7) did not indicate precisely how many specimens he examined, writing: "Anthrena bremensis *erscheint hier, wie schon erwähnt, im letzten Drittel des Juli. Die 2 einzigen Männchen, welche mir*

vorliegen, sind am 20. Juli auf Jasione montana *gefangenl die frühsten Weibchen fing ich am 25. Juli, die spätesten am 26. August, sie besuchen ebenfalls vorzugsweise* Jasione montana, *ausserdem nicht selten* Campanula rotundifolia *und gelegentlich* Thymus serpyllum *und* Potentilla tormentilla" [*Andrena bremensis* appears here, as already mentioned, in the last third of July. The only two males I have were caught on 20th July on *Jasione montana*. I caught the earliest females on 25th July, the latest on 26th August. They also prefer to visit *Jasione montana*, and not infrequently *Campanula rotundifolia* and occasionally *Thymus serpyllum* and *Potentilla tormentilla*].

Examination of the MNHM collection revealed a female labelled as "*Anthrena bremensis* Type Alfk." with the collecting information of 13 August 1892, collected from Achim (a town to the south-east of Bremen) on *Jasione montana* (Campanulaceae). The label was written in Alfken's handwriting, and corresponds to the information presented in his paper (Fig. 11A). A male specimen was also present, but this was caught on 27 July 1900, and although this was determined by Alfken, it does not match the capture date of 20th July indicated in his paper. It is therefore not considered to be a syntype. In the absence of any suitable material in the main German museums that are known to contain type material from Alfken (DEI, SMFD, ZMHB), the female in the MNHM collection is designated as the lectotype. The morphology is consistent with Alfken's concept with the clypeus shiny between the punctures (Fig. 11C) allowing for separation from *A. nigriceps* (Kirby, 1802) and comparatively weaker tergal hairbands (Fig. 11D) compared to *A. simillima s. str.* (Fig. 10D), but whether or not this pubescence character is truly species-specific is unknown; detailed revisionary study of Eurasian *Cnemidandrena* is required.

In line with this lectotype designation for *A. bremensis*, it is beneficial to designate a lectotype for *A. simillima* itself. The type material is in the OUMNH (Gusenleitner & Schwarz 2002), and this can be confirmed, as a series of males and females are present. All of them are unlabelled, but they stand over Smith's written label of *simillima*. A female in good condition is chosen to serve as the lectotype (Fig. 10). Smith writes that specimens were collected at Sandown Bay, Isle of Wight and Folkstone, Kent, meaning that the precise *locus typicus* within England is unknown.

Finally, Wood et al. (2023) excluded *A. simillima* from the fauna of Italy. However, the specimens reported in this work as "*A. freygessneri*" from Trentino-Alto Adige and Abruzzo are likely to be misidentifications of *A. simillima* (*unpublished data*). Further study as well as genetic characterisation of this species or species complex is necessary across its entire range.

Andrena (*Cryptandrena*) *brumanensis* Friese, 1899

Andrena brumanensis Friese, 1899: 344, ♀♂ [Turkey, OUMNH, lectotype by present designation] (Fig. 12)

Material examined. LEBANON • 2♂; Beirut; 22 Apr. 1899; F.D. Morice leg.; OUMNH (possibly syntypic); **TURKEY** • 1♂; Mersina [Mersin]; 8 May 1899; F.D. Morice leg.; OUMNH (**lectotype**).

Distribution. Across the North Mediterranean from south-east France to the Levant and Iran (Gusenleitner & Schwarz 2002, Wood & Monfared 2022).

Remarks. Friese described this species from: "*Zahlreiche Exemplar von Brumana am 30. April, und von Mersina am 8. Mai 1899 (Morice)*" [Numerous specimens from Brumana on April 30th, and from Mersina on May 8th, 1899 (Morice)]. Broummana is a town approximately 10 km to

Fig. 12. Andrena (*Cryptandrena*) *brumanensis* Friese, 1899 lectotype male (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

the east of Beirut. Examination of the OUMNH collection could not find specimens labelled as Brumana from the 30th April, only two specimens from Beirut on 22nd April. Consequently, the male specimen from Turkey which does match Friese's written collecting information (Fig. 12) is selected as the lectotype in order to maintain the current concept of the species, as it conforms to the identification characters used such as the long A3 that clearly exceeds the length of A4 (Fig. 12C).

Andrena (*Didonia*) *mucida* Kriechbaumer, 1873

Andrena mucida Kriechbaumer, 1873: 56, ♀ [Italy, ZSM, lectotype by present designation] (Fig. 13)

Material examined. ITALY • 1♀; Turin; G. Gribodo leg.; ZSM (**lectotype**) • 1♀; Piemonte; G. Gribodo leg.; ZSM (**paralectotype**).

Distribution. Pan-Mediterranean, though absent from Libya and Egypt, extending north to the Pannonian basin and east to eastern Turkey (Gusenleitner & Schwarz 2002).

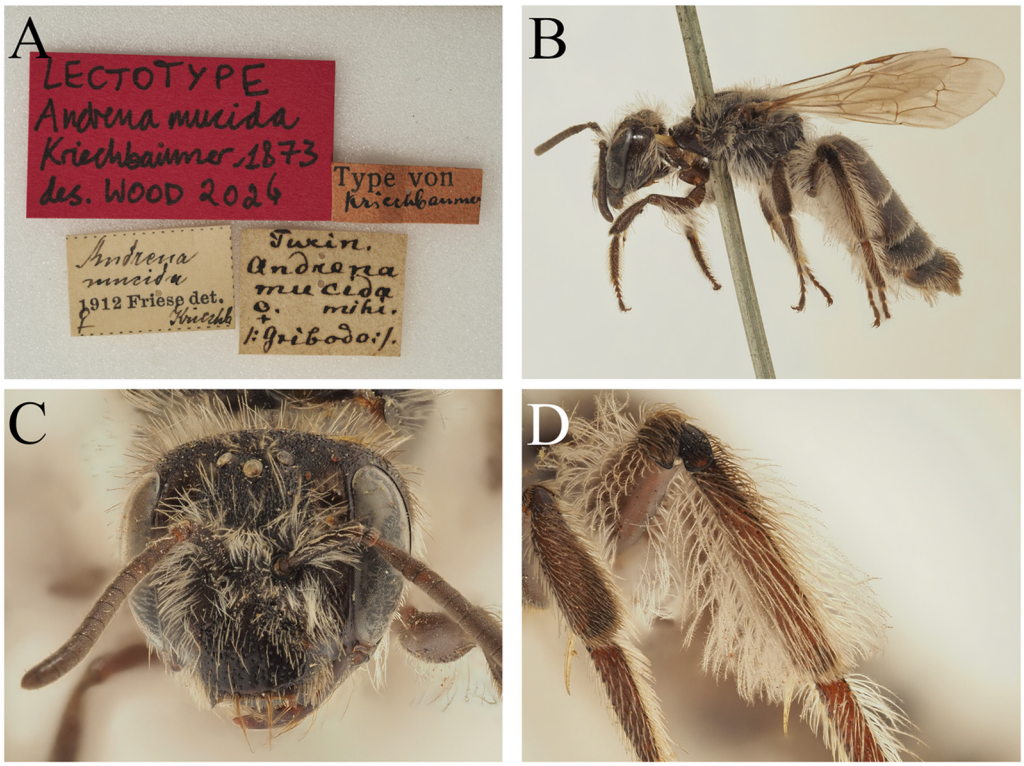

Fig. 13. Andrena (*Didonia*) *mucida* Kriechbaumer, 1873 lectotype female (ZSM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Tibial scopa, profile view

Remarks. *Andrena mucida* is a well-known species with a highly unusual ecology; the species is bivoltine, with the first generation specialising on pollen from *Muscari* (Asparagaceae) and the second generation specialising on pollen from Caprifoliaceae (=Dipsacaceae; Wood 2023a). This currently unique heterolectic behaviour is supported by morphological adaptation, with the tibial scopae of the 1st generation composed of simple hairs, and the tibial scopae of the 2nd generation composed of plumose hairs. On the off chance that *A. mucida* were found to actually represent two univoltine species, it would be beneficial to know which the name *A. mucida* could be applied to. In the ZSM there are two syntypic specimens labelled by Kriechbaumer (Fig. 13). Both are females from the summer generation, as they possess plumose scopal hairs (Fig. 13D). The one explicitly labelled from Turin is selected as the lectotype.

Andrena (*Euandrena*) *alijevi* Osytshnjuk, 1986

Andrena (*Euandrena*) *alijevi* Osytshnjuk, 1986: 410, ♀♂ [Azerbaijan, SIZK, not examined]

Andrena (*Euandrena*) *sani* Wood & Monfared, 2022: 15, ♀♂ [Iran, OÖLM, examined] **syn. nov.**

Material examined. ARMENIA • 2♀; pr. Eriwan [Yerevan], Vazakaz [Voskevaz]; 4 Apr. 1925; A. Schelkovnikow; OÖLM; **AZERBAIJAN** • 1♀; Апшерон [Absheron peninsula], Шувеляны [Shuvelan]; 18 Mar. 1977; H. Aliyev leg.; A. Osytshnjuk det.; ZSM (**paratype**); **IRAN** • 1♂; Ab'e-Ask [Ab-e Ask], Tehran; 23 Mar. 1964; Tirgari leg.; OÖLM • 1♀; Azerbaidjan, Gavgan [Gowgan], Lac Rezaiyeh; 23–24 May 1964; M. Deschamps leg.; OÖLM • 1♀; Azerbaidjan, Tabriz; 26 Apr. 1965; L. Mahle leg.; OÖLM; vergier amandiers [almond orchard] • 6♂, 2♀; Azerbaidjan, Tabriz, Shahgoli; 23 Apr; 1965; L. Mahle leg.; OÖLM/TJWC; vergier [orchard] • 1♀; Kerman, Mahan, Shahzadeh-G; 354 m a.s.l.; 9 May 2019; W-H. Liebig leg.; WHLC. For additional examined material, see Wood and Monfared (2022).

Distribution. Newly recorded from Armenia*, Azerbaijan, and Iran (Osytshnjuk et al. 2008, Wood & Monfared 2022).

Remarks. Although it has not been possible to study the holotype, a female paratype is present in the ZSM collection (Fig. 14). Examination of this specimen confirms a lingering doubt I had that *A. sani* is conspecific with *A. alijevi*. *Andrena sani* was described entirely on material from central Iran, in the province of Yazd. Using the description and key of Osytshnjuk et al. (2008), it was possible to place *A. sani* close to *A. alijevi*, but I thought the former was separable based

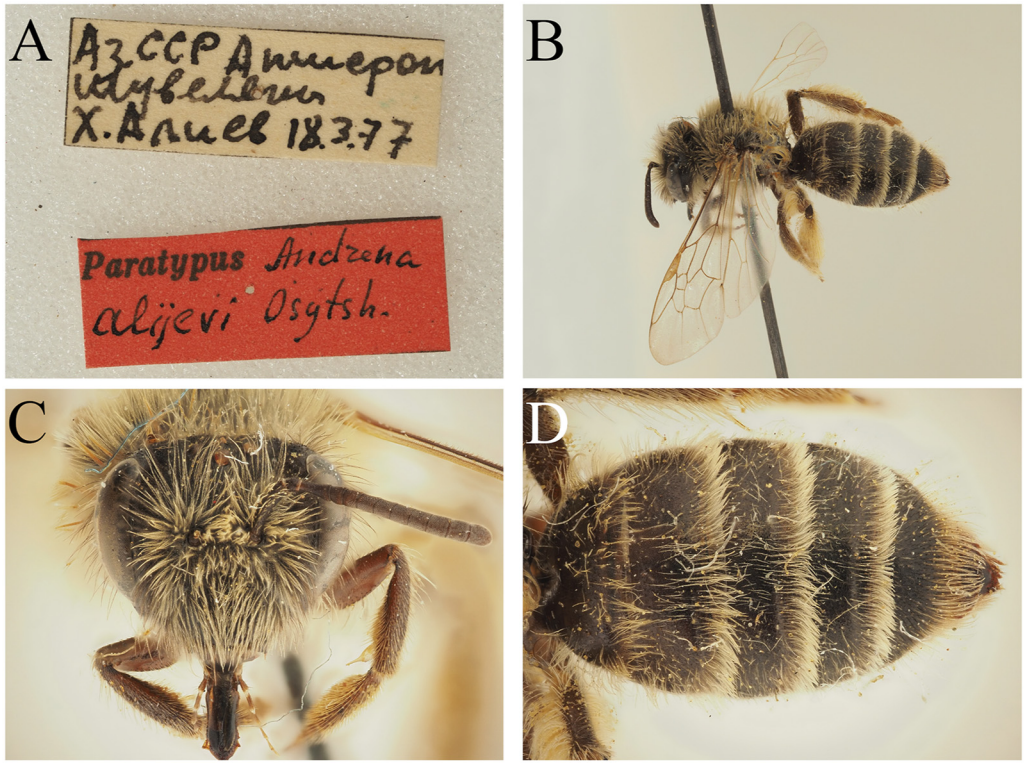

Fig. 14. Andrena (*Euandrena*) *alijevi* Osytshnjuk, 1986 paratype female (ZSM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

on the (nominally) lighter pubescence of the head and mesosoma and longitudinal impunctate midline on the clypeus. However, examination of the paratype of *A. alijevi* shows that it also displays these characters. Moreover, since the publication of *A. sani* in 2022, I was able to examine more material from Armenia and Iran, particularly Iranian Azerbaijan. These produced several specimens of "*A. sani*", and fill the distributional gap. *Andrena alijevi* can now be considered a slightly more widespread early-spring species associated with almond (*Prunus amygdalus*) orchards, the host recorded in Yazd (Wood & Monfared 2022) and also Tabriz in Iranian Azerbaijan. Osytshnjuk et al. (2008) recorded the species in March.

Andrena (*Margandrena*) *morosa* Cameron, 1897

Andrena morosa Cameron, 1897: 119, ♀ [India: Uttarakhand, OUMNH, lectotype by present designation] (Fig. 15)

Andrena burkelii Bingham, 1908: 363, ♀ [India: Himachal Pradesh, ZSI, examined by photograph].

Material examined. INDIA • 3♀; Mussouri [Mussoorie]; G.A.J. Rothney leg.; OUMNH (including **lectotype** female) • 1♀; Masuri [Mussoorie]; NHMUK (false holotype) • 1♀; Simla, Matiana; ZSI; ZSI0000008659 (holotype of *Andrena burkelii*) • 2♀; Mussoorie, Tumal [exact location unclear]; 16 Oct. 1964; S.W. Batra leg.; USNM; **NEPAL** • 1♀; Nawakot, Langtang Khola, Ghora Tabela; 3,200 m a.s.l.; 3 Oct. 1982; C. Holzschuh leg.; OÖLM • 1♂; W-Nepal, Jumla, Jumla; 2,850 m a.s.l.; 10 Oct. 1993; E. Hüttinger leg.; OÖLM.

Distribution. India (Uttarakhand, Himachal Pradesh) and Nepal (Gautam et al. 2024).

Remarks and diagnosis. *Andrena morosa* has had an uncertain phylogenetic placement ranging from *incertae sedis* to *Andrena s. str.* to *Pallandrena* Warncke, 1968 (Gusenleitner & Schwarz 2002, Tadauchi & Matsumura 2007, Gautam et al. 2024) due to a lack of clear morphological characters (see discussion in Gautam et al. 2024). It was also previously known only from the female sex, which has contributed to this lack of clarity. Moreover, the location of the type material has been confused. The main *Andrena* type catalogue (Gusenleitner & Schwarz 2002) referred to the NHMUK as the depository, but the species was described using material from the Rothney collection in the OUMNH. Examination of this collection revealed three females, one of which is here designated as the lectotype (Fig. 15). The NHMUK specimen was incorrectly referred to as the holotype by Gautam et al. (2024), as the authors were not aware of the issues surrounding type depository confusion between the NHMUK and OUMNH (see Introduction). The NHMUK specimen may not even be a syntype. Fortunately, the specimens themselves across both collections are conspecific, and so the concept of the species does not change. Inspection of material from Nepal has revealed the unknown male (Fig. 16), allowing for its description and clarification of the subgeneric position of *A. morosa*.

The male can be recognised due to the combination of dark clypeus (Fig. 16B), gena noticeably broader than the width of the compound eye and with its posterior margins almost carinate (Fig. 16C–D), pronotum with a very strong humeral angle, A3 slightly exceeding A4+5, process of labrum sulcate and slightly upturned, and genitalia simple, with slightly basally broadened penis valves and flattened gonostyli (Fig. 16H). This places it into the subgenus *Margandrena* Warncke, 1968. Due to the sulcate process of the labrum, the slightly but distinctly elongate malar space that approaches the breadth of the flagellum, and the narrow propodeal

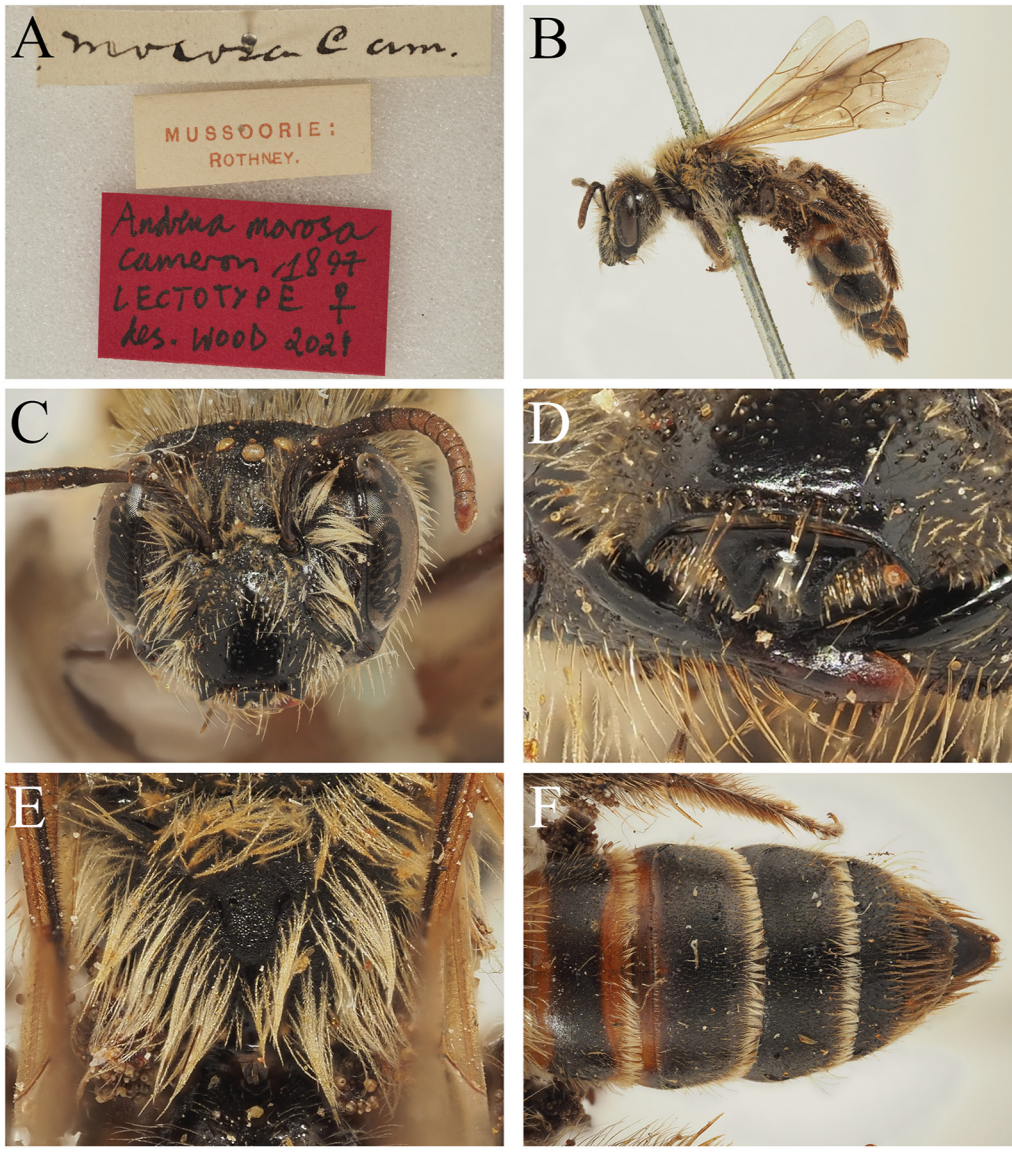

Fig. 15. Andrena (*Margandrena*) *morosa* Cameron, 1897 lectotype female (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Process of labrum, ventral view; E. Propodeum, dorsal view; F. Terga, dorsal view

triangle with distinct basal rugae it can be linked to the female *A. morosa* which also has a strongly medially emarginate process of the labrum (Fig. 15D).

With knowledge of the male, these characters in combination with the ventrally plumose tibial scopa of the female (See Gautam et al. 2024) fits the pattern of subgenus *Margandrena*.

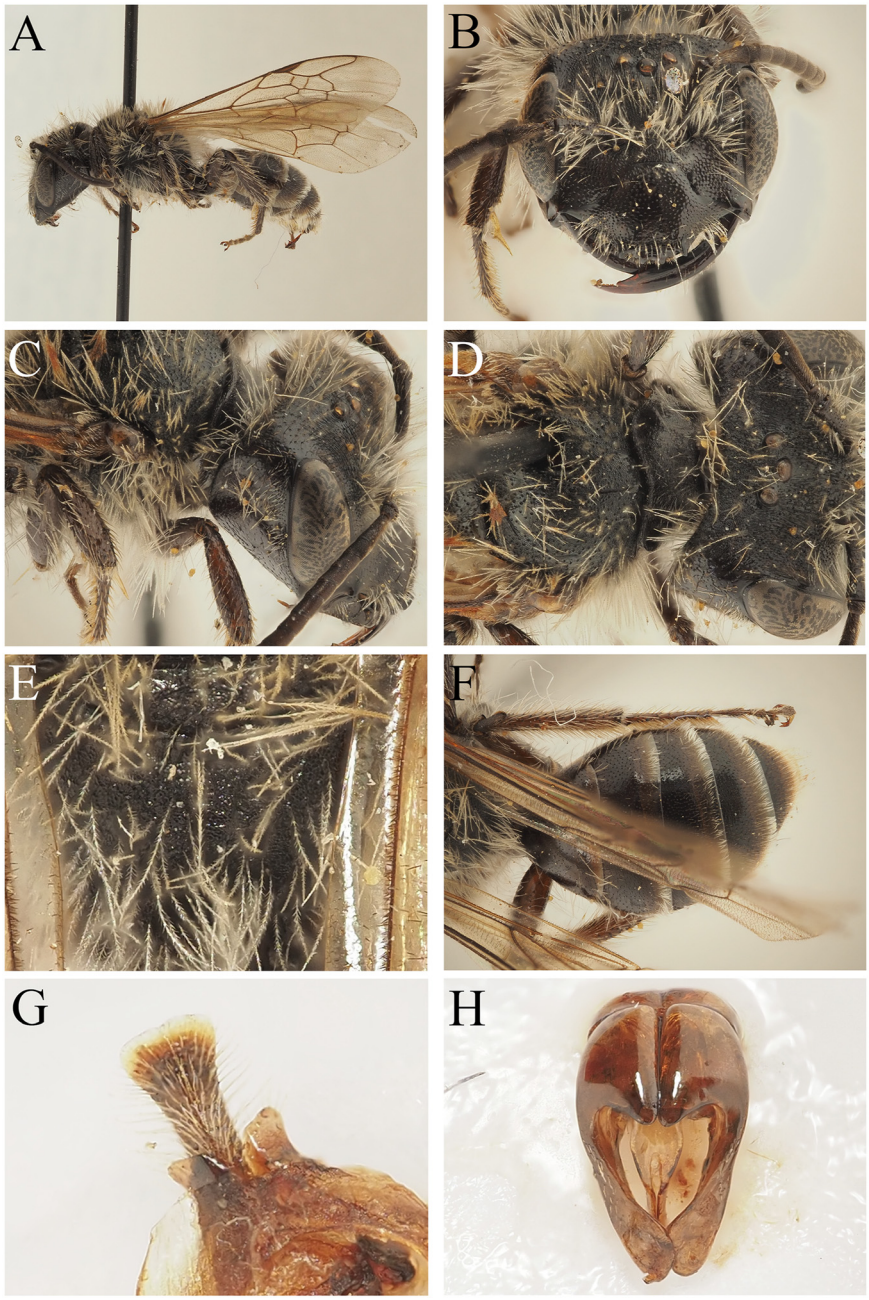

Fig. 16. Andrena (*Margandrena*) *morosa* Cameron, 1897 male. A. Habitus, profile view; B. Head, frontal view; C. Gena, dorsolateral view; D. Scutum, dorsal view; E. Propodeum, dorsal view; F. Terga, dorsal view; G. Sternum 8, ventral view; H. Genital capsule, dorsal view

Four dated specimens are now known, one male and three females collected in October. The flight period can now more reliably be considered to be during October, which is consistent with the idea that this species belongs to the subgenus *Margandrena*, as both *Euandrena* and *Chrysandrena* typically fly during the spring. Males are very similar to a new species of *Margandrena* from Nepal and India described in the male sex, *A. maxillaris* **spec. nov.** (see Section 4), and diagnosis is provided under that species. *Andrena maxillaris* cannot be considered to be the male of *A. morosa* because the malar space is very short/linear (in female *A. morosa* with the malar space approaching the breadth of the flagellum; Fig. 15C) and the propodeal triangle is broad and completely smooth over its entire surface (in female *A. morosa* with the propodeal triangle narrow and with raised rugae in its basal ½; Fig. 15E).

Finally, it should be noted that Tadauchi and Matsumura (2007) described *A.* (*Margandrena*) *annapurna* Tadauchi & Matsumura, 2007 from Nepal, comparing it to *A. hyacinthina* Mavromoustakis, 1958. *Andrena hyacinthina* is best placed as *incertae sedis*, since it likely falls into the *crocusella*-group that represents an undescribed subgenus of species (see Pisanty et al. 2022b, Bossert et al. in prep). Moreover, members of the *crocusella*-group fly in the winter or spring, and *A. annapurna* was captured in April-May, fitting this pattern. The male of *Andrena annapurna* is unknown, but confusion is considered unlikely due to 1) the likely strongly differentiated flight periods and 2) the morphologies of female *A. annapurna* and *A. morosa* which shows many differences, such as a protuberant clypeus and rounded semicircular process of the labrum in *A. annapurna* (clypeus more or less flattened and process of the labrum deeply emarginate in *A. morosa*).

Description of male. Body length: 8.5 mm (Fig. 16A). *Head:* Dark, 1.2 times wider than long (Fig. 16B). Clypeus domed, polished and shining, densely punctate, punctures separated by 0.5 puncture diameters laterally, by up to 1.5 puncture diameters medially. Process of labrum roughly trapezoial, anterior margin slightly upturned, medially deeply emarginate. Gena 1.5 times wider than width of compound eye, posterior margin slightly angulate but not carinate (Fig. 16C); ocelloccipital distance 3 times diameter of compound eye (Fig. 16D). Head predominantly covered with sparse long white hairs, some shorter dark brown to black hairs on frons and inner margin of compound eye, none equalling length of scape. Antennae dark, A3 slightly exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum finely microreticulate over majority of surface, postero-medially with small area smooth and shining, remaining area dull to at most weakly shining. Scutellum posteriorly microreticulate and dull, becoming smooth and shining in anterior ½. Scutum and scutellum irregularly punctate, punctures separated by 0.5–2 puncture diameters. Pronotum with strong humeral angle, internal surface partially smooth and shiny. Mesepisternum and dorsolateral parts of propodeum with microreticulation overlain by network of dense and fine raised rugosity, surface dull. Propodeal triangle narrow, medially constricted, laterally delineated by slightly raised carinae, with short but distinctly raised rugae in basal ½ (Fig. 16E). Mesepisternum covered with long white finely plumose hairs, longest approaching length of scape, hairs becoming shorter and light golden-brown on scutum and scutellum. Legs dark, apical tarsal segments lightened brownish, pubescence whitish to light brownish. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma orange-brown, venation brownish, nervulus interstitial.

Metasoma: Tergal discs dark, marginal areas orange-brown basally, becoming hyaline-white on rims (Fig. 16F). Tergal discs finely shagreened, shining, regularly and deeply punctate, punctures separated by 1–2 puncture diameters, punctures extending onto marginal areas. Tergal discs with short white hairs, not obscuring underlying surface; T2–4 apically with narrow white hairbands, widely interrupted on T2, complete on T3–4. S8 slightly broadened apically, apical margin strongly truncate, ventral surface covered with sparse spreading fan of golden hairs (Fig. 16G). Genital capsule slightly elongate, gonocoxae apically produced into short rounded teeth, gonostyli slightly broadened apically, flattened and spatulate (Fig. 16H). Penis valves moderately broadened basally, gradually tapering to apex.

Andrena (*Melanapis*) *fuscosa* Erichson, 1835

Andrena fuscosa Erichson, 1835: 103, sex not specified [Spain: Andalusia, ZMHB, examined] (Fig. 17A–D)

Andrena ruficornis Smith, 1853: 109, ♀ [Spain: Canary Islands, OUMNH, lectotype by present designation] (Fig. 17E–H)

Material examined. SPAIN • 1♀; Andalusia; Waltl leg.; ZMHB (syntype, possible **holotype**) • 1♂; Canary Islands; OUMNH (**lectotype** of *A. ruficornis*).

Distribution. Palaearctic, from the Canary Islands to northern India (Gusenleitner & Schwarz 2002).

Remarks. In Smith's description of *A. ruficornis*, he did not diagnose it against specific species. *Andrena fuscosa* has had a stable species concept for some time, and *A. ruficornis* is well-established as its junior synonym. Gusenleitner and Schwarz (2002) list the NHMUK as the type depository, but the type material is in the OUMNH, and a lectotype is designated from the sole female specimen standing above a label of *ruficornis*; it perfectly matches Smith's description (Fig. 17E–H). It is unclear how many specimens the species was described from, and hence a lectotype is designated. A lectotype designation is necessary to highlight the availability of this name which has been overlooked in a previous work when describing a synonymous name from the Canary Islands (Patiny 1997, Gusenleitner & Schwarz 2002). The opportunity is taken to also present an image of the possible holotype of *A. fuscosa* in the ZMHB collection (Fig. 17A–D), as this was not done previously (Wood 2023a, 2023b), and the type has been overlooked by a previous worker examining the ZMHB collection, reporting only a specimen collected in Budapest in 1886 (Patiny 1997) which is clearly not syntypic. Although it was common practice to describe new species from singletons in the 19th century, it is impossible to know exactly how many specimens made up the original type species, and only one now remains in the ZMHB collection. It is therefore considered as a syntype and possible holotype.

Andrena (*Melandrena*) *barbareae* Panzer, 1805

Andrena barbareae Panzer, 1805: 94, 10, ♀♂ [Germany, ?ZMHB, ?type lost]

Andrena basifusca Cockerell, 1930: 110, ♀ [Uzbekistan, USNM, examined] (Fig. 18) **syn. nov.**

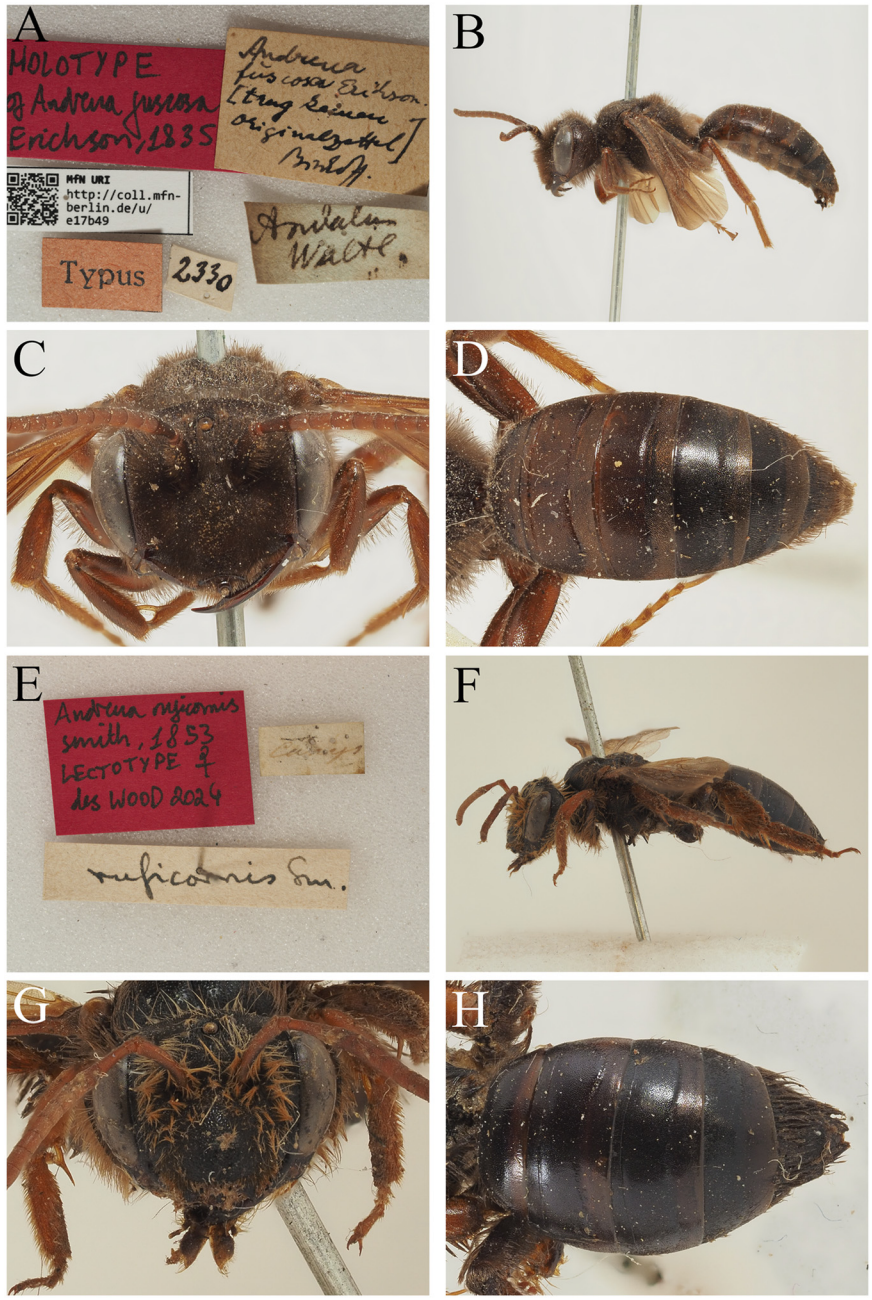

Fig. 17. Andrena (*Melanapis*) *fuscosa* Erichson, 1835 holotype male (ZMHB). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view. *Andrena* (*Melanapis*) *ruficornis* Smith, 1853 lectotype female (OUMNH). E. Label information; F. Habitus, profile view; G. Head, frontal view; H. Terga, dorsal view

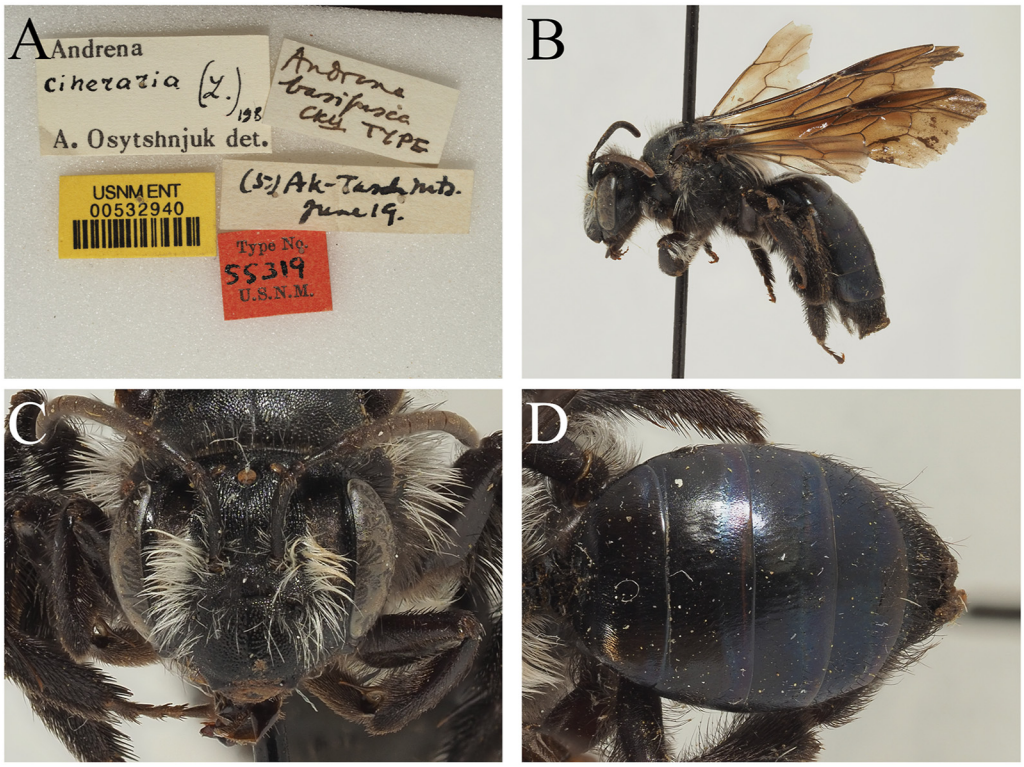

Fig. 18. Andrena (*Melandrena*) *basifusca* Cockerell, 1930 holotype female (USNM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Material examined. AFGHANISTAN • 2♀; prov. Ghor, distr. Chaghcharan, 1.5 km S Bandi Ali vill. Ghazak Mts; 2,400 m a.s.l.; 26 May 2012; O. Pak leg.; TJWC; **KAZAKHSTAN** • 1♀; NO-Kazachstan. Sudl. Altai, Umg. Serebrjansk [Serebryansk], Sewernoje-Schlucht [Severnoje Canyon]; 700 m a.s.l.; 26–30 Jun. 1995; W. Dolin leg.; ZSM • 2♂; SE, Dzungarian Alatau, Sharkent [Zharkent] 32 km NW; 1,221 m a.s.l.; 6 Jun. 2024; C. Schmid-Egger leg.; CSE • 1♀; SE, N Ketmen Mts., S. Kirgyzsay (=Podgornoe [Podgornoye]); 1,600–1,800 m a.s.l.; 3 Jun. 2024; D. Bartsch leg.; SMNS • 1♂; SE, Tian Shan, Bartogay-Lake; 1,011 m a.s.l.; 15 Jun. 2025; C. Schmid-Egger leg.; CSE • 8♂; SE, Tian Shan, Bartogay-Lake, 8 km W; 1,661 m a.s.l.; 15 Jun. 2025; C. Schmid-Egger leg.; CSE • 1♀; Tauturgen; 1,100 m a.s.l.; 16 Jun. 2024; C. Schmid-Egger leg.; CSE; **KYRGYZSTAN** • 2♂; ~25 km SSE Kara-Balta town; 1,600 m a.s.l.; 27–28 May 1995; D. Milko leg.; OÖLM • 1♀; Ala Archa, Kaskha-Suu; 1,650 m a.s.l.; 1–31 Jul. 2002; V. Gurko leg.; OÖLM • 2♀; Kungei-Alatau; 2,200 m a.s.l.; 8–19 Jul. 2001; Z. Klyuchko leg.; OÖLM • 5♀; Naryn-Flussufer; 1,800–1,950 m a.s.l.; 8 Jun. 1998; P. Hartmann leg.; E. Scheuchl det.; ZSM • 1♀; Shiman Bel [Pereval Shiman-Bel']; 24 Jul. 2003; OÖLM • 1♂; Talas valley, 20 km W Taldy-Bulak vill; 1,700 m a.s.l.; 16 Jun. 1996; D. Milko leg.; OÖLM • 1♀; Tschatkal [Chatkal], Ters-Tal, Tschap-Tschama Pass [Pereval Chapchyma]; 8 Jul. 1998;

S. Ovtschinnnikov leg.; ZSM • 2♀; Tschatkal G.K. [Chatkal], Tschap-Tschama Pass [Pereval Chapchyma]; 2,450 m a.s.l.; W. Dolin leg.; ZSM; **TAJIKISTAN** • 1♀; 15 km E Bokhtar, Levakant env. [=Sarband], Tabachki Mts; 750 m a.s.l.; 3 Jun. 2023; O. Pak leg.; TJWC • 1♀; Pamir, Ishkashim [Eshkashem], Mt. Range, Avj vill; 2,600 m a.s.l.; 28 May 2023; O. Pak leg.; TJWC • 1♀; Pashohe 30 km N Kalai-Chum [Kalaikhum]; 13 Jun. 1990; J. Halada leg.; OÖLM • 1♀; Peter I Range, Tajikabad distr. [Tojikobod], 10 km S Tojikobod, Ganishob vill. [Ғанишоб/Ghanishab]; 2,100 m a.s.l.; 8–12 Jun. 2006; E. Ivanova leg.; TJWC; **UZBEKISTAN** • 1♀; Ak-Tash Mountains [near Tashkent]; 19 Jun. 1926; N. Kuznetzov leg.; USNM (**holotype** of *A. basifusca*).

Distribution. Mountains of Europe, Turkey, and Central Asia (Schmid-Egger & Schuechl 1997, Wood 2023c). Further study is required due to inconsistent species concepts.

Remarks. The *cineraria*-group of species are members of the subgenus *Melandrena* Pérez, 1890 that show the metasoma with metallic blue reflections combined with contrasting grey-white and black pubescence on the head and mesosoma; it remains a taxonomically challenging group. It could be considered to consist of four species: *A. cineraria* (Linnaeus, 1758), *A. peregrina* (Smith, 1878), *A. barbareae*, and *A. danuvia* Stöckhert, 1950 (in Pittioni and Stöckhert, 1950), with two slightly more removed species *A. marmora* Nurse, 1904 and *A. metallescens* Cockerell, 1906 (Wood 2023c, Gautam et al. 2024, Wood 2024, Wood & Jacobs 2024). Even in Europe, the difference between *A. cineraria* and *A. barbareae* has been controversial, and requires multilocus DNA evidence to differentiate the two species genetically (Gueuning et al. 2020).

Whilst the consensus in Europe has moved towards three species, namely *A. barbareae*, *A. cineraria*, and *A. danuvia* (Schmid-Egger & Scheuchl 1997, Ghisbain & Rosa et al. 2023), the situation outside of Europe is unclear. The characters used to separate members of this group are variable and challenging to interpret. Inspection of material from the mountains of Central Asia shows that specimens there have a combination of strongly infuscate wings and the integument of the metasoma is dark blue, characters that are consistent with the species concept of *A. barbareae*. Specimens from the Himalayas across China into Mongolia have metasomas with brighter blue metallic colouration and the base of the wings are less infuscate, this being referable to *A. peregrina* (Wood & Jacobs 2024).

Some authors have chosen to treat all members of the group under the name *A. cineraria*, such as Osytshnjuk et al. (2008). It was therefore not a surprise to find that upon inspection of the type specimen of *A. basifusca* in the USNM that it was labelled as *A. cineraria* by Osytshnjuk in 1981 (Fig. 18). Cockerell (1930: 111) writes that the species is "Very like *A. peregrina* (Smith), but easily distinguished by the wings not being hyaline at base". This can be seen in the holotype, in which the radial cell and the 1st cubital cell are infuscate (Fig. 18B). The colouration of the metasoma is also dark blue (Fig. 18D). Based on the examination of the holotype in combination with revision of material from the mountains of Central Asia, it is more justifiable based on the morphology to refer to this material as *A. barbareae*, and hence *A. basifusca* **syn. nov.** is here synonymised with it. Further work is needed to clarify the range limits of *A. barbareae* relative to *A. peregrina*.

Andrena (*Micrandrena*) *sedentaria* Warncke, 1975

Andrena (*Micrandrena*) *sedentaria* Warncke, 1975: ♀♂ [Turkey, OÖLM, examined]

Andrena (*Micrandrena*) *dmitrii* Osytshnjuk, 1993b: 403, ♀ [Turkmenistan, ZMMU, not examined] **syn. nov.**

Material examined. TURKEY • 1♀; Ararat; 15 Jun. 1973; K. Warncke leg.; OÖLM (**holotype**); **TURKMENISTAN** • 1♀; 10 км ю.-з Ашхабада [10 km SW of Ashgabat], Фирюзинское ущ. [Firyuzinskoe gorge = Firjuza], сухие склоны [dry slopes]; 21 Apr. 1979; A. Osytshnjuk leg.; ZSM (**paratype** of *A. dmitrii*). For additional examined material, see Wood and Monfared (2022).

Distribution. Turkey, Iran, and Turkmenistan (Wood & Monfared 2022).

Remarks. Gusenleitner & Schwarz (2002) expressed doubts as to the status of *A. dmitrii* as a species, comparing it to *A. nanaeformis* Noskiewicz, 1925. Wood & Monfared (2022) extended the range of *A. sedentaria* to the east, all the way up to the Iranian side of the Kopet Dag mountains. Since *A. dmitrii* was described from the Iranian side of the Kopet Dag and the description matches *A. sedentaria*, Wood & Monfared (2022) expressed a need for type revision. Examination of the ZSM collection produced a paratype of *A. dmitrii* (Fig. 19) which matches the concept of *A. sedentaria*; the general appearance is of *A. nanaeformis*, but the clypeus is dull and the tergal margins have strong granular microreticulation and are essentially impunctate,

Fig. 19. Andrena (*Micrandrena*) *dmitrii* Osytshnjuk, 1993 paratype female (ZSM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

which contrasts the strongly and densely punctate tergal discs (Fig. 19D). *Andrena dmitrii* is therefore synonymised with *A. sedentaria*.

Andrena (*Oreomelissa*) *rothneyi* Cameron, 1897

Andrena rothneyi Cameron, 1897: 112, ♀ [India: Uttarakhand, OUMNH, lectotype by present designation] (Fig. 20)

Material examined. INDIA • 1♀; Mussouri [Mussoorie]; G.A.J. Rothney leg.; OUMNH (**lectotype**). For additional examined material, see Gautam et al. (2024).

Distribution. India (Himachal Pradesh, Uttarakhand, Arunachal Pradesh) & Nepal (Gautam et al. 2024).

Remarks. Gautam et al. (2024) considered the specimen marked as type in the NHMUK collection to be the holotype. However, following Baker's comments (see Baker 1993; discussed in introduction), it is much more appropriate to designate a lectotype from the Rothney collection. It is ambiguous as to whether or not the specimen in the NHMUK collection is even a syntype.

Fig. 20. Andrena (*Oreomelissa*) *rothneyi* Cameron, 1897 lectotype female (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Andrena (*Plastandrena*) *balucha* Nurse, 1904

Andrena balucha Nurse, 1904: 558, ♀♂ [Pakistan, NHMUK, examined]

Andrena quettensis Cockerell, 1917: 285, ♂ [Pakistan, USNM, lectotype by present designation] (Fig. 21) **syn. nov.**

Material examined. PAKISTAN • 2♀; Baluch. Prov., Pishin; 23–27 May 1984; R.J. McGinley leg.; USNM • 3♂, 7♀; Baluch. Prov., Sariab, 15 km S Quetta; 15 May 1984; R.J. McGinley leg.; USNM • 1♂, 2♀; Baluch. Prov., Sariab, 16 km S Quetta; 26 May 1984; R.J. McGinley leg.; USNM • 1♀; Quetta; 1–31 May 1902; C.G. Nurse leg.; NHMUK (**syntype**) • 4♀; Quetta; 1–30 Jun. 1903; C.G. Nurse leg.; USNM (unclear if these are syntypes of *A. balucha*) • 1♀; Quetta; 1–30 Apr. 1904; C.G. Nurse leg.; USNM (unclear if this is a syntype of *A. balucha*) • 5♂; Quetta, India; 1–31 Mar. 1906; F. Benton leg.; USNM (**lectotype** of *A. quettensis*).

Distribution. Pakistan (Baluchistan).

Remarks. Cockerell (1917) described *A. quettensis* from Quetta, which is also the *locus typicus* for *A. balucha*. His comments are bizzare, as whilst noting that *A. quettensis* could be a dark form of *A. balucha*, he compares it to *A. cingulata* auctorum (=*A.* (*Poecilandrena*) *labiata*

Fig. 21. Andrena (*Plastandrena*) *quettensis* Cockerell, 1917 lectotype male (USNM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Fabricius, 1781) and *A.* (*Poecilandrena*) *laticeps* Morawitz, 1877 (presumably due to the red tergal colouration) and notes that "*A. balucha*, which I have examined in U.S. National museum, has the area of metathorax of the *Trachandrena* type". What he meant by this is that *A. balucha* has a rugose-areolate propodeal triangle, i.e. it can be placed into the subgenus *Plastandrena*; Cockerell presumably only examined females since those were the only sex present in the USNM collection that would have been available. The male specimens of *A. quettensis* in the USNM are clearly *Plastandrena* due to the rugose-areolate propodeal triangle and inner hind tibial spur broadened submedially. Examination of specimens collected from Quetta and its environs throughout the 20th century shows that *A. quettensis* is simply the male of *A. balucha*, a species currently only known from the province of Baluchistan. *Andrena quettensis* is therefore synonymised with *A. balucha* **syn. nov.**

Andrena (*Simandrena*) *combinata* (Christ, 1791)

Apis combinata Christ, 1791: 187 [Germany, type lost]

Andrena cryptodonta Cockerell, 1922: 244, ♀ [Pakistan, USNM, examined] (Fig. 22) **syn. nov.**

Fig. 22. Andrena (*Simandrena*) *cryptodonta* Cockerell, 1922 holotype female (USNM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Material examined. PAKISTAN • 1♀; Peshin [Pishin]; 1–30 Apr. 1903; C.G. Nurse leg.; USNM (**holotype** of *A. cryptodonta*).

Distribution. West and Central Palaearctic (Gusenleitner & Schwarz 2002, Ascher & Pickering 2024).

Remarks. No lectotype designation is necessary, as Cockerell indicates that the type is from Peshin, and that the only other specimen is from Quetta. The Peshin specimen is therefore the holotype. Examination of the type specimen show that the propodeal corbicula is complete (possessing a dorsal and anterior fringe) and the internal surface (the lateral faces of the propodeum) are glabrous, definitively placing this taxon within the subgenus *Simandrena* Pérez, 1890. Cockerell notes that the species "*resembles* A. [Simandrena] dorsata *in the abundant hair of the posterior part of the thorax*" but did not describe this character sufficiently to allow subgeneric diagnosis by subsequent authors (Gusenleitner & Schwarz 2002). Due to the clypeus with latitudinal raised ridges (or wrinkles) combined with the shiny and densely punctate terga (Fig. 22D), *A. cryptodonta* can be synonymised with *A. combinata*, a very widespread species found across the West Palaearctic to Iran (Gusenleitner & Schwarz 2002, Wood & Monfared 2022), western Pakistan known to have strong faunal links with Iran (e.g. Schmid-Egger & Liebig 2021) as part of the Palaerctic fauna. Although the type series of *A. combinata* has never been located as Christ's collection was never preserved (Gusenleitner & Schwarz 2002), the concept of this species is clear based on its use in the literature, and it is not currently considered necessary to designate a neotype.

Andrena (*Taeniandrena*) *kozlovi* Osytshnjuk, 1994 stat. nov.

Andrena (*Taeniandrena*) *callopyrrha kozlovi* Osytshnjuk, 1994: 34, ♀♂ [Russia: Altai, ZISP, examined by photograph]

Andrena (*Taeniandrena*) *xuanzangi* Tadauchi & Xu, 2003: 74, ♀♂ [China: Xinjiang, IZAS, not examined] **syn. nov.**

Material examined. RUSSIA • 1♀; Altai Republic, Kosh-Agach; 26 Jun. 1964; M. Kozlov leg.; ZISP (**holotype** of *A. callopyrrha kozlovi*) • 4♂, 5♀; Altaï rep., Ongudaï vill.; 840–900 m a.s.l.; 27 Jun. 2022; A. Filippov leg.; TJWC/VLC; **MONGOLIA** • 1♀; 70 km E Altay city [Altai], Guulin; 14 Jul. 2005; J. Halada leg.; OÖLM • 1♂; Delger, Govi-Altai; 46.0835°N, 97.9558°E; 1,768 m a.s.l.; 4 Jun. 2023; V. Govorov leg.; NMPC.

Distribution. Russia (Western Siberia), Kazakhstan, Mongolia (western part), China (Xinjiang) (Tadauchi & Xu 2003, as *A. xuanzangi*; Astafurova et al. 2024, as *A. callopyrrha kozlovi*).

Remarks. The subgenus *Taeniandrena* Hedicke, 1933 is known for its extreme taxonomic complexity (e.g. Praz et al. 2022, Wood 2023a, 2023b), and numerous unanswered taxonomic questions persist in the Palaearctic for this subgenus. In East Asia, Tadauchi and Xu (2003) considered *A. callopyrrha* Cockerell, 1929 (described from eastern China in Shandong province) to be found across eastern China (Beijing, Shandong, Jiangsu, Shannxi, Inner Mongolia) and eastern Mongolia, and then described *A. xuanzangi* from Xinjiang. The *locus typicus* is Balikun [Barköl]. This places it around 700 km from the *locus typicus* of *Andrena callopyrrha kozlovi* (Altai Republic, Kosh-Agach).

The morphological characters given for the separation of *A. xuanzangi* from *A. callopyrrha* in the female sex are that the scutum is smooth and shiny posteromedially (weakly tessellate posteromedially in *A. callopyrrha*), hind trochanter brown (trochanter ferruginous in *A. callopyrrha*), process of labrum broad (process of labrum narrow in *A. callopyrrha*), and metasomal sterna black (metasomal sterna reddened basally in *A. callopyrrha*). Examination of the holotype of *A. callopyrrha kozlovi* (Astafurova et al. 2024) shows that it matches these criteria, particularly in the broad process of the labrum. Examination of additional specimens matching the description of *A. xuanzangi* from western Mongolia fill the distributional gap between the two *loci typici*. It is therefore appropriate to treat *A. kozlovi* **stat. nov.** as a valid species and synonymise *A. xuanzangi* **syn. nov.** with it.

Finally, Wood (2024b) designated a lectotype of *A. callopyrrha* in the NHMUK collection, but it is possible that this is an invalid lectotype because the date on the label seems to indicate 11 Apr. 1928, whereas the date given by Cockerell (1929) is 7 Apr. 1928. It may therefore not be part of the syntypic series, even if it was caught by the same collectors and labelled by Cockerell, and the NHMUK was indicated as the type depository by Gusenleitner and Schwarz (2002). Moreover, Xu and Tadauchi (1997) examined the type material of *A. callopyrrha* conserved in the USNM, one of which was indicated as the type by Cockerell based on the handwritten label (which does not make it the holotype automatically, see Wood 2024b). However, inspection of the USNM collection (September 2024) found that the type was missing with a label indicating that it was on loan to O. Tadauchi since 1992 (along with several other East Asian *Andrena* types). In any case, since the NHMUK specimen was identified by Cockerell and was captured at a place and time extremely close to the type series, it is considered to be representative of the species.

Andrena (*Taeniandrena*) *zachroa* Cockerell, 1930 sp. resurr.

Andrena zachroa Cockerell, 1930: 111, ♀ [Tunisia, USNM, examined] (Fig. 23)

Andrena (*Taeniandrena*) *prazi* Wood, 2023b: 57, ♀♂ [Morocco, OÖLM, examined] **syn. nov.**

Material examined. TUNISIA • 1♀; Tunis; USNM (**holotype** of *A. zachroa*). For type series of *A. prazi*, see Wood (2023b).

Distribution. Morocco and Tunisia (Wood 2023b, as *A. prazi*). Almost certainly present also in Algeria.

Remarks. Warncke (1967: 209) synonymised *A. zachroa* with *Andrena* (*Pruinosandrena*) *caroli* Pérez, 1895 based only on the description. The description indicates that the species has a red metasoma, that the "*clypeus* [is] *flattened*", that the hair of the head and the mesosoma is covered in bright red pubescence, and that there is a "*strong resemblance to* A. russula". In this context, I do not know why Warncke did not consider the possibility that *A. zachroa* was part of the subgenus *Taeniandrena*. Examination of the type shows that it is clearly part of this subgenus (Fig. 23C), and that it is also senior to the recently described *A. prazi* (paratypes from Tunisia). Had I known that *A. zachroa* was part of the subgenus *Taeniandrena*, *A. prazi* would not have been described. In any case, this name can be newly synonymised under *A. zachroa*.

Fig. 23. Andrena (*Taeniandrena*) *zachroa* Cockerell, 1930 holotype female (USNM). A. Label information; B. Habitus, dorsolateral view; C. Head, frontal view; D. Terga, dorsolateral view

Andrena (Troandrena) praecocella Cockerell, 1917

Andrena praecocella Cockerell, 1917: 286, ♂ [Pakistan, USNM, lectotype by present designation] (Fig. 24)

Andrena (*Troandrena*) *saettana* Warncke, 1975: 82, ♀♂ [Cyprus, OÖLM, examined] **syn. nov.**

Material examined. PAKISTAN • 4♂; Quetta; 1–31 Mar. 1906; F. Benton leg.; T.D.A. Cockerell det.; USNM (one male selected as **lectotype**) • 8♂; Quetta; 1–31 Mar. 1906; F. Benton leg.; T.J. Wood det.; USNM (non-type material) • 3♂, 15♀; Quetta; 1–31 Mar. 1903; C.G. Nurse leg.; T.D.A. Cockerell det.; USNM • 4♂, 2♀; Quetta; 1–31 Mar. 1903; C.G. Nurse leg.; T.J. Wood det.; OUMNH (ex. coll. Rothney) • 1♀; Quetta; 1–30 Apr. 1903; C.G. Nurse leg.; T.J. Wood det.; OUMNH (ex. coll. Rothney). For additional examined material, see Wood (2024a).

Distribution. Greece (East Aegean islands), Cyprus, Turkey, Israel, Jordan, Iran, Pakistan (Cockerell 1917, 1922, Wood 2024a, as *A. saettana*).

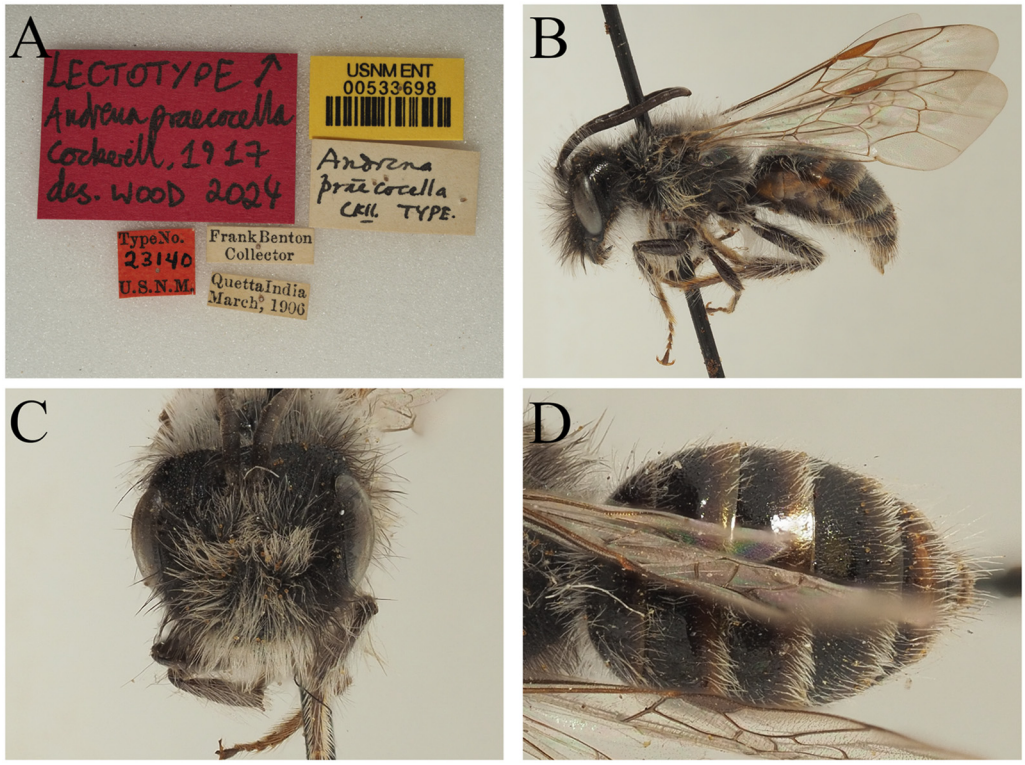

Fig. 24. Andrena (*Troandrena*) *praecocella* Cockerell, 1917 lectotype male (USNM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Remarks. The identity of *A. praecocella* has been obscure ever since its description (Gusenleitner & Schwarz 2002). Cockerell suggested in the original description that it was like *Andrena praecox* (Scopoli, 1763), which would therefore make it an *Andrena s. str.* However, something that was overlooked was that Cockerell (1922: 242) described the female based on C.G. Nurse material from Quetta, indicating that the female was quite different, presenting a metasoma marked with red. Examination of this material in the USNM reveals that *A. praecocella* actually belongs in the subgenus *Troandrena* Warncke, 1975 and that it is the senior synonym of *A. saettana* which was recently reported from Pakistan based on C.G. Nurse material from Quetta (Wood 2024a). The newly designated lectotype male is clearly the male of *A. saettana*, and hence this name takes seniority.

Andrena (*Truncandrena*) *combusta* Morawitz, 1876

Andrena combusta Morawitz, 1876: 163, ♀♂ [Uzbekistan, ZISP, examined by photograph]

Andrena subspinigera Cockerell, 1917: 284, ♀ [Pakistan, USNM, lectotype by present designation] (Fig. 25) **syn. nov.**

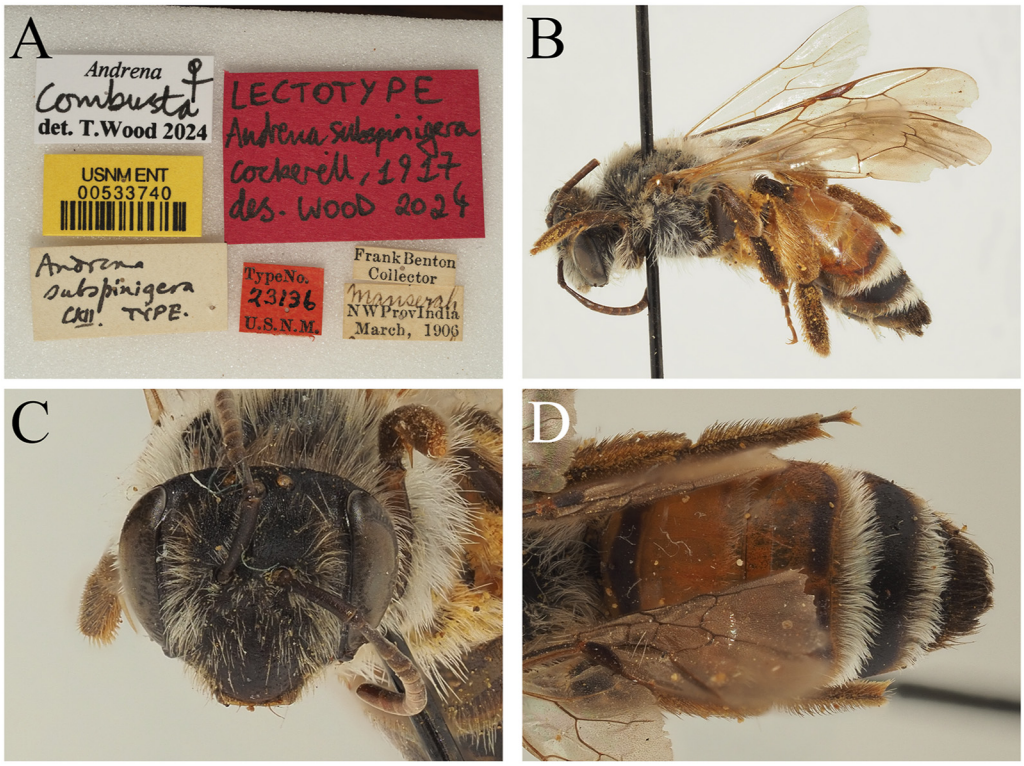

Fig. 25. Andrena (*Truncandrena*) *subspinigera* Cockerell, 1917 lectotype female (USNM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Material examined. AFGHANISTAN • 1♀; Afghani [no further information]; Coll. Radoszkoswki; A.Z. Osytshnjuk det.; ZMHB; **ARMENIA** • 1♀; Erevan, Erebouni [Erebuni Fortress]; 1,130 m a.s.l.; 7 May 2023; V. Leclercq leg.; VLC • 1♀; Lanjazat, Lanjazat, semi-desert; 999 m a.s.l.; 18 May 2023; V. Leclercq leg.; TJWC • 1♀; Myasnikyan, Myasnikyan; 916 m a.s.l.; 11 May 2023; V. Leclercq leg.; VLC • 1♀; Shaghap, Shaghap; 1,199 m a.s.l.; 17 May 2023; V. Leclercq leg.; VLC; **PAKISTAN** • 1♀; Menserah [Mansehra]; 1–31 Mar. 1906; F. Benton leg.; USNM (**lectotype** of *A. subspinigera*); **SYRIA** • 1♀; Simeon Kloster, 45 km NW Aleppo; 500 m a.s.l.; 19 Apr. 1992; K. Warncke leg.; ZSM • 1♂; Stausee [Dam], 10 km SW Homs; 500 m a.s.l.; 15 Apr. 1992; K. Warncke leg.; ZSM; **TURKMENISTAN** • 1♂, 3♀; Kopetdag Schutzgebiet, Hura Houdan Shamli, Scharlouk Flisstal; 26 Apr. 1996; ZSM.

Distribution. Syria, Turkey, Armenia*, Azerbaijan, Iran, Kazakhstan*, Turkmenistan*, Uzbekistan, Tajikistan, Afghanistan, Pakistan* (Schuberth et al. 2001, Wood et al. 2021a, Astafurova et al. 2022, Wood & Monfared 2022).

Remarks. Examination of the type material of *A. subspinigera* reveals that it is not at all allied to *A. spinigera* (Kirby, 1802) as indicated by Cockerell (this taxon rightfully called

A. (*Hoplandrena*) *trimmerana* (Kirby, 1802), see Wood et al. 2022), but is instead part of the subgenus *Truncandrena* Warncke, 1968. Due to the red-marked terga, strong white hairbands on the apical margins of T3–4 (Fig. 25D), and dark brown terminal fringe (see illustration of type material by Astafurova et al. 2022), it can be identified as a junior synonym of *A. combusta* which is found across dry habitats from Turkey and Syria to Afghanistan and now western Pakistan. The specimen indicated as "type" by Cockerell is selected as the lectotype, by present designation, as Cockerell noted that the species was described from multiple individuals.

It is beneficial to note that the identity of *A. combusta* has been confused relative to *A.* (*Truncandrena*) *oulskii* Radoszkowski, 1867 (Schuberth et al. 2001, Wood 2021a). Schuberth et al. (2001) wrote that Warncke misinterpreted a specimen of "*A. oulskii*" from Afghanistan (nominally in collection ZMHB) as the type of *A. oulskii*. However, searches in the ZMHB could not detect this specimen (Wood 2021a), and the identity of *A. oulskii* was settled based on genuine Radoszkowski syntypic material from Baku (the stated *locus typicus*; Radoszkowski 1867, Wood 2021a). The mystery specimen from Afghanistan was finally located in the ZSM, this having been determined as "*oulskii*" by Warncke, then "*minapalumboi* ssp. *oulskii*" by Warncke, and then "*combusta*" by Osytshnjuk. As it is not part of the type series of *A. oulskii*, it has no bearing on the application of this name. It will be returned to the ZMHB, and hence this institution is given as the repository.

The *Andrena subspinigera* auctorum reported by Gautam et al. (2024) is possibly referrable to *A.* (*Hoplandrena*) *tibetica* Xu & Tadauchi, 2005 which is known from southern China (Xizang, Yunnan, Sichuan) (Xu & Tadauchi 2005). There are some slight differences compared to the description, but given the taxonomic problems resulting from morphological variation in this subgenus (Wood et al. 2022), it is prudent not to describe material until type revision and ideally genetic analysis can be conducted.

Andrena (*Ulandrena*) *paradoxa* Friese, 1921

Andrena elegans var. *paradoxa* Friese in Fahringer & Friese, 1921: 170, ♀♂ [Turkey, ZMHB, lectotype by present designation] (Fig. 26)

Material examined. TURKEY • 2♀; Amanusgeb [Amanus Mountains], Bagtsche [Bahçe]; ZMHB (one female **lectotype**, remaining female **paralectotype**) • 1♀; Taurus Cilic.; 1895; Holtz leg.; ZMHB (**paralectotype**) • 1♂; Amanusgeb [Amanus Mountains], Bagtsche [Bahçe]; DEI (probably not syntypic).

Distribution. Southern Turkey, Syria, and Israel (Wood 2024b).

Remarks. Wood (2024b: 37) noted that the type material of *A. paradoxa* should be in the ZMHB, but that it has been on loan to W. Grünwaldt since 1977. Inspection of the ZSM collection has revealed three syntypes of *A. paradoxa*. There is one additional male in the DEI collection, but it is a male from the Bagtsche site, whereas Friese reported only three females from this site, and a male from Jaribaschi. It is possible that he mixed up some specimens, but for safety this male is best treated as not part of the syntypic series. Although the specimen from "Taurus Cilic." bears a red label marked "Type", this was not indicated in the original publication, and consequently one of the females from Bagtsche is selected as the lectotype since the specific site is known, and the specimen is in good condition. It will be returned to the ZMHB.

Fig. 26. Andrena (*Ulandrena*) *paradoxa* Friese, 1921 lectotype female (ZMHB). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Andrena (*Ulandrena*) *speciosa* Friese, 1899

Andrena speciosa Friese, 1899: 344, ♀ [West Bank, OUMNH, lectotype by present designation] (Fig. 27)

Material examined. WEST BANK • 1♀; Jericho; 11 Apr. 1899; F.D. Morice leg.; OUMNH (**lectotype**).

Distribution. Morocco, Algeria, Tunisia, Libya, Egypt, Israel and the West Bank, Jordan, Syria, Iran (Gusenleitner & Schwarz 2002; Wood et al. 2020a).

Remarks. Friese (1899) notes that he had one female from Morice (the OUMNH specimen) and others from Algeria collected by Schmiedeknecht. The location of these Schmiedeknecht specimens is unclear, and Gusenleitner and Schwarz (2002) indicated uncertainty about the type depository (ZMHB or OUMNH). The Morice specimen has now been located and can be designated as the lectotype, fixing the *terra typica* as the West Bank and the type depository as the OUMNH.

Fig. 27. Andrena (*Ulandrena*) *speciosa* Friese, 1899 lectotype female (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Andrena (*Ulandrena*) *tecta* Radoszkowski, 1876

Andrena tecta Radoszkowski, 1876: 82, ♀ [Caucasus, ZMHB, lectotype by present designation] (Fig. 28)

Material examined. CAUCASUS • 1♀; no further information; ZMHB (**lectotype**).

Distribution. Turkey, Georgia, Armenia, Azerbaijan, and Iran (Wood 2024b).

Remarks. As for *A. paradoxa* above, material loaned from the ZMHB (Wood 2024b) was discovered in the ZSM. The species was probably described from a single specimen, but as this is ambiguous in Radoszkowski's original description, this specimen is designated as the lectotype. As for *A. paradoxa*, the specimen will be returned to the ZMHB.

Andrena (incertae sedis) *helouanensis* Friese, 1899

Andrena helouanensis Friese, 1899: 341, ♀ [Egypt, OUMNH, lectotype by present designation] (Fig. 29)

Andrena arabica Scheuchl & Gusenleitner, 2007: 544, ♀♂ [United Arab Emirates, DEI, not examined]

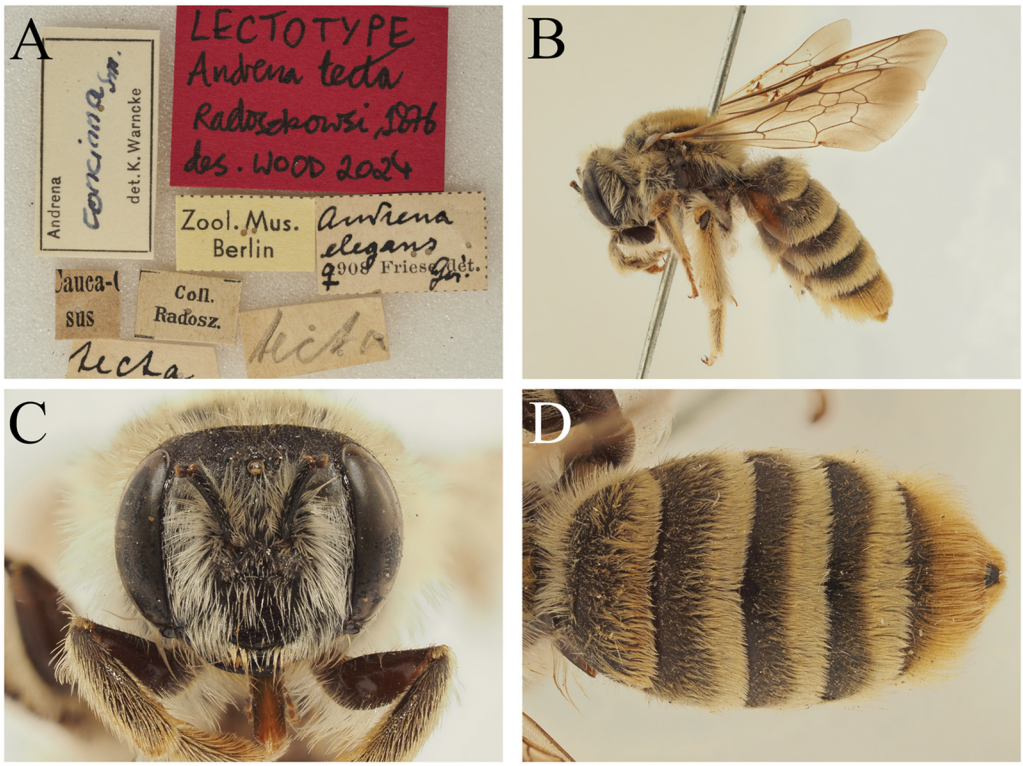

Fig. 28. Andrena (*Ulandrena*) *tecta* Radoszkowski, 1876 lectotype female (ZMHB). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Material examined. ALGERIA • 1♀; 20 km E Tamanrasset; 1,400 m a.sl.; 30 Mar. 1989; M. Schwarz leg.; OÖLM • 3♀; 60 km E of Tamanrasset; 21 Mar. 1989; K. Warncke & M. Schwarz leg.; OÖLM/TJWC • 9♂; Assekrem; 2,300 m a.s.l.; 27 Mar. 1989; M. Schwarz leg.; MSCA/TJWC • 1♀; Mt. Tahat, S. Hoggar; 2,400 m a.s.l.; 28 Mar. 1989; K. Warncke leg.; OÖLM • 1♂; Tamanrasset, Guelta, 52 km NE; 26 Mar. 1989; M. Schwarz leg.; OÖLM; **EGYPT** • 3♀; Helwan; 30 Mar. 1899; F.D. Morice leg.; OUMNH (one female selected as **lectotype**) • 1♀; Helwan; 30 Mar. 1899; F.D. Morice leg.; SMFD (**syntype**, incorrectly labelled as holotype by Wood in 2022) • 1♀; Wadi Hof; 26 Mar. 1912; Storey leg.; NHMUK; **ISRAEL** • 3♀; Arava, 4 km W of Hazeva; 1–4 Apr. 1988; R. Leys leg.; RMNH; ZMA.INS.5104087 • 4♀; Arava, 4 km W of Hazeva; 11–17 Apr. 1988; R. Leys leg.; RMNH; ZMA.INS.5104163 • 1♀; Dead Sea, 5 km S of En Gedi; 30 Mar. 1988; R. Leys leg.; RMNH; ZMA.INS.5104274; **JORDAN** • 1♀; Wadi Rum, Al Ghal env.; 3 Apr. 2013; M. Snižek leg.; OÖLM; **LIBYA** • 8♀; Tripolitania: Jebel Soda [Jabal as Sawdā']; 2 Mar. 1952; K.M. Guichard leg.; NHMUK/TJWC; **OMAN** • 1♀; Al Hajar Mts, Wadi Mayh; 25 Feb. 2020; NHMUK • 1♀; NW of Bahla, Al Ayshi; 6 Mar. 2017; M. Snižek leg.; OÖLM; **UNITED ARAB EMIRATES** • 1♀; Fagsha; 29 Mar. 1986; I.L. Hamer leg.; NHMUK • 1♀; Hayl [Al Hayl]; 28 Mar. 1986; I.L. Hamer leg.; NHMUK • 1♀; Ras al-Khaimah; 24 Feb. 2008; K. Mahamood & A. Polaszek leg.; NHMUK • 2♀; Ras Al-Khaimah, NW Munay; 9–17 Mar. 2020; M. Snižek leg.;

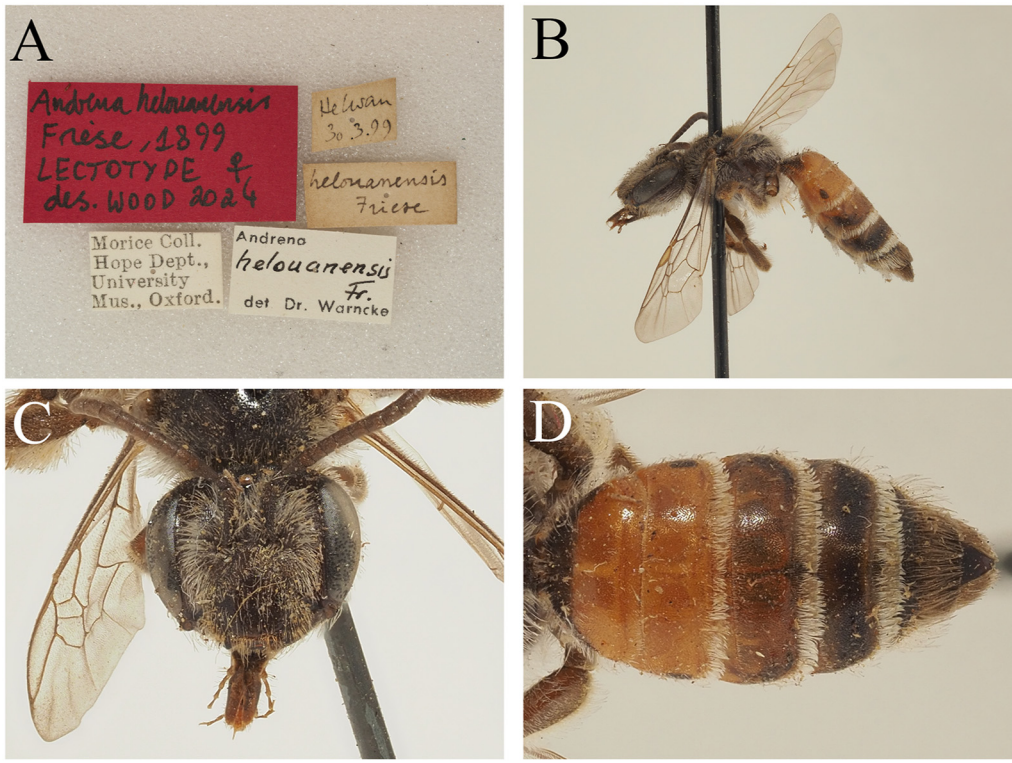

Fig. 29. Andrena (incertae sedis) *helouanensis* Friese, 1899 lectotype female (OUMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

OÖLM/TJWC • 1♂, 3♀; Wadi Bih, dam; 19 Jan. 2010; V. Harten leg.; CSE • 1♂; Wadi Wyrayah; 22 Jan. 2006; C. Tourenq leg.; OÖLM (**paratype** of *A. arabica*) • 1♀; Wadi Maidaq; 29 Mar. – 10 Apr. 2006; A. v. Harten leg.; OÖLM (**paratype** of *A. arabica*).

Distribution. Algeria*, Libya*, Egypt, Israel, Jordan*, United Arab Emirates, Oman* (Pisanty et al. 2018).

Remarks. Gusenleitner and Schwarz (2002) were uncertain about the location of type material of *A. helouanensis*, suggesting the SMFD, the OUMNH, and the ZMHB as possibilities. Inspection of these collections produced four females which appear to be syntypic, three in the OUMNH collection and one in the SMFD collection. Friese indicated that there were several ("*mehrere*") females from Helouan collected on the 30th April 1899 by F.D. Morice. This date however is incorrect, because by 30th April Morice had moved further north into the Levant, e.g. collecting *A. speciosa* at Jericho on 11th April 1899, and *A. brumanensis* Friese, 1899 at Brumana [Broummana] on 30th April 1899. The mention of "April" is clearly a *lapsus calami*, as the four specimens from Helouan [written Helwan] are dated 30th March 1899. The one specimen in the SMFD was labelled as holotype in 2022 before I realised that additional specimens were present in the OUMNH. Since the species was collected by Morice, I designate a lectotype from the

OUMNH to clarify the precise location of the type material. Further clarification of the species concept of *A. helouanensis* was made by Pisanty et al. (2018), but note that the holotype of *A. arabica* has not yet been deposited at the DEI for study (as of September 2023). *Andrena helouanensis* is widespread from southern Algeria (Hoggar Mountains) to the Arabian Peninsula.

Andrena (incertae sedis) *leaena* Cameron, 1907

Andrena leaena Cameron, 1907: 1002, ♀ [India: Punjab, NHMUK, examined] (Fig. 30A–D)

Andrena punjabensis Cameron, 1908: 309, ♂ [India: Punjab, NHMUK, examined] (Fig. 30E–H) **syn. nov.**

Material examined. INDIA • 1♀; Ferozepore [Firozpur]; 1–31 Mar. 1898; C.G. Nurse leg.; NHMUK (**syntype** of *A. leaena*) • 1♀; Ferozepore [Firozpur]; 1–31 Mar. 1898; C.G. Nurse leg.; NHMUK (previously undetermined) • 1♂; Ferozepore [Firozpur]; 1–28 Feb. 1898; C.G. Nurse leg.; NHMUK (**syntype** of *A. punjabensis*) • 1♀; Punjab, Amritsar Distt [sic], Cholasahib [Chohla Sahib]; 4 Nov. 1964; S.W. Batra leg.; USNM • 1♀; Punjab, Hissar [Hisar]; 26 Feb. 1965; S.W. Batra leg.; USNM • 4♀; Punjab, Hissar [Hisar], Madina [exact location unclear]; 26 Feb. 1965; S.W. Batra leg.; USNM • 3♂; Punjab, Ludhiana Campus, Punjab Agric. Univ.; 22–23 Jan. 1965; S.W. Batra leg.; USNM • 2♂; Punjab, Ludhiana Campus, Punjab Agric. Univ.; 29 Jan. 1965; S.W. Batra leg.; USNM • 7♂, 1♀; Punjab, Ludhiana Campus, Punjab Agric. Univ.; 2–6 Feb. 1965; S.W. Batra leg.; USNM • 1♀; Punjab, Ludhiana Campus, Punjab Agric. Univ.; 6 Mar. S.W. Batra leg.; USNM.

Distribution. India (Punjab, Gujarat) (Cameron 1907, Gautam et al. 2024), and almost certainly Pakistan (Punjab).

Remarks. Examination of a series of specimens collected in Punjab by Suzanne Batra allowed an association to be made between *A. leaena* (known only from the female sex) and *A. punjabensis* (known only from the male sex). Batra (1967) actually reported both female and male *A. leaena* from Ludhiana in Punjab (with no further details), but no *Andrena* workers actually noticed this association (e.g. Gusenleitner & Schwarz 2002). Batra reported an unspecified number of females and males collected between 22 January – 12 March 1965. This corresponds to the specimens I could inspect in the USNM, but all of them were stored in unidentified material.

As the subgenetic placement of *A. leaena* has been unclear and *A. pubjabensis* has been placed in the *Carandrena* Warncke, 1968 (=*Notandrena* Pérez, 1890; Pisanty et al. 2022b; Gusenleitner & Schwarz 2002), this has obscured the link between the two taxa. *Andrena leaena* is actually found within the *relata*-group of species (Pisanty et al. 2022b, Bossert et al. in prep), and the placement of *A. punjabensis* in the *Notandrena* was due to the broadened gena and yellow-marked clypeus (Fig. F–G), characters which do not uniquely signify placement here. The large numbers of specimens caught in sympatry allow for a confident sex association to be made, along with the in-common morphological characters, specifically the fine and dense tergal punctation. Members of the *relata*-group are relatively featureless (leading to their lack of recognition as a distinct lineage); this group will be formally recognised and delineated in a future work. Note, Gautam et al. (2024: 33) erroneously indicated that *A. punjabensis* was described in both the female and male sexes, but this was a mistake.

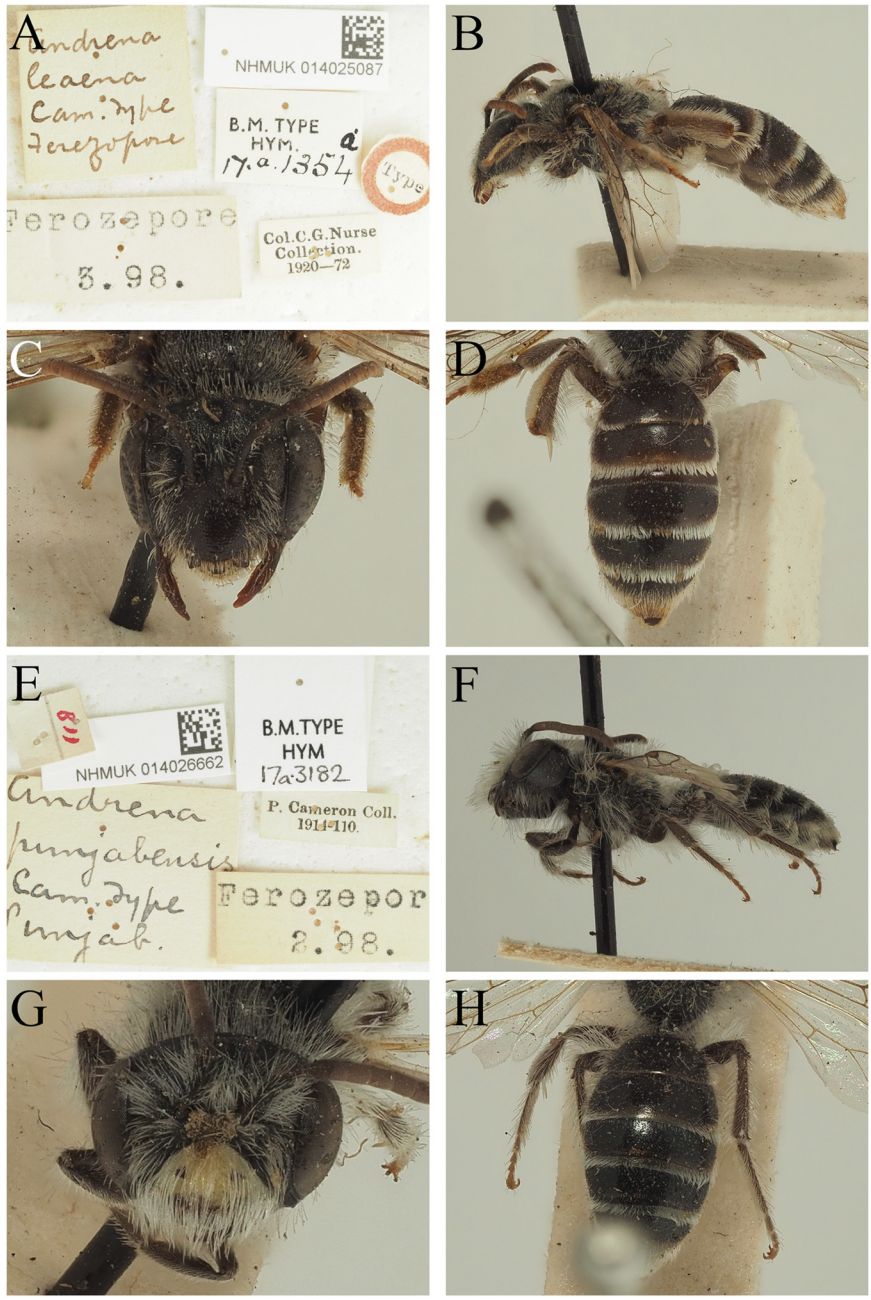

Fig. 30. Andrena (incertae sedis) *leaena* Cameron, 1907 female syntype (NHMUK). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view. *Andrena* (incertae sedis) *helouanensis* Cameron, 1908 male syntype (NHMUK). E. Label information; F. Habitus, profile view; G. Head, frontal view; H. Terga, dorsal view

Finally, there is a specimen of *A. leaena* labelled as collected in Quetta, Pakistan (1–31 Mar. 1904, leg. C.G. Nurse) in the NHMUK collection. I could determine it as *A. leaena* (previously undetermined), but there is the possibility that it is mislabelled as Quetta is in the west of Pakistan, and has very different environmental conditions to Punjab. Nurse collected abundantly in British India (including both modern India and Pakistan), and specimens could have been inadvertently mixed up when his material was deposited at the NHMUK. It is extremely likely that *A. leaena* is in Pakistan, since Firozpur is only around 10 km from the border with Pakistan, but for now its occurrence in this country must be considered unproven.

Andrena (incertae sedis) *tunetana* Schmiedeknecht, 1900

Andrena tunetana Schmiedeknecht, 1900: 226, ♀♂ [Tunisia, ZSM, lectotype by present designation] (Figs 31 and 32)

Material examined. TUNISIA • 1♂, 1♀; Tunis, Carthago [Carthage]; ZSM (female **lectotype** by present designation, male **paralectotype**).

Fig. 31. Andrena (incertae sedis) *tunetana* Schmiedeknecht, 1900 lectotype female (ZSM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

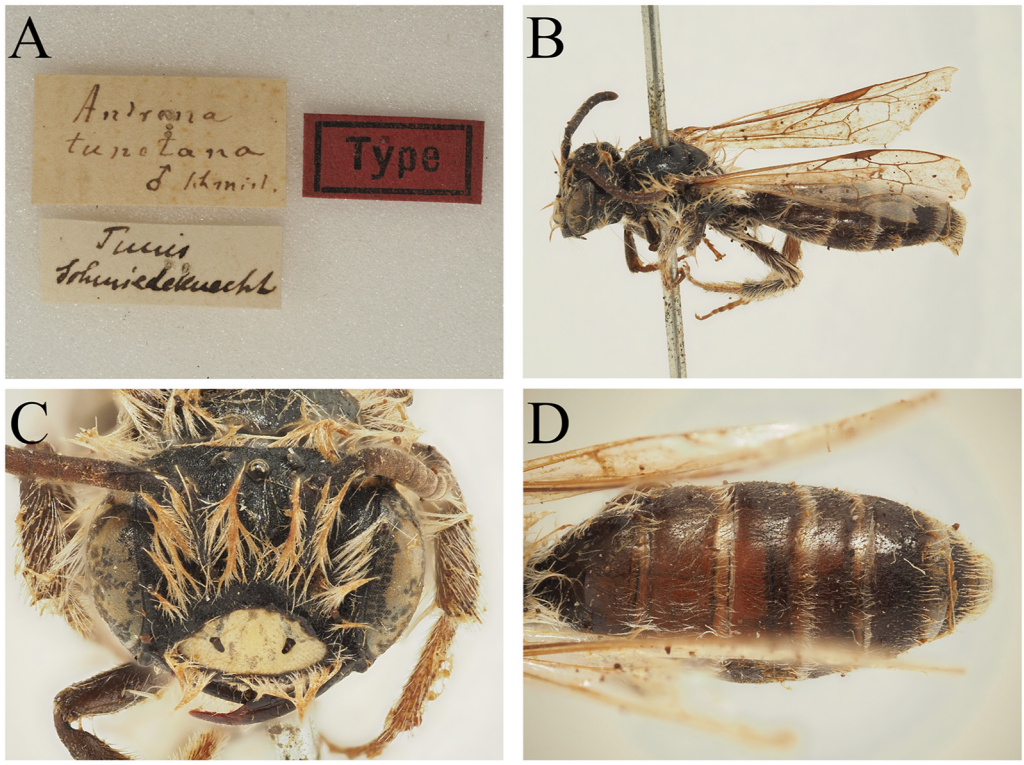

Fig. 32. Andrena (incertae sedis) *tunetana* Schmiedeknecht, 1900 paralectotype male (ZSM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Distribution. Portugal, Spain, Morocco, Algeria, and Tunisia (Gusenleitner & Schwarz 2002, excluding East Mediterranean points which belong to other taxa, see below).

Remarks. *Andrena tunetana* is a well-known West Mediterranean species, but it was treated in a broad sense by Warncke who considered multiple subspecies with essentially non-overlapping ranges (Gusenleitner & Schwarz 2002). Based on morphological difference, it is necessary to treat these subspecies as good species (see Section 4 below). Consequently, it is also beneficial to designate a lectotype for the oldest name in this group, *A. tunetana*. One female and one male are preserved in the ZSM collection, and the female is selected as lectotype as it is in slightly better condition (Fig. 31). Schmiedeknecht noted that he collected the material between the end of April and the beginning of May, but the exact collecting year is not specified. The year was likely 1898, as he was in Tunis at this time (Schmiedeknecht 1900: 226), e.g. collecting the type material of *A. dido* Schmiedeknecht, 1900.

2. *ANDRENA* TAXA DESCRIBED BY HANS HEDICKE

For two taxa, *Andrena aerinifrons levantina* Hedicke, 1938 and *Andrena sphecodimorpha* Hedicke, 1942, the lack of type material is not a problem because the concepts and geographic

distributions of these taxa are clear. However, much more problematic are the four species described by Hedicke (1940) from "*South Manchuria*" in what is now modern day China (*Andrena foveolata* Hedicke, 1940; *Andrena kintschouensis* Hedicke, 1940; *Andrena leucomelaena* Hedicke, 1940; *Andrena paraulica* Hedicke, 1940). These names have remained obscure even since their publication, and no-one currently knows what they are with certainty. Some subgeneric affiliations can be inferred from their descriptions, such as the subgenus *Plastandrena* for *A. leucomelaena* and *A. paraulica*), but none of the four names were ever dealt with in any capacity such as by Popov (1949) or in recent revisions of the Chinese fauna (e.g. Xu & Tadauchi 2011). It is therefore appropriate to deal with them now, since the material can be considered to be lost with a high degree of confidence following visits to the major German museum collections holding *Andrena* type material.

Andrena (*Campylogaster*) *chengtehensis* Yasumatsu, 1935

Andrena chengtehensis Yasumatsu, 1935: 38, ♂ [China: Hebei, ELKU, not examined]

Andrena (*Lepidandrena*) *lebedevi* Popov, 1940: 253, ♀ [China: Beijing, ZISP, examined by photograph]

Andrena (*Lepidandrena*) *nova* Popov, 1940, 253, ♀ [Russia: Eastern Siberia, ZISP, examined by photograph]

Andrena (*Lepidandrena*) *kintschouensis* Hedicke, 1940, 339, ♀ [China: Beijing, RMNH, **neotype** by present designation] (Fig. 33) **syn. nov.**

Material examined. CHINA • 1♂; Beijing, Temple Reclining Buddha; 31 Jun. 1992; G.G.M. Schulten leg.; RMNH; ZMA.INS.5103812 (**neotype** of *A. kintschouensis*) • 5♂; Beijing, Temple Reclining Buddha; 31 Jun. 1992; G.G.M. Schulten leg.; RMNH; ZMA.INS.5103813–ZMA.INS.5103817 • 2♀; Tianma Mountain; 30 Aug. 1942; USNM • 2♂, 3♀; Wufu, west of Beijing; 15 Jul. 1992; Dr. T. Soldán leg.; OÖLM/TJWC; **SOUTH KOREA** • 1♀; Keikido [Keiki-dō], Shoyo-xan [Soyosan]; 27 Aug. 1943; USNM • 1♀; Keikido [Keiki-dō], Shoyo-xan [Soyosan]; 3 Sep. 1943; USNM.

Distribution. Russia (Eastern Siberia, Far East), China (Anhui, Beijing, Hebei, Inner Mongolia, Jiangsu, Shandong), South Korea (Tadauchi et al. 1997, Astafurova et al. 2023). Presumably present also in Mongolia and North Korea.

Remarks. This distinctive species was nevertheless described four times between 1935 and 1940. Popov (1940) even described the species twice, once from northern China (synonymised by Tadauchi et al. 1997: 198) and once from Eastern Siberia (synonymised by Astafurova et al. 2023). Hedicke (1940) provides a short description of *A. kintschouensis* in the female sex, comparing it to *A. erberi* Morawitz, 1871 which is the type species of the subgenus *Campylogaster* Dours, 1873 (although Hedicke actually placed the species in the subgenus *Lepidandrena* Hedicke, 1933 as *Campylogaster* did not achieve widespread use until after Warncke 1968a). He states that the bee is almost identical to *A. erberi* but notes that it is somewhat smaller, the legs are dark, the tergal discs are covered with scaly hairs that are concolourous with those on the apical margins (Fig. 33D), and that the outer margin of the wings are darkened. This clearly matches the species concept of *A. chengtehensis*, as the only other *Campylogaster* species in East Asia is *A.* (*Campylogaster*) *nanshanica* Popov, 1940 which has the mid tarsi and the hind tibiae and tarsi brightly lightened orange (type material illustrated by Astafurova et al. 2023).

Fig. 33. Andrena (*Campylogaster*) *kintschouensis* Hedicke, 1940 neotype male (RMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

As the type material of *A. kintschouensis* is lost, it is desirable to designate a neotype. In line with the conditions of article 75.3 (ICZN 1999), this neotype is needed to decisively settle the status of this name, and to decisively confirm it as a junior synonym of *A. chengtehensis* in order to provide nomenclatural stability. The selected specimen is from Beijing, which is close to the *terra typica* of "South Manchuria", which could today be considered to be parts of the provinces of Inner Mongolia, Jilin, or Liaoning in China. The selected specimen is a male rather than a female, but it is the male of the dark-legged female *Campylogaster* species found in East Asia, namely *A. chengtehensis*. This neotype selection allows *A. kintschouensis* **syn. nov.** to by synonymised with *A. chengtehensis*. The neotype is deposited in the RMNH collection (unique reference number: ZMA.INS.5103812).

Andrena (*Plastandrena*) *leucomelaena* Hedicke, 1940

Andrena leucomelaena Hedicke, 1940: 339, ♀ [China: Beijing, RMNH, **neotype** by present designation] (Fig. 34)

Andrena (*Plastandrena*) *magnipunctata* Kim & Kim, 1989: 201, ♀ [South Korea, EKU, not examined] **syn. nov.**

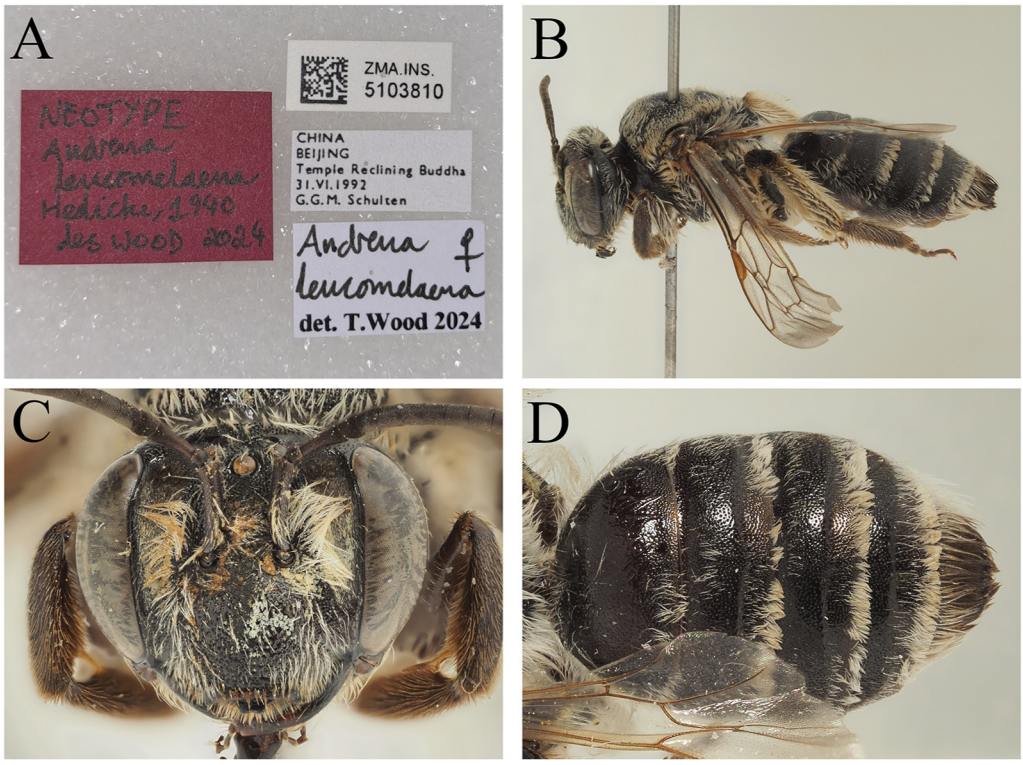

Fig. 34. Andrena (*Plastandrena*) *leucomelaena* Hedicke, 1940 neotype female (RMNH). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Material examined. CHINA • 1♀; Beijing, Temple Reclining Buddha; 31 Jun. 1992; G.G.M. Schulten leg.; RMNH; ZMA.INS.5103810 (**neotype**) • 3♀; Beijing, Temple Reclining Buddha; 31 Jun. 1992; G.G.M. Schulten leg.; RMNH • 8♀; Ganguyi [Ganguyizhen], 35 km NE of Yanan [Shaanxi]; 17–18 May 1996; J. Halada leg.; OÖLM • 2♀; Mandschurei, Charbin [Harbin]; 1–30 Apr. 1952; V. Alin leg.; ZSM • 1♂; Mandschurei, Charbin [Harbin]; 1–31 May 1952; V. Alin leg.; ZSM • 1♂; Mandschurei, Charbin [Harbin]; 1–31 Jul. 1952; V. Alin leg.; ZSM • 1♂; Mandschurei, Charbin [Harbin]; 27 Jul. 1952; V. Alin leg.; ZSM • 4♂, 2#f; Mandschurei, Charbin [Harbin]; 3–11 May 1953; V. Alin leg.; ZSM • 3♀; Mandschurei, Charbin [Harbin]; 2 May 1954; V. Alin leg.; ZSM; **SOUTH KOREA** • 1♀; Keikido [Keiki-dō], Shoyo-xan [Soyosan]; 2 Jul. 1943; USNM • 1♀; Keikido [Keiki-dō], Shoyo-xan [Soyosan]; 27 Jul. 1943; USNM.

Distribution. China (Beijing, Heilongjiang, Shaanxi*) and South Korea (Tadauchi et al. 1997, Xu & Tadauchi 2011).

Remarks. Hedicke described *A. leucomelaena* based on a single female specimen from Manchuria collected in April, highlighting its body size (13 mm in length), its dark integumental colouration, the uniform punctation of the body, the coarsely wrinkled propodeal triangle, the complete white hairbands on the metasoma (Fig. 34D), the depressed marginal areas of

the terga, the terminal fringe dark medially and pale laterally, and the pale scopal hairs. He compared it to *Andrena fukaii* Cockerell, 1914 which is placed in the subgenus *Plastandrena*, and which is a junior synonym of *A. japonica* (Smith, 1873; Xu & Tadauchi 2011). In revising the East Asian *Plastandrena*, Xu & Tadauchi (2011) did not mention the work of Hedicke (1940). However, the description clearly and unambiguously identifies a *Plastandrena* species with dense and regular punctation on the metasoma, and with the metasoma displaying strong hairbands. These characters, as well as those mentioned above, allow clear recognition of the taxon *A. magnipunctata* which was recognised by Tadauchi et al. (1997) and Xu and Tadauchi (2011), as distinct from *A. transbaicalica* Popov, 1949.

In contrast to the situation with *A. kintschouensis*, the unambiguous description of *A. leucomelaena* conflicts with the name *A. magnipunctata*, as *A. leucomelaena* has priority based on publication date. This latter name cannot be considered a *nomen dubium* based on the characters mentioned above, and *A. leucomelaena* cannot be considered a *nomen oblitum* since it was described after 1899. In any case, the name *A. magnipunctata* has not been used in a sufficiently large number of publications in the past 50 years. In line with the conditions of article 75.3 (ICZN 1999), the creation of a neotype is necessary to resolve the concept of *A. leucomelaena* that is consistent with its original description, and allows for confident synonymy of *A. magnipunctata* **syn. nov.** This will provide a stable taxonomic framework for current and future workers. The selected specimen is from Beijing, which is close to the *terra typica* of "South Manchuria", which could today be considered to be parts of the provinces of Inner Mongolia, Jilin, or Liaoning in China. *Andrena leucomelaena* is common in neighbouring Heilongjiang (see examined material), and *A. leucomelaena* can be expected to be distributed through "South Manchuria", and would have been encountered by the collector(s) who provided specimens to Hedicke. The neotype specimen clearly matches the characters mentioned by Hedicke, as outlined above. The selected specimen is deposited in the RMNH collection (unique reference number: ZMA.INS.5103810).

The type material of *A. transbaicalica* was illustrated by Astafurova et al. (2023), and the female type shows no apical tergal hairbands (only with small fringes laterally) and the terga are very shallowly and sparsely punctate, in strong contrast to *A. leucomelaena*. The taxonomic concept of Xu and Tadauchi (2011) is therefore maintained, under the name *A. leucomelaena*. Note, *A. leucomelaena* is bivoltine, and the neotype specimen is from the summer generation and hence has shorter hairs on the dorsum of the mesosoma; spring flying specimens have longer scutal hairs.

Andrena (*Plastandrena*) *paraulica* Hedicke, 1940 *nomen dubium*

Andrena (*Schizandrena*) *paraulica* Hedicke, 1940: 338, ♀ [China: South Manchuria, type lost]

Remarks. Hedicke described this species from two females captured in July. He placed the species in the subgenus *Schizandrena* Hedicke, 1933 which is a synonym of subgenus *Plastandrena* (Gusenleitner & Schwarz 2002). He compares the species to *A. aulica* Morawitz, 1876 which itself has an unclear status (Gusenleitner & Schwarz 2002, Wood & Monfared 2022) and could be treated as distinct or in combination with *A. bimaculata* (Kirby, 1802). Hedicke gives characters based on the colouration of the pubescence, the sculpture of the scutum, the colour of the wings, the size of the 2nd submarginal cell, and the colour of the terminal fringe. Unlike *A. leucomelaena*, there are no distinctive characters such as thick tergal hairbands. In short, all of

the characters given by Hedicke are inadequate to conclusively conclude on its identity given the extreme to impossible difficulty of identifying female *Plastandrena* in Asia for many species, and the taxonomic complexity present (e.g. Popov 1949) that remains to be resolved. The only reasonable recourse is to treat *A. paraulica* as a ***nomen dubium*** and to base taxonomic revisions in *Plastandrena* on taxa for which type material are available; I do not feel that this decision is inconsistent with the choice made for *A. leucomelaena* due to i) the difference in described distinctive morphological characters, and ii) due to the only recent description and recognition of *A. magnipunctata*.

Andrena (incertae sedis) *foveolata* Hedicke, 1940 *nomen dubium*

Andrena foveolata Hedicke, 1940: 340, ♀ [China: South Manchuria, type lost]

Remarks. Hedicke described this species from two females captured in April. Based on the description, it is not possible to confidently identify which *Andrena* species Hedicke had in front of him. In the final paragraph, Hedicke compares the species to "*A. nitida* Geoff.", but there is no such species. There is an *Andrena* (*Melandrena*) *nitida* (Müller, 1776), but it is unclear if this is what Hedicke is actually referring to. Moreover, the species he describes cannot be a *Melandrena*, because the pygidial plate is described as having a clearly defined depressed edge, which suggests *Andrena* s. str., and Hedicke indicates that *A. foveolata* is not actually related to *A. nitida* Geoff. *Andrena* s. str. is diversified and taxonomically complex in East Asia (Xu & Tadauchi 2012), and so there is a possibility of nomenclatural instability in dealing with *A. foveolata* based only on the imprecise description. Without specimens it is not possible to conclusively determine the identity of *A. foveolata*, and therefore it is best considered a ***nomen dubium.***

3. DESCRIPTION OF MISSING SEXES

Andrena (*Calomelissa*) *kumbhuensis* Tadauchi & Matsumura, 2007

Andrena (*Oreomelissa*) *kumbhuensis* Tadauchi & Matsumura, 2007: 5, ♀ [Nepal, ELKU, not examined]

Material examined. BHUTAN • 1♀; W-Bhutan, Thimphu Distr., Taba; 2,600 m a.s.l.; 20–30 Jun. 1988; C. Holzschuh leg.; OÖLM • 1♂; W-Bhutan, Thimphu Distr., Taba; 2,600 m a.s.l.; 4–17 Jul. 1988; C. Holzschuh leg.; OÖLM • 1♀; W-Bhutan, Paro Prov., Chiley-La [Chele La Pass]; 3,000–3,500 m a.s.l.; 10–13 Jul. 1990; C. Holzschuh leg.; OÖLM; **CHINA** • 1♀; Tibet, Phari to Gyangtse; 13,000–15,000 ft a.s.l.; 1–30 Jun. 1904; H.J. Walton leg.; NMHUK • 2♀; Yunnan, Dequen; 12 Jun. 2005; E. Kučera leg.; OÖLM • 1♀; Yunnan, Heishui, 35 km N of [coordinates given=Yulong Snow Mountain]; 27.1300°N, 100.1900°E; 1–19 Jul. 1992; S. Bečvář leg.; OÖLM; **NEPAL** • 2♀; Ghora Tabela; 14 Jul. 1975; M. Kraus leg.; OÖLM • 1♂, 2♀; Khumbu, Khumdzung; 3,900 m a.s.l.; 11–18 Jul. 1962; G. Ebert & H. Falkner leg.; OÖLM • 1♂, 3♀; Langtangtal; 14 Jul. 1975; M. Kraus leg.; OÖLM/TJWC.

Distribution. Bhutan*, China* (Yunnan, Xizang), Nepal (Tadauchi & Matsumura 2007).

Remarks and diagnosis. Tadauchi and Matsumura (2007) described *A. kumbhuensis* in the subgenus *Oreomelissa* Hirashima & Tadauchi, 1975, but based on the relatively large size of 8–9 mm in the female sex (in *Oreomelissa* typically <8 mm in length), the very broad facial foveae which occupy almost the entire space between compound eye and lateral ocellus (conspicuously narrower in *Oreomelissa*), domed and polished clypeus with widely separated punctures (punctures typically dense in *Oreomelissa*), and the propodeal triangle which is relatively broad with their lateral margins slightly outwardly convex (propodeal triangle narrower in *Oreomelissa*, with outer margins not convex) it is better placed in the closely related subgenus *Calomelissa* Hirashima & LaBerge, 1963 (see Pisanty et al. 2022b for phylogeny).

The subgenus *Calomelissa* was revised by Xu and Tadauchi (1995), with five species found from eastern and south-eastern China (Beijing, Fujian, Sichuan, Yunnan, and Zhejiang provinces), Japan, South Korea, and Russia (Far East) (see also Osytshnjuk et al. 2005). Examination of material has shown that *A. kumbhuensis* is more widespread in the Eastern Himalayas, present in Bhutan and on the Tibetan plateau in Xizang and Yunnan. The unknown male has also been located (Fig. 35). The male can be diagnosed due to the genital capsule with gonocoxal teeth only slightly diverging apically (Fig. 35D; in *A. subvelutina* Xu & Tadauchi, 1995 and *A. leucofimbriata* Xu & Tadauchi, 1995 with gonocoxal teeth very strongly separated),

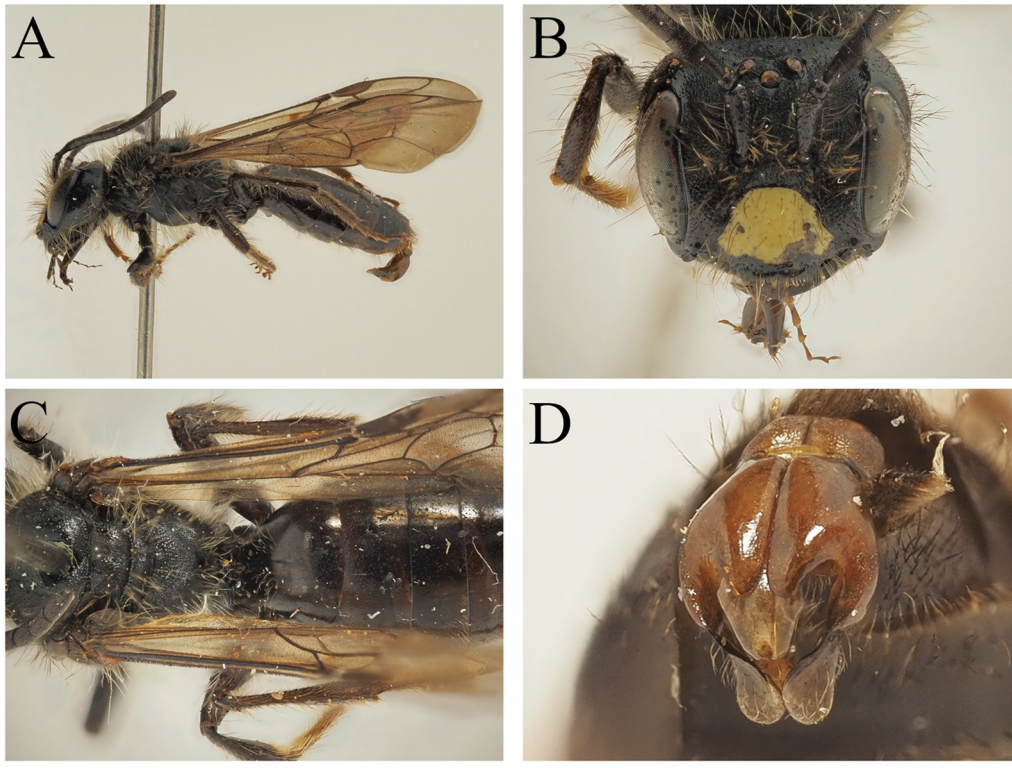

Fig. 35. Andrena (*Calomelissa*) *kumbhuensis* Tadauchi & Matsumura, 2007 male. A. Habitus, profile view; B. Face, frontal view; C. Propodeum and terga, dorsal view; D. Genital capsule, dorsal view

gonostyli not produced into broad triangular shape with the inner face nearly touching medially, the inner angle instead with a clear kink (unlike this in all comparison species, with the gonostyli broadly triangular to quadrate in their apical halves), clypeus weakly domed and without the anterior margin upturned (Fig. 35B; flattened and with the anterior margin upturned in *A. prostomias* Pérez, 1905), and mesepisternum dull and tesselate (polished in *A. leucofimbriata*). The male of *A. pieli* Xu & Tadauchi, 1995 is unknown, but since it occurs in eastern China (Zhejiang) it is considered extremely unlikely to be found at high altitude in the Eastern Himalayas, with known records of *A. kumbhuensis* coming between 2,600 and 4,500 m above sea level.

Description. Male. Body length: 9 mm (Fig. 35A). *Head:* Dark, 1.1 times wider than long (Fig. 35B). Clypeus predominantly yellow-marked, narrowly dark along anterior margin and with two small dark marks laterally. Surface of clypeus polished, sparsely punctate, punctures separated by 2–4 puncture diameters. Process of labrum narrow, noticeably emarginate medially. Gena exceeding width of compound eye; ocelloccipital distance 2 times diameter of lateral ocellus. Head covered with sparse pubescence, brownish to blackish along inner margin of eyes; longest hairs equalling length of scape. Antennae dark, A4–13 ventrally lightened by presence of grey scales; A3 subequal to A4+5.

Mesosoma: Scutum with complex sculpture, microreticulate anteriorly, becoming shagreened medially and laterally to almost polished and shining posteromedially; surface irregularly and shallowly punctate, punctures separated by 1–2 puncture diameters. Scutellum predominantly weakly sculptured and almost shining medially, punctures separated by 1–2 puncture diameters. Pronotum rounded but with weak hint of humeral angle. Mesepisternum and dorsolateral parts of propodeum reticulate, dull. Propodeal triangle broad, not laterally defined by carinae, internal surface covered in basal ⅔ with dense network of fine rugae, propodeal triangle thus defined by change in surface sculpture (Fig. 35C). Mesepisternum with very sparse long brownish hairs, these exceeding length of scape, becoming slightly shorter on scutum, occasionally intermixed with black hairs. Legs dark, tarsal segments lightened brownish, pubescence brownish. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation dark brown, nervulus interstitial. 2nd submarginal cell short, wider than long, clearly shorter than ⅓ length of submarginal cell 1 and ½ length of submarginal cell 3.

Metasoma: Tergal discs dark, marginal areas with rims narrowly lightened brownish. Tergal discs weakly polished, finely and obscurely punctate, punctures separated by 1–2 puncture diameters. Tergal discs with scattered short hairs, not forming apical hairbands. T6–7 with moderately long brown hairs overlying pygidial plate. S8 spatulate, slightly broadened apically, ventral surface with weak fan of brown hairs. Genital capsule with gonocoxae produced into short rounded teeth, these slightly diverging apically (Fig. 35D). Gonostyli apically flattened, apexes rounded, inner margin with strong kink medially. Penis valves relatively broad, occupying majority of space between gonostyli, gently tapering apically.

Andrena (*Euandrena*) *abscondita* Wood, 2023

Andrena (*Euandrena*) *abscondita* Wood, 2023: 40, ♀ [Morocco, OÖLM, examined]

Material examined. MOROCCO • 1♂; Souss-Massa, Tizi-n-Test; 16–17 Apr. 2024; D. Baiocchi leg.; TJWC.

Distribution. Morocco and Tunisia (Wood 2023b).

Remarks and diagnosis. *Andrena abscondita* was described based on females from Morocco and Tunisia. The new male material comes from within the expected range, and due to its black and orange pubescence (Fig. 36A), A3 exceeding the length of A4 (Fig. 36B), simple genital capsule (Fig. 36D), and lack of other distinguishing characters it can be recognised as a *Euandrena* close to the very widespread *A. bicolor* Fabricius, 1775. Separation from the male of *A. berberica* Wood, 2023 is straightforward, as this species has a broadened gena that strongly exceeds the width of the compound eye, whereas in *A. abscondita* the gena only slightly exceeds the width of the compound eye (Figs 36A and 37A). In addition, the facial pubescence of *A. berberica* is a mixture of light and dark hairs, with light hairs dominating over the majority of the central part of the face (in *A. abscondita* with entirely dark facial hairs), the mandibles are elongate and falciform (Fig. 37A), strongly crossing apically (in *A. abscondita* with the mandibles shorter, not falciform, not crossing apically; Fig. 36A), and terga with loose but distinct apical hairbands composed of light hairs which contrast the underlying dark terga (Fig. 37C; in *A. abscondita* with terga almost entirely covered with dark hairs that do not form contrasting apical hairbands; Fig. 36C).

For separation from *A. bicolor*, the character is very subtle but *A. abscondita* can be recognised due to the denser punctation of the clypeus, with punctures separated by <0.5 puncture

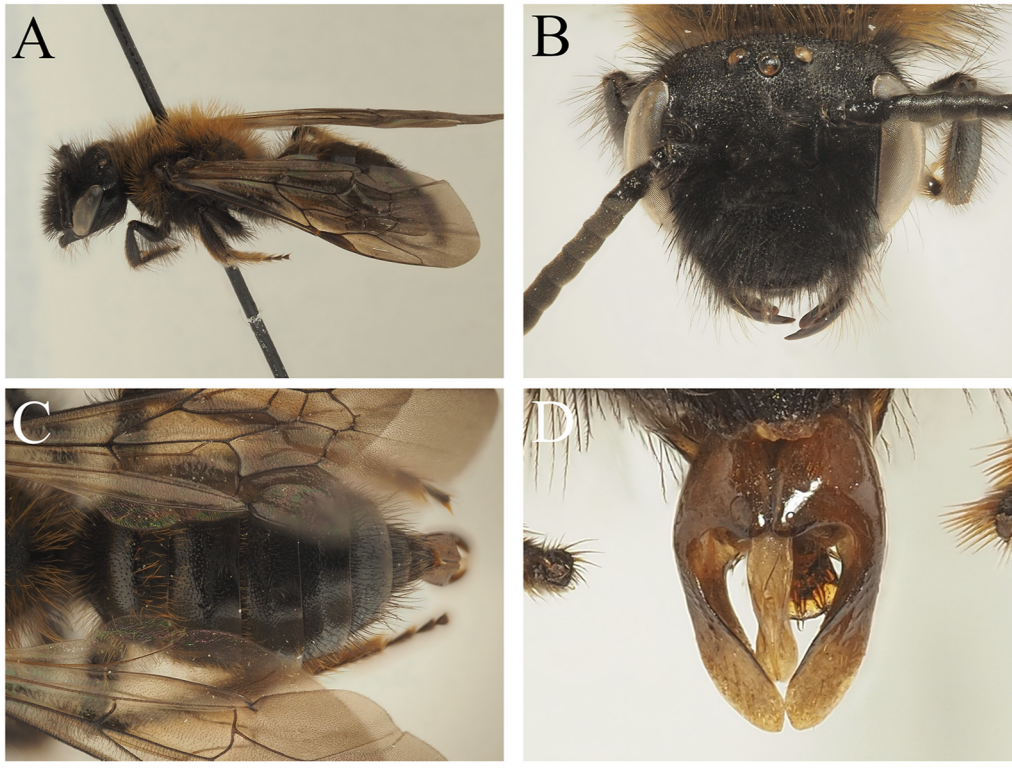

Fig. 36. Andrena (*Euandrena*) *abscondita* Wood, 2023 male. A. Habitus, profile view; B. Face, frontal view; C. Terga, dorsal view; D. Genital capsule, dorsal view

diameters (Fig. 36B; in *A. bicolor* with clypeal punctures separated by 0.5–1 puncture diameters, with clearer shining interspaces present medially). Due to the very high morphological similarity between *A. abscondita* and the well-known *A. bicolor*, no detailed description of the former is given. Ultimately, barcoding of specimens is necessary for complete confident of identification due to the extreme taxonomic difficulties posed by *Euandrena* taxonomy (e.g. Praz et al. 2019).

Andrena (*Euandrena*) *berberica* Wood, 2023

Andrena (*Euandrena*) *berberica* Wood, 2023: 43, ♀ [Morocco, OÖLM, examined]

Material examined. MOROCCO • 1♂, 1♀; Souss-Massa, Tizi-n-Test; 16–17 Apr. 2024; D. Baiocchi leg.; TJWC.

Remarks and diagnosis. *Andrena berberica* was described based on four females captured in south-western Morocco from the Anti-Atlas and High Atlas mountains. The new material comes from within this range, from the Tizi-n-Test mountain pass that crosses the High Atlas into the Taroudant valley. The male (Fig. 37) can be recognised as a *Euandrena* due to A3 exceeding the length of A4 (Fig. 37B), simple genital capsule (Fig. 37D), and lack of other

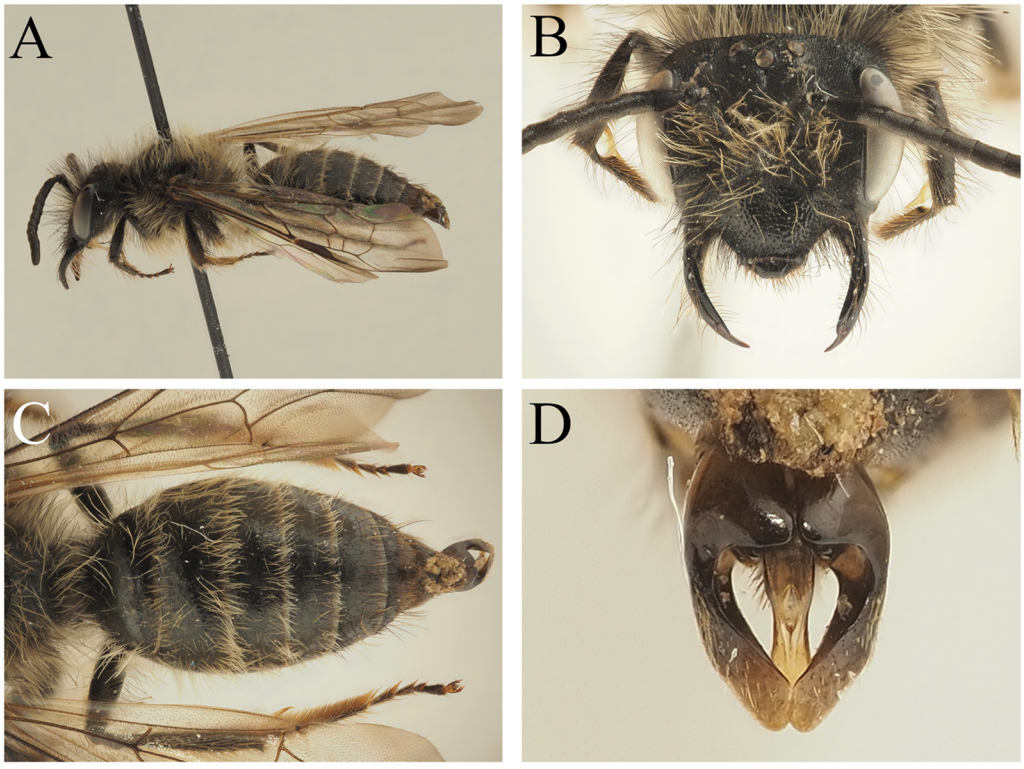

Fig. 37. Andrena (*Euandrena*) *berberica* Wood, 2023 male. A. Habitus, profile view; B. Face, frontal view; C. Terga, dorsal view; D. Genital capsule, dorsal view

distinguishing characters. Within the *Euandrena*, it can be recognised due to the gena which is strongly broadened and clearly broader than the width of the compound eye (nearly twice as broad), clypeus with hints of a slightly longitudinal depression in its basal half, and pronotum with slight hint of a humeral angle. This places it closer to the species around *A. angustior* (Kirby, 1802), in Morocco this being *A. lavandulae* Pérez, 1902.

The two species are very close, but *A. berberica* can be separated due to the weaker shagreen of the tergal discs, most clearly seen on T3–5 (Fig. 36C), discs here with fine granular shagreen and almost shining (in *A. lavandulae* with tergal discs comparatively more strongly shagreened, discs of T3–5 at most weakly shining), pubescence of mesosoma light brown to greyish, with tufts of black hairs intermixed on mesepisternum under wing bases and on propodeum, metasoma with whitish apical hairbands (Fig. 36A; in *A. lavandulae* pubescence of mesosoma and metasoma orange, without intermixed black hairs on mesepisternum or propodeum, or at most with occasional hair, not forming tufts), terga with apical rims lightened white-hyaline (in *A. lavandulae* with apical rims lightened orange-hyaline), and ocelloccipital distance equalling the diameter of a lateral ocellus (in *A. lavandulae* with the ocelloccipital distance slightly larger, 1.2–1.5 times the diameter of a lateral ocellus). Comparison of barcoded material or male material caught with concurrently active females is necessary to fully appreciate these differences.

Distribution. South-western Morocco (Guelmim-Oued Noun, Souss-Massa, Marrakesh-Safi) (Wood 2023b).

Description. Male. Body length: 9 mm (Fig. 37A). *Head:* Dark, 1.2 times wider than long (Fig. 37B). Clypeus very weakly domed, broadly flattened medially, in basal ½ with weak longitudinal impression. Surface of clypeus shallowly punctate, punctures separated by 0.5–1 puncture diameters, underlying surface dull basally and laterally, becoming shagreened and weakly shining medially and anteriorly. Process of labrum rounded-rectangular, 2 times wider than long, surface shining. Gena 2 times wider than width of compound eye; ocelloccipital distance equalling diameter of lateral ocellus. Head with long light brown hairs on gena, supraclypeal area, and around antennal insertions, with long black hairs on clypeus, paraocular areas, frons, and vertex, longest hairs exceeding length of scape. Antennae basally dark, A4–13 ventrally lightened by presence of greyish-silvery scales; A3 exceeding length of A4, shorter than A4+5.

Mesosoma: Scutum and scutellum with granular microsculpture, dull, obscurely punctate, punctures separated by 1–3 puncture diameters. Pronotum with slight hint of humeral angle. Mesepisternum and dorsolateral parts of propodeum microreticulate and dull, propodeum with slightly raised hair-bearing punctures, punctures separated by 2–3 puncture diameters. Propodeal triangle narrow, poorly delineated, internal surface with granular microreticulation and slightly raised rugae basally, without hair-bearing punctures, propodeal triangle thus defined by change in surface sculpture. Mesepisternum covered with long light brown to greyish plumose hairs, with tuft of black hairs under wing base, longest hairs exceeding length of scape. Hairs becoming slightly shorter on scutum and scutellum, light brown with shorter scattered black hairs medially. Propodeum with long light brown to greyish hairs intermixed with black hairs. Legs dark, pubescence reddish-brown to black. Hind tarsal claws with inner tooth. Wings hyaline, stigma dark brown, venation orange-brown, nervulus weakly antefurcal.

Metasoma: Tergal discs dark, marginal areas with apical rims narrowly lightened whitish-hyaline (Fig. 37C). Tergal discs finely shagreened, weakly shining to almost smooth on apical terga; surface with small hair-bearing punctures, punctures separated by 2–3 puncture

diameters. Tergal discs with abundant but scattered light brown hairs, not obscuring underlying surface, hairs forming weak apical hairbands on T1–4, exceeding length of marginal areas, not obscuring underlying surface. T6–7 with dark brown hairs. S8 columnar, apex truncate, ventral surface with fan of short dark brown hairs. Genital capsule simple, gonocoxae with inner margins forming roughly 90° angles, gonostyli with apexes slightly flattened, inner margins slightly raised (Fig. 37D). Penis valves occupying ⅓ space between gonostyli, slightly constricted medially.

Andrena (*Micrandrena*) *tinctoria* Wood, 2023

Andrena (*Micrandrena*) *tinctoria* Wood, 2023: 54, ♀ [Morocco, OÖLM, examined]

Material examined. MOROCCO • 4♂, 3♀; Marrakesh-Safi, Al Haouz P2036, Tizi-n-Test; 1,795 m a.s.l.; 14–17 Apr. 2024; D. Baiocchi leg.; MSVI/TJWC • 2♂, 2♀; Souss-Massa, Tizi-n-Test; 16–17 Apr. 2024; D. Baiocchi leg.; MSVI.

Distribution. Morocco (Souss-Massa, Marrakesh-Safi, Drâa-Tafilalet, Fès-Meknès) (Wood 2023b).

Remarks and diagnosis. *Andrena tinctoria* was described on abundant female material, predominantly from around the High Atlas. Surprisingly, no male material was caught at this time. The new material comes from the High Atlas, and allows a confident sex association to be made. The male (Fig. 38) can be recognised as part of the subgenus *Micrandrena* Ashmead, 1899 due to its small body size, dark clypeus, and rugose propodeal triangle. Within the subgenus, it can be recognised due to the combination of black facial pubescence, clypeus polished and shining over the majority of its surface with spaced punctures (Fig. 38B; punctures separated by 1–3 puncture diameters), scutum clearly punctate but with punctures scattered, separated by 0.5–3 puncture diameters, underlying sculpture with granular shagreen and weakly shining, propodeal triangle entirely rugose, terga with discs showing regular microreticulation, obscurely punctate with punctures disappearing into the sculpture, tergal margins progressively more depressed, mostly strongly so on T3–5, and genital capsule simple, almost featureless (Fig. 38C). These characters allow separation from *A. tenuistriata* Pérez, 1895 (propodeal triangle partially rugose), species around *A. minutula* (Kirby, 1802) (tergal margins not so strongly depressed, clypeal punctures not so scattered), and *A. spreta* Pérez, 1895 (scutum and terga almost impunctate).

Description. Male. Body length: 5.5–6 mm (Fig. 38A). *Head:* Dark, 1.2 times wider than long (Fig. 38B). Clypeus domed, narrowly microreticulate basally, polished and shining over majority of surface, surface with scattered punctures, punctures separated by 1–3 puncture diameters. Process of labrum rectangular, 2 times wider than long, anterior margin slightly impressed, surface shining. Gena slightly exceeding width of compound eye; ocelloccipital distance subequal to diameter of lateral ocellus. Head covered with black hairs, becoming light brown on vertex, longest hairs exceeding length of scape. Antennae basally dark, A4–13 ventrally lightened by presence of greyish-silvery scales; A3 slightly exceeding length of A4, much shorter than A4+5.

Mesosoma: Scutum and scutellum with fine granular shagreen, weakly shining, clearly but irregularly punctate, punctures separated by 0.5–3 puncture diameters. Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum microreticulate, dull, overlain by network of raised

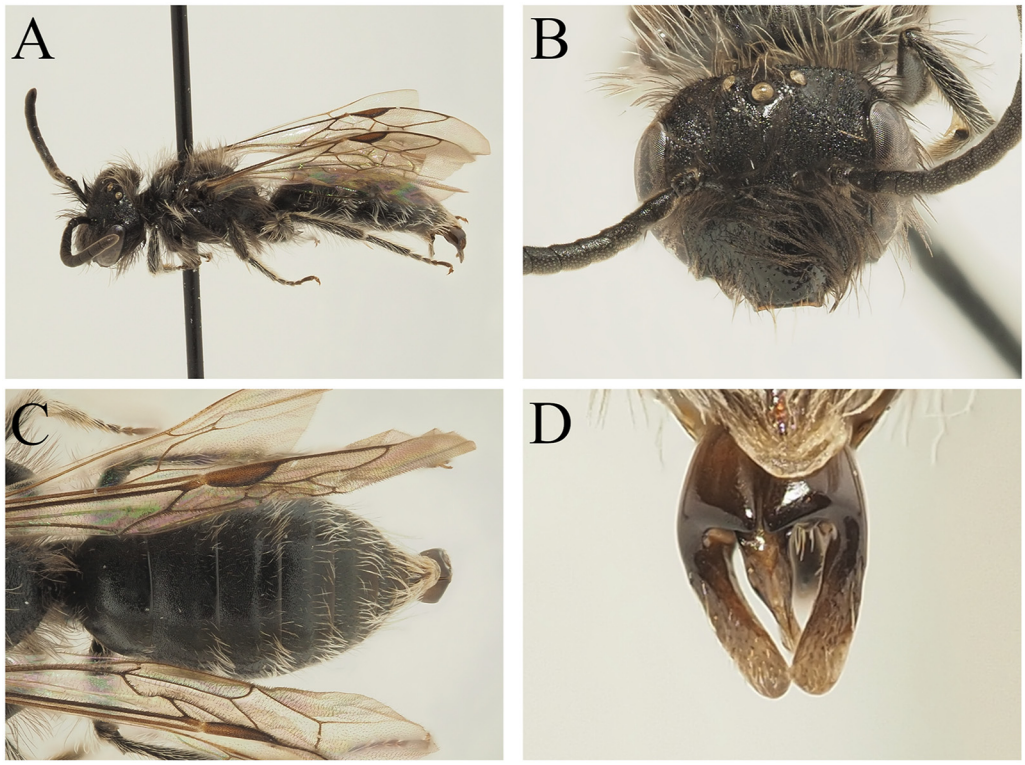

Fig. 38. Andrena (*Micrandrena*) *tinctoria* Wood, 2023 male. A. Habitus, profile view; B. Face, frontal view; C. Terga, dorsal view; D. Genital capsule, dorsal view

rugosity. Propodeal triangle broad, weakly delineated by presence of lateral carinae, internal surface covered with dense network of raised rugae. Mesepisternum with abundant black hairs, hairs becoming paler dorsally, light grey on scutum and scutellum, propodeum with hairs dark grey. Legs dark, pubescence light brown to whitish. Hind tarsal claws with inner tooth. Wings hyaline, stigma orange medially, dark brown laterally, venation dark brown, nervulus interstitial.

Metasoma: Tergal discs dark, marginal areas narrowly and obscurely lightened dark brown (Fig. 38C). Tergal discs finely microreticulate, weakly shining, obscurely punctate, punctures separated by 0.5–2 puncture diameters but disappearing into underlying sculpture. Marginal areas depressed, depression progressively becoming stronger, weak on T1–2, clearly depressed on T3–5. Tergal discs with scattered short white hairs, not obscuring underlying surface, on marginal areas of T2–5 forming weak apical hairbands, clearly extending beyond apical margin onto following tergum, not obscuring underlying surface, hairbands broadly interrupted medially. T6–7 with golden-white hairs. S8 more or less columnar, slightly broadening apically, apex truncate. Genital capsule simple, gonocoxae with anterior margins straight, anteriorly converging, producing slight hint of angular tooth, gonostyli flattened and spatulate apically, slightly broadening (Fig. 38D). Penis valves occupying ⅓ space between gonostyli, narrowing medially.

Andrena (*Pallandrena*) *scheuchli* Dubitzky, 2006

Andrena (*Pallandrena*) *scheuchli* Dubitzky, 2006: 22: ♀ [Turkmenistan, ZSM, not examined]

Material examined. UZBEKISTAN • 1♂; Baysun env., II, Surxondaryo reg.; 38.2830°N, 67.2434°E; 1,913 m a.s.l.; 12 Apr. 2022; D. Benda & T. Fraňková leg.; NMPC.

Distribution. Eastern Turkmenistan and southern Uzbekistan* (Dubitzky 2006). I was unfortunately not able to locate the type in the ZSM collection (October 2024).

Remarks and diagnosis. *Andrena scheuchli* was described based on two specimens from the Kugitang mountains in the very eastern part of Turkmenistan on the border with Uzbekistan at an altitude of 1,400–1,500 m (Dubitzky 2006). The specimens were collected in early May; they could not be located in the ZSM collection during a recent visit. Collections in southern Uzbekistan produced a male *Pallandrena* specimen approximately 80 km to the north-east of the *locus typicus* (Fig. 39). No other *Pallandrena* species have previously been reported from Central Asia. The male of *A. scheuchli* can be associated with the female due to the similar sculpture of the scutum and terga, as the scutum is predominantly smooth and shiny with clear punctures, only weakly shagreened anteriorly and laterally (Fig. 39C), and the terga are almost entirely smooth and shining with deep clear punctures (Fig. 39E). Separation from the similar *A. christineae* Dubitzky, 2006 (Israel, Lebanon, Turkey, Iran, see illustrations in Wood et al. 2020b) can be made by the genital capsule which has the gonocoxae with their internal margins forming rounded 90° angles (Fig. 39F; in *A. christineae* with the gonocoxae with their internal margins forming obtuse angles), the gonostyli with their outer margins rounded (in *A. christineae* with the gonostyli laterally produced into a raised ridge), and with the penis valves relatively narrow and more or less parallel-sided (in *A. christineae* with the penis valves broadened medially). Separation from *A. zagrosa* Wood, 2021 can be made using the same criteria, with the penis valves of *A. zagrosa* grossly inflated medially (see illustrations in Wood 2021b).

Description. Male. Body length: 9 mm (Fig. 39A). *Head:* Dark, 1.3 times wider than long (Fig. 39B). Clypeus dark, weakly domed, somewhat flattened medially, surface covered with large shallow punctures, punctures separated by < 0.5–0.5 puncture diameters, medial punctures with raised rims; underlying surface predominantly dull. Process of labrum rounded-trapezoidal, 3 times wider than long, surface polished and shining. Gena equalling width of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Head covered with whitish pubescence, longest hairs equalling length of scape. Antennae dark, A4–13 ventrally lightened by presence of greyish scales; A3 exceeding length of A4, subequal to A4+5.

Mesosoma: Scutum smooth and shining over majority of area, weakly shagreened anteriorly and laterally, surface irregularly punctate, punctures separated by 0.5–2 puncture diameters (Fig. 39C). Scutellum finely shagreened, weakly shining, more densely punctate, punctures separated by 0.5–1 puncture diameters. Pronotum more or less rounded, with weak longitudinal creases on vertical surface anterior to pronotal lobe. Mesepisternum reticulate, dull. Dorsolateral parts of propodeum with raised reticulate network, interspaces weakly shining; propodeal triangle narrow, finely delineated laterally by raised carinae, internal surface with fine network of evenly spaced carinae radiating from base, giving even appearance, propodeal triangle thus clearly differentiated from dorsolateral parts of propodeum (Fig. 39D). Mesosoma covered with long white plumose hairs, exceeding length of scape. Legs dark, pubescence whitish. Hind tarsal

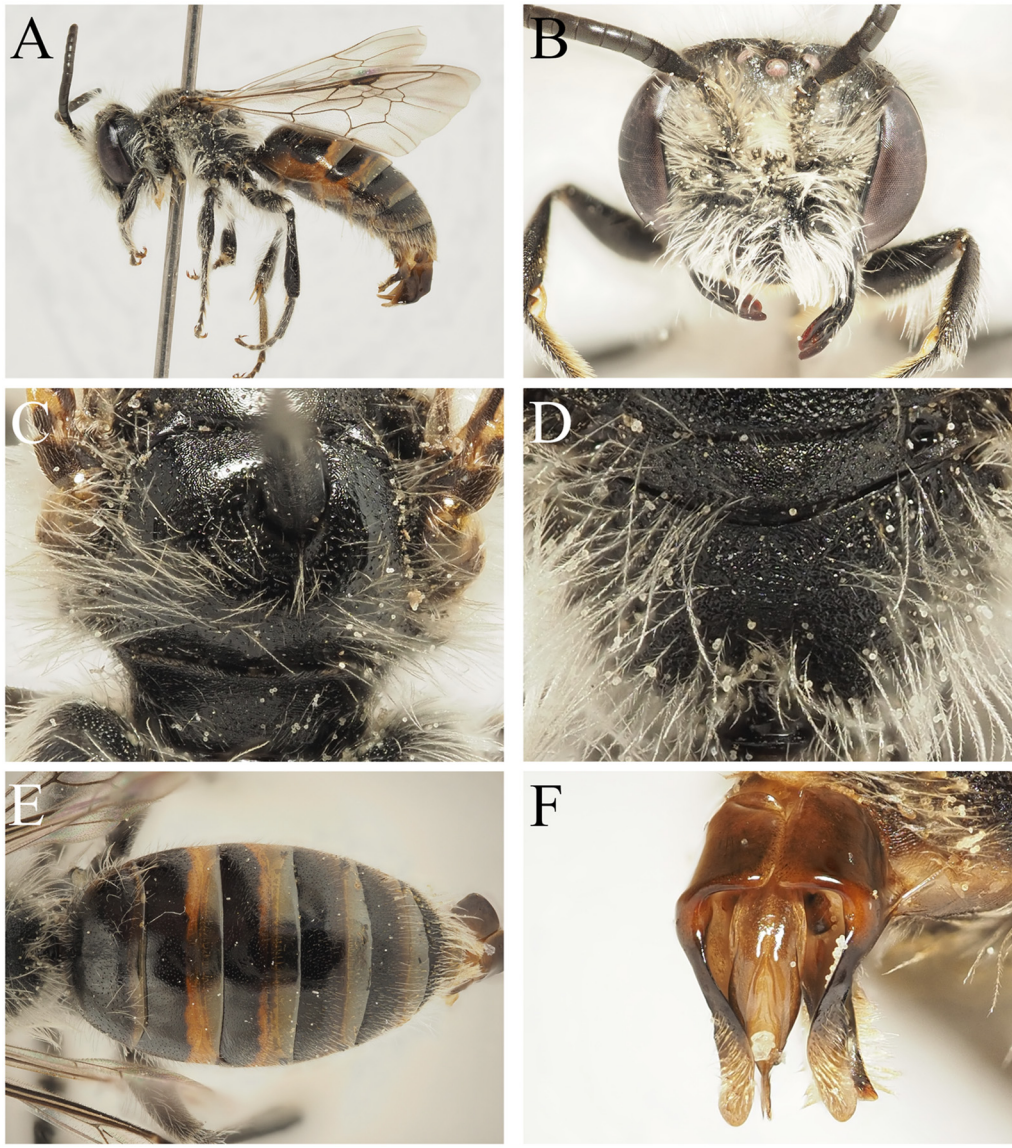

Fig. 39. Andrena (*Pallandrena*) *scheuchli* Dubitzky, 2006 male. A. Habitus, profile view; B. Face, frontal view; C. Scutum, dorsal view; D. Propodeum, dorsal view; E. Terga, dorsal view; F. Genital capsule, dorsal view

claws with strong inner tooth. Wings hyaline, stigma brown with dark orange centre, venation dark brown-orange, nervulus interstitial.

Metasoma: Tergal discs predominantly dark, all tergal margins broadly lightened hyaline-yellow, apical part of discs of T2–3 lightened orange-red; in profile view, ventrolateral parts of

T1–3 lightened orange-red (Fig. 39E). Tergal discs finely punctate, punctures separated by 1–3 puncture diameters, underlying surface polished and shining; punctures becoming weaker and sparser on tergal margins. Tergal discs with scattered short white hairs, not forming hairbands. T6–7 with long whitish hairs overlying pygidial plate. S8 columnar, largely parallel-sided, apex slightly broadened, ventral surface with dense lateral brush of short pale hairs. Genital capsule compact, gonocoxae with internal margins rounded, forming 90° angle, not produced into apically projecting teeth (Fig. 39F). Gonostyli weakly elongate, apically spatulate, apex covered with short golden hairs. Penis valves moderately broadly developed, more or less parallel-sided, occupying ½ space between gonostyli, narrowing in apical ¼.

Andrena (*Simandrena*) *cilissaeformis* Pérez, 1895

Andrena (*Simandrena*) *cilissaeformis* Pérez, 1895: 42, ♀ [Spain, MNHN, examined]

Material examined. MOROCCO • 2♂, 1♀; Marrakesh-Safi, Al Haouz P2036, Tizi-n-Test; 1,795 m a.s.l.; 14–17 Apr. 2024; D. Baiocchi leg.; MSVI/TJWC • 4♂, 1♀; Souss-Massa, Tiznit, Inskat, Barrage Youssef Ben Tachfine; 22 Mar. 2022; T.J. Wood leg.; TJWC • 3♂, 2♀; Souss-Massa, Tiznit, Tanalt, oasis between Ait Moussa and Anadia; 22 Mar. 2022; T.J. Wood leg.; TJWC.

Distribution. Spain, Morocco, Algeria (Wood 2023a).

Remarks and diagnosis. The identity of *A. cilissaeformis* was clarified by Wood (2023a). The name was applied incorrectly (as *A. breviscopa* Pérez, 1895 sensu auctorum, e.g. Gusenleitner & Schwarz 2002) and to date the male has been undescribed due to a lack of clear differentiation from the very similar *A. antigana* Pérez, 1895. Examination of males and females caught in sympatry with *A. antigana* absent (or at least, not recorded during the same collection event) has allowed recognition of the male (Fig. 40). As expected, the male is extremely similar to *A. antigana*, but can be recognised (comparative material required) due to the slightly shallower punctation on the tergal discs (Fig. 40C; progressively weaker, weakest on the discs of T4–5) and with punctures separated by 1–2 puncture diameters (in *A. antigana* with tergal punctures separated by 0.5–1 puncture diameters), underlying surface shagreened and weakly shining (in *A. antigana* with the tergal interspaces dull to obscurely shining). Due to the very strong morphological similarity between *A. cilissaeformis* and *A. antigana*, it is not considered necessary to give a complete description of the male of *A. cilissaeformis*.

Andrena (*Ulandrena*) *satellita* Nurse, 1904

Andrena satellita Nurse, 1904: 566, ♂ [Pakistan, NHMUK, examined]

Material examined. PAKISTAN • 1♂; Peshin [Pishin]; 1–30 Apr. 1903; C.G. Nurse leg.; NHMUK (**syntype** of *A. satellita*) • 3♂; Peshin [Pishin]; 1–30 Apr. 1903; C.G. Nurse leg.; T.J. Wood det.; OUMNH (probably **not** syntypes as specimens are not labelled by Nurse) • 3♀; Islamabad, old embassy road; 13 Apr. 1992; W. Klein leg.; RMNH; RMNH.INS.1266108–RMNH.INS.1266110.

Distribution. Pakistan (Baluchistan, Islamabad).

Remarks and diagnosis. Wood (2023c) described *A.* (*Ulandrena*) *discus* Wood, 2023 from northern Iran, Turkmenistan, and Tajikistan, comparing it to *A. satellita*. *Andrena discus* was

Fig. 40. Andrena (*Simandrena*) *cilissaeformis* Pérez, 1895 male. A. Habitus, profile view; B. Face, frontal view; C. Terga, dorsal view; D. Genital capsule, dorsal view

described in both the male and female sexes, whereas *A. satellita* (described from Quetta in western Pakistan) is known only in the male sex. Inspection of new material has produced the female of *A. satellita* (Fig. 41), allowing diagnosis against the female of *A. discus*. The female of *A. satellita* can be recognised as part of the subgenus *Ulandrena* Warncke, 1968 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 (Fig. 41C), and the lightened tergal marginal zones. In direct comparison, it can be separated from *A. discus* due to the scutum and tergal discs dark, without weak metallic-green reflections (Fig. 41C–D; in *A. discus* with weak but clear metallic-green reflections on the scutum and tergal discs), tergal punctures comparatively larger and coarser, and with interspaces shining (Fig. 41D; in *A. discus* with tergal punctation comparatively finer, with interspaces finely shagreened and weakly shining), and with the tergal margins broader, on T2 occupying nearly ½ the visible disc (Fig. 41D; in *A. discus* with the tergal margins narrower, on T2 occupying ¼ to ⅓ the visible disc).

Finally, there is no possible confusion with *A.* (*Ulandrena*) *flavofacies* Nurse, 1904 which was also described from Quetta (the only other *Ulandrena* species known from Pakistan), as this species has abundant yellow markings on the female clypeus and paraocular areas (type series inspected, NHMUK).

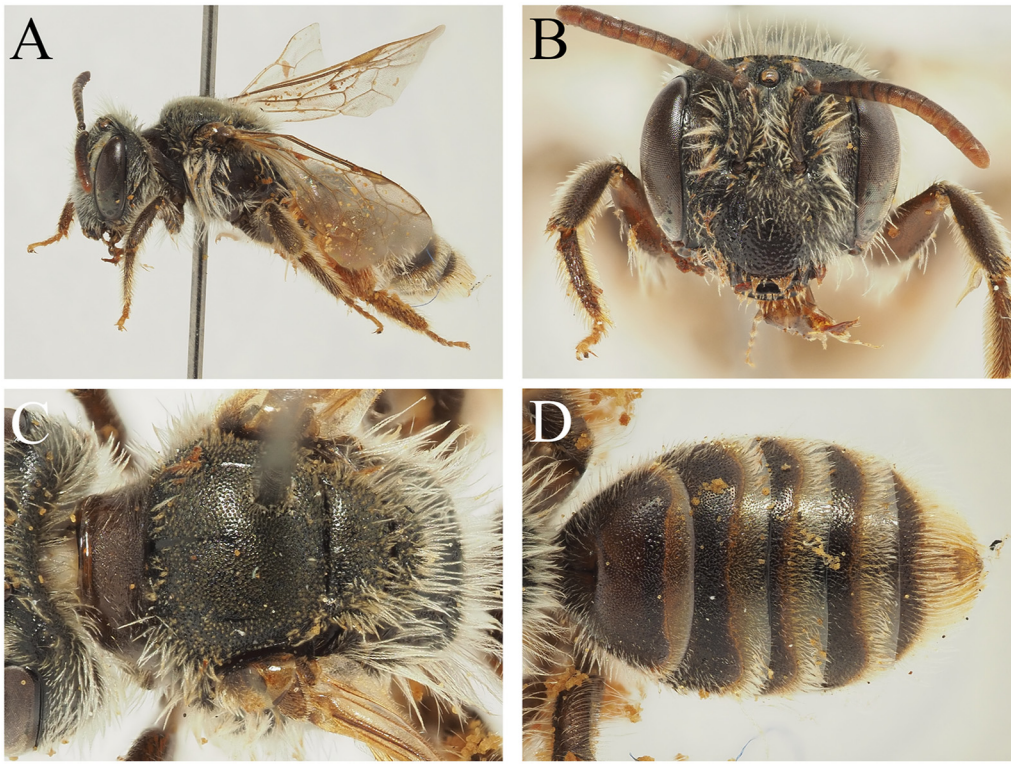

Fig. 41. Andrena (*Ulandrena*) *satellita* Nurse, 1904 female. A. Habitus, profile view; B. Face, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view

Female. Body length: 7 mm. *Head:* Dark, 1.1 times wider than long (Fig. 41A). Clypeus dark, slightly domed, regularly punctate, punctures separated by 0.5–1 puncture diameters, slightly sparser medially; underlying surface shining medially, shagreened laterally (Fig. 41B). Process of labrum broad, rounded-rectangular, 3 times wider than long. Gena slightly exceeding width of compound eye; ocelloccipital distance slightly shorter than diameter of lateral ocellus. Foveae dorsally occupying slightly more than ½ space between compound eye and lateral ocellus, slightly impressed, ventrally extending below level of antennal insertions; foveae filled with pale hairs. Head covered with short pale whitish-yellowish hairs. Antennae basally dark, A4–12 ventrally lightened orange-brown; A3 slightly exceeding length A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum very densely punctate, punctures confluent to separated by 0.5 puncture diameters, interspaces shagreened, weakly shining (Fig. 41C). Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum with network of raised reticulation, weakly shining. Propodeal triangle laterally delineated by fine raised carina, internal surface with similar network of raised reticulation, not strongly differentiated from surrounding sculpture. Mesepisternum with moderately long yellow-brown hairs, not equalling length of scape, hairs on scutum and scutellum much shorter, subsquamous, only slightly exceeding diameter of lateral ocellus in length. Propodeal corbicula weak, incomplete, anterior fringe completely absent; corbicula

composed of light brown plumose hairs, internal surface with long simple whitish hairs. Legs dark, tarsi lightened reddish brown, pubescence brownish. Flocculus complete, composed of white plumose hairs; femoral and tibial scopae composed of white moderately plumose hairs. Hind tibial spurs with inner spur distinctly broadened submedially. Hind tarsal claws with small inner tooth. Posterior face of hind femora without latitudinal carina. Wings hyaline, stigma and venation orange, nervulus interstitial.

Metasoma: Tergal discs dark, without metallic reflections, marginal areas strongly lightened, hyaline-white apically, orange-brown basally (Fig. 41D). Tergal discs strongly and densely punctate, punctures separated by 0.5–1 puncture diameter, interspaces polished and shining. Tergal discs with very short white hairs visible in profile; apical margins of T2–4 laterally with white hairbands, these very broadly interrupted, only slightly obscuring underlying surface laterally. Apical fringe of T5 and hairs flanking pygidial plate golden-orange. Pygidial plate narrowly triangular, apically rounded, medially with slightly raised area, surface dull.

Andrena (incertae sedis) *komarowii* Radoszkowski, 1886

Andrena komarowii Radoszkowski, 1886: 20, ♀ [Turkmenistan, ZMHB, examined] (Figs 42 and 43)

Material examined. TURKMENISTAN • 1♀; Ashabad [Ashgabat]; ZMHB (possible **holotype**) • 1♀; Gerirud River Valley; [co-ordinates given]; 35.7669°N, 61.2836°E; 17 Apr. 1993; D. Milko leg.; OÖLM • 1♂; Badchyz [Badhyz State Nature Reserve]; 5 Apr. 1976; W. Grünwaldt leg.; A. Osytshnjuk det.; ZSM • 1♂, 3♀; Tedschen-Tal [Tejen]; 30 Mar. 1957; W. Grünwaldt leg.; A. Osytshnjuk det.; ZSM • 1♀; Kaachka [Kaakhka]; 29 Mar. 1957; W. Grünwaldt leg.; A. Osytshnjuk det.; ZSM • 1♀; Байрам-али [Bayramaly]; 19 Mar. 1946; A. Osytshnjuk det.; ZSM; **UZBEKISTAN** • 1♀; Daganadzham env., I, near Surxondaryo; 38.1705°N, 67.0429°E; 973 m a.s.l.; 9 Apr. 2022; D. Benda leg.; NMPC • 1♀; Kul'-Kishlak env., Kashkadarya reg.; 38.4790°N, 66.3991°E; 752 m a.s.l.; 10 Apr. 2022; D. Benda leg.; NMPC • 1♂; Tangimush env., II, Surxondaryo reg.; 37.9995°N, 67.5021°E; 530 m a.s.l.; 13 Apr. 2022; D. Benda leg.; NMPC • 1♂, 16♀; Tangimush env., Surxondaryo reg.; 38.0767°N, 67.4293°E; 722 m a.s.l.; 13 Apr. 2022; D. Benda leg.; NMPC/TJWC.

Distribution. Turkmenistan and southern Uzbekistan* (present work).

Remarks and diagnosis. *Andrena komarowii* is a very poorly known species. Warncke (1967) suggested that it may belong to the subgenus *Simandrena* Pérez, 1890 and that it could be conspecific with *A. quadrifasciata* Morawitz, 1876. However, Gusenleitner and Schwarz (2002) concluded based on type examination that this suggested synonymy was incorrect, though they retained the species within the subgenus *Simandrena*. Inspection of the sole female specimen in the ZMHB collection (syntype and possible automatic holotype since the number of specimens used to describe the species is unclear, but searches in Kraków must be made, e.g. see Baker 2004) (Fig. 42) as well as more recently collected material from Turkmenistan and Uzbekistan confirms that it is not a member of the *Simandrena*, but its placement is ambiguous. It shares similarities with the *tunetana*-group, and also with *Andrena mistrensis* Grünwaldt, 2005 (Figs 44 and 45).

Andrena komarowii can be recognised due to the broad facial foveae (occupying almost the entire space between the compound eye and lateral ocellus), the short and triangular process of

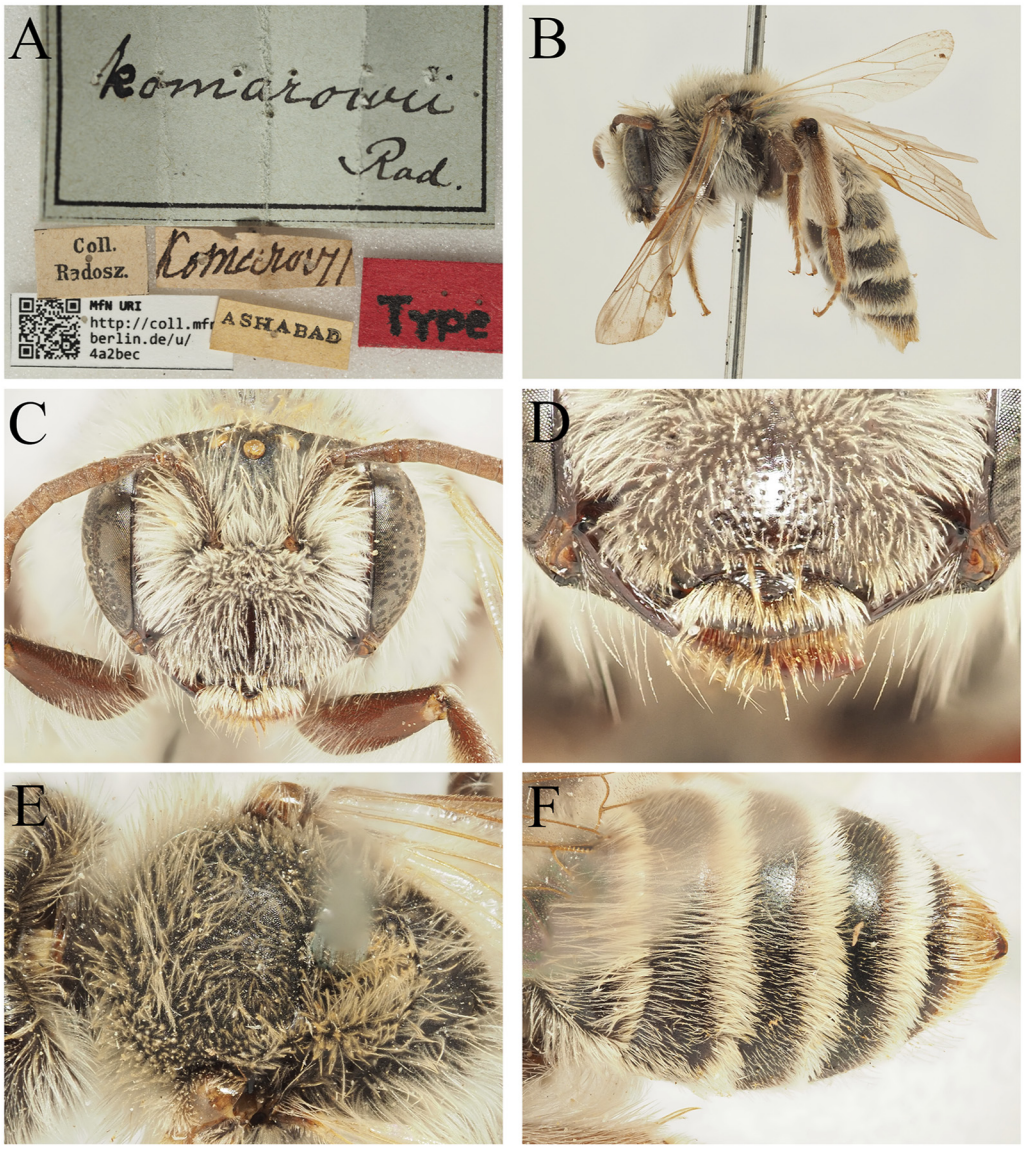

Fig. 42. Andrena (incertae sedis) *komarowii* Radoszkowski, 1886 possible holotype female (ZMHB). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Process of labrum, ventral view; E. Scutum, dorsal view; F. Terga, dorsal view

the labrum (Fig. 42D), the broad and weakly domed clypeus, the weak but distinct humeral angle of the pronotum, the propodeal triangle which is covered with very fine granular reticulation, the complete propodeal corbicula (both dorsal and anterior fringes), the long and strongly produced flocculus, and the pygidial plate with a distinctly raised triangular area

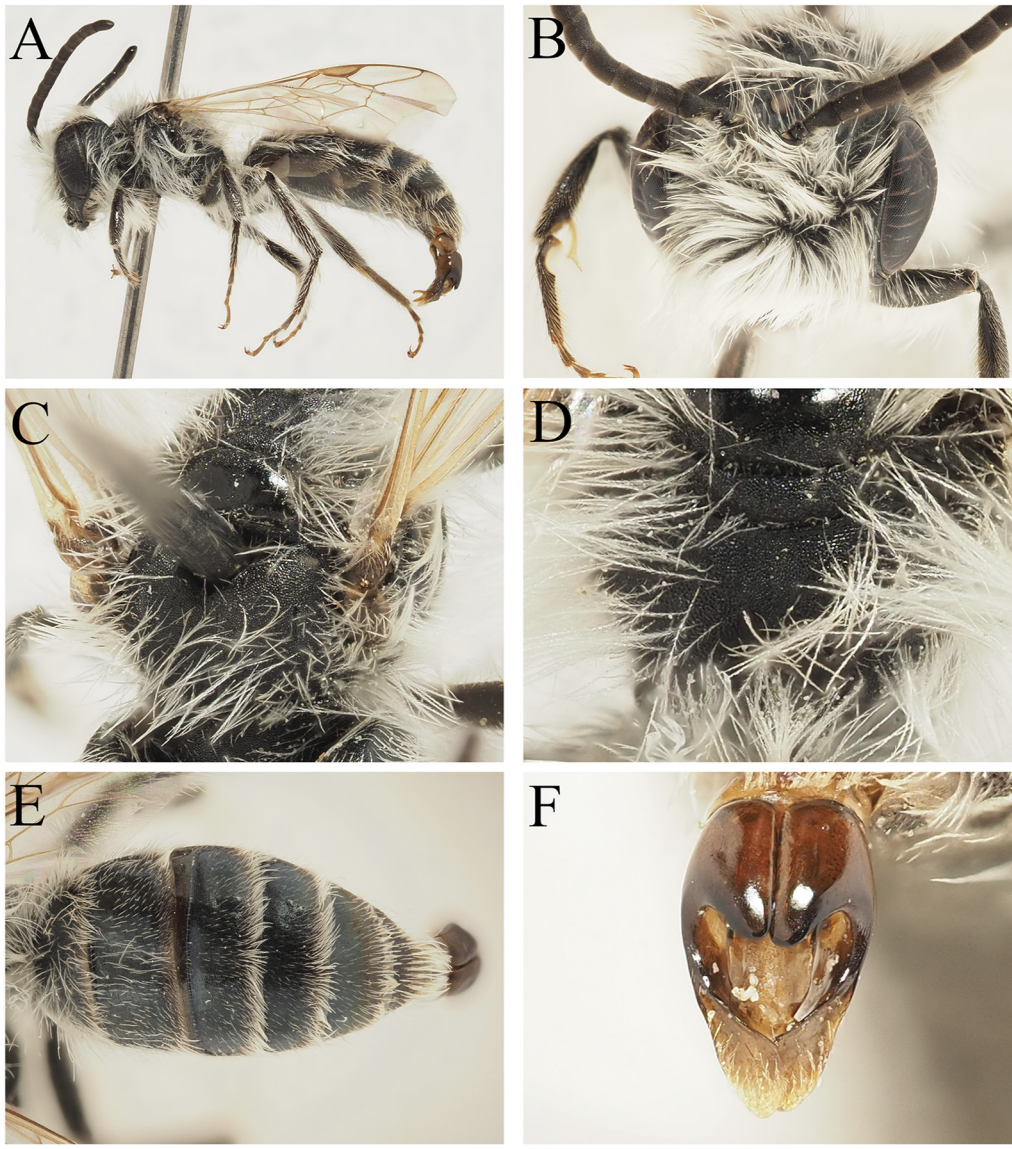

Fig. 43. Andrena (incertae sedis) *komarowii* Radoszkowski, 1886 male. A. Habitus, profile view; B. Head, frontal view; C. Scutum, dorsal view; D. Propodeum, dorsal view; E. Terga, dorsal view; F. Genital capsule, dorsal view

medially. The confused suggestion relating to placement in the subgenus *Simandrena* arises because the propodeal corbicula is complete and the lateral faces of the propodeum (within the propodeal corbicula) are almost completely glabrous, but not completely glabrous as in *Simandrena*, and other characters such as the pygidial plate with a raised triangular area and finely

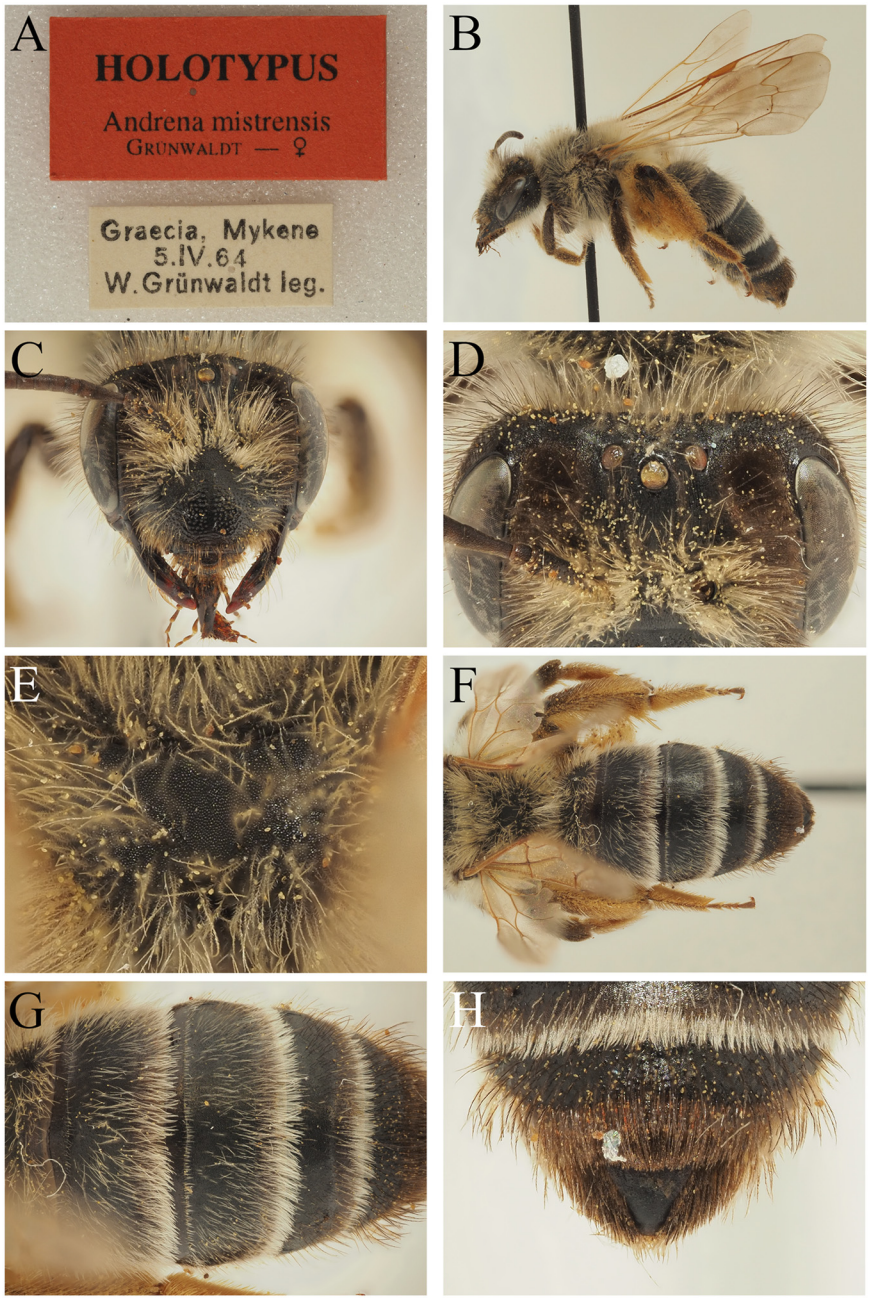

Fig. 44. Andrena (incertae sedis) *mistrensis* Grünwaldt, 2005 holotype female (ZSM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Facial foveae, dorsal view; E. Propodeum, dorsal view; F. Terga, dorsal view; G. Terga, dorsal view, detail; H. Apex of metasoma, dorsal view

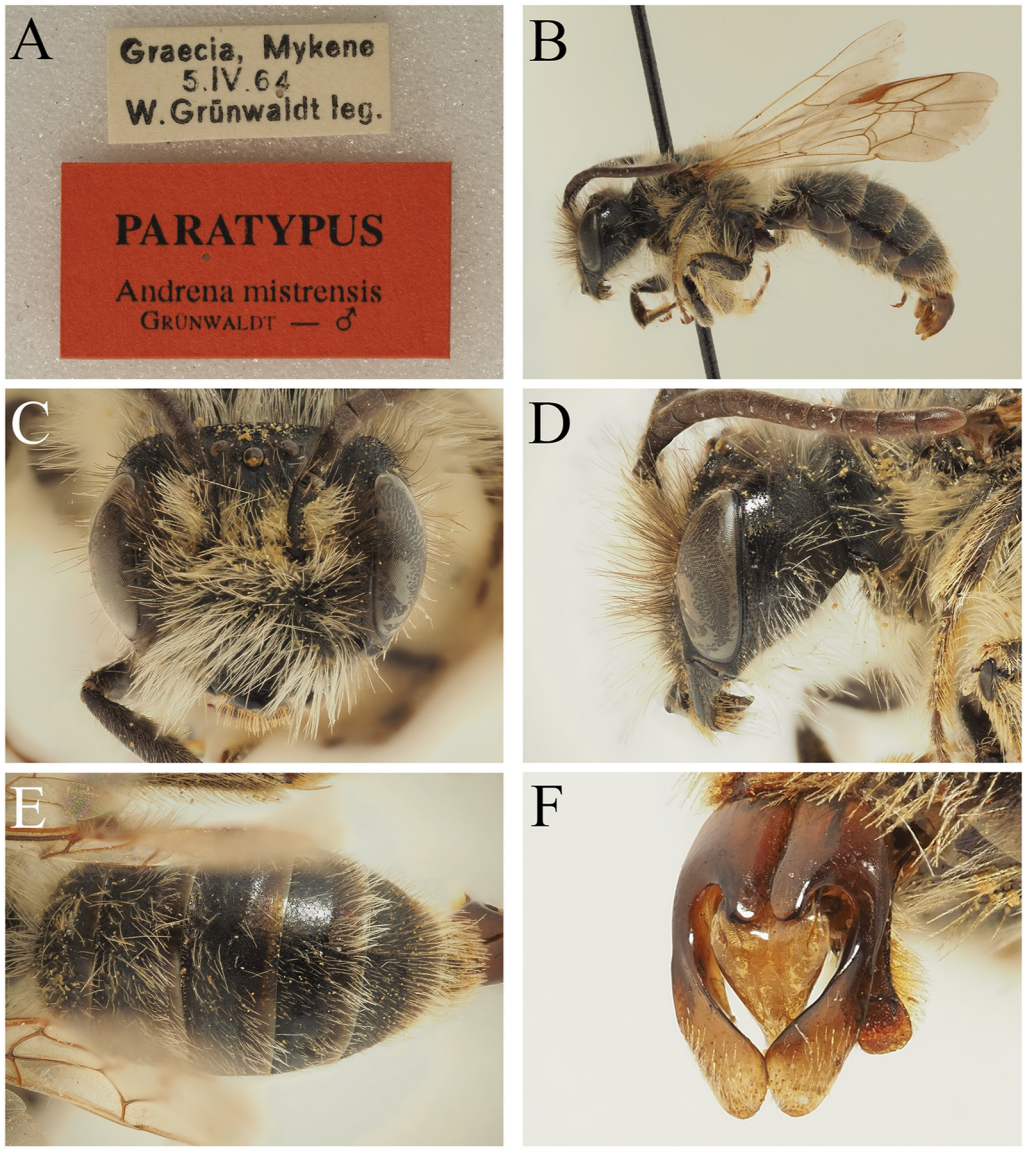

Fig. 45. Andrena (incertae sedis) *mistrensis* Grünwaldt, 2005 paratype male (ZSM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Head, lateral view; E. Terga, dorsal view; F. Genital capsule, dorsal view

granular propodeal triangle do not fit with this subgenus. The *Notandrena* can be excluded as the fore margin of the male clypeus (see male description below) is not upturned, and the *euzona*-group (*Notandrena* auctorum, see Pisanty et al. 2022b) can be excluded, and members of this undescribed subgenus have a large strongly polished and shining area on the scutum

medially, whereas *A. komarowii* has the scutum entirely dull, contrasting the shining scutellum. Due to the triangular process of the labrum, broad facial foveae, and banded metasoma it can be compared to the *tunetana*-group. The *tunetana*-group is currently placed in the subgenus *Leucandrena* Hedicke, 1933, but provisional genetic data suggests that it actually belongs elsewhere in an undescribed subgenus (Bossert et al. in prep.). It is best currently classified as *incertae sedis*.

Female *A. komarowii* can be compared to *A. tunetana* (Iberia and north-western Africa), *A. larisana* Warncke, 1965 (Greece and western Turkey), and *A. medioxima* Warncke, 1975 and *A. sculpturata* Warncke, 1975 **stat. nov.** (both Turkey, see Section 4; Fig. 50). It can immediately be separated from *A. tunetana* because the clypeus lacks raised latitudinal striations, placing it closer to *A. larisana*, *A. medioxima*, and *A. sculpturata*. It can be separated from all three species by the combination of the strongly granularly microreticulate, dull, and essentially impunctate scutum (Fig. 42E) which strongly contrasts the polished, shining, and irregularly punctate scutellum (in comparison species with the scutum and scutellum densely punctate with the underlying surface shining, without either segment contrasting the other), and the strongly shagreened and dull terga which are almost impunctate (Fig. 42F), with only occasional scattered punctures (in comparison species with T2–4 with the terga densely and finely punctate, the underlying surface at least weakly shining). Additionally, the terga of *A. komarowii* are also faintly but distinctly metallic-green-blue, whereas they are dark and without metallic reflections in all comparison species (e.g. Fig. 50D). However, the male of *A. komarowii* (Fig. 43) differs meaningfully from the *tunetana*-group. Although the gena is strongly broadened (slightly exceeding the diameter of the compound eye) and the pronotum has a strongly produced humeral angle, the clypeus is entirely dark (yellow marked in *tunetana*-group males; Figs 32C and 51B), and the genital capsule has the gonocoxae produced into apically projecting and rounded teeth (Fig. 43F; in the *tunetana*-group with the gonocoxae produced into apically diverging angular points; Fig. 51D).

In the structure of the genital capsule, *Andrena komarowii* is closer to *A. mistrensis* (Fig. 45F) which also has apically rounded gonocoxae, as well as having a broadened gena (Fig. 45D) and strong humeral angle. In the female there is similarity in the broad foveae (Fig. 44D), the strongly sculptured, dull, and essentially impunctate scutum, and the structure of the propodeal triangle (Fig. 44E) which is covered with a very fine granular reticulation, reminiscent of the case in subgenus *Nobandrena* Warncke, 1968 (though with the propodeal triangle much shorter). Female *A. komarowii* can be separated due to the faintly metallic-green-blue terga (dark in *A. mistrensis*), the triangular process of the labrum (trapezoidal in *A. mistrensis*; Fig. 44C), the pale hairs of the facial foveae in dorsal view (dark brown in *A. mistrensis*), the orange-white terminal fringe (Fig. 42F; dark brown in *A. mistrensis*; Fig. 44H), and the scutellum which is polished and shining medially, contrasting the dull scutum (with the scutum and scutellum equally dull in *A. mistrensis*). Males can be separated due to the weakly metallic-green-blue terga and the differing genital capsules, specifically the more elongate and narrow capsule shape in *A. komarowii* with the penis valves not noticeably expanded laterally and gently tapering apically compard to the shorter and broader genital capsule of *A. mistrensis* with the penis valves clearly broadened laterally, thus appearing to strongly narrow apically (Figs 43F and 45F).

Finally, *A. komarowii* is also similar to a third species that can be related to *A. mistrensis* that comes from Syria and southern Turkey, *Andrena viridella* **spec. nov.**, which is described and diagnosed in Section 5 (currently known only from the female sex).

Description. Male. Body length: 8–9 mm (Fig. 43A). *Head:* Dark, 1.35 times wider than long (Fig. 43B). Clypeus dark, weakly domed, surface covered with shallow punctures, punctures separated by < 0.5–0.5 puncture diameters, underlying surface predominantly dull. Process of labrum rounded-trapezoidal, 1.5 times wider than long, surface polished and shining. Gena slightly exceeding width of compound eye, forming rounded angle ventro-posteriorly; ocelloccipital distance slightly exceeding diameter of lateral ocellus. Head covered with white pubescence, longest equalling length of scape; clypeus covered with dense tuft of hair, obscuring underlying surface. Antennae dark, A4–13 ventrally lightened by presence of greyish-brown scales; A3 slightly shorter than A4, A4–13 rectangular, all approximately 2 times longer than wide.

Mesosoma: Scutum with dense granular microreticulation, impunctate, surface dull to minutely shining (Fig. 43C); scutellum polished and shining, irregularly punctate, punctures separated by 1–5 puncture diameters. Pronotum with strongly produced humeral angle, laterally with deep vertical furrow with surface shining, remaining lateral face of pronotum with longitudinal striations. Mesepisternum and dorsolateral parts of propodeum finely and densely microreticulate, dull; propodeal triangle obscurely delineated laterally by weakly differentiated rim, internal surface with fine and dense microreticulation, propodeal triangle therefore barely differentiated from remaining areas of propodeum (Fig. 43D). Mesosoma covered with long plumose white hairs, longest clearly exceeding 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 antefurcal.

Metasoma: Tergal discs with weak metallic blue-green reflections, marginal areas with rims narrowly lightened hyaline-yellow (Fig. 43E). Tergal discs with fine granular shagreen, weakly shining, surface with obscure scattered punctures. Discs of T1–2 with long white upstanding hairs, becoming progressively shorter on T3–5; marginal areas of T1–4 with weak white apical hairbands, broadly interrupted on T1–2, complete on T3–4. T6–7 with long whitish hairs overlying pygidial plate. S8 columnar, apex truncate, ventral surface densely covered with short whitish hairs. Genital capsule slightly elongate, gonocoxae produced into broadly rounded apical teeth, gonostyli weakly broadening apically, spatulate with strongly raised internal margins (Fig. 43F). Penis valves moderately broad, occupying ⅔rds of space between gonostyli, lateral margins slightly thickened and raised.

Andrena (incertae sedis) *ledermanni* Schönitzer, 1997

Andrena (*Carandrena*) *ledermanni* Schönitzer, 1997: 310, ♀ [Turkmenistan, ZSM, examined] (Fig. 46)

Distribution. Syria*, Turkmenistan, and Uzbekistan* (Schönitzer 1997).

Material examined. SYRIA • 1♂, 1♀; 30 km NW Dara; 29–30 Mar. 1994; S. Bečvář leg.; OÖLM; **TURKMENISTAN** • 15♀; Kugitang-Gebirge, Plateau neben Dareidere; ca. 1,500 m a.s.l.; 30 Apr. 1995; K. Schönitzer leg.; ZSM (**holotype** and **paratypes**) • 3♀; Kugitang-Gebirge, Hodschapil, oberhalb des "Plateau's der Dinosaurier"; ca. 1,400–1,500 m a.s.l.; 3 May 1995; K. Schönitzer leg.; ZSM (**paratypes**); **UZBEKISTAN** • 1♀; Aman-Kutan; 7 May 1974; M. Kraus leg.; OÖLM.

Remarks and diagnosis. *Andrena ledermanni* was described in the subgenus *Carandrena* which is now a junior synonym of subgenus *Notandrena*. It was diagnosed against *A.* (*Carandrena*) *subsmaragdina* Osytshnjuk, 1984 (=*A.* (*Notandrena*) *trimarginata* (Radoszkowski, 1886), see

Fig. 46. Andrena (incertae sedis) *ledermanni* Schönitzer, 1997 holotype female (ZSM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Scutum, dorsal view; E. Propodeum, dorsal view; F. Terga, dorsal view

Wood (2024b)). However, *A. ledermanni* cannot belong to the *Notandrena*, as the pronotum is rounded and all *Notandrena* species have a clearly angulate pronotum.

Examination of material from southern Syria has unexpectedly produced a male (Fig. 47) and female of *A. ledermanni*. The female matches the type series of *A. ledermanni* from

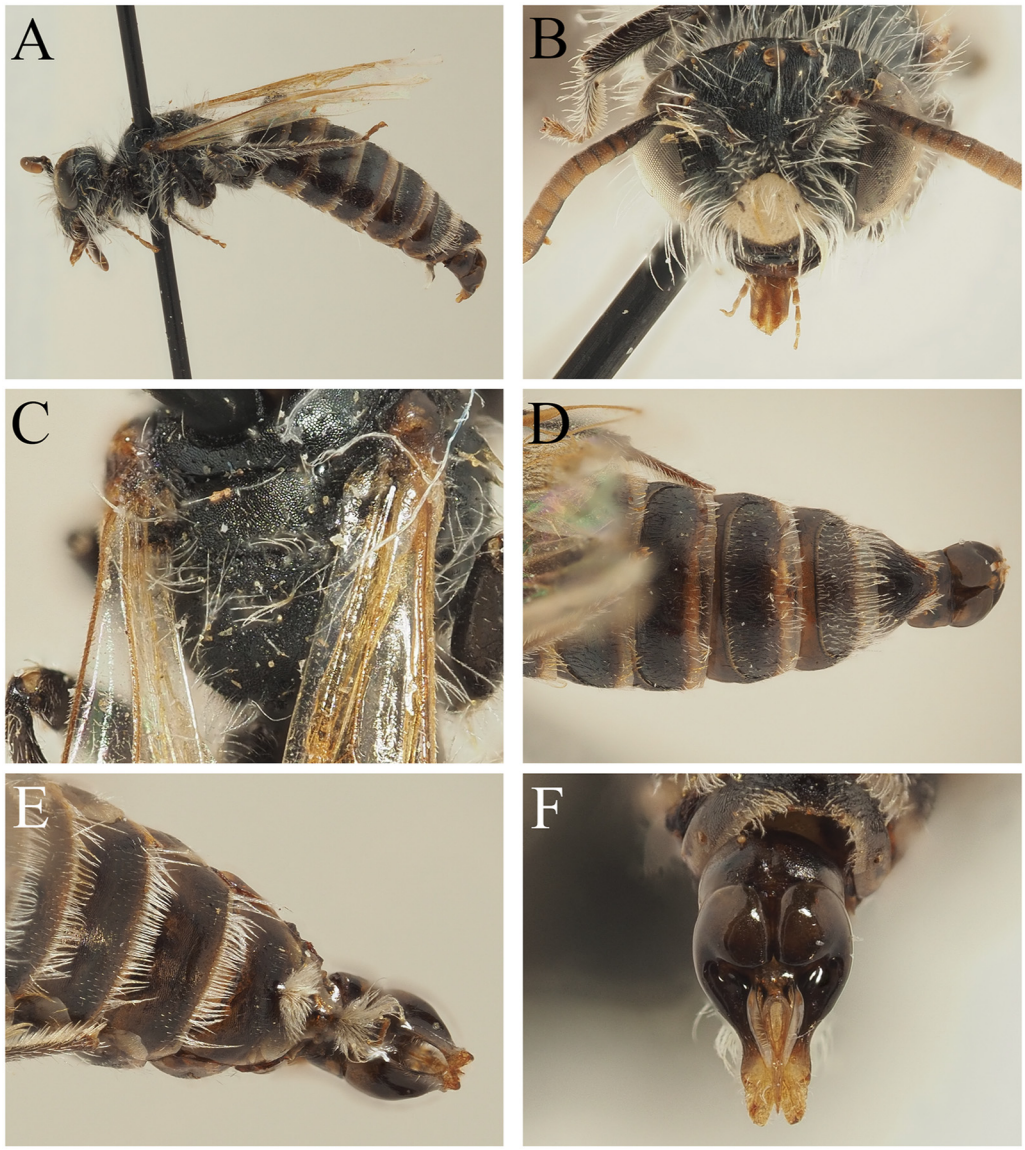

Fig. 47. Andrena (incertae sedis) *ledermanni* Schönitzer, 1997 male. A. Habitus, profile view; B. Head, frontal view; C. Propodeum, dorsolateral view; D. Terga, dorsal view; E. Sterna, ventral view; F. Genital capsule, dorsal view

Turkmenistan in all key characters (elongate propodeum with propodeal triangle covered with distinct granular microreticulation; Fig. 46E; scutum and scutellum with fine granular reticulation and slight hints of metallic bronze-green colouration, sculpture becoming weaker and shinier in the apical ⅓; Fig. 46D; facial foveae occupying ½ space between the compound eye

and a lateral ocellus, clypeus evenly domed and with obscure shallow punctation, forewing with nervulus conspicuously antefurcal; Fig. 46B; tibial scopae composed of finely plumose hairs, terga at most superficially punctate, and tergal marginal areas lightened whitish-hyaline apically, becoming orange-hyaline basally; Fig. 46F).

The associated male is remarkable; it can be associated (in addition to co-occurrence) with the female due to the similar granular shagreen on the scutum and scutellum, the relatively elongate propodeum with the propodeal triangle indicated by granular shagreen, the strongly antefurcal nervulus, and the impunctate terga with the tergal margins which are lightened hyaline (Fig. 47D). It shows also several characters which in combination make it unique; the head is short and broad with a yellow-marked clypeus (Fig. 47B), S2–5 show strong posterior fringes of white hairs (Fig. 47E), on S6 with a distinct laterally-spreading white hair tuft, with the ventral surface of S8 with a large laterally-spreading fan of long white hairs, and the genital capsule has the gonocoxae humped, with the gonostyli strongly narrowing from their broad bases to become narrow and elongate, flanking the needle-like penis valves (Fig. 47F). This genital capsule construction and pale clypeus colouration are reminiscient of the subgenus *Poecilandrena* Hedicke, 1933, a genus known to have taxonomic complexity and to have acted as a "waste bin" for ambiguous taxa (Pisanty et al. 2018, 2022a, Pisanty & Wood 2024). At the present time, it is best to place *A. ledermanni* as *incertae sedis* until genetic data become available. Males can instantly be recognised due to the unique characters related to the sternal pubescence and the genital capsule construction. It is noteworthy to highlight the link between the genital capsule of *A. ledermanni* and *A. relicta* spec. nov. (Fig. 56F; see Section 5). The capsules are remarkably similar, with humped gonocoxae, basally broad gonostyli which strongly narrow medially, and penis valves that are very long and thin over the majority of their length. This is probably co-incidental, as *A. relicta* is part of subgenus *Longandrena* Osytshnjuk, 1993 which display elongate heads and tongues (Fig. 56A–B), whereas the head and tongue of *A. ledermanni* are very short, but this surprising similarity deserves recognition.

Finally, the observed distribution of *A. ledermanni* is also remarkable, but the more that the area around the Anti-Lebanon mountain chain (particularly around Mount Hermon, its final southern extension) is searched and studied, the more bees with Turco-Iranian or Central Asian distributions are found. For example, *Andrena* (*Planiandrena*) *veterana* Pisanty, 2022 (Mount Hermon in Israel and Lebanon, and also Iraqi Kurdistan), *Andrena* (*Planiandrena*) *huma* Wood & Monfared, 2022 (Mount Hermon in Israel and Syria, and Iran), and *Andrena* (incertae sedis) *antilibanotica* Wood, 2020 (Anti-Lebanon in Syria, Turkey, and Iran) (Pisanty et al. 2022b, Wood & Monfared 2022, Wood 2023c, Wood et al. 2024). At the same site together with *A. ledermanni* (30 km to the north-west of Dara), S. Bečvář also captured a female *Andrena* (*Chlorandrena*) *turanica* Osytshnjuk, 1993, a species previously known only from Russia (European part), Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan, and Kyrgyzstan (Osytshnjuk et al. 2005, Schwenninger 2015). I do not believe that Bečvář's specimens are mislabelled, as they also captured *A.* (*Vellandrena*) *bassana* Warncke, 1969, *A.* (*Holandrena*) *fimbriatoides* Scheuchl, 2004 (in Scheuchl et al., 2004), and *A.* (*Fuscandrena*) *iliaca* Warncke, 1969 at this site (specimens all in OÖLM), species that are all restricted to the Levant and sometimes Mediterranean Turkey (e.g. Pisanty & Wood 2024). In this context, that the dry slopes on the eastern side of the Anti-Lebanon mountain chain demonstrably host a relictual fauna, *A. ledermanni* is consequently considered to be a genuine part of the Syrian fauna.

Description. Male. Body length: 8 mm (Fig. 47A). *Head:* Dark, 1.2 times wider than long (Fig. 47B). Clypeus domed, almost entirely yellow-marked with exception of lateral margins and two small black marks laterally. Surface of clypeus shallowly punctate, punctures separated by 1–2 punctures, underlying surface shagreened and weakly shining. Process of labrum small, roughly trapezoidal, 2 times wider than long, anterior margin slightly emarginate. Gena subequal to width of compound eye; ocelloccipital distance slightly narrower than diameter of lateral ocellus. Head covered in long white hairs, longest exceeding length of scape, hairs densest at lateral margins of clypeus, forming weak "moustache". Antennae basally dark, A5–13 ventrally extensively lightened orange; A3 slightly exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum with fine shagreen, weakly shining, covered with sparse hair-bearing punctures, punctures slightly elevated, thus appearing like small bumps, separated by 2–3 puncture diameters. Scutellum with stronger granular shagreen, dull, with similar punctation. Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum with microreticulation, impunctate, dull. Propodeal triangle laterally delineated by very fine carinae, internal surface with granular shagreen, basally with raised wrinkles (Fig. 47C). Mesosoma covered with sparse long white obscurely plumose hairs, longest greatly exceeding length of scape. Legs dark, apical tarsal segments lightened brown, pubescence whitish. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation pale orange, nervulus antefurcal.

Metasoma: Tergal discs predominantly dark, with slight bronze-green metallic hints, tergal margins broadly lightened hyaline-white, becoming brownish-orange at junction with discs (Fig. 47D). Tergal discs finely shagreened, more or less shining apically, becoming slightly duller basally, surface more or less impunctate, with scattered very short pale hairs. Marginal areas with longer hairs, these at most forming weak hair fringes laterally, not obscuring surface. T6 with long whitish hairs, extending past apical margin of segment. S2–5 with long, well-defined apical fringes of dense white hairs (Fig. 47E). S6 with distinct tuft of spreading white plumose hairs emerging apicomedially. S8 slightly broadening apically, weakly triangular, apical margin truncate, ventral surface densely covered with spreading fan of long white hairs. Genital capsule elongate, gonocoxae robust and humped, apical margins rounded and very slightly projecting (Fig. 47F). Gonostyli basally very broad, narrowing and converging medially, apical parts narrow and elongate, with slight but distinct kink in outer margins. Penis valves moderately broad basally, occupying majority of space between gonostyli, evenly tapering, narrow and sharply pointed apically.

Additional material examined (*Andrena turanica*). **KAZAKHSTAN** • 1♀; Čardara [Shardara], pouš̌t [desert] Kyzylkum; 1 May 1988; J. Halada leg.; OÖLM • 3♀; south, Karatau, 16 km NO Kentau, Biresek-Tal; 1–2 May 1994; W. Dolin leg.; ZSM; **KYRGYZSTAN** • 1♀; Tschatkal G.K., Kanysch Kija [Kanysh-Kiya]; 1,700 m a.s.l.; 4 Jun. 1998; W. Dolin leg.; ZSM; **RUSSIA** • 1♂; Kuban; 20 Apr. 1972; M. Kocourek leg.; H.R. Schwenninger det.; OÖLM; **SYRIA** • 1♀; 30 km NW Dara; 29–30 Mar. 1994; S. Bečvář leg.; OÖLM; **TAJIKISTAN** • 2♀; Darvaz, 10 km W Tavil-Dara [Tavildara]; 9–11 May 1991; J. Halada leg.; OÖLM • 6♀; Fajsabad [Faizobod], 60 km E Duschanbe; 5–7 May 1991; J. Halada leg.; OÖLM • 2♂, 3♀; Vose, 120 km SE Duschanbe; 12–13 May 1991; J. Halada leg.; OÖLM/TJWC; **TURKMENISTAN** • 1♂, 1♀; Aschchabad [Ashgabat]; 26 Mar. 1957; W. Grünwaldt leg.; ZSM • 1♀; Kugitang-Gebirge, Plateau bei Daraidere; 1,100–1,200 m a.s.l.; 29–30 Apr. 1995; W. Dolin leg.; A. Osytshnjuk det.; ZSM; **UZBEKISTAN** • 1♀; Ak-Nazar env., Surxondaryi reg.; 1,441 m a.s.l.; D. Benda & T. Fraňková leg.; NMPC • 1♀; Aman

Kutan; 1,200 m a.s.l.; 21 Apr. 1972; J. Niedl leg.; OÖLM • 3♀; Baysun env., II, Surxondaryo reg.; 1,913 m a.s.l.; D. Benda & T. Fraňková leg.; NMPC • 4♀; Taly env., Jizzakh reg., mountain steppe; 2,206 m a.s.l.; 19 Apr. 2022; D. Benda & T. Fraňková leg.; NMPC.

4. ADDITIONAL TAXA NEWLY ELEVATED TO SPECIES STATUS

Andrena (*Micrandrena*) *trigona* Warncke, 1968 stat. nov.

Andrena (*Fumandrena*) *pandosa trigona* Warncke, 1968b: 73, ♀♂ [Spain, OÖLM, examined]

Material examined. ALGERIA • 1♂, 1♀; Sidi bel Abbes; OÖLM (**paratypes**) • 1♀; Font. Gazelles, Oran; 7 Apr. 1958; Barbier leg.; OÖLM (**paratype**) • 1♂; Mascara; 1–30 Apr. 1908; A. Cros leg.; OÖLM (**paratype**); **MOROCCO** • 1♀; Ifkern [Ifkiren], 25 km E Boulemane; 24 May 1995; Ma. Halada leg.; OÖLM; **SPAIN** • 1♂, 1♀; Catalonia, Sta. Creu Olorda; 1–31 May 1933; Esp. i. Vil. leg.; OÖLM (female **holotype**, male **paratype**) • 4♀; 10 km SE Baza; 9 May 2003; J. Halada leg.; OÖLM/TJWC • 2♂; Alicante prov., 6 km N Crevillent, Aspe env.; 327 m a.s.l.; 3 Apr. 2010; Straka, Bogusch, Policarová leg.; NMPC • 1♂; Aragon prov., 13 km W of Alcañiz; 428 m a.s.l.; 9 Apr. 2010; Straka, Bogusch, Policarová leg.; NMPC • 1♂; Benidorm; 15 Apr. 1982; RMNH • 1♀; Granada, Pantano de los Bermejales; 26 May 1982; R. Leys leg.; RMNH • 1♀; Madrid, Rivas-Vaciamadrid, Canal de Manzanares to Camino de Uclés; 19 May 2021; T.J. Wood leg.; TJWC • 1♀; Murcia, Canton; 15 Apr. 1997; M.J. Gijswijt leg.; RMNH • 1♀; Murcia, Sierra de Espuña; 11 May 2023; J. Halada leg.; TJWC • 2♀; Sierra Alhamilla, 5 km E Nijar; 20 Apr. 2003; J. Halada leg.; OÖLM • 2♀; Sierra de Maria, 25 km W Lorca; 10 May 2003; J. Halada leg.; OÖLM • 2♀; Sierra Filabres Albanchez; 23 Apr. 2003; J. Halada leg.; OÖLM/TJWC • 1♂, 4♀; S-Sierra Nevada, env. Lanjaron; 4 May 2003; J. Halada leg.; OÖLM/TJWC.

Distribution. Morocco*, Algeria, Portugal, Spain (Warncke 1968b, 1976).

Remarks. The *A. pandosa* Warncke, 1968 complex was partially dealt with by Wood (2023b), who elevated *A. pandosa heliaca* Warncke, 1974 to species status. The subspecies *A. pandosa trigona* was not dealt with due to uncertainties over its distribution. It was incorrectly assumed that the subspecies was endemic to Iberia, and the existence of a specimen from Morocco cast doubts over this and its validity as a distinct subspecies. This is due to an error; the incorrect publication year of Warncke, 1975 was given by both Wood (2023a: 471) and Wood (2023b: 67), but the subspecies was described in Warncke (1968b) who listed material from north-western Algeria (Mascara, Oran, Sidi Bel Abbès).

With the benefit of this information, and the examination of more material, the presence of a specimen from northern Morocco is consistent with the presence of this taxon in north-western Algeria. Morphologically, *Andrena trigona* **stat. nov.** can be most easily separated from *A. pandosa* s. str. in the female sex due to its combination of triangular process of the labrum which forms a single apical point, whereas the process of the labrum is clearly bidentate in *A. pandosa* s. str. This character is more similar to that seen in *A. heliaca*, but in all other regards *A. trigona* is more structurally similar to *A. pandosa* s. str. These subtle differences are laid out in the identification key below.

Biogeographically, all three species can occur in sympatry in northern Morocco (Fig. 48). *Andrena pandosa* s. str. is the most widespread, and tends to occur in drier habitats and does not

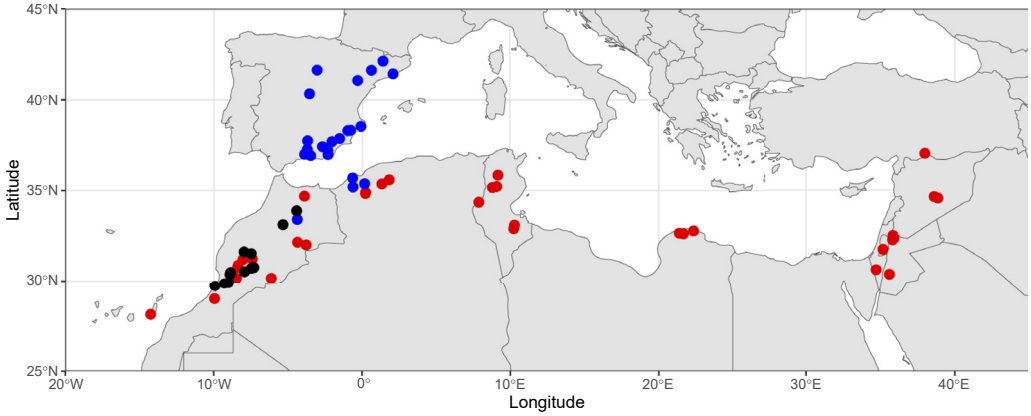

Fig. 48. Distribution of the *pandosa*-group of species. *Andrena* (*Micrandrena*) *pandosa* Warncke, 1968 = red circles, *Andrena* (*Micrandrena*) *trigona* Warncke, 1968 = blue circles, *Andrena* (*Micrandrena*) *heliaca* Warncke, 1974 = black circles

reach the Iberian Peninsula, but stretches to the Levant and southern Turkey in the east. *Andrena heliaca* is endemic to Morocco where it is mostly found in the High Atlas and Anti-Atlas regions, but also extends north to the Middle Atlas. *Andrena trigona* is predominantly Iberian, with some presence in Mediterranean parts of northern Morocco and north-western Algeria. Examined material of *A. pandosa* s. str. and *A. heliaca* was listed by Wood (2023b).

Identification key for the *pandosa*-group

See additional comments and illustrations in Wood (2023b).

1. Females … 2
   - Males … 4
2. Body length slightly larger (8–9 mm). Scutum and scutellum with extremely weak sculpture, more or less smooth and shining. Terga dark, without the apical margins lightened, tergal discs clearly and distinctly punctate. Process of the labrum triangular, forming a narrow point. Restricted to Morocco … ***heliaca* Warncke**
   - Body length slightly smaller (6–7 mm). Scutum and scutellum with regular granular shagreen, weakly shining. Terga dark but with at least part of the apical margins conspicuously lightened hyaline brown, tergal discs impunctate or at most obscurely punctate. Process of labrum either forming a single point or split into two points (bidentate). Found in Morocco or elsewhere … 3
3. Process of the labrum narrowly triangular, forming a single point. Tergal discs finely punctate, most visible on discs of T3–4. In direct comparison, scutum with punctures more clearly defined, distinct against the underlying shagreen, this shagreen slightly finer, thus appearing more glossy. Found in Iberia, northern Morocco, and north-western Algeria … ***trigona* Warncke**
   - Process of the labrum trapezoidal with a median emargination, thus bidentate. Tergal discs obscurely punctate, punctures disappearing into underlying sculpture. Scutum with

punctures less clearly defined, partially disappearing into the underlying shagreen and challenging to see, this shagreen less fine, not appearing glossy. Found from the eastern Canary Islands across North Africa to the Levant and southern Turkey … ***pandosa*** **Warncke**

4. Body length slightly larger (7–8 mm). Tergal margins strongly depressed, tergal discs abundantly and densely punctate, puncture separated by 0.5–1(2) puncture diameters, densest on discs of T3–4. Tergal discs finely shagreened, tergal margins polished and shining, thus contrasting discs. Restricted to Morocco … ***heliaca*** **Warncke**
   - Body length slightly smaller (5–6 mm). Tergal margins at most weakly depressed, tergal discs either abundantly or obscurely punctate, but never with tergal margins polished and shining, sculpture matching the sculpture of the tergal discs. Found in Morocco or elsewhere … 5
5. Terga finely shagreened, discs and margins weakly shining. Tergal discs abundantly punctate, punctures separated by 1–2 punctur diameters, punctures clearly distinct against underlying sculpture. Found in Iberia, northern Morocco, and north-western Algeria … ***trigona*** **Warncke**
   - Terga strongly shagreened and almost dull, obscurely shining. Tergal discs obscurely punctate, punctures separated by 1–2 puncture diameters but disappearing into underlying sculpture. Found from the eastern Canary Islands across North Africa to the Levant and southern Turkey … ***pandosa*** **Warncke**

Andrena (incertae sedis) *emigrata* Warncke, 1974 stat. nov.

Andrena (*Parandrena*) *tunetana emigrata* Warncke, 1974: 51, ♀ [Algeria, OÖLM, examined] (Fig. 49)

Material examined. ALGERIA • 1♀; Biskra; 6 Apr. 1914; R. Heymons S. leg.; OÖLM (**holotype**); **TUNISIA** • 2♀; 50 km W Matmata; 21 Mar. 2001; C. Schmid-Egger leg.; CSE/TJWC.

Distribution. Algeria & Tunisia* (Warncke 1974).

Remarks. *Andrena emigrata* can be recognised as part of the *tunetana*-group due to the broad facial foveae (occupying almost the entire space between the compound eye and a lateral ocellus), terga with clear apical hairbands, propodeal corbicula incomplete and with internal surface displaying hairs (i.e. not a *Simandrena* like *A. rhypara* Pérez, 1903), flocculus well-developed, and process of labrum small, triangular, and clearly sharply pointed. Within the group, *A. larisana* and *A. medioxima* were *de facto* elevated by Hazir et al. (2012, 2014). *Andrena emigrata* can be recognised due to the clypeus without latitudinal wrinkles (Fig. 49C; with latitudinal wrinkles in the West Mediterranean *A. tunetana*) and with the clypeus strongly flattened and irregularly punctate with punctures separated by 0.5–3 puncture diameters (in the East Mediterranean taxa with the clypeus domed and more regularly punctate, punctures separated by 1–2 puncture diameters). Biogeographically, *A. emigrata* occurs in the West Mediterranean but in drier desert edge habitats in eastern Algeria and southern Algeria, contrasting the more Mediterranean distribution of *A. tunetana*. This contributes to the overall pattern of members of the *tunetana*-group displaying non-overlapping distributions, suggesting ecological speciation. The male remains unknown.

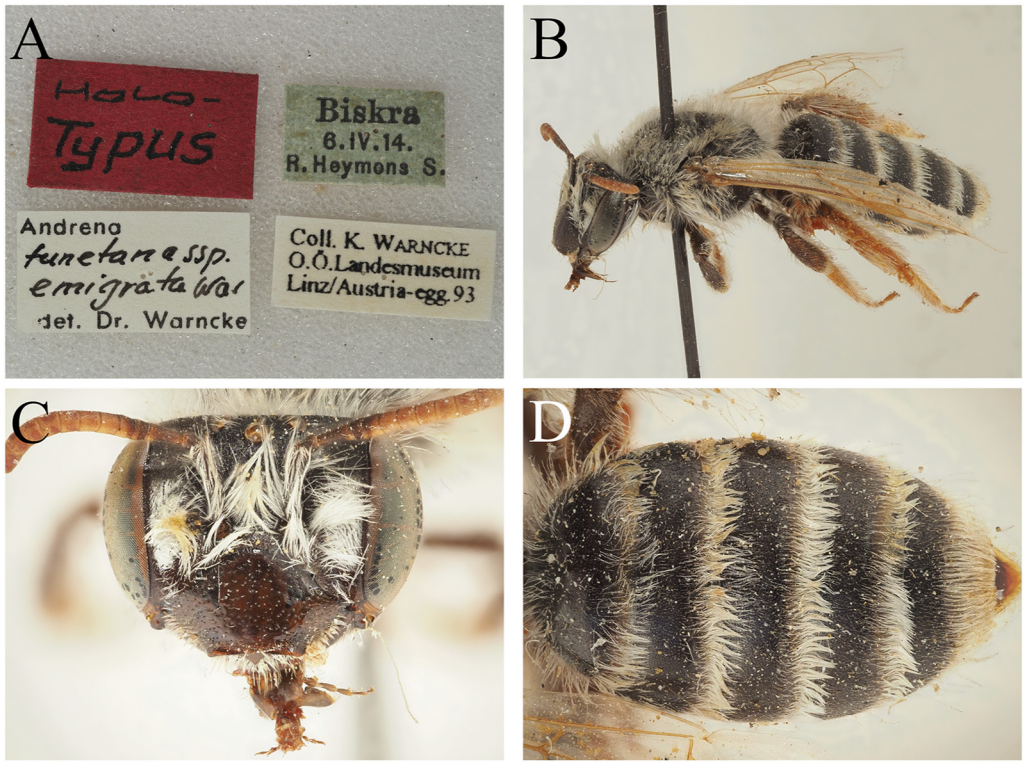

Fig. 49. Andrena (incertae sedis) *emigrata* Warncke, 1974 holotype female (OÖLM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Andrena (incertae sedis) *sculpturata* Warncke, 1975 stat. nov.

Andrena (*Parandrena*) *tunetana sculpturata* Warncke, 1975: [Turkey, OÖLM, examined] (Fig. 50)

Material examined. TURKEY • 8♂, 2♀; 20 km W Kilis/Gaziantep; 27 Apr. 1976; K. Warncke leg.; OÖLM • 1♀; Birecik As. Türk.; 17 May 1972; J. Heinrich leg.; OÖLM (**holotype**) • 2♀; Birecik/Urfa; 22 May 1983; K. Warncke leg.; OÖLM • 23♂, 43♀; Birecik/Urfa; 19 Apr. 1984; K. Warncke leg.; OÖLM/TJWC • 7♀; Gaziantep: Kilis; 13 May 1975; K. Warncke leg.; OÖLM • 1♀; Urfa, 20 km SE Harran; 23 May 1983; K. Warncke leg.; OÖLM.

Distribution. Southern Turkey (Birecik, Gaziantep, Şanlıurfa) (Warncke 1975).

Remarks. *Andrena sculpturata* can be recognised as part of the *tunetana*-group by the same characters as *A. emigrata*, with the addition of the typically broad male head with large yellow marking on the clypeus (Fig. 51B) and typical genital capsule that has the gonocoxae produced into pointed and somewhat hyaline apically projecting triangles (Fig. 51F). The distribution in southern Turkey separates *A. sculpturata* from *A. larisana* (Greece and western Turkey:

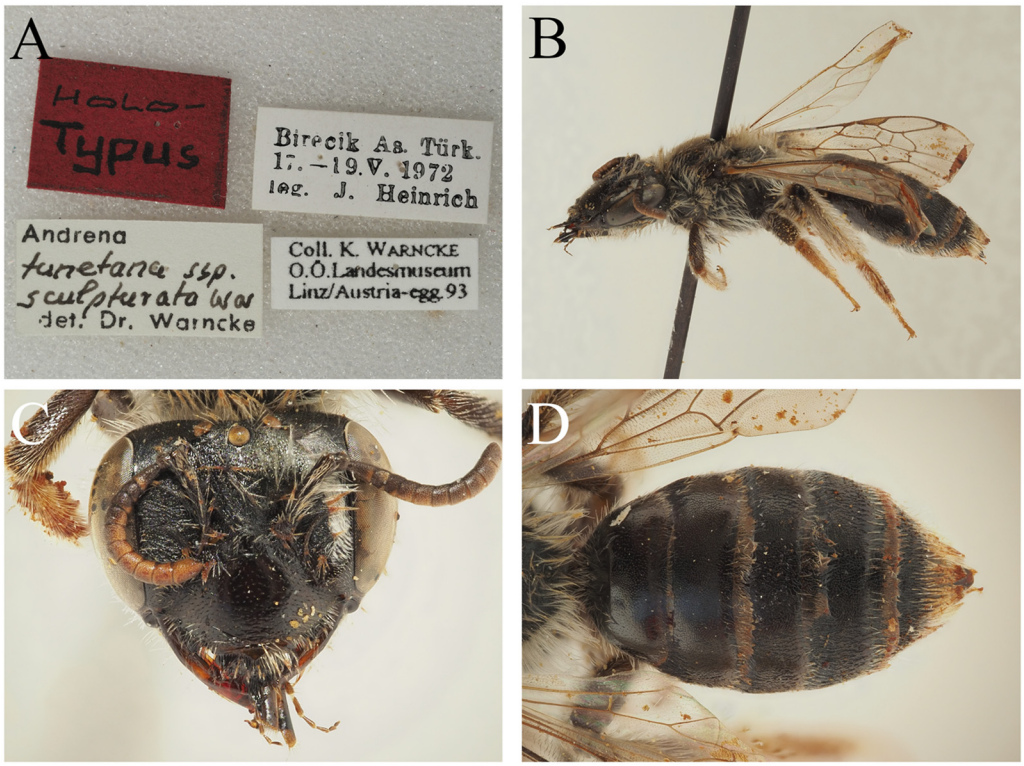

Fig. 50. Andrena (incertae sedis) *sculpturata* Warncke, 1975 holotype female (OÖLM). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Terga, dorsal view

Marmara and Aegean regions) and *A. medioxima* (Turkey: Central Anatolia and Mediterranean regions); these taxa are not currently known to occur in sympatry.

In the female sex, *A. sculpturata* can be recognised due to the denser punctation of T1, with punctures separated by 0.5 puncture diameters medially (Fig. 50D; in comparative taxa with punctures separated by 2–3 puncture diameters across the entire disc), due to the more strongly sculptured scutum, this becoming dull anterolaterally (Fig. 51C; scutum more uniformly polished in comparative taxa), and due to the slightly smaller body size of 8–9 mm versus 10–11 mm in the comparison species. In the male sex, separation is challenging; the scutum is more extensively shagreened with only a small shining area medially (Fig. 51C; in comparative taxa with the scutum more extensively polished and shining) and in direct comparison the genital capsule is narrower, with the gonostyli more elongate.

Description. Male. Body length: 8–9 mm (Fig. 51A). *Head:* Dark, 1.5 times wider than long (Fig. 51B). Clypeus weakly domed, surface finely shagreened and weakly shining, densely but shallowly punctate, punctures separated by 0.5–1 puncture diameters. Process of labrum small, narrow, triangularly pointed. Gena exceeding width of compound eye, in some individuals approaching 1.5 times this distance; ocelloccipital distance 0.5 times diameter of lateral ocellus.

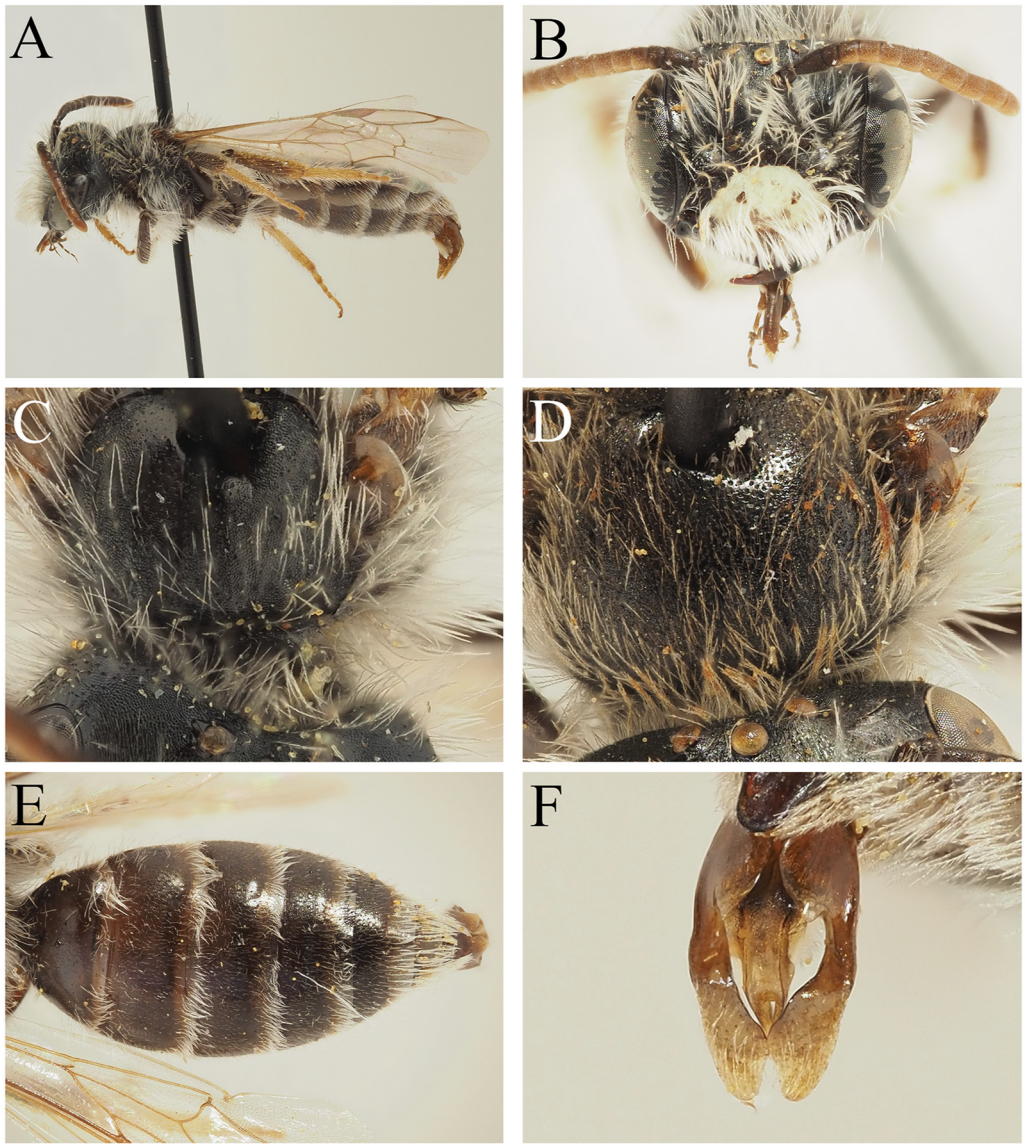

Fig. 51. Andrena (incertae sedis) *sculpturata* Warncke, 1975 male (A–C; E–F) and female (D). A. Habitus, profile view; B. Head, frontal view; C. Scutum, dorsal view; D. Scutum, dorsal view. E. Terga, dorsal view; F. Genital capsule, dorsal view

Head covered with white pubescence, longest hairs not equalling length of scape. Antennae basally dark, A4 ventro-apically, A5–13 ventrally lightened bright orange; A3 longer than A4, slightly shorter than A4+5, A4 subsquare, broader than long.

Mesosoma: Scutum microreticulate over majority of area, dull, with only small roughly circular shagreened and weakly shining area posteromedially; entire scutum regularly punctate, punctures separated by 1 puncture diameter, punctures mostly visible on weakly shagreened area (Fig. 51C). Scutellum more strongly polished and shining, irregularly punctate, punctures separated by 0.5–3 puncture diameters. Pronotum with extremely strong pronotal angle, almost excavated, internal surface with longitudinal wrinkles. Mesepisternum and dorsolateral parts of propodeum microreticulate, more or less dull, wrinkled with hairs emerging from between wrinkes. Propodeum with only weakly differentiated horizontal and vertical parts, propodeal triangle small, lacking lateral or internal carinae, differentiated by fine internal carinae, sculpturally contrasting dorsolateral parts of propodeum due to lack of microreticulation and hairs. Mesosoma covered with long white hairs, longest equalling length of scape. Legs basally dark, tarsi lightened bright orange; pubescence white. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation orange, nervulus weakly to strongly antefurcal.

Metasoma: Tergal discs dark, tergal margins lightened brown to whitish, tergal rims hyaline-white (Fig. 51E). Tergal discs finely but obscurely punctate, punctures separated by 2–3 puncture diameters on T1, by 1–2 puncture diameters on T2–4. T1 shagreened, weakly shining, shagreen forming pattern of weak latitudinal wrinkles; T2–4 with weaker shagreen, more strongly shining, without latitudinal wrinkles. Tergal discs with abundant but spaced short white hairs, margins of T1–5 with more or less complete apical hairbands, these long and exceeding length of marginal areas (abraded in most specimens). T6–7 with whitish hairs overlying pygidial plate. S8 columnar, apically truncate to slightly emarginate, ventral surface covered with short and dense orange hairs. Genital capsule elongate, gonocoxae with inner margins apically diverging, produced into short pointed teeth (Fig. 51F). Gonostyli strongly flattened and spatulate in apical part, with strongly raised inner margins. Penis valves relatively broad, occupying majority of space between gonostyli, gently tapering apically.

Identification key for the *tunetana*-group

Following the comments above on *A. emigrata* and *A. sculpturata*, as well as the unclear phylogenetic position of this group of species, it is beneficial to present a key to their identification to facilitate further work. Note, the male of *A. emigrata* is unknown and is therefore not included in the key. In general, the males are very similar morphologically, and association should be made with females in order to facilitate their identification (along with geographical context).

1. Females … 2
   - Males … 6
2. Clypeus with a clear pattern of raised latitudinal ridges (or wrinkles) running across its entire surface, these ridges separated by a single puncture diameter (Fig. 31C). Found in the West Mediterranean (Portugal, Spain, Morocco, Algeria, Tunisia) … ***tunetana* Schmiedeknecht**
   - Clypeus variably sculptured (Figs 49C and 50C), but never with raised latitudinal ridges, clypeal punctures instead separated by shining interspaces (at least medially). Distribution variable … 3
3. Clypeus strongly flattened, irregularly punctate, punctures separated by 0.5–3 puncture diameters (Fig. 49C). Terga with surface strongly shagreened and weakly shining, T1–4 with

dense pale apical hairbands which clearly exceed the length of the marginal area and extend onto the base of the following tergum (Fig. 49D). Found in Algeria and Tunisia … ***emigrata* Warncke**

- Clypeus more or less domed, not strongly flattened, and with punctures more regular, typically separated by 1–2 puncture diameters. Terga comparatively more weakly shagreened and more strongly shining, T2–4 with apical hairbands shorter, only slightly exceeding onto the base of the following tergum (Fig. 50D). Found in Greece and Turkey … 4

4. T1 with dense punctures, punctures separated by 0.5 puncture diameters medially, becoming slightly sparser laterally, here separated by 1 puncture diameter (Fig. 50D). Scutum more strongly shagreened (most visible anterolaterally), becoming dull (Fig. 51D). Typically slightly smaller, 8–9 mm. Found in southern Turkey (Gaziantep, Birecik, Şanlıurfa) … ***sculpturata* Warncke**

   - T1 with relatively sparse and regular punctures, punctures separated by 2–3 puncture diameters across the entire disc. Scutum more uniformly polished, only very narrowly dull on the very edges of the scutum. Typically slightly larger, 10–11 mm. Found in Greece and western Turkey … 5

The separation of the following two species is challenging; care should be taken, and confidently determined reference material consulted.

5. Scutum in profile with short black hair medially. Found in western Turkey (Central Anatolia and Mediterranean regions) … ***medioxima* Warncke**

   - Scutum in profile with longer brown hair medially. Found in Greece and western Turkey (Marmara and Aegean regions) … ***larisana* Warncke**

6. Found in the West Mediterranean (Portugal, Spain, Morocco, Algeria, Tunisia) … ***tunetana* Schmiedeknecht**

   - Found in Greece and Turkey … 7

7. Scutum extensively shagreened (most visible anteriorly and laterally), with only a small shining area medially and posteriorly. T1 shagreened and only weakly shining, with faint latitudinal wrinkles. In direct comparison, genital capsule narrower, with gonostyli more elongate. Found in southern Turkey (Gaziantep, Birecik, Şanlıurfa) … ***sculpturata* Warncke**

   - Scutum more extensively polished and shining, shining median area larger. T1 polished and shining with only hints of shagreen. In direct comparison, genital capsule less elongate, broader, more robust. Found in Greece and western Turkey … ***larisana* Warncke** and ***medioxima* Warncke** (males are currently morphologically inseparable; association with females and geographical context should be used).

5. DESCRIPTION OF NEW SPECIES

Andrena (*Andrena*) *holzschuhi* spec. nov.

https://zoobank.org/5ACEF1D8-20CD-4981-B7B6-30735083DAE1

Figure 52.

HOLOTYPE: PAKISTAN • 1♀; Hazara, Kawai, Shogran; 2,300 m a.s.l.; 34.6373°N, 73.4596°E; 14–17 May 1978; C. Holzschuh leg.; OÖLM.

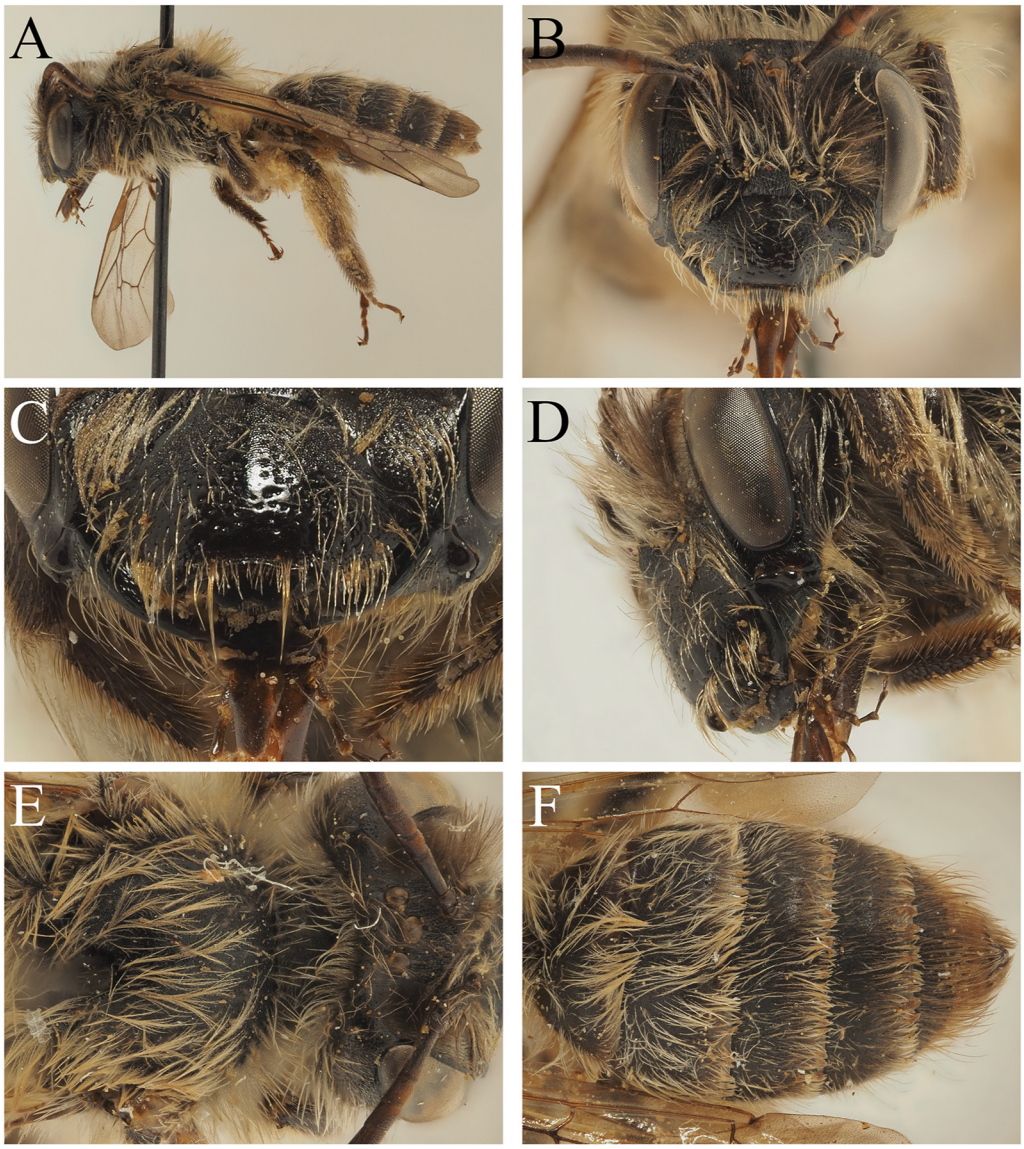

Fig. 52. Andrena (*Andrena*) *holzschuhi* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Process of labrum, ventral view; D. Malar space, lateral view; E. Scutum, dorsal view; F. Terga, dorsal view

PARATYPE: PAKISTAN • 1♀; Hazara, Kawai, Shogran; 2,300 m a.s.l.; 34.6373°N, 73.4596°E; 14–17 May 1978; C. Holzschuh leg.; OÖLM.

Description. Female. Body length: 10–11 mm (Fig. 52A). *Head:* Dark, 1.25 times wider than long (Fig. 52B). Clypeus weakly domed, microreticulate in basal ½, polished and shining in

apical ½; irregularly punctate, punctures in basal ½ separated by 1–2 puncture diameters, in apical ½ separated by 0.5–3 puncture diameters. Process of labrum trapezoidal, 2.5 times wider than long, apical margin emarginate (Fig. 52C). Malar space elongate, equalling diameter of flagellum (Fig. 52D). Gena exceeding width of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Foveae dorsally occupying over ¾ space between compound eye and lateral ocellus, separated from lateral ocellus by distance subequal to own diameter, foveae narrowing ventrally and extending beyond lower level of antennal insertions; foveae filled with dark brown hairs, becoming whitish ventrally. Head with light brown hairs, becoming slightly darker on vertex, hairs not equalling length of scape. Antennae dark basally, A4–12 ventrally lightened by presence of orange scales; A3 equalling A4+5.

Mesosoma: Scutum and scutellum with fine microreticulation, predominantly dull to weakly shining on scutellum; surface obscurely punctate, punctures separated by 0.5–2 puncture diameters, disappearing into underlying sculpture. Pronotum with distinct humeral angle. Mesepisternum and dorsolateral parts of propodeum with fine granular microreticulation, obscurely shining, dorsolateral parts of propodeum with fine hair-bearing punctures. Propodeal triangle with finer granular shagreen, basally with short elevated rugae, propodeal triangle thus defined by change in surface sculpture. Mesepisternum with long finely plumose light brown hairs, longest hairs approaching length of scape, hairs becoming slightly shorter and more golden-brown on scutum and scutellum. Propodeal corbicula incomplete, composed of abundant long golden-yellow plumose hairs, internal surface with long partly plumose hairs. Legs brown, apical tarsal segments lightened dark orange, pubescence light to dark brown. Flocculus complete, composed of long pale plumose hairs; femoral scopae composed of simple buff hairs, tibial scopae bicoloured, dorsally composed of dark brown simple hairs, ventrally composed of white simple hairs. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation orange brown, nervulus interstitial.

Metasoma: Tergal discs dark, marginal areas broadly lightened hyaline yellow-brown. Tergal discs with strong granular microreticulation, obscurely shining, obscurely and shallowly punctate, punctures separated by 2–3 puncture diameters, sculpture continuing only tergal margins with exception of unsculptured apical rims. Tergal discs with abundant hairs, longest and palest yellow-brown on T1, progressively becoming shorter and darker brown on subsequent terga; marginal areas of T1–4 forming apical hairbands, hairbands slightly extending onto subsequent tergum, obscuring underlying surface in fresh specimens. Apical fringe of T5 and hairs flanking pygidial plate dark brown. Pygidial plate rounded-triangular, medially with elevated triangular area, surface impunctate, dull.

Male. Unknown.

Diagnosis. *Andrena holzschuhi* can be recognised as part of the subgenus *Andrena s. str.* due to the combination of broad facial foveae (Fig. 52B and E), pronotum with a humeral angle, strongly developed flocculus, pygidial plate with a triangular elevated area medially, non-triangular hind tibia with unmodified tibial scopa (hind tibia triangular or otherwise broadened apically and presenting a tibial scopa composed of very short hairs in subgenus *Cnemidandrena*), and spring flight period.

Within the Himalayan *Andrena s. str.*, *A. holzschuhi* can be recognised due to the elongate malar space that equals the width of a flagellum (Fig. 52D); this places it closest to *A. rupshuensis* (India: Ladakh) and *A. ladakha* Wood, 2024 (India: Ladakh). The *locus typicus* of Shogran is

only some 200 km to the west of Ladakh, and can be considered to be part of of the Western Himalayas. *Andrena holzschuhi* can be separated due to the intermediate length of the head which is 1.25 times wider than long (1.4 times wider than long in *A. ladakha*), sparse facial pubescence (with abundant dense white hairs on the face in the two comparison species), A3 equalling A4+5 (A3 exceeding A4+5, slightly shorter than A4+5+6 in *A. ladakha* and *A. rupshuensis*), terga with loose pale hairs on the discs that do not obscure the underlying surface, becoming shorter on the marginal areas, forming poorly-defined hairbands (Fig. 52F; with dense hairs that obscure the underlying surface in *A. ladakha* and clearly defined pale hairbands in *A. rupshuensis*), hind basitarsi dark (orange in *A. ladakha* and *A. rupshuensis*), clypeus polished and shining in its apical half with punctures separated here by 0.5–3 puncture diameters (Fig. 52B–C; in *A. ladakha* with the clypeus shagreened, punctures separated by <0.5–0.5 puncture diameters), and tibial scopa bicoloured, dark brown dorsally and white ventrally (in *A. ladakha* with the tibial scopa entirely composed of dark brown hairs).

Etymology. Named after Carolus Holzschuh, an Austrian Coleoptera specialist working particularly on Cerambycidae and Scolytinae (Curculionidae) (e.g. Holzschuh 2017). In addition to beetles, he collected bees in Turkey, Iran, Pakistan, India, Nepal, and Bhutan in the 1970s–1980s (including the current species), these passing to Warncke. This material has proved an invaluable source of specimens when studying the Himalayan *Andrena* fauna.

Distribution. Pakistan (Khyber Pakhtunkhwa).

Andrena (*Euandrena*) *binghami* spec. nov.

https://zoobank.org/C9E09C20-4884-4A3B-8055-828F20F113E7

Figure 53.

HOLOTYPE: INDIA • 1♀; Uttaranchal [Uttarakhand], st. 30 km NW Bageshwar; ~2,400 m a.s.l.; 25–30 Jun. 2003; Kejval & Tryzna leg.; OÖLM.

Description. Female. Body length: 7 mm (Fig. 53A). *Head:* Dark, as wide as long (Fig. 53B). Clypeus domed, laterally shagreened, polished and shining over majority of surface; irregularly punctate, punctures separated by 0.5–1 puncture diameters with exception of a weak longitudinal impunctate midline. Process of labrum trapezoidal, slightly wider than long, anterior margin very weakly concave. Gena exceeding width of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Foveae dorsally occupying ⅓ space between compound eye and lateral ocellus, slightly narrowing ventrally at level of antennal insertions; foveae filled with whitish to dark brown hairs, darkest hairs found dorsally. Face and lower part of gena with white hairs, becoming intermixed light brown and black on vertex and intermixed white and black on frons. Antennae dark basally, A5–12 ventrally lightened by presence of greyish scales; A3 equalling A4+5.

Mesosoma: Scutum and scutellum densely punctate, punctures predominantly separated by 0.5–1 puncture diameters, increasing to 2 puncture diameters medially on scutum, interspaces polished and shining with exception of scutum slightly shagreened and dull anteriorly and laterally (Fig. 53C). Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum microreticulate overlain by network of dense and fine raised rugosity, surface dull. Propodeal triangle narrow, laterally delineated by fine carinae, internal surface with granular

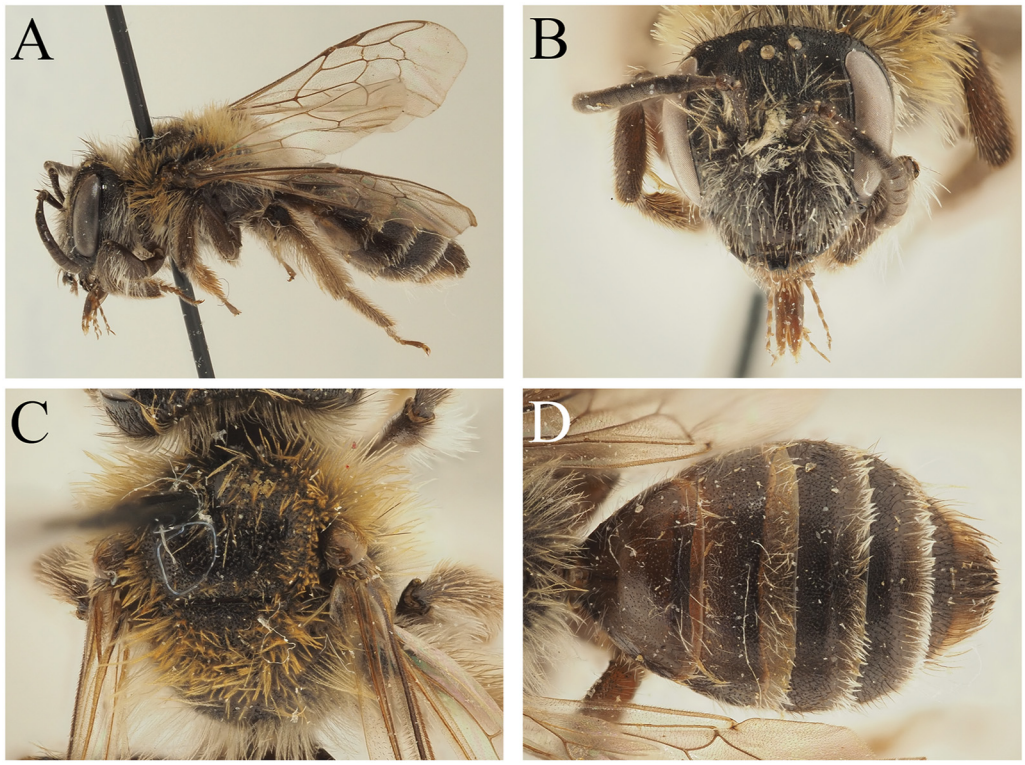

Fig. 53. Andrena (*Euandrena*) *binghami* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view

microsculpture in anterior ½, with fine rugae in basal ½. Mesepisternum with long plumose white hairs, longest equalling length of scape, dorsally becoming golden-brown, on scutum and scutellum hairs shorter, more strongly plumose, almost approaching subsquamous state. Propodeal corbicula incomplete, composed of whitish to light brown plumose hairs, internal surface with scattered long simple hairs. Legs brownish, hind femorae, tibiae, and tarsi distinctly lightened brown, pubescence dark to light brown. Flocculus complete, composed of sparse whitish plumose hairs; femoral scopae composed of pale simple hairs, tibial scopae bicoloured, mostly composed of whitish simple hairs ventrally, becoming brownish dorsally. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation brownish, nervulus very slightly antefurcal. Right forewing with 2 submarginal cells as second submarginal crossvein partially formed; left forewing with 3 submarginal cells.

Metasoma: Tergal discs dark, marginal areas broadly lightened hyaline whitish-brown to reddish-brown (Fig. 53D). Discs of terga strongly, densely, and uniformly punctate, punctures separated by 0.5–1 puncture diameters, punctures not extending onto marginal areas in same form; marginal areas slightly depressed, shallowly and obscurely punctate, separated by 0.5–2 puncture diameters. Tergal discs with short dark brown hairs, not obscuring underlying surface, margins of T2–4 with apical white hairbands, complete on T3–4 but rapidly abraded, not

obscuring underlying surface. Apical fringe of T5 and hairs flanking pygidial plate dark brown. Pygidial plate narrowly triangular, apex rounded, margins slightly upturned, with narrow longitudinal elevated triangular area medially.

Male. Unknown.

Diagnosis. *Andrena binghami* can be placed in the subgenus *Euandrena* due to the facial foveae which dorsally occupy around ⅓ of the space between the compound eye and a lateral ocellus, slightly narrowing ventrally, rounded pronotum, A3 = A4+5, and lack of any other distinctive characters (simple tibial scopae, simple propodeal triangle, posterior face of hind femur rounded, hind tibial spurs unmodified). This subgenus has been the source of much confusion in the Himalayan region (Gautam et al. 2024). Following the conclusive demonstration of the identity of *Andrena* (*Cnemidandrena*) *mephistophelica* as part of a different subgenus (Section 1), all other Himalayan *Euandrena* species possess red-marked terga: *A. familiaris* Smith, 1878; *A. communis* Smith, 1879; *A. murreensis* Cockerell, 1922; and *A. humlaensis* Scheuchl, 2005. *Andrena humlaensis* is likely the priority name for *A. mephistophelica* auctorum (see tentative use of the latter name by Gautam et al. 2024). *Andrena euphorbiacea* Scheuchl, 2005 and *A. kathmanduensis* Tadauchi & Matsumura, 2007 are likely to be junior synonyms of *A. murreensis*, but type revision is required.

Andrena binghami can be separated from all of these species due to its dark terga, but more importantly due to the shape of the head which is relatively elongate, head as wide as long (Fig. 53B; in most *Andrena* species head wider than long), and by the clypeus which is domed, polished and shining, punctate with punctures separated by 0.5–1 puncture diameters with the exception of a weak longitudinal impunctate midline; comparison species have shorter heads with a clypeus that is either more sparsely punctate or which lacks a longitudinal impunctate midline. In combination, the tergal colouration and head morphology allow separation, as well as typical body sizes that exceed 9 mm, whereas *A. binghami* is small with a body length of 7 mm.

Finally. in this somewhat bulging clypeus with a shiny impunctate longitudinal midline *A. binghami* can be compared to *A.* (*?Margandrena*) *annapurna* (see discussion in Section 1 for *A. morosa* as to why this species is likely not found in the subgenus *Margandrena*) from Nepal. *Andrena annapurna* is very morphologically similar, but crucially it has the terga strongly microreticulate with very small and indistinct punctures which are separated by 1–2 puncture diameters, whereas in *A. binghami* the tergal discs are densely and clearly punctate with punctures separated by 0.5–1 puncture diameters. The body length is also greater at 9 mm, whereas *A. binghami* measures 7 mm in length.

Etymology. Named after Charles Thomas Bingham (1848–1908) who was an Irish military officer and naturalist, and who wrote the first complete catalogue and key to the bees, wasps, ants, and cuckoo wasps (Bingham 1897, 1903) of British India (including Pakistan, India, Sri Lanka, and Myanmar).

Distribution. India (Uttarakhand).

Andrena (*Lepidandrena*) *arunachala* spec. nov.

https://zoobank.org/E728E270-16C6-40B8-AE84-859F293A533E

Figure 54.

Fig. 54. Andrena (*Lepiandrena*) *arunachala* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Process of labrum, ventral view; D. Scutum, dorsal view; E. Propodeum, dorsal view; F. Terga, dorsal view

HOLOTYPE: INDIA • 1♀; Arunachal, Etalin vicinity; 28.6161°N, 95.8891°E, 700 m a.s.l.; 15–25 May 2012; O. Sauša leg.; OÖLM.

PARATYPE: INDIA • 1♀; Arunachal, Etalin vicinity; 28.6161°N, 95.8891°E, 700 m a.s.l.; 15–25 May 2012; O. Sauša leg.; OÖLM.

Description. Female: Body length 10.5–11 mm (Fig. 54A). *Head:* Dark, 1.25 times wider than long (Fig. 54B). Clypeus domed, dorsomedially produced into short longitudinal ridge, clypeus thus appearing angular when specimen is tilted; surface densely punctate laterally, punctures becoming separated by 0.5–1 puncture dimeters medially, here interspaces polished and shining (Fig. 54C). Process of labrum broadly trapezoidal, two times wider than long, anterior margin shallowly emarginate. Gena slightly exceeding width of compound eye; ocelloccipital distance nearly 2 times diameter of lateral ocellus. Foveae dorsally occupying almost entire space between compound eye and lateral ocellus, separated from lateral ocellus by distance subequal to diameter of lateral ocellus, ventrally extending below level of antennal insertions; foveae filled with brown hairs. Face and gena covered with light brown hairs, hairs becoming black on vertex. Antennae dark, A3 equalling A4+5.

Mesosoma: Scutum densely punctate, surface anteriorly and laterally reticulate and dull, punctures disappearing into underlying sculpture, becoming shagreened medially, here punctures separated by 0.5–1 puncture diameters (Fig. 54D). Scutellum polished and shining, with irregular punctures, punctures separated by 0.5–2 puncture diameters. Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum covered with network of raised reticulation, dull. Propodeal triangle broad, laterally delineated by fine carinae, internal surface with fine granular shagreen, weakly shining, with fine wrinkles in basal ⅓ (Fig. 54E). Mesepisternum with light brown hair, scutum and scutellum with noticeably shorter and densely plumose hair, this becoming subsquamous and forming thick clumps. Propodeal corbicula incomplete, composed of light brown plumose hairs, internal surface with abundant light brown simple hairs. Legs dark, apical tarsal segments brownish, pubescence dark brown. Flocculus short, complete, composed of buff to pale plumose hairs; femoral scopae well-developed, composed of whitish plumose hairs, tibial scopae composed of black simple hairs. Posterior face of hind femorae covered with abundant bristly brown hairs. Hind tarsal claws with strong inner tooth. Wings moderately infuscate, stigma and venation dark brown, nervulus interstitial.

Metasoma: Terga dark, apical rims of terga narrowly lightened hyaline-brown (Fig. 54F). Discs of terga strongly, deeply, and uniformly punctate, punctures separated by < 0.5–1 puncture diameters, extending onto tergal margins but absent on narrow apical rims. Tergal discs with abundant short inconspicuous black hairs, not obscuring surface, apical hairbands absent. Apical fringe of T5 and hairs flanking pygidial plate black. Pygidial plate apically broadly rounded, with large raised area medially, almost unsculptured, dull.

Male. Unknown.

Diagnosis. *Andrena arunachala* can be recognised as a member of the subgenus *Lepidandrena* due to the combination of very densely and uniformly punctate terga (Fig. 54F; punctures separated by <0.5 puncture diameters, almost confluent), broad facial foveae, tibial scopae composed of simple hairs, labrum differentiated (i.e. with a process of the labrum clearly visible), A3 equalling A4+5, and the presence of abundant squamous to sub-squamous hairs on the scutum and scutellum (Fig. 54D). However, an important character is absent which is the presence of a latitudinal carina on the posterior face of the hind femur combined with a latitudinal row of short spines. These spines are difficult to see even in well-characterised *Lepidandrena* species. To my knowledge, the subgenus is predominantly West Palaearctic, with an eastern limit in Iran and Central Asia, with no species yet known from China or the Indian subcontinent (Osytshnjuk et al. 2008, Astafurova et al. 2022, Wood & Monfared 2022, Gautam

et al. 2024). However, it does not clearly fit any other subgenus, and given the structure of the head, mesosoma, and metasoma, it is considered best to place it within this subgenus as a geographically isolated member.

Within the subcontinental fauna, *A. arunachala* is unique and can be identified by the combination of characters highlighted above. Additionally, the clypeus is dorsomedially produced into a short longitudinal ridge (Fig. 53C; so short as to be almost a point) which is unique amongst *Lepidandrena* species. Due to the presence of subsquamous hairs on the scutum and scutellum, it is also beneficial to highlight a species described from southern China, *A. nasipolita* Strand, 1913 (Fig. 55). This is a very mysterious species with unclear phylogenetic placement due to its unique combination of characters, namely the extremely narrow facial foveae which are removed from the inner margin of the compound eye by a distance several times their diameter (Fig. 55C and E), the domed, polished, and sparsely punctate clypeus (Fig. 55D), and squamous hairs on the scutum (Fig. 55F). Xu and Tadauchi (1998) revised Strand's Asian *Andrena* types and synonymised *A.* (*Lepidandrena*) *stiloclypeata* Wu, 1987 with it, noting that the species is also known from Hengduan Shan mountain in Yunnan which is only around 300 km from the *locus typicus* of *A. arunachala*. Based on the structure of the clypeus and facial foveae, it is not possible to confuse the two species. *Andrena nasipolita* is best placed as *incertae sedis* until genetic analysis can be conducted.

Etymology. Taken from the name of the province, Arunachal Pradesh, which means Land of the Dawn-Lit Mountains in Sanskrit. It is a noun in apposition.

Distribution. India (Arunachal Pradesh).

Additional material examined (*Andrena nasipolita*): **CHINA** • 1♀; Pingshiang, Süd-China [Pingxiang, Guangxi]; Dr. Kreyenberg leg.; DEI (**holotype**) (Fig. 55).

Andrena (*Longandrena*) *relicta* spec. nov.

https://zoobank.org/DD5622DE-36D9-40F8-A5C8-54665CB3E501

Figure 56.

HOLOTYPE: ISRAEL • 1♂; Nahal Lavan, 4.25 km NE Kemehin [Kmehin]; 30.9314°N, 34.4731°E; 226 m a.s.l.; 26 Feb. 2013; A. Dorchin leg.; SMNHTAU.

Description. Female. Unknown.

Male. Body length: 8 mm (Fig. 56A). *Head:* Dark, 1.1 times wider than long (Fig. 56B). Clypeus domed, predominantly covered with yellow maculations with exception of two elongate black marks medio-laterally and narrowly along lateral markings; yellow maculations present also on lower paraocular areas. Surface of clypeus polished and shining, irregularly punctate, punctures separated by 0.5–3 puncture diameters. Process of labrum broad, rounded-oval, occupying almost entire space between apico-lateral margins of clypeus, anterior margin straight, surface covered with fine latitudinal wrinkles. Galea with outer surface finely shagreened, shining. Maxillary palps with 6 segments, labial palps with 4 segments; segments of labial palpi moderately elongate. In frontal view, visible mouthparts including glossa exceeding length of head (Fig. 56B). Glossa extending beyond apex of galea by distance subequal to length of galea in profile view (Fig. 56A). Gena narrower than width of compound eye; ocelloccipital distance

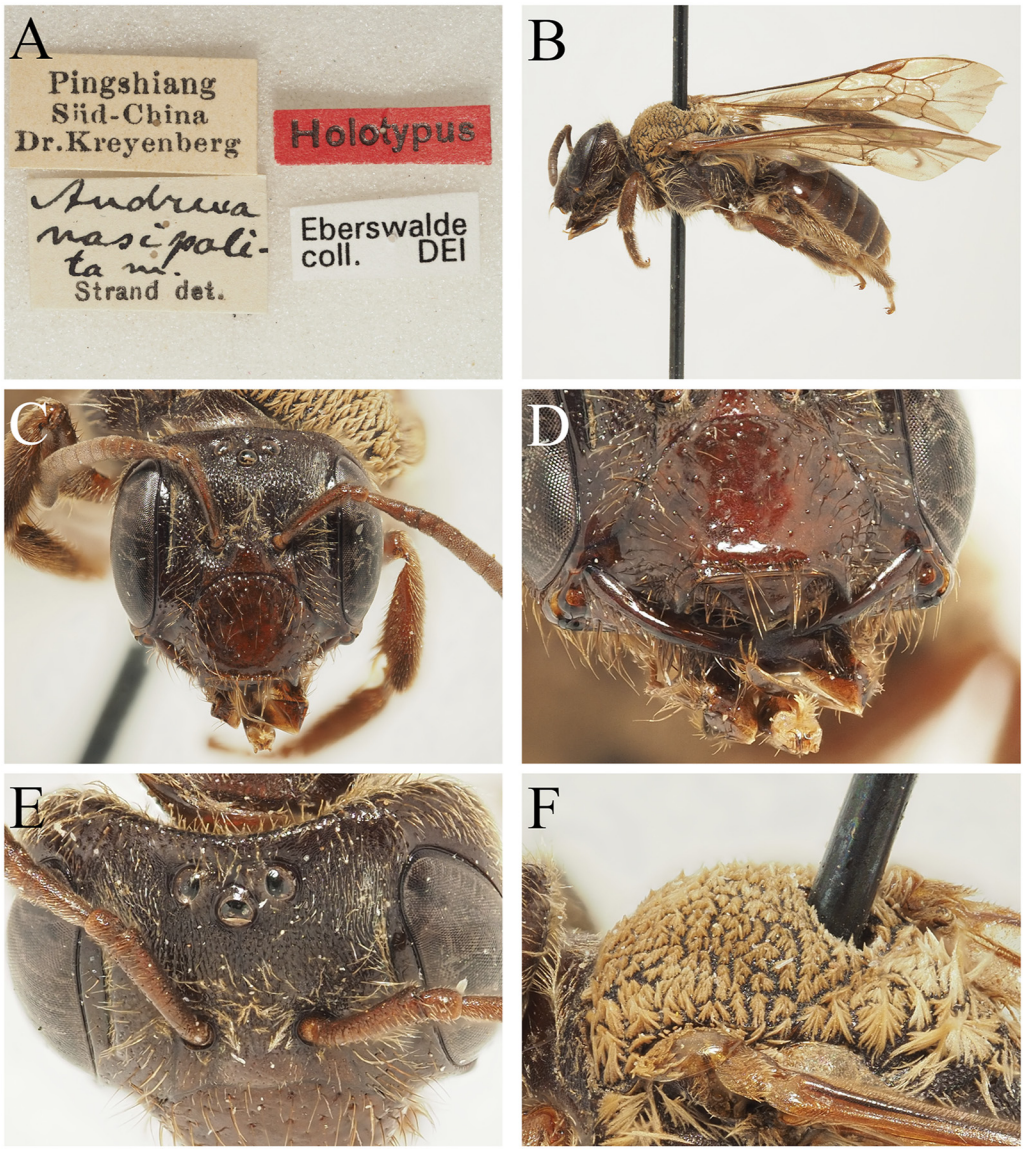

Fig. 55. Andrena (incertae sedis) *nasipolita* Strand, 1913 holotype female (DEI). A. Label information; B. Habitus, lateral view; C. Head, frontal view; D. Process of labrum, ventral view; E. Head, dorsal view; F. Scutum, lateral view, detail

slightly narrower than diameter of lateral ocellus. Head covered with moderate to long white hairs, longest ventrally, equalling length of scape. Antennae basally dark, A4–13 ventrally uniformly lightened by presence of orange scales; A3 slightly shorer than A4+5, A4 more or less square, slightly longer than wide, A5 rectangular, clearly longer than wide.

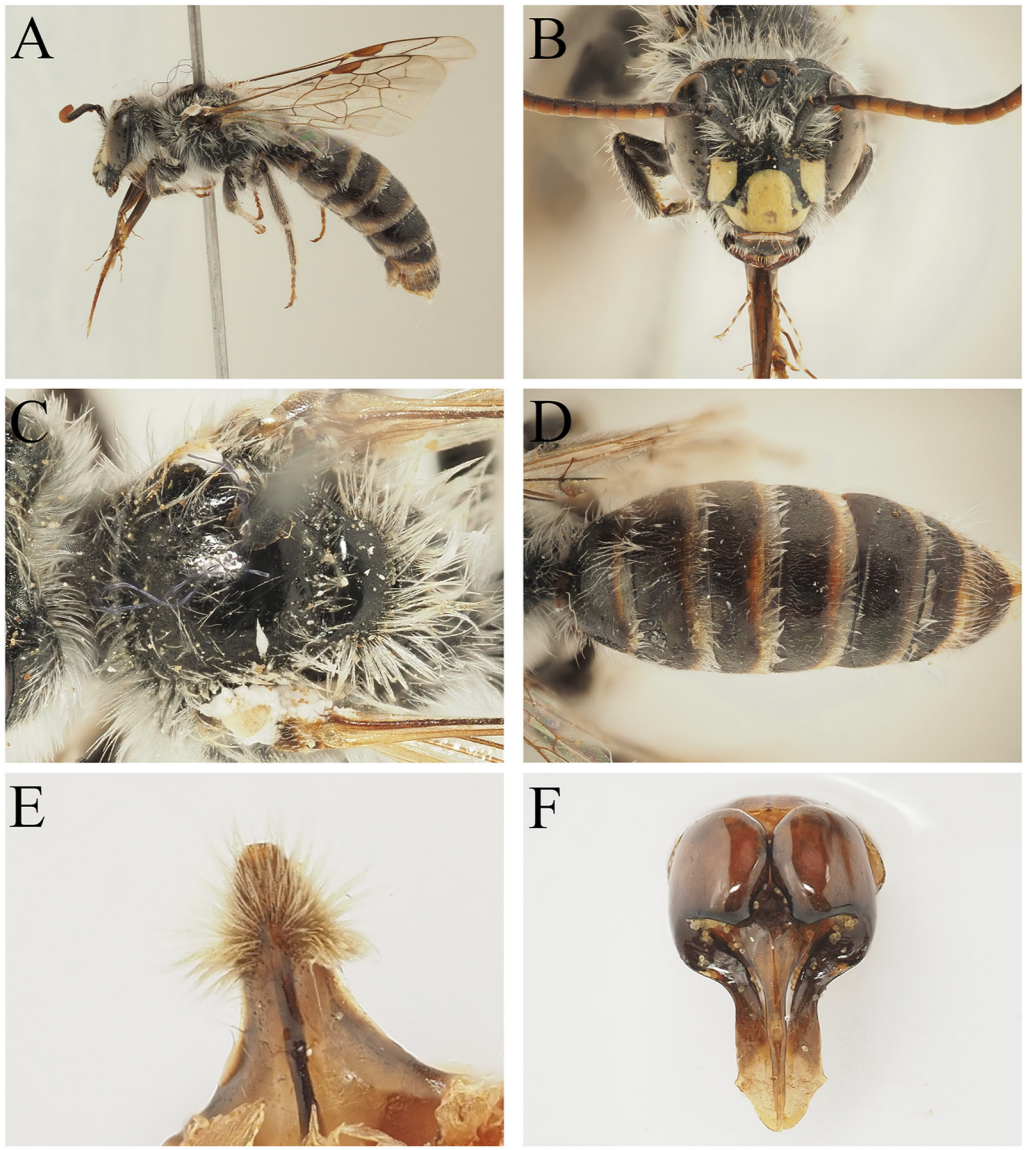

Fig. 56. Andrena (*Longandrena*) *relicta* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view; E. Sternum 8, ventral view; F. Genital capsule, dorsal view

Mesosoma: Scutum and scutellum predominantly polished and shining, with shagreen limited to anterior and lateral margins; surface irregularly punctate, punctures separated by 0.5–4 puncture diameters, sparsest medially (Fig. 56C). Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum finely microreticulate, weakly shining. Propodeal triangle weakly defined, internal surface with granular shagreen overlaid by obscure irregular rugae,

overall surface thus poorly differentiated from dorsolateral parts of propodeum. Mesosoma covered with long white plumose hairs, longest equalling length of scape. Legs dark, apical tarsal segments lightened orange-brown, pubescence white. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange-brown, nervulus interstitial.

Metasoma: Tergal discs dark with the slightest hint of greasy metallic purple, marginal areas broadly lightened hyaline white, becoming orange-brown at junction with disc (Fig. 56D). Tergal discs finely shagreened, shining, regularly but finely punctate with small hair-bearing punctures, punctures separated by 2 puncture diameters. Tergal discs covered with short white hairs, not obscuring underlying surface, marginal areas of T1–5 with thicker white hairbands, likely obscuring underlying surface in fresh specimens. S6–7 with whitish-golden hairs. S8 roughly triangular with strongly truncate apical margin, ventral surface with laterally and anteriorly spreading tuft of whitish hairs (Fig. 56E). Genital capsule with gonocoxae apically diverging, inner margins forming roughly 90° angle, space between gonocoxae therefore forming inverted "U" shape (Fig. 56F). Gonostyli very strongly converging medially, with strong bend in outer margins, flattened and parallel-sided in apical ½, outer margin with small subapical tooth. Penis valves broad and triangular basally, abruptly narrowed medially, forming long, constricted, needle-like structure, apex sharply pointed.

Diagnosis. *Andrena relicta* can be recognised as part of the subgenus *Longandrena* due to the head which is as long as broad (Fig. 56B; uncommon in *Andrena* where the head is almost always somewhat broader than long), process of the labrum enlarged and broadly rounded, occupying majority of surface of labrum and hence not appearing to be a process at all, clypeus and lower paraocular areas with yellow maculations, ocelloccipital distance less than the diameter of a lateral ocellus, A3 slightly shorter then A4+5, mouthparts long, equalling length of head in frontal view (Fig. 56A), and propodeum weakly indicated, internal surface without clear rugae or reticulation. The subgenus *Longandrena* currently contains three species found in north-eastern Iran and Central Asia (Radchenko et al. 2021); it is clearly a group that favours dry desert environments. *Andrena relicta* can be separated from the two species for which males are known (*Andrena longiceps* Morawitz, 1894 and *A. dolini* Osytshnjuk, 1979) due to the genital capsule (Fig. 56F) which has the gonocoxae slightly diverging apically with their inner margins forming right angles (in *A. longiceps* with gonocoxae produced into enormously long apically projecting teeth; in *A. dolini* with the gonocoxae produced into moderately long but distinct apically projecting teeth) and with the gonostyli with a very strong bend in their outer margin, the apical halves parallel to one another, and with a slight but distinct tooth subapically (in *A. longiceps* with gonostyli showing a similar bend in their outer margin, but with gonostyli diverging apically and without lateral subapical tooth; in *A. dolini* without a strong bend in the outer margin of the gonostyli). Excellent comparative illustrations can be found in Radchenko et al. (2021). *Andrena relicta* is not considered to be conspecific with *A. nativa* Osytshnjuk, 1984 which is known only from the type series from central Turkmenistan as this species has the hind tibial spurs strongly hooked apically, and this character is absent from *A. relicta*. Further collecting and examination of material from Turkmenistan is needed to definitively locate the male of *A. nativa* and to describe its morphology.

Etymology. Singular nominative feminine form of the Latin adjective *relictus* meaning abandoned or forsaken, in reference to the isolated distribution of this species compared to its relatively in Iran and Central Asia.

Distribution. Israel (Negev desert).

Andrena (*Margandrena*) *maxillaris* spec. nov.

https://zoobank.org/8F395ADE-BC75-4463-A444-4ED374667727

Figure 57.

HOLOTYPE: NEPAL • 1♂; Kathmandu Valley, Godavari [Godawari]; 5,000 feet a.s.l.; 1 Sep. 1969; C.G. Roche leg.; OUMNH; TYPE HYM 2763.

PARATYPE: INDIA • 3♂; Shillong, Assam; 1–30 Aug. 1903; R. Turner leg.; NHMUK.

Description. Female. Unknown.

Male. Body length: 9 mm (Fig. 57A). *Head:* Dark, 1.3 times wider than long (Fig. 57B). Clypeus dark, with broad and poorly-defined longitudinal impression medially, surface thus appearing roughly flattened; underlying surface polishing and shining, punctures separated by 0.5–1 punctures laterally, by 3–4 puncture diameters medially. Process of labrum strongly raised, knob-like, medially deeply emarginate (Fig. 57C). Malar space linear. Gena 1.5 times wider than width of compound eye; ocelloccipital distance 2 times diameter of lateral ocellus (Fig. 57D). Head with sparse, predominantly pale pubescence, with darker hairs on paraocular areas. Antennae dark, A5–13 ventrally lightened by presence of brownish scales; A3 slightly exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum polished and shining over majority of area, scutum with slight shagreen along apical ¼; surface irregularly punctate, punctures separated by 1–3 puncture diameters (Fig. 57E). Pronotum with strong humeral angle, surface with irregular longitudinal striations. Mesepisternum and dorsolateral parts of propodeum with fine reticulation, weakly shining. Propodeal triangle laterally obscurely delineated by very fine carina, internal surface with fine granular microreticulation, lacking internal rugae, propodeal triangle therefore primarily defined from dorsolateral parts of propodeum by change in surface sculpture (Fig. 57F). Mesepisternum with long whitish plumose hairs, none equalling length of scape, hairs becoming slightly browner and slightly shorter on scutum. Legs dark, pubescence whitish to brownish. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation dark brown, nervulus antefurcal.

Metasoma: Terga predominantly dark, tergal margins obscurely lightened hyaline-reddish-brown (Fig. 57G). Tergal discs with scattered and fine hair-bearing punctures, separated by 3–4 puncture diameters; underlying surface finely shagreened, shining. Tergal discs with short and brownish hairs, visible in profile; apical margins of T2–4 with narrow pale apical hair fringes, interrupted on T2–3, almost complete on T4. S8 columnar, apex slightly broadened, ventral surface with thick fringe of laterally spreading hairs. Genital capsule slightly elongate, gonocoxae with inner margins forming 90° angle, gonostyli slightly broadened apically, flattened and spatulate (Fig. 57H). Penis valves moderately broadened basally before tapering evenly apically.

Diagnosis. *Andrena maxillaris* can be recognised as a *Margandrena* due to the combination of dark clypeus (Fig. 57B), gena broader than the width of the compound eye (Fig. 57D), pronotum with strong humeral angle, A3 slightly exceeding A4+5, and genitalia simple, with slightly basally broadened penis valves and flattened gonostyli (Fig. 57H), process of the labrum sulcate and slightly upturned (Fig. 57C), and autumn flight period (August–September). As discussed in Section 1 under *A.* (*Margandrena*) *morosa*, this places it very close to *A. morosa* which is known from the Western Himalayas in India and Nepal flying in October. *Andrena maxillaris* can be

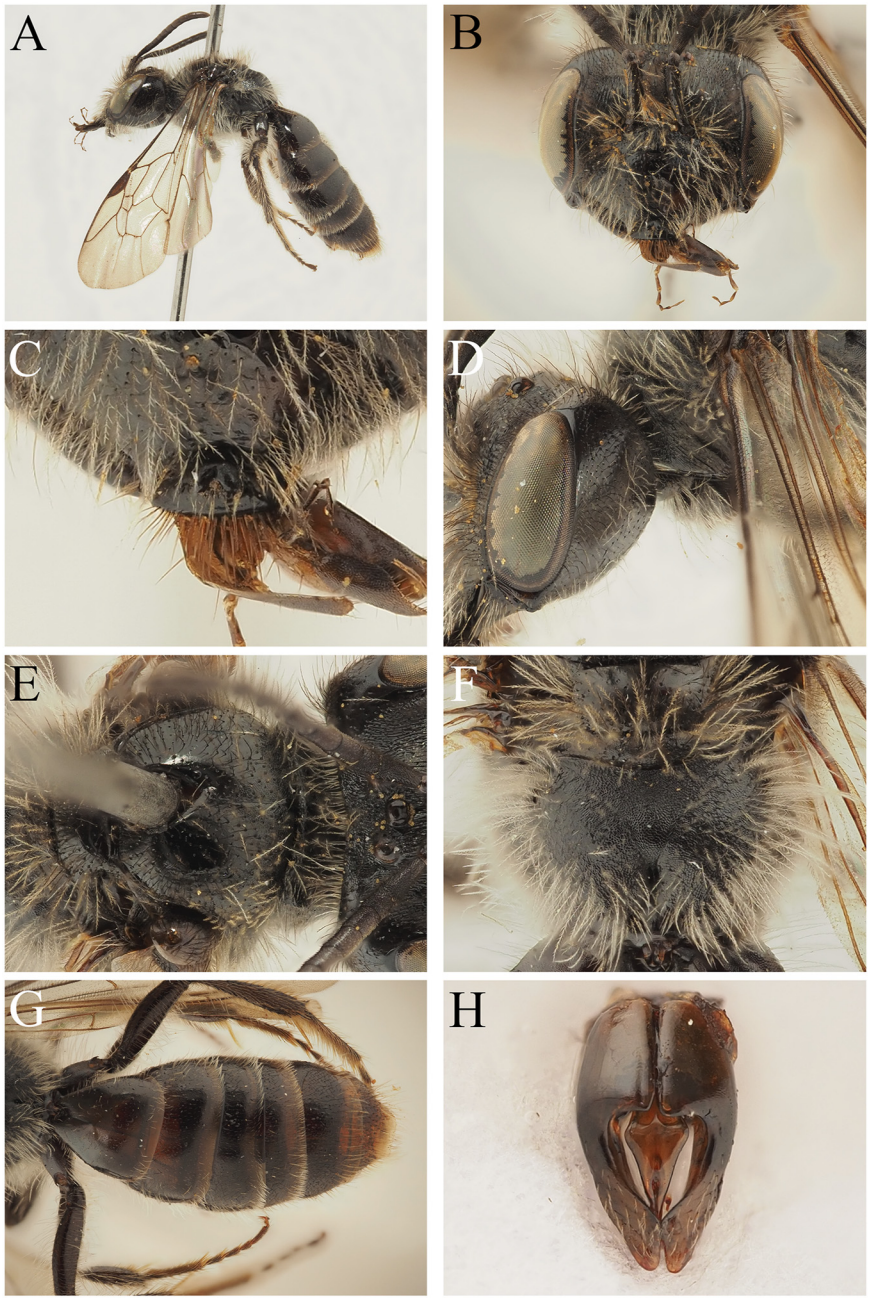

Fig. 57. Andrena (*Margandrena*) *maxillaris* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Process of labrum, frontal view; D. Gena, lateral view; E. Scutum, dorsal view; F. Propodeum, dorsal view; G. Terga, dorsal view; H. Gential capsule, dorsal view

separated due to the very short or linear malar space (Fig. 57D; in *A. morosa* with the malar space distinctly longer, approaching the the breadth of the flagellum, Fig. 16B), the relatively shorter ocelloccipital distance equalling 2 times the diameter of a lateral ocellus (Fig. 57E; in *A. morosa* with the ocelloccipital distance equalling 3 times the diameter of a lateral ocellus, Fig. 16D), by the smooth and shining scutum and scutellum (Fig. 57E; in *A. morosa* with the scutum shagreened to finely microreticulate over the majority of its surface, Fig. 16D), with the propodeal triangle broad with its internal surface with fine granular microreticulation (Fig. 57F; in *A. morosa* with the propodeal triangle narrow and with clearl raised rugae in its basal ½, Fig. 16E), and the clypeus with a broad and poorly-defined longitudinal impression medially, surface thus appearing roughly flattened (in *A. morosa* with the clypeus evenly domed). From the limited number of available specimens, *A. maxillaris* appears to have a more easterly distribution relative to *A. morosa*, but both species seem to be present in central Nepal.

Etymology. The Latin adjective in the nominative form derived from the Latin *maxilla* (jawbone or jaw), i.e. relating to the jaw. This is in reference to the short malar space of this species relative to *A. morosa*.

Distribution. Nepal and India (Meghalaya).

Andrena (*Micrandrena*) *stiletto* spec. nov.

https://zoobank.org/890FCE35-C955-47D1-8F45-75706C40FA67

Figure 58.

HOLOTYPE: UZBEKISTAN • 1♀; Aktaš [Aktash], Taškent env. [Tashkent]; 1,100–1,500 m a.s.l.; 28 Apr. 1988; J. Halada leg.; OÖLM.

Description. Female. Body length: 8 mm (Fig. 58A). *Head:* Dark, 1.1 times wider than long (Fig. 58B). Clypeus broadly flattened, medially with two slightly depressed areas adjacent to longitudinal midline, surface thus appearing uneven. Clypeal surface smooth and polished over majority of area, with fine granular shagreen basally and laterally; surface irregularly punctate with punctures of various sizes, punctures separated by 0.5–2 puncture diameters. Process of labrum broadly triangular-rounded, 2 times wider than long (Fig. 58C). Gena slightly exceeding width of compound eye; ocelloccipital distance 0.25 times diameter of lateral ocellus. Foveae dorsally occupying ¾ space between compound eye and lateral ocellus, very strongly and abruptly narrowed ventrally, linear over ventral ¾ of length, separated from inner margin by distance equal to own diameter, extending below lower margin of antennal insertions; foveae filled with whitish to light brownish hairs. Antennae dark basally, A7–12 ventrally slightly lightened by presence of orange scales; A3 slightly exceeding A4+5, much shorter than A4+5+6.

Mesosoma: Scutum and scutellum with fine granular shagreen, weakly shining, surface regularly punctate, punctures separated by 1–2 puncture diameters, punctures clearly visible against underlying sculpture (Fig. 58D). Pronotum predominantly rounded with slight hint of beginnings of humeral angle dorsolaterally. Mesepisternum with fine granular microreticulation, weakly shining. Dorsolateral parts of propodeum microreticulate overlain by sparse network of finely raised rugosity, surface dull. Propodeal triangle laterally delineated by raised carinae, internal surface entirely covered with dense network of raised rugae (Fig. 58E). Mesepisternum, scutum, and scutellum with moderately long white finely plumose hairs, none equalling length of scape.

Fig. 58. Andrena (*Micrandrena*) *stiletto* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Process of labrum, frontal view; D. Scutum, dorsal view; E. Propodeum, dorsal view; F. Terga, dorsal view

Propodeal corbicula incomplete, composed of whitish plumose hairs, internal surface with long white simple hairs. Legs dark, apical tarsal segments slightly lightened brownish, pubescence light brown to whitish. Flocculus complete, composed of white plumose hairs; femoral and tibial scopae

composed of simple white hairs. Hind tarsal claws with strong inner tooth widely separated from apical tooth. Wings hyaline, stigma and venation orange, nervulus interstitial.

Metasoma: Tergal discs dark, marginal areas with rims lightened hyaline white-yellow, becoming narrowly brown medially (Fig. 58F). Marginal areas of T2–4 weakly depressed. Terga finely shagreened, shining, irregularly, finely, and obscurely punctate, punctures separated by 2–3 puncture diameters, T2 appearing almost impunctate. Tergal discs covered with sparse short pale hairs, not obscuring underlying surface; T2–4 with long apical white hairbands, complete, obscuring underlying surface when dense, extending beyond margin of terga and far onto disc of following segment. Apical fringe of T5 and hairs flanking pygidial plate golden-orange medially, fringe of T5 becoming white laterally. Pygidial plate narrowly triangular, surface slightly domed, featureless.

Male. Unknown.

Diagnosis. *Andrena stiletto* can be recognised as a *Micrandrena* due to the small body size, predominantly dark integument, rugose propodeal triangle (Fig. 58E), and hind tibial claws with a strong inner tooth. Surprisingly, it shows facial foveae which are extremely narrow in their lower ¾, becoming a narrow furrow separated from the inner margin of the compound eyes by a distance equal to their width (Fig. 58B). This character of extremely narrow or slit-like facial foveae is characteristic of the *longibarbis*-group (former subgenus *Distandrena* Warncke, 1968) which is now known to be nested within a broad *Micrandrena* concept (Pisanty et al. 2022b). However, members of this group show the propodeal triangle finely shagreened and more or less smooth, without the presence of rugae. The clearly rugose propodeal triangle of *A. stiletto* hence allows instant separation. More broadly, the *longibarbis*-group species show a strong distributional bias to the Mediterranean basin. Members of the group reach eastwards to Greece (*A. distinguenda* Schenck, 1871) or the southern Levant in Israel and Jordan (e.g. *A. longibarbis* Pérez, 1895, *A. govinda* Warncke, 1974, Pisanty et al. 2022a, Pisanty & Wood in prep.). Given this distribution, *A. stiletto* can instantly be recognised within the Central Asian *Micrandrena* fauna by these extremely narrow foveae.

Morphologically, in possessing a flattened clypeus and a very short ocelloccipital distance (almost linear, at most ¼ the diameter of a lateral ocellus), *A. stiletto* is closest to the *A. mariana* species complex which is found in Iberia, Sicily, and North Africa to the southern Levant (Gusenleitner & Schwarz 2002, Wood 2023a). Apart from the instantly discriminating character of the rugose propodeal triangle, as the clypeus is polished over the majority of its surface, with only a narrow shagreened section basally and laterally (excluding species with abundant shagreen covering at least the basal ½ of the clypeus such as *A. mica* Warncke, 1974 and *A. alma* Warncke 1975), the tergal margins are not broadly lightened hyaline-orange (as in *A. mariana* s. str.), and the scutum is clearly and abundantly punctate (Fig. 58D, with scutal punctures obscure and fading into underlying sculpture in all other members), *A. stiletto* can be recognised as distinct from members of the *mariana*-group of species.

Etymology. From the Italian word *stiletto* for a very sharp and thin dagger derived from the Latin *stilus* (a thin pointed writing instrument) in reference to the extremely narrow facial foveae. It is a noun in apposition.

Distribution. Uzbekistan.

Andrena (*Micrandrena*) *yazdi* spec. nov.

https://zoobank.org/A9C5C2EF-EDE5-4A6B-BE30-18BBD56FB827

Figure 59.

HOLOTYPE: IRAN • 1♀; Yazd, Khezr abad zorband; 31.8672°N, 54.1060°E; 1,844 m a.s.l.; 21 Mar. 2021; S. San leg.; OÖLM. BOLD accession number: WPATW1176-23.

Description. Female. Body length: 7 mm (Fig. 59A). *Head:* Dark, 1.25 times wider than long (Fig. 59B). Clypeus domed, polished and shining over majority of area, narrowly shagreened basally and laterally; surface densely punctate, punctures separated by <0.5–0.5(1) puncture diameters with exception of impunctate longitudinal midline. Process of labrum rounded-trapezoidal, slightly broader than long, surface shining. Gena exceeding width of compound eye; ocelloccipital distance subequal to diameter of lateral ocellus. Foveae dorsally occupying slightly <½ space between compound eye and lateral ocellus, slightly narrowed ventrally, extending slightly below lower level of antennal insertions; foveae filled with brown hairs. Antennae basally brownish, A5–12 ventrally lightened by presence of orange scales; A3 equalling A4+5.

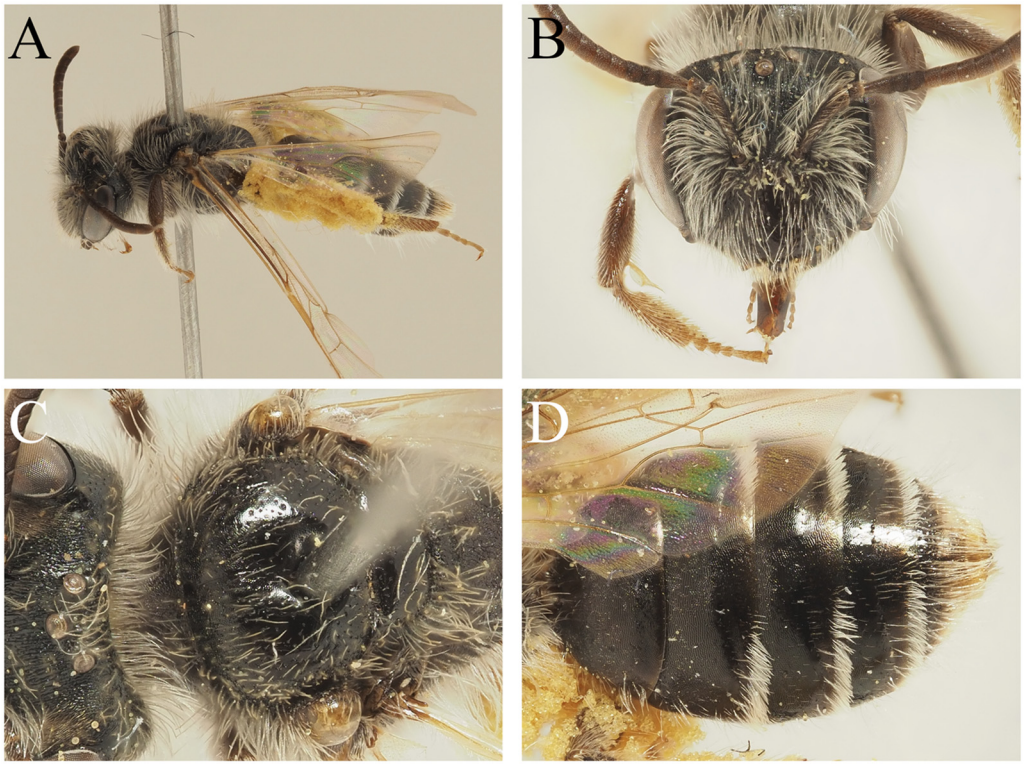

Fig. 59. Andrena (*Micrandrena*) *yazdi* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view

Mesosoma: Scutum shagreened, sculpture strongest along anterior margin, here weakly shining, medially and posteriorly sculpture very fine, surface therefore almost polished and shining; irregularly punctured, punctures separated by 0.5–3 puncture diameters (Fig. 59C). Scutellum entirely polished and shining, more irregularly punctate, punctures separated by 0.5–4 puncture diameters. Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum with microreticulation overlain by sparse network of finely raised rugosity, surface dull. Propodeal triangle laterally delineated by very fine slightly raised carinae, internal surface with network of finely raised rugae. Mesepisternum with whitish finely plumose hairs, not equalling length of scape, hairs becoming slightly shorter on scutum and scutellum. Propodeal corbicula incomplete, composed of whitish plumose hairs, internal surface with white simple hairs. Legs brownish, tarsi weakly but distinctly lightened orange, at least apically, pubescence light brownish to whitish. Flocculus complete, composed of white plumose hairs; femoral and tibial scopae composed of simple white hairs. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation bright orange, nervulus interstitial.

Metasoma: Tergal discs dark, marginal areas with apical rim narrowly lightened hyaline-yellow, remaining marginal areas light brownish, becoming dark basally (Fig. 59D). Marginal areas of T2–4 slightly depressed, most clearly on T4. Terga finely sculptured, disc of T1 with microsculpture forming clear latitudinal wrinkles, sculpture becoming weaker on subsequent terga, wrinkles completely absent from disc of T4, here finely shagreened and shining; all marginal areas with sculpture comparatively weaker. Terga essentially impunctate, with occasional scattered fine hair-bearing punctures. Tergal discs with very scattered short white hairs; T2–4 with dense strongly contrasting apical white hair bands, interrupted on T2–3, complete on T4, on T2–3 hairbands angled 45° relative to apical margin of each tergum; hairbands extending slightly beyond apical rim onto subsequent tergum. Apical fringe of T5 and hairs flanking pygidial plate golden-orange medially, fringe of T5 becoming white laterally. Pygidial plate rounded-triangular, surface dull.

Male. Unknown.

Diagnosis. *Andrena yazdi* can be recognised as a *Micrandrena* due to the small body size, predominantly dark integument, rugose propodeal triangle, and hind tibial claws with am inner tooth. It has foveae that only slightly narrow ventrally, placing it amongst the large group of "typical" *Micrandrena* (such as *A. minutula* (Kirby, 1802)). Diagnosis of *Micrandrena* is always tricky due to the large number of species and the large number of characters which must be held in mind concurrently to exclude possibilities via incompatible character combinations. *Andrena yazdi* shows a unique combination of characters, specifically a predominantly shiny clypeus which is domed and with a slightly elevated longitudinal midline (Fig. 59B); the scutum has very fine shagreen and is more or less polished and shining, with the scutellum completely polished and shining (Fig. 59C); the terga are almost impunctate, T1 with microsculpture forming clear latitudinal wrinkles, this sculpture becoming weaker on subsequent terga, on T4 almost completely absent (Fig. 59D); T2–4 with apical hair fringes of dense and short white hairs which are angled 45° relative to the apical margin of each tergum, hairbands interrupted on T2–3, almost complete on T4; and wing venation (including stigma) bright orange, with the nervulus interstitial.

This unusual combination makes it very difficult to find comparative Palaearctic *Micrandrena*. The almost impunctate terga combined with 45° angled apical hairbands and a clypeus shining between the punctures is reminiscent of *A. tringa* Warncke, 1973 (distributed around

the Black Sea and mountains of the Levant), but this species has the scutum clearly shagreened and dull, with punctures separated by 1 puncture diameters (in *A. yazdi* scutum almost polished and shining, with punctures irregular, separated by 0.5–3 puncture diameters). Most Turkish and Iranian *Micrandrena* have either the clypeus dull, or the terga at least partly with conspicuous punctures, or the scutum dull. It could perhaps be compared to *A. virgata* Warncke, 1975 (Turkey and Armenia) due to the domed and largely polished clypeus, largely polished and shining scutum and scutellum, and more or less impunctate tergal discs with marginal areas slightly shining. However, *A. yazdi* can be separated by the more irregular punctation of the scutum, punctures separated by 0.5–3 puncture diameters (in *A. virgata* with punctures more regular, separated by 0.5–1 puncture diameters), and terga completely lacking lateral hairbands.

Finally, in the more or less impunctate terga with lateral white hairbands combined with a domed and largely shining clypeus places *A. yazdi* moderately close to *A. extenuata* Wood & Monfared, 2022 which is common around Yazd. *Andrena yazdi* can be quickly separated however due to its predominantly polished and shining scutum (in *A. extenuata* with the scutum covered with granular shagreen, only weakly shining) and facial foveae which only slightly narrow ventrally, these not narrower than the width of a flagellum (in *A. extenuata* with the facial foveae strongly narrowed ventrally, clearly narrower than the width of a flagellum).

Etymology. Taken from the province of Yazd in central Iran. "Yazdi" is a common surname in Persian indicating a person from the city of Yazd.

Remarks. The available barcode (BOLD accession number: WPATW1176-23) actually falls closest to North American *Micrandrena*, 8.29% different from *Andrena illinoiensis* Robertson, 1891 (BEECF662-11) and 8.91% different from *Andrena nigrae* Robertson, 1905 (ANDPH006-21). The often more or less impunctate terga in North American *Micrandrena* offer an immediate comparison, but any further association requires detailed study and more robust molecular investigation.

Distribution. Iran (Yazd).

Andrena (*Nobandrena*) *dubitzkyi* spec. nov.

https://zoobank.org/73908B14-3443-4651-B303-34E16A934ACF

Figures 60 and 61.

HOLOTYPE: KYRGYZSTAN • 1♂; Bischkek, Tschon-Aryk [Chon Aryk]; 23 May 1998; W. Dolin leg.; ZSM.

PARATYPES: KYRGYZSTAN • 1♂, 1#f; Bischkek, Tschon-Aryk [Chon Aryk]; 23 May 1998; W. Dolin leg.; OÖLM • 1♂; Alai, Gul'tscha [Gulcha]; 12 May 1965; W.G. Dolin leg.; ZSM • 2♀; Alai, Gul'tscha [Gulcha]; 11 Jun. 1965; W.G. Dolin leg.; ZSM • 1♀; Ala-Tau-Gebirge, Umgebung von Tschon-Aryk (12 km S Bischkek); 14 May 1995; W. Dolin leg.; ZSM • 1♀; Frunze env [Bishkek] (10 km) Čon Arik; 24–28 May 1980; Z. Pádr leg.; OÖLM • 1♀; Jalal-Abad, NE des Ortes Torkent; 1,080 m a.s.l.; 24–25 May 2008; E. &. J. Hüttinger leg.; TJWC; **TAJIKISTAN** • 1♀; Гармский р-н [Garmsky rayon = Rasht], Ганишоу [=Ғанишоб, G'anishob]; 17 Jun. 1987; ZSM.

Description. Female. Body length: 9–12 mm (Fig. 60A). *Head:* Dark, 1.15 times wider than long (Fig. 60B). Clypeus weakly domed, more or less flattened medially, surface with scattered fine

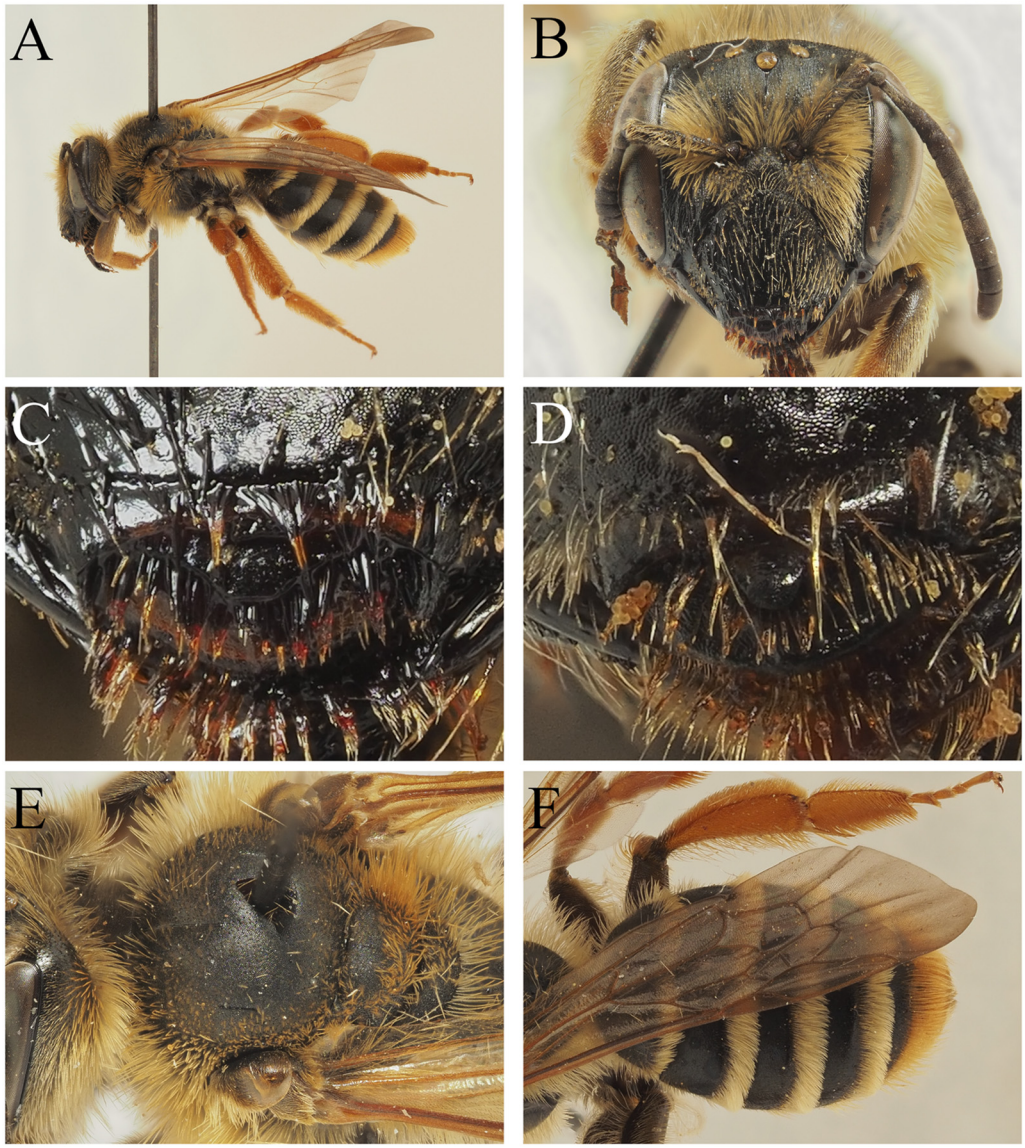

Fig. 60. Andrena (*Nobandrena*) *dubitzkyi* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Process of labrum, frontal view; E. Scutum, dorsal view; F. Terga, dorsal view. *Andrena* (*Nobandrena*) *acutilabris* Morawitz, 1876 female. D. Process of labrum, frontal view

punctures, punctures separated by 2–4 puncture diameters, underlying surface with uniform granular shagreen, weakly shining. Process of labrum broadly triangular, short, 3 times wider than long, anterior margin narrowly truncate, thus technically trapezoidal (Fig. 60C). Gena subequal to width of compound eye; ocelloccipital distance 0.5 times diameter of lateral ocellus.

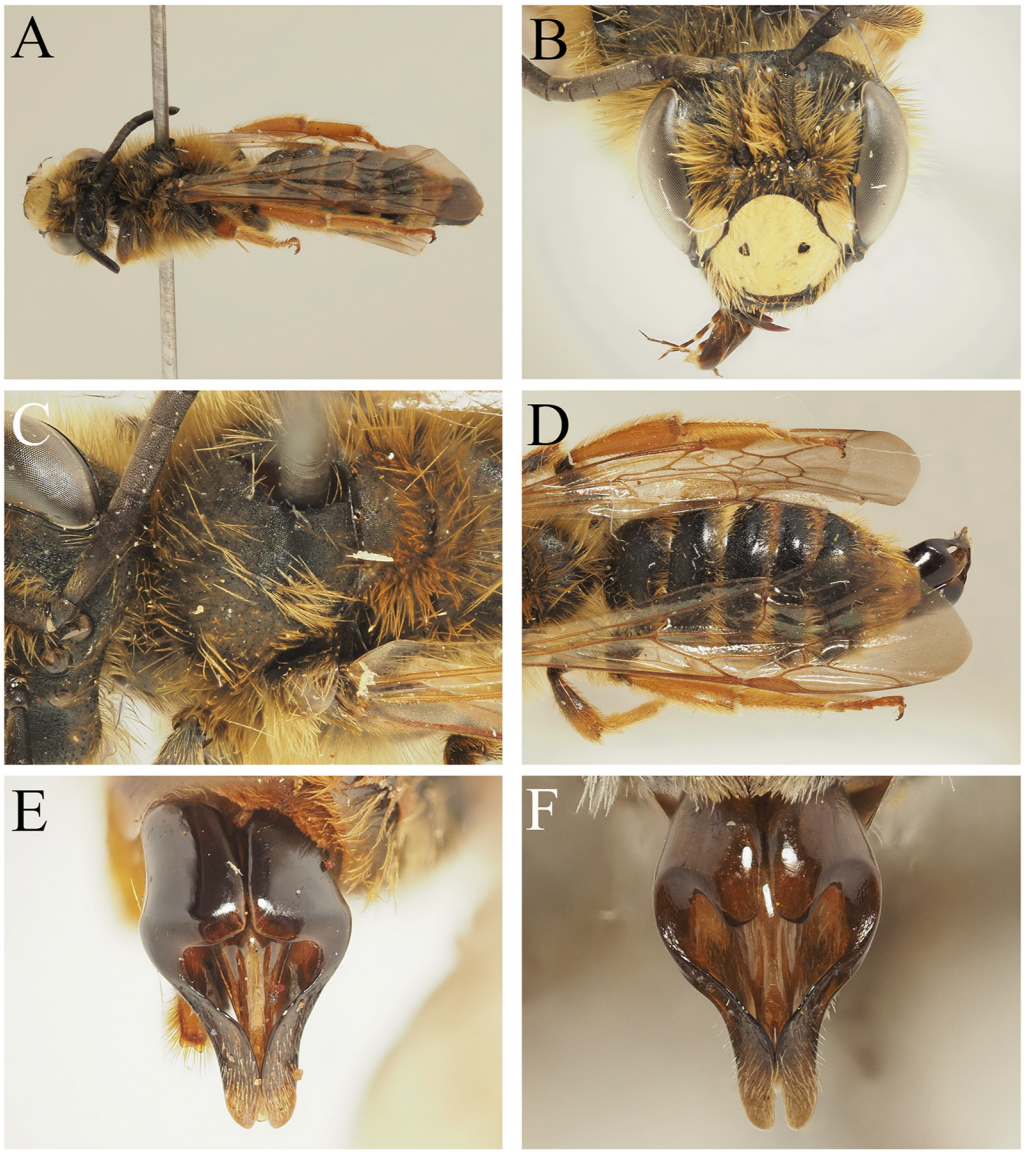

Fig. 61. Andrena (*Nobandrena*) *dubitzkyi* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view; E. Gential capsule, dorsal view. *Andrena* (*Nobandrena*) *acutilabris* Morawitz, 1876 male. F. Gential capsule, dorsal view

Foveae dorsally occupying ⅔ of space between compound eye and lateral ocellus, inner margin separated from lateral ocellus by distance slightly greater than its diameter, foveae ventrally slightly narrowing, extending to lower level of antennal insertions; foveae filled with light brown

hairs. Head covered with light brown hairs, none equalling length of scape. Antennae dark, A3 exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum finely shagreened, dull, shallowly punctate, punctures separated by 0.5–2 puncture diameters (Fig. 60E). Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum with fine granular microreticulation, weakly shining, overlain by network of reticulation resembling areolate punctures. Propodeal triangle lacking lateral carinae, internal surface covered with fine granular shagreen. Mesepisternum with light brown densely plumose hair, hairs not equalling length of scale, becoming shorter on scutum and scutellum. Propodeal corbicula incomplete, completely lacking anterior fringe, dorsal fringe composed of finely plumose golden-brown hairs, internal surface with abundant simple long hairs. Legs basally dark, tarsi and hind tibiae completely orange, pubescence golden-brown. Flocculus complete, composed of dirty-brown plumose hairs; femoral and tibial scopae composed of simple golden hairs. Hind tarsal claws with strong inner tooth, strongly separated from apical tooth. Wings hyaline, stigma and venation orange, nervulus weakly to moderately postfurcal.

Metasoma: Tergal discs dark, marginal areas lightened orange-brown hyaline, distinctly depressed (Fig. 60F). Tergal discs finely shagreened, weakly shining, with obscure and shallow punctures, these almost disappearing into the underlying sculpture, terga thus appearing more or less impunctate. Tergal discs with scattered short pale hairs, T1–4 with strong apical hair-bands, these thick and complete in fresh specimens, completely obscuring underlying integument. Apical fringe of T5 and hairs flanking pygidial plate golden-orange. Pygidial plate narrowly triangular with truncate apex, surface dull and featureless.

Male. Body length: 10.5–11 mm (Fig. 61A). *Head:* Dark, 1.1 times wider than long (Fig. 61B). Clypeus entirely yellow-marked with exception of two black mediolateral spots, yellow markings extending onto lower paraocular areas, almost reaching base of clypeus. Surface of clypeus finely shagreened, shining, shallowly punctate, punctures separated by 0.5–2 puncture diameters. Process of labrum trapezoidal, 3 times wider than long, anterior margin truncate. Gena equalling width of compound eye; ocelloccipital distance equalling diameter of lateral ocellus. Head covered with golden-brown hairs, none equalling length of scape. Antennae dark, A3 exceeding A4+5, shorter than A4+5+6.

Mesosoma: Mesosoma structurally as in female (Fig. 61C), covered with long golden-brown finely plumose hairs, longest equalling length of scape. Legs basally dark, tarsi and fore and mid tibiae orange, hind tibiae predominantly orange, pubescence light orange-brown. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation orange, nervulus interstitial to slightly postfurcal.

Metasoma: Tergal discs dark, marginal areas lightened hyaline-yellow-brown, distinctly depressed (Fig. 61D). Tergal discs finely shagreened, sculpture strongest on basal terga, becoming weaker apically, discs weakly to strongly shining; surface shallowly punctate, punctures separated by 1–2 puncture diameters. Tergal discs with abundant scattered short pale hairs, T2–4 with apical hair fringes, complete in fresh specimens, obscuring underlying surface. T6–7 with fringe of golden hairs. S8 short, apical margin slightly emarginate, ventral surface with short golden hairs. Genital capsule with gonocoxae apically truncate, not produced into apical teeth (Fig. 61E). Overall capsule somewhat broadened medially, gonostyli converging medially, outer margins curved, apically narrowing, slightly flattened. Penis valves moderately broad, with lateral flattened extensions occupying over ½ space between gonostyli, penis valves converging apically.

Diagnosis. *Andrena dubitzkyi* can be recognised as a *Nobandrena* due to the combination of relatively long and poorly defined propodeal triangle which has its internal surface with granular shagreen, terga shagreened and obscurely punctate, with the marginal areas weakly but distinctly depressed, terga with strong apical hairbands (Fig. 60F), scutum and scutellum largely dull and obscurely punctate (Fig. 60E), male with clypeus and parts of the lower paraocular areas yellow-marked (Fig. 61B), head somewhat elongate, A3 slightly exceeding A4+5, and lack of other distinctive characters (pronotum without humeral angle, scopae simple, posterior femur without modifications, hind tibial spurs parallel-sided).

Andrena dubitzkyi is closest to *A. acutilabris* Morawitz, 1876 which is found in Turkmenistan, Uzbekistan, Tajikistan, and Kazakhstan (Astafurova et al. 2022), this being the only *Nobandrena* currently known from this region with the exception of *A. nobilis* Morawitz, 1873 and *A. anatolica* Alfken, 1935 which just reach the Kopet-Dag mountains on the border between Iran and Turkmenistan (Gusenleitner & Schwarz 2002 and *novel data*, respectively). *Andrena dubitzkyi* can be separated in the female sex due to the process of the labrum which is trapezoidal, 3 times wider than long with the apical margin straight but very narrow (Fig. 60C; in *A. acutilabris* with the process of the labrum narrowly triangular, essentially as long as wide, Fig. 60D; see also Astafurova et al. 2022: 109), body pubescence including tergal hairbands bright golden-brown (Fig. 60A; pubescence greyish to whitish in *A. acutilabris*), tarsi and hind tibiae orange (legs dark in *A. acutilabris*), and head relatively elongate, 1.1–1.15 times wider than long (head relatively shorter, 1.3 times wider than long in *A. acutilabris*). In the male sex, separation can be made due to the lower paraocular areas with yellow markings that extend dorsally almost to the level of the base of the clypeus (Fig. 61B; in *A. acutilabris* with the lower paraocular areas only slightly marked with yellow), the tarsi and hind tibiae orange (legs dark in *A. acutilabris*), and genital capsule with gonocoxae abruptly truncate and capsule medially strongly broadened with relatively wide penis valves (Fig. 61E; in *A. acutilabris* with the genital capsule more elongate, the gonocoxae produced into rounded teeth, with the penis valves comparatively more narrow, Fig. 61F).

Note, one female specimen of *A. dubitzkyi* (from Tajikistan) was noticeably smaller than the others (9 mm in length) and was identified as *A. anatolica* by Osytshnjuk. However, based on the morphological characters presented here it is *A. dubitzkyi*. More individuals from Tajikistan are required to understand if this is just an aberrantly small specimen.

Etymology. Named after Andreas Dubitzky who worked on *Andrena* taxonomy during his time at the ZSM (e.g. Dubitzky 2006), including drawing informed and prescient conclusions on phylogenetic relationships within Andrenini based on morphology (Dubitzky et al. 2010).

Distribution. Kyrgyzstan and Tajikistan.

Other material examined (*Andrena anatolica*) **TURKMENISTAN** • 1♀; Bachardan [Baharly]; 16 May 1975; W. Grünwaldt leg.; ZSM • 1♂; Badchyz [Badhyz State Nature Reserve]; 5 Apr. 1976; W. Grünwaldt leg.; W. Grünwaldt det.; ZSM.

Andrena (*Simandrena*) *patera* spec. nov.

https://zoobank.org/317B7001-0A64-4CA3-9598-7D64123DBCEA

Figure 62.

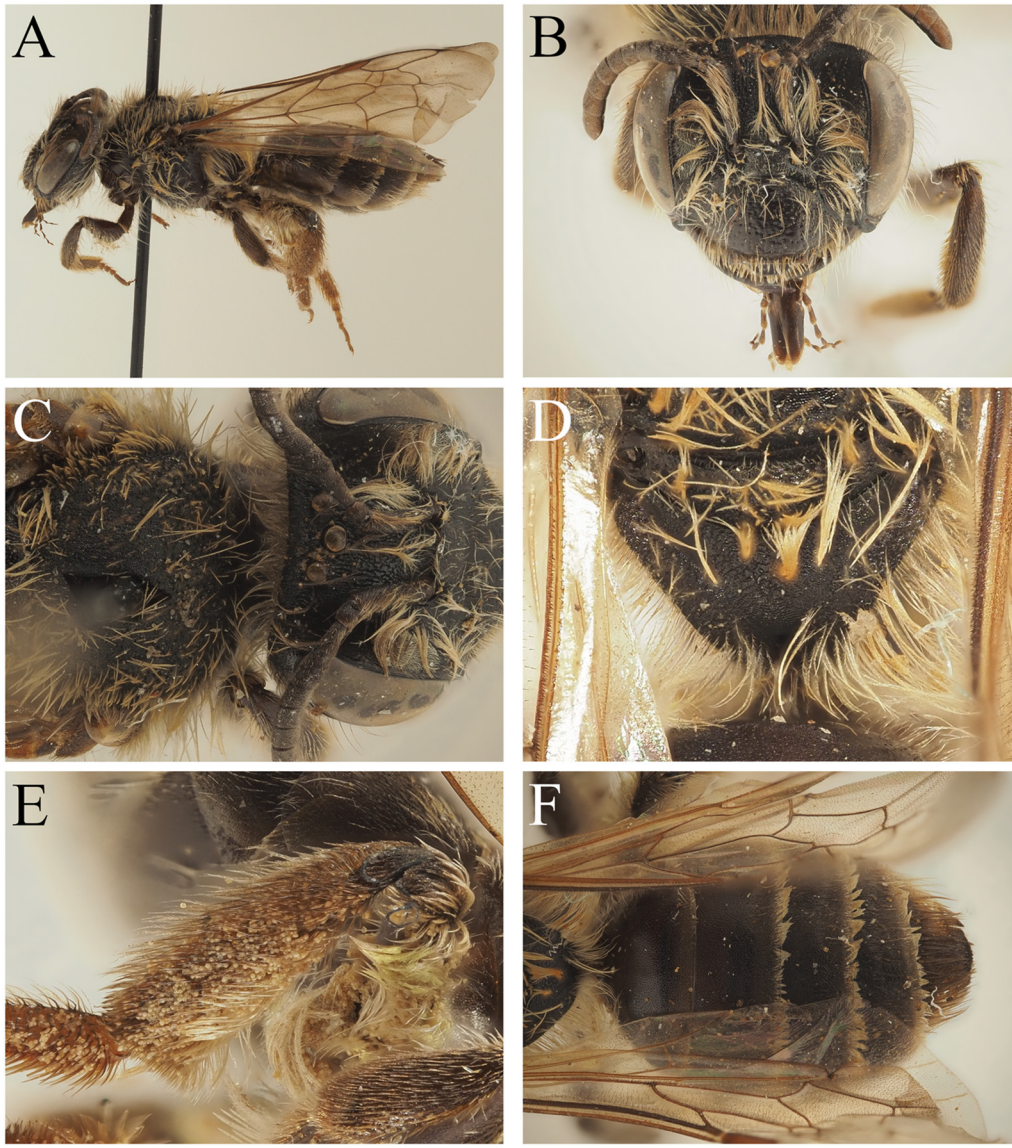

Fig. 62. Andrena (*Simandrena*) *patera* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Propodeum, dorsal view; E. Hind tibia, lateral view; F. Terga, dorsal view

HOLOTYPE: PAKISTAN • 1♀; Hazara, Kaghan Valley, Kaghan; 2,300 m a.s.l.; 34.7820°N, 73.5265°E; 12–13 May 1978; C. Holzschuh leg.; OÖLM.

PARATYPE: PAKISTAN • 1♀; Hazara, Kaghan Valley, Kaghan; 2,300 m a.s.l.; 2,300 m a.s.l.; 34.7820°N, 73.5265°E; 12–13 May 1978; C. Holzschuh leg.; OÖLM.

Description. Female. Body length: 9–10 mm (Fig. 62A). *Head:* Dark, 1.2 times wider than long (Fig. 62B). Clypeus more or less domed but weakly flattened medially, surface very irregularly punctate, punctures separated by 0.5–2 puncture diameters, with weak longitudinal impunctate midline present; underlying surface microreticulate and dull laterally and basally, with weak latitudinal wrinkles, becoming finely shagreened and shining medially and anteriorly. Process of labrum more or less rounded-semicircular, 2.5 times wider than long, surface shining. Supraclypeal area rectangular, 1.5 times wider than long, dorsolateral corners forming 90° angles, distinctly separated from underlying surface, slightly winged. Gena slightly exceeding width of compound eye; ocelloccipital distance slightly exceeding diameter of lateral ocellus. Foveae dorsally broad, occupying ¾ of space between compound eye and lateral ocellus, separated from lateral ocellus by distance equalling diameter of lateral ocellus; foveae narrowing ventrally, ventrally strongly extending beyond lower margin of antennal insertions by distance slightly exceeding diameter of antennal insertion; foveae dorsally filled with dark brown hairs, hairs becoming pale brown ventrally. Frons covered with dense network of rugose-areolate longitudinal carinae. Head covered with long light brown hairs, becoming intermixed with dark brown hairs on vertex, longest hairs not equalling length of scape. Antennae basally dark, A5–12 ventrally lightened by presence of orange scales; A3 exceeding length of A4, shorter than A4+5.

Mesosoma: Scutum with rough microsculpture, surface completely dull, irregularly and shallowly punctate, punctures separated by <0.5–2 puncture diameters, disappearing into underlying sculpture (Fig. 62C). Punctures in anterior ¼ of scutum with raised edges (crater punctures), edges almost merging together to form weak wavy network of latitudinal wrinkles. Scutellum with weaker sculpture, shagreened, weakly shining medially, irregularly punctate with punctures of various sizes, punctures separated by <0.5–2 puncture diameters. Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum microreticulate overlain by network of raised rugosity, surface dull; propodeal triangle laterally delineated by fine carinae, internal surface with network of raised rugae forming network of wrinkles (Fig. 62D). Mesepisternum with pale to buff finely plumose hairs, these becoming light brown and slightly more thickly plumose on scutum and scutellum, almost subsquamous. Propodeal corbicula complete, complete, dorsal and anterior fringes composed of long finely plumose light to dark brown hairs, internal surface finely shagreened and shining, glabrous. Legs dark brown, apical tarsal segments of hind leg lightened obscurely orange, pubescence dark brown. Flocculus complete, composed of long buff plumose hairs; femoral composed of whitish simple hairs. Tibial scopae composed of simple hairs, bicoloured, hairs ventrally white, dorsally dark brown (Fig. 62E). Hind tarsal claws with inner tooth. Wings hyaline, stigma orange-brown, venation dark orange, nervulus interstitial to weakly antefurcal.

Metasoma: Tergal discs dark, marginal areas slightly lightened yellow-brown hyaline, apical rim palest (Fig. 62F). Tergal discs uniformly finely and densely punctate, punctures separated by 0.5 puncture diameters, extending onto marginal areas; punctures sparser only laterally on T1, here separated by 2–3 puncture diameters; underlying surface finely shagreened, weakly shining to shining. T1 apicolaterally with weak hair fringes, not forming clear hairband; T2–4 apically with dense apical hairbands of yellowish hairs, hairbands narrow, only slightly extending beyond the apex of apical rim, obscuring underlying surface. Apical fringe of T5 and hairs flanking the pygidial plate dark brown. Pygidial plate rounded-triangular, surface dull.

Male. Unknown.

Diagonsis. *Andrena patera* can be recognised as a *Simandrena* due to the complete propodeal corbicula (possessing a dorsal and anterior fringe) with the internal surface (the lateral faces of the propodeum) glabrous. Due to the finely and densely punctate terga (Fig. 62F, interspaces shagreened and weakly shining, not polished), broad facial foveae (occupying ¾ of space between the compound eye and lateral ocellus), and apical tergal hairbands, it is similar to several members of the subgenus from Central Asia (*A. quadrifasciata* Morawitz, 1876, *A. sarta* Morawitz, 1876, and *A. iliana* Shebl & Tadauchi, 2011) and the Himalayas (*A. tungnatha* Wood & Gautam, 2024 and *A. gorkhana* Tadauchi & Matsumura, 2007) (see Gautam et al. 2024 for distributions).

Andrena patera can be recognised due to the combination of narrow tergal hairbands which barely extend onto the base of the following tergum, frons with rugose-areolate striations, the scutum has strong microsculpture and appears dull, and the anterior portion of the scutum which is so strongly sculptured that the punctures have raised rims which merge together to form an almost wavy network of latitudinal wrinkles (Fig. 62C). In Central Asian species, the tergal hairbands are compararively long and extending onto the following tergum for approximately ½ their length, the frons does not show a pattern of rugose-areolate striatinos, and the scutum is at least partly shining and without wavy latitudinal wrinkes in the anterior portion.

For Himalayan species, *A. patera* can be separated using the same criteria; *A. gorkhana* shows a scutum which is shagreened and weakly shining, punctures in the anterior portion without raised rims. Separation from *A. tungnatha* (northern India in Himachal Pradesh and Uttarakhand, newly reported from northern Pakistan) which shows a dull scutum can be made due to the predominantly dark hind tibiae with bicoloured tibial scopae, dark brown dorsally and white ventrally (Fig. 62E; in *A. tungnatha* with the hind tibiae orange and with orange-brown tibial scopal hairs, scopae not bicoloured), sculpture of the anterior portion of the scutum (in *A. tungnatha* with the scutum dull but without the punctures in the anterior portion showing raised rims forming latitudinal wrinkles), facial foveae strongly extending below lower margin of antennal insertions by distance slightly exceeding the diameter of an antennal insertion (in *A. tungnatha* with the foveae only slightly extending ventrally beyond the lower margin of the antennal insertions), wing venation dark orange-brown (in *A. tungnatha* with wing venation bright orange), and the process of the labrum with surface shining (in *A. tungnatha* with the surface of the process of the labrum with obscure transverse striations).

Additional material examined (*Andrena tungnatha*). **INDIA** • 2♂, 1♀; Punjab, Bajnath [Baijnath, Himachal Pradesh]; 3,000 ft a.s.l.; 15 Mar. 1965; S.W.T. Batra leg.; USNM • 1♀; Punjab, Kuku Valley, [Himachal Pradesh]; 4,000 ft a.s.l.; 16 Mar. 1965; S.W.T. Batra leg.; USNM; **PAKISTAN** • 1♀; Murree; 7,500 ft a.s.l.; 1–31 May 1920; Dutt leg.; USMN. See Gautam et al. (2024) for additional examined specimens.

Etymology. From the Latin noun *patera* meaning a broad dish or saucer. The distinctive propodeal scopa of subgenus *Simandrena* is sometimes compared to a basket (e.g. in German, *Körbchen-Sandbiene*, or basket mining bees), and hence a comparison is made here also with a dish. It is a noun in apposition.

Distribution. Pakistan (Khyber Pakhtunkhwa).

Andrena (*Taeniandrena*) *tianshanica* spec. nov.

https://zoobank.org/CD5923D2-A179-4161-9FCD-6E3A43010598

Figures 63 and 64.

HOLOTYPE: KAZAKHSTAN • 1♂; 12 km SE Zhalgyzagash; 44.6958°N, 78.6931°E, 1,322 m a.s.l.; 8 Jun. 2024; C. Schmid-Egger leg.; OÖLM.

PARATYPES: KAZAKHSTAN • 1♀; SE, Dzungarian Alatau, Sargan 19 km SE; 1,322 m a.s.l.; 9 Jun. 2024; C. Schmid-Egger leg.; OÖLM • 1♂; Kazstroj [Kazhtroy, Almaty]; malaise trap; 1,240 m a.s.l.; 21 May – 30 Aug. 2013; O. Nakládal leg.; OÖLM.

Description. Female. Body length: 10.5 mm (Fig. 63A). *Head:* Dark, 1.25 times wider than long (Fig. 63A). Clypeus strongly flattened medially, densely punctate, punctures separated by 0.5 puncture diameters with exception of longitudinal impunctate midline equalling 3 puncture diameters in width; surface shagreened, weakly shining. Process of labrum broadly trapezoidal, 3 times wider than long, apically margin narrowly truncate, slightly emarginate; surface shining, covered with latitudinal wrinkles. Gena equalling width of compound eye; ocelloccipital distance

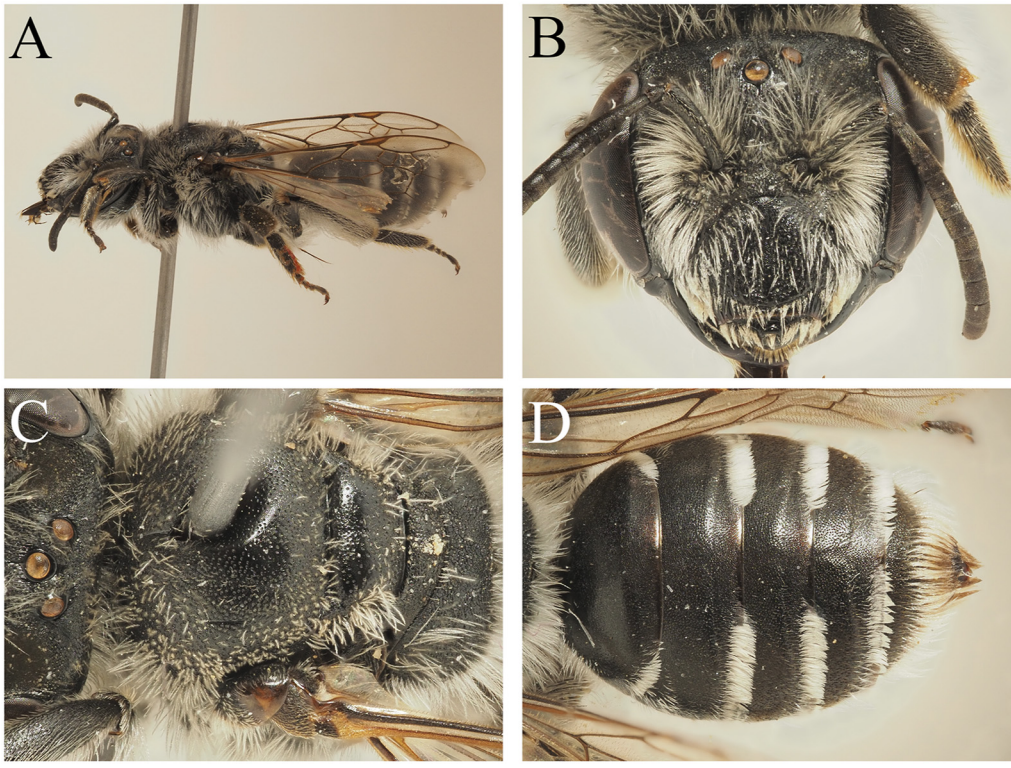

Fig. 63. Andrena (*Taeniandrena*) *tianshanica* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view

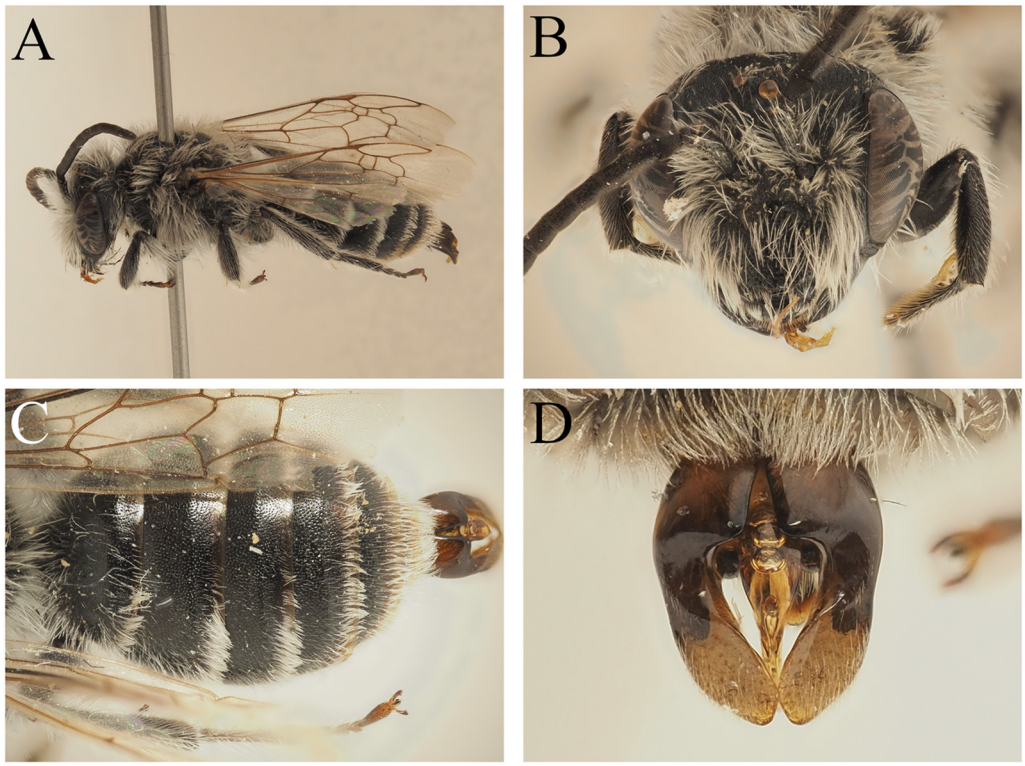

Fig. 64. Andrena (*Taeniandrena*) *tianshanica* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Terga, dorsal view; D. Genital capsule, dorsal view

1.5 times diameter of lateral ocellus. Foveae dorsally occupying ¾ of space between compound eye and lateral ocellus, slightly narrowed below at level of lower margin of antennal insertions; foveae filled with light brown hairs. Head covered with short whitish hairs. Antennae basally dark, A5–12 ventrally lightened by presence of greyish scales; A3 slightly exceeding A4+5, clearly shorter than A4+5+6.

Mesosoma: Scutum densely but somewhat irregularly punctate, punctures touching to separated by 1 puncture diameter over majority of surface; surface sculpture of scutum variable, dull in anterior ½, posteromedially with circular very weakly shagreened area, here almost polished and shining, more sparsely punctate, punctures separated by up to 3 puncture diameters (Fig. 63C). Scutellum shagreened and dull in posterior ½, almost polished and shining in anterior ½, irregularly punctate, punctures separated by <0.5–2 puncture diameters. Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum with granular microreticulation, microreticulation overlain by network of fine raised rugosity, surface dull. Propodeal triangle weakly delineated laterally by carinae, internal surface with irregular network of fine raised rugae, dull; propodeal triangle thus poorly defined. Mesepisternum with whitish plumose hairs, hairs not equalling length of scape, becoming noticeably shorter and more brownish on scutum

and scutellum. Propodeal corbicula incomplete, composed of dense whitish hairs, internal surface with abundant simple long hairs. Legs dark, pubescence whitish to light brownish. Flocculus complete, composed of white plumose hairs; femoral and tibial scopae composed of white simple hairs. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma orange-brown, venation dark orange, nervulus strongly postfurcal.

Metasoma: Tergal discs dark, apical rims of marginal areas narrowly lightened dark brown (Fig. 63D). Tergal discs finely shagreened, weakly shining. Terga punctate; declivity of T1 with punctures shallow, not strongly contrasting underlying sculpture, separated by 1–2 puncture diameters; discs of T2–4 more strongly and deeply punctate, separated by 0.5–1 puncture diameters, contrasting underlying sculpture; punctures extending onto marginal areas, becoming smaller and more obscure. Tergal discs with very short pale hairs, not obscuring underlying surface, margins of T1–4 with narrow apical fringes of dense white hairs, very widely separated on T1, broadly interrupted on T2–3, complete on T4. Apical fringe of T5 and hairs flanking pygidial plate golden-white. Pygidial plate rounded-triangular, medially with raised longitudinal ridge, surface impunctate, dull.

Male. Body length: 9–9.5 mm (Fig. 64A). *Head:* Dark, 1.2 times wider than long (Fig. 64B). Clypeus flattened over majority of area, densely punctate, punctures separated by 0.5 puncture diameters with exception of weakly indicated impunctate longitudinal midline, underlying surface smooth and shining. Process of labrum trapezoidal, 2 times wider than long, anterior margin slightly thickened, emarginate, surface shining. Gena equalling width of compound eye; ocelloccipital distance 2 times diameter of lateral ocellus. Face, gena, vertex, and scape covered with finely plumose white hairs, none equalling length of scape. Antennae dark basally, A4–13 ventrally lightened by presence of grey scales; A3 0.8 times length of A4, A4–13 elongate rectangular, clearly longer than wide.

Mesosoma: Scutum and scutellum structurally as in female. Pronotum rounded. Mesepisternum and propodeum structurally as in female. Mesosoma with long whitish finely plumose hairs, longest equalling length of scape. Legs dark, apical tarsal segments slightly lightened brown, pubescence white. Hind tarsal claws with trong inter tooth. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange-brown, nervulus strongly postfurcal.

Metasoma: Tergal discs dark, marginal areas lightened hyaline-brown (Fig. 64C). Declivity of T1 shagreened and weakly shining, remaining terga with shagreen finer, more or less shining. Terga punctate, on T1 punctures separated by 1–2 puncture diameters, on discs of T2–4 punctures denser, more typically separated by 0.5–1 puncture diameters, punctures extending onto basal ⅔ of marginal areas, their apical ⅓ impunctate. Disc of T1 with long upstanding white hairs, discs of T2–4 with short white hairs, not obscuring underlying surface. T1–5 with apical white hairbands, obscuring underlying surface where fresh, complete on T4–5. S8 columnar, apical margin rounded-truncate, ventral surface covered with dense light brown hairs. Genital capsule compact, gonocoxae with their inner margins gently diverging apically, forming 90° angle at their apexes (Fig. 64D). Gonostyli not contracted basally, maintaining an equal width, with only subtle contraction in outer margin, apexes flattened and spatulate, with inner margin raised. Penis valves basally slightly broadened, occupying ½ space between gonostyli, apically narrowing, with small oval opening medially.

Diagnosis. *Andrena tianshanica* can be recognised as a *Taeniandrena* due to the characteristically flattened clypeus (Fig. 63B) and typical genital capsule with broad flattened gonostyli and

somewhat expanded penis valves (Fig. 64D). It can be placed into the *gelriae*-group of species (see Praz et al. 2022, Wood 2023a, 2024b) due to the long male A4 that is clearly longer than A3 (1.25 times longer) and the genital capsule with the penis valves slightly broadened basally. This group probably has a centre of diversity in Western Europe, extending in the east to Iran (Kerman province) and the Urals, but the eastern range limit of *A. gelriae* van der Vecht, 1927 *sensu lato* across the Eurasian plain is unclear due to the extreme taxonomic difficulty presented by this group and requirement for molecular work in Eastern Europe and beyond. As the genital capsule (Fig. 64D) shows the gonocoxae with inner margins gently diverging apically and forming a 90° angle (as opposed to an acute angle in *A. gelriae* or obtuse angle in *A. intermedia* Thomson, 1870), this places it closest to *A. perpetua* Wood, 2024 from Iran (Kerman). Though differences are small, *A. tianshanica* can be separated due to the clypeus punctation which has most punctures separated by 0.5 puncture diameters (in *A. perpetua* with clypeal punctures slightly sparser, separated by 0.5–1 puncture diameters), longer ocelloccipital distance equalling 2 times the diameter of a lateral ocellus (in *A. perpetua* with the ocelloccipital distance equalling 1.5 times diameter of a lateral ocellus), scutum posteromedially with circular weakly shagreened area that is almost polished and shining, contrasting the remaining dull parts of the scutum (in *A. perpetua* with the scutum more uniformly granularly shagreened and weakly shining, without a noticeable posteromedial circular shining area), scutellum contrastingly shagreened and dull in posterior ½, almost polished and shining in anterior ½ (in *A. perpetua* with the scutellum more uniformly shagreened and weakly shining), and gonostyli which basally remain almost exactly the same width, with only a very subtle impression in their outer margin at the junction with the gonocoxae (in *A. perpetua* with the gonostyli more clearly constricted basally before broadening apically, consequently with a clear impression or kink in the outer margin of the gonostyli where they join the gonocoxae).

From Central Asian *Taeniandrena*, the female can be recognised due to the combination of whitish or pale pubescence of the mesosoma (not reddish-orange as in *A. callopyrrha*, *A. kozlovi*, *A. russula* Lepeletier, 1841, *A. eversmanniana* Osytshnjuk, 1994), pale golden hairs above the hind basitibial plate and in the terminal fringe, T2–4 with apical hairbands, complete only on T4 (complete on T3 in *A. afzeliella* (Kirby, 1802)), tergal discs densely punctate (punctures separated by 0.5–1 puncture diameter) with exception of declivity of T1 where punctures become shallower and do not strongly contrast underlying integument (in *A. wilkella* (Kirby, 1802) with dense and distinct patch of punctures on the declivity of T1).

It has not been possible to examine specimens of *A. viktorovi* Osytshnjuk, 1983 which was described from three females caught between 25 and 27 April 1953 from the foothills of the Zailiyskiy Alatau (Trans-Ili Alatau) which is in almost exactly the same place from which *A. tianshanica* is described. Osytshnjuk (1983b: 21–22) compares the species to *A. sexguttata* Morawitz, 1877, a much darker species from Armenia, describing *A. viktorovi* as larger [at 12 mm in length], having a longer process of the labrum, having differently sculptured terga, showing numerous white hairs in the pubescence of the head and mesosoma, white scopal hairs, white lateral hair spots on T1, large white hair spots on T2–4, and hyaline wings. In this, *A. viktorovi* is close to *A. tianshanica*. However, it differs in some key areas; Osytshnjuk writes that “Голова в черных коротких волосках, спереди на боках возле усиков в длинных густых серовато-белых волосках с примесью сероватых на висках” [The head is covered with short black hairs, with greyish white hairs on the frons near the antennae, and with a mixture of greyish hairs on the gena], “Ноги в черном опушении, только бедра передних и

задних ног в белых волосках" [The legs have black pubescence, only the femorae of the fore and hind legs have white hairs], "Тергиты в очень коротких и редких полуприлегающих черных волосках, 1—5-й на боках вершинных частей с пятнами из белых густых волосков, на боках 2—4-го пятна большие, имеют вид широко прерванных посередине перевязей" [Terga with short and sparse semi-adjacent black hairs, T1–5 apicolaterally with spots of dense white hairs, on the sides of T2–4 the spots are large and have the appearance of widely medially interrupted bands], and "Анальная бахромка черная" [Terminal fringe black]. *Andrena tianshanica* has no black hairs on the head, the legs have pale to light brownish pubescence, the terga have lateral hairbands on T1–4, but that on T4 is almost complete, not widely interrupted medially, and the terminal fringe is golden-white, not black. When combined with the activity period of June for males and females of *A. tianshanica* as opposed to April for *A. viktorovi* females (i.e. with *A. tianshanica* males flying at least a month after *A. viktorovi* females), it seems unlikely that the two could be the same species.

Etymology. Taken from the name of the Tian-Shan mountains that dominate the eastern part of Central Asia.

Distribution. Southern Kazakhstan (northern Tian-Shan range).

Andrena (*Ulandrena*) *robertsi* spec. nov.

https://zoobank.org/F7706F81-755A-48AC-8A2F-C7AC14F1DDA4

Figure 65.

HOLOTYPE: LIBYA • 1♀; Cyrenaica, Tmimi [Al Tamimi] to Tobruk road: km 28; 32.1764°N, 23.2781°E; 9 Apr. 2002; S.P.M. Roberts leg.; RMNH; RMNH.INS.1715673.

Description. Female. Body length: 7 mm (Fig. 65A). *Head:* Dark, 1.25 times wider than long (Fig. 65B). Clypeus slightly elevated but broadly flattened medially, appearing slightly three-faced. Surface predominantly polished and shining, narrowly dull basally and laterally, surface irregularly punctate, punctures separated by 0.5–2 puncture diameters, impunctate longitudinal midline weakly present. Process of labrum rounded-trapezoidal, twice as broad as long, surface with latitudinal wrinkles. Gena slightly exceeding width of compound eye; ocelloccipital distance 0.5 times diameter of lateral ocellus. Foveae occupying slightly less than ½ space between compound eye and lateral ocellus, slightly but distinctly narrowing ventrally at level of antennal insertions; foveae filled with light brown-whitish hairs. Head covered with sparse whitish hairs, none equalling length of scape. Antennae basally dark, A4–12 ventrally lightened orange; A3 equalling A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum densely punctate, punctures essentially confluent, interspaces dull (Fig. 65C). Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum with network of raised reticulation, dull. Propodeal triangle finely delineated laterally by carinae, internal surface with moderately raised longitudinal rugae. Mesepisternum with whitish plumose hairs, hairs on scutum and scutellum very short, chestnut-brown, squamous, almost obscuring underlying underlying surface. Propodeal corbicula weak, incomplete, dorsal fringe composed of sparse white plumose hairs, internal surface with short white simple hairs. Legs dark, apical tarsal segments lightened brown, pubescence whitish to light brown. Flocculus complete, composed of white plumose hairs; femoral and tibial scopae composed of white

Fig. 65. Andrena (*Ulandrena*) *robertsi* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsolateral view; D. Terga, dorsal view

weakly plumose hairs. Posterior face of hind femur evenly rounded. Inner hind tibial spur distinctly broadened submedially. Hind tarsal claws with small inner tooth. Wings hyaline, stigma and venation orange-brown, nervulus strongly antefurcal.

Metasoma: Terga predominantly red-marked with exception of basal section of T1 and lateral black spots on T2–4 (Fig. 65D). Surface of terga weakly and finely shagreened, more or less shining. Tergal discs punctate, punctures separated by 0.5–1 puncture diameters, punctures extending onto marginal areas, here becoming finer and more obscure. Tergal discs with scattered short pale hairs, T2–4 laterally with fine apical hair fringes, not forming complete bands. Apical fringe of T5 and hairs flanking pygidial plate golden-orange. Pygidial plate triangular, apex narrowly rounded, surface dull and featureless, weakly shining.

Male. Unknown.

Diagnosis. *Andrena robertsi* can quickly be recognised as an *Ulandrena* due to the combination of the inner hind tibial spur which is broadened submedially, the lack of a raised latitudinal carina on the posterior face of the hind femur, and the weakly and obscurely plumose hairs of the tibial scopae. It can be further recognised by its red terga (Fig. 65D), placing it next to the only three *Ulandrena* species to occur in North Africa, *A. basimacula* Alfken, 1929, *A. speciosa*,

and *A. tadorna* Warncke, 1974 *sensu lato*. However, *A. robertsi* can immediately be separated due to its dark face (with pale markings in *A. speciosa*, Fig. 27B) and the presence of short squamous hairs on the scutum and scutellum (Fig. 65C; in all three comparison species with simple, non-squamous hairs). Moreover, *A. robertsi* is very small for an *Ulandrena* at 7 mm in length, whereas the comparison species are larger, usually at least 9 mm in length.

Due to the small body size (under 8 mm in length), red-marked terga, and presence of squamous hairs on the scutum and scutellum, *A. robertsi* is superficially closer to females of *A. arsinoe* Schmiedeknecht, 1900 and *A. amicula* Warncke, 1967 which are part of an undescribed subgenus (Pisanty et al. 2022b) most clearly recognised due to the highly distinctive male genitalia. *Andrena robertsi* can be separated from these two comparison species due to the submedially broadened hind tibial spur (hind tibial spur parallel-sided in comparison species) and also due to the scutal punctation which is very dense, punctures almost confluent, overall surface therefore dull (in the comparison species with the scutal punctures clearly separated by at least 1 puncture diameter and with the interspaces clearly shining and polished). It also appears superficially similar to the North African *A.* (*Ovandrena*) *marsae* Schmiedeknecht, 1900 (small body size, red terga, subsquamous scutal hairs) but can again be separated by the more dull scutal punctation (with clear shining interspaces in *A. marsae*) and submedially broadened hind tibial spurs (parallel-sided in *A. marsae*).

Notes. North-eastern Lybia (Cyrenaica) is a known hotspot of unusual *Andrena* diversity, with many endemic or near endemic species (Warncke 1974) that continue to be described to this day (Schwenninger 2023).

Etymology. Named after Stuart Roberts, the British entomologist who collected the type, and who has been a huge part of the European bee community for many years.

Distribution. Libya (Cyrenaica).

Andrena (*Ulandrena*) *rubescens* spec. nov.

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Figures 66 and 67.

HOLOTYPE: UZBEKISTAN • 1♀; Akkapchigay env., wadi, Surxondaryo env.; 38.0577°N, 67.5897°E; 527 m a.s.l.; 15 Apr. 2022; D. Benda leg.; NMPC.

PARATYPES: TAJIKISTAN • 1♀; 3 km W Dusti, 130 km S Duschanbe [Dushanbe]; 15–16 May 1991; J. Halada leg.; OÖLM • 1♀; 50 km S Duschambe [Dushanbe]; 17 May 1991; S. Bečvář leg.; OÖLM; **TURKMENISTAN** • 1♀; 6 km NW Kara-Kala; 14 May 1955; Ponomareva leg.; ZSM • 2♂; Ашхабад [Ashgabat], illegible; 10 Apr. 1979; ZSM • 1♀; Kara-Kala; 20 Apr. 1980; ZSM • 1♀; Tr. Casp. Gr. Balchan [=Uly Balkan]; OÖLM • 1♀; Имам-бабамерв [Imam-Baba Merv = Mary], у. Закасп [Zakasp]; 3–16 Apr. 1912; Кожанчиков [Kozhanchikov] leg.; ZSM • 1♀; Кара-кала, окр. Туркмен. [Kara-Kala]; 30 May 1952; Шмейнберг [Schmeinberg] leg.; ZSM • 1♀; окп. Ашхабада [Ashgabat district], Сухие Склоны [dry slopes], illegible; 22 Apr. 1979; A. Осычнюк [A. Osytshnjuk] leg.; ZSM; **UZBEKISTAN** • 3♂, 1♀; Akkapchigay env., wadi, Surxondaryo env.; 38.0577°N, 67.5897°E; 527 m a.s.l.; 15 Apr. 2022; D. Benda leg.; NMPC/TJWC • 1♂; Karashina env., II. Kashkadarya reg.; 1,050 m a.s.l.; 9–11 Apr. 2022; D. Benda & T. Fraňková; NMPC • 1♂; Karashina env., Kashkadarya reg.; 1,012 m a.s.l.; 9–11 Apr. 2022; D. Benda & T. Fraňková; NMPC.

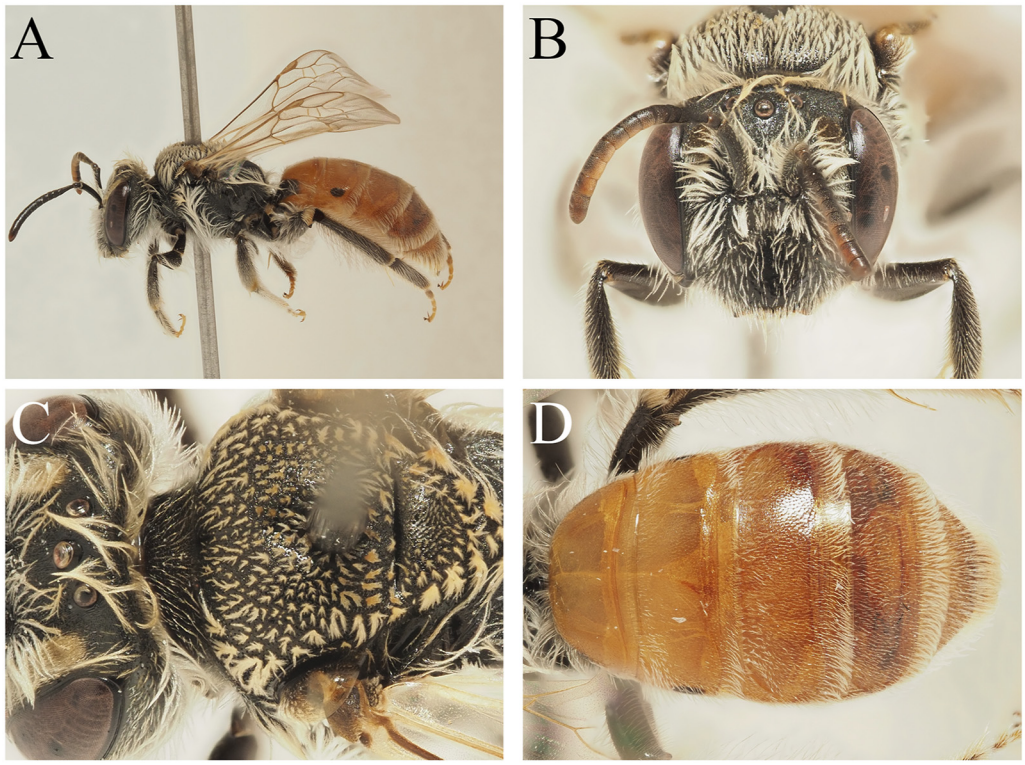

Fig. 66. Andrena (*Ulandrena*) *rubescens* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view

Description. Female. Body length: 8–8.5 mm (Fig. 66A). *Head:* Dark, 1.15 times wider than long (Fig. 66B). Clypeus weakly domed, polished and shining over majority of surface, shagreened along basal and lateral margins; surface punctate, punctures separated by 0.5–2 puncture diameters, impunctate longitudinal midline present. Process of labrum very short, 4 times wider than long, anterior margin broadly emarginate. Gena slightly exceeding width of compound eye; ocelloccipital distance equalling diameter of lateral ocellus. Foveae occupying slightly more than ½ space between compound eye and lateral ocellus, not noticeably narrowed ventrally, reaching lower level of antennal insertions; foveae filled with light brown-whitish hairs. Head covered with light brown to buff hairs, none equalling length of scape. Antennae basally dark, A5–12 ventrally slightly lightened by presence of orange scales; A3 exceeding A4+5, slightly shorter than A4+5+6.

Mesosoma: Scutum and scutellum densely punctate, punctures separated by <0.5–0.5 puncture diameters, underlying surface finely shagreened, weakly shining (Fig. 66C). Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum with fine granular microreticulation, weakly shining, overlain with network of fine reticulation resembling areolate punctures. Propodeal triangle laterally very finely delineated by weak carinae, internal surface with network of weak rugae radiating from base. Mesepisternum with whitish plumose hairs, none reaching

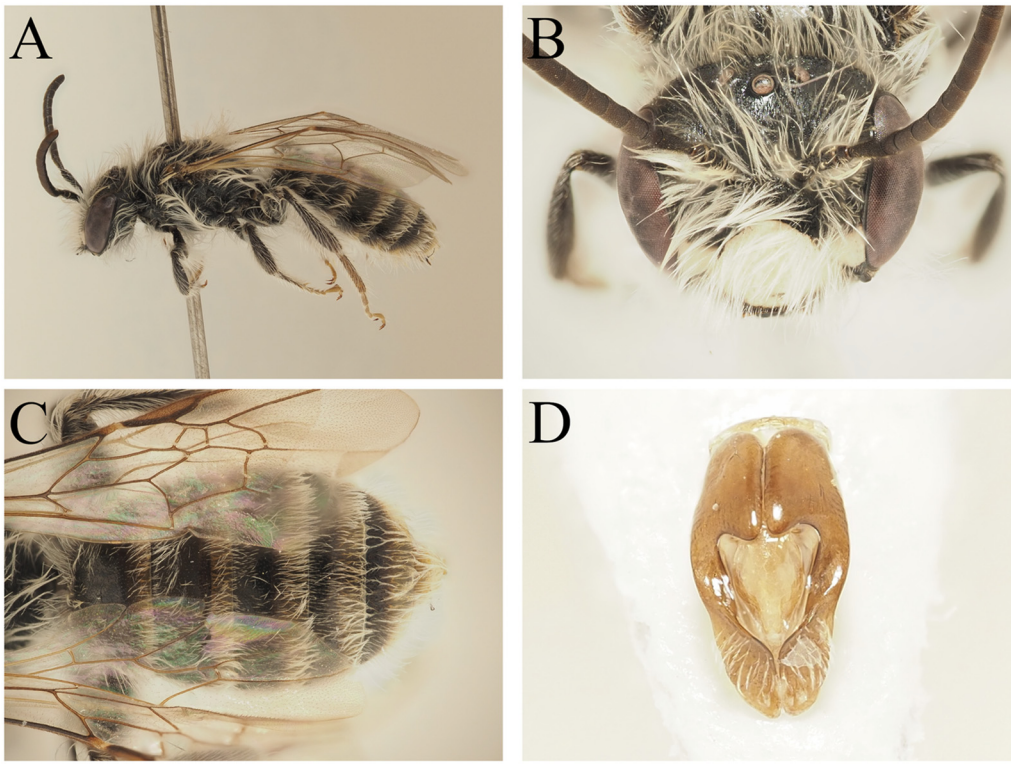

Fig. 67. Andrena (*Ulandrena*) *rubescens* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Terga, dorsal view; D. Genital capsule, dorsal view

length of scape, scutum and scutellum with very short sub-squamous brownish hairs, these not obscuring underlying surface. Propodeal corbicula incomplete, dorsal fringe composed of whitish plumose hairs, internal surface with numerous whitish simple hairs. Legs dark, apical tarsal segments lightened orange-brown, pubescence whitish. Flocculus complete, composed of white plumose hairs; femoral and tibial scopae composed of white predominantly simple hairs, slightly and obscurely plumose apically. Posterior face of hind femur evenly rounded. Inner hind tibial spur distinctly broadened submedially. Hind tarsal claws with small but distinct subapical tooth. Wings hyaline, stigma and venation orange, nervulus moderately to strongly antefurcal.

Metasoma: Terga predominantly red-marked with exception of basal section of T1 and lateral black spots on T2 (Fig. 66D). Surface of terga finely shagreened, weakly shining, regularly and shallowly punctate, punctures separated by 0.5–1 puncture diameters, punctures extending onto marginal areas, here becoming finer and more obscure. Tergal discs with pale short hairs, not obscuring underlying surface, T2–4 laterally with fine apical hair fringes, interrupted on T2–3, complete on T4, not obscuring underlying surface. Apical fringe of T5 and hairs flanking pygidial plate golden-white. Pygidial plate rounded-triangular, medially with raised triangular area flanked by slightly depressed shining areas along lateral margins.

Male. Body length: 7–8 mm (Fig. 67A). *Head:* Dark, 1.2 times wider than long (Fig. 67B). Clypeus entirely ivory-white with exception of two small dark marks, sometimes absent; pale markings extending onto lower paraocular areas, not reaching base of clypeus. Surface of clypeus shining, variably punctate, lateral punctures almost confluent, medially punctures separated by 1–2 puncture diameters. Process of labrum roughly trapezoidal, 3 times wider than long, anterior margin widely emarginate. Gena equalling width of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Head thickly covered in abundant white hairs, longest equalling length of scape. Antennae basally dark, A4–13 ventrally lightened by presence of greyish scales; A3 subequal to A4+5, A4 short, shorter than wide, strongly contrasting A5, this rectangular, clearly longer than wide.

Mesosoma: Scutum and scutellum polished and shining over majority of area, anterior margin of scutum weakly sculptured, becoming more dull; surface deeply and irregularly punctate, punctures separated by 0.5–3 puncture diameters. Mesosoma otherwise sculpturally as in female, covered in long whitish plumose hairs, longest exceeding length of scape. Legs dark, tarsi lightened orange-brown, variable, sometimes only apical tarsal segments lightened, pubescence whitish. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange-brown, nervulus interstitial to antefurcal.

Metasoma: Tergal discs dark, marginal areas weakly but distinctly depressed, broadly lightened hyaline yellow-orange, becoming brown at junction with discs (Fig. 67C). Tergal discs finely shagreened, more or less shining, with fine hair-bearing punctures, punctures separated by 1–2 puncture diameters. Tergal discs with abundant moderately long whitish to brownish upstanding hairs, T2–5 with apical hair fringes of white hairs, interrupted on T2–3, complete on T4–5, hair fringes exceeding length of marginal areas. T6–7 with fringe of brownish-white hairs. S8 columnar, apex truncate with small median emargination, ventral surface with spreading fan of pale hairs. Genital capsule somewhat elongate, gonocoxae apically produced into very short rounded apical teeth, gonostyli broadened and spatulate in apical ½ (Fig. 67D). Penis valves inflated, forming elongate oval shape occupying majority of space between gonostyli.

Diagnosis. *Andrena rubescens* can quickly be recognised as an *Ulandrena* due to the combination of the female inner hind tibial spur which is broadened submedially, the lack of a raised latitudinal carina on the posterior face of the hind femur, the dense, fine, and regular punctation of the scutum (Fig. 66C), the weakly and obscurely plumose hairs of the tibial scopae, the male face with pale markings which cover the clypeus and the lower paraocular areas (Fig. 67B), and the male genital capsule with the penis valves broadened, forming an elongate oval shape (Fig. 67D). Within the Central Asian *Ulandrena* fauna, *A. rubescens* can be recognised in the female sex due to its dark female face (Fig. 66B) and small body size of <9 mm (in *A. fedtschenkoi* Morawitz, 1876 and *A. eburneoclypeata* Lebedev, 1929 with the female clypeus pale-marked, *A. fedtschenkoi* and *A. elegans* Giraud, 1863 over 12 mm in length), red-marked terga (dark in *A. discus* Wood, 2023), and hind tarsal claws with an inner subapical tooth (with the hind tarsal claws unidentate in *A. leucorhina* Morawitz, 1876, *A. mikhaili* Osytshnjuk, 1982, and *A. nesterovi* Osytshnjuk, 1982).

In the male sex, *A. rubescens* can be separated from comparison species due to small size (>12 mm in *A. fedtschenkoi* and *A. elegans*), genital capsule without pronounced gonocoxal teeth (Fig. 67D; with pronounced teeth in *A. leucorhina*), but without the inner margins of the gonocoxae rounded and forming obtuse angles (forming obtuse angles in *A. nesterovi*). This

places it very close to *A. discus* and *A. mikhaili* as the genital capsule has only slightly produced gonocoxal teeth and the penis valves form a rounded or oval disc. *Andrena rubescens* can be separated from these two species due to the antennal segments with A4–13 ventrally lightened by the presence of greyish-brown scales (in *A. discus* and *A. mikhaili* with A5–13 ventrally strongly lightened orange), the scutum polished and shining over almost its entire surface, with shagreen only along its anterior margin (in *A. discus* with the scutum showing some shagreen almost everywhere, with only a small circular section of the scutum located posteromedially that is polished and shining), facial markings ivory-white, clypeus slightly sparsely punctate, punctures separated by 0.5–1.5 puncture diameters, sparsest medially (in *A. discus* with facial markings pale cream, clypeus densely punctate, punctures separated by 0.5 puncture diameters), and in direct comparison with the gonocoxae slightly less strongly produced into anteriorly projecting teeth (in *A. discus* and *A. mikhaili* with the gonocoxal teeth slightly more strongly produced, but still weakly produced in absolute terms).

Etymology. Nominative present participle of the Latin verb *rubesco* (to become red), meaning reddening or reddish, in reference of the partially red-coloured metasoma in the female sex.

Distribution. Turkmenistan, Uzbekistan, and Tajikistan.

Andrena (incertae sedis) *arabissos* spec. nov.

https://zoobank.org/91883B93-0F2D-493A-ABAB-2787D8808360

Figure 68.

HOLOTYPE: TURKEY • 1♀; Maraş [Kahramanmaraş], Afsin [Afşin]; 16 Jun. 1985; OÖLM.

Description. Female. Body length: 8 mm (Fig. 68A). *Head:* Dark, 1.25 times wider than long (Fig. 68B). Clypeus weakly domed and more or less flattened medially, laterally and basally shagreened, becoming smooth and shiny medially and anteriorly. Clypeus densely punctate over majority of area, punctures separated by 0.5–1 puncture diameters, medially with impunctate longitudinal midline, midline becoming wider apically, maximum apical width equalling 4 puncture diameters. Process of labrum rounded-rectangular, very broad, 4 times wider than long, anterior margin uniformly straight. Gena subequal to width of compound eye; ocelloccipital distance slightly exceeding diameter of lateral ocellus. Foveae occupying ⅓ space between compound eye and lateral ocellus, not noticeably narrowed ventrally, reaching lower level of antennal insertions; foveae filled with white hairs. Head covered with moderately long buff to pale golden-white hairs, none equalling length of scape. Antennae basally dark, A6–12 ventrally lightened by presence of orange scapes; A3 exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum polished and shining over majority of surface, becoming narrowly shagreened along anterior margin of scutum; surface irregularly punctate, punctures touching to separated by 2 puncture diameters (Fig. 68C). Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum finely microreticulate, dull to obscurely shining. Propodeal triangle broad, obscurely delineated by weak lateral ridges, internal surface with granular shagreen, becoming weakly rugose basally (Fig. 68D). Mesepisternum, scutum, and scutellum with sparse light brownish hairs, none reaching length of scape. Propodeal corbicula incomplete, dorsal fringe composed of light brown plumose hairs, internal surface with regularly spaced light brown simple hairs. Legs basally dark, tarsi lightened bright orange, pubescence light

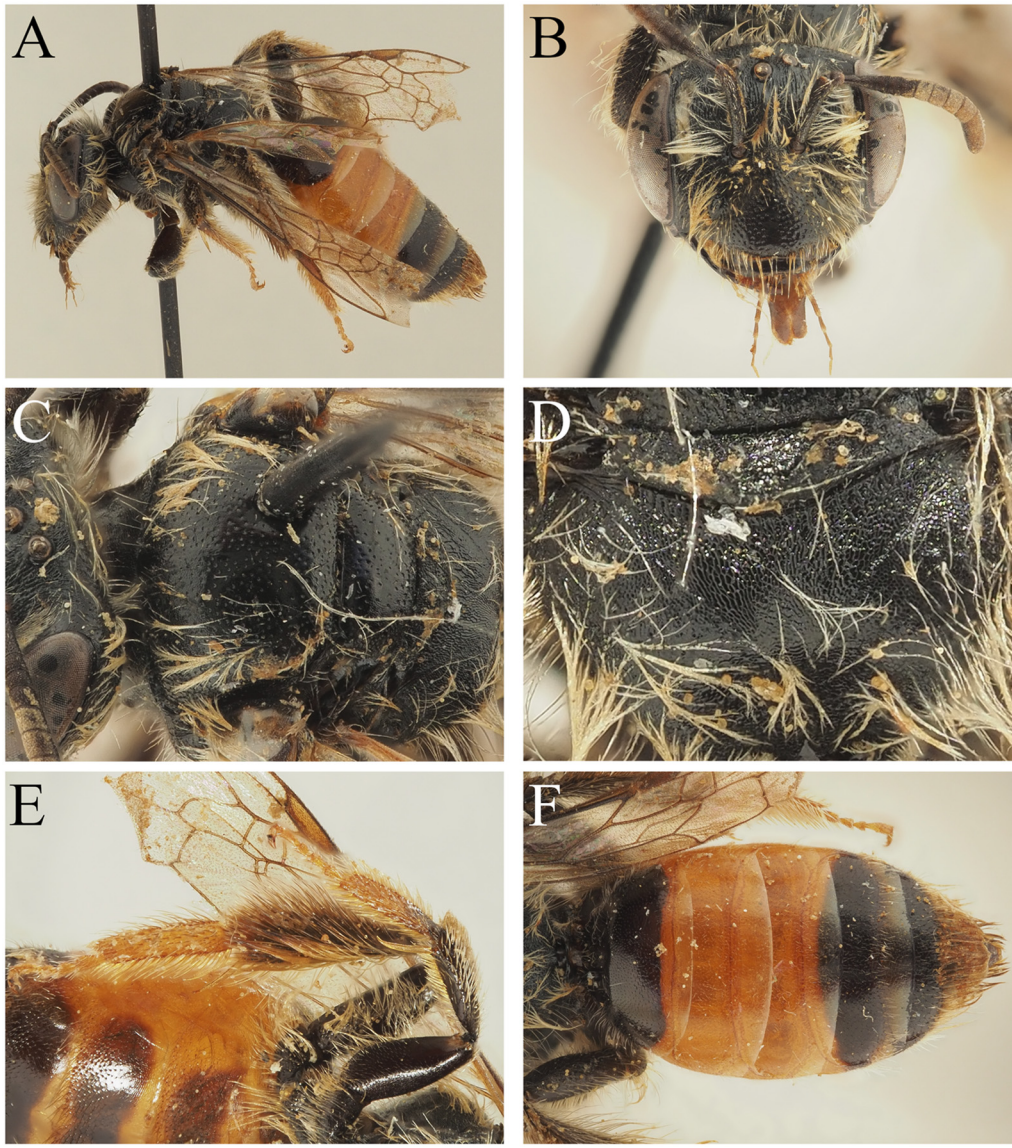

Fig. 68. Andrena (incertae sedis) *arabissos* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Propodeum, dorsal view; E. Hind legs, lateral view; F. Terga, dorsal view

brown (Fig. 68E). Flocculus incomplete, sparse, composed of weakly plumose orange hairs; femoral scopae composed of simple whitish hairs, tibial scopae composed of simple dark brown hairs, becoming slightly golden ventrally. Inner hind tibial spur very slightly broadened submedially. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange-brown, nervulus postfurcal.

Metasoma: Terga with orange-red markings on marginal area of T1, entirety of T2, majority of T3 with exception of marginal area medially, here becoming translucent hyaline, and lateral faces of T4; remaining tergal discs dark, marginal areas hyaline yellow-brown (Fig. 68F). Surface of terga very finely and superficially shagreened, almost smooth, shining, with weak punctures, punctures separated by 1–2 puncture diameters. Tergal discs with scattered pale hairs, not obscuring underlying surface or forming hairbands. Apical fringe of T5 and hairs flanking pygidial plate golden brown. Pygidial plate broadly triangular, apex truncate, medially with raised triangular area flanked by broad depressed areas.

Male. Unknown.

Diagnosis. *Andrena arabissos* cannot currently be placed with confidence into an existing subgenus due to the small body size of 8 mm, majority of T2–3 marked with red (Fig. 68F), pronotum rounded (without humeral angle as in red-marked *Margandrena* and *crocusella*-group), propodeal triangle broad and poorly defined, surface largely granulate with weak basal rugae (Fig. 68D), the conspicuously orange tarsi (Fig. 68E), the head short and broad, clypeus domed and densely punctate with most punctures separated by <1 puncture diameter (Fig. 68B), process of labrum very broad, rounded-rectangular, at least 4 times broader than long, A3 long (equalling or slightly exceeding A4+5), and facial foveae narrow, occupying <⅓ space between compound eye and lateral ocellus. It is best compared to *Andrena limassolica* Mavromoustakis, 1948 (Cyprus, Israel, Jordan) which was only tentatively treated as part of the subgenus *Poecilandrena* by Pisanty et al. (2018), and subsequent work shows that it falls close to but still outside of this "waste-bin" subgenus (Pisanty et al. 2022a; Bossert et al. in prep.).

Andrena arabissos can be separated from *A. limassolica* due to the sculpture of the clypeus which medially and anteriorly is polished and shining, with a longitudinal impunctate midline clearly visible, apically reaching a breadth of 4 puncture diameters (Fig. 68B; in *A. limassolica* with the clypeus shagreened and dull over almost all of its surface, with the longitudinal impunctate midline comparatively more difficult to see, apically reaching a breadth of 2 puncture diameters), the sculpture of the scutum and scutellum polished and shining over the majority of their surface, with only shagreen appearing on the anterior margin of the scutum (Fig. 68C; in *A. limassolica* with the scutum and scutellum more or less uniformly shagreened and dull over their surface, at most with some small patches weakly shining), facial foveae filled with white hairs (in *A. limassolica* foveae with golden-brown hairs), hind tibiae dark, tibial scopae golden to dark brown, not strongly contrasting tibial surface (Fig. 68E; in *A. limassolica* with hind tibiae lightened orange, tibial scopae predominantly black, black hairs contrasting tibial surface), red markings essentially limited to T2–3 (Fig. 68F; in *A. limassolica* with red markings extending onto base of T4, and terminal fringe golden brown (in *A. limassolica* with terminal fringe dark brown). These final three characters are based on colour and may not be consistent pending capture of additional Turkish specimens. However, the preceeding sculptural characters are considered to be convincing.

Etymology. From the ancient city of Arabissos (or Arabissa; ancient Greek: Αραβισσός, also Tripotamos) that was found at the site of modern day Afşin. It is a noun in apposition.

Distribution. Southern Turkey (province of Kahramanmaraş).

Andrena (incertae sedis) *brunnescens* spec. nov.

https://zoobank.org/ADDE9C56-9EBB-4666-B29F-9B11064E2ACC

Figure 69.

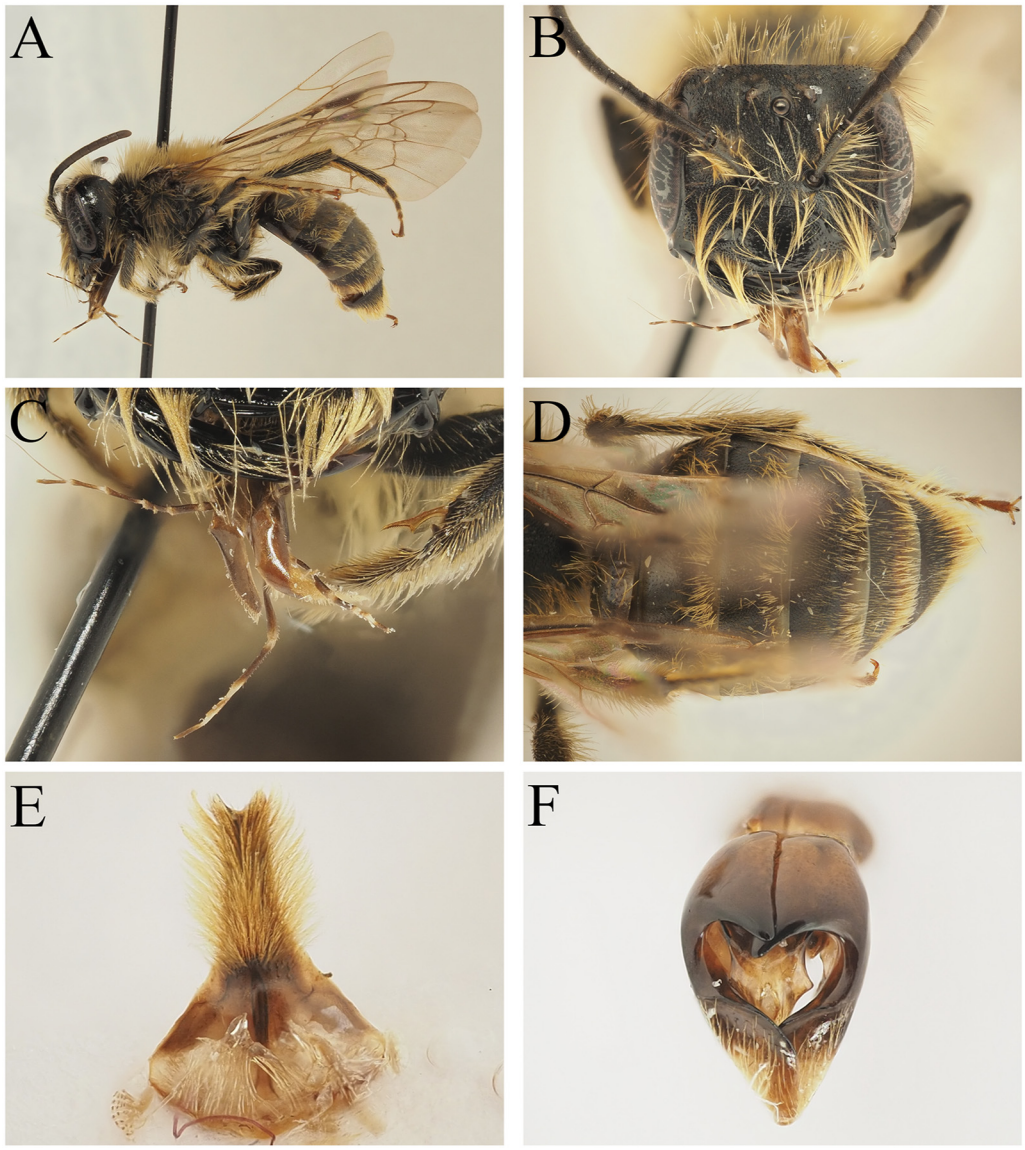

Fig. 69. Andrena (incertae sedis) *brunnescens* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Mouthparts, frontal view; D. Terga, dorsal view; E. Sternum 8, ventral view; F. Genital capsule, dorsal view

HOLOTYPE: TURKEY • 1♂; Muğla, University campus, Malaise Trap; 1 Nov. 2015 – 30 Apr. 2016; Barták & Kubik leg.; OÖLM.

Description. Female. Unknown.

Male. Body length: 8 mm (Fig. 69A). *Head:* Dark, 1.25 times wider than long (Fig. 69B). Clypeus weakly domed, more or less flattened medially, laterally and basally with microreticulation forming fine wrinkles, medially shagreened and weakly shining; surface shallowly punctate, punctures separated by 0.5–1 puncture diameters basally and laterally, by up to 3 puncture diameters medially. Process of labrum very short, 10 times broader than long. Galea with surface finely shagreened, shining. Maxillary palps with 6 segments, labial palps with 4 segments; all palpal segments noticeably elongate (Fig. 69C). Mandibles elongate, strongly crossing apically when closed. Gena noticeably broader than width of compound eye, posterior margin rounded; ocelloccipital distance slightly exceeding 2 times diameter of lateral ocellus. Frons adjacent to compound eye with very narrow but distinct facial foveae, not exceeding breadth of flagellum, filled with dark brown hairs. Lower margin of gena at junction with mandibular base with short ventrally-projecting tooth. Head covered with long golden-brown hairs, longest equalling length of scape. Antennae basally dark, A5–13 ventrally lightened by presence of greyish-brownish scales; A3 exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum with dense granular shagreen, weakly shining, irregularly punctate, punctures separated by <0.5–0.5 puncture diameters over majority of scutum, with impunctate circular space postero-medially, scutellum with punctures separated by 0.5–2 puncture diameters. Pronotum with strongly produced humeral angle, lateral surface polished and shining. Mesepisternum and dorsolateral parts of propodeum densely microreticulate, dull. Propodeal triangle weakly indicated laterally by faintly raised carinae, internal surface densely covered with network of raised rugae. Mesosoma covered with finely plumose golden brown hairs, longest exceeding length of scape. Legs dark, apical tarsal segments lightened brownish, pubescence golden brown. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma orange-brown, venation orange, nervulus interstitial.

Metasoma: Tergal discs dark, marginal areas broadly lightened hyaline yellow-brown (Fig. 69D). Tergal discs very finely and superficially shagreened, almost polished, shining; surface covered with regular hair-bearing punctures, typically separated by 2 puncture diameters, punctures not extending onto tergal margins. Tergal discs covered with abundant short plumose golden-brown hairs, forming dense layer only in profile view, in dorsal view not obscuring underlying surface; T2–5 with hairs forming apical hairbands, obscuring the underlying surface when hairs dense. S6–7 with long golden-orange hairs. S8 columnar, apically deeply emarginate, ventral surface covered with dense fan of golden hairs (Fig. 69E). Genital capsule with gonocoxae apically produced into triangular points, gonostyli strongly broadened and flattened in apical ½, triangular and shovel-like, inner margin strongly raised (Fig. 69F). Penis valves broad, basally occupying majority of space between gonostyli, laterally produced into projecting points.

Diagnosis. *Andrena brunnescens* can be recognised as part of the currently undescribed subgenus best referred to as the *crocusella*-group (Pisanty et al. 2022a, 2022b) due to the pronotum with a very strongly pronounced humeral angle (internal groove with surface shiny), long and apically crossing mandibles, broadened gena, palpi with individual segments elongate (Fig. 69C, but with typical number of 6 maxillary palpi and 4 labial palpi), long ocelloccipital distance, very narrow

but distinctly indicated weak male foveae, and genital capsule with the penis valves laterally produced into distinct points (Fig. 69F). This is the 11th species in this undescribed subgenus (Wood 2024b). Due to the predominantly dark terga (without red markings), normal number of maxillary and labial palpi (not 9:9 or 7:7), and gena broadened but not posteriorly produced into winged carinae it can be compared to *A. crocusella* Pisanty & Scheuchl, 2016, *A. elsei* Scheuchl & Gusenlietner, 2009, *A. dacia* Wood, 2024, and *A. ornithogali* Pisanty & Wood, 2022.

Due to the lower apex of the gena (e.g. the lower margin of the malar space) displaying a tooth, it is closest to *A. ornithogali*, this character previously considered unique to this species within the group. *Andrena brunnescens* can be separated due to the gonocoxae which are apically produced into sharp points (in *A. ornithogali* with the gonocoxae apically rounded), the penis valves which show long pointed teeth laterally (Fig. 69F; in *A. ornithogali* with the penis valves with only the slightest hint of a lateral tooth), and tergal margins broadly lightened hyaline yellow-brown (Fig. 69D; in *A. ornithogali* with the tergal margins dark, almost black). The males of *A. dacia* (Romania) and *A. elsei* (south-eastern Europe and Turkey) are unknown, but *A. brunnescens* is considered unlikely to be the male of either species due to structure of the mouthparts. In *A. dacia*, the outer surface of the galea is covered with strong granular micro-reticulation and is dull, whereas in *A. brunnescens* the galea is finely shagreened and shining (Fig. 69C). *Andrena elsei* also has the surface of the galea finely shagreened and shining, but the palpi are comparatively shorter, only slightly exceeding the length of the galea where in *A. brunnescens* the palpi have conspicuously elongated segments, and clearly exceed the length of the galea (Fig. 69C). Ecologically, *A. elsei* is a spring-flying species, recorded in April – May (Wood 2024b), and whilst a precise flight date for *A. brunnescens* is not available since it was caught in a malaise trap run between November–April, this is hypothesised to suggest winter activity. Further collecting in Mediterranean Turkey is required to locate the missing sexes of these two species and to confidently separate them in that light.

Etymology. From the singular feminine nominative Latin adjective *brunnescens* meaning "brownish", in reference to the brown hairs of this species, when many other species in this group have black pubescence.

Distribution. South-western Turkey (province of Muğla).

Andrena (incertae sedis) *eborifacies* spec. nov.

https://zoobank.org/B10BDBAC-BF5B-402C-87EB-A759D985EA76

Figures 70 and 71.

HOLOTYPE: TURKEY • 1♀; NE Tutak/Ağrı; 11 Jun. 1977; K. Warncke leg.; OÖLM.

PARATYPES: TURKEY • 1♀; NE Tutak/Ağrı; 11 Jun. 1977; K. Warncke leg.; TJWC • 1♂; 10 km N Tutak, Ağrı; 1,500 m a.s.l.; 7 Jun. 1981; K. Warncke leg.; OÖLM • 1♂; Beysehir [Beyşehir]; 4–6 Jun. 1964; J. Gusenleitner leg.; OÖLM • 1♀; Birecik, Euphrat; 26 Apr. 1972; R. Desmier de Chenon leg.; OÖLM • 1♀; E of Şırnak/Siirt; 4 Jun. 1977; K. Warncke leg.; OÖLM.

Description. Female. Body length: 9–10.5 mm (Fig. 70A). *Head:* Dark, 1.25 times wider than long (Fig. 70B). Clypeus domed but slightly flattened medially, surface with large granular shagreen, largely dull; clypeus with large irregular punctures, punctures separated by 0.5–3

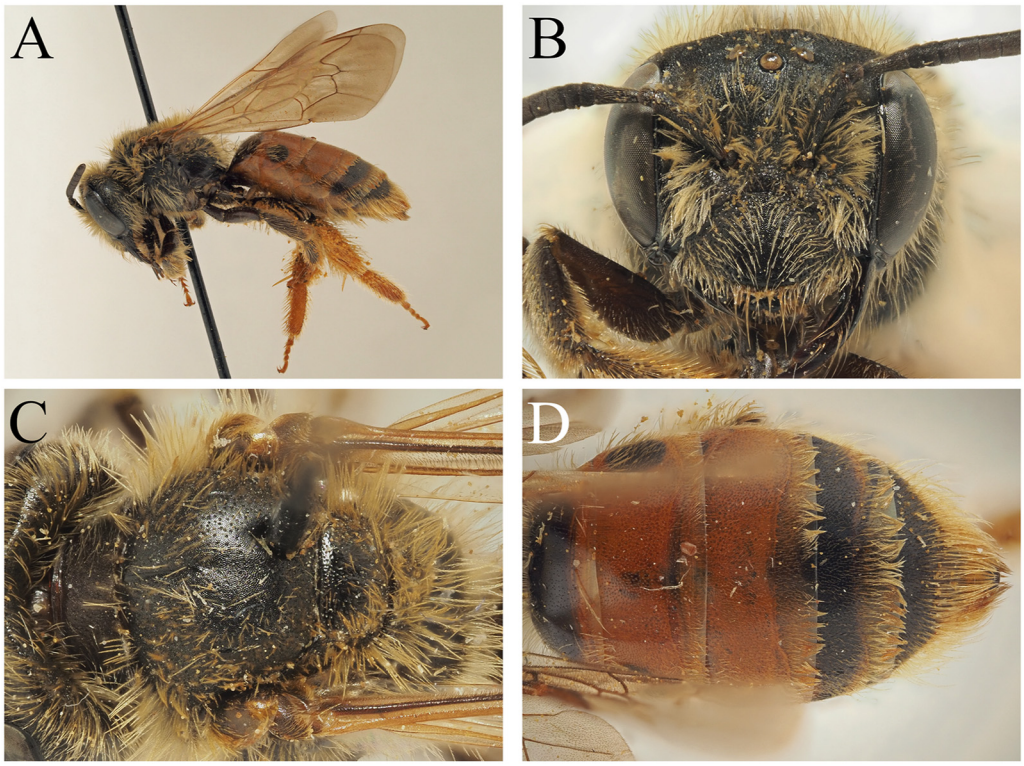

Fig. 70. Andrena (incertae sedis) *eborifacies* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view

puncture diameters, with wide impunctate longitudinal midline medially. Process of labrum broadly trapezoidal, slightly wider than long, anterior margin clearly emarginate. Mouthparts with surface of galea microreticulate and dull, maxillary palpi with six segments, labial palpi with four segments. Gena slightly exceeding width of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Foveae dorsally occupying slightly less than ½ space between compound eye and lateral ocellus; foveae filled with light golden-brown hairs. Head covered with light brownish hairs, none equalling length of scape. Antennae dark, A5–12 ventrally covered with greyish scales; A3 exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum with granular shagreen, weakly shining, irregularly punctate, punctures separated by 0.5–3 puncture diameters, anteriorly disappearing into microreticulation (Fig. 70C). Scutellum more strongly polished, irregularly punctate, punctures touching to separated by 2 puncture diameters. Pronotum with clear humeral angle. Mesepisternum with very fine granular microreticulation, dull. Dorsolateral parts of propodeum with fine granular shagreen, weakly shining, almost undifferentiated from surface of propodeal triangle which lacks lateral carinae, surface slightly smoother; propodeal triangle with very short rugae basally. Mesepisternum with golden brown to whitish finely plumose hairs, hairs becoming shorter and

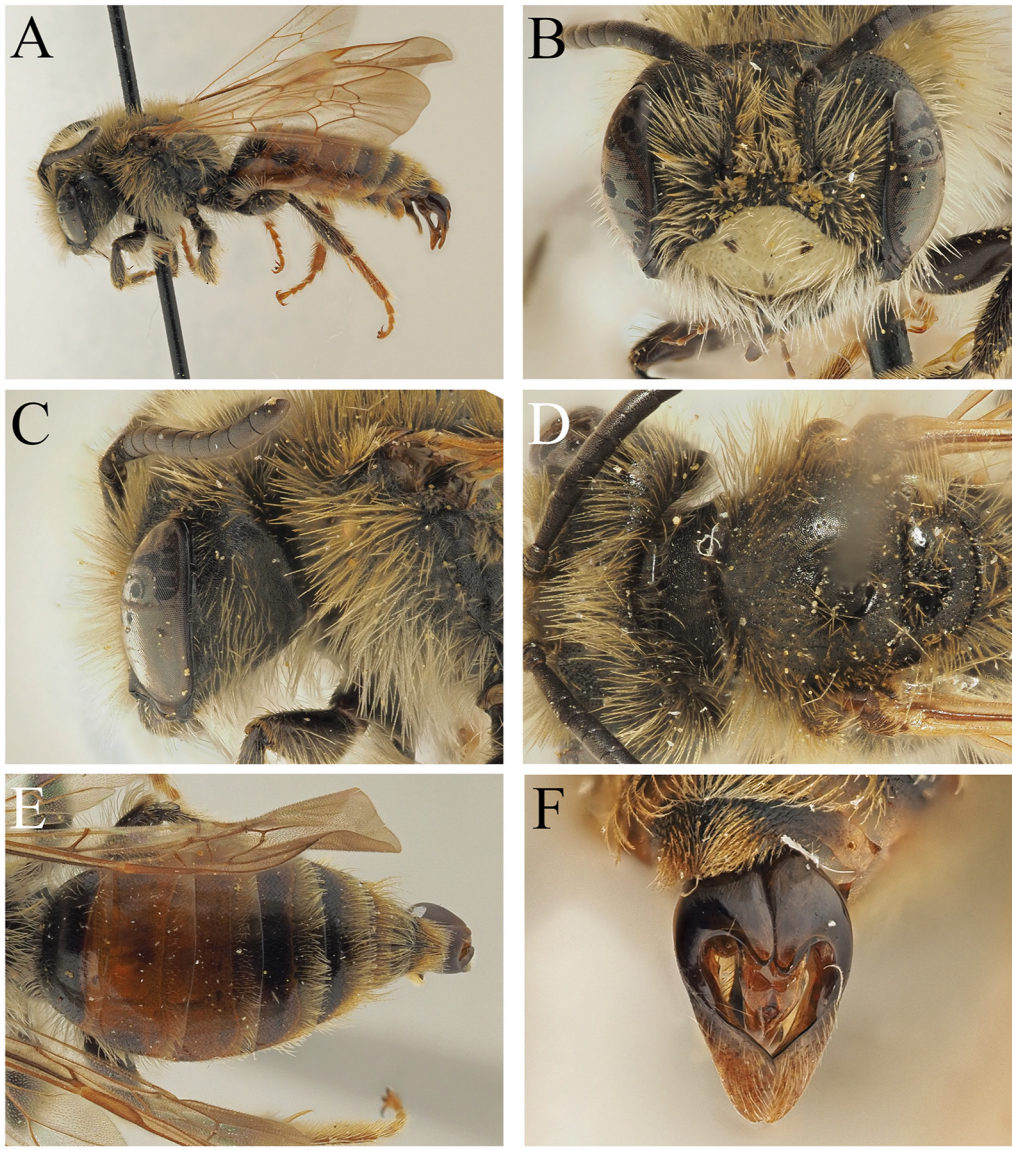

Fig. 71. Andrena (incertae sedis) *eborifacies* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Gena, lateral view; D. Scutum, dorsal view; E. Terga, dorsal view; F. Genital capsule, dorsal view

more strongly plumose on scutum and scutellum. Propodeal corbicula incomplete, weakly formed, composed of obscurely plumose golden hairs; internal surface with simple pale golden hairs. Legs dark, apical tarsal segments lightened orange, in brightest specimens with hind basitarsi also lightened orange, pubescence pale to light brownish. Posterior face of hind femorae

rounded, without projecting spines or latitudinal carinae. Flocculus incomplete, sparse and weakly produced, composed of light brown plumose hairs; femoral and tibial scopae composed of pale golden to silvery simple hairs. Hind tarsal claws with small inner tooth. Wings hyaline, stigma and venation orange-brown, nervulus interstitial.

Metasoma: Terga variably coloured; T2–3 always red-marked over majority of surface, T1 and T4 with colouration variable, from predominantly black (with exception of marginal area) to predominantly red (Fig. 70D). Terga finely shagreened, weakly shining; surface punctate, T1 with punctures sparse, separated by 2–3 puncture diameters, T2–4 with punctures separated by 1 puncture diameter; punctures cover discs and margins with exception of apical rims. Tergal discs with abundant short golden hairs, marginal areas of T2–4 with short apical hair fringes, interrupted on T2, complete on T3–4. Apical fringe of T5 and hairs flanking pygidial plate golden to whitish. Pygidial plate broadly rounded, surface densely punctate with exception of narrow rim, punctures almost confluent, surface dull.

Male. Body length: 9 mm (Fig. 71A). *Head:* Dark, 1.3 times wider than long (Fig. 71B). Clypeus predominantly covered with pale yellow-white markings with exception of anterior margin and two small marks laterally; surface irregularly punctate, lateral punctures separated by <0.5 puncture diameters, medially by 2–3 puncture diameters, with unclear longitudinal midline, surface shagreened, weakly shining. Process of labrum, short, knob-like, slightly wider than long, surface smooth. Gena strongly broadened, nearly 2 times width of compound eye, ventrally with lower corner forming 120° angle; ocelloccipital distance 2 times diameter of lateral ocellus (Fig. 71C). Head with long whitish to light golden hairs, none equalling length of scape. Antennae basally dark, A5–13 extensively lightened ventrally by presence of greyish scales; A3 exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum structurally as in female (Fig. 71D). Pronotum with strong humeral angle, internal surface deeply impressed, furrow-like, surface polished and shining. Mesepisternum and dorsolateral parts of propodeum with fine granular microsculpture, dull. Propodeal triangle weakly indicated, internal surface with slightly finer granular shagreen, basally with short rugae; propodeal triangle thus defined by change in surface sculpture. Mesepisternum with long whitish to light brownish finely plumose hairs, becoming browner dorsally, longest hairs equalling length of scape; scutum and scutellum with slightly shorter golden brown hairs. Legs basally dark, tarsal segments and sometimes parts of hind tibiae lightened orange, pubescence pale. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange, nervulus interstitial.

Metasoma: Disc of T1 black, marginal area orange-red; discs and marginal areas of T2–3 orange-red with exception of two large black spots laterally; T4 with mixture of red and black colouration, predominantly black medially, marginal area lightened hyaline-yellow-reddish (Fig. 71E). Tergal discs polished and shining, with sparse and fine punctures, punctures on T1 separated by 2–3 puncture diameters, on T2–4 separated by 2 puncture diameters. Tergal discs with scattered golden hairs, these becoming longer on T3–4, forming weak apical hair-bands, not obscuring underlying surface. S8 columnar, apex broadened and medially emarginate, thus appearing slight fish-tailed; ventral surface with laterally spreading fringe of golden hairs. Genital capsule slightly elongate, gonocoxae produced into apically projecting rounded teeth, gonostyli broadly spatulate basally (Fig. 71F). Penis valves slightly broadened apically, occupying ½ space between gonostyli, gently tapering apically.

Diagnosis. *Andrena eborifacies* is a species that cannot currently be placed into any known subgenus due to the combination of short, weakly domed and dull clypeus, moderately wide and relatively long facial foveae, pronotum with a strong humeral angle, almost undefined propodeal triangle, weak propodeal corbicula, simple scopal hairs, absence of spines or carinae on the posterior face of the hind femur, parallel-sided hind tibial spurs, male face with pale markings (Fig. 71B), broadened male gena that greatly exceeds the width of the compound eye and which is ventrally angulate (Fig. 71C), red-marked metasoma (Figs 70D and 71E), relatively unremarkable genital capsule (Fig. 71F), and lack of any other distinctive characters.

One of the specimens was labelled by Warncke as "? aff polita" referring to *A.* (*Ulandrena*) *polita* Smith, 1847 which in a broad sense (i.e. the *polita*-group of species) can show species with red-marked terga. However, as *Ulandrena*, these have the female inner hind tibial spur broadened submedially, whereas *A. eborifacies* have the hind tibial spurs parallel-sided. The male genitalia also does not conform to the forms found in the *Ulandrena*, which usually have the penis valves expanded in some way or another.

There are superficial similarities with *A.* (*Opandrena*) *schencki* Morawitz, 1866 (red-marked terga, dull clypeus, pronotum with humeral angle, pale facial markings in male, broadened male gena) but this species has the female clypeus and terga much more densely punctate with punctures almost confluent, the propodeal triangle is well-marked with a clear network of carinae, the male clypeus and lower paraocular areas are marked with yellow (not white), and the male genital capsule is completely different with enormously broadened penis valves that occupy the entire space between the gonostyli.

There are also similarities to *A.* (*Hoplandrena*) *najadana* Warncke, 1975 due to the red-marked terga, pronotum with humeral angle, poorly-defined propodeal triangle, moderately wide foveae, orange male tarsi, and domed clypeus. However, there are many structural differences, such as the dark male clypeus, male A3 only slightly exceeding A4 (in *A. eborifacies* with A3 exceeding A4+5), more slender and elongate gonostyli, almost impunctate terga, bicoloured tibial scopae (pale ventrally, dark dorsally) and comparatively sparsely punctate female clypeus.

It is possible that *A. eborifacies* could be placed in the *crocusella*-group of species due to the pronotum with a humeral angle, broad male gena, and very poorly defined propodeal triangle (the mouthparts show a typical number of palpal segments, rather than the extra number of segments seen in some member of this group). Whilst several members of this group show red marked terga, such as *A. menahemella* Scheuchl & Pisanty, 2016, the males of all currently known members of this group have the face dark, without any pale integumental markings. The females also show narrow facial foveae whereas *A. eborifacies* has foveae which occupy just under ½ of the space between the compound eye and a lateral ocellus. Genetic support is ultimately needed to conclude on the placement of *A. eborifacies*.

Finally, *A. eborifacies* is close to *A. mysteria* **spec. nov.** (described below) from Lebanon and south-western Turkey, as they share most of the same characters described in the first paragraph of this diagnosis. *Andrena eborifacies* can be separated in the female sex due to the hairs of the facial foveae which are light golden-brown (in *A. mysteria* with dark brown-black hairs), propodeal corbicula weakly produced and composed of obscurely plumose hairs (in *A. mysteria* with the propodeal corbicula clearly produced and composed of strongly plumose hairs), tergal discs with very short hairs, surface regularly punctate, punctures separated by 1 puncture diameter (tergal discs of *A. mysteria* with long decumbent hairs, surface with only fine and scattered hair-bearing punctures), and tibial scopae unicolourous, hairs pale golden to silvery (in

A. mysteria with tibial scopae bicoloured, silvery ventrally, dark dorsally. Males can be separated immediately due to the dark face of *A. mysteria* and simple genital capsule without produced gonocoxal teeth (with strongly produced teeth in *A. eborifacies*) and narrow penis valves occupying <⅓ of the space between the gonostyli (occupying ½ this space in *A. eborifacies*).

Etymology. From the Latin *ebor* (ivory) + *faciem* (face) meaning ivory-faced, in refence to the pale colouration of the male clypeus. It is a compound noun in apposition.

Distribution. Southern and eastern Turkey (provinces of Ağrı, Konya, Şanlıurfa, and Şırnak).

Andrena (incertae sedis) *laticincta* spec. nov.

https://zoobank.org/80CEA6BD-642F-4555-92A7-370E90EC9479

Figures 72 and 73.

HOLOTYPE: UZBEKISTAN • 1♀; S., Babatag Mts [Bobotog Mountains]; 1,000 m a.s.l.; 6 Apr. 2003; V. Gurko leg.; OÖLM.

Fig. 72. Andrena (incertae sedis) *laticincta* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Propodeum, dorsal view; D. Terga, dorsal view

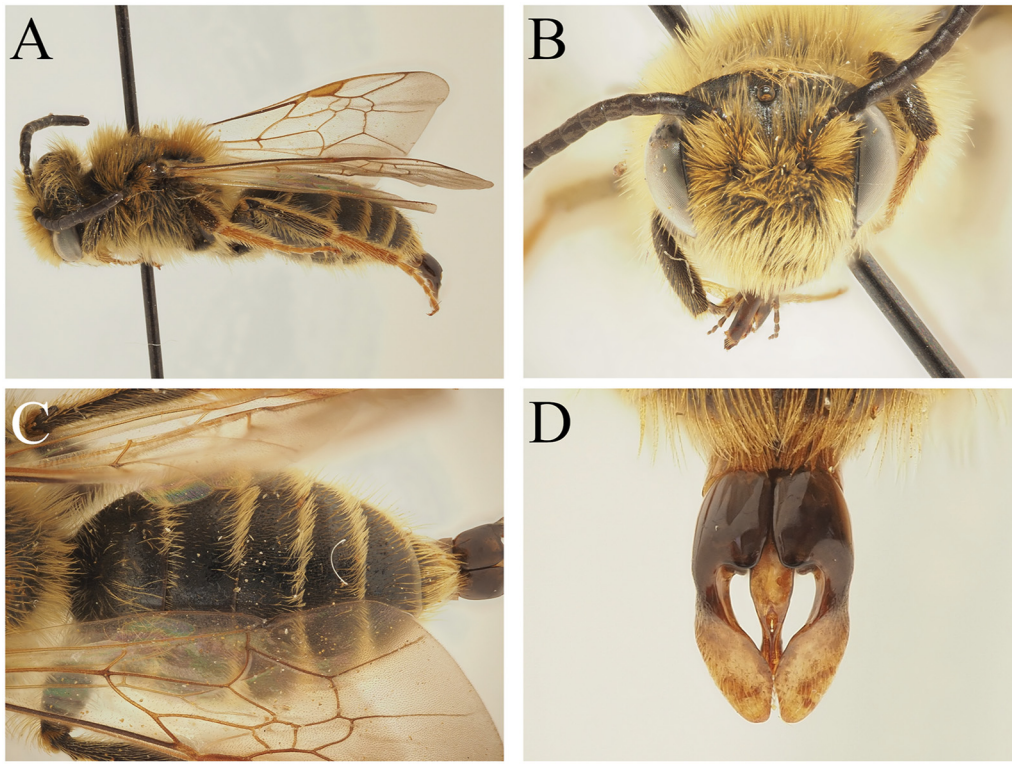

Fig. 73. Andrena (incertae sedis) *laticincta* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Terga, dorsal view; D. Genital capsule, dorsal view

PARATYPES: KAZAKHSTAN • 2♂, 1♀; south, Karatau, 16 km NO Kentau, Biresek-Tal; 5 May 1994; W. Dolin leg.; ZSM; **TAJIKISTAN** • 1♀; Khation reg., 15 km E Kurgan-Tyube [Bokhtar], Sarband env., Tabakchi Mts.; 500 m a.s.l.; 22 Mar. 2008; O. Pak leg.; TJWC; **UZBEKISTAN** • 3♀; S., Babatag Mts [Bobotog Mountains]; 1,000 m a.s.l.; 6 Apr. 2003; V. Gurko leg.; OÖLM/TJWC.

Description. Female. Body length: 10–10.5 mm (Fig. 72A). *Head:* Dark, 1.3 times wider than long (Fig. 72B). Clypeus weakly domed, strongly microreticulate over majority of surface, becoming slightly shiny apically. Surface shallowly and obscurely punctate, punctures separated by 0.5–1 puncture diameters, almost completely disappearing into underlying sculpture in basal half of clypeus, becoming slightly more distinct in apical half. Process of labrum small, more or less square to weakly trapezoidal, slightly wider than long, anterior margin straight. Gena slightly exceeding width of compound eye; ocelloccipital distance slightly exceeding diameter of lateral ocellus. Foveae occupying slightly less than ½ space between compound eye and lateral ocellus, not noticeably narrowed ventrally, extending to lower level of antennal insertions; foveae filled with light yellow hairs. Head covered with short whitish to yellow-brown hairs, paler

ventrally, more yellow dorsally, none equalling length of scape. Antennae dark, A5–12 ventrally slightly lightened by presence of silvery scales; A3 slightly shorter than A4+5.

Mesosoma: Scutum and scutellum with strong granular microreticulation, dull over almost entire surface, densely but shallowly and obscurely punctate, punctures separated by by <0.5–0.5 puncture diameters. Pronotum rounded. Mesepisternum with regular granular shagreen, weakly shining. Dorsolateral parts of propodeum microreticulate, overlain with network of fine reticulation resembling areolate punctures. Propodeal triangle slightly depressed below level of dorsolateral parts of propodeum, internal surface with regular granular microsculpture, surface dull, propodeal triangle thus defined by change in surface sculpture and slightly depressed surface (Fig. 72C). Mesepisternum with whitish finely plumose hairs ventrally, becoming light brown dorsally, none approaching length of scape; scutum and scutellum with short golden-brown densely plumose hairs, these more or less subsquamous, not obscuring underlying surface. Propodeal corbicula incomplete, dorsal fringe composed of long golden-brown plumose hairs, internal surface with some simple golden hairs in dorsal half. Legs brown, pubescence whitish to light brown. Flocculus complete, composed of plumose white hairs; femoral and tibial scopae composed of whitish to light brown simple hairs. Hind tarsal claws with small inner subapical tooth. Wings hyaline, stigma and venation orange-brown, nervulus interstitial to slightly postfurcal.

Metasoma: Terga predominantly dark, marginal areas with apical rim narrowly lightened hyaline-white, becoming brown at junction with disc (Fig. 72D). Surface of terga with dense granular microreticulation, surface dull on T1–2, becoming weakly shining on apical terga; tergal essentially impunctate. Tergal discs with abundant but short ochraceous hairs, not obscuring underlying surface. Tergal margins with thick dense adpressed hairbands, interrupted on T1, complete on T2–4, composed of yellow densely plumose hairs, hairbands long, extending onto subsequent terga, obscuring underlying surface. Apical fringe of T5 and hairs flanking pygidial plate golden-orange. Pygidial plate rounded-triangular, internal surface densely punctate, punctures almost confluent, surface dull.

Male. Body length: *Head:* 9–9.5 mm (Fig. 73A). Dark, 1.3 times wider than long (Fig. 73B). Clypeus weakly domed, densely but shallowly and obscurely punctate, punctures separated by <0.5–1 puncture diameters, almost disappearing into underlying sculpture; clypeal surface dull to slightly shining apically. Process of labrum roughly rectangular, twice as broad as long, anterior margin weakly and shallowly emarginate. Gena exceeding width of compound eye; ocelloccipital distance slightly exceeding diameter of lateral ocellus. Head covered with light brown to golden brown hairs, longest equalling length of scape. Antennae basally dark, A4–13 with ventral surface entirely covered with shiny scales, A4–13 thus appearing shiny, strongly contrasting A3 which is dull; A3 approximately 60% as long as A4, A4–13 rectangular, twice as long as wide.

Mesosoma: Scutum and scutellum microreticulate, dull, densely punctate, punctures separated by <0.5–0.5 puncture diameters. Pronotum rounded. Mesepisternum and dorsolateral parts of propodeum with network of raised reticulation, dull. Propodeal triangle broad, laterally defined by fine carinae, internal surface covered with fine rugae radiating from base. Mesosoma with long golden-brown finely plumose hairs, exceeding length of scape. Legs basally brown, tarsi lightened orange, pubescence light brown to golden-brown. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation orange, nervulus interstitial.

Metasoma: Terga predominantly dark, marginal areas with apical rim narrowly lightened hyaline-brown (Fig. 73C). Tergal discs shagreened, most strongly on T1, here dull, becoming progressively weaker on subsequent terga, apical terga weakly shining. Surface of terga with fine hair-bearing punctures, punctures separated by 1–2 puncture diameters. Tergal discs with abundant short ochraceous hairs, not obscuring underlying surface. Tergal margins with loose apical hair fringes of yellow hairs, complete on T1–4 but rapidly abrading, appearing incomplete; obscuring underlying surface only laterally. S8 columnar, apex truncate, ventral surface with spreading fan of golden hairs. Genital capsule elongate, gonocoxae with inner margins rounded, slightly diverging apically, gonostyli strongly broadened and flattened apically, inner margin weakly raised (Fig. 73D). Penis valves moderately broad basally, occupying slightly less than ½ space between gonostyli, narrowing medially.

Diagnosis. *Andrena laticincta* probably belongs to the group of species around *A. numida* Lepeletier, 1841 which represents a small undescribed subgenus in the Palaearctic (Pisanty et al. 2022b). Until this group is described, it can be referred to in the interim as the *numida*-group (Wood 2023a). The group is challenging to delineate, and hence *A. laticincta* is best diagnosed directly against one of its members, *A. ranunculorum* Morawitz, 1877 due to the similar domed, dull, and microreticulate clypeus (Fig. 72B), strongly microreticulate and dull scutum and scutellum, head and mesosoma with light brown pubescence, poorly delineated propodeal triangle which is slightly depressed below the level of the dorsolateral parts of the propodeum (Fig. 72C), strongly shagreened to microreticulate terga with strong pale hairbands (Fig. 72D), and a golden terminal fringe.

Andrena laticincta females can be separated from *A. ranunculorum* due to the sculpture of the terga which is shows dense granular microreticulation, particularly on T1–2, the surface dull and only starting to show weakly shining areas apically on T3–4 (Fig. 72D; in *A. ranunculorum* with the terga shagreened more or less consistently across all terga, surface weakly shining, without granular microreticulation), the clypeus which is very shallowly punctate, in the basal ½ with punctures almost disappearing into the underlying sculpture and hence difficult to see (in *A. ranunculorum* with clypeal punctures consistently strong across the entire surface, equally visible in the basal ½ of the disc), the scutal punctures which are very shallow and which disappear into the underlying sculpture (in *A. ranunculorum* with the scutal punctures deeper and clearer, never disappearing into the underlying sculpture), and due to the tergal hairbands which are very dense and almost adpressed, with the bands extending onto the base of the subsequent tergum where they remain flat and close to the surface (in *A. ranunculorum* with the tergal hairbands not adpressed, when extending onto the disc of the subsequent tergum they almost lift up away from the surface, thus appearing less dense and more insubstantial).

Males can be recognised due to their antennae, with A4–13 ventrally polished and shining due to the presence of shiny scales (Fig. 73B). This character is common to males of the *numida*-group and also the unrelated subgenus *Chrysandrena* Hedicke, 1933, and *A. laticincta* can be excluded from the *Chrysandrena* due to its much more elongate and robust genital capsule, as well as through association with the female which lacks plumose tibial scopae. Males can again be compared to *A. ranunculorum* due to the shaggy tergal hairbands (Fig. 73C), but in direct comparison the genital capsule of *A. laticincta* has the penis valves less bulbous, more abruptly narrowed medially, the gonostyli are more strongy broadened, the overall shape of the genital capsule is less elongate (Fig. 73D). There is also a difference in the antennal segment ratios, with

A. laticincta showing A4 1.5 times as long as A3, whereas in *A. ranunculorum* A4 is 1.1–1.2 times as long as A3.

One of the males from the ZSM collection was identified by Osytshnjuk as *A. ranunculorum*, but can be separated using the criteria described here. The two species can be found across Central Asia, although they have not yet been found in direct sympatry which is unsurprising given the small number of specimens of *A. laticincta* detected to date.

Etymology. From the Latin adjectives *latus* (broad) and *cinctus* (bordered, in this case banded), hence *laticincta* (broad-banded) in reference to the wider tergal hairbands when compared to *A. ranunculorum*. It is a compound noun in apposition.

Distribution. Southern Kazakhstan, Uzbekistan, and Tajikistan.

Andrena (incertae sedis) *mysteria* spec. nov.

https://zoobank.org/890620B0-F7C6-4B43-BC3B-B8CD41D8AFE1

Figures 74 and 75.

HOLOTYPE: LEBANON • 1♀; Beqaa, Rachaiya, 5 km S, Mount Hermon nature reserve; 33.4586°N, 35.8395°E; 1,500 m a.s.l.; 8 Apr. 2023; T.J. Wood leg.; RMNH; RMNH.INS.1715674; BOLD accession number: WPATW1121-23.

PARATYPE: TURKEY • 1♀; Kirliköy, 40 km S Beyşehir; 29 Apr. 1976; K. Warncke leg.; OÖLM • 1♂; Har Hermon; 33.2992°N, 35.7678°E; 1,650 m a.s.l.; 16 Apr. 2022; G. Pisanty leg.; SMNHTAU; code 389817; BOLD accession number ANDIL515-25.

Description. Female. Body length: 9.5 mm (Fig. 74A). *Head:* Dark, 1.25 times wider than long (Fig. 74B). Clypeus evenly domed, surface microreticulate and dull to obscurely shining apically and shallowly punctate, punctures separated by (0.5)1–2 puncture diameters with faint impunctate longitudinal midline. Process of labrum rounded-trapezoidal, 2 times wider than long, anterior margin straight (Fig. 74C). Mouthparts with surface of galea finely shagreened, weakly shining, maxillary palpi with six segments, labial palpi with four segments. Gena equalling width of compound eye; ocelloccipital distance slightly exceeding diameter of lateral ocellus. Foveae dorsally occupying slightly more than ½ space between compound eye and lateral ocellus; foveae filled with dark brown hairs. Frons, clypeus, and gena with moderately long pale yellowish hairs, hairs becoming dark brown laterally on paraocular areas and vertex, no hairs equalling length of scape. Antennae dark, A3 subequal to A4+5.

Mesosoma: Scutum and scutellum with strong granular shagreen, surface dull, irregularly and shallowly punctate, punctures separated by 0.5–2 puncture diameters, some almost disappearing into underlying sculpture, others with raised rims (Fig. 74D). Pronotum with strong humeral angle. Mesepisternum and dorsolateral parts of propodeum with granular microreticulation overlain by network of fine reticulation resembling areolate punctures. Propodeal triangle not laterally defined by carinae, internal surface with fine granular shagreen and lacking wrinkles, propodeal triangle thus defined by change in surface sculpture (Fig. 74E). Mesepisternum with light brown plumose hairs, hairs not equalling length of scape, scutum and scutellum with hairs becoming golden brown. Propodeal corbicula incomplete, dorsally composed of strongly plumose golden-brown hairs; internal surface with occasional golden

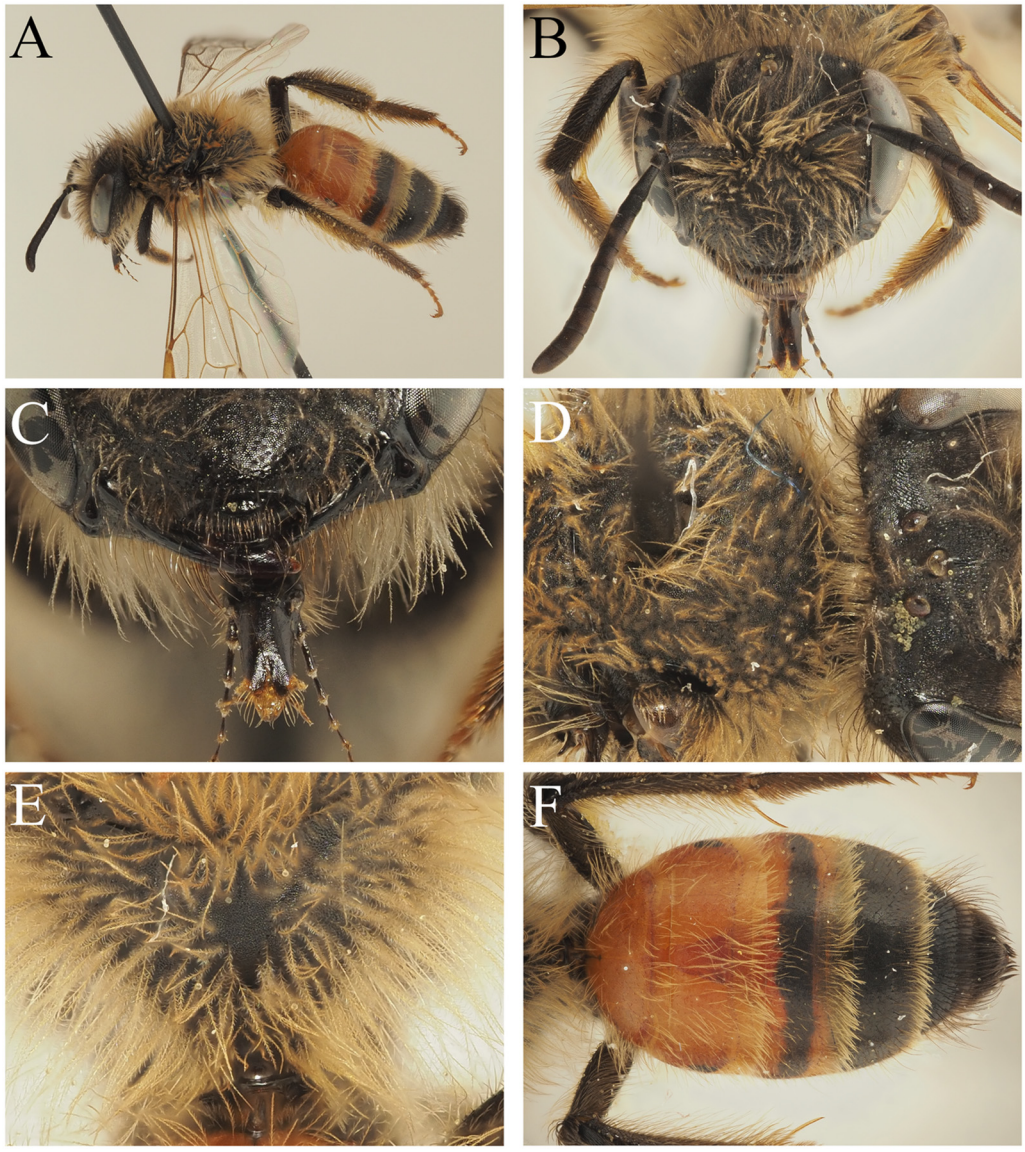

Fig. 74. Andrena (incertae sedis) *mysteria* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Process of labrum, ventral view; D. Scutum, dorsal view; E. Propodeum, dorsal view; F. Terga, dorsal view

simple hairs. Legs dark, apical tarsal segments lightened orange, pubescence light to dark brown. Posterior face of hind femorae rounded, without projecting spines or latitudinal carinae. Hind tibial spurs parallel-sided. Flocculus complete, composed of white plumose hairs; femoral scopa

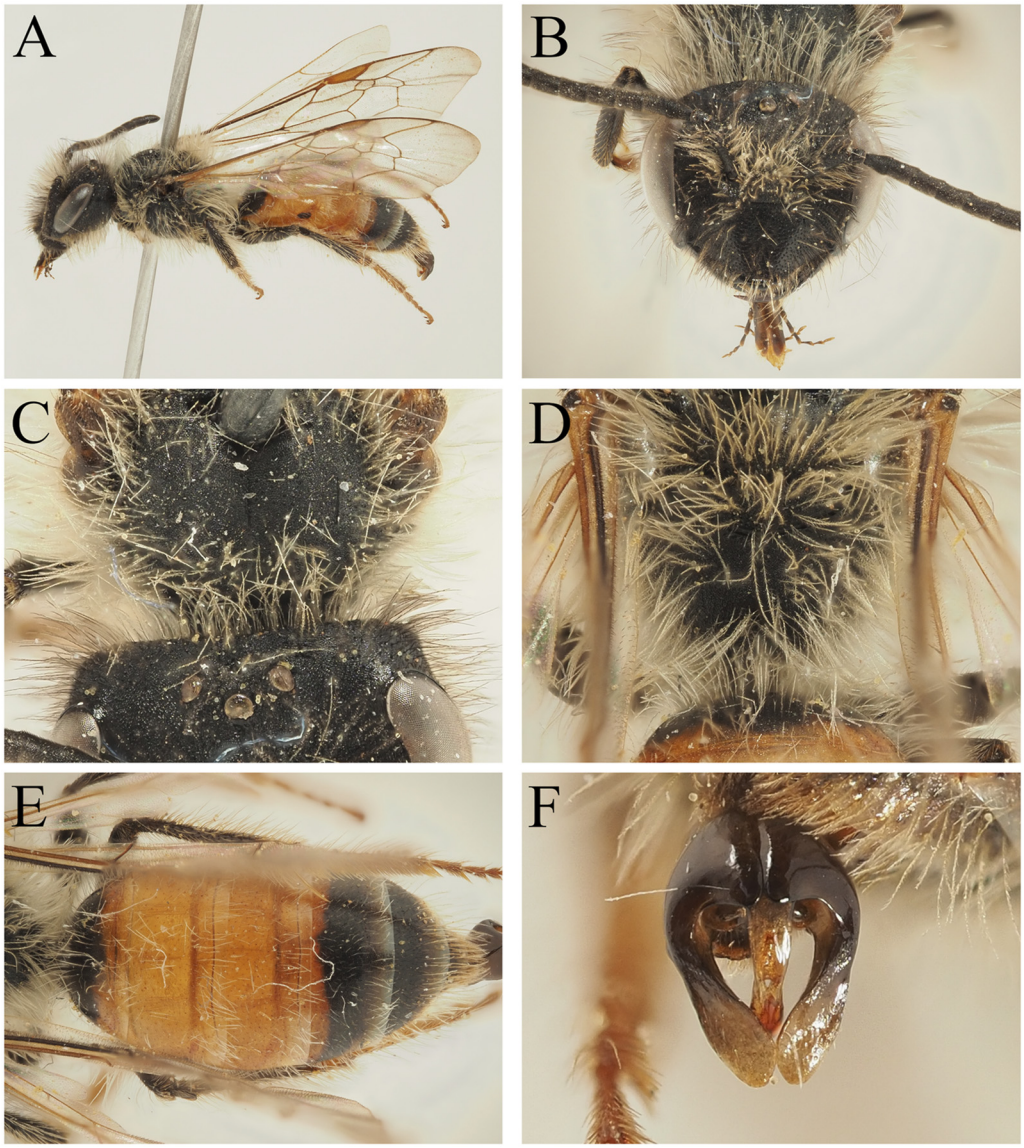

Fig. 75. Andrena (incertae sedis) *mysteria* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Scutum and head, dorsal view; D. Propodeum, dorsal view; E. Terga, dorsal view; F. Genital capsule, dorsal view

composed of white simple hairs, tibial scopa composed of stiff predominantly simple hairs, white ventrally, dark brown dorsally. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation orange, nervulus interstitial to slightly antefurcal.

Metasoma: T1–2 with discs entirely red-marked with exception of two lateral rounded black marks laterally (Fig. 74F). Discs of T3–4 black to predominantly black with narrow red markings anteriorly and posteriorly; marginal areas of T2–4 variably lightened hyaline-yellow-orange. Terga discs and marginal areas finely shagreened, obscurely shining, very obscurely punctate, with scattered widely separated hair-bearing punctures. Tergal discs with pale golden hairs, these longest on T1, forming weak hair fringes on marginal areas of T3–4, never obscuring underlying surface. Apical fringe of T5 and hairs flanking pygidial plate dark brown. Pygidial plate broadly rounded, surface densely punctate with exception of narrow rim, punctures almost confluent, surface dull.

Male. Body length: 9 mm (Fig. 75A). *Head:* Dark, 1.2 times wider than long. Clypeus dark, irregularly flattened, lateral parts angled, becoming broadly flattened medially, with poorly-defined longitudinal impression, clypeus thus appearing weakly three-faced (Fig. 75B). Surface of clypeus variably punctate, laterally punctures separated by <0.5–0.5 puncture diameters, becoming sparser medially, punctures here separated by 1–2 puncture diameters, underlying surface shagreened, weakly shining. Process of labrum small, weakly trapezoidal, apical margin shallowly emarginate, dorsal surface polished. Mouthparts as in female. Gena 1.5 times width of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Head with mixture of long black and greyish to brownish hairs, pale hairs predominantly on supraclypeal area, around antennal insertions, frons, and gena, black hairs predominantly on clypeus, inner margins of compound eyes, and vertex; longest hairs equalling length of scape. Antennae dark, A3 shorter than A4, A4–13 long, rectangular, 2 times longer than wide.

Mesosoma: Scutum and scutellum with strong granular shagreen, surface dull, irregularly and shallowly punctate, punctures separated by 0.5–2 puncture diameters, some almost disappearing into underlying sculpture, others with weakly raised rims (Fig. 75C). Pronotum with weak humeral angle. Mesepisternum and dorsolateral parts of propodeum with granular microreticulation overlain by network of hair-bearing wrinkles, thus appearing to be almost "punctate". Propodeal triangle not laterally defined by carinae, internal surface with fine granular shagreen, basally with short raised rugae (Fig. 75D). Mesosoma covered with long light brown plumose hairs, mesepisternum with scattered black hairs, hairs particularly dense on lateral faces of propodeum; longest hairs equalling length of scape. Legs basally dark, tarsi and apex of hind tibiae lightened orange; pubescence light brown. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation orange, nervulus slightly antefurcal.

Metasoma: Terga with apical part of T1, entirety of T2–3, and base of T4 red-marked, T2 laterally with small oval black marks; remaining surfaces dark (Fig. 75E). Apical margins of T4–5 slightly lightened hyaline whitish to brown at junction with disc. Tergal surface finely shagreened, weakly shining, with scattered fine hair-bearing punctures, punctures separated by 2–3 puncture diameters. Terga covered with long whitish hairs, some upstanding, at most forming slight hints of apical hairbands. T6–7 with reddish-brown hairs. S8 more or less columnar, slightly broadening apically, apical margin truncate, ventrally covered with dense fan of short brown hairs. Genital capsule simple, gonocoxae with inner margins rounded, very slightly projecting, gonostyli slightly broadening apically, flattened and spatulate. Penis valves narrow, almost parallel-sided, occupying slightly <⅓ space between gonostyli.

Diagnosis. *Andrena mysteria* is a species that cannot currently be placed into any known subgenus due to the combination of female domed and dull clypeus, moderately wide facial foveae, pronotum with a strong humeral angle, almost undefined propodeal triangle, simple

scopal hairs, absence of spines or carinae on the posterior face of the hind femur, parallel-sided hind tibial spurs, red-marked metasoma, dark male clypeus, simple male genital capsule, and lack of any other distinctive characters. As discussed above for *A. eborifacies*, this combination of characters is unusual; however, for *A. mysteria*, it is unlikely to suggest placement in the *crocusella*-group due to the genital capsule which lacks any indication of lateral projections on the penis valves, which are moreover too narrow. The male genital capsule, pronotum with humeral angle, and elongate segments A4–13 is suggestive of the subgenus *Hoplandrena*, but the female flocculus is too strongly produced to fit well here. Ultimately, genetic investigation with something more powerful than DNA barcodes is necessary. *Andrena mysteria* can be diagnosed as explained above in the section on *A. eborifacies*.

Etymology. From the Latin adjective *mysterius* meaning something mysterious, in reference to the lack of distinctive morphological characters and the consequent inability to place this species within a broader morphological context.

Remarks. The Lebanese specimen of *A. mysteria* was captured at flowers of *Acer monspessulanum* (Sapindaceae), at which it was collecting pollen, and the Israeli male was also captured at this flower. During the early bloom on Mount Hermon, *Acer* represents a dominant flowering resource (Fig. 76). The available barcode (BOLD accession number: WPATW1121-23) does not come close (within 10%) of any currently available sequence.

Distribution. Northern Israel, Lebanon, south-western Turkey. Probably present also on the Syrian part of Mount Hermon (Jabal al-Shaykh).

Andrena (incertae sedis) *pilosidorsum* spec. nov.

https://zoobank.org/27D49D91-0CAA-40A4-8B27-35B7DD0A2C0D

Figures 77 and 78.

HOLOTYPE: TAJIKISTAN • 1♀; Таджикская ССР, Горно-ботан. ст. Кондара [Mountain Botanical Station Kondara], Варзобское [Varzob]; 1,200 m a.s.l.; 15 Apr. 1979; А. Котенко [A. Kotenko] leg.; ZSM.

PARATYPE: TAJIKISTAN • 1♀; Кондара [Kondara]; 19 Apr. 1980; ZSM • 1♀; Duschanbe; 25 Apr. 1991; J. Halada leg.; OÖLM • 2♂; Darvaz, 10 km W Tavil-Dara [Tavildara]; 9–11 May 1991; J. Halada leg.; OÖLM.

Description. Female: Body length: 8–8.5 mm (Fig. 77A). *Head:* Dark, 1.25 times wider than long (Fig. 77B). Clypeus evenly domed, finely microreticulate, dull, very obscurely punctate. Process of labrum broadly trapezoidal, 2 times wider than long, apical margin weakly to distinctly emarginate. Gena weakly to strongly (1.1–1.5 times) exceeding width of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Foveae dorsally occupying ⅓ of space between compound eye and lateral ocellus, ventrally slightly narrowing, not extending below upper level of antennal insertions; foveae filled with brown hairs. Head predominantly covered with light brown hairs, becoming black laterally on paraocular areas, none equalling length of scape. Antennae dark, A3 exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum with uniform granular shagreen, surface very slightly shining, with slight bronze-green hints, surface impunctate. Pronotum with weakly rounded but distinct

Fig. 76. North-western side of Mount Hermon in Lebanon (33.4590°N, 35.8390°E) on 8 Apr. 2023, *locus typius* of *Andrena mysteria* spec. nov., showing abundant flowering *Acer monspessulanum* L. (Sapindaceae)

humeral angle. Mesepisternum and dorsolateral parts of propodeum with uniform granular microreticulation, surface dull. Propodeal triangle poorly defined, internal surface with fine granular shagreen, outer margin not defined by carinae, very slightly depressed relative to dorsolateral parts of propodeum, outer margins slightly medially constricted (Fig. 77C). Mesepisternum covered with very long plumose pale to light brown hairs, exceeding length of scape, hairs becoming golden-brown on scutum and scutellum. Propodeal corbicula incomplete, dorsal fringe composed of long light brown plumose hairs, internal surface with scattered long simple hairs. Legs dark, apical tarsal segments lightened brownish, pubescence light brown. Flocculus complete, sparse, composed of white plumose hairs; femoral and tibial scopae predominantly composed of white simple hairs, some in apical ½ of tibae showing weak plumosity. Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation orange, nervulus variable, interstitial to antefurcal.

Metasoma: Tergal discs dark, tergal margins broadly lightened white-hyaline, becoming brownish at junction with discs (Fig. 77D). Tergal discs with surface shagreened, more or less shining, with scattered fine hair-bearing punctures, punctures separated by 3–4 puncture diameters. Tergal discs with abundant upstanding hairs, these erect to decumbent, not obscuring underlying surface. Marginal areas of T2–4 with apical hair fringes of long yellowish hairs, these complete in fresh specimens, extending beyond margins of terga, almost obscuring underlying

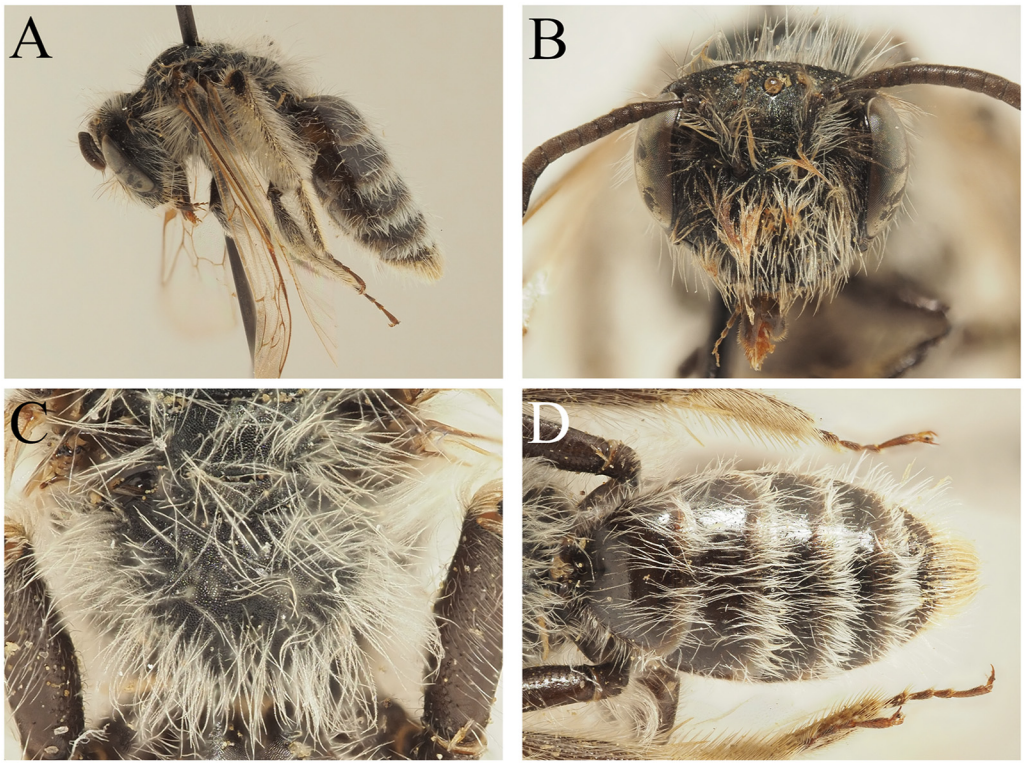

Fig. 77. Andrena (incertae sedis) *pilosidorsum* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Propodeum, dorsal view; D. Terga, dorsal view

surface in fresh specimens. Apical fringe of T5 and hairs flanking pygidial plate golden-brown. Pygidial plate rounded-triangular, medially with narrow longitudinal raised ridge, surface otherwise dull and featureless.

Male: Body length: 8 mm (Fig. 78A). *Head:* Dark, 1.3 times wider than long (Fig. 78B). Clypeus predominantly dark, with small yellow mark along anterior margin; clypeus evenly domed, finely microreticulate, dull, very obscurely punctate. Process of labrum rounded-rectangular, 3 times wider than long, anterior margin weakly emarginate. Gena equalling width of compound eye; ocelloccipital distance slightly exceeding diameter of lateral ocellus. Head with long whitish to light brownish plumose hairs, longest exceeding length of scape. Antennae basally dark, A5–13 ventrally extensively lightened orange; A3 slightly exceeding A4+5, shorter than A4+5+6; A4 more or less square, shorter than A5, much shorter than A3.

Mesosoma: Mesosoma structurally as in female (Fig. 78C), covered with very long whitish plumose hairs, clearly exceeding length of scape. Legs dark, tarsal segments lightened brown to light orange apically, pubescence light brown. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange, nervulus variable, interstitial to weakly antefurcal.

Metasoma: Tergal discs dark, marginal areas broadly lightened hyaline white-yellow, becoming brown at junction with discs (Fig. 78D). Tergal discs finely shagreened, weakly

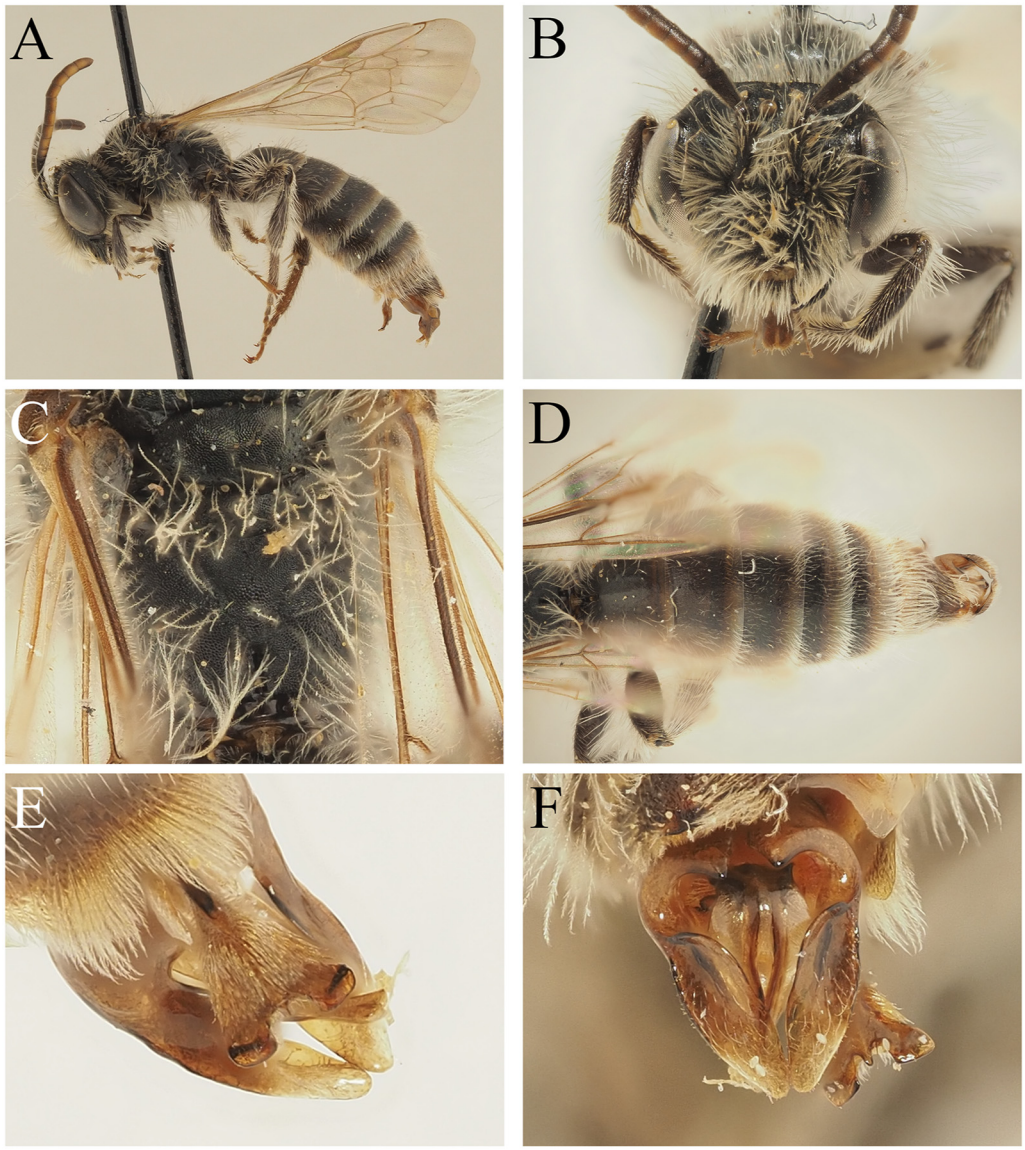

Fig. 78. Andrena (incertae sedis) *pilosidorsum* **spec. nov.** male. A. Habitus, lateral view; B. Head, frontal view; C. Propodeum, dorsal view; D. Terga, dorsal view; E. Sternum 8, ventral view; F. Genital capsule, dorsal view

shining, with extremely fine and obscure hair-bearing punctures, punctures separated by 2–3 puncture diameters. Tergal discs with short scattered pale hairs, margins of T2–5 with long apical hair fringes, interrupted on T2–3, complete on T4–5, hair fringes exceeding length of marginal areas. T6–7 with fringe of golden-white hairs. S8 roughly triangular, strongly

broadened and bifurcate apically, medially with small tooth, overall thus appearing "Y" shaped; ventral surface with short brown hairs (Fig. 78E). Genital capsule robust, gonocoxae with inner margins diverging apically, produced into acutely pointed teeth (Fig. 78F). Gonostyli in apical ¾ strongly broadened and flattened, blade-like. Penis valves broad, broadest medially with almost lateral rounded extensions, tapering apically to narrow truncate apex.

Diagnosis. *Andrena pilosidorsum* may belong to the subgenus *Poecilandrena*, but this subgenus remains challenging to define (see discussion under *A. ledermanni*) and *A. pilosidorsum* shows a number of unusual characters such as the elongate granular propodeal triangle (Figs 77C and 78C), the pronotum which is not carinate but which shows some kind of angulation, and the unique male S8 (Fig. 78E) which render a confident subgeneric placement impossible at this time. It is best compared directly to its most morphologically similar species, *A. ledermanni* (Syria, Turkmenistan, Uzbekistan) due to its combination of evenly domed clypeus which is shagreened, dull, and obscurely punctate, scutum and scutellum with strong granular microsculpture with slight bronze-green metallic hints, elongate propodeal triangular with granular sculpture, terga which have only a few obscure punctures, and tergal margins which are broadly lightened whitish-hyaline (Fig. 77D), as well as a distribution in Central Asia. However, the two species are quite distinct, and the male morphology is sufficiently distinct to raise the question as to how related the two taxa actually are. *Andrena pilosidorsum* is therefore best placed as *incertae sedis* at the present time.

Andrena pilosidorsum can be separated from *A. ledermanni* in the female sex due to the hairs of the tibial scopae which are predominantly simple with only a few showing a little light feathering at their apexes (tibial scopae consistently and uniformly plumose in *A. ledermanni*), the narrower facial foveae which occupy ⅓ of the space between the compound eye and a lateral ocellus (½ this space in *A. ledermanni*), the tergal discs with fine and scattered hair-bearing punctures, these punctures separated by 2–3 puncture diameters (Fig. 77D; in *A. ledermanni* with the tergal discs essentially impunctate, Fig. 46F), and by the tergal pubescence which is composed of long upstanding hairs on the tergal discs, giving a shaggy impression (Fig. 77D; in *A. ledermanni* with the tergal discs essentially hairless, with hairs restricted to the marginal areas, Fig. 46F). It can be separated in the male sex due to the clypeus which has only a narrow pale marking along the anterior margin (Fig. 78B; in *A. ledermanni* with the majority of the clypeus yellow-marked, Fig. 47B), the sternal pubescence which has S2–6 with yellowish apical fringes (in *A. ledermanni* with S2–5 showing strong white hair fringes culminating in a strong laterally-spreading tuft on S6, Fig. 47E), S8 which is roughly triangular, broadening apically where it becomes bifurcated with a tiny median tooth, the ventral surface with only very short hairs (Fig. 78E; in *A. ledermanni* with S8 simple, essentially columnar, ventral surface covered with a spreading fan of long white hairs), and the robust genital capsule with gonocoxal teeth, strongly flattened and broadened gonostyli, and medially broadened penis valves (Fig. 78F; in *A. ledermanni* with the genital capsule much more elongate and delicate, with no gonocoxal teeth and narrow gonostyli and penis valves, Fig. 47F).

Etymology. From the Latin adjective *pilosus* (hairy or shaggy) + the Latin noun *dorsum* (the back), meaning hairy back, in reference to the abundant metasomal pubescence when compared to *A. ledermanni* that has the tergal discs essentially hairless. It is a compound noun in apposition.

Distribution. Tajikistan.

Andrena (incertae sedis) *rubricincta* spec. nov.

https://zoobank.org/8D41A40B-51F8-4FFB-903E-25AE459CA16B

Figure 79.

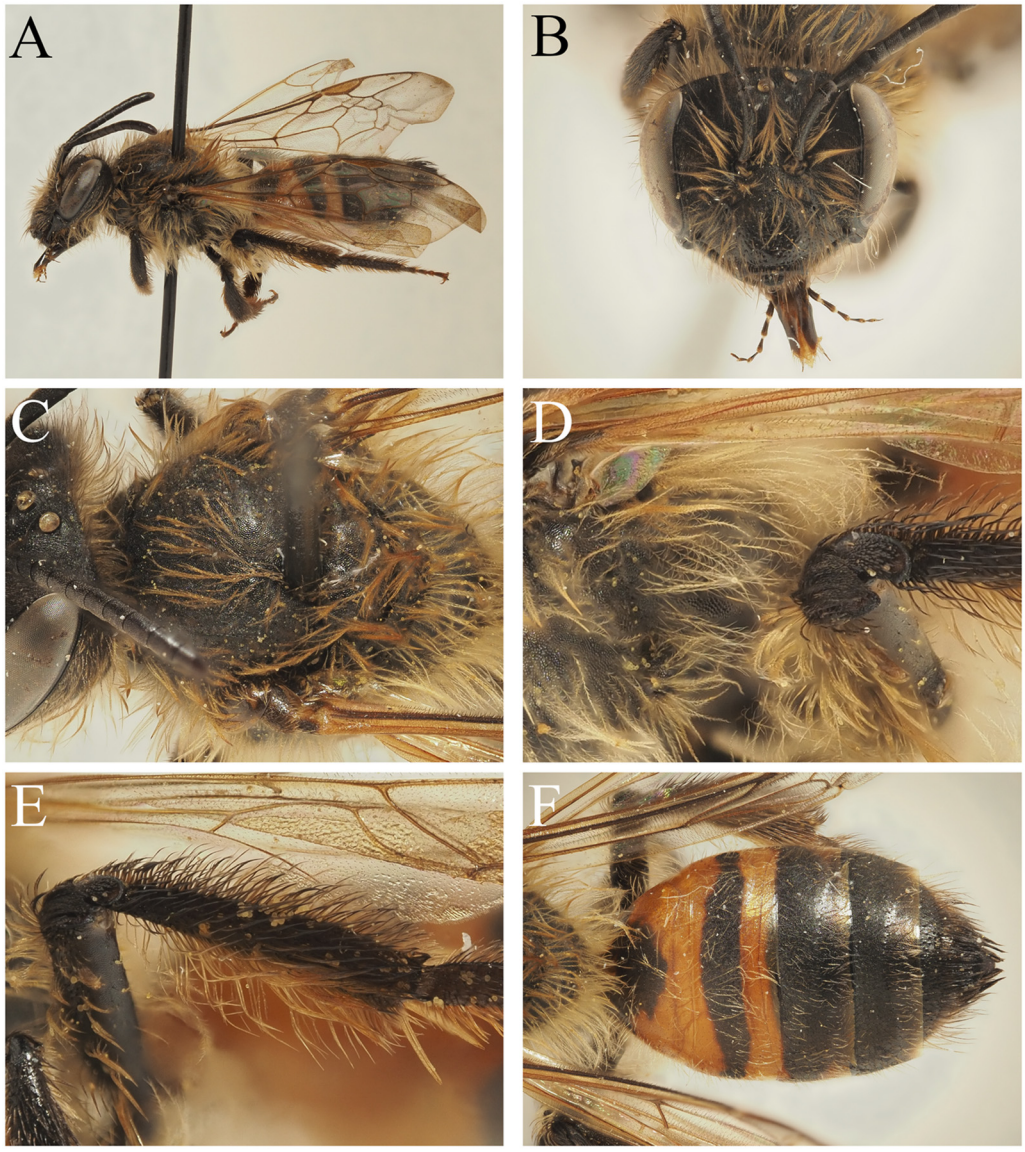

Fig. 79. Andrena (incertae sedis) *rubricincta* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Lateral face of propodeum, lateral view; E. Hind tibia, lateral view; F. Terga, dorsal view

HOLOTYPE: MOROCCO • 1♀; Anti-Atlas, Idergane valley [by Timskite]; 30.7100°N, −7.9566°W; 950 m a.s.l.; 15 Mar. 2023; P. Mlčoch leg.; NMPC.

Description. Female. Body length: 9.5 mm (Fig. 79A). *Head:* Dark, 1.2 times wider than long (Fig. 79B). Clypeus weakly domed, variably sculptured, basally microreticulate with latitudinal wrinkles, sculpture becoming weaker medially, apically very finely shagreened, almost polished and shining. Clypeal surface irregularly and shallowly punctate, punctures separated by 0.5–2 puncture diameters, basally disappearing into underlying sculpture, sparsest along apical margin. Process of labrum rounded-trapezoidal, slightly wider than long. Gena exceeding width of compound eye; ocelloccipital distance equalling diameter of lateral ocellus. Foveae dorsally occupying ¾ space between compound eye and lateral ocellus, separated from lateral ocellus by distance equal to diameter of lateral ocellus; foveae slightly narrowed ventrally, ventrally extending slightly below lower margins of antennal insertions; foveae filled with blackish hairs. Antennae basally dark, A5–12 ventrally slightly lightened by presence of greyish-brown scales; A3 exceeding A4, shorter than A4+5.

Mesosoma: Scutum and scutellum strongly microreticulate and predominantly dull, with obscure punctures disappearing into underlying sculpture (Fig. 79C), punctures most visible on anteromedial part of scutum, here separated by 0.5–2 puncture diameters. Pronotum with weak hint of humeral angle. Mesepisternum and dorsolateral part of propodeum with fine and uniform granular shagreen, weakly shining; propodeal triangle lacking lateral carinae, internal surface with distinctly larger granular shagreen, basally with irregular pattern of radiating fine carinae, longest reaching ¾ length to propodeal declivity; propodeal triangle therefore differentiated from remaining propodeum by slight change in sculpture. Mesepisternum with long densely plumose golden-brown hairs, none equalling length of scape, hairs becoming shorter on scutum and scutellum. Propodeal corbicula complete, dorsal and anterior fringes composed of long densely plumose golden hairs, internal surface with sparse, long, simple golden hairs (Fig. 79D). Legs dark, apical tarsal segments slightly lightened brownish, pubescence blackish to light brownish. Flocculus complete, composed of long strongly plumose light brownish hairs; femoral scopae composed of golden simple and plumose hairs. Tibial scopa composed of simple hairs, hairs in dorsal half and hairs flanking basitibial plate black, ventrally golden brown (Fig. 79E). Hind tarsal claws with inner tooth. Wings hyaline, stigma and venation orange, nervulus interstitial.

Metasoma: Metasomal terga with red markings on margin and lateral flanks of T1, and base and marginal area of T2, elsewhere dark; apical rims of all terga narrowly lightened hyaline-yellow (Fig. 79F). Tergal discs with fine granular microreticulation, weakly shining, with fine hair-bearing punctures, punctures separated by 1–2 puncture diameters, most pronounced on basal parts of discs. Discs of T1–4 with scattered golden-brown hairs, longest on T1, tergal margins with only scattered hairs, not forming apical hairbands. Apical fringe of T5 and hairs flanking pygidial plate dark black. Pygidial plate rounded-triangular, surface with raised triangular area medially, obscurely punctate.

Male. Unknown.

Diagnosis. Despite being revised very recently (Wood 2023b), the *Andrena* fauna of Morocco continues to produce undescribed species. *Andrena rubricincta* shows an unusual combination of characters that defy subgeneric placement, these being facial foveae broad, occupying ¾ space

between the compound eye and a lateral ocellus; A3 exceeding A4 in length, shorter than A4+5 (Fig. 79B); pronotum with a very weak humeral angle; propodeal corbicula complete, both corbicular fringes (dorsal and anterior) composed of long strongly plumose golden hairs, internal surface with long simple golden hairs (Fig. 79D); propodeum with almost no sculpture, propodeal triangle with no lateral carinae but with weak basal rugae; simple femoral and tibial scopae, and lack of any other distinctive characters. This places it very close to the recently described *A. risha* Wood, 2024 (north-western Algeria) which is also known only from the holotype female, this collected from Oran in March 1960.

The character of a complete propodeal corbicula is unusual, but does not suggest membership of subgenus *Simandrena* because the internal surface (the lateral faces of the propodeum) is not glabrous but covered with long simple hairs. The somewhat elongate A3 might suggest placement in the subgenus *Euandrena*, but the facial foveae are much too broad. The subgeneric placement is best left unknown until genetic data can be produced. Diagnosis against *A. risha* can be made across several subtle characters; although none of them are strongly convincing in and of themselves, collectively they suggest between-species variation. Specifically, *A. rubricincta* can be recognised due to the sculpture of the clypeus which is irregularly sculptured, microreticulate and dull basally, becoming finely shagreened and shining apically (in *A. risha* with the clypeus more consistently and uniformly shagreened and weakly shining over its entire surface), the irregular clypeal punctation with punctures separated by 0.5–2 puncture diameters and without an impunctate midline (in *A. risha* with clypeal punctures separated by 0.5–1 puncture diameter, with hints of an impunctate longitudinal midline), the ocelloccipital distance equalling the diameter of a lateral ocellus (in *A. risha* with the ocelloccipital distance of 1.5 times the diameter of a lateral ocellus), the foveae occupying ¾ of the space between the compound eye and a lateral ocellus and filled with black hairs (in *A. risha* with the foveae occupying slightly over ½ this space, filled with dark brown hairs), T1–2 with abundant red markings, and with the rims of the tergal margins only very narrowly lightened hyaline-yellow (Fig. 79F; in *A. risha* with the terga dark with exception of marginal areas of T1–2 broadly lightened hyaline-brown), terga without apical hairbands (in *A. risha* with T1–4 forming weak but distinct apical hairbands that do not obscure the underlying surface), terminal fringe composed of black hairs (in *A. risha* with the terminal fringe composed of dark brown hairs), and pygidial plate with a triangular raised and obscurely punctate area medially (in *A. risha* with the pygidial plate flat, internal surface densely punctate with punctures confluent).

Finally, due to the red-marked terga, poorly defined propodeal triangle, moderate body size, and pronotum with weak humeral angle, *A. rubricincta* is superficially similar to *A.* (*Notandrena*) *binominata* Smith, 1853. However, it shows numerous differences, specifically in the predominantly dull clypeus (in *A. binominata* with the clypeus polished and shining over the majority of its surface), the broad facial foveae (in *A. binominata* with the foveae occupying <½ the space between the compound eye and a lateral ocellus), the dull microsculptured scutum with obscure shallow punctation (in *A. binominata* with the scutum weakly shining and strongly and densely punctate, punctures clearly visible against the underlying sculpture).

Etymology. From the Latin adjectives *rubrum* (red) and *cinctus* (bordered, in this case banded), hence *rubricincta* (red-banded) in reference to the red colouration on T1–2. It is a compound noun in apposition.

Distribution. South-western Morocco (Souss-Massa).

Andrena (incertae sedis) *spirantha* spec. nov.

https://zoobank.org/3D9C0DAE-DD74-4AEB-AAB0-4A91F7454F0D

Figures 80 and 81.

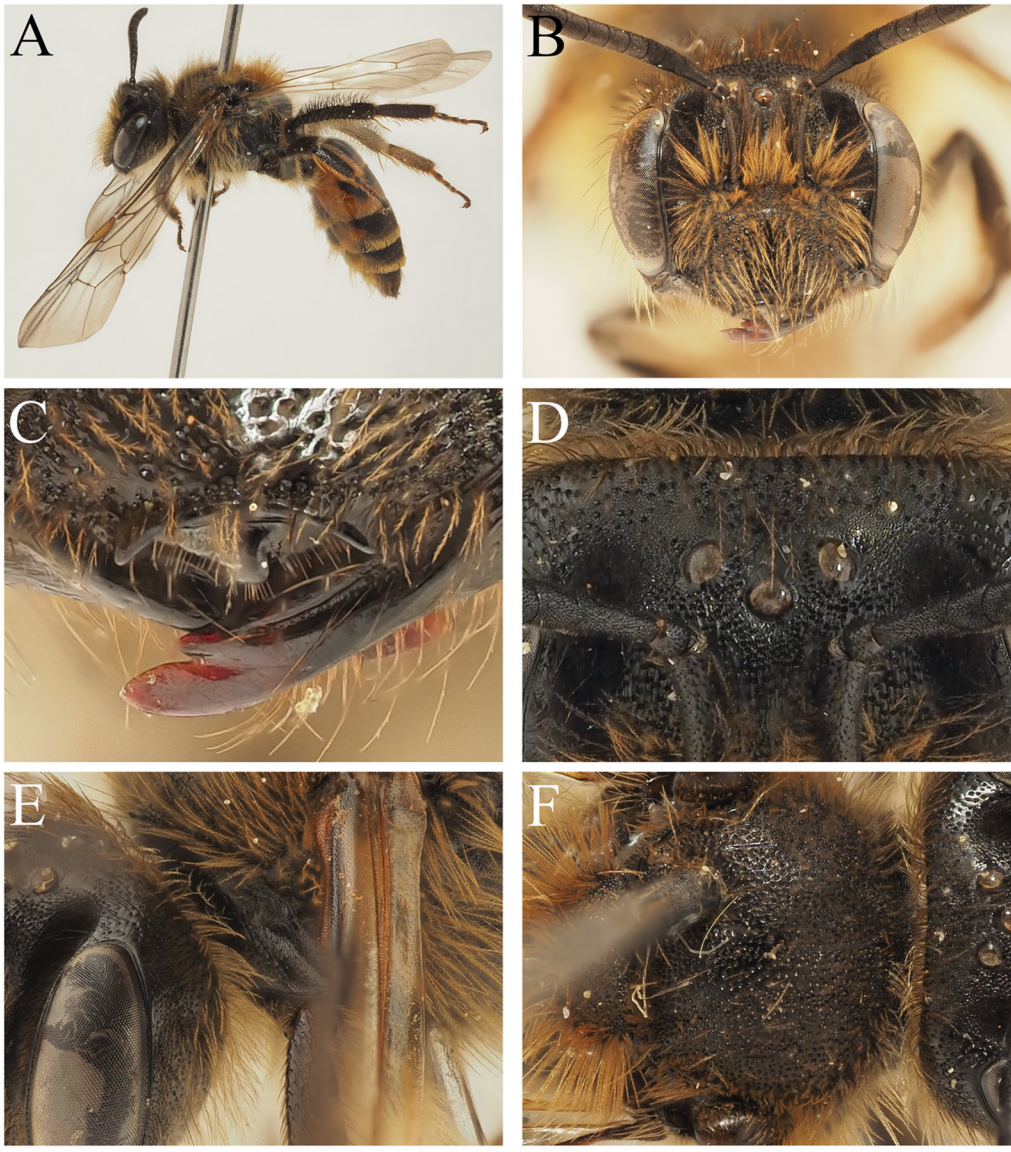

Fig. 80. Andrena (incertae sedis) *spirantha* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Process of labrum, ventral view; D. Facial foveae, dorsal view; E. Pronotum, dorsolateral view; F. Scutum, dorsal view

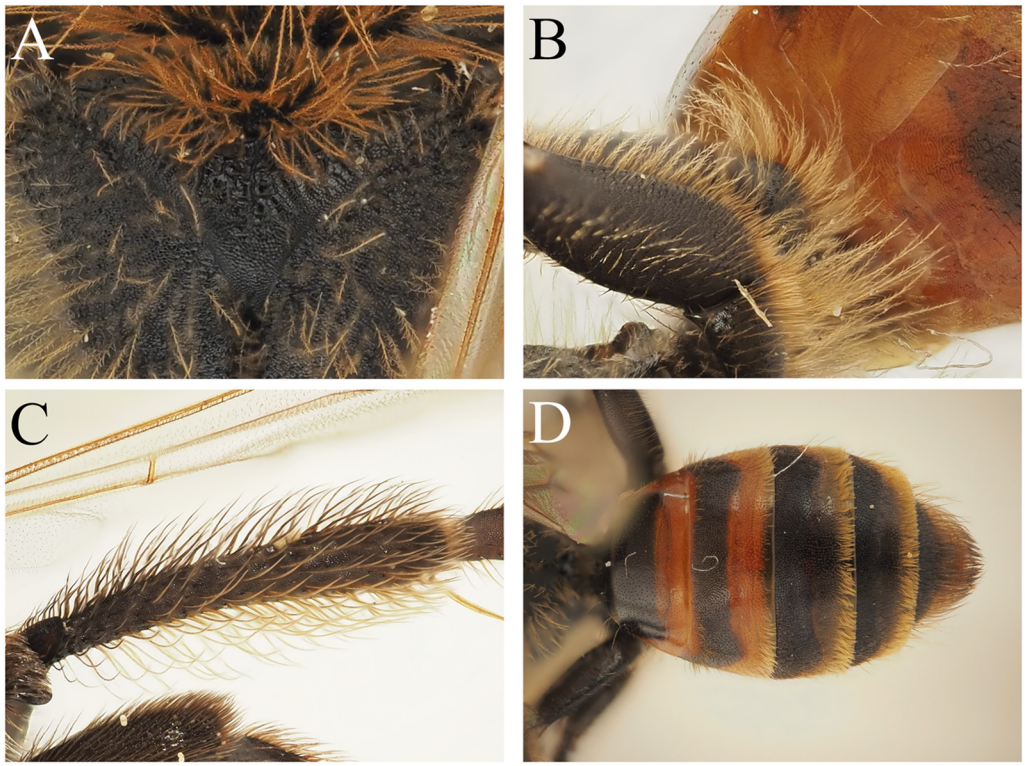

Fig. 81. Andrena (incertae sedis) *spirantha* **spec. nov.** female. A. Propodeum, dorsal view; B. Flocculus, ventral view; C. Hind tibia, lateral view; D. Terga, dorsal view

HOLOTYPE: CHINA • 1♀; Prov. Yunnan, Wenhai, wet meadow; 26.9898°N, 100.1549°E; 3,100 m a.s.l.; 22 Jul. 2015; P. Bernhardt leg.; SEMC; SEMC1551874; on *Spiranthes sinensis* (Pers.) Ames.

Description: Female: Body length: 9 mm (Fig. 80A). *Head:* Dark, 1.3 times wider than long (Fig. 80B). Clypeus more or less flattened over majority of its surface, only very weakly domed. Surface densely punctate with punctures of slightly variable size, punctures separated by 0.5–1(2) puncture diameters with exception of weak impunctate longitudinal midline, underlying surface polished and shining over majority of area, becoming shagreened and dull laterally. Anterior margin of clypeus broadly and shallowly concave, forming a broad semi-circle in frontal view. Process of labrum small, more or less triangular with truncate apical margin (Fig. 80C). Gena 1.5 times width of compound eye; ocelloccipital distance 2.5 times diameter of lateral ocellus. Malar space linear. Surface of vertex with punctures separated by 0.5–2 puncture diameters, strongly contrasting frons, punctures here dense and regular, separated by 0.5 puncture diameters. Foveae dorsally occupying slightly more than ½ space between compound eye and lateral ocellus, deeply impressed (Fig. 80D), ventrally extending below level of antennal insertions, dorsally not extending beyond posterior margin of lateral ocellus, not narrowed or constricted; foveae filled with black hairs. Face medially and gena covered with light

brown hairs, hairs becoming black laterally, on paraocular areas; vertex and scape with intermixed black and light brown hairs. Antennae dark, A5–12 ventrally slightly lightened by presence of greyish scales; A3 exceeding length of A4+5, shorter than A4+5+6.

Mesosoma: Scutum and scutellum shagreened and weakly shining, densely but irregularly punctate, punctures touching to separated by 0.5(1) puncture diameters (Fig. 80F). Pronotum with strongly pronounced humeral angle, humeral angle laterally produced into carina in dorsal half (Fig. 80E). Mesepisternum with granular shagreen, weakly shining, regularly and shallowly punctate, punctures separated by 0.5–1 puncture diameters. Dorsolateral parts of propodeum with fine network of reticulation, predominantly dull. Propodeal triangle broad, laterally with fine granular shagreen, without lateral carinae, shape defined by change in surface sculpture from dorsolateral parts of propodeum; internal surface of propodeal triangle rugose-areolate basally, finely reticulate apically (Fig. 81A). Mesepisternum with long light brown plumose hairs, none equalling length of scape, scutum and scutellum with shorter light brown plumose hairs. Propodeal corbicula weak, incomplete, composed of light brown plumose hairs, internal surface with some shorter light brown plumose hairs. Legs dark, apical tarsal segments lightened brownish-orange, pubescence reddish to brownish. Flocculus incomplete, short and weakly produced, composed of orange-brown plumose hairs (Fig. 81B); femoral scopae short, composed of whitish weakly plumose hairs; tibial scopae composed of thickened, almost bristle-like evenly spaced simple hairs, surface of tibia with fine granular shagreen, weakly shining, surface clearly visible between scopal hairs, these separated by distance subequal to diameter of lateral ocellus (Fig. 81C). Hind tibial spurs parallel-sided. Hind tarsal claws with strong inner tooth. Posterior face of hind femora without latitudinal carina. Wings with three submarginal cells, hyaline, stigma and venation orange, nervulus postfurcal.

Metasoma: Terga predominantly dark, marginal areas of T1–2 strongly and T3–4 weakly lightened orange-red; orange-red colouration more extensive on lateral parts of terga and S1–3 (Fig. 81D). Disc of T1 evenly rounded into declivity. Tergal discs densely punctate, on T1 punctures separated by 1–2 puncture diameters, contrasting discs T2–4, punctures here separated by 0.5 puncture diameters. Tergal discs with short pale hairs, T2–4 with short apical hair fringes composed of golden-brown hairs, interrupted on T2, complete on T3–4. Apical fringe of T5 and hairs flanking pygidial plate dark brown. Pygidial plate apically rounded, with regular granular shagreen, weakly shining.

Male: Unknown.

Diagnosis. *Andrena spirantha* presents a unique combination of characters that both allow its separation from all known Old World species at a specific level, but also render its placement in a subgenus impossible at the present time. Specifically, due to the combination of facial foveae impressed, dorsally occupying slightly over ½ space between lateral ocellus and compound eye (Fig. 80D), not extending dorsally beyond posterior margin of lateral ocellus, not noticeably broadened, narrowed, or constricted along their length; gena broader than the width of the compound eye; pronotum with strongly pronounced humeral angle, this angle laterally produced into a carina in its dorsal half (Fig. 80E); ocelloccipital distance long, 2.5 times the diameter of a lateral ocellus; malar length linear; process of labrum narrow and triangular; propodeal triangle large and broad, lateral margins defined by change in surface sculpture (without a raised carina), internal surface covered strongly raised distinct rugae, these rugose-areolate and visually distinct and striking (Fig. 81A); three submarginal cells; inner hind tibial

spurs parallel (not basally or submedially broadened); flocculus incomplete and weakly produced (Fig. 81B); tibial scopae composed of simple hairs, these thick and widely spaced, sparsest hairs separated by distance subequal to diameter of lateral ocellus (Fig. 81C); propodeal corbicula incomplete, weakly produced, with a few plumose hairs on the lateral faces of the propodeum; hind femur without latitudinal carina; nervulus postfurcal; and disc of T1 evenly rounded into declivity, it cannot be placed anywhere with confidence.

The most distinctive character is the shape of the propodeal triangle which has remarkable strongly raised and individually distinctive internal rugae, but 1) it lacks a raised carina defining its external margin (excluding *Biareolina* Dours, 1873 + *Trachandrena* Robertson, 1902) and 2) the hind tibial spur is not strongly broadened basally (excluding *Plastandrena* and allied subgenera). The strongly angled pronotum combined with the July flight period suggests the possibility of *Cnemidandrena* Hedicke, 1933, but the flocculus is extremely weakly produced and the tibial scopae is composed of thick hairs which are strongly spaced, and the hind tibia does not broaden apically. Another clade of summer-flying *Andrena* that are diversified in East Asia are grouped as subgenera *Calomelissa*, *Oreomelissa*, and *Tarsandrena* Osytshnjuk, 1984 (see Pisanty et al. 2022b). However, these have the propodeal triangle broad and either weakly sculptured or covered with fine dense wrinkles, never with strongly raised and individually distinctive internal rugae, and the tibial scopa is typical dense, not composed of spaced and individually thickened hairs.

Finally, due to the densely punctate metasoma with partial red markings combined with fine bright apical hair fringes on T2-4 and a dark terminal fringe, it is superficially similar to the West Palaearctic *A.* (*Bryandrena*) *florea* Fabricius, 1793 which makes up the monotypic subgenus *Bryandrena* Wood, 2023. However, *A. florea* is easily separated due to its larger size, propodeal triangle which lacks strongly raised internal rugae, dense tibial scopal hairs (clearly separated by a distance far smaller than the diameter of a lateral ocellus), broad trapezoidal process of the labrum, pronotum with only a weak humeral angle (not dorsally carinae), and many other characters.

Etymology. From the plant that it was recorded on, *Spiranthes sinensis* (Orchidaceae), this composed from the Greek *speira* (coil) and *anthes* (flower). The new name *spirantha* is a noun in apposition.

Notes. *Spiranthes* species are known to produce nectar in order to attract pollinators (e.g. Sipes & Tepedino 1995, Willems & Lahtinen 1997, Duffy & Stout 2008), with *Bombus* spp. (Apidae) being the most commonly recorded visitors. *Andrena* do not previously appear to have been reported as visitors of *Spiranthes*, and they are clearly not typical visitors in regions studied to date. In Yunnan, *Bombus*, *Apis* (Apidae), *Ceratina* (Apidae), and Halictidae have been recorded visiting *S. sinensis*, with smaller bees visiting the pink form of this species (Bernhardt et al. 2017). Since orchids do not produce pollen that is accessible to bee species, clearly other plants are used for pollen collection.

Distribution. China (Yunnan).

Andrena (incertae sedis) *viridella* spec. nov.

https://zoobank.org/5ABE4E5D-A524-4CDB-B2F2-215DEB0F1038

Figure 82.

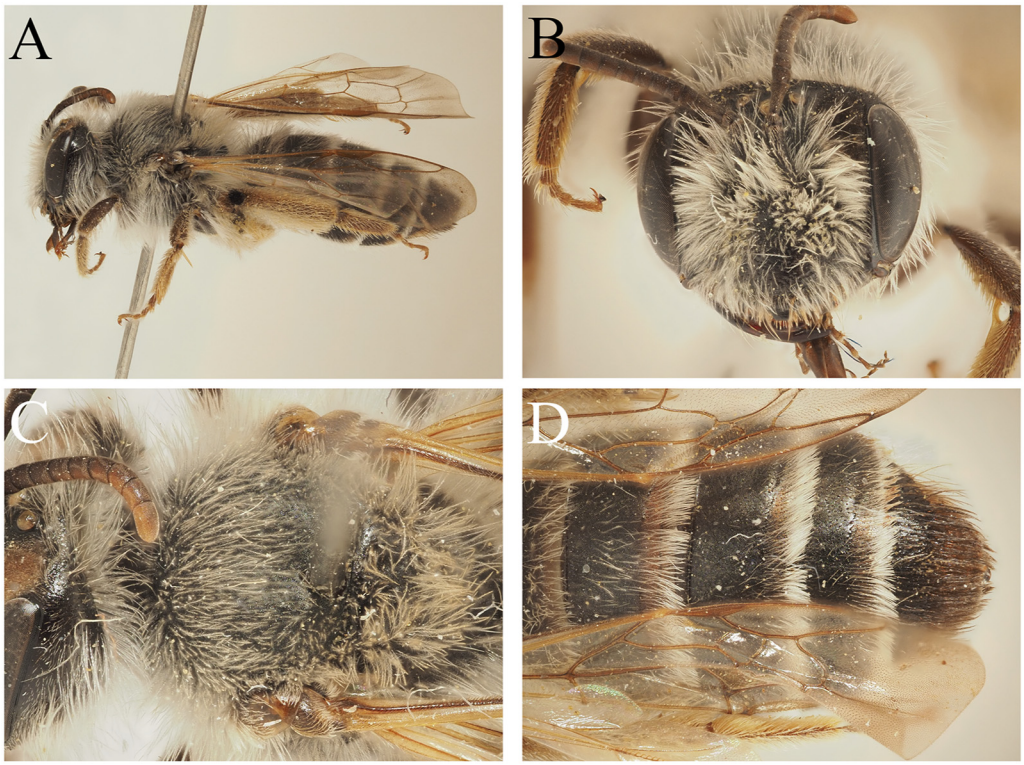

Fig. 82. Andrena (incertae sedis) *viridella* **spec. nov.** female. A. Habitus, lateral view; B. Head, frontal view; C. Scutum, dorsal view; D. Terga, dorsal view

HOLOTYPE: SYRIA • 1♀; Jabbul-See, SE Aleppo [Sabkhat al-Jabbul]; 300 m a.s.l.; 19 Apr. 1992; M. Kraus leg.; OÖLM.

PARATYPES: SYRIA • 2♀; Jabbul-See, SE Aleppo [Sabkhat al-Jabbul]; 300 m a.s.l.; 19 Apr. 1992; M. Kraus leg.; OÖLM/TJWC; **TURKEY** • 1♀; 40 km E Urfa [Şanlıurfa]; 14 May 1975; K. Warncke leg.; OÖLM.

Description: Female: Body length: 10–11 mm (Fig. 82A). *Head:* Dark, 1.3 times wider than long (Fig. 82B). Clypeus weakly domed, irregularly punctate, punctures separated by 0.5–2 puncture diameters, without clear longitudinal impunctate midline, underlying surface shagreened to weakly shining. Process of labrum narrow, trapezoidal, slightly wider than long; apical margin straight. Gena 1.5 times width of compound eye; ocelloccipital distance 1.5 times diameter of lateral ocellus. Foveae dorsally occupying majority of space between compound eye and lateral ocellus, separated from lateral ocellus by distance equal to diameter of lateral ocellus; foveae ventrally extending below lower level of antennal insertions, filled with light brown hairs. Head covered with white plumose hairs, longest hairs equalling length of scape. Antennae basally dark, A5–12 ventrally lightened by presence of orangish scales; A3 exceeding A4+5, shorter than A4+5+6.

Mesosoma: Scutum with fine microreticulation, surface dull and obscurely punctate, punctures separated by 0.5–1 puncture diameters (Fig. 82C). Scutellum predominantly polished over its surface, irregularly punctate, punctures separated by 0.5–4 puncture diameters. Pronotum with humeral angle. Mesepisternum and dorsolateral parts of propodeum with fine microreticulation, dull, covered with hair-bearing punctures, these forming weak network of wrinkles. Propodeal triangle broad, covered entirely with granular reticulation, triangle thus defined by change in surface sculpture relative to dorsolateral parts of propodeum. Mesepisternum covered with abundant long white plumose hairs, longest exceeding length of scape; these hairs becoming shorter dorsally on scutum and scutellum. Propodeal corbicula strongly produced, complete, with both dorsal and anterior fringes, internal surface of corbicula almost without hairs, with a few long white simple hairs dorsally just below dorsal fringe. Legs brownish, pubescence light brownish. Flocculus strongly produced, complete, composed of white plumose hairs; femoral and tibial scopae composed of simple white hairs. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange-brown, nervulus interstitial.

Metasoma: Terga finely microreticulate to shagreened, predominantly dark to displaying weak metallic-green hints, marginal areas lightened reddish-brown (Fig. 82D). Tergal discs shallowly and obscurely punctate, punctures separated by 1–3 puncture diameters. Tergal discs with long upstanding white hairs, longest on T1, much shorter on subsequent terga, hairs not obscuring underlying surface. T2–4 apically with strong and dense white hairbands, these extending onto base of subsequent tergum, obscuring underlying surface. Apical fringe and hairs flanking pygidial plate dark brown. Pygidial plate apically rounded, margin very slightly raised, medially with elevated area.

Male: Unknown.

Diagnosis. *Andrena viridella* is a difficult species to characterise and to place. Due to the combination of broad facial foveae (Fig. 82C; occupying almost the entire space between the compound eye and a lateral ocellus), the pronotum with a weak humeral angle, the scutum which is entirely sculptured and dull with obscure punctures (Fig. 82C), the propodeal triangle which is covered with a very fine granular reticulation, with the overall propodeum clearly shorter than broad, propodeal corbicula almost without internal hairs, with only a few hairs present dorsally just below the dorsal fringe (i.e. very close to the subgenus *Simandrena*, but this subgenus has the propodeal corbicula entirely glabrous internally), terga microreticulate and dull with obscure punctures (Fig. 82D), and terga with apical hairbands it can be compared to *A. komarowii* (Turkmenistan and Uzbekistan) and *A. mistrensis*. *Andrena mistrensis* is distributed from Greece across Turkey to Iran* (Grünwaldt et al. 2005, Hazir et al. 2012). The one male available specimen from Iran is noticeably larger than specimens from Greece and Turkey, but the genital capsule is the same. In the absence of other information, it is considered to be conspecific with *A. mistrensis* at the present time. This trio of species cannot currently be placed into an existing subgenus with confidence (see comments in Section 3).

Andrena viridella can be separated from *A. komarowii* due to the dark brown terminal fringe (Fig. 82D; terminal fringe orange-white in *A. komarowii*, Fig. 42F), process of the labrum trapezoidal, with anterior margin straight (in *A. komarowii* with the process of the labrum triangular, with the apical margin pointed, Fig. 42D), clypeus with weakly indicated impunctate midline, surface shagreened to weakly shining (in *A. komarowii* with the clypeus polished, with a strongly pronounced impunctate midline, Fig. 42C–D), and facial foveae with light brown hairs

when viewed dorsally (in *A. komarowii* with the facial foveae filled with pale golden hairs when viewed dorsally, never with any brown hairs).

Andrena viridella can be separated from *A. mistrensis* due to the medially polished and shining scutellum strongly contrasting the sculptured and dull scutum (Fig. 82C; in *A. mistrensis* with the scutum and scutellum equally sculptured and dull), due to the facial foveae with light brown hairs when viewed dorsally (in *A. mistrensis* with the facial foveae filled with dark brown hairs, Fig. 44D), due to the terga with faint metallic-green colouration (Fig. 82D; in *A. mistrensis* with the terga always dark grey, never with any metallic hints, Fig. 44F–G), due to the uniformly pale tibial scopae (Fig. 82A; in *A. mistrensis* with the tibial scopae composed of brown hairs dorsally and orangish hairs ventrally, Fig. 44B), due to the clypeus with a weakly indicated impunctate midline, surface shagreened to weakly shining (Fig. 82B; in *A. mistrensis* with the clypeus showing a clear impunctate midline, laterally and basally strongly shagreened and dull, Fig. 44C), and pygidial plate with medially raised area (in *A. mistrensis* with the pygidial plate with the surface smooth). This final character may not be stable, but in the specimens of *A. mistrensis* examined to date (including from the type series) there does not appear to be a raised area medially on the pygidial plate. This trio of species do not currently appear to be found in sympatry.

Etymology. From the Latin noun *viridis* (green) and the suffix *-ella* (diminutiveness) meaning "lesser green", in reference to it overall darker appearance of this species when compared to *A. komarowii*. It is a noun in apposition.

Distribution. North-western Syria and southern Turkey (Şanlıurfa).

Additional material examined (*Andrena mistrensis*). **GREECE** • 1♂; Karkalou. Pelopp; 11 Apr. 1988; H. Teunissen leg.; RMNH; RMNH.INS.1266239 • 1♀; Larisa [Larissa]; 22 Apr. 1962; K. Warncke leg.; E. Scheuchl det.; OÖLM • 1♀; Loutra, Lesbos; 16 May 1980; H. Teunissen leg.; RMNH; RMNH.INS.1652246 • 1♂, 1♀; Mykene [Mycenae]; 5 Apr. 1964; W. Grünwaldt leg.; ZSM (**paratypes**; female labelled as holotype but this does not match publication information) • 1♀; Peloponnese, 12 km NWW Sparti; 26–27 May 2005; J. Halada leg.; TJWC • 1♀; Peloponnese, 15 km N Sparta; 600 m a.s.l.; 29 Apr. 2014; K. Deneš leg.; OÖLM; **IRAN** • 1♂; Kohgiluyeh and Boyer-Ahmad, Yasuj, Semeron [Semerun]; 1,529 m a.s.l.; 2 May 2019; N. Yaghoobi, N. Tayebi, S. Shahbazi leg.; TJWC; **TURKEY** • 1♂; 10 km N Tutak, Ağrı; 1,500 m a.s.l.; 28 May 1980; K. Warncke leg.; OÖLM • 4♂; Ağrı, 10 km N Tutak; 1,600 m a.s.l.; 28 May 1980; M. Schwarz leg.; E. Scheuchl det.; OÖLM/TJWC • 1♀; Aydin, Adnan Menderes University, Campus; 182 m a.s.l.; 17 Mar. 2010; E. Scheuchl leg.; E. Scheuchl det.; OÖLM • 1♂; Aydin, Adnan Menderes University, mountain slope; 197 m a.s.l.; 3 Mar. 2010; E. Scheuchl leg.; E. Scheuchl det.; OÖLM • 1♂; Eskişehir; 1–30 Apr. 1934; E. Scheuchl det.; OÖLM.

6. CORRECT SPELLING OF *ANDRENA* NAMES

Andrena (*Euandrena*) *roseipes* Alfken, 1933

Andrena roscipes Alfken, 1933 [misprint]: 88, ♀♂ [Hungary, ZMHB, examined] (Fig. 83)

Material examined. HUNGARY • 1♂, 4♀; Simontornya; 30 Mar. 1933; Pillich leg.; ZMHB (one female **holotype**, remaining **paratypes**) • 1♂; Simontornya; 9 Apr. 1933; Pillich leg.; ZMHB

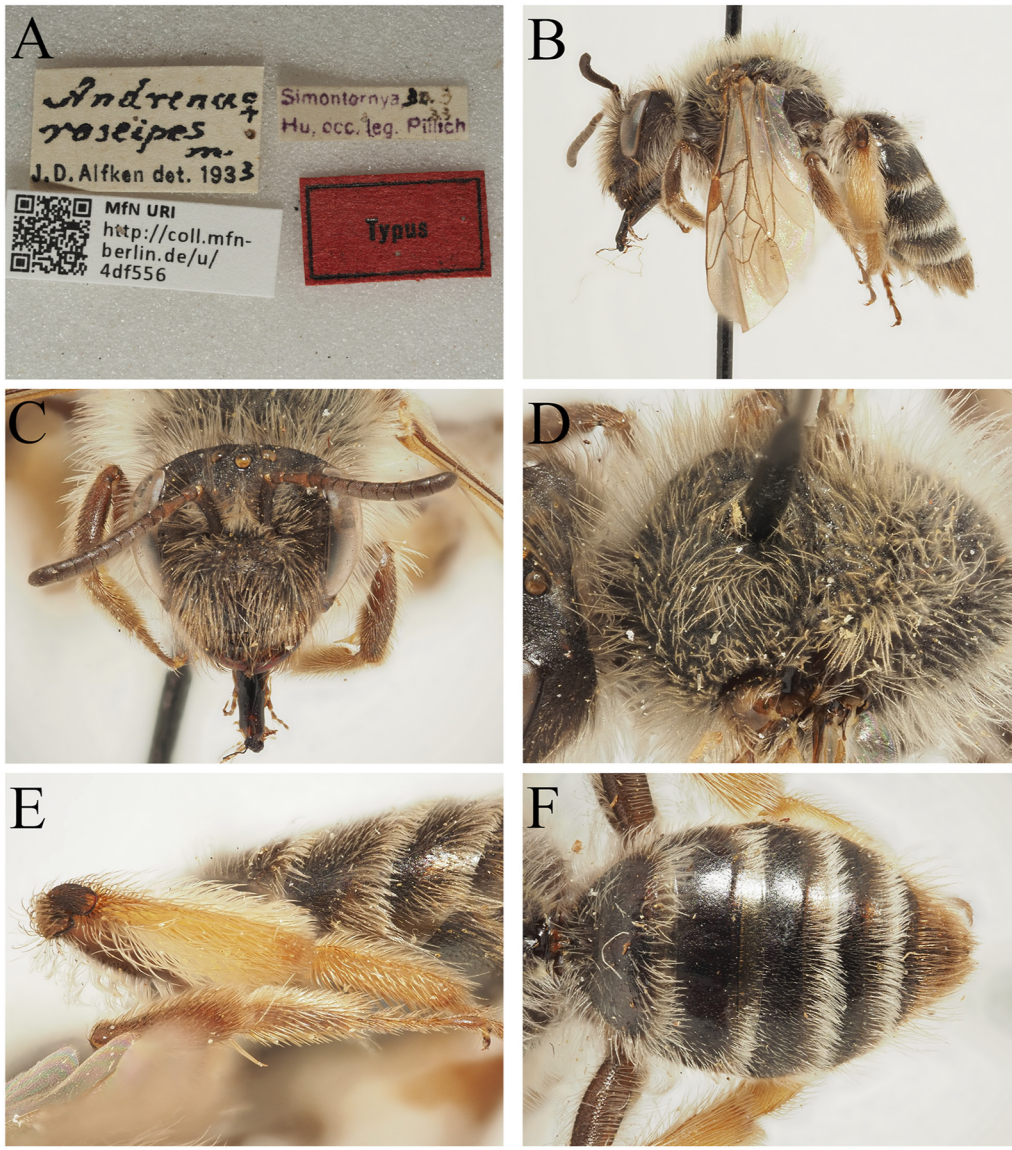

Fig. 83. Andrena (*Euandrena*) *roseipes* Alfken, 1933 holotype female (ZMHB). A. Label information; B. Habitus, profile view; C. Head, frontal view; D. Scutum, dorsal view; E. Hind tibia, posterolateral view; F. Terga, dorsal view

(**paratype**) • 1♀; N. Hungary; 1–30 Apr. 1932; ZMHB • 1♀; Simontornya; 23 Mar. 1935; Pillich leg.; RMNH; RMNH.INS.1660263 • 1♀; Veszprém; Öskü vineyard; 18 Apr. 2022; J. Straka leg.; JSPC • 1♀; Veszprém; Várpalota env., steppe; 3 Apr. 2022; V. Bureš leg.; JSPC; **RUSSIA** • 2♀;

Камышин [Kamyshin, Volgograd region]; 20 Apr. 1950; Л. Зимина leg. [L. Zimina]; OÖLM/TJWC ().

Remarks. The correct spelling for this taxon has been unclear, and it is valuable to explain why the name *A. roseipes* is currently chosen and used in the current European checklist (Ghisbain & Rosa et al. 2023). Whilst some authors used the name *A. roseipes* (e.g. Warncke 1967), others used *A. roscipes* (e.g. Gusenleitner & Schwarz 2002, Osytshnjuk et al. 2008).

In the original publication of Alfken, the name is spelled *Andrena roscipes*. This is clearly a printer's error; in describing the species, Alfken referred to the important character of the hind legs (Fig. 83E) which are coloured golden-red or orange (literally: "*gelbrot gefärbt*"). The name *roseipes* means red-legged in Latin, from *rose* (red) + *pes* (leg). The word *roscipes* in and of itself does not mean anything in Latin. Under ICZN (1999) article 32.5.1 this constitutes evidence of a printer's error, where "e" has been replaced by "c", two very similar letters. This is justifiable without a reference to an external source, such as consulting the original type label which reads *A. roseipes*. The name is therefore corrected to *A. roseipes*, the spelling which is currently used at a European level (Ghisbain & Rosa et al. 2023).

Distribution. Hungary, Slovakia, Ukraine, and Russia (European part) (Straka et al. 2007, Osytshnjuk et al. 2008).

DISCUSSION

Collectively, the changes presented here increase the size of the global *Andrena* fauna to 1,738 species, representing approximately 8% of all bee species (Ascher & Pickering 2024), and confirming its status as one of the hyper-diverse animal genera (Table 1). Patterns of *Andrena* description through time (Fig. 84) have been patchy, with sometimes moderate periods passing (e.g. 1809–1832; 1853–1861) with no descriptions published. Conversely, there have been individual years showing enormous activity (Table 3); this is most clearly seen during the most productive period of activity by Klaus Warncke, whose work makes the 1965–1975 period the single most description-rich time for this genus (e.g. Warncke 1965, 1968b, 1969, 1967, 1973, 1974, 1975). Other workers with highly concentrated *Andrena* works are Morawitz (1876), Pérez (1895), and Viereck (1917a, 1917b). Other prolific *Andrena* authors (Table 4) have produced more dispersed works, particularly Cockerell, Osytshnjuk, LaBerge, Tadauchi, and Xu, who contributed names through regular publications.

Although the 1965–1975 period was the most productive, the 2022–2024 period has produced three of the most prolific years yet seen in *Andrena* description (Table 3), and due to the overall shape of the descriptive trend with a recent uptick in activity (Fig. 84), it is difficult to conclude on the final estimated species richness for the genus. Given the progress that has been achieved through the application of molecular techniques in the revisionary alpha taxonomy of *Andrena* in Europe and the West Mediterranean (e.g. Praz et al. 2022, Wood 2023a, 2023b), one can only suggest that hundreds of species remain to be described globally once such analyses can be conducted in the East Mediterranean and the northern parts of the Middle East, the centre of diversity for *Andrena* (Pisanty et al. 2022a, 2022b, Pisanty & Wood, *unpublished data*), let along western North America and Mexico that require modern revisions (Larkin et al. 2006, Dubitzky et al. 2010) and the high mountains of Asia. This said, *Andrena* is unlikely to surpass

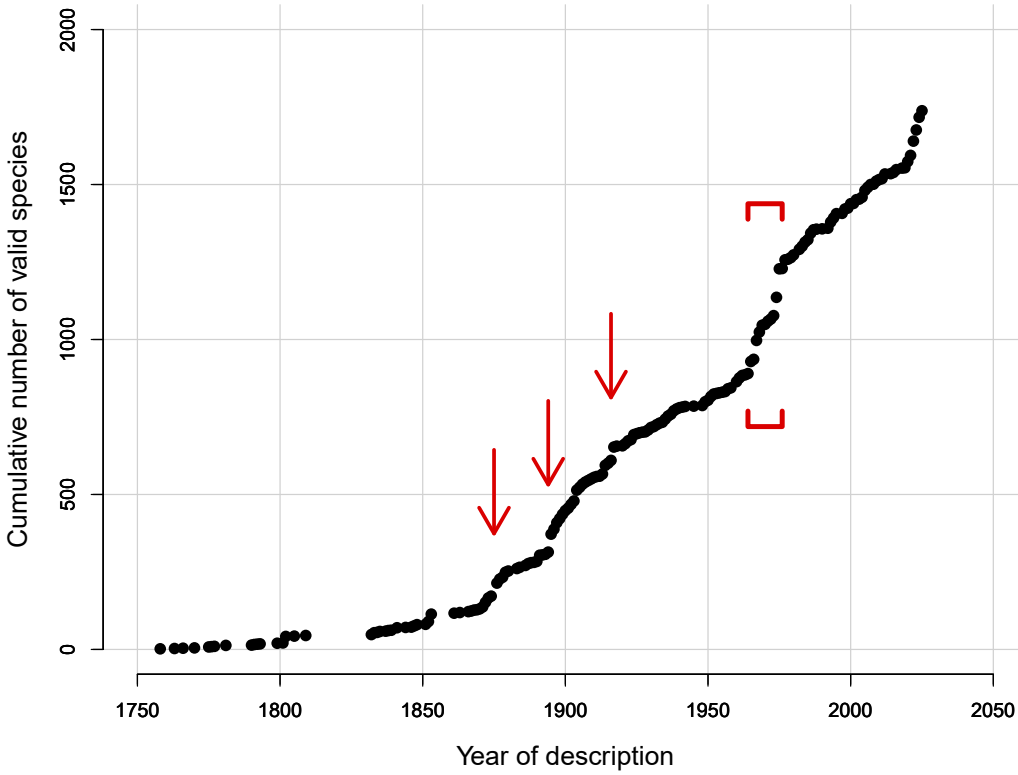

Fig. 84. Pattern of *Andrena* description through time (only species currently considered as valid). Red arrows indicate the temporally concentrated publications of Morawitz (1876), Pérez (1895), and Viereck (1917a, 1917b). Square brackets indicate the 1965–1975 period of concentrated taxonomic activity by Klaus Warncke

Table 3. The top 10 years by number of currently valid *Andrena* species described

Year of publication	No. valid species described
1975	92
1967	61
1974	59
1895	58
2022	46
1917	43
1876	42
2024	41
1965	39
2023	36

Table 4. The top 10 most prolific *Andrena* authors, by number of currently valid species. Shared authorships are counted as full authorship for each co-author independently

Name	Number of valid species	Median year of description
Klaus Warncke	239	1974
Thomas J. Wood	162	2023
Theodore D.A. Cockerell	146	1913
Henry L. Viereck	108	1915
Wallace E. LaBerge	106	1971
Ferdinand Morawitz	90	1876
Osamu Tadauchi	77	2002
Anna Z. Osytshnjuk	74	1986
Jean Pérez	66	1895
Huan-Li Xu	53	2002

Lasioglossum as the largest bee genus due to the cosmopolitan and truly global distribution of the latter compared to the largely Holarctic pattern shown by *Andrena*. This *de facto* means that *Lasioglossum* will encounter a greater variety of niches, and even if they are less effective at colonising them in a narrow sense as seen in *Andrena*, the meaningfully greater area occupied by *Lasioglossum* (broadly South America, sub-Saharan Africa, South-east Asia and Australasia) suggests a greater final richness; *Andrena* remain dominant in regional faunal richness across almost all parts of the Holarctic. Similar analysis of descriptive trends and current species richness in *Lasioglossum* and other hyper-diverse insect genera are welcome to allow for a stronger empirical basis for further comparisons.

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