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Monograph

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A critical revision of the *Andrena* Fabricius, 1775 of India, with the description of two new species (Hymenoptera: Andrenidae) from Uttarakhand

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Abstract. India is a large country in Asia, and covers the transition zone between the Palaearctic and Indomalayan biogeographic realms, with influences from both. Present in India are members of the genus *Andrena*, an enormous bee genus distributed predominantly throughout the Holarctic, with the greatest Indian diversity in the Himalayan region due to its Palaearctic influences. Despite early studies in the late 19th and early 20th centuries, there has been almost no work on this group in India during the past century. A revision of type and non-type museum material combined with new collections has produced a revised total of 36 species of *Andrena* for India, including 11 species reported for the first time as well as the newly described *Andrena* (*Melandrena*) *kedarnatha* Wood & Gautam sp. nov. (northern India and Nepal) and *Andrena* (*Simandrena*) *tungnatha* Wood & Gautam sp. nov. (northern India). The true holotype of *A.* (*Euandrena*) *communis* Smith, 1879 is definitively located. *Andrena burkelii* Bingham, 1908 is synonymised with *A.* (*Pallandrena*) *morosa* Cameron, 1897. Lectotypes are designated for *A.* (*Euandrena*) *murreensis* Cockerell, 1923 and *A.* (incertae sedis) *comberima beharica* Cockerell, 1920. Further comments are made on the status of *Andrena* taxa described from India for which type material is and is not currently available. Thirty additional *Andrena* taxa suggested as present in the Indian fauna are excluded as either erroneous or lacking supporting data. These results illustrate the extent to which study of the Indian *Andrena* fauna has been confused, and provide a more stable taxonomic base for future studies in this country.

Keywords. Alpine, DNA-barcoding, Himalaya, solitary bees, taxonomy.

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Introduction

Andrena Fabricius, 1775 is a hugely speciose genus, the second largest genus of bees after *Lasioglossum* Curtis, 1833, with around 1700 species known globally following recent revisions (Pisanty *et al.* 2022a; Wood & Monfared 2022; Wood 2023a, 2023b, 2023c, 2024a). The genus is relatively young at approximately 25 million years old, and is known for its explosive radiation as one of if not the most rapidly speciating bee lineages (Bossert *et al.* 2022; Pisanty *et al.* 2022b). As a consequence of this rapid speciation, *Andrena* form species-rich communities in which many species can be active concurrently, most clearly seen in regions with a Mediterranean or dry seasonal climate such as the south-western part of North America and the Old World Mediterranean basin extending to mountainous areas in eastern Turkey, the Caucasus, and Iran.

Against this backdrop, whilst there is still a great deal of work to do to more fully understand *Andrena* within their diversity hotspots (e.g., Pisanty *et al.* 2022a; Wood & Monfared 2022; Wood 2023a, 2023b, 2023c), it is also true that the *Andrena* faunas outside of these hotspot regions are often less well studied. This is particularly true for the southern part of the Central Palaearctic as it meets the Indomalayan biogeographical realm around the Himalayas. Although *Andrena* have a strongly Holarctic distribution, the high mountains of the Himalayas provide suitable habitats for other bee groups known to favour cooler temperatures (e.g., *Bombus* Latreille, 1802 (Apidae); Williams 1991, 2023; Williams *et al.* 2015), and so a reasonably large *Andrena* fauna could be expected to occur here.

The country most clearly covering this Himalayan biogeographical transition zone is India. Between 1878 and 1920, there was a flurry of activity as new species of *Andrena* were described by British and American workers from what is now the modern state of India (Smith 1878, 1879; Cameron 1897, 1902, 1907, 1908, 1909; Nurse 1903; Bingham 1908; Cockerell 1911a, 1920), with studies slightly later (1904–1923) focusing on what is now the modern state of Pakistan (Nurse 1904; Cockerell 1911b, 1917, 1920, 1922, 1923). However, following this initial period of study, there followed a great period of near silence, with only two further species of *Andrena* described from India in the following 100 years (LaBerge 1968; Wood 2023a), although Chinese, German, and Japanese workers described species from Nepal and southern and western China (Xizang / Tibet, Yunnan) during this time (e.g., Wu 1982; Xu & Tadauchi 2000; Tadauchi & Xu 2002; Scheuchl in Grünwaldt *et al.* 2005; Tadauchi & Matsumura 2007).

Consequently, at the present time, study of the Indian *Andrena* fauna is complicated. Due to a lack of taxonomic revision and a lack of access to types, species concepts have sometimes been confused (e.g., Makkar *et al.* 2016), and it has not been possible to identify many specimens. Many studies report on the *Andrena* fauna of India, but are often referring to original works from the late 19th early 20th century without adding new data (e.g., Chandra *et al.* 2019). In short, the situation is confused, with between 21 (Ascher & Pickering 2023) and 54 (Meena & Dey 2019) species of *Andrena* listed for India. This wide range of possibilities is unhelpful and stymies ongoing work. As many studies do not report precise records of specimens with repositories indicated, it is difficult to validate them. There is therefore a need to critically appraise species reported for the Indian fauna, as well as to revise existing museum collections and make new contemporary collections.

In the context of ongoing revisions of Old World species of *Andrena*, in addition to type inspection, there was an opportunity to study unidentified material in the NHMUK collection in London, including some specimens from the 1903–1904 British expedition to Tibet. This expedition collected in what is now the

state of Sikkim in north-eastern India in the summer of 1903 before entering Tibet in December 1903 which at that time was an independent country under the protectorate of the Chinese Qing dynasty. In the ZMHB collection in Berlin, there was also an opportunity to examine material from a later expedition that followed the same path, the notable 1938–1939 German expedition to Tibet, led by Ernst Schäfer (1910–1992), conducted on the eve of the Second World War. The expedition also collected in Sikkim during July 1938 en route to Tibet (Kuhlmann 2002). These collections in Sikkim identified two species of *Andrena* (*Oreomelissa* Hirashima & Tadauchi, 1975) that were correctly identified and labelled as new for science (at the time) by an unknown author, but although a name was assigned (see below), nothing was published due to the upheaval caused by the Second World War, and the material has remained un-revised since then. Examination of this neglected material has meaningfully improved our understanding of the distributions of Himalayan species of *Andrena*.

Finally, we were able to make new collections of *Andrena* in northern India in the state of Uttarakhand, a state from which several species of *Andrena* were described historically (Smith 1879; Cameron 1897). Altogether, this combined approach of critical literature appraisal, revision of historical collections, and the collection of new material has allowed us to present a definitive revision of the Indian *Andrena* fauna which will act as a stable baseline for new studies of this genus in this country and beyond.

Material and methods

Species confidently considered to be part of the Indian fauna are listed, along with examined material or reference to work that detail precise specimen information. Full chresonymy is not given for species (see instead the catalogue of Gusenleitner & Schwarz 2002), though relevant synonyms that were described from what are now the modern states India or Pakistan are given. Species excluded from the Indian fauna are listed subsequently, though without any chresonymy, as this is not considered necessary since these taxa have not been convincingly demonstrated to be present in India. Gusenleitner & Schwarz (2002) additionally listed bee species which were described from India as *Andrena*, but which have been demonstrated to belong to other genera such as *Colletes* Latreille, 1802 (Colletidae Lepeletier, 1841) or *Nomia* Latreille, 1804 sensu lato (Halictidae Thomson, 1869). This includes, for example, some of the species described by Cameron (1897, 1908). These synonymies are not repeated here, and Gusenleitner & Schwarz (2002) is used as a baseline of knowledge for the current work.

A small number of recently captured (May 2019) specimens of *Andrena* from Pakistan 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). The BeeCox1F1/BeeCox1R2 primer pair was used (Bleidorn & Henze 2021) to target the COI-5 region. All sequences are published on the Barcode of Life Database (BOLD) website under the dataset https://doi.org/10.5883/DS-PALAND. Phylogenetic trees were supplemented with additional published sequences (e.g., Schmidt *et al*. 2015; Wood 2023b, 2023c) that were downloaded from Genbank and the Barcode of Life Data System. Sequences were aligned using MAFFT (Katoh & Standley 2013). Aligned sequences were analysed in Seaview (Gouy *et al*. 2010) using a maximum likelihood analysis (GTR + G with no partitioning) which was run with 1000 bootstraps. Intra- and interspecific distances were calculated using MEGA-X (Kumar *et al*. 2018). Outgroup taxa were selected based on the phylogenetic analysis of Pisanty *et al*. (2022b), with the selected outgroup species coming from a subgenus basal to those included in each analysis. Only branches with bootstrap support of 75 or higher are marked as such.

All specimens were identified by TJW, unless explicitly stated. It is important to state the species concepts used here for the genus *Andrena*, following the discussion of Wood (2023b). Given the limited use of biological species concepts in *Andrena*, it is best to consider species of *Andrena* to be evolutionarily independent lineages (de Queiroz 2007) that can be delineated through the application of

integrative taxonomy (including genetic, morphological, and ecological data), producing robust species concepts (Schlick-Steiner *et al.* 2010). The species concepts employed here are predominantly based on morphological data, given the lack of genetic and ecological study of *Andrena* in India to date. Species are recognised when specimens can be consistently recognised on the basis of consistent morphological characters which vary between species by less than observed natural morphological variation within species. Where available, genetic and ecological data are integrated to inform analysis and conclusions.

Morphological terminology follows Michener (2007). For the distribution of the species, countries marked with an '*' indicate the first published record for that country. Names marked with '*' are newly recorded for India.

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.

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 camera 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) ver. 2.10. Post-processing of some images was made in Photoshop Elements (Adobe Systems, USA) to improve lighting to highlight specific characters.

Abbreviations for morphological terms

A = antennal segments
S = metasomal sterna
T = metasomal terga

Institutional abbreviations

ELKU = Entomological Laboratory, Kyushu University, Fukuoka, Japan
IZAS = Zoological Institute, Chinese Academy of Sciences, Beijing, China
MRSN = Museo Regionale di Scienze Naturali di Torino, Turin, Italy
NHMUK = Natural History Museum, London, UK
NMPC = National Museum Natural History, Prague, Czechia
NMW = Naturhistorisches Museum Wien, Vienna, Austria
OÖLM = Oberösterreichisches Landesmusum, Linz, Austria
OUMNH = Oxford University Museum of Natural History, Oxford, UK
PCYU = Packer Collection at York University, Toronto, Canada
RMNH = Naturalis Biodiversity Center, Leiden, the Netherlands
SEMC = Snow Entomological Collection, University of Kansas Natural History Museum, Laurence, USA
TJWC = Personal collection of Thomas J. Wood, Leiden, the Netherlands
USNM = Smithsonian National Museum of Natural History, Washington D.C., USA
WHLC = Personal collection of Wolf-Harald Liebig, Bad Muskau, Germany
WII = Wildlife Institute of India, Dehradun, India
ZISP = Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia
ZMHB = Museum für Naturkunde, Berlin, Germany
ZSI = Zoological Survey of India, Kolkata, India

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Family Andrenidae Latreille, 1802

Genus ***Andrena*** Fabricius, 1775

Problems with the subgenus *Euandrena* Hedicke, 1933

The subgenus *Euandrena* Hedicke, 1933 is taxonomically complex, as many cryptic taxa are present, and morphological recognition is highly challenging, even in comparatively well-studied regions such as Europe (e.g., Praz *et al.* 2019). The situation around the Himalayas (from the western to eastern extent) is currently unsatisfactory due to the large number of available names of uncertain status. Currently, seven red-marked species of *Euandrena* are known, specifically 1) *Andrena familiaris* Smith, 1878 (described from East Turkestan in what is now western China), 2) *A. communis* Smith, 1879 (described from Mussoorie in northern India), 3) *A. mephistophelica* Cameron, 1897 (described from Mussoorie in northern India), 4) *A. murreensis* Cockerell, 1923 (described from Murree in northern Pakistan), 5) *A. euphorbiacea* Scheuchl, 2005 (described from Yunnan in southern China), 6) *A. humlaensis* Scheuchl, 2005 (described from Nepal), and 7) *A. kathmanduensis* Tadauchi & Matsumura, 2007 (described from Nepal). Modern descriptions (Grünwaldt *et al.* 2005; Tadauchi & Matsumura 2007) unfortunately do not provide diagnoses against these older Himalayan taxa, and it is not clear if these authors were aware of these available names, their likely identities, or indeed how any of these names relate to each other.

It is necessary to deal with the four oldest available names, and definitively locate the location of type material as the listings in Gusenleitner & Schwarz (2002) are unfortunately not always correct due to historical uncertainty, and the huge size of the genus which has not always allowed for each reported type locality to be specifically investigated. The first name, *A. familiaris*, was described from East Turkestan [neighbourhood of Yárkand = Yarkant County, Xinjiang, western China] (Smith 1878: 2). The species was described in the male sex only, and is illustrated (Smith 1878: fig. 3). Although Gusenleitner & Schwarz (2002) indicate that the type of *A. familiaris* is present at the NHMUK, no such specimen matching this collection information is present and Donald Baker (unpublished thesis: 272–273) concludes that type material is likely to be in the ZSI. Examination of the ZSI website (https://zsicollections.in/search?genus=Andrena) shows that the male type of *A. familiaris* is present there (reference specimen code ZSI0000008548).

However, in the NHMUK type catalogue, there is an entry for *A. familiaris* (B.M. type 17a 1306). Inspection of this specimen (Fig. 1) shows that it was collected from Masuri [= Mussoorie] in northern India, and it is a female. A handwritten label (not in the handwriting of Smith) indicates "*Andrena familiaris* (Type) Sm.". An additional handwritten note by Donald Baker correctly indicates that this is a false type, since it is a female, and it comes from Masuri rather than Yárkand. However, the specimen matches perfectly the collection information for *A. communis* which was described from Masuri, collected at an elevation of 7000 feet (Smith 1879: 51). *Andrena communis* was described only in the female sex, and as the NHMUK specimen matches Smith's description, the specimen is here considered to be the holotype of *A. communis*. No other specimens labelled as "*A. communis*" are known in the NHMUK catalogue (type collection or main collection). Since Smith (1879) is titled "Descriptions of new Hymenoptera species in the collection of the British Museum", and all other species of *Andrena* described in this publication are present in the NHMUK, it is considered unlikely that the type might actually be in another institution.

Gusenleitner & Schwarz (2002) list the NHMUK as the type depository for *A. communis*, but these authors did not inspect this material. They doubtful associate *A. communis* with the subgenus *Oreomelissa* Hirashima & Tadauchi, 1975, probably on the basis of Bingham (1897) who confusingly uses a character of a punctate propodeum in his identification key, later leading to *A. communis*. Based on this holotype specimen, *A. communis* is clearly a member of the subgenus *Euandrena*, lacks distinct punctures on the propodeum, and is relatively small at 9 mm in length.

In Bingham's (1897) identification key, *A. communis* is placed close to *A. mephistophelica*, and is separated by colouration, with *A. mephistophelica* having the tergal margins and bases lightened, rather than the red markings also covering the disc of T2, as in *A. communis* (Fig. 1D). *Andrena mephistophelica* was also described from Mussouri [= Mussoorie], and Cameron (1897) indicates its body length as 11–12 mm. Gusenleitner & Schwarz (2002) again indicate that type material is at the NHMUK, but it is actually in the Rothney Collection (OUMNH). However, the exact location of *Andrena* type material from the Rothney collection is unclear, and it is not currently available for study (J. Hogan, in litt.). Based on the description and the redescription by Bingham (1897: 443), *A. mephistophelica* is very close to *A. murreensis* which was described from Murree in northern Pakistan with a female body length of 9–11 mm (Cockerell 1923). Examination of the NHMUK collection produced a specimen of *A. murreensis* labelled by Cockerell with his distinctive handwriting and a yellow "co-type" label, from Murree at an elevation of 7500 feet. The specimen was collected by Dutt and has an additional label of "156". This corresponds to Cockerell (1923: 265), who listed eight numbered specimens from the

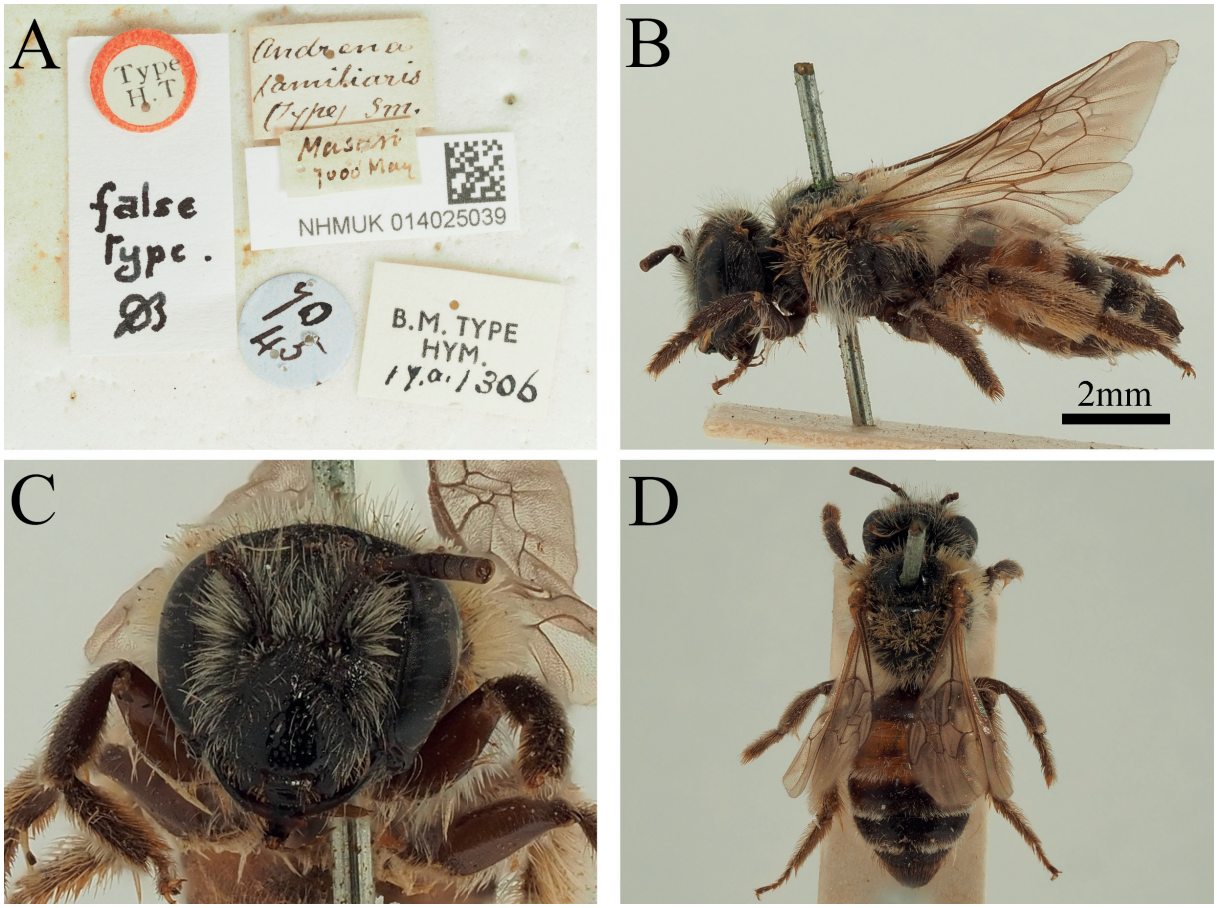

Fig. 1. *Andrena* (*Euandrena*) *communis* Smith, 1879, holotype, ♀ (NHMUK). **A**. Label information. **B**. Habitus, lateral view. **C**. Face, frontal view. **D**. Body, dorsal view.

Fletcher collection. The specimen is hereby designated as a lectotype (Fig. 2; see below for full specimen details). An additional specimen is present in the USNM collection with the same collecting information (https://collections.nmnh.si.edu/search/ento/) with the number "50". It is part of the syntypic series, but is not designated as the lectotype.

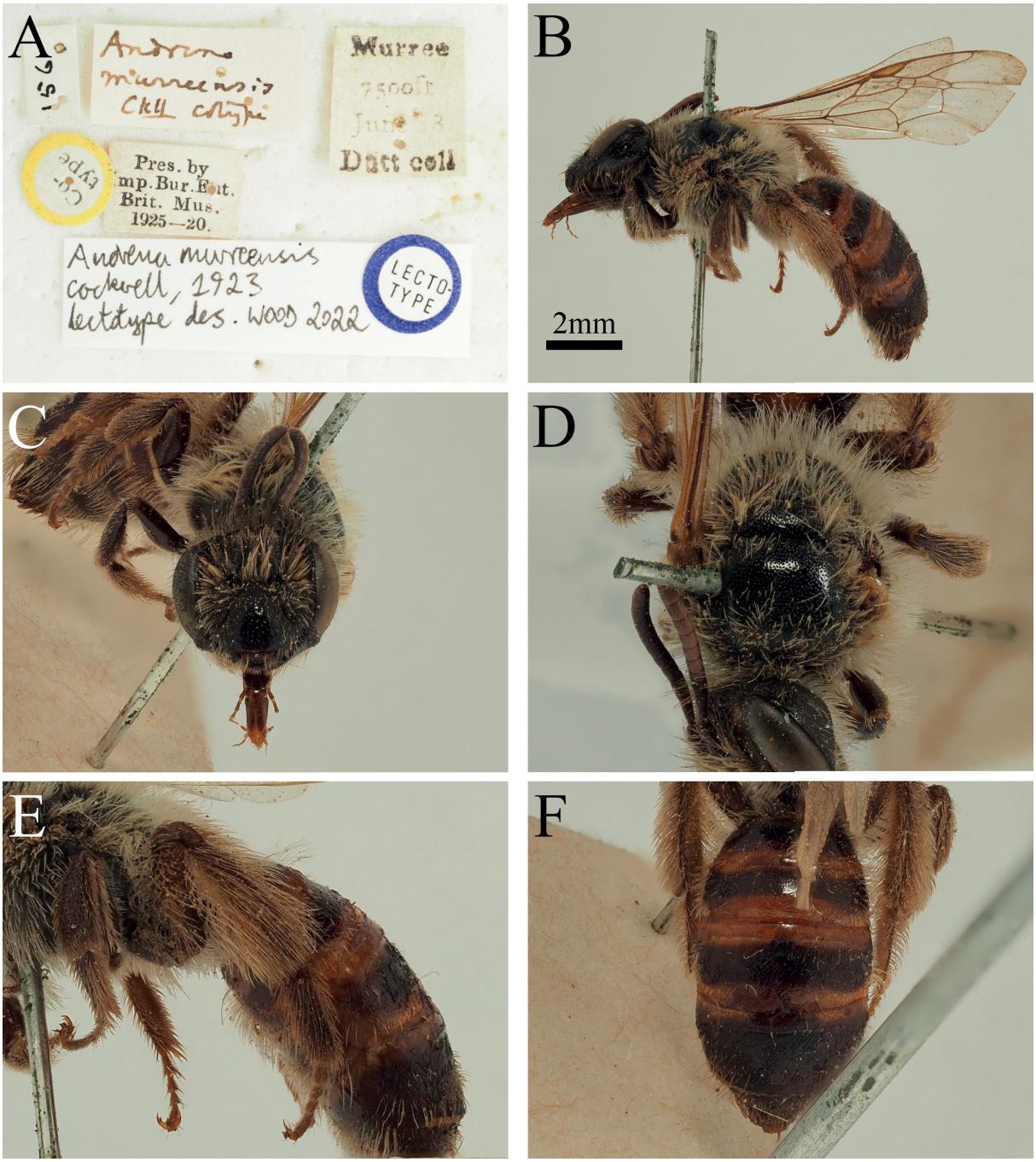

Fig. 2. *Andrena* (*Euandrena*) *murreensis* Cockerell, 1923, lectotype, ♀ (NHMUK). **A**. Label information. **B**. Habitus, lateral view. **C**. Face, frontal view. **D**. Scutum, dorsal view. **E**. Hind tibia, lateral view. **F**. Terga, dorsal view.

Genetic analysis of five samples of red-marked *Euandrena* from northern Pakistan provisionally identified as *A. communis* (one female) and *A. murreensis* (three females, one male) plus two sequences of *A. murreensis* available from BOLD (PCYU, two female specimens identified by TJW) produced three lineages with strong posterior support (Fig. 3). Three "*A. murreensis*" sequences form a clade with bootstrap support of 98 separated from *A. communis* + the remaining three "*A. murreensis*" sequences, these latter three sequences forming a clade with bootstrap support of 99. Morphologically, examination of the two "*A. murreensis*" clades plus the lectotype of *A. murreensis* shows subtle but consistent differences. Specifically, 1) true *A. murreensis* has the clypeus distinctly punctate, but punctures are sparse and scattered, separated by 1–3 puncture diameters, particularly medially where large impunctate areas are present (Fig. 4C), whereas the comparison clade shows a more evenly punctate clypeus, with punctures separated by 1–2 puncture diameters over the entire disc (Fig. 4D); 2) true *A. murreensis* has the scutum predominantly shiny, shagreened laterally and anteriorly but shining over 60% of the scutum

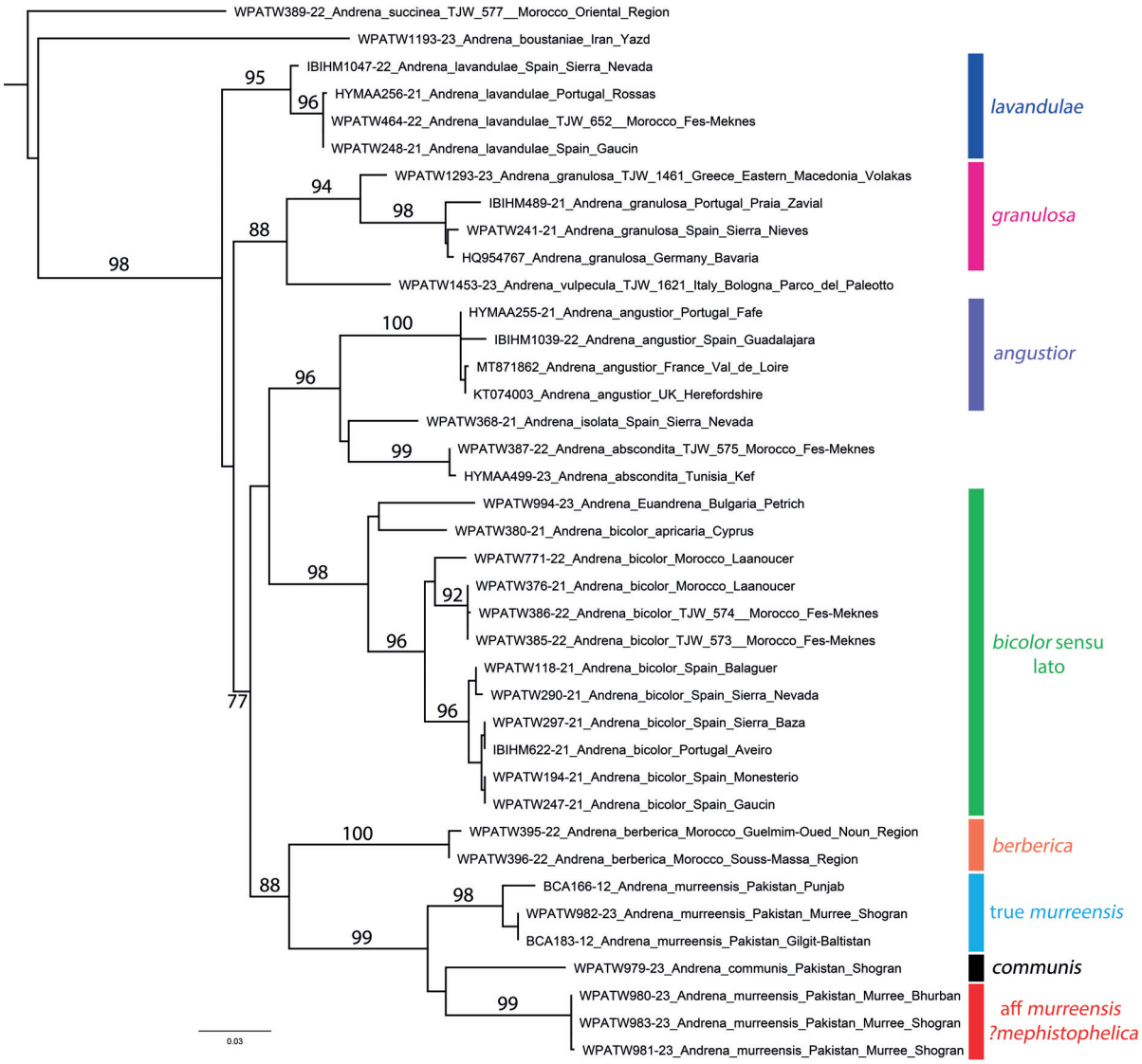

Fig. 3. Phylogenetic tree (maximum likelihood) of *Andrena* Fabricius, 1775 subgenus *Euandrena* Hedicke, 1933 based on the mitochondrial COI gene. Numbers above branches represent bootstrap support (values of < 75 are omitted).

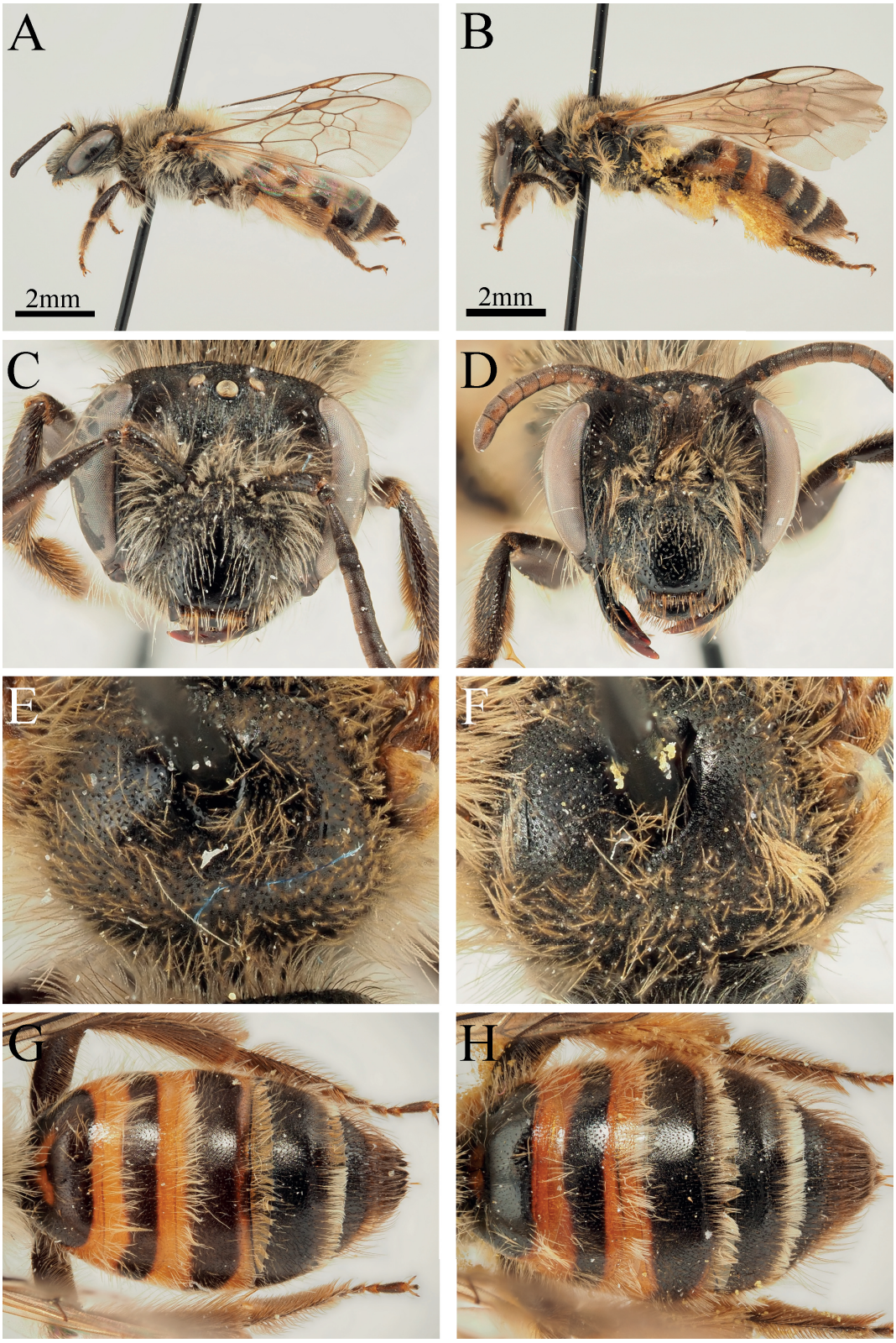

Fig. 4. A, C, G, E. *Andrena* (*Euandrena*) *murreensis* Cockerell, 1923, ♀ (TJWC). **A**. Habitus, lateral view. **C**. Face, frontal view. **E**. Scutum, dorsal view. **G**. Terga, dorsal view. – **B, D, F, H**. *Andrena* (*Euandrena*) aff. *murreensis*, ♀ (TJWC). **B**. Habitus, lateral view. **D**. Face, frontal view. **F**. Scutum, dorsal view. **H**. Terga, dorsal view.

(Fig. 4E), whereas the comparison clade has the scutum strongly and consistently shagreened, with around 20% of the disc weakly shining medially (Fig. 4F); and 3) true *A. murreensis* has the propodeal triangle more strongly depressed and the dorsolateral parts of the propodeum more strongly rugose, thus reciprocally more strongly contrasting, whereas the comparison clade has both the propodeal triangle less strongly depressed and the dorsolateral parts of the propodeum less strongly rugose, so they only weakly contrast each other.

It remains unclear if the other lineage can be called *A. mephistophelica*, or whether *A. mephistophelica* is the senior synonym of *A. murreensis*, and the remaining lineage refers to one of the more recently described species of red-marked *Euandrena* (Grünwaldt *et al.* 2005; Tadauchi & Matsumura 2007), or perhaps is even undescribed. Based on the description, the next best candidate for the non-*murreensis* clade would be *A. humlaensis* given its comparatively densely punctate clypeus (Grünwaldt *et al.* 2005: 363), whereas *A. euphorbiacea* and *A. kathmanduensis* appear to be more similar to *A. murreensis* based on the sparse clypeal punctures. For the present time, this second lineage is referred to as "aff. *A. murreensis*". The two lineages can be found in direct sympatry, for example at Shogran (both historical and modern specimens, see below).

The true *A. murreensis* clade was separated from the aff. *A. murreensis* clade by 7.20% (range 7.14–7.31%), and *A. communis* was separated from the true *A. murreensis* clade by 8.23% (range 8.10–8.37%) and the aff. *A. murreensis* clade by 6.85%. It is important to note that these distances in and of themselves (the so called "barcoding gap") should not be simply accepted as proof of species-level differences, as high intraspecific divergence can occur within widely distributed species (e.g., Hickerson *et al.* 2006; Collins & Cruickshank 2013; Zhang *et al.* 2017). However, the species of *Euandrena* here have only moderate ranges (restricted to the Himalayas), show consistent morphological differences, and present a tree topology that indicates that genetic distance is not the sole difference, with the sequence of *A. communis* sitting between the two more morphologically similar larger *A. murreensis* and aff. *A. murreensis* clades.

On the basis of these consistent morphological differences, combined with these divergent DNA barcodes and tree topology, the conclusion is therefore drawn that at least three red-marked species of *Euandrena* can be found in the Western Himalayas. Two of these species can be confidently referred to as *A. communis* (the smaller individuals with all of T2 red-marked; Fig. 1D, contrast Figs 4G–H) and *A. murreensis* (larger individuals with the base and apexes of the terga red-marked, but not the tergal discs, Fig. 4G, the clypeus with deep scattered punctures, Fig. 4B, and the scutum predominantly shiny, Fig. 4E) on the basis of currently available type material.

Full details on examined specimens are given below under each species entry, but in conclusion, 1) *A. familiaris* is currently only confidently known from the type series in the ZSI (probably a single male specimen) from the locus typicus in western China, 2) *A. communis* can be placed in the *Euandrena* and is known from northern India and Pakistan, 3) *A. mephistophelica* remains an unclear taxon, but is likely referable to one of the two large-bodied *Euandrena* genetic clades, and 4) *A. murreensis* is known from across northern Pakistan and India into Nepal (see below for examined material). The more recently described taxa from the Eastern Himalayas require type investigation, combined with additional genetic analysis from Nepal and southern China.

Description of new species

Andrena* (*Melandrena*) *kedarnatha Wood & Gautam sp. nov.
urn:lsid:zoobank.org:act:19CF4125-2926-4B48-B6DA-327D82095F3C
Figs 5, 6A, C, E, G

Diagnosis

Andrena kedarnatha Wood & Gautam sp. nov. can be recognised as a *Melandrena* Pérez, 1890 due to its large body size and robust shape (15–16 mm), dark integument and predominantly dark pubescence with partially infuscate wings (Fig. 5A), long ocelloccipital distance (3 × diameter of lateral ocellus, Fig. 6A), large propodeal triangle with roughly raised internal carinae (Fig. 5C), and lack of other diagnostic characters. Due to the dark integument without metallic reflections, the almost entirely dark pubescence (without white bands or spots of pubescence), the broad facial foveae that occupy almost the entire distance between the compound eye and lateral ocellus (Fig. 6A), and the clearly and densely punctate terga (Figs 5D, 6E, 6G), it can be placed close to *A. cussariensis* Morawitz, 1886. This species was described from what is now Azerbaijan (type material illustrated by Astafurova *et al.* 2021) and is found from Crimea and European Russia through Turkey, Iran, the Caucasus to Central Asia, Siberia, and Mongolia (Osytshnjuk *et al.* 2008; Astafurova *et al.* 2021; Wood & Monfared 2022). *Andrena cussariensis* is currently not confidently recorded from India specifically or the Himalayan region more generally, and is not considered to be present (see Remarks).

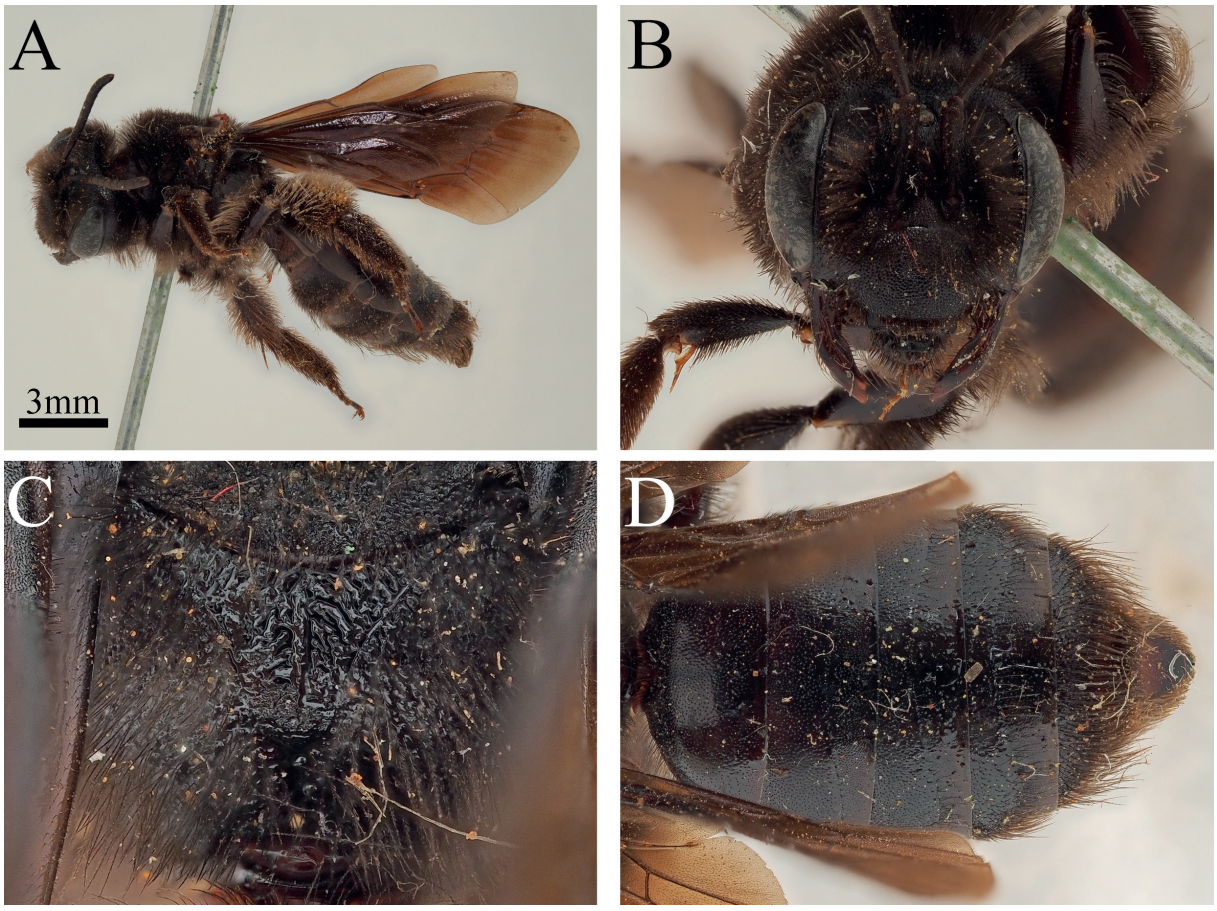

Fig. 5. *Andrena* (*Melandrena*) *kedarnatha* Wood & Gautam sp. nov., paratype, ♀ (NHMUK). **A**. Habitus, lateral view. **B**. Face, frontal view. **C**. Propodeum, dorsal view. **D**. Terga, dorsal view.

Morphologically, *A. kedarnatha* Wood & Gautam sp. nov. can be separated due to its larger body length of 15–16 mm (slightly but noticeably larger than the body length of *A. cussariensis* which averages 13–14 mm in length), its longer ocelloccipital distance of 3–3.5 × diameter of lateral ocellus with the vertex most strongly and coarsely punctate (Fig. 6A; in *A. cussariensis* with shorter ocelloccipital distance of 2–2.5 × diameter of lateral ocellus, with the vertex more weakly and finely punctate, Fig. 6B), by a more consistently dense punctation of the scutum with punctures separated by < 0.5–0.5 puncture diameters, not becoming slightly but noticeably sparser posteromedially (Fig. 6C; in *A. cussariensis* with the scutal punctures typically separated by 0.5 puncture diameters but in some specimens with punctures separated by 1–2 puncture diameters posteromedially, forming a small but distinct shining space, Fig. 6D), terga with slightly but comparatively larger and coarser punctures, most visible on the discs of T1–2 (Fig. 6E; in *A. cussariensis* with comparatively smaller and finer punctures, Fig. 6F), and T2 laterally with the shallow foveae broadened and filled with reddish-bristles, surface densely punctate with punctures separated by 0.5 puncture diameters (Fig. 6G; in *A. cussariensis* without a noticeable foveae present laterally on T2, surrounding surface comparatively sparsely and weakly punctate, Fig. 6H). To best appreciate the final characters, comparative material is required. There is some variation in colouration between the older museum specimens which have the wing venation orange-brown, the tergal margins slightly lightened brownish, the tibial scopa with off-white to light brownish hairs whereas recently collected specimens are uniformly darker (dark venation, dark terga, and dark scopal hairs). This is considered to represent variation, as sculptural characters do not differ between these specimens.

Etymology

Taken from the name of the Kedarnath temple (Uttarakhand) which is found close to the modern sampling localities of this new species (Fig. 7). It is a noun in apposition.

Type material

Holotype

INDIA • ♀; Uttarakhand, Chaumasi Village; 30.6146° N, 79.0695° E; 2250 m a.s.l.; 8 May 2022; R.K. Gautam leg.; WII.

Paratypes

INDIA • 1 ♀; Uttarakhand, Chaumasi Village; 30.6146° N, 79.0695° E; 2250 m a.s.l.; 8 May 2022; R.K. Gautam leg.; WII • 1 ♀; Gulmarg [Jammu and Kashmir]; summer 1913; Lt-Col. F.W. Thomson leg.; NHMUK.

NEPAL • 1 ♀; W-Nepal, Jumla, Jumla; 2850 m a.s.l.; 4 Oct. 1993; E. Hüttinger leg.; OÖLM.

Description

Female

Body. Length 15–16 mm (Fig. 5A).

Head. Dark, 1.2 × as wide as long (Fig. 5B). Clypeus domed, densely punctate, punctures separated by 0.5 puncture diameters, underlying surface dull. Process of labrum broadly trapezoidal, 2.5 × as wide as long, lateral margins weakly emarginate, apical margin truncate. Gena broad, 1.2–1.5 × diameter of compound eye; ocelloccipital distance 3–3.5 × diameter of lateral ocellus. Vertex strongly and coarsely punctate, punctures behind ocellar triangle separated by 0.5 puncture diameters (Fig. 6A). Foveae dorsally broad, occupying almost entire space between compound eye and lateral ocellus, separated from lateral ocellus by distance subequal to its diameter; foveae ventrally strongly passing level of antennal insertions ventrally, filled with dark brown hairs. Head with black to dark brown hairs, none equalling length of scape. Antennae dark, A3 equalling A4+5, shorter than A4+5+6.

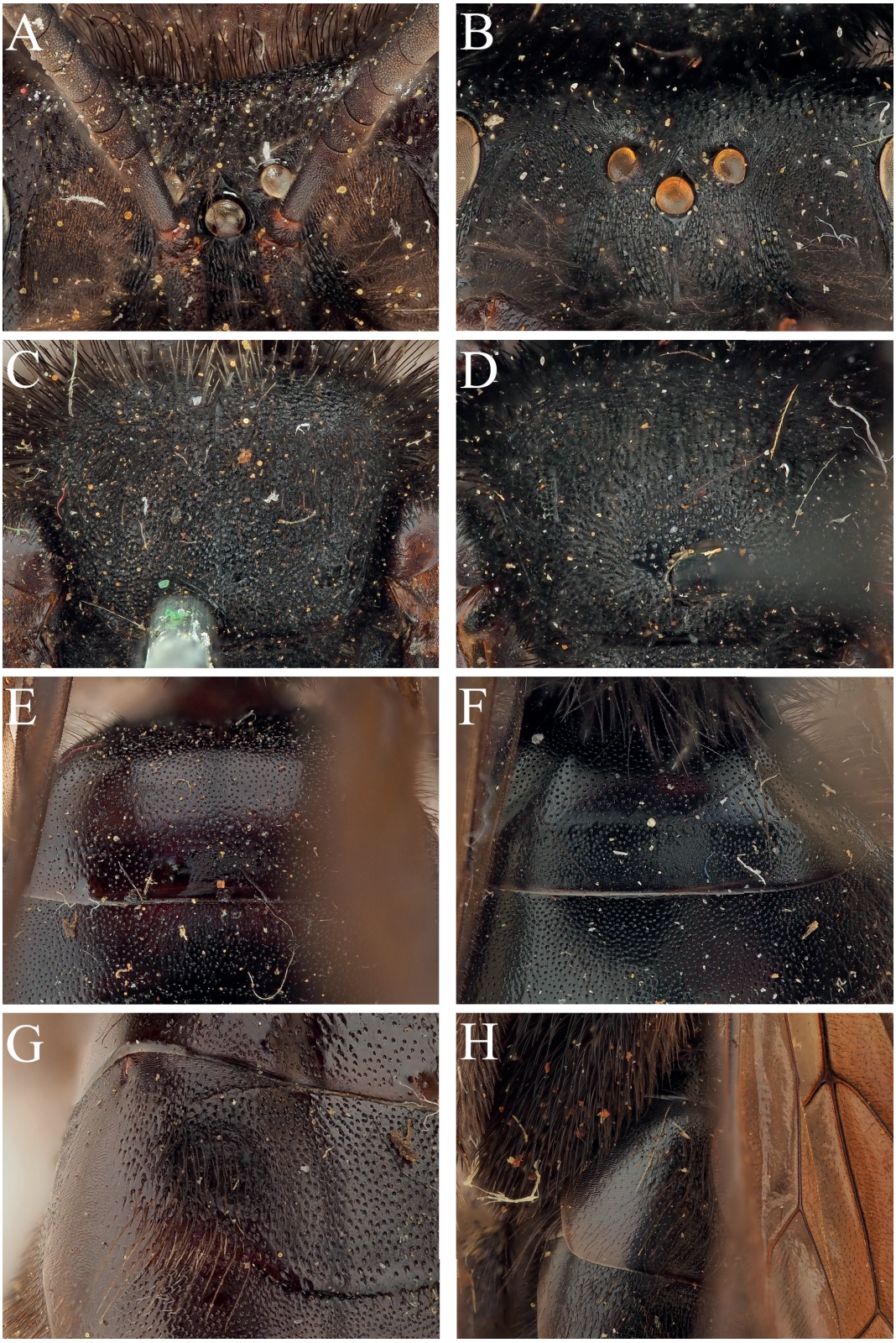

Fig. 6. A, C, E, G. *Andrena* (*Melandrena*) *kedarnatha* Wood & Gautam sp. nov., paratype, ♀ (NHMUK). **A**. Vertex, dorsal view. **C**. Scutum, dorsal view. **E**. T1–2, dorsal view. **G**. T2, lateral view detail. – **B, D, F, H**. *Andrena* (*Melandrena*) *cussariensis* Morawitz, 1886, ♀ (TJWC). **B**. Vertex, dorsal view. **D**. Scutum, dorsal view. **F**. T1–2, dorsal view. **H**. T2, lateral view detail.

Mesosoma. Scutum and scutellum densely and regularly punctate, punctures separated by < 0.5 puncture diameters, almost confluent, interspaces weakly shining medially, dull anteriorly and laterally (Fig. 6C). Pronotum rounded. Mesepisternum densely but shallowly punctate, punctures separated by 0.5 puncture diameters, interspaces microreticulate, dull. Dorsolateral parts of propodeum densely and shallowly punctate, punctures separated by 0.5 puncture diameters, interspaces raised to form network of finely raised rugae; propodeal triangle large, laterally delineated by finely raised carinae, internal surface with dense network of raised carinae (Fig. 5C). Mesosoma with abundant but relatively short black pubescence, longest on mesepisternum, becoming shorter but not squamous on scutum and scutellum. Propodeal corbicula incomplete, dorsal fringe composed of abundant and strongly plumose black hairs, internal surface covered with latitudinal weakly raised rugae, with abundant simple black hairs. Legs dark, apical tarsal segments lightened reddish brown; pubescence black to dark brown. Flocculus incomplete, weakly produced, composed of plumose black hairs; femoral and tibial scopae composed of off-white to light brownish or predominantly black simple hairs. Hind tarsal claws with strong inner tooth. Wings infuscate over majority of surface, becoming marginally weaker away from venation; stigma and venation dark orange-brown to black, nervulus interstitial.

Metasoma. Tergal discs dark, apical margins narrowly lightened dark brown or almost entirely dark (Fig. 5D). Tergal discs densely but slightly irregularly punctate, punctures typically separated by 0.5–1 puncture diameters (Fig. 6E), up to 2 puncture diameters medially; punctures becoming progressively finer and weaker on marginal areas from T1–4, on T4 almost disappearing into underlying sculpture. Tergal discs obscurely shagreened, shining to weakly shining. T2 laterally with shallow but distinct broad foveae, foveae subtly impressed, covered with reddish-brown to black bristles (Fig. 6G). Tergal discs with scattered short dark hairs, not forming apical hairbands. Apical fringe of T5 and hairs flanking pygidial plate dark brown. Pygidial plate large, rounded triangular, surface finely and evenly shagreened, weakly shining.

Male

Unknown.

Remarks

Andrena cussariensis was listed for the Indian fauna by Meena & Dey (2019) who mentioned it from Kohtak [= Kohat, Pakistan], Musooree [= Mussoorie], Shimla, and Punjab. The listing of this species from India is complicated, and requires dissection. The listing from Kohat refers to the record of Cockerell (1917) who reported *A. cussariensis* from "Kohat, N.W. Provinces, India", and described the subspecies *A. cussariensis kohatensis* Cockerell, 1917. Kohat is today found in the state of Pakistan. Moreover, the material identified by Cockerell actually belongs to *A. fuscosa*, and *A. cussariensis kohatensis* has now been synonymised with *A. fuscosa* (Wood 2024a). Records from low-elevation areas of India therefore would therefore seem most likely to be *A. fuscosa*. It is impossible to say whether the records from Mussoorie refer to *A. kedarnatha* Wood & Gautam sp. nov. or not without examination of specimens (which are not precisely cited or referenced), and so the presence of *A. cussariensis* in India is considered to be unproven given its known global distribution and the risk of confusion with *A. kedarnatha*.

Distribution

Northern India (Jammu & Kashmir, Uttarakhand) and Nepal.

Andrena* (*Simandrena*) *tungnatha Wood & Gautam sp. nov.
urn:lsid:zoobank.org:act:60275075-8392-48A1-A5F1-C4537B36B109
Figs 8A–C, E, G–H, 9

Diagnosis

Andrena tungnatha Wood & Gautam sp. nov. can quickly be recognised as part of the subgenus *Simandrena* Hedicke, 1933 due to the propodeal corbicula which is perfect (possessing strongly developed dorsal and anterior fringes), with the internal surface (the lateral faces of the propodeum) glabrous, the short male A3 (clearly shorter than A4), the long second tarsal segment of the hind leg in the male sex, and the simple genital capsule. *Andrena tungnatha* is similar to many Central Asian species of *Simandrena* in the female sex due to the fine and dense tergal punctation combined with clear apical tergal hairbands, e.g., *A. quadrifasciata* Morawitz, 1876 (Kazakhstan, Uzbekistan, Tajikistan), *A. sarta* Morawitz, 1876 (Kazakhstan, Uzbekistan), and *A. iliana* Shebl & Tadauchi, 2011 (Kazakhstan). However, in each comparison species, the tergal hairbands are thick, long, and dense, clearly extending from the base of the marginal area to beyond its apical rim, whereas in *A. tungnatha* the tergal hairbands are narrow, covering only the apical rim of the marginal area and barely extending beyond it (Fig. 8H). Moreover, the scutum is completely dull (Fig. 8D; partially shining in *A. quadrifasciata* and *A. iliana*, completely shining in *A. sarta*), and the clypeus is strongly and densely punctate with large punctures with relatively narrow shining interspaces (Fig. 8B; clypeus shagreened to dull in *A. quadrifasciata*, shiny with fine and scattered punctures in *A. sarta*, and only weakly and finely punctate in *A. iliana*).

The main comparison should be with *A. gorkhana* Tadauchi & Matsumura, 2007, which is the only other species of *Simandrena* known from the Western Himalayas (*A.* (*Simandrena*) *metuoensis* Xu & Tadauchi, 2001 is known from Xizang [Tibet] in China, but this species has T1–3 lightened red, the scutellum is shiny and broadly impunctate, and the terga are impunctate), and both species display fine and narrow tergal hairbands, finely and densely punctate terga, and show a densely punctate clypeus with shining interspaces. *Andrena tungnatha* can be separated from *A. gorkhana* by its slightly larger body size of 9 mm (7–8 mm in *A. gorkhana*), by the more strongly sculptured scutum, at most weakly shining but predominantly dull (Fig. 8C; in *A. gorkhana* with the scutum with extremely weak shagreen, almost smooth and shining over its entire area, Fig. 8D), by the hairs of the scutum and scutellum that are moderately long and orange, of a uniform consistency and colour between the scutum and scutellum (Fig. 8E, in *A. gorkhana* with scutal hairs short and pale whitish-brown, scutal hairs orange and distinctly longer, forming a clear tuft, Fig. 8F), and by the hind tibiae lightened orange with orange-brown scopal hairs (Fig. 8G; in *A. gorkhana* with hind tibiae dark, scopal hairs whitish-light brownish).

Separation in the male sex can also be aided by size, as males of *A. tungnatha* Wood & Gautam sp. nov. are 8–8.5 mm long (Fig. 9A) compared to 6 mm long in the newly discovered male of *A. gorkhana* (Fig. 10A), having been described in the female sex only. This male of *A. gorkhana* is formally described below. However, since only one male specimen of *A. gorkhana* is known, and this may be an unusually small specimen, structural separation should and can be made. Specifically, *A. tungnatha* has the clypeus densely punctate, punctures separated by 0.5–1 puncture diameter, with a weak impunctate longitudinal mid-line (Fig. 9B; in *A. gorkhana* with the clypeus more irregularly punctate, punctures separated by 0.5–2 puncture diameters, without an impunctate longitudinal mid-line, Fig. 10B), scutum entirely dull, with strong and rough microsculpture, punctures obscure and hardly visible (Fig. 9D, in *A. gorkhana* scutum anteriorly with microsculpture, but becoming smooth and shining medially, punctures clearly visible against underlying surface, Fig. 10D), and genital capsule with the penis valves relatively wide (Fig. 9F; in *A. gorkhana* with the penis valves relatively narrow, Fig. 10F).

Etymology

Taken from the name of the Tungnath temple (Rudraprayag, Uttarakhand) which is found close to the modern sampling localities of this new species (Fig. 7). It is a noun in apposition.

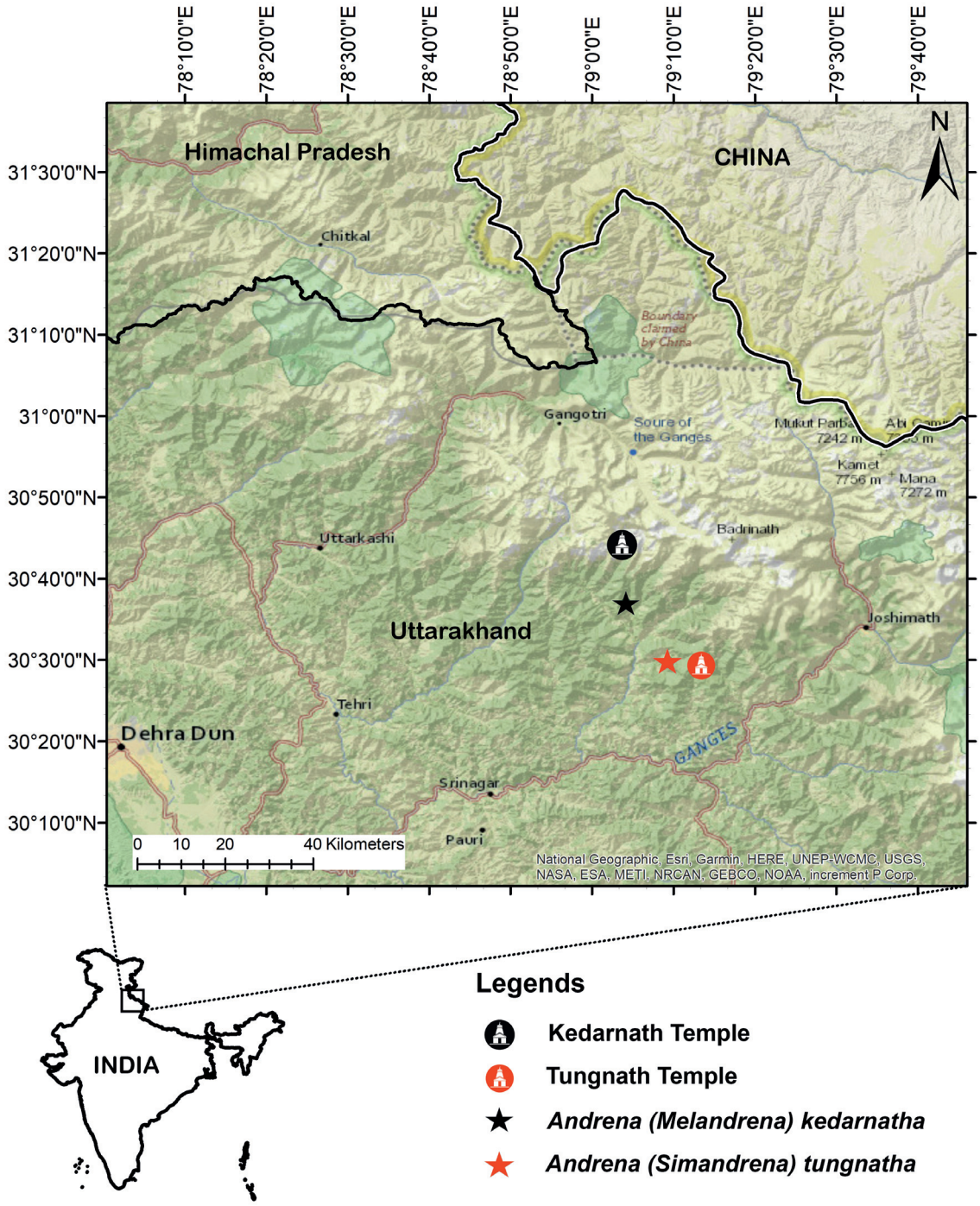

Fig. 7. Distribution map of northern Uttarakhand province in India showing the loci typici for *Andrena* (*Melandrena*) *kedarnatha* Wood & Gautam sp. nov. and *Andrena* (*Simandrena*) *tungnatha* Wood & Gautam sp. nov., as well as Kedarnath and Tungnath temples.

Type material

Holotype

INDIA • ♀; Uttarakhand, Hudu Village, 4.5 km W of Chopta; 30.4953° N, 79.1559° E; 2098 m a.s.l.; 6 Apr. 2022; R.K. Gautam leg.; WII.

Paratypes

INDIA • 1 ♂; Uttarakhand, Hudu Village, 4.5 km W of Chopta; 30.4953° N, 79.1559° E; 20 Mar. 2021; R.K. Gautam leg.; WII • 3 ♂♂; Uttarakhand, Ukhimath, Gari Village; 1586 m a.s.l.; 20 Mar. 2021; R.K. Gautam leg.; WII • 2 ♀♀; Simla [Shimla]; 1–31 May 1897; C.G. Nurse leg.; NHMUK.

Description

Female

Body. Length: 9 mm (Fig. 8A).

Head. Dark, 1.3 × as wide as long (Fig. 8B). Clypeus moderately domed but medially somewhat flattened, surface uneven, irregularly punctate with deep punctures of variable size, punctures separated by <0.5–2 puncture diameters; underlying surface smooth and shiny medially, becoming shagreened laterally. Process of labrum rounded trapezoidal, slightly more than twice as wide as long, surface with obscure transverse striations. 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 sub-equal to diameter of lateral ocellus; foveae slightly narrowing ventrally, ventrally extending slightly beyond lower margin of antennal insertions; foveae dorsally filled with dark brown hairs, hairs becoming pale brown ventrally. Face, gena, and scale with light brown hairs, frons dorsally and vertex with longer dark brown to black hairs, none equalling length of scape. Antennae dark basally, A5–12 ventrally lightened by presence of orange scales; A3 exceeding length of A4, shorter than A4+5.

Mesosoma. Scutum with strong microsculpture, microreticulate, weakly shining, densely punctate over majority of area, punctures separated by 0.5–1 puncture diameters except medially, here separated by 1–2 puncture diameters (Fig. 8C). Scutellum strongly punctate, punctures confluent to separated by 1 puncture diameter, interspaces smooth and shining medially. Pronotum rounded. Mesepisternum finely shagreened, predominantly shining, surface with dense hair-bearing punctures, punctures separated by 1 puncture diameter. Dorsolateral parts of propodeum finely microreticulate, fine sculpture overlain by network of delicately raised rugosity; propodeal triangle laterally delineated by raised carinae, internal surface with network of finely raised rugae in basal ⅔, surface dull to weakly shining. Mesepisternum with abundant long and finely plumose hairs, whitish ventrally, becoming light brown dorsally, longest hairs not equalling length of scape. Scutum and scutellum with shorter densely plumose light brown-light orange hairs, hairs appearing sub-squamous (Fig. 8E). Propodeal corbicula complete, perfect, dorsal and anterior fringes composed of long finely plumose light brown hairs, internal surface finely shagreened and shining, glabrous. Legs basally dark, apical tarsal segment of fore and mid legs reddish brown, hind tibiae and tarsi lightened orange; pubescence light brown to brownish (Fig. 8G). Flocculus incomplete, composed of brown densely plumose hairs; femoral scopae composed of golden simple hairs, tibial scopae composed of simple hairs, golden ventrally, brownish dorsally, dorsal fringe with scattered weakly plumose hairs. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange, nervulus weakly antefurcal.

Metasoma. Tergal discs dark, apical rims narrowly lightened hyaline-yellow (Fig. 8H). Tergal discs uniformly finely and densely punctate, punctures separated by 0.5 puncture diameters, punctures sparser only laterally on T1, here separated by 2–3 puncture diameters; underlying surface finely shagreened, weakly shining to shining. T1 latero-apically with weak hair fringes, not forming clear hairband, hairs

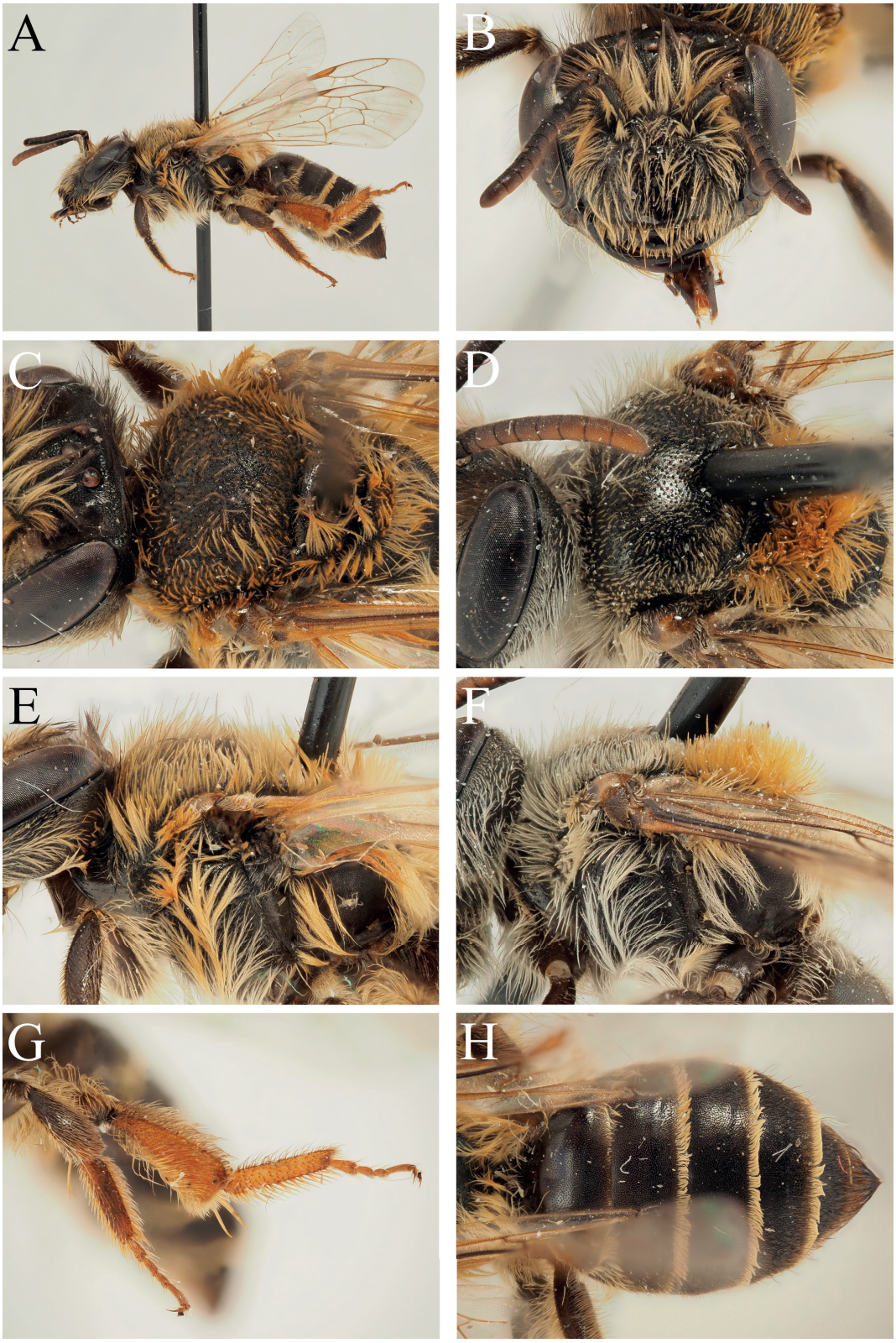

Fig. 8. A–C, E, G–H. *Andrena* (*Simandrena*) *tungnatha* Wood & Gautam sp. nov., holotype, ♀ (WII). **A**. Habitus, lateral view. **B**. Face, frontal view. **C**. Scutum, dorsal view. **E**. Mesosoma, lateral view. **G**. Hind leg, lateral view. **H**. Terga, dorsal view. – **D, F**. *Andrena* (*Simandrena*) *gorkhana* Tadauchi & Matsumura, 2007, ♀ (WII). **D**. Scutum, dorsal view. **F**. Mesosoma, lateral view.

extending onto basolateral parts of T2; 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 to black. Pygidial plate narrow, rounded triangular, surface dull.

Male

Body. Length: 8–8.5 mm (Fig. 9A).

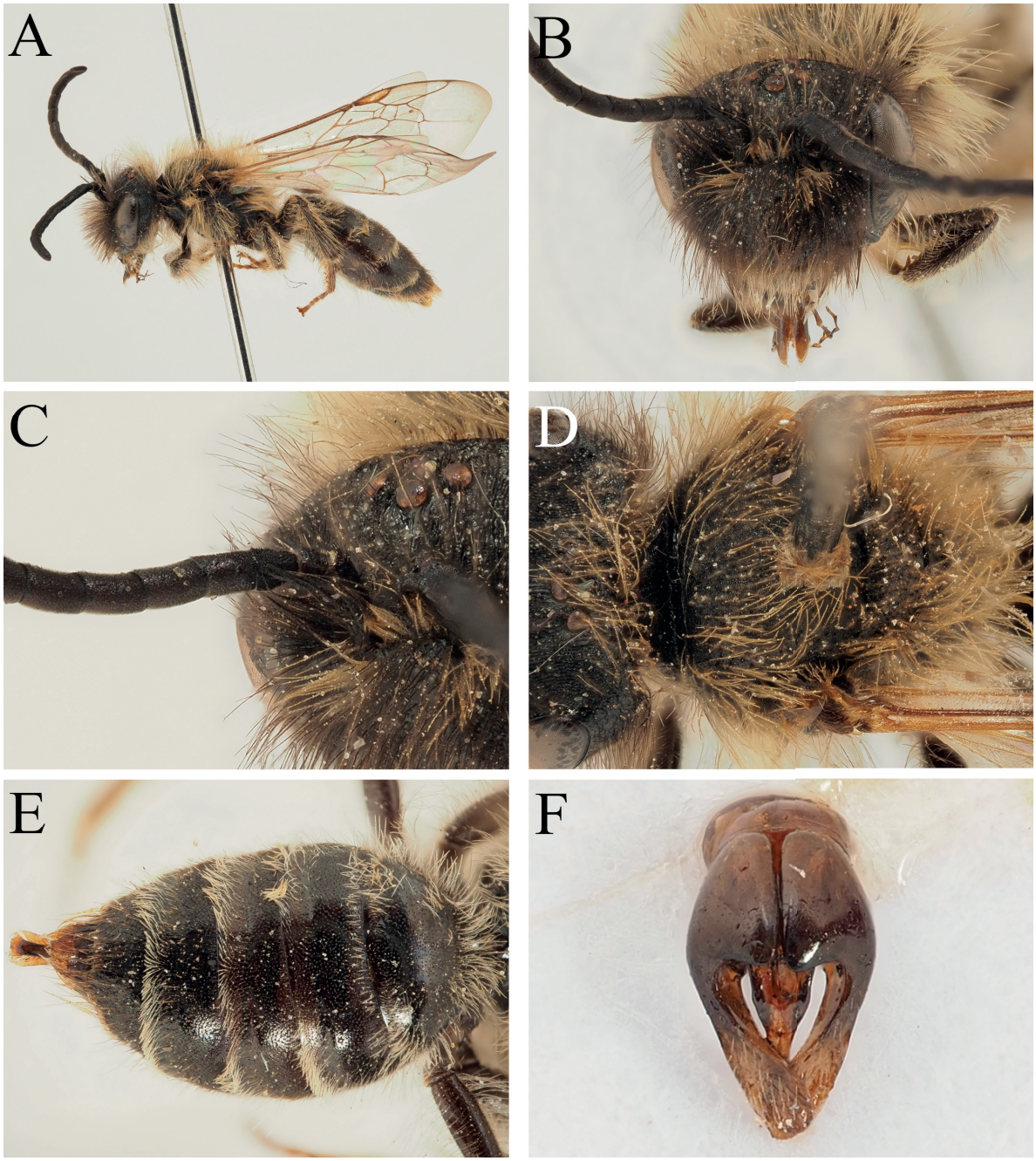

Fig. 9. *Andrena* (*Simandrena*) *tungnatha* Wood & Gautam sp. nov., paratype, ♂ (WII). **A**. Habitus, lateral view. **B**. Face, frontal view. **C**. Antennal segments A1–7, frontal view. **D**. Scutum, dorsal view. **E**. Terga, dorsal view. **F**. Genital capsule, dorsal view.

Head. Dark, 1.25 × as wide as long (Fig. 9B). Clypeus weakly domed, more or less flattened medially, regularly punctate with deep punctures, punctures separated by 0.5–1 puncture diameters with exception of impunctate longitudinal mid-line, mid-line extending ventrally to mid-point of clypeus; underlying surface smooth and shining. Process of labrum rounded rectangular, 2.5 × as wide as long. Gena equalling width of compound eye; ocelloccipital distance 1.5 × diameter of lateral ocellus. Head covered with mixture of long black and light brown hairs, black hairs covering majority of face with light brown

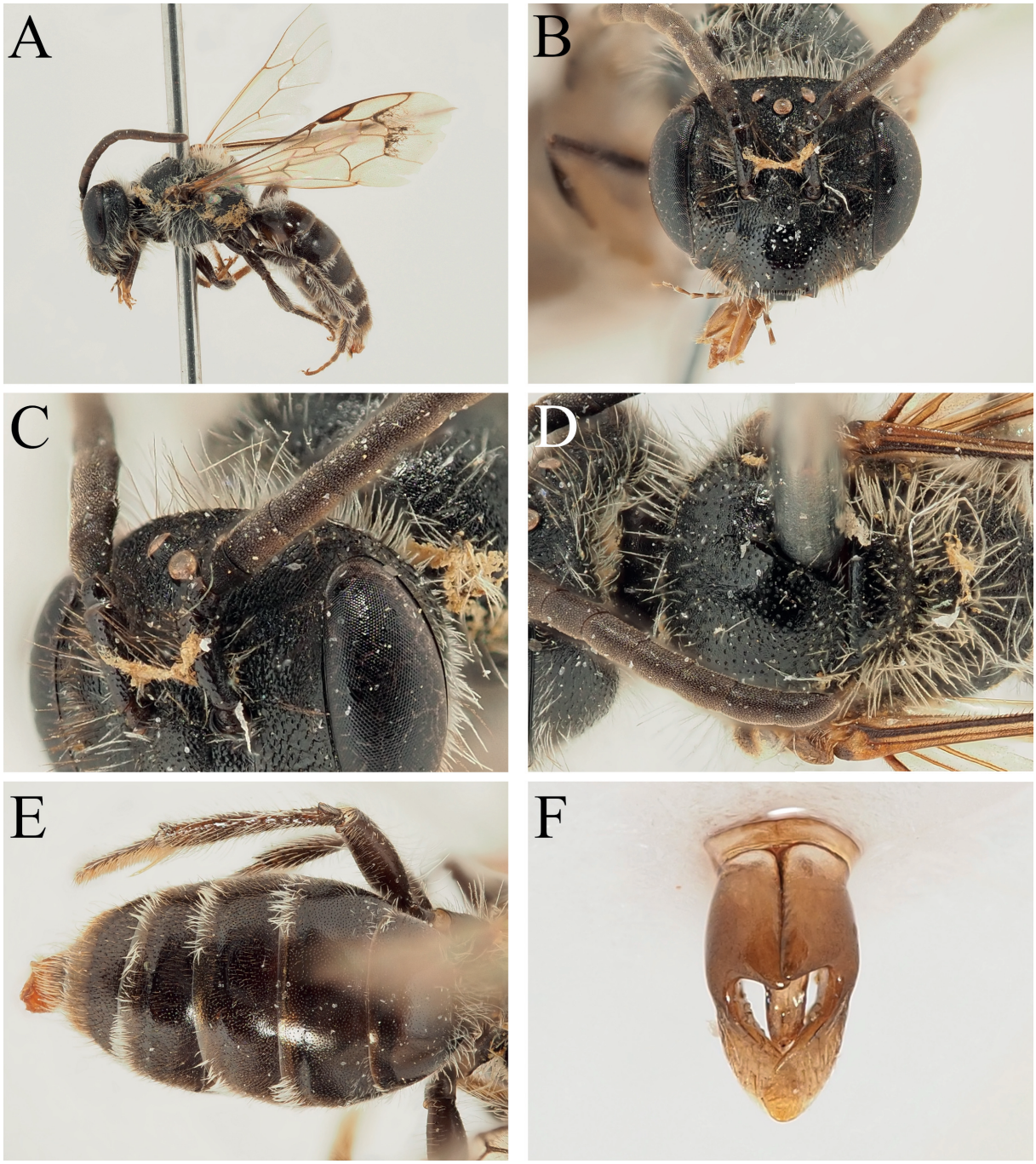

Fig. 10. *Andrena* (*Simandrena*) *gorkhana* Tadauchi & Matsumura, 2007, ♂ (WII). **A**. Habitus, lateral view. **B**. Face, frontal view. **C**. Antennal segments A1–7, frontal view. **D**. Scutum, dorsal view. **E**. Terga, dorsal view. **F**. Genital capsule, dorsal view.

hairs restricted to antennal insertions and apex of clypeus, gena and vertex with predominantly light brown hairs; longest hairs exceeding length of scape. Antennae dark, A3 clearly shorter than A4, A4–13 rectangular, clearly longer than broad (Fig. 9C).

Mesosoma. Scutum with rough microsculpture, dull, punctures abundant but shallow and obscure, with margins raised and blending into network of raised rugosity (Fig. 9D). Scutellum less strongly sculptured, surface weakly shining medially, punctures without raised rims, separated by 0.5–1 puncture diameters. Pronotum rounded. Mesepisternum microreticulate, overlain by network of weakly raised rugosity, weakly shining. Propodeum with strong microreticulation overlain by dense network of raised rugosity, propodeal triangle broad, laterally defined by raised carinae, internal surface with finely raised rugosity. Mesosoma with long light brown finely plumose hairs, majority exceeding length of scape. Legs dark, tarsal segments dark reddish, pubescence light brown. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma and venation orange, nervulus weakly antefurcal.

Metasoma. Tergal discs dark, apical rims narrowly lightened hyaline-yellow (Fig. 9E). Tergal sculpture as in female. T1 apico-laterally with weak fringe of long hairs, T2–4 with complete hairbands of whitish hairs, rapidly degraded, not obscuring underlying surface. T6–7 with long dark brown hairs overlying pseudopygidial plate of T7. S8 columnar, apex slightly broadened, rounded; ventral surface with lateral fan of brown hairs. Genital capsule slightly elongate, gonocoxae weakly produced into rounded teeth apically, gonostyli basally narrow, broadening apically, spatulate, with inner margin raised (Fig. 9F). Penis valves weakly broadened basally, occupying ½ space between gonostyli, narrowing apically.

Remarks

Two undetermined specimens of this new species were found in undetermined material collected by C.G. Nurse in the NHMUK collection, where they seemingly have been overlooked by previous workers.

Distribution

Northern India (Himachal Pradesh, Uttarakhand).

Species considered to be part of the Indian fauna

1. *Andrena* (*Andrena*) *submediocalens* Wu, 1982*

Andrena (*Andrena*) *submediocalens* Wu, 1982: 392; ♀♂ [China: Xizang, IZAS, not examined].

Material examined

INDIA • 1 ♀; Uttarakhand, 4 km N of Chaumasi; 30.6368° N, 79.0725° E; 2588 m a.s.l.; 9 May 2022; R.K. Gautam leg.; WII • 1♂; Uttarakhand, Kanda Village; 30.4987° N, 79.1457° E; 1920 m a.s.l.; 7 Apr. 2022; R.K. Gautam leg.; WII • 5 ♂♂, 4 ♀♀; Uttarakhand, Chhopta, Bhujgyali Bugyal; 30.4921° N, 79.2033° E; 2996 m a.s.l.; 17 Mar. 2021; R.K. Gautam leg.; WII • 6 ♂♂, 1 ♀; Uttarakhand, Chopta; 30.487° N, 79.2004° E; 2874 m a.s.l.; 6 Mar. 2021; R.K. Gautam leg.; WII • 1 ♂; Uttarakhand, Kanchula Kharg; 30.4596° N, 79.229° E; 2680 m a.s.l.; 24 Feb. 2021; R.K. Gautam leg.; WII • 6 ♀♀; Sikkim; C.T. Bingham leg.; ZMHB.

Remarks

This is the first *Andrena* (*Andrena*) species reported with confidence from India (see below). It was frequently encountered at high altitude sites in the spring.

Distribution

India* (Uttarakhand, Sikkim), China (Xizang) (Wu 1982).

2. *Andrena* (*Cnemidandrena*) *carinigena* Wu, 1982*

Andrena (*Cnemidandrena*) *carinigena* Wu, 1982: 390; ♀♂ [China: Xizang, IZAS, not examined].

Material examined

INDIA • 1 ♀; Uttarakhand, Hudu Village; 30.5044° N, 79.1504° E; 1800 m a.s.l.; 19 Nov. 2019; R.K. Gautam; WII.

Distribution

India* (Uttarakhand), China (Xizang, Yunnan) (Tadauchi & Xu 2002, as *A. carinigera*, incorrect spelling).

3. *Andrena* (*Cnemidandrena*) *granulitergorum* Tadauchi & Xu, 2002*

Andrena (*Cnemidandrena*) *granulitergorum* Tadauchi & Xu, 2002: 97, ♀ [China, IZAS, not examined].

Material examined

INDIA • 1 ♂; Darjeeling; Juni [likely June 1902]; H. Fruhstorfer leg.; NMW • 1 ♀; Rungaroom [Darjeeling]; [undated]; C.T. Bingham leg.; ZMHB • 1 ♀; Sikkim; [undated]; C.T. Bingham leg.; ZMHB.

Remarks

Wood (2024b) described the male of *A. granulitergorum*, and reported it from Nepal for the first time. Examination of material in the NMW collection revealed another male specimen, this time from the northern part of West Bengal. It was collected by Hans Fruhstorfer (1866–1922), a German explorer, insect trader, and entomologist. Between 1899–1902, he went on a three year round the world expedition through North America and Eastern Asia, returning via India. We therefore estimate that this specimen was collected in 1902. There were also two specimens from this region collected by Bingham, but the specimens are undated. It can be estimated that the specimens were collected in the 1890s based on Bingham's most active collecting period.

Distribution

India* (West Bengal, Sikkim), Nepal, and China (Sichuan, Yunnan) (Tadauchi & Xu 2002; Wood 2024).

4. *Andrena* (*Cnemidandrena*) *kishidai chagyabensis* Wu, 1982

Andrena (*Cnemidandrena*) *chagyabensis* Wu, 1982: 389, ♀♂ [China: Xizang, IZAS, not examined].

Listed by

Wood (2024b).

Remarks

Tadauchi & Xu (2002) placed *A. chagyabensis* in combination with *A. kishidai* Yasumatsu, 1935. Wood (2024b) reported *A. kishidai chagyabensis* as new for India, Bhutan, and Nepal, suggesting that *A. k. chagyabensis* may not only be distinct based on its disjunct distribution (*A. kishidai* s. str. is found in northern and north-eastern China), but may have been previously described from northern India by earlier workers (e.g., *A. gracillima* Cameron, 1897, see below). However, type material is currently unavailable for study to confirm or disprove this.

Distribution (subspecies *chagyabensis*)

India (Himachal Pradesh), Bhutan, Nepal, China (Xizang, Yunnan) (Xu & Tadauchi 2002; Wood 2024b).

5. *Andrena* (*Cnemidandrena*) *rufina* Morawitz, 1876

Andrena rufina Morawitz, 1876: 162, ♀♂ [Tajikistan, ZISP, photograph examined].

Material examined (see also Wood 2024b)

INDIA • 7 ♀♀; Ladakh, Leh, garden; 3535 m a.s.l.; 12 Aug. 1983; I. Tangelder leg.; RMNH; ZMA. INS.5103695 to ZMA.INS.5103701 • 4 ♂♂, same data as for preceding; ZMA; ZMA.INS.5103702 to ZMA.INS.5103705.

Listed by

Wood (2024b).

Distribution

Kazakhstan, Uzbekistan, Tajikistan, Kyrgyzstan, Afghanistan, India (Jammu & Kashmir, Ladakh) (Osytshnjuk *et al.* 2005; Astafurova *et al.* 2022; Wood 2024b).

6. *Andrena* (*?Euandrena*) *arima* Cameron, 1909

Andrena arima Cameron, 1909: 129, ♀ [India: Himachal Pradesh, NHMUK, examined].

Listed by

Cameron (1909); Tadauchi & Matsumura (2007); Meena & Dey (2019); Chandra *et al.* (2021); Ascher & Pickering (2023).

Material examined

INDIA • 1 ♀; Simla [Shimla]; 1–31 Aug. 1898; C.G. Nurse leg.; NHMUK (holotype of *A. arima*) • 3 ♀♀; NW India, U.P. [Uttar Pradesh, now Uttarakhand], Kumaon, Naini Tal [Nainital]; 2000–2480 m a.s.l.; 3–11 Oct. 1978; M.A. Lieftinck leg.; RMNH; RMNH.INS.1266112 to RMNH.INS.1266114.

NEPAL • 1 ♀; Langtang-Ghora Tabela; 18 Jul. 1975; M. Kraus leg.; OÖLM • 1 ♀; Langtangtal; 14 Jul. 1975; M. Kraus leg.; OÖLM • 1 ♀; Nawakot, Langtang Khola, Ghora Tabela; 3200 m a.s.l.; 3 Oct. 1982; C. Holzschuh leg.; OÖLM • 3 ♀♀; Kathmandu, Pulchoki, SE Godavari; 2760 m a.s.l.; 14 Sep. 1995; E. and J. Hüttinger leg.; OÖLM • 1 ♂, 1 ♀; Kathmandu, SE Kathmandu, Pulchoki; 1860–2500 m a.s.l.; 23 Sep. 1993; E. Hüttinger leg.; OÖLM • 2 ♀♀; Kathmandu, SE Kathmandu, Pulchoki; 2610 m a.s.l.; 20 Sep. 1993; E. Hüttinger leg.; OÖLM.

Remarks

Gusenleitner & Schwarz (2002) did not confidently place *A. arima* into a subgenus, whereas Tadauchi & Matsumura (2007) placed it in the subgenus *Ptilandrena* Robertson, 1902. Inspection of the type along with additional material from Nepal suggests that *A. arima* is associated with the subgenus *Euandrena* due to the simple scopal hairs, pronotum rounded and without a humeral angle, facial foveae weakly drop-shaped, weakly sculptured terga, and lack of any other distinctive characters. The use of the subgenus *Ptilandrena* by Tadauchi & Matsumura indicates that they drew essentially the same conclusions, as *Ptilandrena* and *Euandrena* are sister subgenera, but following the revision of Pisanty *et al.* (2022b), the use of *Ptilandrena* is restricted to North America. A specimen of the undescribed male was found in the OÖLM collection, but unfortunately it is stylopised and does not represent a typical individual, so

it is not described here. A genetic analysis is required to confirm the phylogenetic position of *A. arima*, though it appears likely to fall in the derived group of subgenera around or close to *Euandrena*.

Distribution

India (Himachal Pradesh, Uttarakhand), Nepal*.

7. *Andrena* (*Euandrena*) *communis* Smith, 1879

Andrena communis Smith, 1879: 50, ♀ [India: Uttarakhand, NHMUK, examined].
Andrena maligna Cameron 1897: 114, ♂ [India: Uttarakhand, OUMNH, not examined].

Listed by

Smith (1878); Bingham (1897); Cameron (1897); Meena & Dey (2019); Ascher & Pickering (2023).

Material examined

INDIA • 1 ♀; Masuri [= Mussoorie]; 7000 ft a.s.l.; NHMUK (holotype of *A. communis*) • 1 ♀; Uttarakhand, Kanda Village; 30.4987° N,79.1457° E; 1920 m a.s.l.; 7 Apr. 2022; R.K. Gautam leg.; WII • 1 ♀; Uttarakhand, Trijuginarayan; 30.6365° N, 78.9688° E; 2418 m a.s.l.; 2 Jun. 2022; R.K. Gautam leg.; WII • 1 ♂; Uttarakhand, Hudu; 30.5044° N, 79.1504° E; 1800 m a.s.l.; 19 Nov. 2019; R.K. Gautam leg.; WII.

PAKISTAN • 1 ♀; Azad Kashmir, Paras, Shogran; 25 May 2019; M. Kafka leg.; BOLD: WPATW979-23; TJWC • 1 ♀; Hazara, Kawai, Shogran; 14 May 1978; C. Holzschuh leg.; OÖLM.

Remarks

Smith (1879) described *A. communis* from Masuri [= Mussoorie] in Uttarakhand, and Cameron (1897) described *A. maligna* from Mussouri [= Mussoorie] as well. Cameron (1897: 114) wrote that his species could "hardly be the ♂ of *A. communis*" but Bingham (1897: 443) nevertheless synonymised the two species, without any justification. The type material of *A. maligna* is in the Rothney Collection (OUMNH), but is not currently available for study. This synonymy is maintained pending further investigations, though it is plausible given that the two taxa share the same locus typicus. As discussed above, the specimen labelled as "*Andrena familiaris* (Type) Sm." in the NHMUK collection is considered to be the holotype of *A. communis*.

Distribution

India (Uttarakhand) and Pakistan*.

8. *Andrena* (*Euandrena*) *flavitarsis* Morawitz, 1876

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

Material examined

INDIA • 9♀♀; Uttarakhand, Chhopta, Bhujgyali Bugyal; 30.4921° N, 79.2033° E; 2996 m a.s.l.; 8 Jun. 2021; R.K. Gautam leg.; WII • 2 ♀♀; Uttarakhand, Chhopta, Bhujgyali Bugyal; 30.4921° N, 79.2033° E; 2996 m a.s.l.; 17 Mar. 2021; R.K. Gautam leg.; WII • 9 ♀♀; Uttarakhand, Chopta; 30.487° N, 79.2004° E; 2874 m a.s.l.; 6 Mar. 2021; R.K. Gautam leg.; WII • 1 ♀; Uttarakhand, Ukhimath, Gari Village 30.5288° N, 79.1001° E; 1586 m a.s.l.; 2 Mar. 2021; R.K. Gautam leg.; WII.

KAZAKHSTAN • 1 ♀; Ketman Mts; ~2100 m a.s.l.; 14 Jun. 1988; V. Gurko leg.; OÖLM • 1 ♀; Arslambob, Kyzyl-Suu; 1590 m a.s.l.; 14 Jun. 2017; M. Kafka leg.; OÖLM • 1 ♂, 1 ♀; Frunze env.

[Bishkek] (30 km) Orto-Sai [Orto-Say]; 28 May 1980; Z. Pádr leg.; OÖLM • 2 ♀♀; Jalal Abad, 5 km SE of Arslanbob; 1600 m a.s.l.; 2–3 Jun. 2019; J. and L. Halada leg.; OÖLM/TJWC • 1 ♀; Jalal-abad Oblast, 5 km W of KashkaSuu, Jylamysh R.; 1774 m a.s.l.; 27 May 2009; L.R. Best leg.; PCYU • 1 ♀; Moldo-Too NR, S slope, Teke-Uyuk rav.; 2300 m a.s.l.; 30 Jun. 1999; D. Milko leg.; OÖLM • 2 ♀♀; Tschuy, Dist. Moskau, Kirgis Geb. S. Sosnovka; 1600–1750 m a.s.l.; 23 May 2008; H. and R. Rausch leg.; OÖLM/TJWC.

UZBEKISTAN • 2 ♀♀; Daganadzham env., I, near Surxondaryo; 973 m a.s.l.; 9–11 Apr. 2022; D. Benda leg.; NMPC/TJWC • 2 ♀♀; Daganadzham env., II, near Surxondaryo; 973 m a.s.l.; 9 Apr. 2022; D. Benda leg.; NMPC/TJWC • 1 ♀; Kishlyk env., III, Kashkadarya reg.; 1065 m a.s.l.; 7–10 Apr. 2022; D. Benda and T. Fraňková leg.; NMPC • 1 ♀; Myk env., II, NP Zaamin, Jizzakh reg.; 1828 m a.s.l.; 19 Apr. 2022; D. Benda and T. Fraňková leg.; NMPC.

Remarks

Andrena flavitarsis was described from what is now Uzbekistan, and most authors reported it only from this country (Astafurova *et al.* 2022). However, Osytshnjuk *et al.* (2008: 48) report the species from Uzbekistan and "Pendzhab (India)". 'Pandzhab' is Polish for 'Punjab', and may be an overlooked translation error, as the work of Osytshnjuk *et al.* was translated from Russian to English by Polish co-authors following the death of Anna Osytshnjuk in 1998. This listing has been overlooked by subsequent authors (e.g., Meena & Dey 2019; Astafurova *et al.* 2022), and indeed is difficult to believe without additional supporting evidence. Examination of new material shows that *A. flavitarsis* is widespread in Central Asia and extends south into the Western Himalayas in Uttarakhand. In this context, the mention of Punjab is more plausible, though presumably it would have to be from northern Punjab (e.g., close to Kashmir) since *A. flavitarsis* is found in mountainous habitats. Therefore, *A. flavitarsis* is not reported as new for India, though this is the first mention supported by detailed specimen records.

Distribution

Kazakhstan*, Uzbekistan, Kyrgyzstan*, India (?Punjab, Uttarakhand) (Osytshnjuk *et al.* 2008; Astafurova *et al.* 2022).

9. *Andrena* (?*Euandrena*) *mephistophelica* Cameron, 1897

Andrena mephistophelica Cameron, 1897: 117, sex not specified [India: Uttarakhand, OUMNH, not examined].

Listed by

Bingham (1897); Cameron (1897); Bingham (1908); Meena & Dey (2019); Chandra *et al.* (2021); Ascher & Pickering (2023).

Remarks

As discussed above, *A. mephistophelica* is likely to be one of the larger-bodied red-marked *Euandrena* species present in the Himalayas. The exact location of the type material must be ascertained before further taxonomic action can be conducted.

Distribution

India (Uttarakhand) (Cameron 1897).

10. *Andrena* (*Euandrena*) *murreensis* Cockerell, 1923*

Andrena murreensis Cockerell, 1923: 264, ♀♂ [Pakistan, NHMUK, **lectotype** by present designation].

Type material

Lectotype (by present designation, Fig. 2)
PAKISTAN • 1 ♀; Murree, 7500 ft, 18 Jun. 1920; "156"; Dutt leg.

Syntype (examined by photograph)
PAKISTAN • 1 ♀; Murree Hills, Punjab; 7500 ft; May.1920; "50"; Dutt leg.; type no. 18260; USNM.

Further material examined

true *A. murreensis*
INDIA • 1 ♀; Kumaon Himalaya, U.P. [Uttar Pradesh, now Uttarakhand], distr. Almora, Ranikhet – Chaubattia; 1800 m a.s.l.; 28 May 1981; C. Holzschuh leg.; OÖLM • 1 ♀; Simla [Shimla]; 1–31 May 1897; C.G. Nurse leg.; NHMUK • 2 ♀♀; Shillong, Assam; 1–30 Apr. 1903; R. Turner leg.; NHMUK • 1 ♀; NE India, Arunchal pr., Dirang vicinity; 1800 m a.s.l.; 8–22 May 2006; P. Pacholátko leg.; OÖLM • 4 ♀♀; NW India, U.P. [Uttar Pradesh, now Uttarakhand], Kumaon, Naini Tal [Nainital]; 2000–2480 m a.s.l.; 3–8 Oct. 1978; M.A. Lieftinck leg.; RMNH; RMNH.INS.1266115 to RMNH.INS.1266118 • 1 ♀; U.P. [Uttar Pradesh, now Uttarakhand], Garhwal Himalaya, Uttarkashi; 1300 m a.s.l.; 28–29 Apr. 1995; S.W.T. Batra leg.; SEMC; SEMC0988949.

NEPAL • 1 ♀; E Nepal, Dhankuta, Arun-Valley, Lamobagar Gola; 1000–1400 m a.s.l.; 27 May–3 Jun. 1980; C. Holzschuh leg.; OÖLM • 1 ♀; Jiri, Bhodung [?]; 2400 m a.s.l.; 19 May 1962; G. Ebert and H. Falkner leg.; OÖLM • 1 ♀; Tatopani; 1200 m a.s.l.; 14 May 1984; C. Holzschuh leg.; OÖLM • 1 ♀; Kathmandu, Shivaburi [Shivapuri] whatersheet; 1800–1950 m a.s.l.; 17 Apr. 1994; E. and J. Hüttinger leg.; OÖLM.

PAKISTAN • 1 ♀; Azad Kashmir, Paras, Shogran; 25 May 2019; M. Kafka leg.; BOLD: WPATW982-23; TJWC • 1 ♀; Hazara, Kawai, Shogran; 14 May 1978; C. Holzschuh leg.; OÖLM.

aff. *A. murreensis*, cryptic species
NEPAL • 1 ♀; Kathmandu, Shivaburi [Shivapuri] whatersheet; 1800–1950 m a.s.l.; 17 Apr. 1994; E. and J. Hüttinger leg.; OÖLM • 1 ♀; Langtangtal; 14 Jul. 1975; M. Kraus leg.; OÖLM • 1 ♀; Trisuli Khola-Langtang Kh., Syabru Bensi [Syapru Besi]; 1600 m a.s.l.; 29 Sep. 1982; C. Holzschuh leg.; OÖLM.

PAKISTAN • 5 ♂♂; Azad Kashmir, Paras, Shogran; 25 May 2019; M. Kafka leg.; BOLD: WPATW981-23; OÖLM/TJWC • 34 ♀♀; same data as for preceding; BOLD: WPATW983-23; OÖLM/TJWC • 1 ♂, 5 ♀♀; Azad Kashmir, Murree, Bhurban; 19 May 2019; M. Kafka leg.; BOLD: WPATW980-23; OÖLM/TJWC • 1 ♀; Hazara, Kawai, Shogran; 14 May 1978; C. Holzschuh leg.; OÖLM • 1 ♀; Murree Hills, Bhurban; 1900 m a.s.l.; 3 May 1978; C. Holzschuh leg.; OÖLM.

Remarks

As discussed above, *A. murreensis* is morphologically very close to a cryptic taxon for which the appropriate name is unclear. However, based on the designation of a lectotype for *A. murreensis*, this species can be recognised as having a range that extends across northern India to central Nepal.

Distribution (true *A. murreensis*)

Pakistan, India* (Himachal Pradesh, Uttarakhand, Meghalaya, Arunachal Pradesh), Nepal*.

11. *Andrena* (*Hoplandrena*) *subspinigera* Cockerell, 1917*

Andrena subspinigera Cockerell, 1917: 284, ♀ [Pakistan, USNM, examined by photograph].

Listed by

Meena & Dey (2019).

Type material

Syntype (examined by photograph)
PAKISTAN • 1 ♀; Menserah [Mansehra]; 1–31 Mar. 1906; F. Benton leg.; type no. 23136; USNM.

Other material examined

INDIA • 1 ♀; Uttarakhand, Chopta; 2874 m a.s.l.; 6 Mar. 2021; R.K. Gautam leg.; WII.

PAKISTAN • 4 ♀♀; Azad Kashmir, Paras, Shogran; 25 May 2019; M. Kafka leg.; OÖLM/TJWC.

Remarks

Andrena subspinigera was described from Mansehra in what is now north-western Pakistan in the foothills of the Himalayas. Cockerell drew comparison with *A. spinigera* (Kirby, 1802) [= *A. trimmerana* (Kirby, 1802), see Wood *et al.* 2022], but considered the two taxa distinct. It was possible to generate a barcode sequence from a specimen collected 40 km north-east of the locus typicus (Shogran). Genetically, *A. subspinigera* is well differentiated from *A. trimmerana*, and instead is closest to *A. nuptialis* Pérez, 1902 (Fig. 11), though is clearly distinct with a genetic distance of 8.50% (range 8.37–8.63%).

It is important to note that the type material of *A. subspinigera* has the discs of T1–2 almost entirely red-marked, whereas in our examined material, only the marginal areas of T1–2 and a narrow strip immediately anterior to the margins are lightened dull reddish. This is considered to represent variation, as members of the subgenus *Hoplandrena* Pérez, 1890 are well known for extensive variation in their tergal colouration, leading to the creation of a large number of synonyms (e.g., Gusenleitner & Schwarz 2002; Wood *et al.* 2022; Wood 2023a).

Meena & Dey (2019) listed *A. subspinigera* from central India, but provided no supporting evidence. We consider the presence of *A. subspinigera* in central India unlikely, since all confirmed records come from the Himalayas or close to them, and therefore our records represent the first confirmed records of the species in India.

Distribution

India* (Uttarakhand) and Pakistan (Cockerell 1917).

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

Andrena fuscosa Erichson, 1835: 103, ♂ [Spain, ZMHB, examined].
Melanapis violaceipennis Cameron, 1902: 422, ♀♂ [India: Punjab, NHMUK, examined].
Melanapis rufifrons Nurse, 1904: 567, ♀♂ [Pakistan, NHMUK, examined].

Listed by

Cameron (1902); Batra (1967); Makkar *et al.* (2016, as *A. agilissima* (Scopoli, 1770)); Chandra *et al.* (2019); Meena & Dey (2019); Ascher & Pickering (2023).

Remarks

Several authors, beginning with Makkar *et al.* (2016), reported *A. agilissima* for India when in fact they were referring to *A. fuscosa* (see below).

Material examined

INDIA • 1 ♀; Ferozepore [Firozpur]; 1–31 Mar. 1898; C.G. Nurse leg.; NHMUK (syntype of *Melanapis violaceipennis*).

PAKISTAN • 1 ♀; Quetta; 1–31 Mar. 1903; C.G. Nurse leg.; NHMUK (syntype of *Melanapis rufifrons*).

Distribution

West and Central Palaearctic to Pakistan and India (Punjab, Delhi, Bihar) (Gusenleitner & Schwarz 2002; Ascher & Pickering 2023; Wood 2023b).

13. *Andrena* (*Melandrena*) *cineraria* (Linnaeus, 1758) sensu lato

Andrena cineraria Linnaeus, 1758: 575, [Europe, type lost].
Lamprocolletes peregrinus Smith, 1878: 2 [China, ZSI, examined by photograph].

Listed by

Nurse (1904); Meena & Dey (2019); Chandra *et al.* (2021); Ascher & Pickering (2023).

Type material

Syntypes

CHINA • 1 ♀; Yangihissár [=Yengisar]; ZSI; ZSI0000008643 • 1 ♀; Yarkand [=Yarkant]; NHMUK.

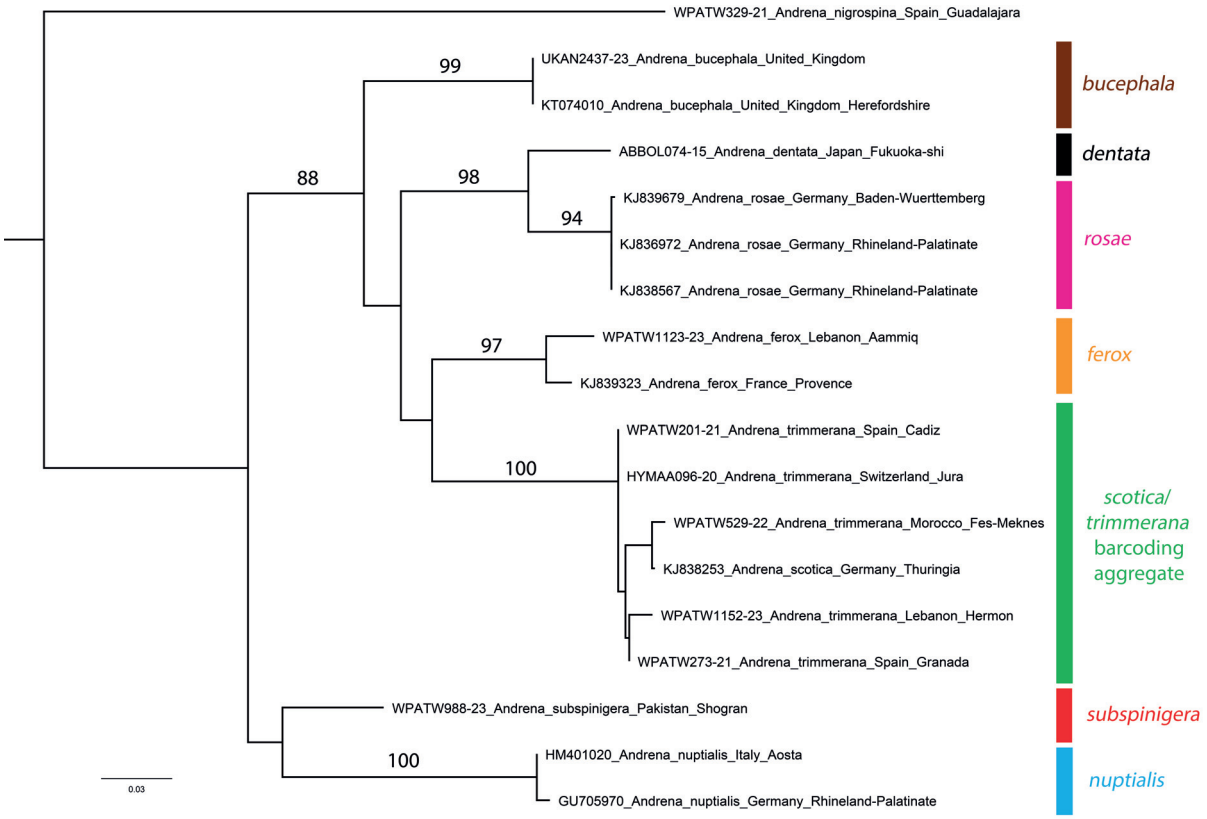

Fig. 11. Phylogenetic tree (maximum likelihood) of *Andrena* subgenus *Hoplandrena* Pérez, 1890 based on the mitochondrial COI gene. Numbers above branches represent bootstrap support (values of <75 are omitted).

Other material examined

INDIA • 5 ♀♀; West Himalaya, Khalatse [Khalsi], Kashmir, 4000–5000 m a.s.l.; 12–23 May 1933; ZMHB.

Remarks

It is difficult to find a primary listing for the presence of *A. cineraria* in India. *Andrena cineraria* has been treated as a broad taxon, but it represents a species complex including *A. barbareae* Panzer, 1805 and *A. danuvia* Stöckhert, 1950. In Asia, "*A. cineraria*" has been reported to be bivoltine (e.g., Osytshnjuk *et al.* 2008; Xu & Tadauchi 2009a), and hence is suspected to be more closely related to *A. barbareae* rather than to *A. cineraria* (Wood 2023a). Further study is required, along with genetic analysis (Gueuning *et al.* 2020).

Additionally, the name *A. peregrina* (Smith, 1878) is available, and is currently listed as a synonym of *A. cineraria* (Gusenleitner & Schwarz 2002). Originally described as a *Lamprocolletes* Smith, 1853 (Colletidae), examination of a specimen in the NHMUK collection labelled as "Type" in the handwriting of Smith (Fig. 12) shows that this taxon is an *Andrena* (although the head is missing, the remaining body is clearly a species of *Andrena*), and is closely affiliated with *A. cineraria*. Indeed, Warncke (1967: 298) considered *A. peregrina* to be conspecific with *A. cineraria*, leading to the current listing of Gusenleitner & Schwarz. However, the published type locality is Yangihissár [Yengisar] in East Turkestan [=Xinjiang in western China], whereas the specimen is labelled as "Yarkand" [=Yarkant] which is approximately 100 km to the south-east of Yangihissár. Donald Baker (unpublished thesis: 273) suggested that additional type material of *A. peregrina* may be in the ZSI, and that this NMHUK specimen is presumably a syntype retained by Smith. Searching through the ZSI website produces a specimen of *A. peregrina* from Yangihissár (ZSI0000008643) which is clearly syntypic, but is not automatically considered to be the holotype since the NHMUK specimen is also considered to be a syntype. At the present time, neither specimen is designated as a lectotype.

Given the complexity of species delineation within this group of species (Gueuning *et al.* 2020), no taxonomic action is taken here. The status of *A. basifusca* Cockerell, 1930 (described from Uzbekistan and currently listed as a valid species by Gusenleitner & Schwarz 2002) must also be resolved in future molecular revisions focusing on Asia. Since Nurse (1904) mentioned that *A. cineraria* was "fairly common in Kashmir", the species is retained on the Indian list of *Andrena* in a broad sensu lato, pending further investigations.

Distribution

Unclear, possibly restricted to the West Palaearctic or perhaps more broadly across the Palaearctic.

14. *Andrena* (*Melandrena*) *flavipes* Panzer, 1799

Andrena flavipes Panzer, 1799: 20, ♀♂ [Austria, ?NMW, type probably lost, not examined].
Andrena levilabris Cameron, 1908: 308, ♀ [India: Punjab, NHMUK, examined].
Andrena punjaubensis Cameron, 1909: 130, ♀ [India: Punjab, NHMUK, examined].

Listed by

Cameron (1908, 1909); Cockerell (1922); Tadauchi & Matsumura (2007); Chandra *et al.* (2019); Meena & Dey (2019); Ascher & Pickering (2023); Umbrey *et al.* (2023).

Fig. 12. *Lamprocolletes peregrinus* Smith, 1878 (= *Andrena peregrina* (Smith, 1878)), syntype, ♀ (NHMUK). **A**. Label information. **B**. Body, dorsal view.

Material examined

INDIA • 1 ♀; Ferozepore [Firozpur]; 1–31 May 1898; C.G. Nurse leg.; NHMUK (syntype of *A. levilabris*) • 1 ♀; Ferozepore [Firozpur]; 1–31 Mar. 1898; C.G. Nurse leg.; NHMUK (syntype of *A. punjaubensis*) • 1 ♂; Darjeel. Kalimpong; 20 Apr. 1984; Bahadur leg.; OÖLM • 19 ♀♀; Kalimpong [West Bengal]; 1350 m a.s.l.; 7 May 1981; M. Kraus leg.; OÖLM • 1 ♀; Uttarakhand, 4 km N of Chaumasi; Ukhimath, Gari Village; 30.5288° N, 79.1001° E; 2588 m a.s.l.; 9 May 2022; R.K. Gautam leg.; WII • 7 ♂♂; Uttarakhand, Kanda Village; 30.4987° N, 79.1457° E; 1908 m a.s.l.; 16 Nov. 2019; R.K. Gautam leg.; WII • 1 ♂, 1 ♀; Uttarakhand, Chaumasi; 30.6146° N, 79.0695° E; 2260 m a.s.l.; 8 May 2022; R.K. Gautam leg.; WII • 1 ♀; Uttarakhand, Gwar Village; 30.4931° N, 79.1375° E; 1404 m a.s.l.; 8 Apr. 2022; R.K. Gautam leg.; WII • 1 ♂; Uttarakhand, Kanchula Kharg; 2680 m a.s.l.; 24 Feb. 2021; R.K. Gautam leg.; WII • 1 ♂; Uttarakhand, Trijuginarayan; 30.6365° N, 78.9688° E; 2418 m a.s.l.; 2 Jun. 2022; R.K. Gautam leg.; WII • 1 ♀; U.P. [Uttar Pradesh, now Uttarakhand], Himalayas, Harsil; 2700 m a.s.l.; 20 May 1990; S.W.T. Batra leg.; SEMC; SEMC0988947 • 3 ♀♀; Sikkim; [undated]; C.T. Bingham leg.; ZMHB.

Distribution

West and Central Palaearctic to Pakistan, India (Punjab, Kashmir, Himachal Pradesh, Uttarakhand, West Bengal, Sikkim, Arunachal Pradesh), and China (Gusenleitner & Schwarz 2002; Ascher & Pickering 2023).

15. *Andrena* (*Melandrena*) *induta* Morawitz, 1894

Andrena induta Morawitz, 1894: 62, ♀♂ [Uzbekistan, ZISP, examined by photograph].
Andrena patella Nurse, 1903: 542, ♀♂ [Kashmir, NHMUK, examined].
Andrena brunneipennis Bingham, 1908: 362, ♀ [India: Shimla, ZSI, examined by photograph].

Listed by

Nurse (1903); Bingham (1908); Osytshnjuk *et al.* (2008); Meena & Dey (2018a, 2019); Astafurova *et al.* (2021); Chandra *et al.* (2021); Wood & Monfared (2022); Ascher & Pickering (2023).

Material examined

INDIA • 1 ♂; Uttarakhand, 4 km N of Chaumasi; 30.6368° N, 79.0725° E; 2588 m a.s.l.; 9 May 2022; R.K. Gautam leg.; WII • 1 ♀; Uttarakhand, Hudu Village; 30.4953° N, 79.1559° E; 2070 m a.s.l.; 4 Jun. 2022; R.K. Gautam leg.; WII • 1 ♀; Uttarakhand, Duggalbitta; 30.4883° N, 79.1738° E; 2607 m a.s.l.; 10 Apr. 2022; R.K. Gautam leg.; WII • 1 ♀; Gulmarg; summer 1913; NHMUK • 1 ♀; Kashmir; 6000–7000 ft a.s.l.; 1–30 Aug. 1901; C.G. Nurse leg.; NHMUK (**syntype** of *A. patella*) • 1 ♀; Ladakh, Ronding; 14 Aug. 1977; M. Kraus leg.; OÖLM • 1 ♀; Matiana, Simla Hills; 8000 ft a.s.l.; 28–30 Apr. 1907; ZSI; ZSI0000008660; (**syntype** of *A. brunneipennis*) • 1 ♀; Matiana, Simla Hills; 8000 ft a.s.l.; 28–30 Apr. 1907; ZMHB (**syntype** of *A. brunneipennis*) • 1 ♀; West Himalaya, Khalatse [Khalsi], Kashmir; 4000–5000 m a.s.l.; 6 May 1939; OÖLM.

Remarks

Wood & Monfared (2022) synonymised *A. patella* with *A. induta*. To date, confirmed Indian records come from high altitude sites in the Western Himalayas. The holotype depository for *A. brunneipennis* was unclear (see Wood 2024b), but a syntype (marked as a paratype by Warncke) was examined in the ZMHB collection (Fig. 13), and examination of photographs from the ZSI website indicate that a syntype is present there as well. These specimens confirm that the currently accepted synonymy (see Warncke 1967) with *A. induta* is correct. A lectotype is currently undesignated, but the type depository for *A. brunneipennis* can be considered to be the ZSI based on the original intent of Bingham (1908).

Distribution

Turkey, Armenia, Iran, Turkmenistan, Uzbekistan, Tajikistan, Afghanistan, India (Jammu & Kashmir, Ladakh, Himachal Pradesh, Uttarakhand) (Osytshnjuk *et al.* 2008; Astafurova *et al.* 2021; Wood & Monfared 2022).

16. *Andrena* (*Melandrena*) *kedarnatha* Wood & Gautam sp. nov.

Distribution

Northern India (Ladakh, Uttarakhand) and Nepal.

17. *Andrena* (*Micrandrena*) *semirugosa* Cockerell, 1924*

Andrena semirugosa Cockerell, 1924: 180, ♀ [Russia: Siberia, NHMUK, examined].

Material examined

INDIA • 2 ♂♂, 1 ♀; Uttarakhand, Dever Village; 1934 m a.s.l.; 9 Mar. 2021; R.K. Gautam leg.; WII • 3 ♀♀; Uttarakhand, Hudu Village; 30.4953° N, 79.1559° E; 2098 m a.s.l.; 20 Mar. 2021; R.K. Gautam leg.; WII • 6 ♂♂, 2 ♀♀; Uttarakhand, Kanda Village; 30.4987° N, 79.1457° E; 1908 m a.s.l.; 26 Feb. 2021; R.K. Gautam leg.; WII • 3 ♂♂, 9 ♀♀; Uttarakhand, Hudu Village; 30.4953° N, 79.1559° E; 2098 m a.s.l.; 13 Jul. 2021; R.K. Gautam leg.; WII.

Distribution

India* (Uttarakhand), Nepal, China, South Korea, Russia (Far East), Japan (Tadauchi & Matsumura 2007; Ascher & Pickering 2023).

18. *Andrena* (?*Notandrena*) *bellidoides* LaBerge, 1968

Andrena bellidoides LaBerge, 1968: ♀♂ [India: Lonavala, NHMUK, examined].

Listed by

LaBerge (1968); Meena & Dey (2019); Ascher & Pickering (2023); Wood (2023a).

Type material

Holotype

INDIA • ♀; W. India, Lonavala; 1–30 Nov. 1964; NHMUK.

Paratypes

INDIA • 1 ♂; W. India, Lonavala; 1–30 Nov. 1964; SEMC; SEMC0977708 • 1 ♀; same data as for preceding; SEMC; SEMC0977709.

Other material examined

INDIA • 2 ♀♀; W Ghats, Lonavala; 1 Jan. 1967; OÖLM • 4 ♂♂; W Maharashtra st. 70 km SSW of Pune; 1400 m a.s.l.; 30 Sep. 2005; J. Bezděk leg.; OÖLM • 1 ♂; W Ghats, Lonavala; 620 m a.s.l.; 9 Nov. 1961; SEMC; SEMC0981603 • 1 ♀; same data as for preceding; SEMC; SEMC0981604.

Remarks

Placement in the subgenus *Notandrena* Pérez, 1890 requires further support (see Wood 2023a).

Distribution

India (Maharashtra) (Wood 2023a).

19. *Andrena* (*Notandrena*) *punjabensis* Cameron, 1908

Andrena punjabensis Cameron, 1908: 309, ♀♂ [India: Punjab, NHMUK, examined].

Listed by

Cameron (1908); Ascher & Pickering (2023).

Type material

Syntype

INDIA • 1 ♂; Ferozepore [Firozpur]; 1–28 Feb. 1898; C.G. Nurse leg.; NHMUK.

Remarks

Examination of type material supports continued placement in *Notandrena* due to the yellow male clypeus, broadened gena, and pronotum with humeral angle (previously placed in the now synonymous subgenus *Carandrena* Warncke, 1968).

Fig. 13. *Andrena* (*Melandrena*) *brunneipennis* Bingham, 1908, syntype, ♀ (ZMHB). **A**. Label information. **B**. Habitus, lateral view. **C**. Face, frontal view. **D**. Terga, dorsal view.

Distribution

India (Punjab) (Cameron 1908).

20. *Andrena* (*Oreomelissa*) *fani* Xu & Tadauchi, 2000*

Andrena (*Oreomelissa*) *fani* Xu & Tadauchi, 2000: 49, ♀♂ [China, IZAS, not examined].

Material examined

CHINA • 1 ♂, 1 ♀; Gyangtse [Gyantse]; 13 000 ft a.s.l.; 1–30 Jun. 1904; H.J. Walton; NHMUK • 2 ♂♂; Khamba Jong., Sikkim [Kampa Dzong, actually in Tibet]; 15 000–16 000 ft a.s.l.; 15–30 Jul. 1903; Tibet Exped. leg.; NHMUK.

INDIA • 5 ♀♀; Thangu; 3800 m a.s.l.; 1–12 Jul. 1938; Schäfer. Exped. leg.; ZMHB • 2 ♂♂, 4 ♀♀; Thangu R.; 2 Jul. 1938; Schäfer. Exped. leg.; ZMHB • 8 ♂♂, 3 ♀♀; Sikkim, Teesta Vy., Tungu, [Thangu]; 13 000–14 000 ft a.s.l. [= 4000–4200 m a.s.l.]; 1–15 Jul. 1903; Tibet Expedition leg.; NHMUK.

Remarks

Material in the ZMHB was separated as "*Andrena dictyonota* n. sp.", an unpublished name. The location of "Tungu" as indicated on the NHMUK specimens from Sikkim is unclear, but based on the recorded altitude (ca 4000–4200 m a.s.l.), it likely refers to Thangu Valley which is found 3900 m a.s.l. Some specimens marked as "Sikkim" occur slightly further north in what is now Chinese Tibet.

Distribution

India* (Sikkim) & China (Xizang, Yunnan) (Xu *et al.* 2000).

21. *Andrena* (*Oreomelissa*) *himalayana* Tadauchi & Matsumura, 2007

Andrena (*Oreomelissa*) *himalayana* Tadauchi & Matsumura, 2007: 6, ♀♂ [Nepal, ELKU, not examined].

Material examined

INDIA • 1 ♀; NW India, U.P. [Uttar Pradesh, now Uttarakhand], Kumaon, Naini Tal [Nainital]; 2000–2480 m a.s.l.; 3–11 Oct. 1978; M.A. Lieftinck leg.; RMNH; RMNH.INS.1266150.

NEPAL • 1 ♀; Trisuli Khola-Langtang Kh., Syabru Bensi [Syapru Besi]; 1600 m a.s.l.; 29 Sep. 1982; C. Holzschuh leg.; OÖLM.

Remarks

One specimen was found in the RMNH collection that matches material from central Nepal (Syapru Besi) that is relatively close (ca 100 km) to the locus typicus of Namche Bazar (Tadauchi & Masumura 2007).

Distribution

India* (Uttarakhand) and Nepal (Tadauchi & Matsumura 2007).

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

Andrena rothneyi Cameron, 1897: 112, ♀ [India: Mussoorie, NHMUK, examined].
Andrena simlaensis Cameron, 1902: 422, ♂ [India: Shimla, NHMUK, examined].

Listed by

Bingham (1897); Cameron (1897); Cameron (1902); Cockerell (1923); Tadauchi & Matsumura (2007); Meena & Dey (2018b; 2019); Chandra *et al.* (2021); Ascher & Pickering (2023); Umbrey *et al.* (2023).

Type material

Holotype

INDIA • ♀; Masuri [Mussoorie]; NHMUK.

Other material examined

INDIA • 1 ♂; Simla [Shimla]; 1–30 Aug. 1898; NHMUK (**holotype** of *A. simlaensis*) • 1♂, 1♀; Simla [Shimla]; 1–30 Aug. 1898; ZMHB.

NEPAL • 1 ♀; Anapurnareg., Ghorepani [Ghode Pani]; ca 2850 m a.s.l.; 12 Oct. 1999; W-H. Liebig leg.; WHLC • 1 ♀; Anapurnareg., Koto; ca 2600 m a.s.l.; 29 Sep. 1999; W-H. Liebig leg.; WHLC • 1 ♀; Kathmandu, Pulchoki, SE of Godavari; 2760 m a.s.l.; 14 Sep. 1995; E. and J. Hüttinger leg.; E. Scheuchl det.; OÖLM • 3 ♀♀; Kathmandu, SE of Kathmandul, Pulchoki; 1860–2500 m a.s.l.; 23 Sep. 1993; E. and J. Hüttinger leg.; E. Scheuchl det.; OÖLM.

Distribution

India (Himachal Pradesh, Uttarakhand, Arunachal Pradesh) & Nepal*.

23. *Andrena* (*Oreomelissa*) *submontana* Wu, 1982*

Andrena (*Oreomelissa*) *submontana* Wu, 1982: 386, ♀ [China: Xizang, IZAS, not examined].

Material examined

INDIA • 3 ♀♀; Uttarakhand, Nanu Chatti, Gaundhar; 30.61126° N, 79.2013° E; 2440 m a.s.l.; 5 Oct. 2021; R.K. Gautam leg.; WII • 1 ♂, 3 ♀♀; Thangu; 3800 m a.s.l.; 1–12 Jul. 1938; Schäfer. Exped. leg.; ZMHB • 1 ♀; Thangu R.; 2 Jul. 1938; Schäfer. Exped. leg.; ZMHB.

Remarks

Specimens from Uttarakhand were collected from *Geranium wallichianum* Oliv. (Geraniaceae Juss.) (Fig. 14). Females of *A. submontana* present partially plumose tibial scopal hairs and long spines on the posterior face of the hind femorae, along with two other Himalayan species of *Oreomelissa* (Xu *et al.* 2000). This is reminiscent of the characters present in some members of the unrelated subgenus *Avandrena* Warncke, 1968 that are specialised on *Erodium* L'Hér. ex Aiton (Geraniaceae) (Wood 2023b). Further study is required to assess whether these structures are functionally involved in pollen collection, and thus represent convergent evolution, since spined *Avandrena* and *Oreomelissa* are strongly separated phylogenetically (Pisanty *et al.* 2022b). Specimens from Sikkim collected by the Schäfer Expedition were separated as "*Andrena adicyta* n. sp.", an unpublished name.

Distribution

India* (Uttarakhand, Sikkim) & China (Xizang, Qinghai, Yunnan) (Xu *et al.* 2000).

24. *Andrena* (*Pallandrena*) *morosa* Cameron, 1897

Andrena morosa Cameron, 1897: 119, ♀ [India: Uttarakhand, NHMUK, examined].
Andrena burkelii Bingham, 1908: 363, ♀ [India: Himachal Pradesh, ZSI, examined by photograph] **syn. nov.**

Listed by

Bingham (1897); Cameron (1897); Bingham (1908, as *A. burkelii*); Tadauchi & Matsumura (2007); Meena & Dey (2019); Ascher & Pickering (2023).

Type material

Holotype

INDIA • ♀; Masuri [Mussoorie]; NHMUK.

Other material examined

INDIA • 1 ♀; Simla, Matiana; ZSI; ZSI0000008659 (syntype of *A. burkelii*).

NEPAL • 1 ♀; Nawakot, Langtang Khola, Ghora Tabela; 3200 m a.s.l.; 3 Oct. 1982; C. Holzschuh leg.; OÖLM.

Remarks

Gusenleitner & Schwarz (2002) did not place *A. morosa* within a subgenus, and Tadauchi & Matsumura (2007) placed it within *Andrena* s. str. Fabricius, 1775. Examination of the holotype (Fig. 15) shows that it presents a strongly emarginate process of the labrum, and the ventral pollen-collecting hairs of the tibial scopae are long and strongly plumose. This strongly suggests placement in the subgenus *Pallandrena* Warncke, 1968, members of which are associated with the family Geraniaceae which has large pollen grains, necessitating sparse plumose scopal hairs. Indeed, the hind legs of the type specimen are covered in large grains that are visible to the naked eye (Fig. 15D). We therefore place *A. morosa* into the subgenus *Pallandrena*, and hypothesise that it will be caught on *Geranium* or related genera in the future.

Andrena burkelii was described from Matiana from an altitude of 8000 feet. Bingham mentioned that it had a body length of 12 mm, and that it was unlike any other species of *Andrena* he had examined. Possible type depositories were discussed by Wood (2024b), but examination of the ZSI website

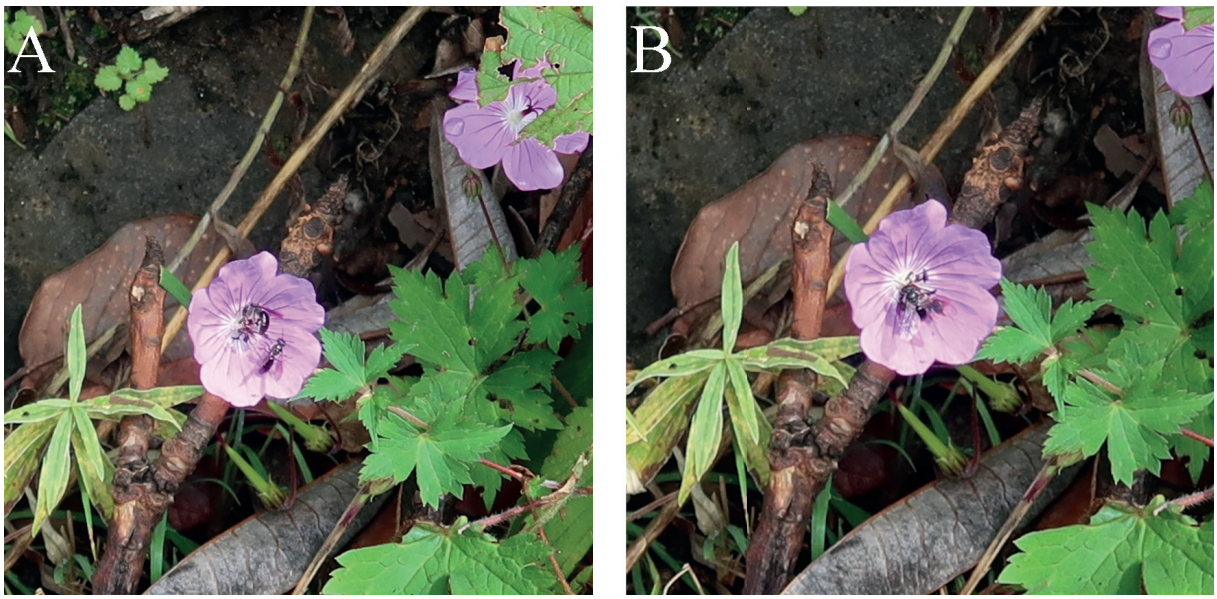

Fig. 14. A–B. *Andrena* (*Oreomelissa*) *submontana* Wu, 1982, ♀♀ on *Geranium wallichianum* Oliv. (Geraniaceae Juss.) in Uttarakhand, November 2021.

revealed type material in that collection. Examination of the photographed female specimen (possibly automatically the holotype, but it is unclear how many specimens are included in the type series) shows that it displays the same characters (particularly the same body size, pubescence, and decoloured tergal margins) as *A. morosa*, and indeed the hind tibial scopae are completely covered in the same large pollen grains. Within the Western Himalayas, the locus typicus of Matiana is only 100 km to the north-west of Mussoorie, the locus typicus of *A. morosa*. We therefore synonymise *A. burkelii* with *A. morosa* syn. nov.

Distribution

India (Himachal Pradesh, Uttarakhand) & Nepal*.

25. *Andrena* (*Plastandrena*) *mongolica* Morawitz, 1880*

Andrena mongolica Morawitz, 1880: 360, ♀ [China, ZISP, examined by photograph].

Material examined

INDIA • 1 ♂; West Himalaya, Khalatse [Khalsi], Kashmir [Ladakh]; 4000–5000 m a.s.l.; 6 May 1939; K. Warncke det.; OÖLM.

Fig. 15. *Andrena* (*Pallandrena*) *morosa* Cameron, 1897, syntype, ♀ (NHMUK). **A**. Label details. **B**. Habitus, lateral view. **C**. Face, frontal view. **D**. Terga and hind leg, dorso-lateral view.

Remarks

Members of the subgenus *Plastandrena* Hedicke, 1933 are fiendishly difficult to identify due to variable morphology without clear and consistent 'break points' between species and lack of resolution using genetic barcoding (e.g., Wood 2023b). Further study using more powerful genetic techniques (e.g., including nuclear DNA) is required, but *A. mongolica* can be reported from India based on a male specimen presenting the characteristic genital capsule of this species.

Distribution

Turkey, Azerbaijan, Iran, Afghanistan, Kyrgyzstan, Kazakhstan, China, India* (Ladakh) (Astafurova *et al.* 2021).

26. *Andrena* (*Plastandrena*) *pilipes* Fabricius, 1775

Andrena pilipes Fabricius, 1775: 474, [Italy, type lost].
Andrena dolorosa Nurse, 1904: 563, ♀ [Pakistan, NHMUK, examined].

Listed by

Nurse (1904); Meena & Dey (2019); Ascher & Pickering (2023).

Material examined

PAKISTAN • 1 ♀; Peshin [Pishin]; 1–30 Apr. 1903; C.G. Nurse leg.; NHMUK (syntype of *A. dolorosa*) • 1 ♀; 1–31 Mar. 1902; C.G. Nurse leg.; NHMUK (syntype of *A. dolorosa*).

Remarks

Nurse (1904) noted that this species was "very common at all elevations in Kashmir". We have not been able to examine any material, but retain this listing as the distribution is plausible, since the species is widespread across Central Asia south to Pakistan, and Kashmir contains more Palaearctic faunal elements than the remaining parts of the Indian Himalayas.

Distribution

West and Central Palaearctic to China (Gusenleitner & Schwarz 2002; Ascher & Pickering 2023).

27. *Andrena* (*Simandrena*) *gorkhana* Tadauchi & Matsumura, 2007*

Andrena (*Simandrena*) *gorkhana* Tadauchi & Matsumura, 2007: 3, ♀ [Nepal, ELKU, not examined].

Material examined

INDIA • 1 ♂, 9 ♀♀; Uttarakhand, Chandrabani; 30.2830° N, 77.9753° E; 662 m a.s.l.; 10 Apr. 2023; R.K. Gautam leg.; WII • 1 ♀; Punjab, Chandigarh; 17 Apr. 1965; S.W.T. Batra leg.; SEMC; SEMC0981602 • 1 ♀; Uttarakhand, Dehradun, Forest Research Institute; 18 Apr. 2023; @ashirwad; https://www.inaturalist.org/observations/155452620.

NEPAL • 1 ♀; Kathmandu Valley, Nagarjong [Nagarjun]; 1500–1700 m a.s.l.; 1 May 1967; Dieri-Forster-Schacht leg.; OÖLM • 1 ♀; Kathmandu; 1800 m a.s.l.; 29 Apr. 1996; OÖLM.

Description

Male

Body. Length: 6 mm (Fig. 10A).

Head. Dark, 1.2 × as wide as long (Fig. 10B). Clypeus domed, irregularly punctate, punctures separated by 0.5 puncture diameters laterally, by 0.5–2 puncture diameters medially, underlying surface smooth and shining. Process of labrum rounded rectangular, 2 × as wide as long, fore margin emarginate, surface smooth and shining. Gena equalling width of compound eye; ocelloccipital distance 1.5 × diameter of lateral ocellus. Head medially with short pale pubescence, with scatter black hairs laterally; gena, vertex, and scape with pale hairs. Antennae dark, A4–13 ventrally lightened by presence of dark orange-brown scales. A3 much shorter than A4, approximately ½ length, A4–13 elongate, rectangular, 2 × as long as broad (Fig. 10C).

Mesosoma. Scutum laterally and anteriorly microreticulate, dull, sculpture becoming weaker medially, here smooth and shining; surface punctate, punctures separated by 0.5–1 puncture diameters, obscure laterally, becoming more visible medially (Fig. 10D). Scutellum with weaker sculpture, predominantly smooth and shining, punctation equal. Pronotum rounded. Mesepisternum microreticulate, overlain by network of moderately raised irregular rugosity, dull. Propodeum strong microreticulation overlain by dense network of raised rugosity, propodeal triangle broad, laterally defined by raised carinae, internal surface with raised rugosity, not strongly differentiated from sculpture of dorsolateral parts of propodeum. Mesosoma covered with pale, weakly plumose hairs. Legs dark, apical tarsal segments lightened brownish, pubescence whitish. Hind tarsal claws with strong inner tooth. Wings hyaline, stigma orange-brown, venation dark orange, nervulus strongly antefurcal.

Metasoma. Tergal discs dark, apical rims moderately lightened hyaline-brown yellow (Fig. 10E). Tergal discs and margins finely and densely punctate, punctures separated on average by 1 puncture diameter, underlying surface finely shagreened, shining. Declivity of T1 with erect white hairs, T2–4 with weak apical hairbands of moderately long white hairs, condition degraded, widely separated on T2–3, nominally complete on T4. T6–7 with light brown hairs overlying pseudopygidial plate of T7. S8 columnar, apex slightly broadened, rounded; ventral surface with lateral fan of brown hairs. Genital capsule somewhat elongate, gonocoxae weakly produced into rounded teeth apically, gonostyli basally narrow, broadening apically, spatulate, with inner margin raised (Fig. 10F). Penis valves parallel sided, occupying ½ space between gonostyli.

Remarks

Newly recorded from India, including the first record of the male, which is described here. Tadauchi & Matsumura (2007) recorded the species from January and February only, and our late capture dates indicate that the species may be bivoltine, or at least sporadic in emergence. Diagnosis against *A. tungnatha* is provided above, and the male sex is described here.

Distribution

India* (Punjab, Uttarakhand) and Nepal (Tadauchi & Matsumura 2007).

28. *Andrena* (*Simandrena*) *tungnatha* Wood & Gautam sp. nov.

Distribution

Northern India (Himachal Pradesh, Uttarakhand).

29. *Andrena* (*Suandrena*) *savignyi* Spinola, 1838

Andrena savignyi Spinola, 1838: 512, ♀ [Egypt: MRSN, examined, see Wood 2023c].
Andrena ilerda Cameron, 1907: 1001, ♀♂ [India: Punjab, NHMUK, examined].
Andrena ferozeporensis Cameron, 1909: 131, ♂ [India: Punjab, NHMUK, examined].
Andrena ilerda inglisi Cockerell, 1920: 134, ♀♂ [India: Bihar, type lost].

Listed by

Cameron (1907; 1909), Cockerell (1920); Batra (1967); Meena & Dey (2015; 2019); Chandra *et al.* (2019); Wood & Monfared (2022); Ascher & Pickering (2023); Umbrey *et al.* (2023).

Material examined

INDIA • 1 ♀; Ferozepore [Firozpur]; 1–31 Mar. 1898; C.G. Nurse leg.; NHMUK (syntype of *A. ilerda*) • 1 ♂; Ferozepore [Firozpur]; 1–28 Feb. 1898; C.G. Nurse leg.; NHMUK (syntype of *A. ferozeporensis*) • 13 ♂♂; Rajasthan, Sawai Madhopur Rathambhore; 308 m a.s.l.; 15 Jan. 2005; D. Brzoska leg.; SEMC; SEMC0648294 to SEMC0648306 • 14 ♀♀; same data as for preceding; SEMC0648307 to SEMC0648320.

Distribution

From the Canary Islands (Spain), across North Africa, France (Corsica), Italy (Sardinia and mainland), the Levant, the Arabian Peninsula, Iran, Iraq, Afghanistan, Pakistan, to India (Gujarat, Rajasthan, Punjab, Bihar, Arunachal Pradesh) (Gusenleitner & Schwarz 2002; Wood & Monfared 2022).

30. *Andrena* (incertae sedis) *aegyptiaca* Friese, 1899

Andrena aegyptiaca Friese, 1899: 343, ♀♂ [Egypt, ZMHB, examined].
Andrena comberima Cockerell, 1911b: 235, ♀♂ [Pakistan, NHMUK, examined].
Andrena comberima beharica Cockerell, 1920: 135, ♀♂ [India: Bihar, NHMUK, **lectotype** by present designation].

Listed by

Cockerell (1920); Batra (1967); Chandra *et al.* (2019); Meena & Dey (2019); Chandra *et al.* (2021); Ascher & Pickering (2023).

Type material

Syntypes

EGYPT • 3 ♀♀; Cairo; 13 Mar.–4 Apr. 1899; F. Morice leg.; OÖLM/ZMHB.

Other material examined

INDIA • 1 ♂; Banhar, Bihar; 8 Apr. 1919; H. Inglis leg.; NHMUK (**lectotype** by present designation of *A. comberima beharica*, Fig. 16) • 1 ♀; Banhar, Bihar; 10 Apr. 1919; H. Inglis leg.; NHMUK (syntype of *A. comberima beharica*) • 1 ♀; Deesa [Gujarat]; 1–31 Mar. 1901; C.G. Nurse leg.; NHMUK.

JORDAN • 1 ♀; Wadi Ramm [Wadi Rum]; 12 May 1995; K. Deneš leg.; OÖLM.

OMAN • 1 ♀; Muscat, Bosher sand; 7 Feb. 2020; A. Al Jahdhami leg.; NHMUK.

PAKISTAN • 1 ♀; Krchi [Karachi]; NHMUK (syntype of *A. comberima*).

TUNISIA • 6 ♂♂, 1 ♀; Nefta [Naftah]; 20–22 May 1993; J. Batelka leg.; OÖLM • 2 ♂♂; Tozeur; 24 Mar. 1978; K.M. Guichard leg.; NHMUK • 2 ♀♀; SE Ben Guardane; 13 Apr. 2001; M. Halada leg.; E. Scheuchl det.; OÖLM • 1 ♂, 2 ♀♀; Hazoua, 30 km W of Nefta [Naftah]; 19 Apr. 1996; J. Batelka and H. Podrouzkova leg.; E. Scheuchl det.; OÖLM.

UNITED ARAB EMIRATES • 2 ♂♂, 2 ♀♀; Al Ain Road; 1 Feb. 1985; J.N.B. Brown leg.; NHMUK • 1 ♂, 1 ♀; Sarjan Province, W of Dhaid; 120 m a.s.l.; 2 Mar. 2017; Ma. Halada leg.; OÖLM • 1 ♂, 1 ♀; Umm al Qaywayn, Biatah; 50 m a.s.l.; 3 Mar. 2017; Ma. Halada leg.; OÖLM • 1 ♂; Suweihan [Sweihan]; 21 Mar. 1986; I.L. Hamer leg.; NHMUK.

Remarks

Andrena aegyptiaca is a complex of species that is currently undergoing revision (e.g., Pisanty *et al.* 2023). If the eastern populations are separated, *A. comberima* will be the priority name. For now, a broad *A. aegyptiaca* concept is maintained. As the type material of *A. comberima beharica* was located in the NHMUK collection, a male is here designated as the lectotype (Fig. 16).

Distribution (*A. aegyptiaca* sensu lato)

Spain (Canary Islands), Morocco, Algeria, Tunisia*, Egypt, Israel, Jordan*, Saudi Arabia, United Arab Emirates*, Oman*, Pakistan, India (Gujarat, Punjab, Himachal Pradesh, Bihar) (Gusenleitner & Schwarz 2002; Ascher & Pickering 2023).

Fig. 16. *Andrena* (incertae sedis) *comberima beharica* Cockerell, 1920, lectotype, ♂ (NHMUK). **A**. Label information. **B**. Habitus, lateral view. **C**. Face, frontal view. **D**. Body, dorsal view.

31. *Andrena* (incertae sedis) *anonyma* Cameron, 1897

Andrena anonyma Cameron, 1897: 122, sex not specified [India: Uttarakhand, OUMNH, not examined].

Listed by

Bingham (1897); Cameron (1897); Cockerell (1923); Meena & Dey (2019); Chandra *et al.* (2021); Ascher & Pickering (2023).

Remarks

The identity of *A. anonyma* is completely unclear, as no-one has examined the type material. It must remain a mystery taxon until the type material becomes available for study.

Distribution

India (Uttarakhand) (Cameron 1897).

32. *Andrena* (incertae sedis) *floridula* Smith, 1878

Andrena floridula Smith, 1878: 2, ♂ [India: Ladakh, ZSI, examined by photograph].

Listed by

Bingham (1897); Bingham (1908); Meena & Dey (2019); Chandra *et al.* (2021); Ascher & Pickering (2023).

Material examined

Holotype

INDIA • ♀; Leh; ZSI; ZSI0000008658.

Remarks

Gusenleitner & Schwarz (2002) indicate that the NHMUK is the type depository, but no entry exists in the type register and no specimens could be found here. Baker (unpublished thesis) indicates that type material could be in the ZSI, but he never saw any such material. Examination of the ZSI website indicates that a specimen is present in that collection. The specimen is in very poor condition with the metasoma having been partially glued back onto the mesosoma and with the hind legs missing, but a dorsal view of the head shows the presence of facial foveae, even though Smith described the species in the male sex. Examination of the illustrated plate provided by Smith (1878: fig. 4, as *A. floricula* sic) indicates that the type specimen may actually be female, since the hind legs (not preserved in the ZSI specimen) seem to present scopae. We therefore consider this specimen to be the holotype, and actually be a female despite Smith's original description as a male specimen.

Distribution

India (Ladakh) (Smith 1878).

33. *Andrena* (incertae sedis) *gracillima* Cameron, 1897

Andrena gracillima Cameron, 1897: 118, ♀ [India: Uttarakhand, OUMNH, not examined].

Listed by

Bingham (1897); Cameron (1897); Bingham (1908); Meena & Dey (2019); Ascher & Pickering (2023).

Remarks

This is a mystery taxon, as no-one appears to have examined the type material. Wood (2024b) speculated, based on the description, its reported large body length of 15 mm, and the illustration provided by Cameron (1897: pl. 4, fig. 19), that it could potentially be the senior name for *A. kishidai chagyabensis*. However, type location and examination are required before any further action can be taken.

Distribution

India (Uttarakhand) (Cameron 1897), doubtfully listed from West Bengal by Bingham (1908).

34. *Andrena* (incertae sedis) ***leaena*** Cameron, 1907

Andrena leaena Cameron, 1907: 1002, ♀ [India: Punjab, NHMUK, examined].

Listed by

Cameron (1907); Batra (1967); Tadauchi & Matsumura (2007); Chandra *et al.* (2019); Meena & Dey (2019); Ascher & Pickering (2023).

Type material

Syntype

INDIA • 1 ♀; Ferozepore [Firozpur]; 1–31 Mar. 1898; C.G. Nurse leg.; NHMUK.

Other material examined

INDIA • 1 ♀; Ferozepore [Firozpur]; 1–31 Mar. 1898; C.G. Nurse leg.; NHMUK (previously undetermined).

Remarks

Although the type of *A. leaena* is conserved, its subgeneric affiliation remains unclear, and the male has never been described. Additional study is required to clarify the nature of this species. Though the specimen in the NHMUK type collection is labelled "type", it is not automatically the holotype and is only a syntype as Cameron (1907) indicates that specimens come from both Ferozepore and Deesa, indicating that multiple individuals were used to describe the species.

Distribution

India (Punjab, Gujarat) (Cameron 1907).

35. *Andrena* (incertae sedis) ***maharashtra*** Wood, 2023

Andrena (incertae sedis) *maharashtra* Wood, 2023a: 21, ♀♂ [India: Maharashtra, OÖLM, examined].

Listed by

Wood (2023a).

Distribution

India (Maharashtra) (Wood 2023a).

36. *Andrena* (incertae sedis) ***rupshuensis*** Cockerell, 1911

Andrena rupshuensis Cockerell, 1911a: 243, ♀ [India: Ladakh, USNM, photograph examined].

Listed by

Cockerell (1911a); Meena & Dey (2019); Ascher & Pickering (2023).

Type material

Syntype (possibly automatically the holotype, type no. 23136, photograph examined)
INDIA • 1 ♀; Kashmir, Ladakh, Rupshu; 16 000 ft a.s.l. [= ca 5000 m a.s.l.]; 22 Jul. 1897; W.L. Abbott leg.; USNM.

Remarks and diagnosis

Andrena rupshuensis is a mysterious species that was previously known only from the type series (an unclear number of specimens, not specified in the original publication). It was collected at the extremely high altitude of nearly 5000 meters above sea level which would be one of if not the highest ever reported altitude for a species of *Andrena*. The morphology (photographs available on the Smithsonian website https://collections.nmnh.si.edu/search/ento/) does not conform to any current species concept, as the malar space is clearly elongate and shining. Some of the morphology is reminiscent of the subgenus *Taeniandrena* Hedicke, 1933, specifically the broad facial foveae, the terga with clear apical hairbands, the general rounded shape of the body and ovoid metasoma, the shortish light brown hairs on the scutum contrasting white hairs on the mesepisternum, and the tarsi which are lightened orange. However, the clypeus appears to be shining with a broad impunctate mid-line which is not known from the subgenus. Further study is required, as well as new collections at high altitude around the locus typicus.

Distribution

India (Ladakh) (Cockerell 1911a).

Other species excluded from the Indian fauna

1. *Andrena* (*Andrena*) *helvola* (Linnaeus, 1758)

Listed by

Meena & Dey (2019): North India.

Remarks

Andrena helvola is a predominantly West Palaearctic species, with some populations extending into the East Palaearctic in the Altai mountains of Kazakhstan and also into northern China (Heilongjiang; Gusenleitner & Schwarz 2002; Osytshnjuk *et al.* 2005; Xu & Tadauchi 2012; Ascher & Pickering 2023; Wood, unpublished data). It is therefore considered implausible that *A. helvola* is present in northern India, since even in Ladakh the nearest verified populations would be over 1500 km away in the Altai mountains. Meena & Dey (2019) present no evidence to support this listing, and so this species is excluded from the Indian fauna.

2. *Andrena* (*Andrena*) *praecox* (Scopoli, 1763)

Listed by

Meena & Dey (2019): Bihar.

Remarks

Andrena praecox is a predominantly West Palaearctic species, with some populations extending into northern Kazakhstan. The south-eastern limit is the Caucasus region (Gusenleitner & Schwarz 2002; Osytshnjuk *et al.* 2005; Ascher & Pickering 2023). It is considered implausible that this species of

temperate woodland is present in Bihar, a state with a predominantly subtropical climate. Meena & Dey (2019) present no evidence to support this listing, and so this species is excluded from the Indian fauna.

3. *Andrena* (*Andrena*) *varians* (Kirby, 1802)

Listed by

Meena & Dey (2019): North India.

Remarks

Andrena varians is a predominantly West Palaearctic species, with some populations extending into Kazakhstan (Gusenleitner & Schwarz 2002; Osytshnjuk *et al.* 2005; Shebl & Tadauchi 2009; Ascher & Pickering 2023). It is considered implausible that this species is present in northern India. Meena & Dey (2019) present no evidence to support this listing, and so this species is excluded from the Indian fauna.

4. *Andrena* (*Bryandrena*) *florea* Fabricius, 1793

Listed by

Meena & Dey (2019): North India.

Remarks

Andrena florea is a West Palaearctic species extending east into Iran and southern Turkmenistan (Gusenleitner & Schwarz 2002; Wood & Monfared 2022; Ascher & Pickering 2023). It is considered implausible that this species is present in northern India. Meena & Dey (2019) present no evidence to support this listing, and so this species is excluded from the Indian fauna.

5. *Andrena* (*Chlorandrena*) *taraxaci* Giraud, 1861

Listed by

Meena & Dey (2019): North India, Bihar.

Remarks

Andrena taraxaci is a West Palaearctic species, with the East Asian subspecies ssp. *orienticola* Strand, 1915 currently in the process of being elevated (Schwenninger 2015; Xu & Tadauchi 2002; Wood, in review). There is no evidence to suggest that this species as currently defined is present in India (or indeed any *Chlorandrena* species at all), and so this species is excluded from the Indian fauna.

6. *Andrena* (*Euandrena*) *bicolor* Fabricius, 1775

Listed by

Meena & Dey (2019): Punjab, North India.

Remarks

Andrena bicolor is a widespread West and Central Palaearctic species that extends to parts of Central Asia (though due to its highly variable nature, several distinct, cryptic, and / or unrecognised species have been confused with it, see Praz *et al.* (2019) and Wood (2023c) for examples). The exact distribution is unclear, but given the enormous confusion surrounding this taxon and its scarcity in Central Asia based on examined material, and the lack of specific supporting records by Meena & Dey (2019), true *A. bicolor* is considered unlikely to be present in India.

7. *Andrena* (*Hoplandrena*) *rosae* Panzer, 1801

Listed by

Meena & Dey (2019): Bihar.

Remarks

Andrena rosae is a widespread Palaearctic species, found from Europe to Japan, including Central Asia (Gusenleitner & Schwarz 2002; Osytshnjuk *et al.* 2008). However, in Central Asia it is found in mountainous regions only. Ecologically, it is very difficult to consider that it could be present in the low-lying state of Bihar (average elevation 53 m a.s.l.). Due to the lack of supporting records presented by Meena & Dey (2019), it is removed from the Indian fauna.

8. *Andrena* (*Leucandrena*) *barbilabris* (Kirby, 1802)

Listed by

Meena & Dey (2019): Bihar.

Remarks

Andrena barbilabris is a widespread Holarctic species, found from Europe to North America (Ascher & Pickering 2023). However, in Asia it is found in the north, and in the Central Palaearctic is found only in Kazakhstan, Russia, and Mongolia (Gusenleitner & Schwarz 2002; Osytshnjuk *et al.* 2008; Xu & Tadauchi 2009b). Its reported presence in Bihar is therefore considered to be impossible, and the species is removed from the Indian fauna.

9. *Andrena* (*Leucandrena*) *ventralis* Imhoff, 1832

Listed by

Meena & Dey (2019): North India.

Remarks

Andrena ventralis is a trans-Palaearctic species of temperate woodland that ranges from Europe to China and Japan, including parts of Central Asia (Gusenleitner & Schwarz 2002; Xu & Tadauchi 2005; Ascher & Pickering 2023). In Central Asia, the species is sporadic in occurrence and more or less restricted to mountainous areas due to its ecological specialisation on *Salix* L. (Salicaceae Mirb.) that is principally found in areas with a temperate climate. Meena & Dey (2019) present no evidence to support the presence of this species in India. It is not impossible that it could be present in Kashmir, but without verified specimen records, *A. ventralis* is excluded from the Indian fauna.

10. *Andrena* (*Melandrena*) *cussariensis* Morawitz, 1886

Listed by

Meena & Dey (2019): Kohtak [= Kohat, Pakistan], Musooree [= Mussoorie], Shimla, Punjab.

Remarks

As discussed above, the listing of Meena & Dey (2019) probably refers to multiple misidentified specimens including *A. fuscosa* and possibly *A. kedarnatha* Wood & Gautam sp. nov. There is currently no evidence that true *A. cussariensis* has a range that extends south of Central Asia.

Distribution

Crimea, Russia (European part to the Urals), Turkey, the Caucasus (Georgia, Armenia, Azerbaijan), Iran, Central Asia (Kazakhstan, Uzbekistan, Tajikistan, Kyrgyzstan), Mongolia (Osytshnjuk *et al.* 2008; Astafurova *et al.* 2021; Wood & Monfared 2022).

11. *Andrena* (*Melandrena*) *delrragarensis* nomen nudum

Listed by

Meena & Dey (2019).

Remarks

Meena & Dey (2019: 444) introduced the name *A. delrragarensis* with no description or further details. It is clearly a nomen nudum and is ignored here.

12. *Andrena* (*Melandrena*) *gravida* Imhoff, 1832

Listed by

Meena & Dey (2019): Bihar, Shimla.

Remarks

There is no evidence supporting the listing of *A. gravida* in India. *Andrena gravida* is a West Palaearctic species of temperate woodland, with no records outside of this area (Gusenleitner & Schwarz 2002). It is therefore excluded from the Indian fauna.

13. *Andrena* (*Melandrena*) *limata* Smith, 1853

Listed by

Meena & Dey (2019): North India, Bihar.

Remarks

Andrena limata is a widespread Palaearctic species, extending from the West Palaearctic into most countries in Central Asia (Gusenleitner & Schwarz 2002; Osytshnjuk *et al.* 2008). It is possible that *A. limata* could be present in Kashmir, without available specimens it cannot be confidently listed as part of the Indian fauna.

14. *Andrena* (*Melandrena*) *nigroaenea* (Kirby, 1802)

Listed by

Meena & Dey (2019): Bihar.

Remarks

The listing of *A. nigroaenea* in India may come from a misidentified *A. induta*; for example, Bingham (1908: 363) in the description of the junior synonym *A. brunneipennis* mentioned that it was: "Nearest to probably a race of the European *A. nigroaenea*, Kirby, but larger; the colour of the pubescence and of the wings different". *Andrena nigroaenea* is a West Palaearctic species, with no records from Central Asia (Gusenleitner & Schwarz 2002; Osytshnjuk *et al.* 2008). The listing from Bihar is not considered to be plausible, and the species is excluded from the Indian fauna.

15. *Andrena* (*Melandrena*) *nitida* (Müller, 1766)

Listed by

Meena & Dey (2019): Bihar.

Remarks

Andrena nitida is a predominantly West Palaearctic species, extending into Central Asia only in Kazakhstan (Gusenleitner & Schwarz 2002; Osytshnjuk *et al.* 2008). The listing from Bihar is not considered to be plausible, and the species is excluded from the Indian fauna.

16. *Andrena* (*Melandrena*) *pantragarensis* nomen nudum

Listed by

Meena & Dey (2019).

Remarks

Meena & Dey (2019: 444) introduced the name *A. pantragarensis* with no description or further details. It is clearly a nomen nudum and is ignored here.

17. *Andrena* (*Orandrena*) *oralis* Morawitz, 1876

Listed by

Meena & Dey (2019): Bihar.

Remarks

Meena & Dey (2019) present no evidence to support a listing of this species from India. *Andrena oralis* is a species of open grasslands and steppe from Central Europe to Turkey and Central Asia (Gusenleitner & Schwarz 2002; Astafurova *et al.* 2022). It is not impossible that *A. oralis* could be present in Kashmir, but it is ecologically inconceivable that it will be present in Bihar, and so this species is excluded from the Indian fauna.

18. *Andrena* (*Plastandrena*) *agilissima* (Scopoli, 1770)

Listed by

Makkar *et al.* (2016): Punjab; Meena & Dey (2018b, 2019): North India; Chandra *et al.* (2019): Bihar, Delhi, and Punjab.

Remarks

Makkar *et al.* (2016) reported *A. agilissima* as new for India based on specimens from Muktsar in western Punjab. They also provided a barcode for this species (Genbank: KT960836). However, this specimen is *A. fuscosa*, both based on the morphology presented in photographs, and also based on the barcode which clusters with specimens from Spain and Israel (Wood 2023b). *Andrena agilissima* (eastern limit in Hungary and Poland) is therefore excluded from the Indian fauna, with these Indian records referring instead to *A. fuscosa*.

19. *Andrena* (*Plastandrena*) *bimaculata* (Kirby, 1802)

Listed by

Meena & Dey (2019): Bihar.

Remarks

Andrena bimaculata is a widespread but taxonomically challenging species. There is a great deal of uncertainty concerning species boundaries in the subgenus *Plastandrena*, with enormous colour variation in females that is not associated with commensurate variation in male genital capsules. Some members of the *Plastandrena*, including *A. bimaculata* and *A. tibialis*, are also seemingly not always identifiable using barcodes (Schmidt *et al.* 2015; Wood 2023b). In this context, *A. bimaculata* appears to have a predominantly Palaearctic distribution extending from the West Palaearctic to Mongolia, including Central Asia (Gusenleitner & Schwarz 2002; Ascher & Pickering 2023). However, this requires investigation using more powerful genetic techniques (e.g., using nuclear DNA). However, given the nominal distribution, the biogeography, the taxonomic uncertainty, and the lack of supporting specimen records, *A. bimaculata* cannot be accepted as present in Bihar, and is excluded from the Indian fauna.

20. *Andrena* (*Plastandrena*) *peridonea* Cockerell, 1920

Listed by

Meena & Dey (2019): North India.

Remarks

Cockerell (1920) described *A. peridonea* from Hangu which is now in the state of Pakistan (Khyber Pakhtunkhwa Province). Although Gusenleitner & Schwarz (2002) indicated that the type depository was unclear, the type material is actually in the USNM collection (USNMENT00533689). Photographs on the Smithsonian website (https://collections.nmnh.si.edu/search/ento/) indicate that the species is part of the subgenus *Plastandrena*, though since it was described in the female sex only it is very difficult to comment on its specific status due to the numerous taxonomic problems in this subgenus, particularly in the female sex (2023b). Meena & Dey (2019) list the species from northern India, but without any specimen records. This listing likely refers to the concept of pre-partition British India (the title of Cockerell's paper is "Some Indian bees of the genus *Andrena*"), and hence the species is excluded from the contemporary Indian fauna pending precise specimen records.

21. *Andrena* (*Plastandrena*) *tibialis* (Kirby, 1802)

Listed by

Meena & Dey (2019): Bihar.

Remarks

The situation for *A. tibialis* is the same as for *A. bimaculata*, and the species is also excluded from the Indian fauna.

22. *Andrena* (*Scitandrena*) *scita* Eversmann, 1852

Listed by

Meena & Dey (2019): Bihar, Punjab.

Remarks

Andrena scita is a predominantly West Palaearctic species typically of warm open grasslands, extending in the east only to Kazakhstan and Turkmenistan (Gusenleitner & Schwarz 2002). There is no evidence to support the listing of this highly distinctive species from India.

23. *Andrena* (*Simandrena*) *dorsata* (Kirby, 1802)

Listed by

Meena & Dey (2019): North India.

Remarks

Andrena dorsata is a widespread Palaearctic species extending from Europe into parts of Central Asia. Given that the *Simandrena* fauna of India is has been poorly known until now (with the addition of *A. tungnatha* Wood & Gautam sp. nov. and the relatively recently described *A. gorkhana*), the presence of *A. dorsata* in northern India is uncertain. It is best excluded from the Indian fauna pending precise occurrence records which can be examined and confirmed as either *A. dorsata* or a different species of *Simandrena*.

24. *Andrena* (*Taeniandrena*) *ovatula* (Kirby, 1802)

Listed by

Meena & Dey (2019): Bihar.

Remarks

Meena & Dey (2019) present no evidence for the presence of *A. ovatula* in India. Moreover, it is more or less ecologically impossible for true *A. ovatula* to be present in India, as this taxon is confined to the western part of the West Palaearctic (Praz *et al.* 2022). It is not impossible that the taxon *A.* (*Taeniandrena*) *afzeliella* (Kirby, 1802) could be present in northern India, but this must be established robustly through verified specimens and ideally genetic work. *Andrena ovatula* is therefore excluded from the Indian fauna.

25. *Andrena* (*Taeniandrena*) *wilkella* (Kirby, 1802)

Listed by

Nurse (1904): Kashmir; Meena & Dey (2019): Kashmir; Ascher & Pickering (2023).

Remarks

Nurse (1904) reported that *A. convexiuscula* (Kirby, 1802) was "common" in Kashmir, *A. conveixuscula* being a known synonym of *A. wilkella* (Gusenleitner & Schwarz 2002). The subgenus *Taeniandrena* is taxonomically complex and often defies morphological delineation (Praz *et al.* 2022), and historical species concepts cannot be used in a modern context. Whilst it is clear that Nurse was referring to a species of *Taeniandrena*, its identity must remain obscure until genetic sampling of the Indian *Taeniandrena* fauna is possible, as it is highly likely that true *A. wilkella* is not present. It is therefore excluded from the Indian fauna.

26. *Andrena* (*Trachandrena*) *haemorrhoa* (Fabricius, 1781)

Listed by

Meena & Dey (2019): North India.

Remarks

Meena & Dey (2019) present no evidence to support the presence of *A. haemorrhoa* in India. *Andrena haemorrhoa* is a trans-Palaearctic species of temperate woodland, with some marginal occurrences in North Africa (Gusenleitner & Schwarz 2002; Cherair *et al.* 2013; Ascher & Pickering 2023). In Central

Asia, it is restricted to mountainous areas. It is not impossible that *A. haemorrhoa* could be present in Kashmir, but as no precise specimen records are available this is considered unproven. It is therefore excluded from the Indian fauna.

27. *Andrena* (*Truncandrena*) *tscheki* Morawitz, 1872

Listed by

Meena & Dey (2019): Bihar.

Remarks

Meena & Dey (2019) present no evidence to support the presence of this species in India. *Andrena tscheki* is a West Palaearctic species found in Europe to Turkey, the Caucasus, and the Levant (Gusenleitner & Schwarz 2002; Astafurova *et al.* 2021). Populations in the south-east of its range probably represent a distinct species (*A. tscheki tritica* Warncke, 1965), but it is ecologically inconceivable that populations reach to Bihar, and so it is excluded from the Indian fauna.

28. *Andrena argada* nomen nudum

Listed by

Meena & Dey (2019): North India.

Remarks

This species does not exist – Meena & Dey state that it was described by Cameron (1909: 130) from Ferozepur. However, the only species matching this information is *A. punjaubensis* which is a synonym of *A. flavipes* (see above). It is not clear where the name *A. argada* comes from, but since it is a nomen nudum it is excluded from the Indian fauna.

29. *Andrena cameroni* Cockerell, 1910 = *Melitta cameroni* (Cockerell, 1910)

Listed by

Gusenleitner & Schwarz (2002).

Remarks

The name *A. cameroni* is a replacement name for *A. caroli* Cameron, 1909, a taxon described from Shimla (Cameron 1909: 130), but whose name is preoccupied by *A. caroli* Pérez, 1895 (junior primary homonym). Listed as an *Andrena* by Gusenleitner & Schwarz (2002) in line with its original description, the true identity of this taxon is actually that of a member of the genus *Melitta* Kirby 1802 (Melittidae Michener, 2000), to which it was moved by Michez & Eardley (2007). Interestingly, this was actually noticed by Nurse and pointed out to Cockerell (see Cockerell 1922: 247), but this did not achieve wider recognition within the *Andrena* literature. It is therefore excluded from the Indian *Andrena* fauna.

30. *Andrena* (incertae sedis) ***cara*** Nurse, 1904

Listed by

Meena & Dey (2019): Kashmir.

Remarks

Andrena cara was described by Nurse from Peshin [= Pishin] in western Pakistan. It is a junior synonym of *A.* (incertae sedis) *hieroglyphica* Morawitz, 1876, and its complicated history of use was clarified

by Wood & Monfared (2022). There is no evidence available to support a listing of *A. hieroglyphica* in Kashmir, as the species is found in dry desert habitats in Central Asia, typically not at high altitude (Astafurova *et al.* 2022; Wood & Monfared 2022). It is therefore excluded from the Indian fauna.

Discussion

The revised list of 36 confirmed species of *Andrena* is the first of its kind for India, and represents a milestone in the study of this genus in this country. Comparison with earlier works is difficult, as for example the earliest available checklist compiled by Bingham (1897) is almost unusable, since of the 13 species of *Andrena* listed from British India, six of these names actually refer to species within the genera *Colletes*, *Nomia* sensu lato, or *Melitta* (see Gusenleitner & Schwarz 2002). More recent works (e.g., Meena & Dey 2019) have presented many names for the Indian fauna, but without supporting information, making it difficult to separate valid and invalid occurrences.

Against this complex and confused history of study, the revised total of 36 species of *Andrena* for a large country like India is quite small, especially compared to the large faunas of Asian countries such as Turkey (388 species) and Iran (215 species) (Wood & Monfared 2022; Wood 2023a; Wood, unpublished data). However, as one moves from the West Palaearctic to the Central Palaearctic, the diversity of species of *Andrena* noticeably declines. The countries of Central Asia are understudied, but currently host what could be considered to be mediocre faunas. Other than Kazakhstan (ca 158 species), the remaining countries (Turkmenistan, Uzbekistan, Tajikistan, Kyrgyzstan) have between 75–112 species (Osytshnjuk *et al.* 2005, 2008; Ascher & Pickering 2023; Wood, unpublished data). Whilst a genuine shortfall of knowledge cannot be excluded, and a number of new species from Central Asia are waiting to be described (Wood, unpublished data), such work will increase species richness by dozens, not hundreds.

This pattern of diversity strongly contrasts the patterns seen for bumble bees (*Bombus*). The Indian bumble bee fauna numbers around 60 species (Williams 1991, 1998, 2023) which is around twice that of the currently known *Andrena* fauna. This strongly contrasts the pattern of relative diversity in the West Palaearctic where the species ratio of *Andrena*:*Bombus* is typically between 3–6:1 in favour of *Andrena* in most European countries, with this ratio only becoming grossly disproportionate towards *Andrena* in dry North African or Middle Eastern countries such as Morocco where species of *Andrena* outnumber species of *Bombus* by 40:1 (e.g., Lhomme *et al.* 2020; Wood 2023c). In this context, it may be that the high mountains and strongly seasonal nature of the climate in Central Asia to the Himalayas genuinely does not favour or promote the diversity of *Andrena* compared to the habitats present in and around the Mediterranean basin, and therefore the Himalayan *Andrena* fauna may remain relatively small even after additional study. It may also be simply that the Himalayas are close to the centre of origin for bumble bees (Williams 2023), and have therefore had more time to accumulate bumble bee species, whereas *Andrena* likely evolved in the Middle East (Pisanty *et al.* 2022b). Additional study and taxonomic characterisation of the Himalayan *Andrena* fauna is required before strong conclusions can be drawn.

Two Indian species of *Andrena* are known exclusively from the Indomalayan biogeographic realm, as opposed to northern India where a transitional zone with the Palaearctic realm occurs. These two species (*A. bellidoides* and *A. maharashtra*) are currently known only from the northern part of the Western Ghats in the state of Maharashtra. In this way, the Indian *Andrena* fauna somewhat mirrors that of the Indian *Colletes* fauna, with most diversity found in the northern Himalayan region and a few recently described species from the central (Maharashtra) or southern (Tamil Nadu) part of the country (Kuhlmann 2003). Like *Andrena*, *Colletes* (in the Old World) have the greatest species richness in the Palaearctic, and hence favour areas with a cooler microclimate. In the Indomalayan part of India, these species of *Colletes* and *Andrena* are hence found in hills or mountains usually above 1000 m in

altitude, in some cases up to 2000 m in altitude (Kuhlmann 2003; Wood 2023a). Additional searches in the mountains of central and southern India may well therefore produce new and undescribed species of *Andrena*, though we sound a note of caution that much more sampling effort is required before this can be comprehensively concluded upon.

Another major area requiring study is that of north-eastern India and the Eastern Himalayas. The states of Sikkim, West Bengal, Meghalaya, Assam, Arunachal Pradesh, and Nagaland are very poorly studied, and are likely to host additional diversity of *Andrena* given the species known from the neighbouring Chinese provinces of Tibet (Xizang) and Yunnan. Ensuring that species concepts remain consistent across this ecological meeting point represents a major challenge in the future study of the *Andrena* fauna of India. Whilst it is not currently possible to estimate the likely species richness of the Indian *Andrena* fauna, the results presented here and the known areas that have been poorly studied suggest that it will clearly exceed 36 species, only a renewed period of study will satisfactorily resolve this open question.

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