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# ZOOTAXA

5185

## Twenty-five new species of mining bees (Hymenoptera: Andrenidae: *Andrena*) from Israel and the Levant



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

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## Abstract

*Andrena* is one of the most diverse bee genera, comprising about 1,600 described species of ground-nesting solitary bees. Many *Andrena* species are plant specialists, and several taxa have been indicated to be important pollinators of wild and/or crop plants. The Eastern Mediterranean Basin and Israel in particular are one of the main world diversity hotspots of *Andrena*. Based on extensive examination of museum specimens combined with DNA barcoding, we hereby describe twenty-five Levantine species of *Andrena* new to science: *Andrena anathema* Pisanty **sp. nov.**, *A. ardentia* Pisanty **sp. nov.**, *A. asluji* Pisanty **sp. nov.**, *A. curviocciptus* Pisanty & Wood **sp. nov.**, *A. dividicincta* Pisanty **sp. nov.**, *A. dorchini* Pisanty **sp. nov.**, *A. euphorbiae* Pisanty **sp. nov.**, *A. gageae* Wood & Pisanty **sp. nov.**, *A. herodesi* Pisanty & Wood **sp. nov.**, *A. hulae* Pisanty **sp. nov.**, *A. igraeca* Pisanty & Wood **sp. nov.**, *A. inusitata* Pisanty **sp. nov.**, *A. janthinoides* Pisanty **sp. nov.**, *A. longistilus* Pisanty & Wood **sp. nov.**, *A. lunaris* Pisanty & Wood **sp. nov.**, *A. macula* Pisanty & Wood **sp. nov.**, *A. obtusa* Pisanty **sp. nov.**, *A. ornithogali* Pisanty & Wood **sp. nov.**, *A. petrae* Wood **sp. nov.**, *A. protuber* Pisanty **sp. nov.**, *A. sulfurea* Wood **sp. nov.**, *A. turmalina* Pisanty & Wood **sp. nov.**, *A. veronicae* Pisanty & Wood **sp. nov.**, *A. veterana* Pisanty **sp. nov.**, and *A. xera* Pisanty **sp. nov.** We synonymise *Andrena edentula* Wood with *A. tadauchii* Gusenleitner **syn. nov.**, and recognise four infraspecific names as valid species: *Andrena mediterranea* Pisanty & Scheuchl **stat. nov.**, *A. mizorhina* Warncke **stat. nov.**, *A. noacki* Alfken **sp. resurr.** and *A. ochraceohirta* Alfken **sp. resurr.** We additionally describe the hitherto unknown sexes of four species, provide new records for fifteen species previously unknown from Israel, and list fourteen taxa whose previously reported presence in Israel is considered erroneous or questionable.

**Key words:** DNA barcoding, Eastern Mediterranean, Jordan, Lebanon, solitary bee, Syria

## Introduction

*Andrena* is one of the most diverse genera of bees, comprising about 1600 described species which amounts to 7% of worldwide bee diversity (Michener 2007; Ascher & Pickering 2021). *Andrena* are solitary to communal, ground-nesting bees predominantly occupying temperate to arid biomes in the Northern Hemisphere (Michener 2007). Many *Andrena* species are specialists, collecting pollen from a single botanical family or genus (Michener 2007; Wood & Roberts 2018), and several taxa are important pollinators of wild and crop plants (e.g. Park *et al.* 2016; Ballantyne *et al.* 2017).

Our knowledge of the genus *Andrena* has seen major advances in recent years, in several respects. The higher organization of this diverse genus has been resolved to a large extent, due to large-scale phylogenetic studies based on both morphological and molecular characters (Dubitzky *et al.* 2010; Pisanty *et al.* 2022). In addition, the alpha taxonomy of the genus has revealed many new discoveries of unknown taxa, especially in the Western Palearctic region, due to ongoing meticulous examination of material scattered among European museums and private collections (e.g. Dubitzky 2006; Scheuchl & Hazir 2012; Schwenninger 2015; Pisanty *et al.* 2016; Wood 2021a). Some recent studies have further increased the true diversity of *Andrena* based on the study of molecular barcode sequences, leading to the discovery of several cryptic species and to the resolution of poorly understood species complexes (Schmidt *et al.* 2015; Praz *et al.* 2019; Gueuning *et al.* 2020; Wood *et al.* 2021). The Mediterranean Basin is one of the world diversity hotspots of *Andrena* (Pisanty *et al.* 2022), and recent publications have revealed as many as 71 species of *Andrena* new to science from the region (e.g. Pisanty *et al.* 2016, 2018; Wood 2021a,b; Wood *et al.* 2020a,b, 2021). This includes numerous species from poorly-collected countries (e.g. Lebanon, Syria) as well as

well-studied areas (e.g. Israel, Turkey). Still, it is estimated that at least thirty further species of *Andrena* are awaiting description throughout the Mediterranean (TJW and GP, unpublished results).

The current study makes another important contribution to the knowledge of *Andrena* in the East Mediterranean Basin. Our study focuses mostly on material from Israel, a well-documented local bee hotspot. Based on extensive collection work throughout the diverse habitats of this small country, generous genetic sampling of specimens to compare barcode sequences, and examination of large amounts of Levantine material in European collections, we hereby describe twenty-five Levantine species of *Andrena* new to science. We additionally describe the hitherto unknown sexes of four species, provide new records for fifteen species previously unknown from Israel, and list fourteen taxa whose previously reported presence in Israel is considered erroneous or questionable.

## Materials and methods

As part of an ongoing project to barcode the entire *Andrena* fauna of Israel, we performed DNA barcoding on representative specimens from all species of *Andrena* collected in Israel in the past twenty years that are deposited in the SMNHATAU collection, including all described species and undetermined morphospecies. This includes the majority of taxa included in the current study, as well as some of their close relatives from other countries. Molecular work was conducted at S. Cardinal's lab, Agriculture and Agri-Food Canada, Ottawa, Canada. For each barcoded specimen, DNA was extracted from 1–3 legs following established CCDB glass-fibre plate protocols ([https://ccdb.ca/site/wp-content/uploads/2016/09/CCDB\\_DNA\\_Extraction.pdf](https://ccdb.ca/site/wp-content/uploads/2016/09/CCDB_DNA_Extraction.pdf)). DNA extracts were added with 9 bp Molecular identification tags (Faircloth & Glenn 2012), spacers (Fardosh *et al.* 2014) and Illumina MiSeq tails. Amplicon sequencing (Shokralla *et al.* 2015) of the 658 bp barcode region of the cytochrome c oxidase I (COI) gene was performed using the following primer pairs: Lco-mix + Ap2154R, MLepF + Hco-mix, and full length Lco-mix + Hco-mix (see Table 1 for primer details). Final libraries were sequenced on Illumina MiSeq using a v3 kit (2 × 300 bp), de-multiplexed (Illumina), trimmed and aligned using Vsearch 2.11.1 ([anaconda.org/bioconda/vsearch/files?version=2.11.1](http://anaconda.org/bioconda/vsearch/files?version=2.11.1)) and BMap (Github ver 38.22). We used the program Geneious 2021.2.2 (Biomatters Ltd., Auckland, New Zealand) to create a neighbour-joining phylogenetic tree and a genetic distance matrix from all sequenced barcodes. These analyses were used to test species and subgeneric hypotheses based on morphology. Sequences associated with each barcoded specimen are available on the Barcode of Life Data System (<http://www.boldsystems.org>) (Ratnasingham & Hebert 2007) under the project code ANDIL. All barcoded specimens belonging to taxa discussed in the current publication are listed in Table 2.

**TABLE 1. List of primer mixes used for DNA barcoding**

Ap2154R	Ap2154R (GG RGG RTA WAY WGT TCA TCC WGT TCC)
Hco-mix	Hco2198 (Folmer <i>et al.</i> 1994), LepR1 (Hebert <i>et al.</i> 2004)
Lco-mix	Ap1851 (T TTG CTA TAT GAT CAG GAA TAA TTG G), Lco1490 (Folmer <i>et al.</i> 1994), LepF1Bee (A WTA WAC HAA ACA TAA ARA TMT TGG, modified from Hebert <i>et al.</i> 2004)
MLepF	MLepF (Footitt <i>et al.</i> 2014)

*Andrena* species were assigned to subgenera according to the updated classification system proposed by Pisanty *et al.* (2022), which is based on a comprehensive molecular phylogenetic study of the Andreninae. Species are listed alphabetically by subgenus. Body length was measured in lateral view as the sum of distances from the antennal sockets to the posterior end of the propodeum and from the latter to the tip of the metasoma, and rounded to the nearest 0.5 mm. Morphological terminology follows Michener (2007). Examined material is listed alphabetically according to common locality names; localities appearing under different names or spellings on specimen labels are indicated in square parentheses. Most of the specimen labels for material originating from the West Bank and collected after 1967 denote Israel as the country of origin.

Pollen analysis was conducted on selected specimens to provisionally investigate their dietary niches, using the method of Wood & Roberts (2018). In brief, specimens were relaxed and pollen was removed from the scopae using an entomological pin. Pollen was rehydrated and fixed using fuchsin-stained glycerine jelly. The percentage of the pollen load was estimated along three randomly selected lines across the slide at a magnification of 400×. Pollen species representing < 1% of the load were excluded from further analysis because their presence might have arisen from contamination.

**TABLE 2. List of barcoded specimens.**

BOLD Accession no.	Species	Sex	Type	Country	Locality	Date	Collector
ANDIL016-22	<i>Andrena anathema</i>	♀	paratype	Israel	Beit Guvrin	28.iii.2010	G. Pisanty
ANDIL017-22	<i>Andrena anathema</i>	♀	paratype	Israel	Britannia Park	11.ii.2011	T. Koznichki
ANDIL032-22	<i>Andrena anathema</i>	♀	paratype	Israel	Adulam-France Park	2013	Y. Berner
ANDIL047-22	<i>Andrena anathema</i>	♀	paratype	West Bank	Nahal Perat	14.iii.2015	G. Pisanty
ANDIL050-22	<i>Andrena anathema</i>	♀	paratype	West Bank	Elon More	17.iii.2015	L. Friedman
ANDIL052-22	<i>Andrena anathema</i>	♀	paratype	West Bank	Za'atara	06.iii.2015	T. Jumah
ANDIL067-22	<i>Andrena anathema</i>	♀	paratype	Israel	Sasa	03.iv.2016	O. Winberger
ANDIL099-22	<i>Andrena anathema</i>	♀	paratype	Israel	Nabi Hazuri	27.iv.2020	G. Pisanty
ANDIL113-22	<i>Andrena anathema</i>	♂	holotype	Israel	Horbat Kefar Lakhish	05.iii.2021	G. Pisanty
ANDIL053-22	<i>Andrena ardentia</i>	♀	paratype	West Bank	Za'atara	06.iii.2015	T. Jumah
ANDIL023-22	<i>Andrena asluji</i>	♂	paratype	Israel	Holot Mash'abbim N.R.	14.ii.2012	G. Pisanty
ANDIL102-22	<i>Andrena cedricola</i>	♀	paratype	Israel	Mount Hermon	11.v.2020	G. Pisanty
ANDIL062-22	<i>Andrena cervina</i>	♀	paratype	Israel	Har Addir	21.iv.2016	G. Pisanty
ANDIL064-22	<i>Andrena cervina</i>	♀	paratype	Israel	Mount Hermon	15.v.2016	G. Pisanty
ANDIL066-22	<i>Andrena cervina</i>	♀	paratype	Israel	Ya'ar Yish'i	31.iii.2016	T. Chaprazaro
ANDIL074-22	<i>Andrena cervina</i>	♂	paratype	Israel	Mount Meron	04.iv.2017	G. Pisanty
ANDIL101-22	<i>Andrena cervina</i>	♀	paratype	Israel	Odem Forest N.R.	27.iv.2020	G. Pisanty
ANDIL124-22	<i>Andrena cervina</i>	♂	paratype	Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL061-22	<i>Andrena cinereophila</i>	♀	paratype	Israel	Ziv'on	05.iv.2016	G. Pisanty
ANDIL081-22	<i>Andrena cinereophila</i>	♂	paratype	Israel	Montfort	28.ii.2018	G. Pisanty
ANDIL084-22	<i>Andrena cinereophila</i>	♂	paratype	Israel	Lahavot HaBashan	01.iii.2018	G. Pisanty
ANDIL087-22	<i>Andrena cinereophila</i>	♀	paratype	Israel	Tel Zafit	07.iii.2018	T. Roth
ANDIL094-22	<i>Andrena cinereophila</i>	♀	paratype	Israel	Nahal Yadbir	24.iii.2019	A. Dorchin, T. Roth, A. Svir
ANDIL027-22	<i>Andrena convexifrons</i>	♀	paratype	Israel	Kare Deshe	19.iii.2012	T. Shapira
ANDIL034-22	<i>Andrena convexifrons</i>	♀	paratype	Israel	Forest of the Martyrs	30.iii.2014	N. Shamir
ANDIL051-22	<i>Andrena convexifrons</i>	♀	paratype	Israel	Nahal Meshushim	01.v.2015	G. Pisanty
ANDIL090-22	<i>Andrena convexifrons</i>	♀	paratype	Israel	Nahal Batra	23.v.2019	A. Dorchin, T. Roth
ANDIL134-22	<i>Andrena corax</i>	♀	paratype	Spain	Sierra Nevada	04.v.2003	J. Halada

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**TABLE 2. (Continued)**

BOLD Accession no.	Species	Sex	Type	Country	Locality	Date	Collector
ANDIL065-22	<i>Andrena curvicoiput</i>	♀	paratype	Israel	Mount Hermon	15.v.2016	G. Pisanty
ANDIL056-22	<i>Andrena danini</i>	♂		Israel	Lakhish	19.ii.2016	G. Pisanty
ANDIL057-22	<i>Andrena danini</i>	♂		Israel	Lakhish	19.ii.2016	G. Pisanty
ANDIL085-22	<i>Andrena danini</i>	♀		Israel	Beit Nir	11.iii.2018	T. Roth
ANDIL088-22	<i>Andrena danini</i>	♀		Israel	Tel Zafit	07.iii.2018	T. Roth
ANDIL107-22	<i>Andrena danini</i>	♂		Israel	Har'el	21.ii.2020	K. Levy
ANDIL114-22	<i>Andrena danini</i>	♂		Israel	Horbat Sheqofa	15.iii.2021	G. Pisanty
ANDIL105-22	<i>Andrena decollata</i>	♀		Israel	Nahal Alexander	27.ii.2020	K. Levy
ANDIL110-22	<i>Andrena decollata</i>	♀		Israel	Holot Nizzanim N.R.	25.ii.2009	L. Friedman
ANDIL018-22	<i>Andrena dividicincta</i>	♂	paratype	Israel	Mount Meron	05.iii.2011	A. Freidberg
ANDIL108-22	<i>Andrena dividicincta</i>	♀	paratype	Israel	Montfort	05.iii.2008	A. Freidberg
ANDIL089-22	<i>Andrena dorchini</i>	♀	paratype	West Bank	Sartava N.R.	14.ii.2019	A. Dorchin
ANDIL076-22	<i>Andrena elmaria</i>	♀		Israel	Mount Meron	04.iv.2017	G. Pisanty
ANDIL130-22	<i>Andrena elmaria</i>	♀		Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL026-22	<i>Andrena euphorbiae</i>	♂	paratype	Israel	Kare Deshe	19.iii.2012	T. Shapira
ANDIL028-22	<i>Andrena euphorbiae</i>	♀	paratype	Israel	Ramat Hanadiv	22.iii.2012	T. Shapira
ANDIL021-22	<i>Andrena forsterella</i>	♂		Israel	Revadim	28.v.2011	A. Golan
ANDIL019-22	<i>Andrena fulvicornis</i>	♀		Israel	Zomet Nashut	22.v.2011	A. Freidberg
ANDIL020-22	<i>Andrena fulvicornis</i>	♀		Israel	Zomet Nashut	22.v.2011	M. Guershon
ANDIL115-22	<i>Andrena fulvicornis</i>	♂		Israel	Nahal Maresha	15.iii.2021	G. Pisanty
HYMAA360-22	<i>Andrena gageae</i>	♀	holotype	Lebanon	Bsharri	27.v.2017	P. Rasmont, M. Boustani
HYMAA361-22	<i>Andrena gageae</i>	♂	paratype	Lebanon	Bsharri	27.v.2017	P. Rasmont, M. Boustani
ANDIL037-22	<i>Andrena guttata</i>	♂		West Bank	Nabi Musa Road	22.ii.2014	A. Gotlieb
ANDIL040-22	<i>Andrena guttata</i>	♀		West Bank	Nabi Musa Road	12.iv.2014	A. Gotlieb
ANDIL013-22	<i>Andrena igræca</i>	♀	paratype	Israel	Kefar Menahem	01.iii.2008	Y. Mandelik
ANDIL039-22	<i>Andrena igræca</i>	♂	paratype	Israel	Jerusalem	24.ii.2014	A. Gotlieb
ANDIL077-22	<i>Andrena igræca</i>	♀	paratype	Israel	Mount Meron	04.iv.2017	G. Pisanty

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**TABLE 2. (Continued)**

BOLD Accession no.	Species	Sex	Type	Country	Locality	Date	Collector
ANDIL117-22	<i>Andrena igraeca</i>	♂	paratype	Israel	Mount Hermon	07.iv.2021	G. Pisanty
ANDIL029-22	<i>Andrena israelica</i>	♀		Israel	Lakhish	20.iii.2013	T. Shapira
ANDIL030-22	<i>Andrena israelica</i>	♀		Israel	Lakhish	08.iv.2013	T. Shapira
ANDIL031-22	<i>Andrena israelica</i>	♀		Israel	Ramat Hanadiv	13.ii.2013	T. Shapira
ANDIL095-22	<i>Andrena israelica</i>	♂		Israel	Me'arat Yishah	22.ii.2019	G. Pisanty
ANDPH060-21	<i>Andrena israelica</i>	♀		Israel	Netiv Halamed He	27.iii.2017	T. Roth
ANDIL070-22	<i>Andrena janthina</i>	♂		Israel	Shivta junction	10.iii.2017	G. Pisanty
ANDIL078-22	<i>Andrena janthinoides</i>	♀	paratype	Israel	Forest of the Martyrs	26.ii.2017	Y. Farago
ANDIL116-22	<i>Andrena limassolica</i>	♀		Israel	Mount Hermon	07.iv.2021	G. Pisanty
ANDIL012-22	<i>Andrena longistilus</i>	♀	paratype	Israel	En Yahav	08.iii.2009	A. Godlieb
ANDIL035-22	<i>Andrena longistilus</i>	♀	paratype	Israel	Har Horesha	02.iv.2014	L. Friedman
ANDIL043-22	<i>Andrena longistilus</i>	♀	paratype	Israel	Lehavim	28.i.2015	G. Pisanty
ANDIL058-22	<i>Andrena longistilus</i>	♀	paratype	Israel	Lakhish	26.ii.2016	G. Pisanty
ANDIL071-22	<i>Andrena longistilus</i>	♂	paratype	Israel	Shivta junction	10.iii.2017	G. Pisanty
ANDIL073-22	<i>Andrena longistilus</i>	♀	paratype	Israel	Shivta junction	17.iii.2017	G. Pisanty
ANDIL096-22	<i>Andrena longistilus</i>	♀	paratype	Israel	Borot Loz	23.iii.2020	L. Friedman
ANDIL106-22	<i>Andrena longistilus</i>	♂	paratype	Israel	Lakhish	09.iii.2020	K. Levy
ANDIL046-22	<i>Andrena lunaris</i>	♀	paratype	Israel	Nes Ziyayona	13.iii.2015	G. Pisanty
ANDIL054-22	<i>Andrena lunaris</i>	♂	paratype	Israel	Lakhish	05.ii.2016	G. Pisanty
ANDIL079-22	<i>Andrena lunaris</i>	♀	paratype	Israel	Forest of the Martyrs	16.iv.2017	Y. Farago
ANDIL111-22	<i>Andrena lunaris</i>	♂	paratype	Israel	Nahal Keziv	26.ii.2021	G. Pisanty
ANDIL072-22	<i>Andrena macula</i>	♀	paratype	Israel	Shivta junction	17.iii.2017	G. Pisanty
ANDIL041-22	<i>Andrena mediterranea</i>	♀	paratype	Israel	Malkia	28.iv.2015	O. Winberger
ANDIL045-22	<i>Andrena mediterranea</i>	♂	paratype	West Bank	Kedumim	27.ii.2015	L. Friedman
ANDIL068-22	<i>Andrena mediterranea</i>	♀		Israel	Malkia	04.iv.2016	O. Winberger
ANDIL118-22	<i>Andrena mediterranea</i>	♀		Israel	Mount Hermon	07.iv.2021	G. Pisanty
ANDIL132-22	<i>Andrena mediterranea</i>	♂		West Bank	Har Eval	29.iii.2021	L. Friedman

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**TABLE 2. (Continued)**

BOLD Accession no.	Species	Sex	Type	Country	Locality	Date	Collector
ANDIL014-22	<i>Andrena mirna</i>	♂		Israel	Arad	07.iii.2010	A. Freidberg
ANDIL044-22	<i>Andrena mirna</i>	♀		Israel	Lehavim	28.i.2015	G. Pisanty
ANDIL015-22	<i>Andrena mizorhina</i>	♂		Israel	Pura N.R.	18.iii.2010	A. Freidberg
ANDIL033-22	<i>Andrena mizorhina</i>	♂		Israel	Lakhish	18.ii.2013	T. Shapira
ANDIL112-22	<i>Andrena mizorhina</i>	♂		Israel	Holot Nizzanim N.R.	10.iii.2021	A. Dorchin
ANDPH034-21	<i>Andrena mizorhina</i>	♀		West Bank	Kedumim	24.iii.2015	L. Friedman
ANDIL135-22	<i>Andrena mucronata</i>	♀		Israel	Kfar Yavetz	04.iv.2012	O. Afik
ANDIL136-22	<i>Andrena mucronata</i>	♂		West Bank	Sartava N.R.	13.ii.2019	A. Dorchin
ANDIL137-22	<i>Andrena mucronata</i>	♀		Israel	Nahal Alexander	22.iii.2020	K. Levy
ANDIL127-22	<i>Andrena najadana</i>	♂		Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL009-22	<i>Andrena obtusa</i>	♀	paratype	Israel	Nahal Zin	15.iv.2007	I. Lalzar
ANDIL097-22	<i>Andrena obtusa</i>	♂	paratype	Israel	Shivta junction	16.iii.2020	G. Pisanty
ANDIL098-22	<i>Andrena obtusa</i>	♀	paratype	Israel	Shivta junction	16.iii.2020	G. Pisanty
ANDIL049-22	<i>Andrena ochraceohirta</i>	♀		West Bank	Har Kabbir	17.iii.2015	L. Friedman
ANDIL059-22	<i>Andrena ochraceohirta</i>	♀		Israel	Lakhish	04.iii.2016	G. Pisanty
ANDIL103-22	<i>Andrena ornithogali</i>	♀	paratype	Israel	Odem Forest N.R.	01.iii.2018	G. Pisanty
ANDIL122-22	<i>Andrena ornithogali</i>	♀	paratype	Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL042-22	<i>Andrena protuberata</i>	♀	paratype	Israel	Sasa	20.iv.2015	O. Winberger
ANDIL126-22	<i>Andrena protuberata</i>	♂	paratype	Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL048-22	<i>Andrena pyrozonata</i>	♂		Israel	Nahal Keziv	05.iii.2008	L. Friedman
ANDIL128-22	<i>Andrena pyrozonata</i>	♀		Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL022-22	<i>Andrena rufula</i>	♀		Israel	Mount Hermon	21.iv.2012	G. Pisanty
ANDIL093-22	<i>Andrena scrophulariae</i>	♂		Israel	Hermon N.R.	29.v.2019	L. Friedman
ANDIL133-22	<i>Andrena semirubra</i>	♀		Turkey	Kastamonu Prov.	19.vi.2006	E. Scheuchl
ANDIL063-22	<i>Andrena sillata</i>	♀		Israel	Mount Meron	21.iv.2016	G. Pisanty
ANDIL075-22	<i>Andrena sillata</i>	♂		Israel	Mount Meron	04.iv.2017	G. Pisanty
ANDIL082-22	<i>Andrena sillata</i>	♂		Israel	Odem Forest N.R.	01.iii.2018	G. Pisanty

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**TABLE 2. (Continued)**

BOLD Accession no.	Species	Sex	Type	Country	Locality	Date	Collector
ANDIL091-22	<i>Andrena sillata</i>	♀		Israel	Hermon N.R.	28.v.2019	L. Friedman
ANDIL100-22	<i>Andrena sillata</i>	♀		Israel	Odem Forest N.R.	27.iv.2020	G. Pisanty
ANDIL123-22	<i>Andrena sillata</i>	♂		Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL125-22	<i>Andrena sillata</i>	♂		Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL080-22	<i>Andrena symphyti</i>	♂		Israel	Montfort	28.ii.2018	G. Pisanty
ANDPH056-21	<i>Andrena symphyti</i>	♀		Israel	Mount Meron	04.iv.2017	G. Pisanty
ANDIL060-22	<i>Andrena tadauchii</i>	♂		Israel	Lakhish	04.iii.2016	G. Pisanty
ANDIL086-22	<i>Andrena tadauchii</i>	♀		Israel	Beit Nir	25.iii.2018	T. Roth
ANDIL024-22	<i>Andrena thomsonii</i>	♂		Israel	Mount Hermon	24.v.2012	L. Friedman
ANDIL092-22	<i>Andrena thomsonii</i>	♀		Israel	Hermon N.R.	28.v.2019	L. Friedman
ANDIL129-22	<i>Andrena thomsonii</i>	♂		Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL121-22	<i>Andrena turmalina</i>	♀	paratype	Israel	Mount Hermon	07.iv.2021	G. Pisanty
ANDIL008-22	<i>Andrena varicornis</i>	♀		Israel	Nahal Zin	15.iv.2007	I. Lalzar
ANDIL011-22	<i>Andrena varicornis</i>	♀		Israel	Nahal Sayif	14.iv.2007	Y. Hollender
ANDIL036-22	<i>Andrena varicornis</i>	♀		Israel	Har Horesha	02.iv.2014	L. Friedman
ANDIL038-22	<i>Andrena varicornis</i>	♀		West Bank	Nabi Musa Road	22.ii.2014	A. Gottlieb
ANDIL069-22	<i>Andrena varicornis</i>	♂		Israel	Shivta junction	10.iii.2017	G. Pisanty
ANDIL083-22	<i>Andrena veronicae</i>	♂	paratype	Israel	Odem Forest N.R.	01.iii.2018	G. Pisanty
ANDIL104-22	<i>Andrena veronicae</i>	♀	paratype	Israel	Odem Forest N.R.	01.iii.2018	G. Pisanty
ANDIL119-22	<i>Andrena veronicae</i>	♀	paratype	Israel	Mount Hermon	07.iv.2021	G. Pisanty
ANDIL120-22	<i>Andrena veronicae</i>	♂	paratype	Israel	Mount Hermon	07.iv.2021	G. Pisanty
ANDIL131-22	<i>Andrena veterana</i>	♀	paratype	Israel	Mount Hermon	16.iv.2021	G. Pisanty
ANDIL025-22	<i>Andrena wilhelmi</i>	♀		Israel	Kare Deshe	27.ii.2012	T. Shapira
ANDIL055-22	<i>Andrena xera</i>	♀	holotype	Israel	Nahal Shezaf	14.ii.2016	G. Pisanty

Photographs were taken either using a Zeiss Axiocam 305 colour camera through a Zeiss Discovery.V20 stereomicroscope, or 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 or a LOMO 3.7 objective lens in combination with an Olympus M.Zuiko 2× 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 7.7.0 (Helicon Soft Ltd., Ukraine) or Zerene Stacker 1.04 (Zerene Systems, USA) and edited in GNU Image Manipulation Program (GIMP) 2.10.

Specimen depositories are listed under the following acronyms:

AD	Private collection of Abdelkader Dermane, Tlemcen, Algeria
AV	Private collection of Androulla Varnava, Limassol, Cyprus
CNC	Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada
ES	Private collection of Erwin Scheuchl, Ergolding, Germany
MNHN	Muséum national d'Histoire naturelle, Paris, France
NHMUK	Natural History Museum, London, United Kingdom
OLML	Oberösterreichs Landesmuseum, Linz, Austria
RBINS	Royal Belgian Institute of Natural Sciences, Brussels, Belgium
RMNH	Naturalis Biodiversity Center, Leiden, the Netherlands
SMFM	Senckenberg Naturmuseum, Frankfurt am Main, Germany
SMNH-TAU	The Steinhardt Museum of Natural History, Tel Aviv University, Tel Aviv, Israel
TJW	Private collection of Thomas J. Wood, Mons, Belgium
ZMHB	Museum für Naturkunde, Berlin, Germany
ZSMC	Zoologische Staatssammlung München, Germany

## Results

### *Andrena (Aciandrena) anathema* Pisanty sp. nov.

(Figs. 1–9)

**Female** (Fig. 1).

**Body length:** 5–5.5 mm.

**Colour.** Head, mesosoma and legs dark brown to black; metasoma brown to black (Fig. 1). Anterior side of flagellomeres 3–10 orange (Fig. 2). Wings hyaline, veins brown, stigma brownish-golden (Fig. 1). Tergal marginal zones yellowish-golden apically, often somewhat reddish (Fig. 4).

**Pubescence.** Body hair mostly short and sparse, minutely plumose to plumose, whitish (Fig. 1). Clypeus and supraclypeal area with sparse, short and thin, minutely plumose whitish hair. Paraocular area and scape with moderately dense, short whitish plumose hair (Fig. 2). Facial foveae in dorsal view brownish on upper half, whitish on lower half. Vertex with erect, short yellowish plumose hairs (Fig. 3). Genal area with short whitish, minutely plumose hair. Mesonotum, scutellum and metanotum with short whitish to light brown plumose hair, sparse on center of mesonotum and anterior half of scutellum, dense and thick (semi-squamous) peripherally (Fig. 3). Mesepisternum with medium-lengthed minutely plumose white hair. Propodeal corbicula incomplete, dorsoposterior fringe with long white plumose hair, corbicular surface with few long white simple hairs. Leg hair mostly short, white to light brown (Fig. 1); tibial scopal hair simple, whitish; flocculus incomplete, white. Tergal discs 1–2 hairless, 3–4 with sparse inconspicuous minute whitish hairs. Tergal marginal zones 2–4 with weak bands of short white hair, broadly interrupted on 2–3, continuous but sparser on 4. Terminal fringe golden (Fig. 4).

**Head** (Figs. 2–3). 1.2 times broader than long. Mandible bidentate. Galea shagreened. Labral process more or less triangular. Clypeus flat, shagreened, occasionally with a small smooth medioapical area, shallowly and finely punctured, distance between punctures 2 puncture diameters, without impunctate midline (Fig. 2). Supraclypeal plate finely shagreened, not striated, finely punctured. Flagellomere 1 slightly shorter than 2+3. Frons finely and shallowly longitudinally striated. Facial foveae tapering downwards, extending from level of middle of lateral ocellus to middle of antennal socket, 0.5 times as broad as antennocular distance (Fig. 2). Distance of fovea from lateral

ocellus about 1 ocellus diameter. Ocelloccipital distance 0.5 ocellus diameter. Vertex strongly carinate medially (Fig. 3).

**Mesosoma** (Fig. 3). Mesonotum and scutellum shiny, weakly but uniformly shagreened, punctation fine and shallow, distance between punctures 1–3 puncture diameters (Fig. 3). Mesepisternum and propodeum finely reticulate. Propodeal triangle delineated by weak carina, basal part somewhat more coarsely sculptured than flanking areas outside triangle. Hind pretarsal claw unidentate. Recurrent vein 1 meets submarginal cell 2 at its proximal 1/3–1/2. Submarginal crossvein 1 meets marginal cell 1–2 vein widths from stigma (Fig. 1). Nervulus distinctly antefurcal.

**Metasoma** (Fig. 4). Tergal discs shagreened and impunctate. Tergal marginal zones similar, smooth near apex, slightly arched, medially covering 1/3–1/2 of tergum length, 2–4 weakly depressed.

**Male** (Fig. 5).

**Body length:** 4.5 mm.

**Colour.** Similar to female (clypeus and paraocular area dark).

**Pubescence.** Clypeus, paraocular and supraclypeal areas and scape with moderately dense, short to medium white plumose hair (Fig. 6). Genal area with short greyish-white hair anterodorsally, medium white hair posteroventrally. Mesonotum, scutellum and metanotum with sparse, short to long, white to yellowish minutely plumose hair (Fig. 7). Mesepisternum and propodeum with long plumose white hair. Femora and tibiae mostly with short white to yellowish hair. Tarsi with short white to golden hair (Fig. 5). Tergal discs 2–4 and basal half of 1 with minute inconspicuous white hairs, apical half of 1 almost hairless. Apical half of tergal marginal zones 2–4 with weak, strongly interrupted bands of short white to whitish-golden hairs. Tergal marginal zone 5 with sparse band of medium-lengthed whitish-golden hairs. Terminal fringe whitish-golden (Fig. 5).

**Head** (Figs. 6–7). Labral process weakly trapezoidal, slightly broader than long, very finely transversely striated, apical margin concave. Clypeus not to weakly protuberant at apical half, flattened, shiny, basal half shagreened, apical half shagreened to smooth, punctation moderate, distance between punctures 1.5–3 puncture diameters, without impunctate midline (Fig. 6). Flagellomere 1 shorter than 2+3, 2 slightly shorter than 3. Rest of head similar to female.

**Mesosoma** (Fig. 7). Basal part of propodeal triangle finely alveolate, more strongly sculpted than in female. Hind pretarsal claw bidentate. Otherwise similar to female.

**Metasoma.** Similar to female.

**Genitalia and hidden sterna** (Figs. 8–9). Dorsal gonocoxite lobes developed, broadly rounded. Gonostylus broadening at 1/3 of its length, blade flattened, of uniform width, apical margin more or less rounded. Penis valves moderately broad basally, gradually tapering towards narrow apex (Fig. 8). Sternum 8 simple, columnar, apical process broadened, blunt-ended (Fig. 9).

**Diagnosis.** *Andrena anathema* and the closely related *A. (Aciandrena) longistilus* **sp. nov.** are distinguished from most other *Aciandrena* by the distinctly flattened clypeus (Figs. 2, 6, 19, 23). As far as we can see, the females of the two species cannot be morphologically differentiated, and were hereby assigned to species based on DNA barcoding (Table 2). Moreover, preliminary molecular data suggests that there may be additional, undescribed Levantine species of very similar morphology (GP, unpublished results). Use of DNA barcoding is therefore essential for validating specimen identity and establishing species boundaries within this difficult taxonomic group. Females of *A. anathema* and *A. longistilus* resemble those of *A. (Aciandrena) spolata* Warncke, but in the latter species the clypeus is flattened to a lesser extent, very slightly convex, and always smooth apically (usually with majority of surface area shagreened in *A. anathema* and *A. longistilus*). Additionally, *A. spolata* has a narrowly trapezoidal labral process (more triangular in *A. anathema* and *A. longistilus*) and stronger mesonotal punctation. *Andrena (Graecandrena) impunctata* Pérez possesses a similarly flattened clypeus, but has a larger body size, broadly trapezoidal labral process (triangular in *A. anathema* and *A. longistilus*), striated supraclypeal plate, and narrower facial foveae.

The male of *A. anathema* closely resembles *A. (Aciandrena) israelica* Scheuchl & Pisanty and was confused with the latter species, with representatives included in its type series (Pisanty *et al.* 2016). Compared to *A. israelica*, the clypeus and mesonotum of *A. anathema* are without metallic luster and more distinctly punctured, the clypeus is flattened and often smooth apically (slightly convex and fully shagreened in *A. israelica*), flagellomeres 2–11 are reddish to orange (light brown in *A. israelica*), the nervulus is more weakly antefurcal, and the terga are more strongly shagreened. The genital capsules of the two species are almost identical; in direct comparison, the dorsal gonocoxite lobe and the base of the gonostylus of *A. israelica* seem slightly broader.



**FIGURES 1–9.** *Andrena (Aciandrena) anathema* **sp. nov.** 1. female habitus, 2. female head, 3. female head and mesosoma, 4. female metasoma, 5. male habitus, 6. male head, 7. male vertex and mesosoma, 8. male genitalia, 9. male eighth sternum.

**Distribution:** North and central Israel, West Bank, reaching south as far as 31.4°N. Seems to exhibit a vicariance pattern with *A. longistilus* **sp. nov.**, which occupies drier habitats located further south or east. The two species are sympatric along the Mediterranean-desert transition zone.

**Flight period:** February–April.

**Flower records:** Brassicaceae: *Erucaria microcarpa*. Additionally, undetermined *A. anathema*/*A. longistilus* females were collected from Brassicaceae: *Erucaria rostrata*, *Rapistrum rugosum*, *Sinapis arvensis*, and Plantaginaceae: *Plantago lagopus*.

**Holotype:** ISRAEL: Horbat Kefar Lakhish, 31.575°N 34.8532°E, 5.iii.2021, G. Pisanty, sweeping, ♂ (SMNHHTAU:358873).

**Paratypes:** ISRAEL: Adulam-France Park [Ya'ar Adulam], 2013, Y. Berner (1♀); Beit Guvrin [Bet Guvrin], 28.iii.2010, G. Pisanty, pan trap (1♀); Britannia Park [Park Britanya], 11.ii.2011, T. Koznichki, pan trap (1♀); Dvir [Devira], 12.iv.2009, L. Friedman (1♂) (*A. israelica* paratype label); Horbat Kefar Lakhish, 31.575°N 34.853°E, 5.iii.2021, G. Pisanty, pan traps (2♂); 15.iii.2021, G. Pisanty, pan traps (2♂); 31.575°N 34.8532°E, 5.iii.2021, G. Pisanty, sweeping (2♂); Horbat Sheqofa, 31.5775°N 34.871°E, 15.iii.2021, G. Pisanty, pan traps (4♂); Lakhish, 22.ii.2012, T. Shapira, pan trap (1♂) (*A. israelica* paratype label); 21.iii.2013, T. Shapira, pan trap (1♂); 3 km NE, 31.575°N 34.870°E, 4.iii.2016, G. Pisanty (1♂) (*A. israelica* paratype label); 31.578°N 34.870°E, 19.ii.2016, G. Pisanty (2♂) (*A. israelica* paratype labels); 26.ii.2016, G. Pisanty (1♀, 1♂) (*A. israelica* paratype label); Nabi Hazuri, 33.252°N 35.727°E, 27.iv.2020, G. Pisanty (1♀); Nahal Maresha, 220 m, 31.577°N 34.858°E, 15.iii.2021, G. Pisanty, sweeping (1♂); Sasa, 3.iv.2016, O. Winberger (1♀); WEST BANK: Elon More, 'En Kefir, 530 m, 17.iii.2015, L. Friedman (1♀); Nofei Prat [NofePerat, Kefar Adummim], north-facing slope of Nahal Perat, 27.ii.2007, L. Friedman (1♂); Wadi Qelt [Nahal Perat], 31.83°N 35.34°E, 14.iii.2015, G. Pisanty (1♀); Za'atara, 6.iii.2015, T. Jumah, on *Erucaria microcarpa* (1♀) (ES, OLML, RMNH, SMNHHTAU, TJW).

**Etymology.** *anathema* = Greek for “something strongly disliked” in reference to the identification challenges posed by this species. The species epithet is a noun in apposition.

**Other material examined (undetermined *A. anathema* / *A. longistilus* females):** ISRAEL: Adulam-France Park [Ya'ar Adullam], 20.iv.2011, T. Koznichki, pan traps (3♀); Arad, 7.ii.1987, E. Shney-Dor (1♀); Beersheba [Negev, Beer Sheva], 30–31.iii.1961 (3♀); Beit Guvrin [Bet Guvrin], 28.iii.2010, G. Pisanty, pan traps (14♀); Beit Nir [Bet Nir], 28.iii.2010, G. Pisanty, pan traps (8♀+1♀ stylopised); Bor Mashash, 25.iii.1987, A. Shlagman (1♀ stylopised); Britannia Park [Park Britannia], 24.iv.2011, T. Koznichki, pan traps (5♀); 26.iii.2015, T. Chaprazaro (1♀); 17.iv.2016, T. Chaprazaro (1♀); [Park Britanya], 7.iv.2010, T. Koznichki, pan trap (1♀); 11.ii.2011, T. Koznichki, pan trap (1♀); Degania Alef [Deganya A], 25.iii.1942, Y. Palmoni (1♀); Dimona, 28.iii.1978, D. Furth (1♀); Dvir [Devira], 12.iv.2009, L. Friedman (3♀); Ein Hajla, Rt. 90, 31°49'N 35°30'E, 16.iii.2004, L. Friedman (1♀); Gal'on, 4.iv.2018, T. Roth (1♀); 2 km NW, 31.649°N 34.837°E, 2.iv.2015, G. Pisanty, pan trap (1♀); Hamakhtesh HaGadol [Negev, 5 km SE Yeroham, Hamakhtesh Hagadol], 21.iii.1990, R. Leys (1♀); Har Hoesha, Rt. 171, 930 m, 2.iv.2014, L. Friedman (9♀); Holot Mash'abbim Nature Reserve [Holot Mash'abbim], ], 30.999°N 34.757°E, 10.iii.2017, G. Pisanty (1♀); 30.999°N 34.7575°E, 13.ii.2002, L. Friedman (1♀); 30.999°N 34.7578°E, 13.ii.2002, G. Pisanty, sweeping (1♀); 18.ii.2002, G. Pisanty, pan traps (2♀); Horbat Kefar Lakhish, 31.575°N 34.853°E, 5.iii.2021, G. Pisanty, pan traps (2♀); 15.iii.2021, G. Pisanty, pan traps (5♀); 31.575°N 34.8532°E, 5.iii.2021, G. Pisanty, sweeping (4♀); Horbat Sheqofa, 31.5775°N 34.871°E, 15.iii.2021, G. Pisanty, pan traps (13♀); Kedma [Qedma], 5.iii.2009, G. Pisanty (2♀); Kfar Giladi [Kefar Giladi S], 12.iv.1997, R. Kasher (1♀); 1.5 km N of Kfar Shamai [Kefar Shammay], 650 m, 13.iv.1988, C. O'Toole (1♀); Kfar Shmuel [Kefar Shemuel], 15.ii.1968 (2♀); 25.ii.1968, S. Bleszynski (1♂); 20.iii.1968, S. Bleszynski (1♀); 23.iii.1968, S. Bleszynski (2♀); Kiryat Gat – Beit Kama [Qiryat Gat – Bet Qama], ca. i.2011, I. Van Rijn (5♀); Lakhish, 22.ii.2012, T. Shapira, pan trap (1♀); 23.ii.2012, T. Shapira, pan trap (1♀ stylopised); 21.iii.2012, T. Shapira, pan traps (3♀); 4.ii.2013, T. Shapira, pan traps (1♀); 18.ii.2013, T. Shapira, pan traps (1♀); 6.iii.2013, T. Shapira, pan traps (2♀); 7.iii.2013, T. Shapira, pan traps (1♀); 10.iii.2013, T. Shapira, pan traps (1♀); 14.iii.2013, T. Shapira, pan traps (1♀); 18.iii.2013, T. Shapira, pan traps (1♀); 19.iii.2013, T. Shapira, pan traps (6♀); 20.iii.2013, T. Shapira, pan traps (2♀+1♀ stylopised); 13.iv.2013, T. Shapira, pan traps (2♀); 3 km NE, 31.575°N 34.870°E, 4.iii.2016, G. Pisanty (1♀); 11.iii.2016, G. Pisanty, partly from pan traps (4♀); 31.578°N 34.870°E, 26.ii.2016, G. Pisanty (1♀); 19.iii.2016, G. Pisanty, partly from pan traps (2♀); 31.579°N 34.871°E, 4.iii.2016, G. Pisanty, pan trap (1♀) and on *Sinapis* (1♀); Lehavim, 31.365°N 34.830°E, 28.i.2015, G. Pisanty, partly from pan traps (14♀); 31.370°N 34.8257°E, 7.iii.2015, G. Pisanty, pan traps (6♀+3♀ stylopised); Ma'agar Yeroham, 30°59'N 34°55'E, 5.iv.2007, S. Chaviv & N. Greenman (1♀);

Mitzpe Ramon [Mizpe Ramon], 30 km SW Har Ramon, 10.iv.1990, K. Warncke (1♀) (*A. avedata* paratype label); Nahal Dishon, 1.iv.1991, R. Kasher (1♀); Nahal Gerar, 31.3998°N 34.470°E, 21.i.2015, G. Pisanty, pan trap (1♀); Nahal Maresha, 220 m, 31.577°N 34.858°E, 15.iii.2021, G. Pisanty, pan traps (2♀) and sweeping (2♀); Nahal Me'arot, 8.iv.1988, I. Yarom (1♀); Nahal Revivim [N. Rvivim], 4.iv.1988, Y. Zvik (1♀); Nahal Tahmas, 16.iii.1999, L. Friedman (1♀); Nahal Yavne'el spill, 17.iii.1942, Y. Palmoni (1♀); Nahal Ye'elim, 6.iv.1988, F. Kaplan (1♀) & I. Yarom (1♀); Nahal Ye'elim, Rt. 31, 20.iv.2015, L. Friedman (2♀); Nahshon, 25.ii.2009, G. Pisanty (1♀); Northern Negev, 27.iii.2015, G. Pisanty (2♀); Pura Nature Reserve, 31.496°N 34.778°E, 27.iii.2015, G. Pisanty (1♀); 200 m, 31°29.7'N 34°46.8'E, 18.iii.2010, A. Freidberg (1♀); Retamim, 273 m, 31°03'N 34°41.5'E, 3.iv.2009, A. Freidberg (1♀); Revivim, 12.iii.1974, D. Furth (1♀); Sasa, 3.iv.2016, O. Winberger (2♀); Sde Boker [Sde Boqer], 28.iii.1978, D. Furth (2♀); 3 km N [Sede-Boqer], 19.ii.1995, R. Kasher (1♀); 8.iii.1995, R. Kasher (1♀); Shivta, 17.iii.1977, A. Freidberg (3♀+1♀ stylotised, 1♂); Shivta Junction, 30.941°N 34.597°E, 16.iii.2020, G. Pisanty, pan traps (2♀); [Holot Shunera], 30.941°N 34.597°E, 17.iii.2017, G. Pisanty (5♀+1♀ stylotised); Tel Yeroham [Tel-Jerucham], 25.iii.1959, J. Kugler, on *Erucaria microcarpa* (2♀); Tell es-Safi [Tel Zafit], 7.iii.2018, T. Roth, on *Plantago lagopus* (1♀); 31.iii.2018, T. Roth, partly on *Rapistrum rugosum* (3♀); Yeruham [Kfar-Jerucham], 24.iii.1959, I. Kugler (1♀ stylotised); [Yeroham], 2 km E, 21.iii.1990, R. Leys (1♀); **JORDAN:** Al-Maghtas, 10.iv.1943, H. Bytinski-Salz (1♀); Dana, 3.v.2012, M. Kafka (630♀, 66♂); Kerak env. [Al Karak env.], 6.iv.2013, M. Snižek (2♀); 15 km W Madaba, 760 m, 27.iv.2006, K. Deneš (1♀); **SYRIA:** 30 km W Palmyra, 580 m, 23.iv.1992, K. Warncke (2♀); 110 km E of Palmyra, 350 m, 21–22.iv.1992, K. Warncke (5♀); **WEST BANK:** Almog, 10 km S Jericho, –350 m, 3.ii.1990, R. Kasher, on *Erucaria rostrata* (1♀); Elon More, 'En Kefir, 530 m, 17.iii.2015, L. Friedman (1♀); Herodium [Herodyon], 31°40'N 35°14'E, 31.iii.2009, M. Guershon (1♀); Ma'on, 0–1 km S, 750–800 m, 14.iv.2015, L. Friedman (2♀); Maskiot [Maskiyot], Rt. 578, Wadi Halat Mahmud el-'Ali, –75 m, 32°19'18"N 35°29'52"E, 27.ii.2020, L. Friedman (1♀); Mehola, Rt. 578, –177 m, 32°21'48"N 35°30'49"E, 27.ii.2020, L. Friedman (2♀); Nofei Prat [NofePerat, Kefar Adummim], north-facing slope of Nahal Perat, 27.ii.2007, L. Friedman (4♀); Ubeidiya, 6.iv.2014, I. Arar, on *Sinapis arvensis* (1♀+1♀ stylotised); Za'atara, 14.iv.2014, I. Arar, on *Erucaria rostrata* (1♀) (CNC, OLML, RMNH, SMNHTAU, TJW).

### *Andrena (Aciandrena) curviociput* Pisanty & Wood sp. nov.

(Figs. 10–17)

**Female** (Fig. 10).

**Body length:** 5.5 mm.

**Colour.** Body dark brown to black (Fig. 10). Anterior side of flagellum gradually becoming orange apically (Figs. 10–11). Distal tarsal segments reddish-brown. Wings slightly infusate, stigma brown peripherally, yellowish to brown medially, veins light to dark brown (Fig. 10). Tergal marginal zones yellowish to dark brown (Fig. 13).

**Pubescence.** Body hair mostly short, minutely plumose, white to golden (Fig. 10). Clypeus and mandibles with short golden hairs. Supraclypeal and paraocular areas, frons and vertex with short whitish hairs (Fig. 11). Facial foveae with minute whitish to brownish hairs. Genal area with short hair, whitish dorsally, golden ventrally. Mesonotum with sparse, minute inconspicuous hairs. Scutellum and metanotum with short whitish hairs (Fig. 12). Mesepisternum with long white hairs. Propodeal corbicula incomplete, dorsoposterior fringe with sparse, long white plumose hairs. Surface of corbicula with sparse, long white simple hairs. Leg hair white to golden (Fig. 10). Scopal hairs simple, whitish. Flocculus incomplete, white. Tergal discs with sparse, minute, inconspicuous white hair. Tergal marginal zones 2–4 with narrow lateral bands of short hair, white on 2–3, white to golden on 4. Prepygidial fimbria golden medially, white laterally; pygidial fimbria golden (Fig. 13).

**Head** (Fig. 11). 1.2–1.3 times broader than long. Labral process trapezoidal, apex much narrower than base. Clypeus weakly convex, shiny, superficially shagreened, punctures of moderate size and strength, puncture density 1–2 puncture diameters, a broad impunctate midline is sometimes partly to fully developed (Fig. 11). Paraocular area shiny, finely longitudinally striated, densely and more finely punctured, distance between punctures 0–0.5 puncture diameters. Flagellomere 1 about as long as 2+3, 2 as long as 3. Frons shiny, superficially shagreened, finely and weakly punctured, distance between punctures about 2 puncture diameters. Facial fovea 0.6 times as broad as antennoclar distance, extending from almost upper end of lateral ocellus to lower end of antennal socket or slightly below. Upper 3/5 of fovea shallow, gradually tapering, lower 2/5 deeper, almost linear, separated from compound

eye by smooth area (Fig. 11). Distance of fovea from lateral ocellus about 0.8 ocellus diameters. Vertex strongly arched, lateral ocelli reaching preoccipital ridge (ocelloccipital distance zero) (Figs. 11–12). Genal area as broad as compound eye (Fig. 10).

**Mesosoma** (Fig. 12). Mesonotum and scutellum shiny, superficially shagreened and weakly punctured, distance between punctures 2–4 puncture diameters on mesonotum and 1–2 on scutellum (Fig. 12). Mesepisternum, propodeal corbicula and posterolateral part of propodeum shiny, finely reticulate, impunctate. Propodeal triangle equilateral, more coarsely reticulated than rest of propodeum, with narrow basal band of longitudinal rugae (Fig. 12). Tarsal claws unidentate. Recurrent vein 1 reaching submarginal cell 2 at its middle or slightly closer to submarginal crossvein 1. Nervulus distinctly antefurcal.

**Metasoma** (Fig. 13). Tergal discs shiny, impunctate, finely shagreened except on apical parts of 2–4. Tergal marginal zones weakly depressed, shiny, superficially shagreened, impunctate, occupying 0.3–0.4 of tergal width. Pygidial plate V-shaped, flat.

**Male** (Fig. 14).

**Body length:** 5.5 mm.

**Colour.** Similar to female. Clypeus and paraocular areas dark (Fig. 15).

**Pubescence.** Genal area with long hair ventrally, mostly white (Fig. 14). Rest of body hair similar to female, but generally brighter, usually white (Fig. 14).

**Head** (Figs. 15–16). Labral process broad, rectangular-trapezoidal, apex not much narrower than base. Ocelloccipital distance about 0.3 ocellus diameter (Figs. 15–16). Rest of head similar to female.

**Mesosoma.** Similar to female, except rugosity of propodeal triangle more extensive, covering basal third of triangle; tarsal claws bidentate.

**Metasoma.** Similar to female.

**Genitalia and hidden sterna** (Fig. 17). Dorsal gonocoxite lobe distinct, rounded. Gonostylus blade strongly broadened, more or less triangular, flattened, outer margin weakly concave, inner margin strongly convex, apex rounded. Penis valves moderately broad basally, tapering apically (Fig. 17). Sternum 8 narrow, columnar, apical process broadened, apical margin distinctly notched, fishtail-shaped.

**Diagnosis.** *Andrena curviociput* is easily differentiated from all other species of *Aciandrena* by the strongly arched vertex, with the lateral ocelli reaching the preoccipital ridge, therefore without an ocelloccipital distance; this is especially pronounced in the female (Figs. 11, 12, 15, 16). *Andrena pulicaria* Warncke also possesses a strongly arched vertex, but differs in the distinct ocelloccipital distance, stronger shagreenation on mesonotum and terga, longer female clypeus which is smooth apically, and centrally yellow male clypeus.

**Distribution:** High altitudes in Lebanon, southeast Turkey and northern Israel (Mt. Hermon). Likely present also in Syria.

**Flight period:** April–June.

**Flower records:** Brassicaceae spp.

**Holotype: ISRAEL:** Mount Hermon [Hermon], 1640–1675 m, 33.298–299°N 35.767–770°E, 19.v.2022, G. Pisanty, on Brassicaceae, ♀ (SMNHTAU:392774).

**Paratypes: ISRAEL:** Hermon Nature Reserve [Hermon NR], 300 m N lower parking lot, 1508 m, 33.294°N 35.760°E, 28.v.2019, L. Friedman (1♀); Mount Hermon [Har Hermon], 1500 m, 25.v.1977, D. Gerling (1♀); 1600 m, 23.v.1998, A. Freidberg (1♀); 18.v.2009, A. Freidberg (1♀); 33.300°N 35.767°E, 11.v.2020, G. Pisanty, pan traps (2♀, 1♂); 33.3005°N 35.767°E, 15.v.2016, G. Pisanty, pan trap (1♀); 1620 m, 33.300°N 35.767°E, 11.v.2020, G. Pisanty (1♂); 1642 m, 33.2992°N 35.7668°E, 19.v.2022, G. Pisanty, pan trap (1♀); 1659 m, 33.2984°N 35.7683°E, 19.v.2022, G. Pisanty, pan trap (1♀); 1970 m, 33.310°N 35.796°E, 15.v.2016, G. Pisanty, pan trap (1♀); [Hermon], 1640–1675 m, 33.298–299°N 35.767–770°E, 19.v.2022, G. Pisanty, sweeping (7♀) and on Brassicaceae (2♀); **LEBANON:** Tannourine, 28.iv.2016, N. Nemer (1♂); **TURKEY:** Karadut, Nemrut Dag, 9.vi.1998, M. Halada (2♀); Nemrut Dağı, Adiyaman, 1500 m, 1.vi.1983, K. Warncke (1♀); Tanin-Tanin-Pass, 2300 m, 19.v.1989, K. Warncke (1♂) (OLML, RMNH, SMNHTAU, TJW).

**Etymology.** *curviociput* = Latin for the “curved occiput” characteristic of this species, with an extremely small ocelloccipital distance. The species epithet is a noun in apposition.





**FIGURES 10–17.** *Andrena (Aciandrena) curviocipit* sp. nov. 10. female habitus, 11. female head, 12. female vertex and mesosoma, 13. female metasoma, 14. male habitus, 15. male head, 16. male head and mesonotum, 17. male genitalia.

*Andrena (Aciandrena) longistilus* Pisanty & Wood sp. nov.

(Figs. 18–26)

**Female** (Fig. 18).

**Body length:** 5–5.5 mm.

**Colour.** Head and mesosoma dark brown to black (Fig. 18). Metasoma brown to black. Anterior side of flagellomeres 4–10 orange. Legs brown (Fig. 18). Wings hyaline to slightly infuscate, veins light to dark brown, stigma golden. Tergal marginal zones golden, sometimes reddish basally (Fig. 21).

**Pubescence.** Body hair mostly short and sparse, minutely plumose, white to golden (Fig. 18). Clypeus with sparse, short, thin white to yellowish hair. Paraocular area and scape with moderately dense, short white to yellowish hair (Fig. 19). Facial foveae black in ventral view, white to brownish in dorsal view (Fig. 20). Vertex and genal area with short white to golden hair. Mesonotum, scutellum and metanotum with short whitish to golden hair, sparse on center of mesonotum and anterior half of scutellum, dense and thick (almost scale-like) elsewhere (Fig. 20). Mesepisternum with long white hair. Propodeal corbicula incomplete, dorsoposterior fringe with long white plumose hair, corbicular surface with few long white simple hairs. Leg hair mostly white; scopal hair simple, white; flocculus incomplete, white (Fig. 18). Tergal discs 1–2 hairless, 3–4 with sparse inconspicuous minute white hairs, denser on 4. Tergal marginal zones 2–4 with moderately dense bands of short white hair, interrupted on 2–3, continuous on 4. Prepygidial fimbria white laterally, golden medially; pygidial fimbria golden (Fig. 21).

**Head** (Figs. 19–20). 1.2 times broader than long. Mandible bidentate. Galea shagreened. Labral process triangular to narrowly trapezoidal. Clypeus strongly flattened medially, finely shagreened, occasionally with a smooth apical region up to 1/3 of clypeus height, shallowly and finely punctured, distance between punctures 1–2 puncture diameters, punctures gradually sparser medially, an impunctate midline is not indicated (Fig. 19). Supraclypeal plate finely and shallowly shagreened, not striated. Flagellomere 1 slightly shorter than 2+3. Frons finely and shallowly longitudinally striated. Facial foveae tapering downwards, extending from level of middle–lower end of lateral ocellus to middle of antennal socket, about 0.4 times as broad as antennocular distance (Fig. 19). Distance of fovea from lateral ocellus 1 ocellus diameter. Ocelloccipital distance about 0.5 ocellus diameter. Vertex moderately carinate (Fig. 20).

**Mesosoma** (Fig. 20). Mesonotum and scutellum shiny, weakly but uniformly shagreened, punctation fine, extremely shallow and inconspicuous, distance between punctures 1–3 puncture diameters (Fig. 20). Mesepisternum and propodeum finely reticulate-alveolate. Propodeal triangle delineated by carina, sculpturing much coarser than on flanking areas (Fig. 20). Hind pretarsal claw unidentate. Recurrent vein 1 meets submarginal cell 2 at its proximal 1/3–1/2. Submarginal crossvein 1 meets marginal cell 1–2 vein widths from stigma. Nervulus antefurcal.

**Metasoma** (Fig. 21). Tergal discs impunctate, 1–3 strongly shagreened, 4 more shallowly so. Tergal marginal zones similar, smooth near apex, slightly arched, medially covering 1/3–1/2 of tergum length, 2–4 weakly depressed.

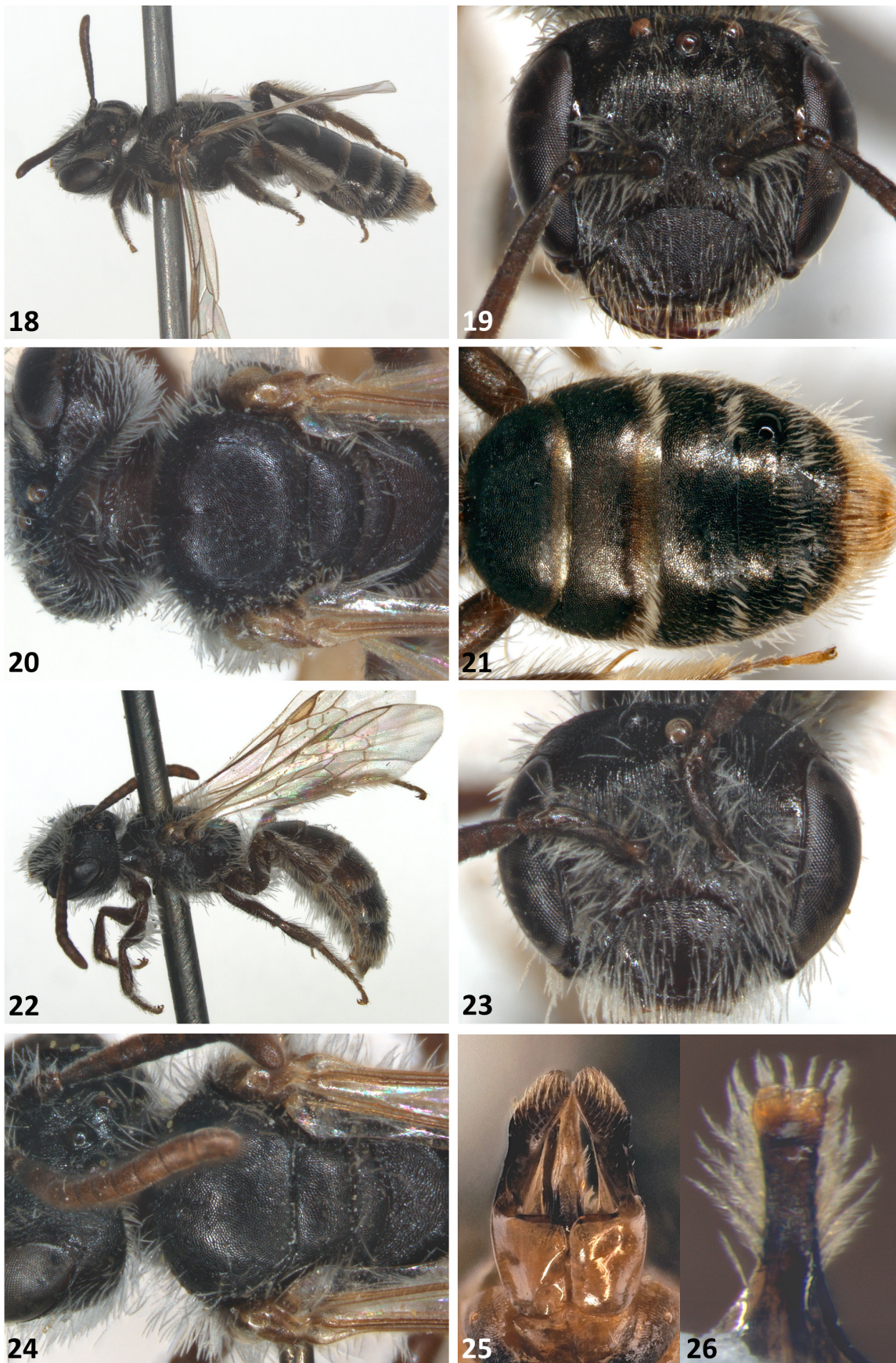
**Male** (Fig. 22).

**Body length:** 4.5 mm.

**Colour.** Similar to female (clypeus and paraocular area dark, one male from Kerak, Jordan with clypeus yellow centrally), generally somewhat darker, flagellum reddish-brown apically, tergal marginal zones more reddish (Fig. 22).

**Pubescence.** Clypeus with short white hairs, dense apicolaterally, moderately dense elsewhere. Paraocular area and scape with moderately dense, medium-lengthed white to yellowish hair (Fig. 23). Vertex with short to medium, white to yellowish hair. Genal area with white to yellowish short hair dorsally, short to medium white hair ventrally. Mesonotum, scutellum and metanotum with moderately dense, medium-lengthed white to brownish hair (Fig. 24). Mesepisternum and propodeum with long white hair. Legs with mostly white hair. Tergal discs with short hair laterally, minute inconspicuous white hair medially. Tergal marginal zones 2–4 with moderately dense bands of white hair, interrupted on 2–3, almost continuous on 4 (Fig. 22).

**Head** (Figs. 23–24). 1.2 times broader than long. Labral process trapezoidal, apex bifurcate. Clypeus strongly flattened medially, weakly shagreened basally, smooth apically, finely punctured, distance between punctures 1–3 puncture diameters, punctation sparser apically, without impunctate midline (Fig. 23). Supraclypeal plate finely and shallowly shagreened, not striated. Flagellomere 1 about as long as 4, 2 slightly shorter than 3. Frons finely and shallowly longitudinally striated (Fig. 23). Ocelloccipital distance 0.7 ocellus diameter. Vertex carinate (Fig. 24).



**FIGURES 18–26.** *Andrena (Aciandrena) longistilus* **sp. nov.** 18. female habitus, 19. female head, 20. female vertex and mesosoma, 21. female metasoma, 22. male habitus, 23. male head, 24. male vertex and mesosoma, 25. male genitalia, 26. male eighth sternum.

**Mesosoma** (Fig. 24). Similar to female, but hind leg pretarsal claw bidentate.

**Metasoma**. Similar to female.

**Genitalia and hidden sterna** (Figs. 25–26). Dorsal lobe of gonoxocite not developed. Gonostyli very elongate, almost straight, spatulate, gradually broadening apically. Penis valves narrow, tapering apically (Fig. 25). Sternum 8 simple, columnar, apical process slightly and gradually broadened (Fig. 26).

**Diagnosis.** For the female of *A. longistilus*, see corresponding section in *A. anathema* **sp. nov.** The males of *A. longistilus* are easily identified by their elongate gonostyli (Fig. 25), which are unique among *Aciandrena* species.

**Distribution:** Semi-arid to arid habitats in central and southern Israel, Jordan, Syria and the West Bank. Seems to exhibit a vicariance pattern with *A. anathema* **sp. nov.**, with *A. anathema* mostly occupying more mesic habitats in north and central Israel. The two species are sympatric along the Mediterranean-desert transition zone.

**Flight period:** January–May.

**Flower records:** Undetermined *A. anathema*/*A. longistilus* females were collected from Brassicaceae: *Erucaria microcarpa*, *Erucaria rostrata*, *Rapistrum rugosum*, *Sinapis arvensis*, and Plantaginaceae: *Plantago lagopus*.

**Holotype:** ISRAEL: Shivta Junction, 30.941°N 34.597°E, 17.iii.2017, G. Pisanty, pan trap, ♂ (SMNHNTAU:269112).

**Paratypes:** ISRAEL: Arad, 570 m, 31°15.346'N 35°11.958'E, 7.iii.2010, A. Freidberg (1♂); Avdat [Avedat], 16.iii.1988, A. Freidberg (1♂) & A. Shlagman (2♂); 10.iv.1990, K. Warncke (1♂) (*A. avedata* paratype label); Bor Hemet, 19.iv.2001, L. Friedman (1♂); Borot Loz, 930 m, 23.iii.2020, L. Friedman (1♀); Ein Yahav [‘En Yahav], 8.iii.2009, A. Gotlieb (1♀); Har Horesha, Rt. 171, 930 m, 2.iv.2014, L. Friedman (1♀); Holot Mash’abbim Nature Reserve [Holot Mash’abbim], 30.999°N 34.7575°E, 13.ii.2022, L. Friedman (2♂); 30.999°N 34.7578°E, 18.ii.2022, G. Pisanty, pan trap (1♂); 31.000°N 34.756°E, 16.iii.2020, G. Pisanty, pan traps (1♂); Kiryat Gat – Beit Kama [Qiryat Gat – Bet Qama], ca. i.2011, I. Van Rijn (2♂); Lakhish, 4.ii.2013, T. Shapira, pan trap (1♂); [Lachish], 9.iii.2020, K. Levy, pan trap (1♂); Lehavim, 31.365°N 34.830°E, 28.i.2015, G. Pisanty, partly from pan traps (1♀, 23♂); 31.370°N 34.8257°E, 7.iii.2015, G. Pisanty, pan traps (1♂); Nahal Zin, 15.iv.2007, I. Lalzar (1♀); Retamim, 273 m, 31°03'N 34°41.5'E, 3.iv.2009, A. Freidberg (2♂); Sa’ad, 31.468°N 34.5287°E, 21.i.2015, G. Pisanty, pan traps (2♂); Sde Boker [Sde Boqer], 28.iii.1978, D. Furth (1♂); 3 km N [Sede-Boqer], 19.ii.1995, R. Kasher (3♂); Shivta, 17.iii.1977, A. Freidberg (1♂); Shivta Junction [Holot Shunera], 30.941°N 34.597°E, 10.iii.2017, G. Pisanty (2♂); 17.iii.2017, G. Pisanty (5♂); JORDAN: Dana, 3.v.2012, M. Kafka (3♂); Kerak, 1000 m, 27.ii.1986, K.M. Guichard (1♂); Kerak env. [Al Karak env.], 6.iv.2013, M. Snižek (3♂); SYRIA: 110 km E of Palmyra, 350 m, 21–22.iv.1992, K. Warncke (3♂); WEST BANK: Kfar Adumim [NahalPerat, north-facing slope, Kefar Adummim], 27.ii.2007, A. Freidberg (2♂); [NofePerat, Kefar Adummim, north-facing slope of Nahal Perat], 27.ii.2007, L. Friedman (1♂) (ES, NHMUK, OLML, RMNH, SMNHNTAU, TJW, ZSMC).

**Etymology.** *longistilus* = Latin for “long stick”, referring to the notable length of the gonostyli in the male genital capsule. The species epithet is a noun in apposition.

**Other material examined (undetermined *A. anathema* / *A. longistilus* females):** see corresponding section in *A. anathema* **sp. nov.**

**Remarks.** This taxon was recognised as new by Klaus Warncke under the name *A. avedata*, though he died in 1993 before he could publish a description of this species (see Pisanty *et al.* 2016). *Andrena avedata* is therefore a nomen nudum, and we have chosen a clearly different name to avoid confusion.

### *Andrena (Aciandrena) obtusa* Pisanty **sp. nov.**

(Figs. 27–35)

**Female** (Fig. 27).

**Body length:** 6–6.5 mm.

**Colour.** Head and mesosoma dark brown to black (Fig. 27). Anterior side of flagellomeres 4–10 orange (Fig. 27–28). Legs brown to black, apical tarsomeres light brown. Wings slightly infuscate, veins brown, stigma golden, often partly translucent medially (Fig. 27). Tergal discs brown. Tergal marginal zones reddish-orange basally, white apically (Fig. 30).

**Pubescence.** Body hair mostly sparse, short, minutely plumose, white to yellowish-white (Fig. 27). Head and mesosoma mostly with white hair ventrally and yellowish hair dorsally (Fig. 27). Clypeus with sparse short white hair. Paraocular area and area around antennal sockets with dense short white hair (Fig. 28). Facial foveae dark in

ventral view, white to brownish-white in dorsal view (Fig. 29). Vertex with white to golden, medium-lengthed hair. Genal area with short yellowish hair dorsally, medium white hair ventrally. Mesonotum and scutellum with short brownish-white hairs, relatively sparse and thin medially, dense and thick peripherally (Fig. 29). Mesepisternum with long white hair. Propodeal corbicula incomplete, dorsoposterior fringe with long white plumose hair, corbicular surface with few long, white simple hairs. Femora and tibiae with mostly short white hair, tarsi with short white to golden hair; scopal hairs simple, white; flocculus incomplete, white (Fig. 27). Tergal discs with short white hair laterally; medially, 1–2 with extremely sparse and minute inconspicuous hair; 3–4 with sparse short white hair; 5 with relatively long white hair, merging into prepygidial fimbria. Tergal marginal zones 2–4 with dense bands of white hair covering bases of following tergal discs, interrupted in 2–3, continuous in 4. Prepygidial fimbria white, pygidial fimbria golden (Fig. 30).

**Head** (Figs. 28–29). 1.2 times broader than long. Mandible weakly to strongly bidentate. Galea shiny, very finely shagreened except on inner basal area. Labral process trapezoidal, apex distinctly narrower than base, basal part transversely striated. Clypeus almost completely flat, shiny, weakly shagreened basolaterally, more or less smooth medioapically, sparsely, irregularly punctured, distance between punctures 1.5–3 puncture diameters (Fig. 28). Flagellomere 1 longer than 2+3, 2 as long as 3. Frons longitudinally striated. Facial foveae of moderate width, tapering downwards, extending from level of middle–upper end of lateral ocellus to middle–lower end of antennal socket, about 0.6 times as broad as antennocular distance (Fig. 28). Distance of fovea from lateral ocellus about 0.7 ocellus diameter. Ocelloccipital distance 1 ocellus diameter. Vertex weakly carinate, almost rounded (Fig. 29).

**Mesosoma** (Fig. 29). Pronotum without elevated dorsolateral angle or lateral carina. Mesonotum and scutellum strongly shagreened, weakly shiny, very superficially and imperceptibly punctured, distance between punctures 1–2 puncture diameters (Fig. 29). Mesepisternum finely alveolate, obliquely punctured. Propodeal corbicula finely reticulate. Posterior part of propodeum finely alveolate, triangle very weakly demarcated by weak carina, sculpturing slightly coarser basally compared to flanking areas (Fig. 29). Hind pretarsal claw unidentate. Recurrent vein 1 meets submarginal cell 2 near its middle. Submarginal crossvein 1 meets marginal cell 3–5 vein widths from stigma. Nervulus strongly antefurcal.

**Metasoma** (Fig. 30). Tergal discs finely shagreened and impunctate, 1 strongly so, the following gradually more weakly shagreened and shinier. Tergal marginal zones similarly sculptured, weakly depressed, 2–4 distinctly arched, medially occupying 1/3–1/2 of tergum length. Pygidial plate without elevated medial zone.

**Male** (Fig. 31).

**Body length:** 6–7 mm.

**Colour.** Head and mesosoma dark brown to black (Fig. 31). Clypeus white except for two small mediolateral dark maculations. Paraocular area white almost up to level of clypeal base (Fig. 32). Anterior side of flagellomeres 3–11 orange. Legs dark brown to black, apical tarsomeres light brown. Wings slightly infuscate, veins brown, stigma brownish-golden (Fig. 31). Tergal discs dark brown to black. Tergal marginal zones reddish-orange basally, yellowish-white apically (Fig. 33).

**Pubescence.** Body hair mostly thin, white, short to medium-lengthed, minutely plumose (Fig. 31). Clypeus with dense fringe of white hairs, extending below to about half clypeus length. Paraocular area and area around antennal sockets with dense short white hair (Fig. 32). Vertex with medium-lengthed white hairs medially, short white to greyish hairs laterally (Fig. 31). Genal area with white hairs, short dorsally, medium ventrally. Mesonotum, scutellum and metanotum with relatively long, moderately dense, white to greyish thin hairs. Mesepisternum with long white hair. Lateral part of propodeum with fringe of long white plumose hairs. Femora and tibiae with white hair, tarsi with short white to golden hair (Fig. 31). Tergal discs with thin white hair of moderate density, very short on medial part of terga 2–5, longer laterally and on tergum 1. Tergal marginal zones 2–4 with interrupted bands of dense, short white hair; 5 with continuous band of medium-lengthed, sparse white hair (Fig. 33).

**Head** (Fig. 32). 1.2 times broader than long. Labral process weakly trapezoidal, almost rectangular, apical margin emarginate. Clypeus weakly convex, almost smooth, finely punctured, distance between punctures 1–2 puncture diameters, puncture density increasing laterally, without impunctate midline (Fig. 32). Supraclypeal plate not striated. Frons longitudinally striated. Flagellomere 1 slightly shorter than 2+3, 2 shorter than 3 (Fig. 32). Ocelloccipital distance 1.2 ocellus diameters. Vertex carinate. Posterior margin of genal area more or less rounded, not carinate.

**Mesosoma.** Similar to female, except for bidentate hind pretarsal claw.

**Metasoma** (Fig. 33). Similar to female, but a very fine tergal punctation is weakly perceptible, distance between punctures 2–3 puncture diameters. Tergal marginal zones more weakly arched than in female, usually occupying no more than 2/5 of tergal length.



**FIGURES 27–35.** *Andrena (Aciandrena) obtusa* sp. nov. 27. female habitus, 28. female head, 29. female vertex and mesosoma, 30. female metasoma, 31. male habitus, 32. male head, 33. male metasoma, 34. male genitalia, 35. male eighth sternum.

**Genitalia and hidden sterna** (Figs. 34–35). Dorsal gonocoxite lobe weakly developed, rounded. Gonostyli elongate, finger-shaped, rounded apically. Basal half of penis valves moderately broad and strongly tapering, apical half very narrow (Fig. 34). Sternum 8 simple, columnar, of uniform width, apical process suddenly but slightly broadened (Fig. 35).

**Diagnosis.** *Andrena obtusa* closely resembles *A. (Aciandrena) varicornis* Pérez, but differs in the broader facial foveae, slightly more flattened and shagreened female clypeus, ivory-coloured male clypeus (yellow in *A. varicornis*), and finger-shaped, apically rounded gonostyli (hook-shaped, apically pointed in *A. varicornis*).

**Distribution:** Southern Israel.

**Flight period:** February–April.

**Flower records:** Asteraceae: *Senecio glaucus*; Brassicaceae: *Erucaria microcarpa*.

**Holotype: ISRAEL:** Shivta Junction, 30.941°N 34.597°E, 16.iii.2020, G. Pisanty, ♂ (SMNHATAU: 333575).

**Paratypes: ISRAEL:** Holot Mash'abbim Nature Reserve [Holot Mash'abbim], 30.999°N 34.7578°E, 18.ii.2022, G. Pisanty, pan traps (2♂) and sweeping (5♂); Mashabei Sadeh [Mashabe Sade], 16.ii.1976, A. Freidberg (1♀); [N. Negev Des't, Mash'abbe Sade, 15 km S Be'er Sheva], 16.iii.1989, C. O'Toole, on *Senecio glaucus* (1♂); Nahal Zin, 15.iv.2007, I. Lalar (1♀); Retamim, 273 m, 31°03'N 34°41.5'E, 3.iv.2009, A. Freidberg (2♀, 2♂); Shivta, 17.iii.1977, A. Freidberg (1♀); Shivta Junction, 30.941°N 34.597°E, 6.iii.2020, G. Pisanty, partly from pan traps (2♀, 1♂); Tel Yeroham [Tel-Jerucham], 25.iii.1959, J. Kugler, on *Erucaria microcarpa* (1♂) (OLML, RMNH, SMNHATAU, TJW).

**Etymology.** *obtusus* = Latin for “blunt, dull, obtuse”, in reference to the gonostyli which lack points, unlike the related species *A. varicornis*. The species epithet is an adjective.

### *Andrena (Aciandrena) turmalina* Pisanty & Wood sp. nov.

(Figs. 36–43)

**Female** (Fig. 36).

**Body length:** 4.5–5 mm.

**Colour.** Body dark brown to black. Legs brown to almost black (Fig. 36). Anterior side of flagellomeres 4–10 weakly to strongly reddish (Figs. 36–37). Wings slightly infuscate, veins dark brown, stigma dark brown peripherally, light brown centrally (Fig. 36). Tergal marginal zones brown, weakly yellowish apically (Fig. 39).

**Pubescence.** Hairs on body and legs mostly thin, short and sparse, moderately bright, their colour varying from whitish to brown, partly depending on angle of view (Fig. 36). Clypeus and supraclypeal area with sparse and thin, minutely plumose short brown hairs (Fig. 37). Paraocular area with short plumose hairs, brown on its lower half, whitish on upper half. Scape with short brown plumose hairs. Facial foveae brown (Fig. 38). Vertex with sparse, long, erect brown hairs. Mesonotum, scutellum and metanotum with sparse, erect, brown plumose hair, mostly short, interspersed with few long hairs (Fig. 38). Mesepisternum with medium-lengthed whitish plumose hairs. Propodeal corbicula incomplete, posterodorsal fringe with sparse, long whitish plumose hairs, corbicular surface with sparse, long, whitish simple hairs. Leg hair short, white to brown (Fig. 36). Flocculus incomplete, white. Tibial scopal hairs simple, brownish (Fig. 36). Tergal discs almost bare, 2–4 with sparse, extremely short inconspicuous hair. Tergal marginal zones 2–4 with very sparse, thin, short brown hair mostly on lateral areas, longer on tergum 4, not forming distinct hair bands. Terminal fringe brown (Fig. 39).

**Head** (Figs. 37–38). 1.1 times broader than long. Mandibles bidentate, weakly crossed. Galea shiny, finely and shallowly shagreened. Labral process very small, distinctly triangular. Clypeus very slightly convex, not protuberant, very shiny, basal 2/3 superficially shagreened, apical 1/3 smooth, punctation sparse, distance between punctures 2–4 puncture diameters, without clear impunctate midline (Fig. 37). Supraclypeal area very finely, shallowly shagreened. Paraocular area densely and finely punctured in lower part, longitudinally striated in upper part (area between fovea and frons). Flagellomere 1 slightly longer than 2+3, 2 about as long as 3. Frons shagreened, impunctate, not striated. Facial foveae long and narrow, 0.5 times as broad as antennocular distance, extending from level of lower end of lateral ocellus to middle of antennal socket, lower part narrower and distinctly separated from compound eye (Fig. 37). Distance of fovea from lateral ocellus 1 ocellus diameter. Ocelloccipital distance about 0.4 ocellus diameter. Vertex strongly carinate and concave, dorsoposterior margin of genal area slightly carinate (Fig. 38).



**FIGURES 36–43.** *Andrena (Aciandrena) turmalina* sp. nov. 36. female habitus, 37. female head, 38. female vertex and mesosoma, 39. female metasoma, 40. male habitus, 41. male head, 42. male metasoma, 43. male genitalia.



**Mesosoma** (Fig. 38). Mesonotum and scutellum shiny, moderately and uniformly shagreened, sparsely, shallowly and finely punctured, distance between punctures 2–4 puncture diameters (Fig. 38). Mesepisternum and propodeum finely reticulated, impunctate. Propodeal triangle broad, delineated by weak carina, sculpturing stronger and coarser than on flanking areas, basal margin often with hint of extremely short radial rugae (Fig. 38). Hind leg pretarsal claw with distinct inner tooth. Recurrent vein 1 meets submarginal cell 2 at its middle or proximal to it. Submarginal crossvein 1 meets marginal cell 2–3 vein widths from stigma. Nervulus strongly antefurcal (Fig. 36).

**Metasoma** (Fig. 39). Tergal discs impunctate, distinctly shagreened. Tergal marginal zones impunctate, superficially shagreened basally, almost smooth apically, 2–4 moderately depressed and occupying 1/3–1/2 of tergal length.

**Male** (Fig. 40).

**Body length:** 4.5 mm.

**Colour.** Similar to female (clypeus and paraocular areas dark).

**Pubescence.** Clypeus with sparse, short whitish plumose hairs (Fig. 41). Lower half of paraocular area with medium-lengthed whitish plumose hairs. Scape with medium-lengthed, white to brownish plumose hairs. Frons with minute brown hairs. Vertex with sparse, long, brownish-white erect plumose hairs (Fig. 40). Genal area with short brown hairs dorsally, medium to long white hairs ventrally. Mesonotum, scutellum and metanotum with sparse, short to long, white to brownish hair. Mesepisternum with long white plumose hairs. Propodeum with medium-lengthed, strongly plumose whitish hairs. Femora and tibiae with mostly whitish hair; tarsi with white to light brown hair (Fig. 40). Tergal discs almost bare, with sparse, minute inconspicuous white hair. Tergal marginal zones 2–4 with very sparse, thin, short white to brownish hair mostly on lateral areas, longer on tergum 4, not forming distinct hair bands. Tergal marginal zone 5 with weak uninterrupted band of sparse and thin, whitish-brownish hair. Terminal fringe whitish to light brown (Fig. 42).

**Head** (Fig. 41). Labral process trapezoidal, of moderate width. Clypeus slightly elevated, flattened medially, very shiny, basal 1/3–1/2 shallowly shagreened, apical 1/2–2/3 smooth, punctuation fine and sparse, distance between punctures 2–3 puncture diameters, with impunctate midline broadening apically. Flagellomere 1 slightly shorter than 2+3, 2 as long as 3 or slightly longer. Rest of head as in female.

**Mesosoma.** Basal margin of propodeal triangle distinctly radially rugose. Hind leg pretarsal claws bidentate. Rest of mesosoma as in female.

**Metasoma** (Fig. 42). Tergal discs mostly shagreened and impunctate, except for apical margin of discs 2–4 which is often smooth and very sparsely, finely punctured. Tergal marginal zones as in female.

**Genitalia and hidden sterna** (Fig. 43). Dorsal gonocoxite lobes developed, rounded. Gonostyli simple, elongate and flattened, more or less uniformly broad, rounded apically, inner margin with small, distinct bulge in mid-length. Penis valves moderately broad basally, gradually narrowing apically (Fig. 43). Sternum 8 simple, columnar, apical process broadened, blunt-ended.

**Diagnosis.** *Andrena turmalina* stands out among all other *Aciandrena* in its combination of shiny, shallowly shagreened and punctured cuticle, especially in the clypeus and mesonotum; slightly elongate, weakly domed, and centrally slightly flattened clypeus that is additionally black-marked in the male sex; the female's extremely short and pointed, triangular labral process; and the sparse, brownish (particularly in the female) pubescence.

**Distribution:** High altitudes in Iran, southeast Turkey and northern Israel. Likely present also in Lebanon and Syria.

**Flight period:** April–June.

**Flower records:** Liliaceae: *Gagea* sp. Most specimens collected from pan traps.

**Holotype:** ISRAEL: Mount Hermon [Har Hermon], 1610 m, 33.300°N 35.767°E, 7.iv.2021, G. Pisanty, pan trap, ♀ (SMNHTAU:360801).

**Paratypes:** IRAN: Kurdistan province, Paniran, 1450 m, 14.v.2016, M. Kafka (1♀); Tehran env., 2.v.1999, K. Deneš (1♀); ISRAEL: Mount Hermon [Har Hermon], 1420 m, 33.2855°N 35.763°E, 7.iv.2021, G. Pisanty, pan traps (10♀); 1480 m, 33.292°N 35.7595°E, 7.iv.2021, G. Pisanty, pan traps (5♀); 1610 m, 33.300°N 35.767°E, 7.iv.2021, G. Pisanty, pan traps (22♀, 10♂); 1644 m, 33.2991°N 35.7667°E, 16.iv.2022, G. Pisanty, pan traps (2♀, 22♂); 33.2992°N 35.767°E, 16.iv.2022, G. Pisanty, on *Gagea* (12♂); 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan traps (1♀, 13♂); 1645 m, 33.2994°N 35.7675°E, 16.iv.2021, G. Pisanty, pan traps (8♀) and sweeping (1♀); [Hermon], 1642 m, 33.2992°N 35.7668°E, 16.iv.2022, G. Pisanty, sweeping (1♂); TURKEY: Tanin-Tanin-Pass, 1700 m, 12.vi.1984, K. Warncke (1♀) (ES, NHMUK, OLML, RMNH, SMNHTAU, TJW, ZMHB, ZSMC).

**Etymology.** *turmalina* = Spanish for tourmaline, a type of small black shiny gemstone, in reference to the small, black, and shiny nature of this species. The species epithet is a noun in apposition.

***Andrena (Aciandrena) varicornis* Pérez, 1895**

(Fig. 44)

**Distribution:** Algeria, Egypt, southern Israel, Morocco, Tunisia, West Bank (Wood *et al.* 2020b).

**Flight period:** February–April.

**Flower records:** Brassicaceae: *Sisymbrium irio*.

**Material examined:** **ISRAEL:** Har Horesha, Rt. 171, 930 m, 2.iv.2014, L. Friedman (2♀); Holot Mash'abbim Nature Reserve [Holot Mash'abbim], 30.999°N 34.7578°E, 18.ii.2022, G. Pisanty (1♂); Nahal Sayif, 14.iv.2007, Y. Hollander (1♀); Nahal Zin, 15.iv.2007, I. Lalzar (1♀); Sde Boker, 22.iii.1963, J. Kugler (1♂); Shivta, 17.iii.1977, A. Freidberg (2♀, 1♂); Shivta junction, 30.941°N 34.597°E, 10.iii.2017, G. Pisanty (1♂); Yeruham [Bir Rekhme], 21.iii.1958, L. Fishelsohn (1♀); **WEST BANK:** Nabi Musa Road, 22.ii.2014, A. Gotlieb, on *Sisymbrium irio* (1♀) (SMNHNTAU).

**Remarks.** The integumental colour of terga 2–5 in Israeli *A. varicornis* females varies from the typical brown to reddish (specimens from Har Horesha, Nahal Sayif, Nabi Musa Road)—a variant hitherto unknown from North African populations (Fig. 44).

***Andrena (Aciandrena) xera* Pisanty sp. nov.**

(Figs. 45–49)

**Female** (Fig. 45).

**Body length:** 6.5 mm.

**Colour.** Body black (Fig. 45). Flagellomeres 1–3 brown basally, orange apically; 4–10 orange (Figs. 45–47). Mid and hind femora and basal 3/4 of mid tibia dark brown. Mid and hind tarsi, hind tibia and apical 1/4 of mid tibia golden. Wings hyaline, veins and stigma golden (Fig. 45). Tergal marginal zones reddish-orange basally, yellowish apically (Fig. 49).

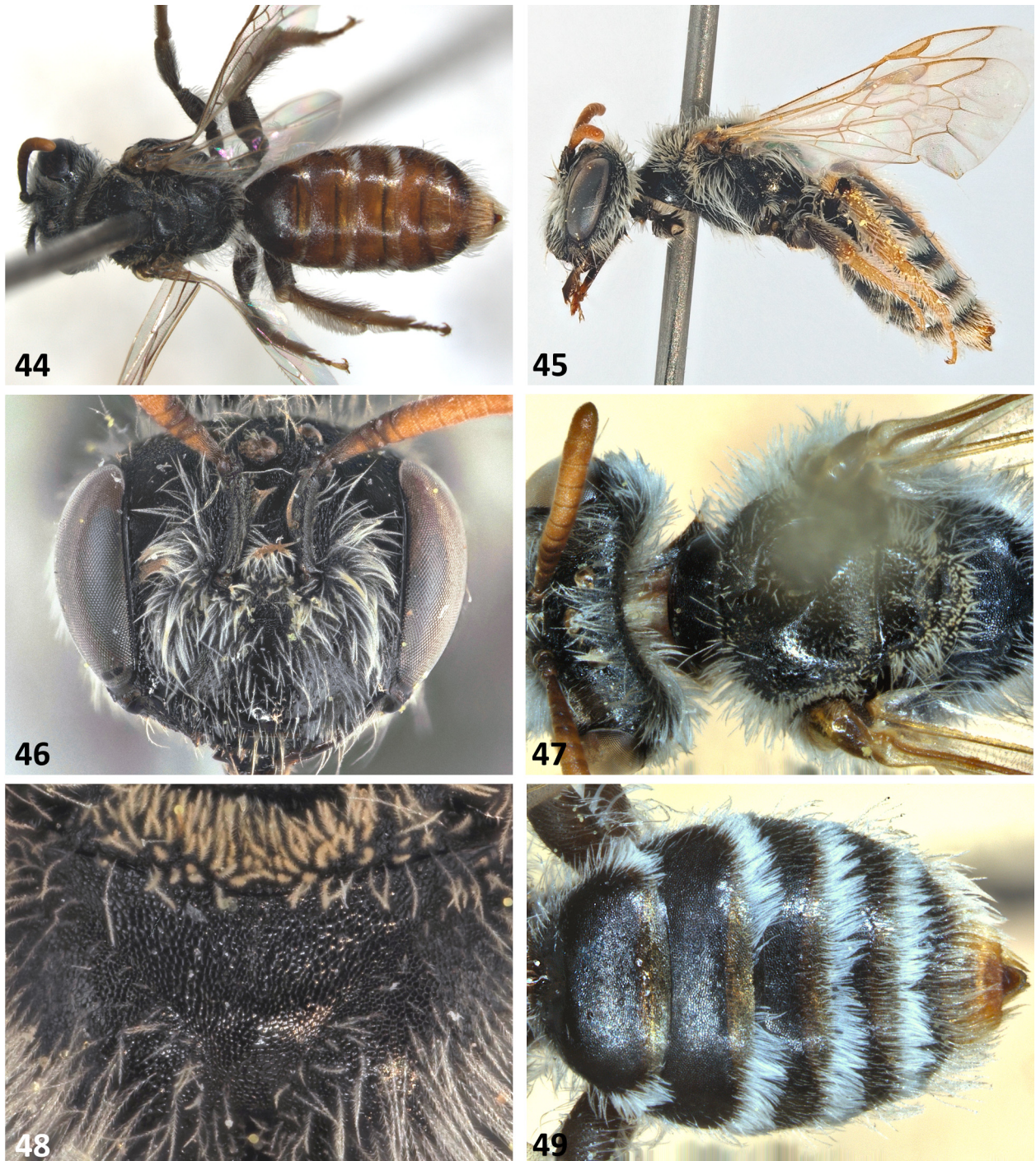
**Pubescence.** Body hair mostly sparse, short, minutely plumose, white to yellowish (Fig. 45). Clypeus with sparse short white hair. Lower 2/3 of paraocular area with dense, white medium-lengthed hair. Scape and area between antennal sockets with white to yellowish hair (Fig. 46). Facial foveae dark in ventral view, brownish-white in dorsal view (Figs. 46–47). Vertex with medium-lengthed yellowish-white hair. Genal area with short yellowish-white hair dorsally, medium white hair ventrally. Mesonotum, scutellum and metanotum with relatively thick, yellowish hair, very short and moderately dense medially, short to medium and dense peripherally (Fig. 47). Mesepisternum with long white hair. Propodeal corbicula incomplete, dorsoposterior fringe with long white plumose hair, corbicular surface with few long, white simple hairs. Leg hair mostly white; scopal hairs simple, white (Fig. 45). Tergal discs with short to medium white hair laterally; tergal discs 1–3 hairless medially. Tergal marginal zones with dense, thick bands of white hair, extending to over 1/2 the length of following tergal disc medially, limited to small lateral patches on tergum 1, interrupted on 2, continuous on 3–4. Prepygidial fimbria white laterally, mostly golden medially; pygidial fimbria golden (Fig. 49).

**Head** (Figs. 46–47). 1.2 times broader than long. Galea shiny, superficially shagreened. Labral process narrow, almost square-shaped, apical margin slightly emarginate. Clypeus almost flat, basal half superficially shagreened, apical half smooth, moderately punctured, distance between punctures 1.5–2 puncture diameters, punctation slightly sparser medially, without impunctate midline (Fig. 46). Supraclypeal plate not striated. Flagellomere 1 longer than 2+3, 2 as long as 3. Frons longitudinally striated. Facial fovea broad, weakly tapering downwards, extending from level of middle of lateral ocellus to lower end of antennal socket, 0.5 times as broad as antennocular distance (Fig. 46). Distance of fovea from lateral ocellus 0.7 ocellus diameters. Ocellocipital distance 1 ocellus diameter. Vertex weakly carinate (Fig. 47). Genal area 0.9 times as broad as compound eye.

**Mesosoma** (Figs. 47–48). Pronotum without elevated dorsolateral angle or lateral carina. Mesonotum finely shagreened on anterior 1/3, smooth medially, punctation very fine, distance between punctures 1–2 puncture diam-

eters (Fig. 47). Scutellum very smooth on anterior 2/3, punctation slightly sparser. Mesepisternum finely alveolate, finely obliquely punctured. Propodeal corbicula finely reticulate. Posterior part of propodeum finely alveolate, triangle weakly delineated from flanking regions, sculptured slightly coarser, with a weak, short mediobasal ruga (Fig. 48). Hind pretarsal claw unidentate. Recurrent vein 1 meets submarginal cell 2 at its middle or slightly distal to it. Submarginal crossvein 1 meets marginal cell 3 vein widths from stigma. Nervulus distinctly antefurcal (Fig. 45). The single available specimen lacks both front legs (removed for DNA extraction), which are therefore absent from the description.

**Metasoma** (Fig. 49). Tergal discs shagreened and impunctate, 1–2 strongly so, 3–4 more superficially, weakly shiny. Tergal marginal zones similarly sculptured, 1–2 not depressed, 3–4 depressed and distinctly arched, medially occupying 1/2 tergum length. Pygidial plate centrally with raised longitudinal ridge.



**FIGURES 44–49.** *Andrena (Aciandrena) varicornis* Pérez. 44. female habitus. *Andrena (Aciandrena) xera* **sp. nov.**, holotype. 45. female habitus, 46. female head, 47. female head and mesosoma, 48. female propodeal triangle, 49. female metasoma.

**Male.** Unknown.

**Diagnosis:** *Andrena xera* is closest to *A. palmyriae* Wood and *A. pavonia* Warncke. All three are desert habitat species with short semi-squamous hairs on the mesonotum and scutellum, orange hind tibiae, and thick white hair-bands covering the tergal margins. *Andrena xera* can be separated by the absence of an impunctate midline on the clypeus (present in *A. palmyriae* and *A. pavonia*), medially smooth mesonotum (completely smooth in *A. palmyriae*, completely shagreened in *A. pavonia*), weakly notched labral process (deeply notched in *A. palmyriae*), antefurcal nervulus (more or less interstitial in *A. palmyriae*), and very broad tergal hair bands (narrower in *A. pavonia*).

**Distribution:** Israel (Arava valley). Likely present also in Jordan.

**Flight period:** February.

**Flower records:** Brassicaceae.

**Holotype:** ISRAEL: Nahal Shezaf, 30.722°N 35.270°E, 14.ii.2016, G. Pisanty, on Brassicaceae, ♀ (SMNHATAU:234067).

**Etymology.** *xera* = Greek for “dry”, in reference to extreme desert habitat of this species. The species epithet is an adjective.

### *Andrena (Avandrena) caudata* Warncke, 1965

**Distribution:** Southeastern Turkey, newly recorded from central Israel.

**Flight period:** March–April (Israel), April–May (Turkey).

**Flower records:** Geraniaceae: *Erodium* sp.

**Material examined:** ISRAEL: Lakhish, 3 km NE, 31.575°N 34.870°E, 19.iii.2016, G. Pisanty (1♀); Tel ‘Eton, 31.492°N 34.925°E, 3.iv.2022, G. Pisanty, on *Erodium* (1♂) (SMNHATAU).

### *Andrena (Avandrena) euphorbiae* Pisanty sp. nov.

(Figs. 50–57)

**Female** (Fig. 50).

**Body length:** 7–7.5 mm.

**Colour.** Body and legs dark brown to black (Fig. 50). Anterior side of flagellomeres 3–10 orange. Apical tarso-meres orange. Wings hyaline, veins brown, stigma tan medially. Tergal marginal zones yellowish-brown (Fig. 53).

**Pubescence.** Supraclypeal area, vertex, basal half of clypeus, lower half of frons, and area around antennal sockets with mixed whitish and dark, medium to long plumose hairs; apical half of clypeus with long, brown simple hairs (Fig. 51). Facial foveae brownish. Genal area with medium-lengthed whitish to golden hairs. Mesonotum, scutellum and metanotum with medium-lengthed, whitish to golden plumose hairs (Fig. 52). Mesepisternum with long plumose hairs, mostly dark on dorsal 1/3, whitish to golden on ventral 2/3. Propodeal corbicula incomplete, dorsoposterior fringe with long, white to golden plumose hairs, corbicular surface with few simple bright hairs. Leg hair mostly short, white to brown, fore femur with some black hair near apex (Fig. 50). Flocculus complete. Tibial scopal hairs simple, whitish (Fig. 50). Tergal discs with sparse, weakly plumose whitish hairs, short to long on tergum 1, short on terga 2–4. Tergal marginal zones 2–4 with distinct bands of white hair extending onto following disc, interrupted on tergum 2, almost complete on 3, complete on 4. Terminal fringe brownish (Fig. 53).

**Head** (Figs. 51–52). 1.3 times broader than long. Labral process triangular, apex pointed. Clypeus medially flattened, very shiny, basal half superficially shagreened, apical half more or less smooth, punctuation weak, of moderate size, distance between punctures 1.5 puncture diameters, with medioapical impunctate area (Fig. 51). Flagellomere 1 as long as 2+3 or slightly shorter, 2 about as long as 3. Frons longitudinally striated. Facial foveae short, broad and shallow, drop-shaped, extending from level of lower end of lateral ocellus to upper half of antennal socket, 0.7 times as broad as antennocular distance (Figs. 51–52). Distance of fovea from lateral ocellus about 1.5 ocellus diameters. Ocelloccipital distance 1.5 ocellus diameters. Vertex moderately carinate (Fig. 52).

**Mesosoma** (Fig. 52). Dorsolateral angle of pronotum not elevated, pronotum not carinate. Mesonotum weakly shiny, strongly and completely shagreened, impunctate except for a few shallow oblique punctures medially (Fig. 52). Scutellum similar, more strongly shiny. Mesepisternum and posterolateral part of propodeum finely alveolate. Propodeal corbicula finely reticulate. Propodeal triangle narrow, radially rugose on basal 1/4–1/2, very finely alveo-

late apically. Inner side of hind femur rounded, not carinate, without spines. Inner hind tibial spur more or less straight and of uniform width. Hind leg pretarsal claw with distinct inner tooth. Nervulus antefurcal. Recurrent vein 1 meets submarginal cell 2 at its middle or distal to it.

**Metasoma** (Fig. 53). Basal half of tergal disc 1 smooth; apical half and tergal discs 2–4 shiny, superficially shagreened, sparsely, inconspicuously and very finely punctured, distance between punctures 2–3 puncture diameters. Tergal marginal zones similarly superficially shagreened and shiny, slightly depressed, hardly discernible from discs. Pygidial plate not elevated medially.

**Male** (Fig. 54).

**Body length:** 6.5–7 mm.

**Colour.** Head and mesosoma dark brown to black (Fig. 54). Clypeus and paraocular areas dark (Fig. 55). Anterior side of flagellomeres 2–11 light brown (Figs. 54–55). Legs and metasoma brown to black. Wings hyaline, veins brown, stigma tan medially (Fig. 54).

**Pubescence.** Face covered with long hairs up to antennal sockets, dark on paraocular areas and lateral parts of clypeus, whitish on centre of clypeus, black and white around antennal sockets (Fig. 55). Vertex with whitish hairs (Fig. 54). Genal area with dark hairs anteriodorsally, whitish hairs elsewhere. Mesosoma with medium to long, whitish plumose hairs. Leg hair mostly white to brown, fore femur with some dark hair near apex. Tergal discs with sparse whitish hairs, short to medium on terga 1–2, short on terga 3–5. Tergal marginal zones 2–4 with distinct bands of white hair extending onto following disc, interrupted on terga 2–3, complete on 4 (Fig. 54). Tergal marginal zones 5–6 with sparse, long whitish hairs.

**Head** (Figs. 55–56). 1.3 times broader than long. Labral process weakly trapezoidal, apical margin distinctly emarginate. Clypeus weakly convex, shagreened basally and shiny apically, densely and shallowly punctured, distance between punctures 0.5–1 puncture diameters, without impunctate midline (Fig. 55). Flagellomere 1 slightly shorter than 2, 2 slightly shorter than 3. Frons longitudinally striated. Ocelloccipital distance about 1.5 ocellus diameters. Vertex distinctly carinate (Fig. 56). Posterior margin of genal area not carinate.

**Mesosoma** (Fig. 56). Similar to female.

**Metasoma.** Similar to female.

**Genitalia and hidden sterna** (Fig. 57). Dorsal gonocoxite lobes developed, narrow, rounded apically. Gonostylus elongate, gradually broadening apically, blade flattened, rounded apically. Penis valves long and narrow, of uniform width (Fig. 57). Sternum 8 columnar, apical process broadened.

**Diagnosis.** *Andrena euphorbiae* belongs to a group of *Avandrena* lacking female femoral spines, whose phylogenetic placement is uncertain (Pisanty *et al.* 2022). This group includes also *A. canohirta* (Friese), *A. caudata* Warncke, *A. melacana* Warncke and *A. ochropa* Warncke (Warncke 1980). The female of *A. euphorbiae* is distinguished from these species by the triangular labral process (indented rectangular in all four species), normal clypeus edge (anteriorly curved in *A. melacana*), non-carinate pronotum (weakly carinate in *A. canohirta* and *A. melacana*, strongly so in *A. ochropa*), shagreened mesonotum and scutellum (partly to fully smooth in *A. canohirta*, *A. caudata* and *A. melacana*), simple-haired scopa (plumose in *A. caudata*), and shagreened terga (smooth in *A. canohirta*). The male of *A. euphorbiae* is easily distinguished from all other *Avandrena* by its simple, unmodified genital capsule, with narrow penis valves (Fig. 57).

**Distribution:** North and central Israel.

**Flight period:** February–April.

**Flower records:** Euphorbiaceae: *Euphorbia hierosolymitana*.

**Pollen preferences:** Four analysed loads from Ramat HaNadiv and Matlul Avinadav contained pure *Euphorbia* pollen, confirming the field observations. One analysed load from Ramat Hadassa visually contained much larger grains, but these also belonged to *Euphorbia*, though clearly of a different species. *Andrena euphorbiae* would therefore seem to be a specialist of *Euphorbia*, the first bee species to our knowledge to be documented as such.

**Holotype: ISRAEL:** Mevo Hama Forest, 32.709°N 35.6495°E, 1.iii.2022, G. Pisanty, on *Euphorbia hierosolymitana*, ♀ (SMNHTAU:385097)

**Paratypes: ISRAEL:** Bethlehem of Galilee [Bet Lehem haGelilit], 10.iii.1997, L. Friedman (1♀); Karei Deshe [Kare Deshe], 19.iii.2012, T. Shapira, pan trap (1♂); Malkia [Malkiyya], 10.iv.2014, O. Winberger (2♀); 13.iv.2014, O. Winberger (1♀); Matlul Avinadav, 32.46°N 35.435°E, 19.ii.2019, G. Pisanty, on *Euphorbia hierosolymitana* (1♀); Ramat Hadassa, 3.iv.1963 (1♀); Ramat HaNadiv, 22.iii.2012, T. Shapira (1♀); 32.551°N 34.945°E, 15.ii.2021, G. Pisanty, on *Euphorbia hierosolymitana* (7♀, 1♂) (OLML, RMNH, SMNHTAU, TJW).

**Etymology.** From *Euphorbia*, in reference to the species' host plant. The species epithet is an adjective.



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FIGURES 50–57. *Andrena (Avandrena) euphorbiae* sp. nov. 50. female habitus, 51. female head, 52. female vertex and mesosoma, 53. female metasoma, 54. male habitus, 55. male head, 56. male vertex and mesosoma, 57. male genitalia.

## *Andrena (Chlorandrena) danini* Pisanty & Scheuchl, 2016

(Figs. 58–62, 64–65)

**Male** (Fig. 58).

**Body length:** 7–7.5 mm.

**Colour.** Head, mesosoma and legs black (Fig. 58). Apical 1/4–1/3 of clypeus usually yellow, at least centrally; paraocular area black (Fig. 59). Anterior side of flagellomeres 2–11 brown. Wings hyaline, veins and stigma brown. Metasoma dark brown to black; tergal marginal zones yellowish-brown, sometimes reddish (Fig. 61).

**Pubescence.** Head and mesosoma with medium to long white hair, especially dense and long on genal area, mesepisternum and fore coxa (Figs. 58–60). Femora and tibiae with white hair, tarsi with white to golden hair (Fig. 58). Tergal discs with moderately dense white hair, relatively long on tergum 1, gradually shorter on following terga, longer on lateral parts of terga. Tergal marginal zones with similar hair, denser on lateral parts, not forming distinct hair bands (Fig. 61).

**Head** (Figs. 59–60). 1.2 times broader than long. Labral process broader than long, trapezoidal, smooth and shiny, apical margin distinctly emarginate. Clypeus convex, very weakly protuberant, shagreened on basolateral margin, elsewhere smooth and shiny, punctation strong and dense, distance between punctures 1 puncture diameter, without impunctate midline (Fig. 59). Flagellomere 1 twice as long as 2, slightly longer than 3. Frons strongly longitudinally striated, interspersed with fine punctures. Ocelloccipital distance 1.2 ocellus diameters. Vertex strongly carinate, posterodorsal margin of genal area slightly carinate (Fig. 60).

**Mesosoma** (Fig. 60). Dorsolateral angle of pronotum not elevated, pronotum not carinate. Mesonotum and scutellum shiny, distinctly shagreened peripherally, weakly shagreened to smooth centrally, strongly punctured, distance between punctures 0.5–1.5 puncture diameters (Fig. 60). Mesepisternum and anterolateral part of propodeum strongly and densely obliquely punctured. Posterolateral part of propodeum finely alveolate, finely and irregularly rugose. Propodeal triangle delineated by weak carina, very finely rugose basally, very finely rugose to alveolate apically. Nervulus interstitial to antefurcal.

**Metasoma** (Fig. 61). Tergal discs shiny, 1 shagreened to smooth, 2–4 shagreened basally, weakly shagreened to smooth apically, disc 1 with strong, coarse crater-like punctures, the following discs gradually more shallowly punctured, distance between punctures 1–2 puncture diameters. Tergal marginal zones broad, moderately depressed, impunctate, finely shagreened except near apex, 2–4 occupying 0.4–0.5 of tergum length centrally.

**Genitalia and hidden sterna** (Figs. 62, 64–65). Dorsal gonocoxite lobes adjoined along medial genital axis, strongly developed, rounded apically. Gonostyli very elongate, blades flattened, leaf-shaped, apex weakly to strongly pointed. Basal 1/3 of penis valves of moderate, uniform width, central 1/3 tapering apically, apical 1/3 narrow (Fig. 62). Sternum 8 columnar, without lateral extensions, slightly broadened medially, apical half densely, uniformly hairy on ventral side, elsewhere mostly hairless, apical process slightly broadened, blunt-ended (Figs. 64–65).

**Diagnosis.** The males of *A. danini* very closely resemble those of *A. cinereophila* Warncke, and Warncke regarded them as a subspecies of the latter, named *Andrena cinereophila antelica* nomen nudum. The true identity of these specimens was only made possible with the advent of DNA barcoding (Table 2). *Andrena danini* males are distinguished from *A. cinereophila* by the smaller yellow apical area on the clypeus (covering half of clypeus in *A. cinereophila*), the more or less evenly, finely rugose propodeal triangle (basal margin more or less radially rugose, more strongly sculpted than apical part in *A. cinereophila*), the centrally smooth tergal discs 2–3, with distinct crater-like punctures (smooth to shagreened, crater-like punctures absent or weakly present only laterally in *A. cinereophila*), the more elongate genital capsule, and the straight, adjoined, apically rounded dorsal gonocoxite lobes (diverging outwards, more pointed apically in *A. cinereophila*) (Figs. 62–63).

**Distribution:** Israel (Pisanty *et al.* 2016); newly recorded from Jordan, Syria, Turkey and the West Bank, in arid to semi-arid habitats. In Israel, *A. danini* is present in the central region and the northern Negev, as well as the Jordan Valley, but it is apparently absent from the more mesic-habitat regions of the Carmel, Galilee, northern Golan and Mount Hermon.

**Flight period:** February–April, occasionally into May in Turkey (one handwritten record apparently from July, possibly erroneous).

**Flower records:** Asteraceae: *Calendula* sp., *Crepis sancta*, *Geropogon hybridus*, *Leontodon tuberosus*; Brassicaceae: *Sinapis* sp.; Geraniaceae: *Geranium* sp.; Linaceae: *Linum pubescens*.



**FIGURES 58–67.** *Andrena (Chlorandrena) danini* Pisanty & Scheuchl. 58. male habitus, 59. male head, 60. male vertex and mesosoma, 61. male metasoma, 62. male genitalia, 64. male eighth sternum, ventral view, 65. male eighth sternum, dorsal view. *Andrena (Chlorandrena) cinereophila* Warncke. 63. male genitalia. *Andrena (Chlorandrena) macula* **sp. nov.** 66. female habitus, 67. female head.



**Material examined: HOLOTYPE: ISRAEL:** Lakhish, 3 km NE, 31.578°N 34.870°E, 19.ii.2016, G. Pisanty (♀) (SMNHTAU:234232); **PARATYPES: ISRAEL:** Besor Stream [Bsor W.], 4.iii.1985, E. Shney-Dor (1♀); Canada Park, 31.836°N 35.000°E, 18.iii.2016, G. Pisanty (1♀); Hartuv [Har.Tuv], 22.ii.1955, student (1♀); Jerusalem, 2.?.vii.1940, H. Bytinski-Salz (1♀); Lakhish, 6.iii.2013, T. Shapira, pan traps (2♀); 20.iii.2013, T. Shapira, pan traps (2♀); 8.iv.2013, T. Shapira, pan trap (1♀); 13.iv.2013, T. Shapira, pan traps (2♀); 3 km NE, 31.575°N 34.870°E, 4.iii.2016, G. Pisanty, partly from pan traps (3♀); 11.iii.2016, G. Pisanty (1♀); 19.iii.2016, G. Pisanty, pan traps (2♀); 31.578°N 34.870°E, 19.ii.2016, G. Pisanty (1♀); Netiv HaLamed-Heh [Netiv Halamed He], 2 km WNW, 31.694°N 34.96°E, 26.ii.2009, G. Pisanty (1♀) (ES, OLML, SMNHTAU); **non-type material: ISRAEL:** Beit Govrin [Beit Govrin], 28.iii.2010, G. Pisanty (6♀); Beit Nir, 28.iii.2010, G. Pisanty (1♀); 11.iii.2018, T. Roth, on *Crepis sancta* (1♀) and *Linum pubescens* (1♀); Degania [Deganya], 23.ii.1942, Y. Palmoni (1♂) (*A. c. antelica* paratype label); Gal'on, 4.iv.2018, T. Roth, on *Geropogon hybridus* (1♀); Gilat Research Center, fallow field, 31.3372°N 34.6633°E, 2.iii.2022, G. Pisanty, pan traps (2♂); Har'el, 21.ii.2020, K. Levy, pan trap (1♂); Horbat Sheqofa, 252 m, 31.5775°N 34.871°E, 15.iii.2021, G. Pisanty, pan traps (3♀, 7♂); Jerusalem, Mt. Scopus, 22.ii.1946 (1♂) (*A. c. antelica* paratype label); 15.iii.1946, on *Calendula*, *Geranium* and *Sinapis* (6♂) (*A. c. antelica* holotype/paratype labels); Jerusalem env., 28.iii.1988, R. Leys (1♂); Kfar Menahem [Kefar Menahem], 6.ii.2010, G. Pisanty, on *Leontodon tuberosus* (1♂); Lakhish, 21.ii.2013, T. Shapira, pan trap (1♂); 3 km NE, 31.578°N 34.870°E, 19.ii.2016, G. Pisanty (2♂); [Lachish], 18.ii.2020, K. Levy, pan trap (1♀) and T. Roth, on *Crepis sancta* (1♂); 4.iii.2020, K. Levy, pan trap (1♂); 8.iii.2020, K. Levy, pan trap (1♂); 8.iii.2020, T. Roth, on *Crepis sancta* (1♂); Ma'agar Yeroham [Yerucham Lake], 15.iv.1997, A. Maklakov (1♀); Mikveh Israel [Miqwe Israel], 10.iii.1919, H. Bytinski-Salz (1♂) (*A. c. antelica* paratype label); Nahal Arugot [N.Arugot], 2.iii.1981, S. Kronenberg (1♀); Nahal Poleg [Birquat Ramadan], 13.iii.1940, H. Bytinski-Salz (1♂) (*A. c. antelica* paratype label); Negba, 31.iii.2021, Y. Halevi (1♀, 1♂); Netiv HaLamed-Heh [Netiv Halamed He], 2 km WNW, 31.694°N 34.96°E, 26.ii.2009, G. Pisanty, pan trap (1♂); Tell es-Safi [Tel Zafit], 7.iii.2018, T. Roth, pan traps (2♀); **JORDAN:** Irbid, Saham, 25.iv.2003, I. Pljushtch (1♀); **SYRIA:** Jabbul-See, SE Aleppo, 300 m, 19.iv.1992, K. Warncke (1♀); Maaloula [Maalula], 15.iv.1992, M. Kraus (1♀); **TURKEY:** Urfa, Ceylanpinar, 25.iv.1976, K. Warncke (1♂); Urfa, 20 km SE Harran, 23.v.1983, K. Warncke (1♀); **WEST BANK:** Har Brakha [Berakha], 1 km S, 'Amassa Spring, 595 m, 6.iii.2015, L. Friedman (1♂); Maskiot [Maskiyot], Rt. 578, Wadi Halat Mahmud el-'Ali, -75 m, 32°19'18"N 35°29'52"E, 27.ii.2020, L. Friedman (1♀); Wadi Ahmar, nr. Yarden, 32°01'N 35°30'E, 15.iii.2005, I. Zonstein (1♂); Wadi al-Far'a [Wadi Faria], 19.ii.1974, A. Freidberg (1♂) (*A. c. antelica* paratype label); Wadi Qelt [Nahal Perat], south-facing slope, 28.ii.2007, L. Friedman (1♂) (OLML, RMNH, SMNHTAU, TJW).

### *Andrena (Chlorandrena) macula* Pisanty & Wood sp. nov.

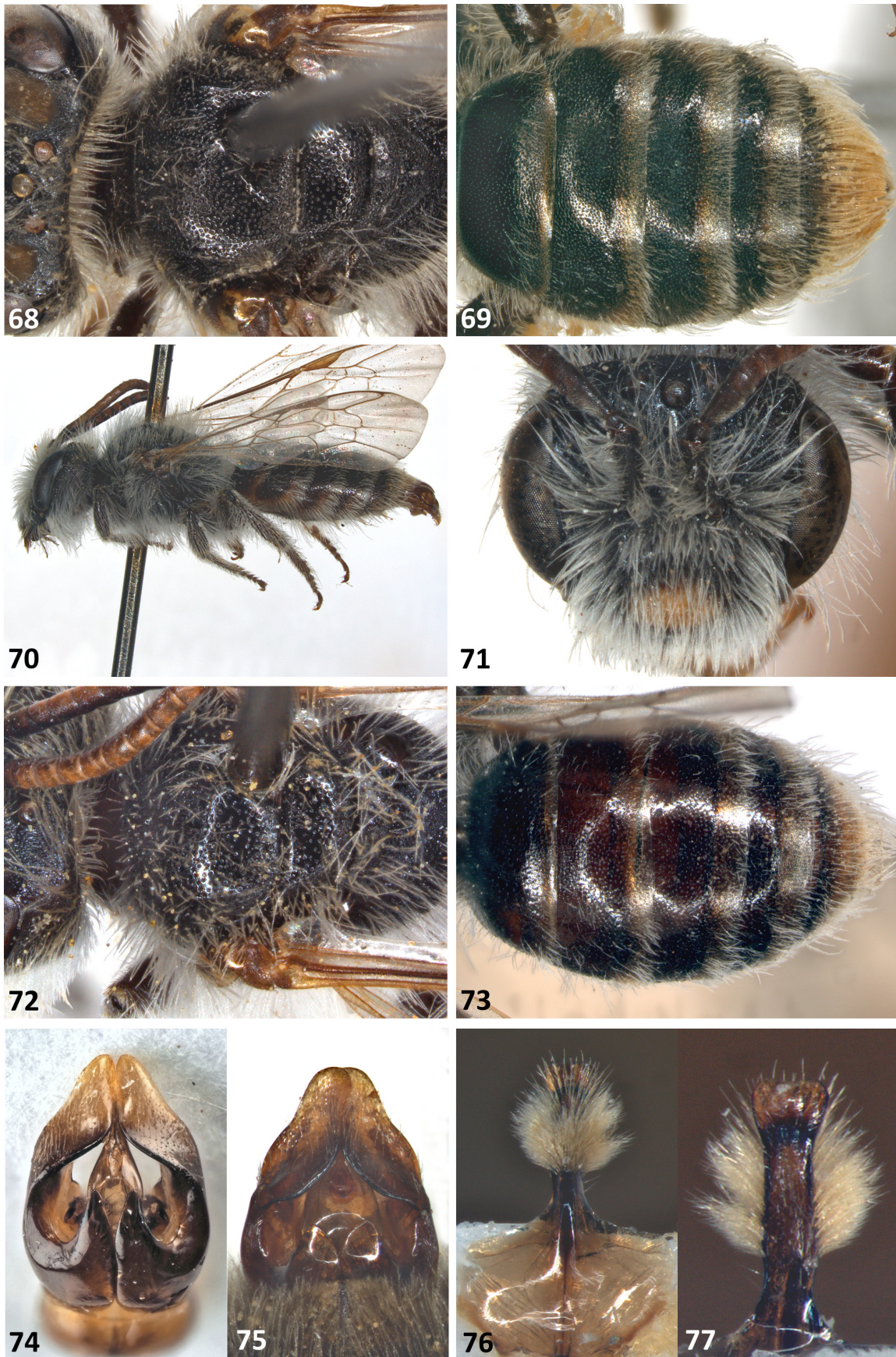
(Figs. 66–74, 76–77)

**Female** (Fig. 66).

**Body length:** 8.5 mm.

**Colour.** Body and legs black to dark brown (Fig. 66). Anterior side of flagellomeres 4–10 orange. Wings weakly infusate, veins brown, stigma yellowish to brownish. Tergal marginal zones reddish basally, gradually yellowish apically (Fig. 69).

**Pubescence.** Face, vertex and genal area more or less uniformly covered with moderately dense, short to medium, white to yellowish minutely plumose hairs. Facial foveae with dense minute hair, appearing white in dorsal view, brownish to black in ventral view (Figs. 67–68). Mesonotum, scutellum and metanotum with white to yellowish, minutely plumose hairs, very short and sparse medially, denser and longer peripherally (Fig. 68). Mesepisternum with long, white to yellowish plumose hairs (Fig. 66). Propodeal corbicula incomplete, dorsoposterior fringe with long, white to yellowish plumose hairs, corbicular surface with sparse, minute white hairs and a few long, simple to plumose white hairs. Leg hair white to golden. Scopa large, greatly broadened apically, hair dense, strongly plumose, white to golden (Fig. 66). Flocculus developed, white. Tergal discs weakly haired, hair white, minutely plumose, minute and inconspicuous apically, slightly longer basally, much longer laterally. Tergal disc 4 with sparse, narrow apical band of relatively long whitish hairs extending over entire marginal zone length. Tergal marginal zones 2–4 with weak bands of white hair covering their apical half, strongly interrupted in 2–3, continuous in 4. Prepygidial fimbria golden medially, white to golden laterally; pygidial fimbria golden (Fig. 69).



**FIGURES 68–77.** *Andrena (Chlorandrena) macula* sp. nov. 68. female vertex and mesosoma, 69. female metasoma, 70. male habitus, 71. male head, 72. male vertex and mesosoma, 73. male metasoma, 74. male genitalia, 76. male eighth sternum, ventral view, 77. male eighth sternum, dorsal view. *Andrena (Chlorandrena) clypella* Warncke. 75. male genitalia.

**Head** (Figs. 67–68). 1.2 times broader than long. Mandible slightly to distinctly bidentate. Galea finely shagreened, apex weakly pointed. Labral process trapezoidal, broader than long, apex straight to weakly emarginate. Clypeus weakly convex, basal half strongly transversely striated and usually dull, apical half smoother, shiny; punctation strong and dense, finer and denser basally, without impunctate midline, distance between punctures 0–1 puncture diameters. Flagellomere 1 longer than 2+3, 2 as long as 3. Frons strongly longitudinally striated. Facial foveae deep, broad on upper part, gradually tapering downwards, extending from level of upper end–middle of lateral ocellus to slightly below lower end of antennal sockets, 0.6 times as broad as antennocular distance (Figs. 66–68). Distance of fovea from lateral ocellus about 0.7 ocellus diameter. Ocelloccipital distance 0.8 ocellus diameter. Vertex weakly carinate (Fig. 68).

**Mesosoma** (Fig. 68). Pronotum without elevated dorsolateral angle or lateral carina. Anterior 1/3–1/2 of mesonotum dull to weakly shiny, weakly shagreened, weakly, finely and densely punctured, distance between punctures 0.5–1 puncture diameters; posterior 1/2–2/3 smooth and shiny, strongly and more coarsely and sparsely punctured, distance between punctures 0.5–2 puncture diameters. Scutellum similar to posterior part of mesonotum, but more finely punctured (Fig. 68). Mesepisternum finely reticulate, obliquely punctured; propodeal corbicula finely reticulate. Posterolateral part of propodeum finely rugose-areolate. Propodeal triangle delineated by carina, basal half rugose-areolate, often with strong medial carina, apical half very finely alveolate to transversely striate (Fig. 68). Inner side of hind femur smooth, not to weakly carinate dorsally, with about 10 spines. Hind leg pretarsal claw bidentate. Recurrent vein 1 meets submarginal cell 2 distal to its mid-length. Nervulus antefurcal.

**Metasoma** (Fig. 69). Tergal discs smooth, punctation without raised margins (not crater-like). Tergal disc 1 clearly differentiated into basal and apical parts, basal part irregularly, very finely and sparsely punctured, distance between punctures 1–4 puncture diameters; apical part more coarsely and densely punctured, distance between punctures 0.5–2 puncture diameters. Tergal discs 2–4 distinctly punctured, distance between punctures 0.5–1 puncture diameters. Tergal marginal zones increasing in shagreenation towards apical terga, weakly and very finely punctured, distance between punctures about 1 puncture diameter; 1 not depressed; 2–4 depressed. Pygidial plate without elevated medial area.

**Male** (Fig. 70).

**Body length:** 7.5 mm.

**Colour.** Body and legs black to brown (Fig. 70). Clypeus yellow medially, black peripherally, yellow area often with two dark lateral triangles (Fig. 71). Anterior side of flagellomeres 3–11 brown to orange. Wings weakly infusate, veins brown, stigma brownish (Fig. 70). Tergal marginal zones reddish basally, gradually whitish apically (Fig. 73).

**Pubescence.** Head with dense medium-lengthed white hair (Fig. 71). Mesonotum and scutellum with long white to yellowish hairs (Fig. 72). Mesepisternum and propodeum with long white hairs. Femora and tibiae with short white hairs; tarsi with short whitish to golden hairs (Fig. 70). Apical 1/3 of tergum 1 with sparse long white hairs. Tergal discs 2–4 with minute inconspicuous hair medially and short white hair laterally. Tergal marginal zones 1–4 with distinct bands of white hair, denser but strongly interrupted in 1–3, sparser but almost continuous in 4. Terminal fringe whitish to golden (Fig. 73).

**Head** (Figs. 71–72). Clypeus weakly convex, smooth except near base, strongly and coarsely punctured, distance between punctures 0.5–1 puncture diameters, without impunctate midline. Flagellomere 1 as long as 2+3, 2 shorter than 3 (Fig. 71). Ocelloccipital distance 1.5 ocellus diameters. Vertex carinate (Fig. 72). Rest of head similar to female.

**Mesosoma** (Fig. 72). Punctation of anterior part of mesonotum weaker and sparser than in female (Fig. 72). Mesepisternum and lateral part of propodeum densely obliquely punctured. Recurrent vein 1 meets submarginal cell 2 at or distal to its mid-length. Rest of mesosoma similar to female.

**Metasoma** (Fig. 73). Similar to female, but punctation of tergal discs slightly sparser, distance between punctures 1–2 puncture diameters. Punctation of apical 1/3 of tergum 1 slightly coarser than rest of terga, with slightly raised margins (crater-like punctures).

**Genitalia and hidden sterna** (Figs. 74, 76–77). Dorsal gonocoxite lobe strongly developed, elongate, apex pointed. Gonostylus blade broadened, flattened, apex weakly pointed. Penis valves of moderate width, tapering apically (Fig. 74). Sternum 8 columnar, without lateral protrusions, uniformly narrow except for slightly broadened apical process, ventral side with dense tuft of hairs medially, protruding laterally (Figs. 76–77).

**Diagnosis.** *Andrena macula* is distinguished from most species of *Chlorandrena* by the extremely smooth terga,

lacking crater-like punctures (although slightly developed in the male) (Figs. 69, 73). It most closely resembles *A. clypella* Strand, from which it differs in the smaller body size, shorter ocelloccipital distance, antefurcal nervulus (interstitial in *A. clypella*), brighter tergal marginal zones with distinct hair bands (hardly developed in *A. clypella* except for a sparse band on tergum 4), the female's apically smooth clypeus (fully shagreened in *A. clypella*), broader foveae, coarser mesonotal punctation and more rugose propodeum, and the male's smoother mesonotum and more slender, elongate genitalia (Figs. 74–75).

**Distribution:** Iran, Central Israel, Jordan.

**Flight period:** March–May.

**Flower records:** None. The species most probably forages on Asteraceae, as do all other known species of *Chlorandrena*.

**Holotype:** ISRAEL: Park ha-Les Nature Reserve [Park ha-Les NR], 31.2575°N 34.597°E, 19.iii.2022, G. Pisanty, sweeping, ♀ (SMNHATAU:385762).

**Paratypes:** IRAN: Nain env., 5.v.1999, K. Deneš sen. (2♀); ISRAEL: Beersheba [Be'er Sheva], 1.6 km N, Road 40 E, Goral Junction, 352 m, 26.iii.2017, A. Dorchin (2♀); 20 km S, 1.v.2019, M. Halada (1♀); Beit Guvrin [Beit Govrin], 28.iii.2010, G. Pisanty (1♀); Ein Gedi, 23.iii.1958, I. Kugler (1♀); Gilat Research Center, fallow field, 31.3372°N 34.663°E, 2.iii.2022, G. Pisanty, sweeping (1♂); Mashabei Sadeh [Mashabe Sade], 16.ii.1976, A. Freidberg (2♂); Sde Boker [Sede Boqer], 3 km S, 10.iv.1990, K. Warncke (3♀); Sdom Rd., km 40, 3.iv.1953, E. Swirski (1♂); Shivta Junction [Holot Shunera], 30.941°N 34.597°E, 17.iii.2017, G. Pisanty, partly from pan traps (2♀, 1♂); JORDAN: Kerak [Al Karak] env., 6.iv.2013, M. Snížek (2♀); 15 km E Petra, 26.iv.2006, K. Deneš (1♀) (OLML, SMNHATAU, TJW).

**Etymology.** *macula* = Latin for “spot”, in reference to the small yellow mark on the male clypeus. The species epithet is a noun in apposition.

**Other material examined (*A. clypella*):** GREECE: Crete [W.CRETA], Meskla, 3.v.1973, H. Teunissen (1♂); (no precise locality), 7.v.1939, Dr. Enslin (1♀); NORTH MACEDONIA: Monastery of Saint Naum [Svetli.Naum. Yu.Mac.], 30.v.1972, Teunissen (1♂) (OLML, SMNHATAU).

## *Andrena (Chlorandrena) tadauchii* Gusenleitner, 1998

*Andrena edentula* Wood, 2020 **syn. nov.**

**Distribution:** Israel, Syria, Turkey, West Bank. Likely present also in Lebanon.

**Flight period:** February–May.

**Flower records:** Asteraceae: *Crepis aspera*, *Glebionis coronaria*, *Picris* spp., *Rhagadiolus stellatus*; Brassicaceae: *Sinapis arvensis*.

**Material examined:** HOLOTYPE (*A. edentula*): SYRIA: occ. Al-Nasrah [An Nasrah] env., 8.iv.2005, J. Saki (♂) (OLML); non-type material: ISRAEL: Aderet, 24.iii.2010, G. Pisanty, pan trap (1♀); Banias, 18.iv.1992, R. Kasher (1♀); [Panyas], 430 m, 15.iii.2011, 33°14.850'N 35°41.674'E, A. Freidberg (1♂); Beit Guvrin [Beit Govrin], 28.iii.2010, G. Pisanty, pan traps (4♀); [Bet-Govrin, 20 km S Hebron], 17.iii.1990, R. Kasher (1♂); Beit Nir, 28.iii.2010, G. Pisanty, pan traps (2♀); 25.iii.2018, T. Roth, on *Picris* (1♀); Beit Oren [Bet Oren], 1.5 km S, 18.iv.2015, 32.715 35.01, G. Pisanty (1♀); Giv'at Gad [Sheich-Ali, 20 km E Qiryat-Gat], 17.iii.1990, R. Kasher (1♂); Haifa University, 10.iv.1988, I. Yarom (1♀, 1♂); Har Gilo, 11.iv.1990, R. Kasher (1♂); Holot Nizzanim Nature Reserve, Nahal Evtah, 25.ii.2009, A. Freidberg (1♂); Horbat Sheqofa, 252 m, 15.iii.2021, 31.5775°N 34.8709°E, G. Pisanty, pan trap (1♂); Hurshat Tal, 13.iii.1996, R. Kasher (1♂); Jerusalem, 19.iii.1955, J. Wahrman (1♀); Jerusalem [Yerushalayim], 13.iv.2014, I. Arar, on *Crepis aspera* (1♀) and *Sinapis arvensis* (1♂); 27.ii.2015, T. Jumah (1♂); Kfar Giladi [Kefar Gil'adi], 1.iv.1997, R. Kasher (1♀, 1♂); 12.iv.1997, R. Kasher (1♀); 24.iv.1997, R. Kasher (1♀); Kfar Menahem [Kefar Menahem], 19.ii.2010, G. Pisanty (1♀); Lakhish, 3 km NE, 26.ii.2016, 31.578°N 34.870°E, G. Pisanty (1♂); 4.iii.2016, 31.575°N 34.870°E, G. Pisanty (2♂); 11.iii.2016, 31.575°N 34.870°E, G. Pisanty (1♀); Majdal Shams, 1100 m, 27.iv.2020, 33.262°N 35.755°E, G. Pisanty (1♀); Malkia [Malkiyya], 27.iv.2014, O. Winberger, pan traps (2♀); Matzuva [Mazuva], 18.iii.1951, J. Wahrman (1♀); Meirav [Hare Gilboa', Merav], Har Avinadav, 420 m, 20.iii.2012, 32°28'N 35°26'E, L. Friedman (1♂); Merom Golan, 3.iv.1997, R. Kasher (5♀, 4♂); 20.iv.1997, R. Kasher (3♂); 23.iv.1997, R. Kasher (2♂); Mount Carmel, 2 km SE Haifa University, 24.iii.1990,

A. Dafni (2♀,6♂); Mount Carmel [Har Shana (Carmel)], 24.iii.1989, J. Kugler (1♀); Mount Hermon, 23.iv.1973, H. Bytinski-Salz (4♂) (*A. holophila* paratype labels); [Har Hermon], 1640 m, 7.iv.2021, 33.300°N 35.7675°E, G. Pisanty, sweeping (2♂); 1644 m, 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan trap (1♂); 1645 m, 16.iv.2021, 33.2994°N 35.7675°E, G. Pisanty, pan traps (2♂) and sweeping (1♂); [Sheh], 26.v.1972, M. Tintpulver (1♀); Mount Meron [Har Meron], 5.iv.2016, 32.9945°N 35.415°E, G. Pisanty (1♂); Nahal Alexander, 30.iii.2021, K. Levy (1♀); Nahal 'Iyyon, 430 m, HaTanur Waterfall, 33°16.064'N 35°34.500'E, 15.iii.2011, E. Morgulis (1♂); Nahal 'Iyyon Nature Reserve, haTanur [Tanur], 15.iii.1975, F. Kaplan (1♂); Nahal Sa'ar, 30.iii.1997, R. Kasher (1♀,5♂); Nimrod Castle [Qala'at Nemrod], 6.v.1987, A. Shlagman (1♀); Road 869, 1.65 km W Daliyyot Junction, 428 m, 11.iv.2019, 32.892°N 35.760°E, A. Dorchin, O. Halbershtat & Y. Mersman (1♀); Snir, Hermon Field Study Center, 5.iii.1996, R. Kasher (1♀); 31.iii.1996, R. Kasher, on *Rhagadiolus stellatus* (1♀); 4.iv.1996, R. Kasher (1♀); 6.iv.1996, R. Kasher (1♀); 27.iii.1997, R. Kasher (1♀); 3.iv.1997, R. Kasher (1♀); **WEST BANK:** Mevo Horon, 24.ii.2010, G. Pisanty, on *Glebionis coronaria* (2♂); **SYRIA:** Stausee, 10 km SW Homs, 500 m, 15.iv.1992, M. Kraus & K. Warncke (2♂) (OLML, SMNHTAU).

**Remarks.** *Andrena tadauchii* was originally described from a single female as *A. humilis prunella* Warncke, 1975, but this name was preoccupied by an unrelated taxon described from Afghanistan (nec *A. prunella* Warncke, 1974). Due to the scarcity of material, Warncke could not associate the two sexes together, and labeled the males as *A. holophila* nomen nudum, but died before publishing them. Gusenleitner (1998) renamed *A. h. prunella* as *A. tadauchii*, associated the sexes together and described the male. In the Warncke collection, only the female was available for study until recently, when specimens used to describe the male were discovered in an unmarked box. *Andrena tadauchii* is part of the *humilis*-group within the subgenus *Chlorandrena*, though its male is highly unusual for this group as its sternum 8 is noticeably enlarged and resembles members of the *rhenana*-group. As a result, Wood *et al.* 2020a misdiagnosed *A. edentula* as an undescribed taxon belonging to the *rhenana*-group, and not the male of *tadauchii*. After inspection of the missing material, the two taxa are synonymised, and male material has been integrated into the Warncke collection proper.

### *Andrena (Euandrena) gageae* Wood & Pisanty sp. nov.

(Figs. 78–85)

**Female** (Fig. 78).

**Body length:** 9–10 mm.

**Colour.** Body black (Fig. 78). Flagellum black basally, flagellomeres 3–10 ventrally lightened by presence of grey cilia. Apical tarsal segments very slightly lightened brown. Wings hyaline, stigma and venation dark orange to orange (Fig. 78). Tergal marginal zones apically lightened brown-hyaline (Fig. 81).

**Pubescence.** Face, paraocular area and gena with black hairs (Figs. 78–80). Gena immediately behind base of mandibles with tuft of long white hair intermixed among black hairs. Vertex with almost entirely long white hairs. Frons and area around antennal sockets with mixture of black and white hairs (Fig. 79). Mesonotum and scutellum with long white hairs (Figs. 78, 80). Mesepisternum predominantly with long black hairs, mixing with white hairs anterolaterally and ventrally (Fig. 78). Propodeal corbicula incomplete, composed predominantly of black plumose hairs with occasional white hairs intermixed. Surface of corbicula with sparse simple whitish hairs. Leg hair blackish brown, femoral scopa white, tibial scopa whitish golden (Fig. 78). Flocculus incomplete, composed of sparse black plumose hairs. Tergum 1 with long sparse white hairs, 2–3 with short white hairs on discs. Terga 2–3 laterally, 4–5 all over with black hairs. Terminal fringe dark brown (Fig. 81).

**Head** (Figs. 79–80). 1.3 times broader than long. Labral process short, trapezoidal, basally 3 times broader than long, apical margin straight. Clypeus flattened centrally, strongly and evenly punctured, punctures separated by 0.5 puncture diameters laterally, becoming slightly sparser centrally, here separated by 1 puncture diameter. Clypeal surface smooth and shining over majority of its area except for narrowly shagreened area basally (Fig. 79). Paraocular area with clear punctures of same density as on clypeus, frons finely longitudinally ridged, dull. Flagellomere 1 exceeds 2+3, shorter than 2+3+4. Facial fovea dorsally occupying 0.25 distance between lateral ocellus and compound eye, narrowed below at level of antennal insertions, here narrower than width of flagellum (Figs. 79–80). Fovea dorsally separated from lateral ocellus by 2.5 diameter of lateral ocellus. Ocelloccipital distance subequal to width of lateral ocellus (Fig. 80). Genal area slightly exceeding width of compound eye.

**Mesosoma** (Fig. 80). Pronotum with very subtly elevated dorsolateral angle, essentially rounded. Mesonotum

and scutellum laterally shagreened and dull, this becoming weaker centrally, here weakly shining to shining; irregularly punctured with shallow punctures, punctures separated by 0.5–2 puncture diameters (Fig. 80). Mesepisternum and propodeal corbicula finely reticulate, weakly shining. Propodeal triangle narrow, internal surface centrally and laterally with network of fine raised rugosity, otherwise with fine granular microreticulation; lateral margins of propodeal triangle differentiated from dorsolateral parts of propodeum by change in sculpture, dorsolateral parts granularly shagreened with fine network of raised reticulation (Fig. 80). Tarsal claws with strong inner tooth. Recurrent vein 1 reaching submarginal cell 2 very slightly before its middle. Submarginal crossvein 1 meets marginal cell 5 vein widths from stigma. Nervulus interstitial to slightly antefurcal (Fig. 78).

**Metasoma** (Fig. 81). Tergal discs with variable sculpturing, tergum 1 with disc and declivity smooth and shining, 2–4 with discs smooth centrally to shagreened basally; all terga with fine and sparse punctures, punctures separated by 3–5 puncture diameters. Tergal margins weakly depressed, occupying 0.3–0.4 of tergal width, with fine latitudinal granular shagreen. Pygidial plate pointed triangular, centrally slightly raised, densely punctate.

**Male** (Fig. 82).

**Body length:** 8 mm.

**Colour.** As in the female.

**Pubescence.** Similar to female. Gena and base of mandibles with larger, more extensive patch of intermixed white hairs, extending to flank galea laterally in frontal view. Intermixed white hairs of face more extensive, a few extending onto base of clypeus (Fig. 83). Mesepisternum with white hairs more extensive, extending dorsally to mid-way point. Terga lacking dark hairs, entirely white-haired (Fig. 82).

**Head** (Figs. 83–84). 1.3 times broader than long. Structurally as in the female, though flagellomere 1 exceeding 2, shorter than 2+3.

**Mesosoma** (Fig. 84). Structurally as in female, though shining central area of mesonotum comparatively small (Fig. 84). Nervulus clearly antefurcal.

**Metasoma.** As in female.

**Genitalia and hidden sterna** (Fig. 85). Genital capsule with gonocoxa produced into small teeth, apically touching. Gonostyli flattened, with weakly raised internal margin, apically spatulate. Penis valves basally slightly broadened, narrowing medially before slightly broadened and drop-like apex (Fig. 85). Sternum 8 columnar, slightly broadened apically, essentially parallel sided, apically truncate. Ventral surface with short brownish hairs projecting laterally.

**Diagnosis.** *Andrena gageae* can be placed in the subgenus *Euandrena* because of the characteristic drop-shaped fovea which are narrowed below, and the simple scopal hairs. Further diagnosis is highly challenging and ideally requires comparison with barcoded specimens.

Females have a similar hair colour pattern to *A. bicolor* Fabricius, but have white hairs on the face, the clypeus is flattened centrally and the surface is smooth and shining, and the terga are smoother with finer and sparser punctation. There are similarities to *A. glabriventris* Alfken known from Turkey which has the same hair colour pattern (though without intermixed pale hairs on the face), but can be separated structurally because the vertex of *A. glabriventris* females behind the ocellar triangle is densely punctate, whereas it is impunctate in *A. gageae*.

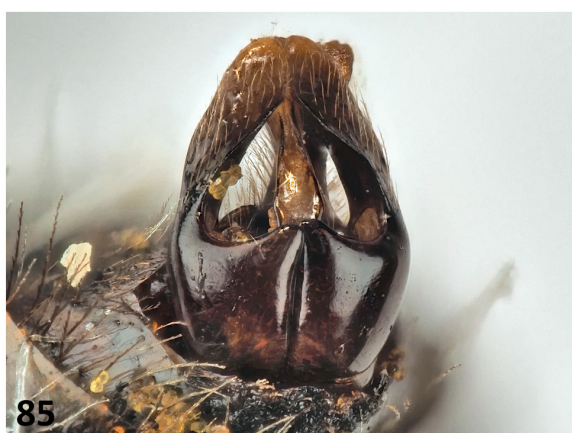
Females are identical to the description of *A. hermonella* Scheuchl & Pisanty females. However, this is because the sexes of *A. hermonella* were incorrectly associated. The male of *A. gageae* (confirmed by barcoding, Table 2) which was caught at the same locality on the same day has simple, ‘typical’ *Euandrena* genitalia, without the lateral hyaline extensions to the penis valves that characterise *A. hermonella* (see illustrations in Pisanty *et al.* 2016). The tergal punctation of the *A. gageae* male is also much less dense, further supporting this difference. Males can therefore be diagnosed by the combination of white hairs on the face, smooth and sparsely punctate terga, and simple genital capsule.

**Distribution:** Israel and Lebanon, from high altitude (>2000 m) in the Mount Lebanon and Anti-Lebanon mountain chains. Likely present also in Syria.

**Flight period.** May, presumably into June.

**Flower records.** Lilaceae: *Gagea micrantha*.

**Pollen analysis.** Five analysed pollen loads contained pure *Gagea* pollen. However, pollen loads were all from the same day, so caution should be taken before interpreting these results as representative of the entire diet. Other alpine *Euandrena* can show affinity with other monocotyledon plants whilst also having a generalised diet (Praz *et al.* 2019).



**FIGURES 78–85.** *Andrena (Euandrena) gageae* sp. nov. 78. female habitus, 79. female head, 80. female vertex and mesosoma, 81. female metasoma, 82. male habitus, 83. male head, 84. male head and mesosoma, 85. male genitalia.

**Holotype:** LEBANON: Bsharri [Bcharré], Dahr el Adib, 2585 m, 34°12'40.0"N, 36°03'35.7"E, 27.v.2017, P. Rasmont & M. Boustani, ♀ (OLML).

**Paratypes:** ISRAEL: Mount Hermon, 2000 m, 22.v.1973, H. Bytinski-Salz (1♀); 2050 m, 31.v.1991, K. Warncke (2♀) (*A. hermonella* paratype labels); LEBANON: Bsharri [Bcharré], Dahr el Adib, 2585 m, 34°12'40.0"N, 36°03'35.7"E, 27.v.2017, P. Rasmont & M. Boustani, (6♀, 1♂) (OLML, SMNHTAU, TJW).

**Etymology.** Named after the yellow star-of-Bethlehem lily *Gagea micrantha*. The species epithet is an adjective.

**Remarks.** There is a swarm of *Euandrena* diversity in southeastern Europe to the Levant (Praz *et al.* 2019; GP, TJW and C. Praz, unpublished data), much of it probably undescribed. Extreme care must be taken when determining *Euandrena* in this region; barcoding specimens is essential. A further publication will resolve outstanding issues in East Mediterranean members of this subgenus.

Lebanese specimens were collected from *Gagea micrantha* which may be important for its ecology in the way that other monocotyledon plants are for other species of alpine *Euandrena* (Praz *et al.* 2019). This plant taxon is also restricted to Israel, Lebanon and Syria in high altitude sites.

**Other material examined:** (*A. glabriventris*): HOLOTYPE: TURKEY: Ankara, 10.v.1934, A. Seitz (♀) (SMFM); PARATYPES: TURKEY: same as holotype (3♀) (SMFM).

### *Andrena (Euandrena) hermonella* Scheuchl & Pisanty, 2016

**Distribution:** High altitudes in northern Israel (Mt. Hermon, above 2000 m). Likely present also in Lebanon and Syria.

**Flight period:** May, July.

**Flower records:** None.

**Material examined:** HOLOTYPE: Mount Hermon [Mt. Hermon], 2000 m, 22.v.1973, H. Bytinski-Salz (♂) (OLML); PARATYPES: Mount Hermon, 2000 m, 22.v.1973, H. Bytinski-Salz (1♂); 2.vii.1984, F. Kaplan (1♂); 1.vii.1986, A. Freidberg (1♂) (OLML, SMNHTAU); non-type material: Mount Hermon [Har Hermon], 2000–2100 m, 26.vi.1997, A. Freidberg (1♂) (SMNHTAU).

**Remarks.** The female of this species is unknown; the females in the original species description (Pisanty *et al.* 2016) were wrongfully associated with the males, and are redescribed in the current publication as *A. gageae* Wood & Pisanty **sp. nov.**

### *Andrena (Euandrena) igraeca* Pisanty & Wood **sp. nov.**

(Figs. 86–95)

**Female** (Fig. 89).

**Body length:** 8–8.5 mm.

**Colour.** Head and ventrolateral part of mesosoma black (Figs. 86, 89). Anterior side of flagellum brown to black (Fig. 86). Mesonotum, scutellum and metanotum dark with bluish metallic luster (Fig. 87). Legs and metasoma brown to black (Fig. 89). Wings hyaline, veins and stigma brown. Tergal marginal zones yellowish (Fig. 88).

**Pubescence.** Clypeus and area around antennal sockets with medium-lengthed golden hair (Fig. 86). Outer half of paraocular area with short to medium black hair. Scape with short black hairs. Frons with short to long black hairs. Facial foveae brown (Fig. 87). Vertex with long, erect golden and black hairs. Genal area with short black hair anteriodorsally, short to medium golden hair posteroventrally. All parts of mesosoma covered with medium to long, erect golden hair (Figs. 87, 89). Propodeal corbicula incomplete, posterodorsal fringe with dense, long golden hairs, corbicular surface with long sparsely plumose golden hairs. Leg hair golden to brown (Fig. 89). Flocculus incomplete, yellowish. Femoral and tibial scopal hairs sparsely plumose, golden (Fig. 89). Tergal discs with sparse short to medium golden hair, longer on lateral parts of terga 1–2. Tergal marginal zones 1–4 with strong continuous bands of dense, medium-lengthed yellowish-golden hair, arising from base of marginal zone and extending onto base of following disc, longer on tergum 1. Terminal fringe brown (Fig. 88).

**Head** (Figs. 86–87). 1.2 times broader than long. Mandible bidentate. Galea shagreened. Labral process broad,



trapezoidal, basal half transversely striated, apical half smooth, apical margin weakly concave. Clypeus moderately convex, shagreened basally, gradually smooth apically, distinctly punctured, distance between punctures 1 puncture diameters, without impunctate midline, apical margin mostly impunctate (Fig. 86). Lower part of paraocular area finely shagreened, finely punctured. Flagellomere 1 longer than 2+3, 2 as long as 3. Frons longitudinally striated. Facial foveae short, extending from level of lower end of lateral ocellus to lower end of antennal socket, 0.4 times as broad as antennocular distance (Figs. 86–87). Distance of fovea from lateral ocellus about 1.1 ocellus diameters. Ocelloccipital distance about 1 ocellus diameter. Vertex moderately carinate (Fig. 87).

**Mesosoma** (Fig. 87). Dorsolateral angle of pronotum not elevated, pronotum not carinate. Mesonotum and scutellum shiny but strongly, uniformly and finely shagreened, punctation dense and coarse, extremely superficial and often almost indistinguishable from shagreenation, distance between punctures 0.5–1 puncture diameters (Fig. 87). Mesepisternum and posterolateral part of propodeum finely alveolate-reticulate, densely, shallowly and obliquely punctured, punctures merging into reticulation. Propodeal corbicula finely reticulate, sparsely and coarsely, obliquely punctured. Propodeal triangle T-shaped, very finely alveolate, basal margin radially rugose (Fig. 87). Hind leg pretarsal claw bidentate. Nervulus more or less interstitial.

**Metasoma** (Fig. 88). Tergal discs shiny, weakly to moderately shagreened, very finely punctured, distance between punctures about 2 puncture diameters, apical half of disc 1 often with crater-like punctures. Tergal marginal zones shagreened, apical margin smooth. Pygidial plate without elevated medial area.

**Male** (Fig. 90).

**Body length:** 6.5 mm.

**Colour.** Head and mesosoma black, non-metallic (Figs. 90–92). Anterior side of flagellomeres 2–11 dark brown (Figs. 90–91). Legs and metasoma dark brown to black (Figs. 90, 93). Wings hyaline, veins and stigma dark brown (Fig. 90). Tergal marginal zones reddish-yellowish (Fig. 93).

**Pubescence.** Clypeal hair long, two-coloured, varying among specimens from mostly black with an apical fringe of golden hairs, to mostly golden with small lateral patches of black hair (Figs. 90–91). Paraocular area with long black hair. Area around antennal sockets with medium to long golden hair. Scape with medium-lengthed golden and black hairs. Frons with medium to long black hairs. Vertex with long, erect golden hairs. Genal area with medium-lengthed black hair anteriodorsally, medium to long golden hair posteroventrally. All parts of mesosoma covered with medium to long, erect golden hair (Figs. 90, 92). Leg hair mostly golden, sometimes with few black hairs on femora and tibiae (Fig. 90). Tergal discs with sparse white to golden hair, short centrally, long on lateral parts of disc 1, gradually shorter on lateral parts of following terga. Tergal marginal zones 1–5 with strong continuous bands of dense, medium-lengthed white to golden hair, arising from base of marginal zone and extending onto base of following disc, longer on tergum 1. Terminal fringe light brown (Fig. 93).

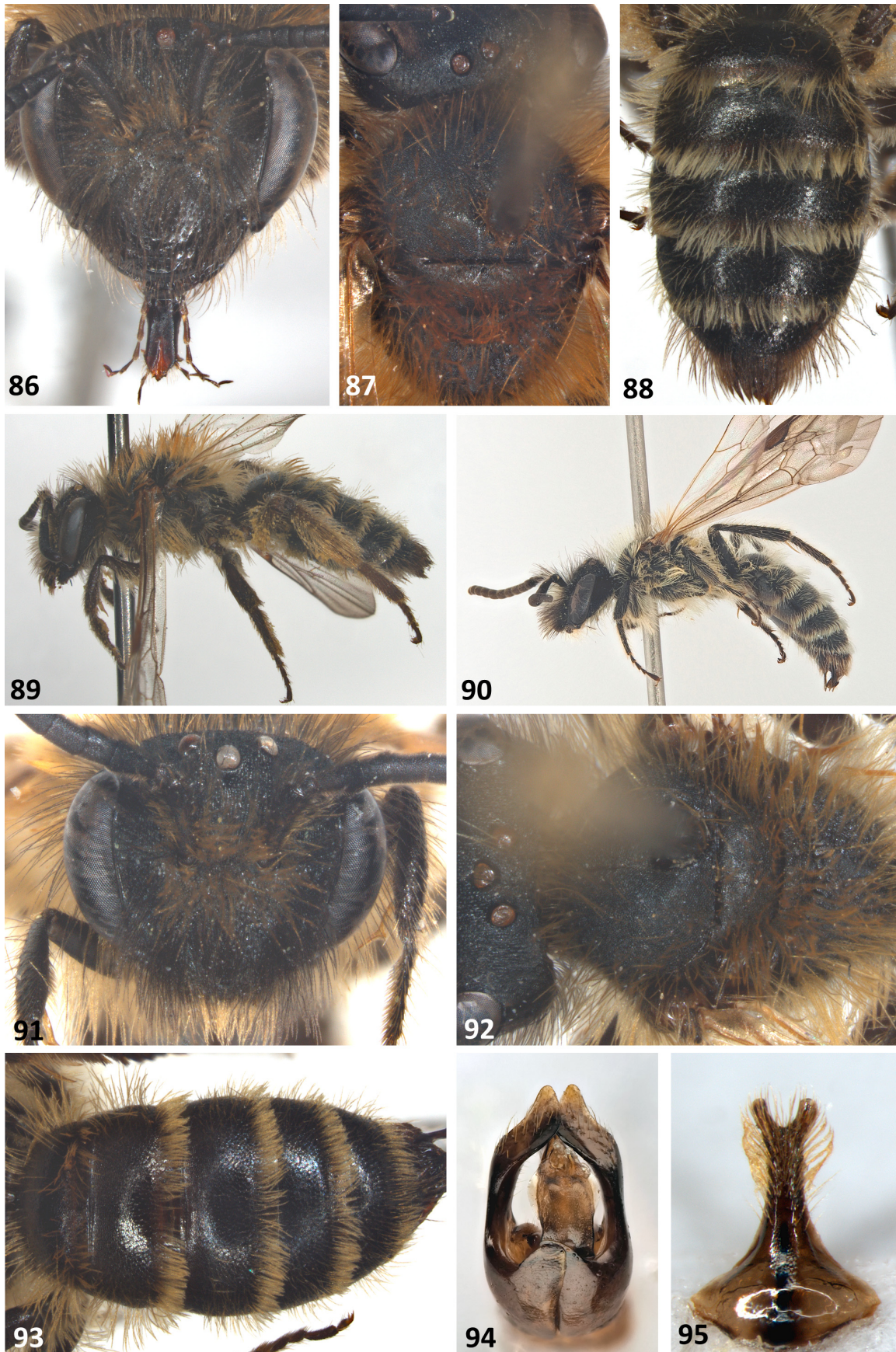
**Head** (Figs. 91–92). Clypeus not protuberant, often centrally flattened, basal half shagreened, apical half shagreened to smooth, punctation dense, distance between punctures 0.5–1 puncture diameters, without impunctate midline. Flagellomere 1 longer than 3, 2 shorter than 3. Rest of head as in female.

**Mesosoma** (Fig. 92). Similar to female, but mesonotum and scutellum mat, punctation sparser, distance between punctures 1–2 puncture diameters (Fig. 92).

**Metasoma** (Fig. 93). Similar to female.

**Genitalia and hidden sterna** (Figs. 94–95). Dorsal lobes of gonocoxite distinct, broad and rounded. Gonostyli narrow basally, blade flattened and broadened, inner margin convex, outer margin concave, apex pointed. Basal half of penis valves of moderate, uniform width, with a narrow, arched flanking lamella; apical half tapering (Fig. 94). Sternum 8 Y-shaped, with a columnar stem and a distinctly bilobed apical process (Fig. 95).

**Diagnosis.** *Andrena igraeca* is closely related to *A. rufula* Schmiedeknecht. The female is distinguished from most *Euandrena* by the strongly shagreened and mat, imperceptibly punctured, metallic-hued mesonotum (Fig. 87). It differs from *A. rufula* in the smaller body size, stronger metallic hue of the mesonotum, and presence of distinct yellowish tergal apical hair bands (tergal discs and marginal zones in *A. rufula* more or less uniformly covered in orange-brown hair, not forming distinct apical hair bands). The male of *A. igraeca* is easily distinguished from all other *Euandrena* by the unique genital capsule and sternum 8 (Figs. 94–95). It differs from *A. rufula* in the smaller body size, distinct dorsal gonocoxite lobe (weakly produced and truncate in *A. rufula*), broader penis valves, and strongly bifurcate, Y-shaped sternum 8 (normally built in *A. rufula*, with an apical notch). *Andrena scrophulariae* Wood also possesses a Y-shaped sternum 8, but it has a much broader gonostylus blade (Fig. 100), and a longer, very smooth clypeus (Fig. 96).



**FIGURES 86–95.** *Andrena (Euandrena) igraeca* sp. nov. 86. female head, 87. female vertex and mesosoma, 88. female metasoma, 89. female habitus, 90. male habitus, 91. male head, 92. male vertex and mesosoma, 93. male metasoma, 94. male genitalia, 95. male eighth sternum.

**Distribution:** North and central Israel, Lebanon, Syria. Likely present also in Hatay province, Turkey.

**Flight period:** February–April.

**Flower records:** Brassicaceae: *Sinapis alba*; Lamiaceae: *Salvia rosmarinus*; Plantaginaceae: *Veronica syriaca*; Rosaceae: *Prunus dulcis*.

**Holotype:** ISRAEL: Horbat Kefar Lakhish, 31.575°N 34.853°E, 5.iii.2021, G. Pisanty, pan trap, ♂ (SMNHTAU:358922).

**Paratypes:** ISRAEL: Bet Me'ir, 18 km W [E] Jerusalem, 4.iii.1990, T. Boker, on *Sinapis alba* (1♀); Har Avital, Golan Heights, 15.iii.1995, R. Kasher (1♀, 7♂); Horbat Kefar Lakhish, 31.575°N 34.853°E, 5.iii.2021, G. Pisanty, pan trap (1♀, 3♂); 15.iii.2021, G. Pisanty, pan trap (3♀, 7♂); Jerusalem, 18.iii.1991, R. Kasher, on *Salvia rosmarinus* (1♀); 24.ii.2014, A. Gotlieb (3♂); 700 m, 5.iii.1975, K.M. Guichard (1♀); Kfar Menahem [Kefar Menahem], 1.iii.2008, G. Pisanty (1♀); Kokhav Ya'ir, Ya'ar Sappir, 32°13.9'N 34°59.5'E, 160 m, 16.ii.2010, L. Friedman (1♀); Montfort, 17.iii.1983, F. Kaplan (1♀); [Montfort, Nahal Keziv], 28.ii.2018, G. Pisanty (1♂); Mount Carmel, 4.iii.1975, F. Kaplan (1♀); Mount Carmel, Hay-Bar, 1 km S University, 25.iii.1990, R. Kasher (1♀); Mount Hermon [Har Hermon], 1610 m, 33.300°N 35.767°E, 7.iv.2021, G. Pisanty, pan trap (2♂); 1642 m, 33.2996°N 35.7677°E, 16.iv.2022, G. Pisanty, pan traps (1♀, 5♂); [Hermon], 1641 m, 33.2993°N 35.7670°E, 16.iv.2022, G. Pisanty, on *Prunus dulcis* (1♀); Mount Hermon Nature Reserve, 21.iv.2012, G. Pisanty (1♂); Mount Meron [Har Meron], 33.000°N 35.3927°E, 4.iv.2017, G. Pisanty, pan trap (2♀); 1000 m, 1.iv.2012, L. Friedman (1♀); Nahal Kziv [Nahal Keziv], 33°02.7'N 35°13.6'E, 5.iii.2008, A. Freidberg (1♂); Odem Forest Nature Reserve [Ya'ar Odem N.R.], 1.iii.2018, G. Pisanty (4♂); [Ya'ar Odem NR], 33.186°N 35.7356°E, 27.ii.2020, G. Pisanty, pan trap (1♂); **LEBANON:** Horch Ehden, Nabeh Jouit, 1336 m, 24.iv.2019, M. Boustani, on *Veronica syriaca* (1♀); **SYRIA:** Kesab [Kassab] env., 28.iii.1994, J. & S. Becvar (1♀) (NHMUK, OLML, RMNH, SMNHTAU, TJW).

**Etymology.** *i graeca* is the Latin name for the Roman letter Y, in reference to the 'Y' shaped sternum 8 of the male. The species epithet is a noun in apposition.

### *Andrena (Euandrena) rufula* Schmiedeknecht, 1883

**Distribution:** South and Central Europe, Turkey and Lebanon (Gusenleitner & Schwarz 2002; Scheuchl & Willner 2016; Wood *et al.* 2020a). Newly recorded from Israel and Syria.

**Flight period:** March–April, up to May in Central Europe (Scheuchl & Willner 2016).

**Flower records:** Rosaceae: *Crataegus* spp., *Prunus dulcis*, *Prunus spinosa*, *Pyrus syriaca*; Salicaceae: *Salix* spp.; Sapindaceae: *Acer* spp. (Scheuchl & Willner 2016 and new records).

**Material examined:** ISRAEL: Hermon Nature Reserve [Hermon Reserve], 21.iv.2012, G. Pisanty, on *Prunus dulcis* (1♀); Meron Junction [Meron JNC.], 20.iii.1995, on *Pyrus syriaca* (3♀); Mount Hermon [Har Hermon], 1640 m, 33.300°N 35.7675°E, 7.iv.2021, G. Pisanty, sweeping (1♀); 1649 m, 33.2993°N 35.7679°E, 7.iv.2021, G. Pisanty, on *Acer monspessulanum* (2♀, 1♂); 16.iv.2021, G. Pisanty, on *Acer monspessulanum* (33♀, 2♂ + 4♀ stylopised); 1650 m, 33.2993°N 35.7678°E, 16.iv.2022, G. Pisanty, on *Acer monspessulanum* (2♀); [Hermon], 1641 m, 33.2993°N 35.7670°E, 16.iv.2022, G. Pisanty, on *Prunus dulcis* (2♀); **SYRIA:** Bloudan [Bludan], 57 km NW Damascus, 2000 m, 24.iv.1992, K. Warncke (8♀, 1♂); Maaloula [Maalula], 60 km NE Damascus, 1400 m, 14.iv.1992, K. Warncke (1♀); **TURKEY:** Akseki, 17.iv.1974, K. Warncke (2♂) (OLML, SMNHTAU).

### *Andrena (Euandrena) scrophulariae* Wood, 2020

(Figs. 96–101)

**Male** (Fig. 99).

**Body length:** 7–9 mm.

**Colour.** Body and legs dark brown to black (Fig. 99). Clypeus dark, with weak bluish-golden metallic luster (Fig. 96). Flagellomeres 2–11 brown. Wings hyaline, veins and stigma brown (Fig. 99). Tergal marginal zones yellowish (Fig. 98).

**Pubescence.** Clypeus, supraclypeal area, scape, and area around antennal sockets with medium to long whitish hairs (Figs. 96, 99). Paraocular area with short to long hair, black on outer part, white on inner part. Vertex and

genal area mostly with long white hair, and with short black hair around margin of compound eye (Figs. 96, 99). Scutellum, metanotum and periphery of mesonotum with medium to long, erect whitish hairs. Mesepisternum and propodeum with long white plumose hairs. Legs with white to golden, mostly short hairs (Fig. 99). Tergal discs with sparse, inconspicuous minute white hairs medially, short white hairs laterally. Tergal marginal zone 1 with band of sparse, medium-lengthed, whitish plumose semi-appressed hairs, reaching mid-length of tergum 2. Tergal marginal zones 2–4 with distinct, continuous bands of short plumose white hairs, slightly protruding onto the following tergal discs. Tergal marginal zones 5–6 with sparse, long golden hairs (Fig. 98).



**FIGURES 96–101.** *Andrena (Euandrena) scrophulariae* Wood. 96. male head, 97. male vertex, mesonotum and scutellum, 98. male metasoma, 99. male habitus, 100. male genitalia, 101. male eighth sternum.

**Head** (Figs. 96–97). 1.1 times broader than long. Labral process large, slightly broader than long, weakly trapezoidal, basal 1/3 transversely striated to smooth, apical 2/3 smooth (Fig. 96). Clypeus elongate, slightly convex, very smooth and shiny, strongly, coarsely and densely punctured, distance between punctures about 1 puncture diameter, without impunctate midline. Paraocular area densely, finely, obliquely punctured. Malar area length 0.2 times mandible width at base. Flagellomere 1 longer than 3, 2 shorter than 3. Frons longitudinally striated (Fig. 96). Ocellocipital distance 1.3 ocellus diameters. Vertex weakly carinate (Fig. 97). Genal area as broad as compound eye, posterior margin not carinate.

**Mesosoma** (Fig. 97). Dorsolateral angle of pronotum not elevated, pronotum not carinate. Mesonotum and scutellum strongly shagreened and mat, punctuation coarse and sparse, very shallow and inconspicuous, distance between punctures 1–2 puncture diameters (Fig. 97). Mesepisternum and anterolateral part of propodeum finely alveolate. Posterolateral part of propodeum finely alveolate, coarsely obliquely punctured. Propodeal triangle narrow, finely rugose, rugosity finer medioapically. Nervulus antefurcal (Fig. 99).

**Metasoma** (Fig. 98). Tergal discs very smooth and shiny, sparsely and very finely punctured, distance between punctures 2–3 puncture diameters. Tergal marginal zones distinctly depressed, basal part shagreened, apical part smooth.

**Genitalia and hidden sterna** (Figs. 100–101). Dorsal gonocoxite lobes developed, broad, connected throughout. Gonostyli broadening apically, blade dorsally concave, spatulate, pointed apically. Penis valves moderately broad basally, gradually tapering apically, basal part with narrow, curved lamellar extensions (Fig. 100). Sternum 8 columnar, apical part distinctly bifurcated, creating a Y shape (Fig. 101).

**Diagnosis.** The male of *A. scrophulariae* is distinguished from all other *Euandrena* by the long, very smooth clypeus (Fig. 96) and the unique shape of the genitalia (Fig. 100) and Y-shaped sternum 8 (Fig. 101). *Andrena igraeca* sp. nov. also possesses a Y-shaped sternum 8 (Fig. 95), but it has a much narrower gonostylus blade (Fig. 94), and a more normally built clypeus (Fig. 91).

**Distribution:** High altitudes (above 1400 m) in Israel (Mt. Hermon, first record), Lebanon and Turkey (first record). Likely present also in Syria.

**Flight period:** May–June.

**Flower records:** Scrophulariaceae: *Scrophularia* spp. (Wood *et al.* 2020a and new records).

**Material examined: HOLOTYPE: LEBANON:** Arz Tannourine Gate area, 1754 m, 20.v.2018, M. Boustani (♀) (RBINS); **non-type material: ISRAEL:** Hermon Nature Reserve, Sheluhah Duvdevan, 2124 m, 33.315°N 35.797°E, 29.v.2019, A. Dorchin (2♂); Mount Hermon, 1500 m, 22.v.1990, R. Kasher, on *Scrophularia* (2♀); Mount Hermon, 1600 m, 27.v.1986, A. Shlagman (2♀); **TURKEY:** Kars, 10 km E Karakurt, 1500 m, 28.v.1983, K. Warncke (1♀); 15 km E Karakurt, 1460 m, 2.vi.1988, K. Warncke, on *Scrophularia* (8♀) (OLML, SMNHTAU, TJW).

### *Andrena (Euandrena) symphyti* Schmiedeknecht, 1883

**Distribution:** South and Central Europe, Caucasus, Near East (Gusenleitner & Schwarz 2002; Scheuchl & Willner 2016). Newly recorded from Syria and northern Israel, which is apparently its southernmost distributional limit. A single record exists from Israel's central coastal plain (Kfar Azar), but this could be a labeling error.

**Flight period:** February–May (Israel), April–June (Central Europe, Scheuchl & Willner 2016).

**Flower records:** Oligolectic on Boraginaceae: *Cerithe*, ?*Nonea*, *Onosma*, *Symphytum* (Scheuchl & Willner 2016).

**Material examined: HOLOTYPE (*A. symphyti furcata*): TURKEY:** Kahramanmaraş, Kayabaşı [Kayabaschi], 8.vii.1913, F. Tölg (♀) (ZMHB); **non-type material: ISRAEL:** Hermon Nature Reserve, Har Shezif, 1447 m, 33.286°N 35.7524°E, 16.iv.2022, G. Pisanty, pan traps (1♀, 4♂); Kfar Azar [Kefar Azar], 2.ii.1955, student (1♀); Montfort, Nahal Kziv [Nahal Keziv], 28.ii.2018, G. Pisanty (1♂); Mount Hermon [Har Hermon], 1642 m, 33.2996°N 35.7677°E, 19.v.2022, G. Pisanty, pan trap (1♀); Mount Meron [Har Meron], 5.iv.2016, G. Pisanty (4♀); 33.000°N 35.3927°E, 4.iv.2017, G. Pisanty, pan traps (28♀, 7m+8♀ stylopised), sweeping (4♀) and on *Symphytum brachycalyx* (10♀, 4♂+3♀ stylopised); 1000 m, 1.iv.2012, L. Friedman (1♂); 17.iv.2012, L. Friedman (1♂); 1100 m, 32°59.7'N 35°24.7'E, 14.iv.2011, A. Freidberg (1♂); [Meron], 23.iv.1973, D. Furth (1♀); **SYRIA:** Slanfah [Slenfe], 1200 m, 19.iv.1986, K.M. Guichard (1♀) (ES, NHMUK, OLML, SMNHTAU, TJW).

**Remarks.** COI barcode sequences show a 2.4–2.7% difference between Israeli vs. Central European populations of *A. symphyti*. We employ here a broad species concept of *A. symphyti*, as there is no clear 'break point' between populations separated by Warncke as *A. symphyti* in Europe and *A. symphyti furcata* Friese in Turkey and the Caucasus (see map in Gusenleitner & Schwarz 2002). We prefer to consider this a continuum of variation across this range until demonstrated otherwise.

### *Andrena (Holandrena) forsterella* Osytshnjuk, 1978

**Distribution:** Azerbaijan, Bulgaria, Croatia, Cyprus, Greece, Iran, Italy, Lebanon, Macedonia, Turkey (Gusenleitner & Schwarz 2002; Wood *et al.* 2020a); newly recorded from Israel.

**Flight period:** May–June (Israel), up to August in more northern latitudes (Schönitzer *et al.* 1995).

**Flower records:** None.

**Material examined: ISRAEL:** Beit Uziel [Bet Uzi'el], 27.v.2011, N. Meltzer (1♂); Jerusalem, Mt. Scopus, 26.v.1940 (1♀); Revadim, 28.v.2011, A. Golan (1♂); 30.v.2011, A. Golan (1♂); 4.vi.2011, A. Golan (1♂); 7.vi.2011, A. Golan (1♂); Merom Golan, 33°08'N 35°46'E, 1.vi.2008, I. Gerlitz (1♀) (SMNHTAU).

**Remarks.** This species has often been confused with *Andrena wilhelmi* Schuberth, which has an earlier flight period, and is also present in Israel (Pisanty *et al.* 2018).

### *Andrena (Hoplendrena) najadana* Warncke, 1975

**Distribution:** High altitudes (1300–1700 m) in Israel (first record) and Turkey. Likely present also in Lebanon and Syria.

**Flight period:** April (Warncke 1974c).

**Flower records:** Sapindaceae: *Acer monspessulanum*.

**Material examined: HOLOTYPE: TURKEY:** Akseki/Taurus, 1300 m, 25.iv.1973, K. Warncke (♂) (OLML); **non-type material: ISRAEL:** Mount Hermon [Har Hermon], 1649 m, 33.2993°N 35.7679°E, 16.iv.2021, G. Pisanty, on *Acer monspessulanum* (1♀, 2♂); 1650 m, 33.2993°N 35.7678°E, 16.iv.2022, G. Pisanty, on *Acer monspessulanum* (3♀) (SMNHTAU).

### *Andrena (Melandrena) pyrozonata* Friese, 1921

**Distribution:** Cyprus, Israel, Turkey. Likely present also in Lebanon and Syria.

**Flight period:** March–April.

**Flower records:** Fagaceae: *Quercus infectoria* (Mavromoustakis 1958); Sapindaceae: *Acer monspessulanum*.

**Material examined: HOLOTYPE: TURKEY:** Kahramanmaraş, Kayabaşı [Kayabaschi], 8.vii.1913, F. Tölg (♀) (ZMHB); **PARATYPE (A. perapedica Mavromoustakis): CYPRUS:** Pera Pedi, 4.iv.1952, Mavromoustakis (1♀) (SMNHTAU); **non-type material: ISRAEL:** Montfort [Monfort], 17.iii.1983, A. Freidberg (1♂); Mount Hermon [Har Hermon], 1640 m, 33.300°N 35.7675°E, 7.iv.2021, G. Pisanty, sweeping (1♀); 1644 m, 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan trap (1♀); 1649 m, 33.2993°N 35.7679°E, 16.iv.2021, G. Pisanty, on *Acer monspessulanum* (2♀); Nahal Kziv [Nahal Keziv], 5.iii.2008, L. Friedman (1♂) (SMNHTAU).

**Remarks.** This species was formerly classified in the polyphyletic group known as *Poliandrena* (now a synonym of *Ulandrena*, Pisanty *et al.* 2022). We now reclassify it under *Melandrena*, as it is closely related morphologically to *A. (Melandrena) elmaria* Gusenleitner, and the barcode sequences of these two species cluster together with *A. (Melandrena) nigroaenea* (Kirby) in phylogenetic analyses of barcode sequences.

### *Andrena (Micrandrena) cedricola* Wood, 2020

**Distribution:** High altitudes in Israel (first record), Lebanon, Syria and Turkey (first record) (Wood *et al.* 2020a).

**Flight period:** March–May (Wood *et al.* 2020a).

**Flower records:** Brassicaceae: *Brassica* sp. (Wood *et al.* 2020a), *Peltaria angustifolia*.

**Material examined: HOLOTYPE: LEBANON:** Hadath el Jebbe, Border of the Cedar forest, 1646 m, 13.v.2019, M. Boustani (♀) (RBINS); **non-type material: ISRAEL:** Hermon Nature Reserve [Hermon NR], 1508 m, 300 m N lower parking lot, 33.294°N 35.760°E, 28.v.2019, L. Friedman (2♀); Hermon Nature Reserve, Biq'at Man, 1450 m, 33.292°N 35.751°E, 29.iv.2022, G. Pisanty, on *Peltaria angustifolia* (2♀); Merom Golan, 1000 m, 23.iv.1997, R. Kasher (1♀); Mount Hermon [Har Hermon], 1480 m, 33.292°N 35.7595°E, 7.iv.2021, G. Pisanty, pan trap (1♂); 1600 m, 23.v.1998, A. Freidberg (1♀); 18.v.2009, L. Friedman (1♀); 1620 m, 33.300°N 35.767°E, 11.v.2020, G. Pisanty (1♂); 1644 m, 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan trap (1♂); 1645 m, 33.2994°N 35.7675°E, 16.iv.2021, G. Pisanty, pan traps (3♂) and sweeping (1♂); [Har Hermon], Nahal Guveta, 1410 m, 33.285°N 35.763°E, 11.v.2020, G. Pisanty, on *Peltaria angustifolia* (10♀, 4♂); [Hermon], 1640–1675 m, 33.298–299°N 35.767–770°E, 19.v.2022, G. Pisanty, on Brassicaceae (1♀); Mount Meron, 1100 m, 13.iv.1988, I. Yarom (2♀, 1♂); [Har Meron], 1100 m, 17.iv.2000, A. Freidberg (3♂); Neve Ativ, 16 km NE Qiryat-Shmona,

1000 m, 18.iv.1990, R. Kasher (1♀); Nimrod Castle [Qala'at Nemrod], 6.v.1987, A. Shlagman (2♀,1♂); **SYRIA:** Camp Faouar [Faouar], 11.iii.2001, J. Plass (1♂); **TURKEY:** Hakkari, 18 km NW Yüksekova, 1800 m, 13.vi.1981, K. Warncke (2♀); Hakkari, Suvani Halil-Pass, 2300 m, 14.vi.1981, K. Warncke (6♀); Tanin-Tanin-Pass, 1900 m, 3.vi.1980, M. Schwarz (1♀) (OLML, SMNHTAU, TJW).

### *Andrena (Micrandrena) cervina* Warncke, 1975

**Distribution:** Cyprus, newly recorded from Israel and the West Bank, likely present also in Lebanon and Syria.

**Flight period:** March–May.

**Flower records:** Brassicaceae: *Sinapis alba*.

**Material examined: CYPRUS:** Latsi, 5 km W (Akamas peninsula), 1–10.iv.2000, S. Kadelc (1♀); [Akamas, Neo Chorio, Lakki], 100 m, 10.iv.2000, J. Voříšek (6♀,1♂); E of Lemesos, Mary env., 6.iii.2014, M. Snižek (7♀,99♂); Kykkos, 800 m, 11.v.2014, M. Kafka (15♀); Limassol, Polemidia National Forest Park, 8.iii.2017, Bee course 2017 (3♀,1♂); Paphos district, Lysos [Lycos], 5.iv.2006, J. Simaki (5♀,5♂); Polis Chrysochous [Polis] env., 9.iii.2014, M. Snižek (78♀,24♂); Troodos mountains, Kelefos Bridge, 1–10.iv.2000, S. Kadelc (5♂); **ISRAEL:** Adulam-France Park [Ya'ar 'Adulam], 20.iv.2011, T. Koznichki (1♀); Alonci Abba [Aloné Abba], 14.iv.1999, A. Freidberg (1♀); Forest of the Martyrs [Ya'ar Kedoshim], 4.iii.2014, N. Shamir, pan traps (1♂); Har Addir, 33.033°N 35.361°E, 5.iv.2016, G. Pisanty, pan traps (1♂); 21.iv.2016, G. Pisanty, pan traps (4♀,1♂); Malkia [Malkiyya], 27.iv.2014, O. Winberger, pan traps (1♀); Mount Hermon [Har Hermon], 1600 m, 33.300°N 35.767°E, 11.v.2020, G. Pisanty, pan trap (1♂); 1790 m, 33.3015°N 35.7737°E, 15.v.2016, G. Pisanty, pan traps (2♀); Mount Meron, 900 m, 13.iv.1988, C. O'Toole, on *Sinapis alba* (1♂); [Har Meron], 33.300°N 35.3925°E, 5.iv.2016, G. Pisanty (1♀); 33.300°N 35.3927°E, 4.iv.2017, G. Pisanty, pan traps (2♂); 1100 m, 17.iv.2000, A. Freidberg (1♂); 25.iv.2002, L. Friedman (1♀); Mount Meron Nature Reserve [Har Meron Reserve], 'En Zeved, 32°59'N 35°26'E, 24.iv.2002, L. Friedman (1♀); Odem Forest Nature Reserve [Ya'ar Odem NR], 33.205°N 35.736°E, 27.iv.2020, G. Pisanty, partly from pan traps (2♀); Sasa, 20.iv.2015, O. Winberger, pan traps (2♂); 31.iii.2016, O. Winberger (3♂); 14.iv.2016, O. Winberger (3♀,7♂); Ya'ar Yish'i, 31.iii.2016, T. Chaprazaro (1♀); Yiftah [Yiftach], 21.iv.2015, O. Winberger, pan traps (1♀); 30.iii.2016, O. Winberger (9♀); 12.iv.2016, O. Winberger (27♀); Yir'on, 10.iv.2014, O. Winberger, pan traps (1♂); **WEST BANK:** Peduel, Deir Qala', 27.iii.2013, L. Friedman (1♀) (AV, OLML, SMNHTAU, TJW).

### *Andrena (Micrandrena) convexifrons* Wood, 2021

**Distribution:** Israel (first record), Jordan. Likely present also in Lebanon and Syria.

**Flight period:** April–June (Wood 2021a).

**Flower records:** None.

**Material examined: HOLOTYPE: JORDAN:** Ajloun [Aljun], 16 km WNW, 600 m, 21.v.2007, Z. Kejval (♀) (OLML); **PARATYPES: JORDAN:** Ajloun [Aljun, 30 km W Jarash], 2.vi.2006, Z. Kejval (1♀); [Aljun], 6–7.v.2012, M. Kafka (1♂); [Aljun], 16 km WNW, 600 m, 21.v.2007, Z. Kejval (38♀,2♂); Kufur, 4–5.v.2012, M. Kafka (3♂); 20 km SW Madaba, 1–31.v.2006, F. Kantner (10♀); North Shuna, 29–30.iv.1996, M. Halada (4♂); [Zadba/Zadaba], 6.v.2012, M. Kafka (3♀,86♂) (OLML, SMNHTAU, TJW); **non-type material: ISRAEL:** Katzrin [Qazrin], 335 m, 32°59.2'N 35°41.8'E, 22.v.2011, A. Freidberg (1♀); Nahal Batra, 43 m, 32.913°N 35.681°E, 23.v.2019, A. Dorchin & T. Roth (3♀); 85 m, 32.916°N 35.688°E, 23.v.2019, A. Dorchin & T. Roth (2♀); Nahal Meshushim, 32.939°N 35.662°E, 1.v.2015, G. Pisanty (1♀); Park HaYarden, –190 m, 32°54.7'N 35°37.6'E, 22.v.2011, M. Guershon (2♀); Ravid, 17.v.2009, L. Friedman (1♀); Shebaa Farms [Har Dov], Karst, 1380 m, 33°18.6'N 35°43.2'E, 25.v.2010, A. Freidberg (1♀); Zomet Ha'Amaqim (Jalame), 18–22.v.1993, A. Freidberg (1♀); 26–30.v.1993, A. Freidberg (3♀) (SMNHTAU, TJW).

### *Andrena (Micrandrena) decollata* Warncke, 1974

**Distribution:** Mediterranean coastline of Algeria, Lybia and Tunisia (Gusenleitner & Schwarz 2002); newly recorded from the coastal plain of Israel.

**Flight period:** January–April.

**Flower records:** Brassicaceae; Boraginaceae: *Alkanna strigosa*.

**Material examined:** ISRAEL: Binyamina, 26.i.1976, A. Freidberg (1♂); Gan Sorek [Gan Soreq], Give'at Humera, 4.ii.2020, L. Friedman (1♂); Gvulot [Gevulot], 14.iii.1987, E. Shney-Dor (1♀); Holon [Hulon], 18.i.1954, L. Fishelsohn (1♂); Kadima [Qadima], 5.iii.1990, R. Kasher, on *Alkanna strigosa* (1♀); 6.iv.2015, I. Eliakim (1♂); Mikveh Israel [Mikve Israel], 5.iii.1946 (1♀); Nahal Alexander, 27.ii.2020, K. Levy, pan trap (4♀); 16.iii.2020, K. Levy, pan trap (2♀); Nitzanim [Nizzanim], 17.ii.2005, A. Freidberg (3♂); Nizzanim Nature Reserve, 25.ii.2009, A. Freidberg (2♂) and L. Friedman (1♀, 2♂); Rehovot, ii.1934, Hecht (3♀, 1♂); 9.ii.1942, H. Bytinski-Salz (3♀); [R.Gh] (possibly Ramat Gan or Ramat Chen), 3.ii.1940 (1♀); 6.ii.1940 (1♀); Tel Aviv, 17.iii.1940, H. Bytinski-Salz (1♀); ?.iii.1940, H. Bytinski-Salz (1♂); Tel Aviv, Ramat Aviv, 32.130°N 34.801°E, 9.ii.2015, G. Pisanty, pan traps (2♀, 2♂); 1.iv.2017, G. Pisanty, partly on Brassicaceae (2♂); Zur Moshe, 27.iv.2015, I. Eliakim (1♀, 1♂); TUNISIA: Hammamet env., 15.iii.1996, K. Deneš (2♀) (OLML, RMNH, SMNHTAU, TJW).

**Remarks.** Israeli specimens of *A. decollata* were erroneously identified by Warncke as *A. longibarbis* Pérez (Warncke 1969). Pisanty *et al.* (2018) considered them a distinct, undescribed species related to *A. decollata*. However, upon examination of more material, we see no reason to separate them from the north African material of *A. decollata*.

### *Andrena (Micrandrena) dividicincta* Pisanty sp. nov.

(Figs. 102–109)

**Female** (Fig. 102).

**Body length:** 7–7.5 mm.

**Colour.** Body dark brown (Fig. 102). Flagellum entirely dark brown. Femora, tibiae and basitarsi dark brown; apical tarsal segments reddish-brown. Wings slightly infuscate, veins brown, stigma orangish-brown (Fig. 102). Tergal marginal zones light to dark brown (Fig. 105).

**Pubescence.** Head and mesosoma covered with whitish to light brown plumose hairs of moderate length and density (Figs. 102–104). Facial fovea with dense, minute brownish hairs (Fig. 104). Propodeal corbicula incomplete, posterodorsal fringe with long plumose hairs. Surface of corbicula with few long simple hairs. Leg hair whitish-golden (Fig. 102). Flocculus incomplete. Scopal hairs mostly simple, unilaterally plumose on posterior part. Surface of tergal discs almost bare medially, with very sparse, short bright hairs laterally. Tergal marginal zones 2–4 with distinct interrupted bands of very dense white hairs, covering 1/2–2/3 of tergal width. Terminal fringe golden (Fig. 105).

**Head** (Figs. 103–104). 1.1 times broader than long. Galea shiny, superficially shagreened. Labral process broad and short, more or less arched. Clypeus very weakly convex, almost flat, shagreened basally, shagreened to smooth apically, distance between punctures 1–1.5 puncture diameters, puncture size medium, without impunctate midline (Fig. 103). Paraocular area strongly punctate below, strongly longitudinally grooved above. Supraclypeal area weakly punctate to longitudinally grooved. Flagellomere 1 about as long as 2+3, 2 as long as 3 or slightly shorter. Frons strongly longitudinally striated, with an areolate midline. Facial fovea narrow, almost linear, extending from level of medial ocellus to base of clypeus, 0.4 times as broad as antennocular distance, distinctly separated from compound eye (Figs. 103–104). Distance of fovea from lateral ocellus about 2 ocellus diameters. Ocelloccipital distance 1 ocellus diameter. Vertex carinate (Fig. 104).

**Mesosoma** (Fig. 104). Dorsolateral angle of pronotum not to very weakly elevated, pronotum not carinate laterally. Mesonotum entirely matt and strongly shagreened, coarsely but very shallowly, obliquely punctured, punctures visible mostly in anterior view, distance between punctures 1–2 puncture diameters. Scutellum similar, slightly shinier (Fig. 104). Mesepisternum matt, finely alveolate, impunctate, anterior part weakly rugose-areolate. Propodeal triangle finely rugose-areolate mediobasally, alveolate apicolaterally (Fig. 104). Posterolateral part of propodeum finely alveolate, impunctate, sculpturing finer compared to triangle. Propodeal corbicula shiny, finely reticulated, impunctate. Hind leg pretarsal claws distinctly bidentate. Submarginal crossvein 1 reaching marginal cell 1–2 vein widths from stigma. Recurrent vein 1 reaching marginal cell 2 at its middle or proximal to it. Nervulus interstitial to very weakly antefurcal.





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**FIGURES 102–109.** *Andrena (Micrandrena) dividicineta* sp. nov. 102. female habitus, 103. female head, 104. female head and mesosoma, 105. female metasoma, 106. male habitus, 107. male head, 108. male metasoma, 109. male genitalia.

**Metasoma** (Fig. 105). Tergal discs moderately to weakly shagreened, somewhat shiny, impunctate, shagreenation strongest on tergum 2 and weakest on 3–4. Tergal marginal zones weakly depressed, basal part more weakly shagreened than disc, apical part smooth.

**Male** (Fig. 106).

**Body length.** 6 mm.

**Colour.** Similar to female. Clypeus and paraocular areas dark (Fig. 107).

**Pubescence.** Head and mesosoma with long, plumose, mostly yellowish hair (Figs. 106–107). Frons, lateral part of paraocular area, and upper part of genal area with short to medium dark hairs (Figs. 106–107). Metasomal hair similar to female, but terminal fringe whitish (Fig. 108).

**Head** (Fig. 107). 1.2 times broader than long. Clypeus almost flat, very smooth and shiny, strongly and densely punctate, distance between punctures 0.5–2 puncture diameters, puncture density increasing laterally, without impunctate midline. Flagellomere 1 slightly shorter than 3, 2 slightly shorter than 1 (Fig. 107). Rest of head similar to female.

**Mesosoma.** Similar to female.

**Metasoma** (Fig. 108). Tergal disc 1 shiny, very superficially shagreened, weakly, sparsely and very finely punctate, distance between punctures 2 puncture diameters. Tergal discs 2–5 shagreened basally and smooth apically, shagreenation decreasing gradually towards distal terga, punctation weak, sparse and very fine, distance between punctures 2–3 puncture diameters. Tergal marginal zones weakly depressed, smooth to very slightly shagreened, impunctate.

**Genitalia and hidden sterna** (Fig. 109). Gonocoxites separated almost from base, dorsal gonocoxite lobe strongly developed, rounded. Gonostylus blade strongly and abruptly broadened apically. Penis valves broad basally, strongly tapering apically (Fig. 109). Sternum 8 simple, columnar, narrow, apical process spatulate, not broadened.

**Diagnosis.** *Andrena dividicincta* is closely related to *A. querquedula* Warncke from Turkey, and both species are easily distinguished from most *Micrandrena* by the almost flat clypeus, impunctate female terga, broad and finely granular propodeal triangle, and unique pattern of metasomal hair bands. *Andrena dividicincta* differs from *A. querquedula* in the stronger shagreenation of the male clypeus (smooth in *A. querquedula*) and female and male terga (completely smooth in female *A. querquedula*, and to a lesser extent in the male).

**Distribution:** Northern Israel (Upper Galilee and Mount Hermon). Likely present also in Lebanon and Syria.

**Flight period:** February–April.

**Flower records:** Rosaceae: *Prunus dulcis*, *Pyrus syriaca*; Sapindaceae: *Acer monspessulanum*.

**Pollen analysis.** Six analysed pollen loads from Mount Hermon, Montfort and Meron Junction contained 31.2% Sapindaceae (*Acer*), 30.6% Rosaceae (*Prunus*-type, *Crataegus*-type), 19.0% Rhamnaceae (*Rhamnus*-type), and 19.0% an unidentified, featureless pollen type (Poaceae?). The species therefore appears to be polylectic, favouring flowering trees and shrubs.

**Holotype:** ISRAEL: Montfort, Nahal Kziv [Montfort, Nahal Keziv], 28.ii.2018, G. Pisanty, ♀ (SMNHHTAU:286301).

**Paratypes:** ISRAEL: Meron Junction [Meron JNC.], 20.iii.1995, on *Pyrus syriaca* (9♀); Montfort, 2.iii.1987, A. Freidberg (1♀) and A. Shlagman (1♀); 4.iii.1993, A. Freidberg (2♀); 5.iii.2008, A. Freidberg (1♀); [Montfort], 10.iii.1981, F. Kaplan (1♀); [Montfort, Nahal Keziv], 28.ii.2018, G. Pisanty (3♀, 1♂); [Nahal Keziv, Montfort], 400 m, 33°02'N 35°14'E, 24.ii.2011, A. Freidberg (1♀); Mount Hermon [Har Hermon], 1644 m, 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan trap (1♀); 1649 m, 33.2993°N 35.7679°E, 7.iv.2021, G. Pisanty, pan trap (2♂), sweeping (2♀), and on *Acer monspessulanum* (12♀, 1♂); 16.iv.2021, G. Pisanty, on *Acer monspessulanum* (87♀, 2♂); 1650 m, 33.2993°N 35.7678°E, 16.iv.2022, G. Pisanty, on *Acer monspessulanum* (16♀, 2♂); [Hermon], 1641 m, 33.2993°N 35.7670°E, 16.iv.2022, G. Pisanty, on *Prunus dulcis* (7♀); 1642 m, 33.2992°N 35.7668°E, 16.iv.2022, G. Pisanty, on Rosaceae (11♀); Mount Meron [Har Meron], 800 m, 5.iii.2011, A. Freidberg (1♂); Nahal Kziv [Nahal Keziv], 33°02.7'N 35°13.6'E, 5.iii.2008, A. Freidberg (1♀); 33.0465°N 35.226°E, 26.ii.2021, G. Pisanty (1♀); Sasa, 20.iv.2015, O. Winberger (1♀) (ES, NHMUK, OLML, RMNH, SMNHHTAU, TJW, ZMHB, ZSMC).

**Etymology.** *dividicincta* = Latin for “with divided belt”, in reference to the species’ strongly interrupted tergal hair bands. The species epithet is an adjective.

**Other material examined (*A. querquedula*):** PARATYPES: TURKEY: Akseki/Taurus, 1300 m, 25.iv.1973, K. Warncke (2♀, 10♂) (SMNHHTAU).

*Andrena (Micrandrena) herodesi* Pisanty & Wood sp. nov.

(Figs. 110–114)

**Female** (Fig. 110).

**Body length:** 7.5–8 mm.

**Colour.** Body and legs dark brown (Fig. 110). Anterior side of flagellum gradually reddish-brown apically (Figs. 110–111). Wings hyaline, veins brown, stigma orange (Fig. 110). Tergal marginal zones reddish-brown (Fig. 114).

**Pubescence.** Head and mesosoma with white to brownish minutely plumose hairs of moderate length and density (Figs. 110–113). Facial foveae with dense minute hairs, white on lower and medial sections, white to brownish on upper section (Figs. 111, 113). Propodeal corbicula incomplete, posterodorsal fringe with long white plumose hairs. Surface of corbicula with few long white simple hairs. Legs with mostly white to golden hair (Fig. 110). Flocculus developed, white. Scopa moderate, hairs mostly white and simple, brownish near tibial base, unilaterally plumose on posterior part (Fig. 110). Surface of terga with sparse short white hairs. Tergal marginal zones 2–4 with distinct continuous bands of dense white hairs, limited to the apical half of the marginal zone in the center of the tergum. Terminal fringe golden to light brown (Fig. 114).

**Head** (Figs. 111–113). 1.2 times broader than long. Galea shagreened. Labral process trapezoidal (Fig. 112). Clypeus flat, basal 2/3 matt, shagreened and very finely longitudinally grooved, apical 1/3 more or less smooth; punctation shallow, distance between punctures 1–2 puncture diameters, puncture size medium, with an ill-defined impunctate midline (Fig. 112). Paraocular area weakly shagreened to longitudinally striated below, distinctly longitudinally striated above (Figs. 111–112). Supraclypeal area and frons longitudinally striated. Flagellomere 1 slightly longer than 2+3, 2 slightly shorter than 3 (Fig. 111). Facial foveae in lower 2/3 narrow and linear, in upper 1/3 broadened, 0.2 and 0.4 times as broad as antennocular distance, respectively, extending from level of middle of lateral ocellus to base of clypeus (Figs. 111, 113). Distance of fovea from lateral ocellus 1 ocellus diameter. Ocell-occipital distance 0.8 ocellus diameter (Fig. 113).

**Mesosoma** (Fig. 113). Dorsolateral angle of pronotum not to weakly elevated, pronotum not carinate laterally. Mesonotum entirely matt and strongly shagreened, very shallowly punctured, distance between punctures 1.5–2 puncture diameters, puncture size medium. Scutellum similar, with a shinier medial narrow area (Fig. 113). Mesepisternum finely alveolate, impunctate. Propodeal triangle finely alveolate, except for a small mediobasal area which is very finely and shallowly rugose-areolate (Fig. 113). Propodeal corbicula shiny, finely reticulated, impunctate. Hind pretarsal claws bidentate. Submarginal crossvein 1 meeting marginal cell about 4 vein widths from stigma. Recurrent vein 1 meeting submarginal cell 2 near its middle. Nervulus interstitial to weakly postfurcal (Fig. 110).

**Metasoma** (Fig. 114). Tergal discs matt, strongly shagreened and impunctate. Tergal marginal zones shagreened, 1 not depressed, 2–4 weakly so.

**Male.** Unknown.

**Diagnosis.** *Andrena herodesi* belongs to the *Andrena longibarbis* species group of *Micrandrena*, formerly regarded as subgenus *Distandrena* (Pisanty *et al.* 2022). It most closely resembles *A. fria* Warncke, but differs in the smaller body size, trapezoidal labral process (triangular in *A. fria*), more weakly grooved clypeus, foveae that are less strongly narrowed below, and impunctate terga (distinctly punctured in *A. fria*).

**Distribution:** Southern Israel, Jordan, West Bank.

**Flight period:** March.

**Flower records:** None.

**Holotype:** WEST BANK [ISRAEL]: Herodium [Herodyon], 31°40'N 35°14'E, 31.iii.2009, M. Guershon, ♀ (SMNHTAU:348536).

**Paratypes:** ISRAEL: Sde Boker [Sede Boqer], 21.iii.1985, I. Yarom (2♀); JORDAN: Wadi-el-Mawjib, 400 m, 20.iii.2009, V. Barták (1♀); WEST BANK: Herodium [Herodyon], 31°40'N 35°14'E, 31.iii.2009, M. Guershon (5♀) (OLML, SMNHTAU).

**Etymology.** Named after king Herod the Great (Herodes in Latin), builder of the palace fortress of Herodium, the species' locus typicus. The species epithet is an adjective.

**Other material examined (*A. fria*):** SPAIN: Sierra de Maria, 25 km W Lorca, 10.v.2003, J. Halada (2♀); Sierra Filabres Albánchez, 23.iv.2003, J. Halada (10♀) (OLML).



**FIGURES 110–117.** *Andrena (Micrandrena) herodesi* sp. nov. 110. female habitus, 111. female head, 112. female clypeus and labral process, 113. female vertex and mesosoma, 114. female metasoma. *Andrena (Micrandrena) lunaris* sp. nov. 115. female habitus, 116. female head, 117. female clypeus and labral process.

*Andrena (Micrandrena) lunaris* Pisanty & Wood sp. nov.

(Figs. 115–126)

**Female** (Fig. 115).

**Body length:** 6 mm.

**Colour.** Body black (Fig. 115). Anterior side of flagellomeres 2–10 dark brown to black. Legs brown to black. Wings weakly infuscate, veins and stigma light to dark brown (Fig. 115). Tergal marginal zones dark brown to black (Fig. 120).

**Pubescence.** Body hair mostly short, white to golden, distinctly plumose (Fig. 115). Clypeus with moderately dense, short and thin yellowish hairs (Figs. 116–117). Paraocular and supraclypeal areas, frons and scape with moderately dense, short to medium, whitish to golden hairs (Fig. 116). Upper half of fovea golden-brown in dorsal view (Fig. 118). Vertex with short to medium golden hairs. Genal area with short golden hairs dorsally, gradually white medium hairs ventrally. Mesonotum and anterior half of scutellum with dense, short and thick golden hairs (Figs. 118–119). Metanotum and posterolateral margin of scutellum with dense, medium-lengthed, thick whitish to golden hairs. Mesepisternum with long whitish to golden hairs. Propodeal corbicula incomplete, dorsoposterior fringe with long whitish plumose hairs, corbicular surface with few long simple white hairs. Legs with white to golden hairs; scopal hairs simple, whitish; flocculus incomplete, white (Fig. 115). Tergal discs 1–4 laterally with sparse short white hair; medially, 1 almost hairless, 2 and especially 3–4 with minute inconspicuous white hairs. Apices of tergal discs 2–4 with sparse fringes of medium-lengthed white hairs reaching end of marginal zone, interrupted on 2–3, continuous on 4. Tergal marginal zones 2–4 with broadly interrupted, narrow apical bands of dense short white hair, slightly extending onto following tergal disc, thinner and narrower on tergum 4. Prepygidial fimbria whitish laterally, light brown medially; pygidial fimbria light brown (Fig. 120).

**Head** (Figs. 116–118). 1.2 times broader than long. Mandible bidentate. Galea finely shagreened. Labral process complex, basal half triangular, apical half snout-shaped, weakly protuberant (Fig. 117). Clypeus weakly convex, shagreened, apical margin often smooth, punctation fine, distance between punctures 1–2 puncture diameters, with a broad impunctate midline (Figs. 116–117). Supraclypeal plate, paraocular area and frons strongly longitudinally striated, a strong punctation is developed mainly on lower half of paraocular area and above antennal sockets (Fig. 116). Flagellomere 1 about as long as 2+3. Facial foveae elongate, of moderate, uniform width, extending from level of middle–lower end of lateral ocellus to base of clypeus or slightly above, 0.3 times as broad as antennocular distance (Figs. 116, 118). Distance of fovea from lateral ocellus 1.5 ocellus diameters. Ocelloccipital distance slightly less than 1 ocellus diameter. Vertex moderately carinate (Fig. 118).

**Mesosoma** (Fig. 118). Pronotum without elevated dorsolateral angle or lateral carina. Mesonotum finely and very densely punctured, distance between punctures 0–0.5 puncture diameters, anterior part with punctures becoming oblique and blending into shagreenation (Fig. 119). Scutellum similarly punctured, often somewhat shinier (Fig. 118). Mesepisternum finely alveolate, obliquely punctured. Propodeal corbicula finely reticulate, with few very coarse, oblique punctures. Posterior part of propodeum strongly right-angled, posterolateral part rugose-areolate; triangle weakly delineated by shallow carina, basal 1/3–1/2 rugose-areolate, apical 1/2–2/3 finely alveolate, a strong mediobasal carina is sometimes developed (Fig. 118). Hind pretarsal claw bidentate. Recurrent vein 1 meets submarginal cell 2 at its middle or slightly proximal to it. Submarginal crossvein 1 meets marginal cell 1–2 vein widths from stigma. Nervulus slightly antefurcal to interstitial (Fig. 115).

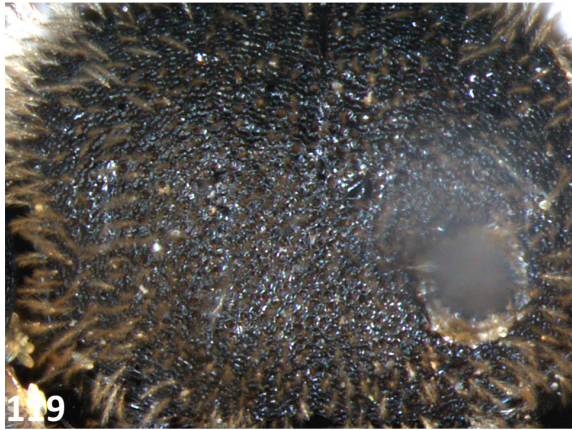
**Metasoma** (Fig. 120). Tergal discs shagreened, shagreenation decreasing towards apical terga; 1 impunctate, 2–4 finely, very densely and very shallowly punctured, punctation blending into shagreenation and hardly discernible. Tergal marginal zones broad, arched, medially covering 1/2–3/5 of tergal length, impunctate, shagreened to shallowly reticulate, shagreenation decreasing towards apical terga.

**Male** (Fig. 121).

**Body length:** 5.5 mm.

**Colour.** Similar to female.

**Pubescence.** Facial hair colour variable among individuals, ranging from fully white to predominantly black in some areas of the face, especially the paraocular area and frons (Figs. 121–122). Clypeus with dense fringe of medium-lengthed white hairs, extending beyond clypeal apex to about 1/2 of clypeus length (Figs. 121–122). Paraocular area with moderately dense, short to medium, white to black hairs. Scape and area between antennal sockets with dense, medium-lengthed white to mixed black and white hairs. Frons with sparse, short to medium, white to black hairs.



**FIGURES 118–126.** *Andrena (Micrandrena) lunaris* sp. nov. 118. female vertex and mesosoma, 119. female mesonotum, 120. female metasoma, 121. male habitus, 122. male head, 123. male mesonotum and scutellum, 124. male metasoma, 125. male genitalia, 126. male eighth sternum.

Vertex with short white to black hairs and long white to golden hairs. Genal area with short white to black hairs dorsally, gradually medium-lengthed, white ventrally. Mesonotum, scutellum and metanotum with moderately dense, short to medium, white to golden hairs, longer and denser peripherally (Figs. 121, 123). Mesepisternum with long white hairs, sometimes golden dorsally (Fig. 121). Propodeum with long whitish hairs. Legs with white to golden hair. Tergal discs 1–5 laterally and 1 basally with short white to yellowish hair; 1–5 medially with minute inconspicuous bright hair. Apices of tergal discs 2–4 with sparse fringes of medium-lengthed, white to golden thin hairs reaching end of marginal zone, interrupted on 2–3, continuous on 4. Tergal marginal zones 2–4 with broadly interrupted, narrow apical bands of moderately dense short white hair, slightly extending onto following tergal disc (Fig. 124).

**Head** (Fig. 122). 1.2 times broader than long. Labral process square, apical margin strongly emarginate. Clypeus weakly convex, shagreened to shiny, transversely striated, moderately punctured, distance between punctures 0.5–1 puncture diameters, a narrow impunctate midline is sometimes weakly indicated. Supraclypeal and paraocular areas and frons distinctly rugose. Flagellomere 1 shorter than 2+3, 2 shorter than 3. Ocelloccipital distance 1 ocellus diameter. Vertex carinate.

**Mesosoma** (Fig. 123). Similar to female, but mesonotal punctation sparser and very shallow, blending into shagreenation, distance between punctures 0.5–1 puncture diameters (Fig. 123).

**Metasoma** (Fig. 124). Similar to female, tergal marginal zones 2–4 narrower, medially occupying 1/3–1/2 of tergal length.

**Genitalia and hidden sterna** (Figs. 125–126). Dorsal gonocoxite lobes weakly developed, apices pointed, adjacent to one another. Gonostyli broadening apically, blade flat, rounded. Basal half of penis valves relatively broad, spade-shaped, apical half needlelike (Fig. 125). Sternum 8 simple, columnar, densely and uniformly hairy, weakly broadening apically, apical margin blunt to weakly emarginate (Fig. 126).

**Diagnosis.** *Andrena lunaris* is distinguished from other *Micrandrena* by the combination of the elongate, slightly protuberant, snout-shaped labral process (Fig. 117), and the extremely densely punctate and dull mesonotum covered by relatively dense and thick short hair (Figs. 118–119). The male is easily identified by the unique shape of the genitalia (Fig. 125).

**Distribution:** North and central Israel, Jordan, Syria, West Bank.

**Flight period:** February–April.

**Flower records:** Amaryllidaceae: *Allium trifoliatum*; Asparagaceae: *Ornithogalum narbonense*; Asteraceae: *Glebionis* sp.; Brassicaceae: *Diplotaxis erucooides*, *Sinapis alba*; Orchidaceae: *Cephalanthera longifolia*.

**Holotype:** ISRAEL: Montfort, Nahal Kziv [Montfort, Nahal Keziv], 28.ii.2018, G. Pisanty, ♀ (SMNHNTAU:286280).

**Paratypes:** ISRAEL: Adulam-France Park [Ya'ar Adulam], 20.ii.2013, Y. Berner, on *Diplotaxis erucooides* (4♂); [Ya'ar Adullam], 20.iv.2011, T. Koznichki, pan trap (1♀); Bar'am, 4.iv.2014, N. Atkin, on *Sinapis* (1♀) & O. Winberger, on *Glebionis* and from pan traps (2♀); Beit Keshet [Bet Qeshet], 1.5 km NW, 32.74°N 35.38°E, 20.ii.2019, G. Pisanty (3♂); Beit Oren [Bet-Oren], 16.ii.1990, R. Kasher (1♂); Bnei Dror [Bené Deror], 7.iii.2012, O. Afik, partly from pan traps (4♀, 2♂); Buraiqa Nature Reserve [Buraiqa NatReserve], 32.5413°N 34.979°E, 15.ii.2021, G. Pisanty (1♂); Dishon, 7.iv.2016, O. Winberger, pan traps (1♀); Forest of the Martyrs [Ya'ar Kedoshim], 2.iii.2014, N. Shamir, pan traps (1♂); 4.iii.2014, N. Shamir, pan traps (1♂); 6.iii.2014, N. Shamir, pan traps (1♀); 7.iii.2014, N. Shamir, pan traps (1♂); 23.iii.2014, N. Shamir, on *Allium trifoliatum* (3♀) and *Sinapis alba* (1♀); 24.iii.2014, N. Shamir, pan traps (1♂); 26.iii.2014, N. Shamir, pan traps (2♀); 30.iii.2014, N. Shamir, pan traps (1♀); 7.iii.2017, Y. Farago, pan traps (1♀); 18.iii.2017, Y. Farago, pan traps (5♀, 1♂); 3.iv.2017, Y. Farago, pan traps (1♀); 16.iv.2017, Y. Farago, pan traps (2♀); Give'at Humera [Humra Hill], 12.iii.2009, A. Dorchin (1♀); Goren, 33°02'47.7"N 35°13'19.8"E, 25.iii.2021, T. Novoselsky (1♀); Haifa, 26.ii.1977, A. Freidberg (1♀); 20.iii.1979, A. Dafni, on *Cephalanthera longifolia* (1♂); Hanita, 27.iii.1976, D. Gerling (1♀); Har Karmila, 340 m, 31°47.7'N 35°00.9'E, 27.iii.2011, A. Freidberg (1♂); Har Tayyasim, 740 m, 31°46.3'N 35°05.1'E, 27.iii.2011, A. Freidberg (1♀); Harutzim [Harutsim], 26.ii.2009, A. Dorchin (1♀, 1♂); Hirbet Samara, 2.iii.2009, A. Dorchin (5♀, 1♂); Horbat Sheqofa, 252 m, 31.5775°N 34.8709°E, 15.iii.2021, G. Pisanty, pan trap (1♀); Kadima [Qadima], 5.iii.1990, R. Kasher (1♀); Kiryat Tiv'on [Tiv'on], 6.ii.1975, H. Bytinski-Salz (1♂); Lakhish, 23.ii.2012, T. Shapira, pan traps (11♂); 18.ii.2013, T. Shapira, pan traps (3♂); 6.iii.2013, T. Shapira, pan traps (2♀); 15.iii.2013, T. Shapira, pan traps (1♂); 18.iii.2013, T. Shapira, pan traps (1♀); 19.iii.2013, T. Shapira, pan traps (8♀); 2 km E, 31.556°N 34.87°E, G. Pisanty, 5.ii.2016, G. Pisanty, pan trap (1♂); 31.5562°N 34.869°E, 4.iii.2016, pan trap (1♀); 31.557°N 34.870°E,

4.iii.2016, pan traps (2♀); 3 km NE, 31.575°N 34.870°E, 11.iii.2016, G. Pisanty, pan trap (1♀); 31.578°N 34.870°E, 19.ii.2016, G. Pisanty (1♂); 26.ii.2016, G. Pisanty, partly from pan traps (1♀, 5♂); 31.579°N 34.871°E, 4.iii.2016, G. Pisanty, pan trap (1♀); Lehavot HaBashan [Lahavot HaBashan], 1.iii.2018, G. Pisanty (1♀); Malkia [Malkiyya], 10.iv.2014, O. Winberger, pan traps (3♀); 19.iv.2016, O. Winberger, pan traps (13♀); Me'arat Yishah, 0.5 km E, 32.718°N 35.007°E, 22.ii.2019, G. Pisanty (2♂); Mi'ilya–Montfort Road [Meiliya Mt.Fort Rd.], 5.iv.1972, D. Gerling (1♂); Montfort, 17.iii.1983, A. Freidberg (1♂); 33.045°N 35.225°E, 26.ii.2021, G. Pisanty (1♀, 1♂); [Montfort], 4.iii.1976, A. Freidberg (1♀, 2♂); 10.iii.1981, F. Kaplan (3♂) & T. Furman (1♂); [Montfort, Nahal Keziv], 28.ii.2018, G. Pisanty (2♀, 10♂); Mount Carmel, Hay-Bar, 1 km S University, 25.iii.1990, R. Kasher (2♀); Mount Meron, 900 m, 13.iv.1988, I. Yarom (1♂); [Har Meron], 32.9945°N 35.415°E, 5.iv.2016, G. Pisanty (1♀); 33.000°N 35.3927°E, 4.iv.2017, G. Pisanty, pan traps (1♀, 2♂); 1000 m, 1.iv.2012, A. Freidberg (1♂); 1100 m, 17.iv.2000, A. Freidberg (1♀); [W.Habiz, Mt. Meron], 8.iv.1972, A. Kesar (1♂); Mount Meron Nature Reserve [Meron NR], 1.2 km SSW Meron Field School, 998 m, 32°59'55"N 35°23'31"E, 3.iv.2016, A. Dorchin (1♀); Nahal Alexander, 4.iii.2017, K. Levy, pan trap (1♀); Nahal Dishon, 1.iv.1991, R. Kasher (2♂); Nahal Kziv [Nahal Keziv], 33.0465°N 35.226°E, 26.ii.2021, G. Pisanty (6♀, 23♂); 33°02.7'N 35°13.6'E, 5.iii.2008, A. Freidberg (1♂); [W. Habiz, Upper Galilee], 3.iv.1972, D. Gerling (2♀, 1♂); Ness Ziona [Nes Ziyayona], 31.928°N 34.78°E, 13.iii.2015, G. Pisanty (1♀); Netanya, Irus Ha'Argaman Nature Reserve [Irus Ha'Argaman NR], 32.287°N 34.842°E, 24.ii.2021, G. Pisanty (2♂); Netiv HaLamed-Heh [Netiv Halamed He], 24.ii.2009, G. Pisanty, pan traps (4♂); 26.ii.2009, G. Pisanty, pan trap (1♂); Ramat HaNadiv, 22.iii.2012, T. Shapira, pan trap (1♀); 11.iv.2012, T. Shapira, pan traps (2♀); 12.iv.2012, T. Shapira, pan traps (2♀); 2.iv.2013, T. Shapira, pan trap (1♀); [Hasharon, Zikhron Ya'aqov, Ramas Hanadiv], 12.iii.1990, R. Leys (2♀); [R. Hanadiv], 4.iii.1990, R. Kasher (1♂); Sasa, 1.iv.2014, O. Winberger, pan trap (1♂); 29.iv.2014, O. Winberger, pan trap (1♀); 3.iv.2016, O. Winberger, pan trap (1♂); Sheikh Ali, 20 km E Qiryat Gat, 17.iii.1990, R. Kasher (2♀); Shoham, 17.iii.2010, L. Friedman (1♀); 22.iii.2012, L. Friedman (2♀); Snir, Hermon Field Study Center, 13.iii.1997, R. Kasher (2♀); 27.iii.1997, R. Kasher (2♀, 1♂); 30.iii.1997, R. Kasher (1♀); Ya'ar Nehusha [Ya'ar Nehosha], 22.iii.2016, T. Chaprazaro, on *Ornithogalum narbonense* (1♀); Yiftah [Yiftach], 30.iii.2016, O. Winberger, pan traps (1♀); Zur Natan, 500 m NE, 32.245°N 35.021°E, 6.iv.2020, G. Pisanty (1♀); **JORDAN**: 10 km N Jerash, 20.iv.2002, M. Snižek (1♀); **SYRIA**: Burg Marqab, 7 km SE Banyas, 16.iv.1992, K. Warncke (36♀, 1♂); **WEST BANK**: Har Kabbir, 700 m, 17.iii.2015, L. Friedman (1♂); Kedumim [Qedumim], 20.ii.2006, L. Friedman (1♂); Maskiot [Maskiyyot], Rt. 578, Wadi Halat Mahmud el-'Ali, -75 m, 32°19'18"N 35°29'52"E, 27.ii.2020, L. Friedman (1♀); Nahal Teqoa, 31°38'N 35°14'E, 31.iii.2009, A. Freidberg (1♀) (ES, NHMUK, OLML, RMNH, SMNHTAU, TJW, ZMHB, ZSMC).

**Etymology.** *lunaris* = Latin for “lunar”, in reference to the sculpturing of the mesonotum which appears to be marked with crater-like punctures, like the surface of the moon. The species epithet is an adjective.

### *Andrena (Micrandrena) protuber* Pisanty sp. nov.

(Figs. 127–136)

**Female** (Fig. 127).

**Body length:** 6 mm.

**Colour.** Body and legs dark brown to black (Fig. 127). Anterior side of flagellomeres 3–10 dark brown. Wings hyaline, veins dark brown, stigma brown. Tergal marginal zones light brown to yellowish (Fig. 134).

**Pubescence.** Clypeus with medium-lengthed whitish hairs, apical margin with long brown hairs (Figs. 129–130). Outer half of paraocular area with short to medium black hairs. Area around antennal sockets with both whitish and black medium-lengthed hairs. Facial foveae brown. Vertex with medium brownish hairs. Genal area with short black hair anteriodorsally, medium whitish hair posteroventrally. Mesonotum, scutellum and metanotum with short to medium whitish to brown hair (Figs. 127, 132). Mesepisternum with long white hair (Fig. 127). Propodeal corbicula incomplete, posterodorsal fringe with long white plumose hair, corbicular surface with medium-lengthed weakly plumose white hair. Leg hair white to brown. Flocculus incomplete, white. Tibial scopal hair weakly plumose, greyish-white (Fig. 127). Tergal discs with sparse, minute inconspicuous white hair centrally, short white hair laterally. Tergal marginal zones 2–4 with distinct narrow bands of short white hair on apical half, interrupted on 2–3, almost continuous on 4. Terminal fringe light brown (Fig. 134).

**Head** (Figs. 129, 130, 132). 1.1 times broader than long. Mandible bidentate. Galea shiny, shallowly, finely shagreened. Labral process broad and short, trapezoidal, smooth and shiny except near base, apical margin blunt to



slightly concave. Clypeus moderately protuberant, strongly convex, strongly shagreened basolaterally, smooth and shiny centrally, coarsely punctured, distance between punctures 1–2 puncture diameters, apical half with weakly indicated impunctate midline, apical margin of clypeus laterally thickened and densely longitudinally striated (Figs. 129–130). Supraclypeal and paraocular areas and frons finely longitudinally striated and moderately to finely punctured, punctation finer dorsally. Flagellomere 1 about as long as 2+3, 2 as long as 3 or slightly shorter. Facial foveae linear and narrow, extending from level of lower end of lateral ocellus almost to lower end of antennal socket, weakly tapering downwards, distinctly separated from compound eye, 0.4 times as broad as antennocular distance (Figs. 129, 132). Distance of fovea from lateral ocellus about 1.5 ocellus diameters. Ocelloccipital distance about 0.7 ocellus diameter. Vertex weakly to moderately carinate (Fig. 132).

**Mesosoma** (Fig. 132). Dorsolateral angle of pronotum not elevated, pronotum not carinate. Mesonotum finely and uniformly shagreened, weakly shiny, finely, shallowly and irregularly punctured, distance between punctures 1–3 puncture diameters. Scutellum very shiny and more weakly shagreened, similarly punctured (Fig. 132). Mesepisternum and propodeal corbícula finely reticulate, shallowly obliquely punctured. Posterolateral part of propodeum finely reticulate, area close to triangle very finely, shallowly rugose. Propodeal triangle broad, equilateral, delineated by distinct carina, mediobasal part distinctly radially rugose, apicolateral part finely reticulate (Fig. 132). Hind tibial spur distinctly curved apically. Hind pretarsal claw bidentate. Nervulus antefurcal. Submarginal cross-vein 1 meets marginal cell 2–5 vein widths from stigma.

**Metasoma** (Fig. 134). Tergal disc 1 smooth, 2–4 shallowly shagreened to almost smooth basally, smooth apically, tergal punctation fine to very fine, distance between punctures 1–2 puncture diameters, apical ¼ of discs mostly impunctate, punctation gradually finer on discs 3–4. Tergal marginal zones shallowly shagreened to smooth, occasionally with fine punctures.

**Male** (Fig. 128).

**Body length:** 5.5–6 mm.

**Colour.** Head and mesosoma black (Fig. 128). Anterior side of flagellomeres 2–11 brown. Legs dark brown to black. Wings hyaline, veins dark brown, stigma brown. Metasoma brown to black. Tergal marginal zones light brown to yellowish (Fig. 136).

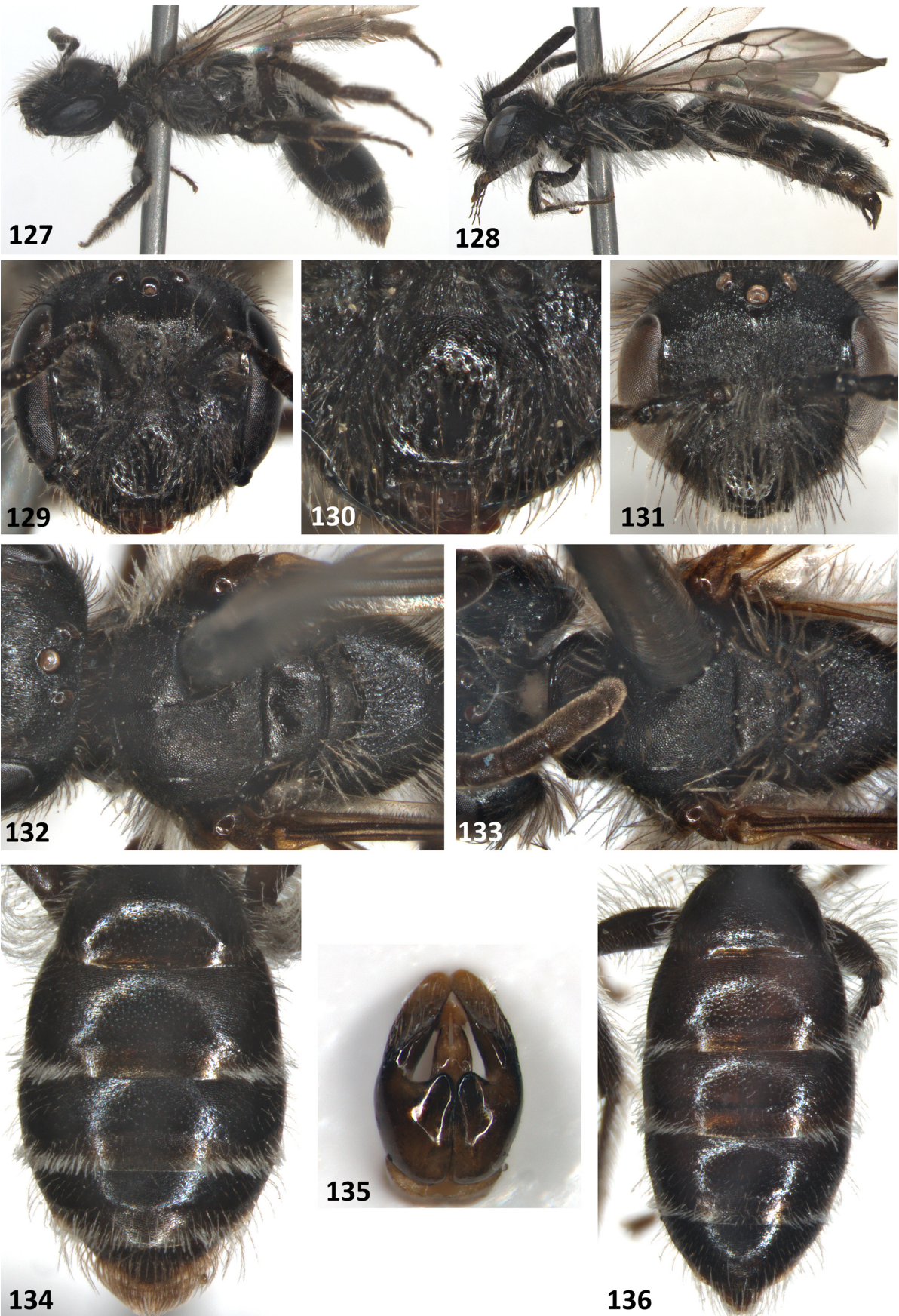
**Pubescence.** Clypeus hair medium to long, two-coloured, white medioapically, black laterally, black to mixed black and white mediobasally (Figs. 128, 131). Paraocular area and frons with short to long black hairs. Area around antennal sockets with black and white, medium to long hairs. Central part of vertex with long erect whitish hairs. Lateral part of vertex and anteriodorsal part of genal area with medium black hairs. Posteroventral part of genal area with white hairs. Mesonotum, scutellum and metanotum with sparse, medium-lengthed erect white to yellowish-white hair (Figs. 128, 133). Mesepisternum mostly with long white hairs, dorsal part also with few black hairs (Fig. 128). Propodeum with long white hairs. Legs with white to brownish hairs. Tergal discs with sparse, minute inconspicuous white hair centrally, short white hair laterally. Tergal marginal zones 2–4 with weak, narrow bands of short white hair on apical half, broadly interrupted on 2–3, narrowly interrupted on 4 (Fig. 136).

**Head** (Figs. 131, 133). 1.1 times broader than long. Labral process broad and short, trapezoidal to rectangular, smooth and shiny, apical margin blunt to slightly concave. Clypeus convex, moderately protuberant, strongly shagreened basolaterally, smooth and shiny centrally, strongly punctured, distance between punctures 1–2 puncture diameters, without impunctate midline (Fig. 131). Supraclypeal and paraocular areas and frons finely longitudinally striated and moderately to finely punctured, punctation finer dorsally. Flagellomere 1 about as long as 3, longer than 2. Ocelloccipital distance about 1 ocellus diameter. Vertex moderately carinate, dorsoposterior margin of genal area often slightly carinate (Fig. 133).

**Mesosoma** (Fig. 133). Mesonotum and scutellum finely and uniformly shagreened, weakly shiny, punctation fine and extremely shallow, often imperceptible, distance between punctures 1–3 puncture diameters (Fig. 133). Nervulus strongly antefurcal to almost interstitial (Fig. 128). Rest of mesosoma as in female.

**Metasoma** (Fig. 136). Tergal discs shiny, basal part weakly to strongly shagreened, apical part more or less smooth, punctation fine to very fine, distance between punctures 1.5–2 puncture diameters, apical margin of discs sparsely punctured to almost impunctate. Tergal marginal zones weakly depressed, shagreened to smooth, occasionally with sparse, very fine punctures.

**Genitalia and hidden sterna** (Fig. 135). Dorsal gonocoxite lobes weakly developed, broadly rounded. Gonostylus blades flattened, tongue-shaped. Penis valves of moderate width, basal part slightly tapering apically (Fig. 135). Sternum 8 columnar, apical process broadened, apical margin blunt.



**FIGURES 127–136.** *Andrena (Micrandrena) protuber* sp. nov. 127. female habitus, 128. male habitus, 129. female head, 130. female clypeus, 131. male head, 132. female vertex and mesosoma, 133. male vertex and mesosoma, 134. female metasoma, 135. male genitalia, 136. male metasoma.

**Diagnosis.** *Andrena protuber* is distinguished from most other *Micrandrena* by the narrower head (Figs. 129, 131) and weaker sculpturing of the mesonotum and propodeal triangle (Figs. 132, 133), which are more typical of *Aciandrena*, *Fuscandrena* and *Graecandrena*, and the *Andrena fumida* species group (subgenus *Fumandrena* sensu Warncke); and by the unusual female clypeus, reminiscent of *A. (Euandrena) symphyti*, which is protuberant, centrally smooth, and laterally longitudinally striated especially at the apical margin (Figs. 129, 130). In the weakly sculptured mesonotum, the males resemble *A. immaculata* Warncke but can easily be separated by the genital capsule which lacks lateral extensions on the penis valves.

**Distribution:** Northern Israel. Likely present also in Lebanon and Syria.

**Flight period:** March–May.

**Flower records:** Cupressaceae: *Juniperus drupacea*. The species was collected from pan traps in two localities where plants of *Symphytum brachycalyx* (Boraginaceae) and/or individuals of *Andrena symphyti* Schmiedeknecht were also present. It also shares the same protuberant clypeus of the larger *Andrena symphyti*, which is presumably associated with enhanced mouthparts that enable females to extract pollen and nectar from Boraginaceae flowers. We therefore hypothesize that the species is a Boraginaceae specialist, by analogy to *A. symphyti*.

**Holotype:** ISRAEL: Mount Meron [Har Meron], 33.000°N 35.3927°E, 4.iv.2017, G. Pisanty, pan trap, ♀ (SMNHTAU:270289).

**Paratypes:** ISRAEL: Mount Hermon [Har Hermon], 1642 m, 33.2996°N 35.7677°E, 16.iv.2022, G. Pisanty, pan trap (1♂); 19.v.2022, G. Pisanty, pan traps (2♀); 1644 m, 33.2991°N 35.7667°E, 16.iv.2022, G. Pisanty, pan trap (1♂); 1645 m, 33.2994°N 35.7675°E, 16.iv.2021, G. Pisanty (5♂); 1649 m, 33.2992°N 35.7677°E, 16.iv.2022, G. Pisanty, on *Juniperus drupacea* (4♂); 1650 m, 33.299°N 35.769°E, 7.iv.2021, G. Pisanty (3♂); Mount Meron [Har Meron], 33.000°N 35.3927°E, 4.iv.2017, G. Pisanty, pan trap (1♀); 1000 m, 1.iv.2012, A. Freidberg (2♂); 1000 m, 32°59.7'N 35°24.7'E, 14.iv.2011, L. Friedman (1♂); Nahal Keziv, Montfort, 33°02.6'N 35°13.3'E, 4.iii.2010, L. Friedman (1♀, 1♂); Sasa, 20.iv.2015, O. Winberger (1♀); Ziv'on, 1 km SW, 33.019°N 35.407°E, 5.iv.2016, G. Pisanty, pan trap (1♂) (OLML, RMNH, SMNHTAU, TJW).

**Etymology.** *protuber* = Latin for “lump in front”, referring to the protruding clypeus in the female sex. The species epithet is a noun in apposition.

### *Andrena (Micrandrena) rubecula* Warncke, 1974

**Distribution:** Egypt, Libya (Gusenleitner & Schwarz 2002). Likely present in southern Israel.

**Flight period:** February–April (Warncke 1974a).

**Flower records:** None.

**Material examined:** HOLOTYPE: EGYPT: Cairo, Maadi [Meadi], 20.ii.1931, H. Priesner (♀) (OLML); PARATYPE: EGYPT: Wadi Digla, 13.iii.1931, Dr. H. Priesner (1♀) (SMNHTAU); non-type material: EGYPT [ISRAEL]: Taba, 19.iii.1988, Y. Zvik (2♀) (SMNHTAU).

**Remarks.** The collecting locality of Taba is only about 1 km from the Israeli border, and the species is therefore likely to occur also in Israel.

### *Andrena (Micrandrena) sillata* Warncke, 1975

**Distribution:** Greece, Turkey (Gusenleitner & Schwarz 2002). Newly recorded from Israel, Jordan, Lebanon, Syria and the West Bank. Warncke (1974c) mentions the species is limited to high elevations (above 1300 m); in Israel, however, it can be found even below 1000 m. Krainov (2013) mentions this species from western Siberia in Russia, which is unlikely.

**Flight period:** February–May (Israel), April–June (Turkey, Warncke 1974c).

**Flower records:** Rosaceae: *Prunus dulcis*, *Pyrus syriaca*; Sapindaceae: *Acer monspessulanum*.

**Material examined:** HOLOTYPE: TURKEY: Akseki/Taurus, 1300 m, 25.iv.1973, K. Warncke (♀) (OLML); PARATYPES: GREECE: Rhodes, Profitis Ilias, 20.iv.1970, H. Teunissen (1♀); TURKEY: Akseki/Taurus, 1300 m, 25.iv.1973, K. Warncke (1♂) (OLML); non-type material: ISRAEL: Bar'am, 4.iv.2014, O. Winberger, pan traps (2♀); 1.iv.2016, O. Winberger (2♀); Dovev, 14.iv.2016, O. Winberger (1♀); Har Addir, 33.033°N 35.361°E,

5.iv.2016, G. Pisanty, pan trap (1♀); Har Avital, 15.iii.1995, R. Kasher (1♀); Hermon Nature Reserve [Hermon NR], Har Kahal, 1368 m, 33.286°N 35.736°E, 28.v.2019, L. Friedman (1♀); [Hermon NR], Har Shezif, 1447 m, 33.286°N 35.7524°E, 16.iv.2022, G. Pisanty, pan traps (3♂); Jish [Gush Halav], 31.iii.2016, O. Winberger (1♂); Kfar Giladi [Kefar Giladi S], 12.iv.1997, R. Kasher (1♀); 14.iv.1997, R. Kasher (1♀); Kfar Shamai [Kfar Shammay], 13.iv.1988, I. Yarom (1♀); Meron Junction [Meron JNC.], 20.iii.1995, on *Pyrus syriaca* (5♀); Montfort [Nahal Keziv, Montfort], 33°02.6'N 35°13.3'E, 4.iii.2010, L. Friedman (2♂); Mount Hermon [Har Hermon], 1420 m, 33.2855°N 35.763°E, 7.iv.2021, G. Pisanty, pan traps (5♂); 1540 m, 33.296°N 35.763°E, 7.iv.2021, G. Pisanty, pan traps (3♂); 1610 m, 33.300°N 35.767°E, 7.iv.2021, G. Pisanty, pan traps (3♂); 1640 m, 33.300°N 35.7675°E, 7.iv.2021, G. Pisanty, sweeping (3♂); 1642 m, 33.2996°N 35.7677°E, 16.iv.2022, G. Pisanty, pan traps (5♂); 1644 m, 33.2991°N 35.7667°E, 16.iv.2022, G. Pisanty, pan traps (43♂); 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan traps (30♂); 1645 m, 33.2994°N 35.7675°E, 16.iv.2021, G. Pisanty, pan traps (98♂) and sweeping (4♂); 1649 m, 33.2993°N 35.7679°E, 16.iv.2021, G. Pisanty, on *Acer monspessulanum* (2♂); [Hermon], 1641 m, 33.2993°N 35.7670°E, 16.iv.2022, G. Pisanty, on *Prunus dulcis* (1♂); 1642 m, 33.2992°N 35.7668°E, 16.iv.2022, G. Pisanty, on Rosaceae (1♂); Mount Meron [Har Meron], 32.9987°N 35.392°E, 21.iv.2016, G. Pisanty, pan traps (2♀); 33.00°N 35.395°E, 15.v.2015, G. Pisanty (2♀); 33.000°N 35.3925°E, 21.iv.2016, G. Pisanty, (9♀); 33.000°N 35.3927°E, 4.iv.2017, G. Pisanty, pan traps (5♀,13♂); 1000 m, 1.iv.2021, L. Friedman (1♀); 17.iv.2012, L. Friedman (1♀); 1000 m, 32°59.7'N 35°24.7'E, 14.iv.2011, L. Friedman (2♀); 1100 m, 17.iv.2000, A. Freidberg (1♀,1♂); [Har Meron], 4 km E, 9.iv.1988, R. Leys (1♂); [Meiron], 23.iv.1973, M. Kaplan (1♀); [Meron], 23.iv.1973, D. Furth (1♀); [MtMeron], 1000 m, 13.iv.1988, I. Yarom (1♀); [W. Habiz, Mt. Meron], 8.iv.1972, H. Lebel (1♂); Mount Meron Nature Reserve [Meron NR], 1.2 km SSW Meron Field School, 998 m, 32°59'55"N 35°23'31"E, 3.iv.2016, A. Dorchin (1♀); Odem Forest Nature Reserve [Ya'ar Odem N.R.], 1.iii.2018, G. Pisanty (1♀,2♂); [Ya'ar Odem NR], 33.205°N 35.736°E, 27.iv.2020, G. Pisanty, pan traps (3♀); 33.206°N 35.736°E, 27.ii.2020, G. Pisanty, pan trap (1♂); Sasa, 1.iv.2014, O. Winberger, pan traps (2♀); 20.iv.2015, O. Winberger, pan trap (1♀); 27.iv.2015, O. Winberger, pan trap (1♀); 3.iv.2016, O. Winberger (2♀,2♂); 14.iv.2016, O. Winberger (2♀,2♂); Snir, Hermon Field Study Center, 21.iii.1997, R. Kasher (1♀); Ziv'on, 1 km SW, 33.019°N 35.407°E, 5.iv.2016, G. Pisanty (1♀); 33.02°N 35.41°E, 21.iv.2016, G. Pisanty (1♀); **JORDAN:** 10 km N Jerash, 20.iv.2002, M. Snižek (1♀); **LEBANON:** Ras El Beida, 3.iv.1978, D. Gerling (1♀); **SYRIA:** Bloudan [Bludan], 57 km NW Damascus, 2000 m, 24.iv.1992, K. Warncke (1♀,8♂); Slanfah [Slenfe], 19.iv.1986, K.M. Guichard (1♀); **WEST BANK:** Azzun [Azun], 7.iii.1973, M. Kaplan (1♀) (NHMUK, OLML, RMNH, SMNHATAU, TJW).

#### *Andrena (Notandrena) deserta* Warncke, 1974

**Distribution:** Algeria, Israel (first record), Tunisia.

**Flight period:** February–March (Warncke 1974a).

**Flower records:** Brassicaceae: *Erucaria microcarpa*.

**Material examined: HOLOTYPE: ALGERIA:** Biskra, 1.iii.1897 (♀) (OLML); **PARATYPE: TUNISIA:** Gafsa (1♂) (OLML); **non-type material: ALGERIA:** Tiaret, Bougara, 15.iv.2018, A. Dermane (2♀); 22.iv.2018, A. Dermane (1♀,1♂); **ISRAEL:** Mashabei Sadeh [Mash'abbe Sade], 23.ii.1979, D. Furth (1♀); Tel Yeroham, 25.iii.1959, I. Kugler, on *Erucaria microcarpa* (3♂); Yeroham [Yeroham], 24.iii.1959, I. Kugler (1♀) (AD, SMNHATAU, TJW).

#### *Andrena (Notandrena) fulvicornis* Schenck, 1853

**Distribution:** Unclear because of historical synonymy by Warncke with *A. nitidiuscula* Schenck (see Schmid-Egger & Doczkal 1995; Gusenleitner & Schwarz 2002; Schwenninger 2013). *Andrena fulvicornis* has a more southerly distribution in hotter and more Mediterranean areas, and is found across the Mediterranean basin to the Middle East (Hazir *et al.* 2014; Wood *et al.* 2020b).

**Flight period:** March–June (Israel), April–August (Central Europe, Scheuchl & Willner 2016). One female was collected in February 2010, which was an exceptionally hot year in Israel.

**Flower records:** Apiaceae: *Ammi visnaga*, *Anthriscus sylvestris*, *Artedia squamata*, *Daucus carota*, *Falcaria*

*vulgaris*, *Ferula communis*, *Heracleum sphondylium*; Brassicaceae: *Sinapis alba*, *Rapistrum rugosum*; Resedaceae: *Reseda alba* (Schmid-Egger & Doczkal 1995; Dermane *et al.* 2021; new records).

**Material examined: ISRAEL:** Beit Guvrin [Beit Govrin], 28.iii.2010, G. Pisanty, pan traps (2♀); 15.iv.2017, T. Roth (5♀); Beit Nir, 28.iii.2010, G. Pisanty, pan traps (2♀); Binyamina [Benjamina], 15.v.1940, H. Bytinski-Salz (1♀); 10.v.1973, H. Bytinski-Salz (2♀); 20.v.1973, H. Bytinski-Salz (1♀); Ga'aton, 21.iv.1973, M. Kaplan (1♂); Gal'on, 23.iii.2010, G. Pisanty, pan traps (2♀, 2♂); Herzliya [Herzliyah], 17.iii.1942, H. Bytinski-Salz (1♂); 17.vi.1945, H. Bytinski-Salz (1♀); Hulda, 29.iv.2010, G. Pisanty, on *Ammi visnaga* (2♂); 23.v.2011, A. Golan (1♀); Katzrin [Kazrin], 28.v.1985, J. Kugler (1♂); [Qazrin], 335 m, 32°59.2'N 35°41.8'E, 22.v.2011, A. Freidberg (2♂) and M. Guershon (1♂); Kfar Menahem [Kefar Menahem], 19.ii.2010, G. Pisanty, pan trap (1♀); 3.vi.2011, A. Golan (4♀); 3.iv.2017, T. Roth (1♀); Moradot HaGolan Nature Reserve, S Nahal Zamud, 388 m, 33.083°N 35.659°E, 31.v.2019, A. Dorchin & T. Roth (1♂); Moradot HaGolan Nature Reserve, 550 m E Darbashiyya, 397 m, 32.088°N 35.660°E, 31.v.2019, A. Dorchin & T. Roth (1♂); Moradot HaGolan Nature Reserve, 2.65 km NW 'Aleqa, 492 m, 33.061°N 35.682°E, 19.v.2019, A. Dorchin & A. Sviri (1♂); Nahal Batra, 43 m, 32.913°N 35.681°E, 23.v.2019, A. Dorchin & T. Roth (1♀); Nahal Dishon [N. Dishon], 15.v.1973, M. Kaplan (1♀); Nahal Maresha, 220 m, 31.5773°N 34.8576°E, 15.iii.2021, G. Pisanty, sweeping (1♂); Nahal Sa'ar [W. Saar Golan], 1.vi.1970, H. Bytinski-Salz (1♀, 4♂); Nahal Shuah, 464 m, 33.068°N 35.677°E, 31.v.2019, A. Dorchin & T. Roth (2♂); Nahshon, 25.iii.2010, G. Pisanty, on *Artemia squamata* (1♀); 31.iii.2010, G. Pisanty, on *Artemia squamata* (1♂); 18.v.2010, G. Pisanty, pan trap (1♂); Nahshonim [Nachsonim], 12.v.1976, D. Simon (1♀); Neve Shalom, 21.v.2009, G. Pisanty (1♂); Peki'in [Peqi'in], 14.v.1974, A. Freidberg (2♀); Ramot Naftali [R. Naftali], 15.vi.1965, J. Kugler (1♀); Ravid, 17.v.2009, A. Freidberg (1♀); Revadim, 28.v.2011, A. Golan (2♀); 30.v.2011, A. Golan (2♀); 7.vi.2011, A. Golan (3♀, 1♂); 27.iii.2018, T. Roth, on *Ferula communis* (9♀) and *Sinapis alba* (1♀); Sha'alvim, 16.iii.2017, T. Roth, partly from pan trap (2♂); Tal Shazar, 26.iv.2010, G. Pisanty, on Brassicaceae (1♂); Tel Aviv, 6.iv.1940, H. Bytinski-Salz (1♀); 16.iv.1940, H. Bytinski-Salz (1♀); Tel Dan [Tel el Kadi], 18.v.19??, H. Bytinski-Salz (2♀, 1♂); Tell es-Safi [Tel Zafit], 31.iii.2018, T. Roth, on *Rapistrum rugosum* (1♀); Yad Binyamin, 10.v.2010, G. Pisanty, pan trap (1♂); Yesodot, 16.iii.2010, G. Pisanty, on *Ferula communis* (1♀); Yir'on, 14.v.1974, A. Freidberg (1♂); Zikhron Ya'akov, 10.v.1973, A. Freidberg (1♂) and J. Kugler (1♀, 1♂); 20.v.1973, H. Bytinski-Salz (1♀, 1♂), A. Freidberg (1♀) and J. Kugler (2♀, 1♂); Zomet HaShiryon, 5 km W, Rt. 91, 530 m, 33°02.9'N 35°42.3'E, 22.v.2011, M. Guershon (1♀); Zomet Nashut, Rt. 91, 327 m, 33°01.1'N 35°39.6'E, 22.v.2011, A. Freidberg (2♀) and M. Guershon (2♀, 1♂); **WEST BANK:** Jericho, 8.iii.1976, M. Kaplan (1♂) (SMNHTAU).

**Remarks.** Israeli material belonging to this species was previously identified as *A. nitidiuscula nigellata* Pérez (Warncke 1969), which is most probably a synonym of *A. fulvicornis* (Wood *et al.* 2020b).

### *Andrena (Pallandrena) christineae* Dubitzky, 2006

**Distribution:** Israel (first record), Iran, Lebanon, Turkey. Likely present also in Syria.

**Flight period:** April–June (Dubitzky 2006; Wood *et al.* 2020a).

**Flower records:** Geraniaceae: *Geranium libanoticum* (Wood *et al.* 2020a).

**Material examined: ISRAEL:** Mount Hermon, 2000 m, 28.v.1985, J. Kugler (1♀); **TURKEY:** 10 km N Tutak, Ağrı, 1500 m, K. Warncke, 7.vi.1981 (1♀) (OLML, SMNHTAU).

### *Andrena (Planiandrena) veterana* Pisanty sp. nov.

(Figs. 137–147)

**Female** (Fig. 140).

**Body length:** 8–8.5 mm.

**Colour.** Body and legs black (Fig. 140). Anterior side of flagellum brownish-black. Hind basitarsi dark brown to black, all legs' apical tarsomeres brown. Wings hyaline, veins brown, stigma medially orange to light brown (Fig. 140). Tergal marginal zones brown (Fig. 139).

**Pubescence.** Hair colour varies from white to golden–light brown, but is more or less uniform within a single specimen, except where otherwise indicated (Fig. 140). Head and mesosoma mostly with moderately dense, me-

dium-lengthed, weakly plumose to plumose hair (Figs. 137, 138, 140). Facial foveae brown in dorsal view (Fig. 138). Propodeal corbicula incomplete, dorsoposterior fringe with long plumose hairs, corbicular surface with few simple long hairs. Flocculus complete, tibial scopal hairs simple. Tergal disc 1 with sparse medium-lengthed hair, mostly on basal half; tergal marginal zone 1 with similar hair, creating a sparse band reaching 1/3–1/2 the length of tergal disc 2. Tergal discs 2–4 with very sparse, inconspicuous minute hairs. Tergal marginal zones 2–4 basally with sparse short to minute hairs, apically with distinct, continuous bands of dense short hair protruding onto the following tergal discs. Terminal fringe golden to light brown (Fig. 139).

**Head** (Figs. 137–138). 1.2 times broader than long. Mandible bidentate. Galea shagreened. Labral process trapezoidal, much broader than long, transversely striated. Clypeus elevated and medially flattened, superficially shagreened, moderately punctured, distance between punctures 1–1.5 puncture diameters, with distinct impunctate midline (Fig. 137). Paraocular area densely punctured. Frons finely longitudinally striated, interspersed with dense shallow punctures. Flagellomere 1 slightly longer than 2+3, 2 about as long as 3. Facial foveae narrow, arched, extending from level of lower end of lateral ocellus to supraclypeal area, tapering downwards, 0.3 times as broad as antennocular distance (Figs. 137–138). Distance of fovea from lateral ocellus about 1.5 ocellus diameters. Ocellocipital distance 0.7 ocellus diameter. Vertex moderately carinate (Fig. 138). Genal area as broad as compound eye.

**Mesosoma** (Fig. 138). Dorsolateral angle of pronotum not to weakly elevated, pronotum not carinate. Mesonotum very shiny, finely and superficially shagreened, moderately punctured, distance between punctures 1–1.5 puncture diameters. Scutellum finely, sparsely and irregularly punctured, anterior half very shiny and more or less smooth, posterior half shagreened (Fig. 138). Mesepisternum and posterolateral part of propodeum very finely shagreened, densely, shallowly and obliquely punctured. Propodeal corbicula finely reticulate, with few shallow coarse punctures around hair bases. Propodeal triangle with basal band of dense parallel rugae, otherwise very finely and shallowly reticulate (Fig. 138). Inner side of hind femur not carinate. Inner hind tibial spur slightly bent at 1/3–1/2 of length, not significantly broadened basally. Hind pretarsal claw with distinct inner tooth. Nervulus interstitial to antefurcal. Submarginal crossvein 1 meets marginal cell 5–6 vein widths from stigma.

**Metasoma** (Fig. 139). Tergal disc 1 smooth and shiny, sparsely and very finely punctured, distance between punctures 2–5 puncture diameters, punctures denser basally. Discs 2–3 shiny, shagreened basally, smooth to very weakly shagreened apically, sparsely and very finely punctured, punctation denser on disc 3. Disc 4 shiny, superficially shagreened, very finely punctured. Tergal marginal zones 2–4 weakly depressed, shiny and superficially shagreened, irregularly, very sparsely, very finely punctured. Pygidial plate without elevated medial area.

**Male** (Fig. 141).

**Body length:** 8–9.5 mm.

**Colour.** Clypeus yellow except for narrow peripheral black margin and two mediolateral black spots (Fig. 142). Otherwise as in female.

**Pubescence.** Head and dorsal side of mesosoma mostly with moderately dense, medium to long, minutely plumose hair (Figs. 141–143). Clypeus, supraclypeal area, scape, inner side of paraocular area, and area around antennal sockets with whitish to light brown hair (Fig. 142). Outer side of paraocular area with dark hair. Frons with sparse, short dark hair. Vertex with whitish to golden hair. Genal area with black hair anteriodorsally, white to golden hair posteroventrally. Mesosoma and legs with whitish to light brown hair (Figs. 141, 143). Tergal discs 1–2 with medium-lengthed whitish to golden hair, denser on 2. Tergal discs 3–5 with sparse short to minute hairs. Tergal marginal zones 3–5 basally with sparse short whitish hairs, apically with bands of moderately dense short whitish hair protruding onto the following tergal discs. Terminal fringe whitish-golden (Fig. 144).

**Head** (Figs. 142–143). 1.3 times broader than long. Mandibles bidentate, crossed. Galea shagreened. Labral process trapezoidal, much broader than long, apical margin weakly concave. Clypeus weakly elevated, medially flattened, mostly smooth, moderately punctured, distance between punctures 1.5–2 puncture diameters, with distinct impunctate midline (Fig. 142). Paraocular area densely punctured. Flagellomere 1 longer than 3, 2 shorter than 3. Frons finely longitudinally striated, interspersed with dense shallow punctures. Ocellocipital distance 0.9 ocellus diameter. Vertex distinctly carinate (Fig. 143). Genal area 0.9 times as broad as compound eye, posterior margin not carinate.

**Mesosoma** (Fig. 143). Dorsolateral angle of pronotum often distinctly elevated, creating a weak, short lateral carina. Mesonotum distinctly shagreened and mat, shallowly punctured (Fig. 143). Rest of mesosoma as in female.



**FIGURES 137–147.** *Andrena (Planiandrena) veterana* sp. nov. 137. female head, 138. female vertex and mesosoma, 139. female metasoma, 140. female habitus, 141. male habitus, 142. male head, 143. male vertex and mesosoma, 144. male metasoma, 145. male genitalia, 146. male eighth sternum, dorsal view, 147. male eighth sternum, ventral view.

**Metasoma** (Fig. 144). Tergal disc 1 very shiny, basal part very superficially shagreened to smooth, apical part smooth, punctuation sparse and very fine, distance between punctures 3–5 puncture diameters. Discs 2–4 finely and more densely punctured, distance between punctures 1.5–2 puncture diameters, 2–3 strongly and finely shagreened basally, weakly shagreened to smooth apically, 4 moderately shagreened. Tergal marginal zones 2–4 weakly depressed, shiny and superficially shagreened, more or less impunctate.

**Genitalia and hidden sterna** (Figs. 145–147). Dorsal gonocoxite lobe distinct, very broad and rounded. Gonostyli and penis valves short, gonostylus blade suddenly narrowed, flattened, finger-shaped, rounded apically. Penis valves broad basally, strongly tapering apically (Fig. 145). Sternum 8 triangular, gradually narrowing apically, apical process broadening apically, distinctly notched (Figs. 146–147).

**Diagnosis.** The female of *A. veterana* differs from other species of *Planiandrena* in body length (larger in *A. laevis* Osytshnjuk), weakly shagreened clypeus (smooth in *A. planirostris* Morawitz and *A. tobiasi* Osytshnjuk), brown flagellum (orange anteroapically in *A. arenata* Osytshnjuk and *A. tobiasi*), relatively short flagellomere 1 (about as long as 2+3+4 in *A. planirostris* and *A. tobiasi*), weakly shagreened, shiny mesonotum (mostly shagreened and mat in *A. tobiasi*), shagreened and shallowly punctured posterolateral part of propodeum (smooth and strongly punctured in *A. laevis*), punctate terga (impunctate in *A. tobiasi*), continuous, moderately broad tergal hair bands 2–4 (broader in *A. arenata*, interrupted in *A. laevis* and *A. tobiasi*), and the centrally flat pygidial plate (centrally elevated in *A. arenata*, *A. laevis* and *A. planirostris*). The male of *A. veterana* is easily differentiated from those of *A. planirostris* and *A. tobiasi* by the yellow clypeus (dark in *A. tobiasi*) and unusual genital capsule, with very short gonostyli and penis valves (normally elongate in *A. planirostris* and *A. tobiasi*), the presence of a projection on the inner margin of the gonostyli (absent in *A. planirostris*) and obtusely rounded dorsal gonocoxite lobe (hardly developed in *A. planirostris*, long and acutely pointed in *A. tobiasi*). The males of *A. arenata* and *A. laevis* have not been discovered so far.

**Distribution:** Northern Israel (Mt. Hermon). Likely present also in Lebanon and Syria.

**Flight period:** April.

**Flower records:** Sapindaceae: *Acer monspessulanum*.

**Pollen analysis.** Seven analysed pollen loads contained pure *Acer* pollen, confirming the field observations. However, all analysed pollen loads were from the same location on the same day, so additional samples from different places and collecting dates are required before firm conclusions as to the dietary niche of this species can be drawn.

**Holotype: ISRAEL:** Mount Hermon [Har Hermon], 1649 m, 32.2993°N 35.7679°E, 16.iv.2021, G. Pisanty, on *Acer monspessulanum*, ♀ (SMNHTAU:361673).

**Paratypes: ISRAEL:** Mount Hermon [Har Hermon], 1649 m, 32.2993°N 35.7679°E, 7.iv.2021, G. Pisanty, on *Acer monspessulanum* (3♀, 2♂); 16.iv.2021, G. Pisanty, on *Acer monspessulanum* (38♀, 9♂); 1650 m, 32.2993°N 35.7678°E, 16.iv.2022, G. Pisanty, on *Acer monspessulanum* (37♀, 6♂); [Hermon], 1642 m, 32.2992°N 35.7668°E, 16.iv.2022, G. Pisanty, sweeping (1♀) (ES, NHMUK, OLML, RMNH, SMNHTAU, TJW, ZMHB, ZSMC).

**Etymology.** *veterana* = Latin for “senior, veteran, with long experience” in reference to the species’ isolated distribution away from Central Asia. The species epithet is an adjective.

### *Andrena (Poecilandrena) mediterranea* Pisanty & Scheuchl, 2016 stat. nov.

*Andrena sphecodimorpha mediterranea* Pisanty & Scheuchl, 2016

**Distribution:** North and central Israel, Jordan, Lebanon, Syria, West Bank (Pisanty *et al.* 2018, Wood *et al.* 2020a).

**Flight period:** February–May (Pisanty *et al.* 2018; Wood *et al.* 2020a).

**Flower records:** Amaryllidaceae: *Allium trifoliatum*; Apiaceae: *Scandix verna*; Asteraceae: *Leontodon tuberosus*; Brassicaceae: *Diplotaxis eruroides*, *Erysimum* spp., *Thlaspi* spp.; Euphorbiaceae: *Euphorbia* sp.; Iridaceae: *Moraea sisyrinchium*; Plantaginaceae: *Veronica syriaca*; Rosaceae: *Pyrus syriaca* (Pisanty *et al.* 2016, 2018; Wood *et al.* 2020a; new records).

**Material examined: HOLOTYPE: ISRAEL:** Lakhish, 2 km E, 31.5562°N 34.869°E, 4.iii.2016, G. Pisanty, pan trap (♀) (SMNHTAU:235320); **PARATYPES:** see Pisanty *et al.* 2016; **new records: ISRAEL:** Har’el,



21.ii.2020, T. Roth, on *Leontodon tuberosus* (1); Hermon Nature Reserve, 1670 m, 33.299°N 35.769°E, 28.iv.2021, A. Dorchin (1♀); Hermon Nature Reserve [Hermon Nat. Res.], 1467 m, 33.292°N 35.7505°E, 29.iv.2022, G. Pisanty, on *Euphorbia* (1♀); [Hermon], Biq'at Man, 1450 m, 33.292°N 35.751°E, 29.iv.2022, G. Pisanty (2♀); Meron Junction, 20.iii.1995, on *Pyrus syriaca* (2♀); Mount Gilboa [Hare Gilboa], Har Avinadav, 32°28'N 35°26'E, 22.iii.2012, L. Friedman (1♀); Mount Hermon [Har Hermon], 1420 m, 33.2855°N 35.763°E, 7.iv.2021, G. Pisanty, pan traps (7♀,1♂); 1480 m, 33.292°N 35.760°E, 11.v.2020, G. Pisanty, pan traps (1♀); 33.2922°N 35.7595°E, 7.iv.2021, G. Pisanty, pan traps (2♂); 1540 m, 33.296°N 35.763°E, 7.iv.2021, G. Pisanty, pan traps (2♀); 1610 m, 33.300°N 35.767°E, 7.iv.2021, G. Pisanty, pan traps (6♀); 1640 m, 33.300°N 35.7675°E, 7.iv.2021, G. Pisanty, sweeping (2♂); 1642 m, 33.2992°N 35.7668°E, 19.v.2022, G. Pisanty, pan traps (1♀,1♂); 33.2996°N 35.7677°E, 19.v.2022, G. Pisanty, pan trap (1♀); 1644 m, 33.2991°N 35.7667°E, 16.iv.2022, G. Pisanty, pan traps (2♀,3♂); 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan trap (1♂); 1645 m, 33.2994°N 35.7675°E, 16.iv.2021, G. Pisanty, pan traps (4♂) and sweeping (2♀); [Har Hermon], Nahal Guveta, 1410 m, 33.285°N 35.763°E, 11.v.2020, G. Pisanty, pan traps (2♀); [Hermon], 1640–1675 m, 33.298–299°N 35.767–770°E, 19.v.2022, G. Pisanty, on *Erysimum* (1♀); Odem Forest Nature Reserve [Ya'ar Odem N.R.], 1.iii.2018, G. Pisanty (5♀,4♂); [Ya'ar Odem NR], 33.186°N 35.7356°E, 27.ii.2020, G. Pisanty, pan traps (5♂); 3.205°N 35.736°E, 27.iv.2020, G. Pisanty, pan traps (4♀); 33.206°N 35.736°E, 27.ii.2020, G. Pisanty, pan traps (2♂); **WEST BANK:** Har 'Eval, 750–800 m, 29.iii.2021, L. Friedman (1♂) (SMNHTAU).

**Remarks.** Molecular data of the nominate *A. sphecodimorpha* Hedicke and of *A. hybrida* Warncke is still unavailable to us. However, both sexes of *A. mediterranea* are well separated from these species by several traits (shagreenation, hair colouration, integumental colouration, see Pisanty *et al.* 2016). According to our improved understanding of species limits within *Andrena* and specifically *Poecilandrena*, such differences are clearly sufficient to demarcate different species.

### *Andrena (Poecilandrena) veronicae* Pisanty & Wood sp. nov.

(Figs. 148–152, 155–159, 161)

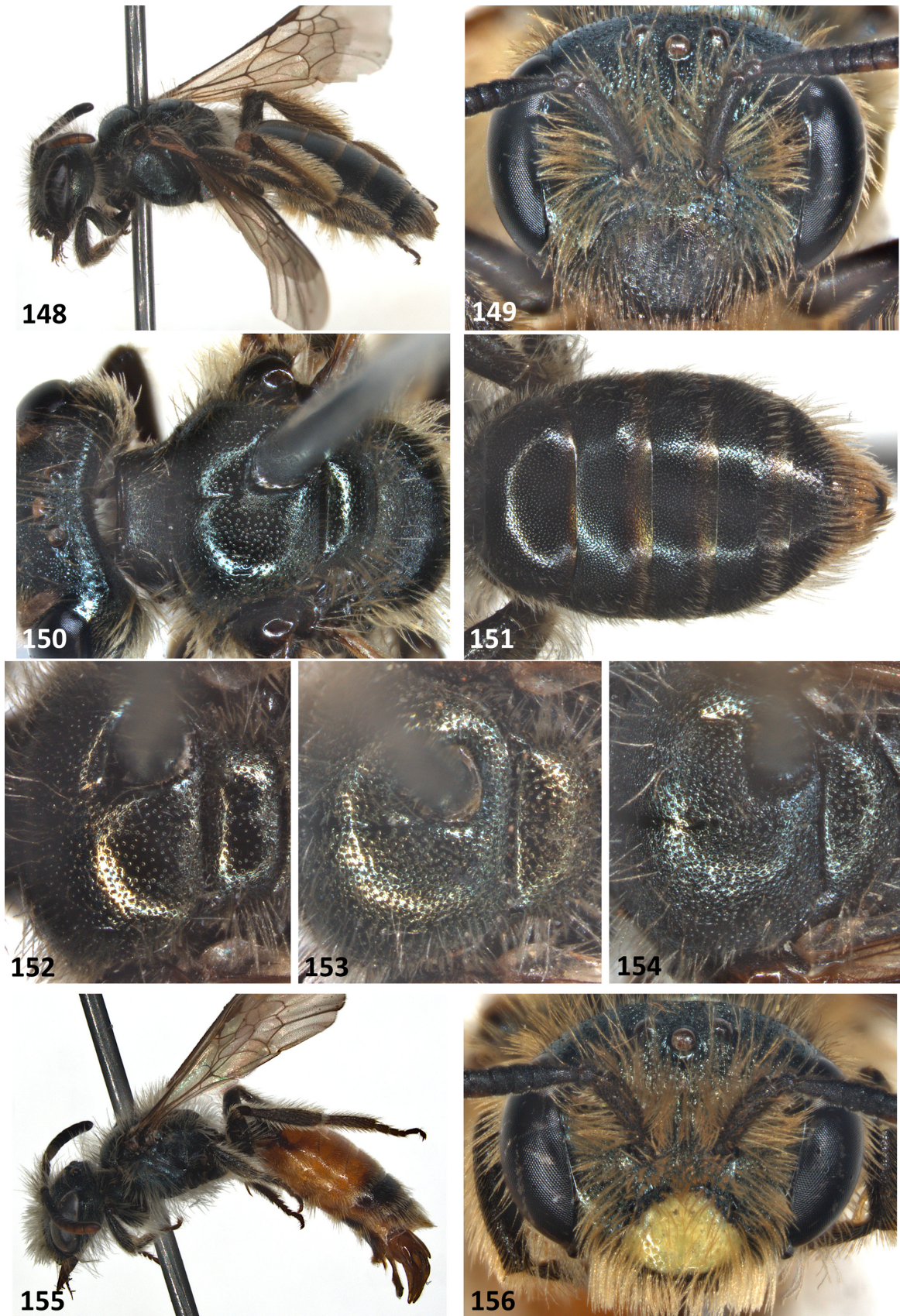
**Female** (Fig. 148).

**Body length:** 7.5–8 mm.

**Colour.** Basal half of clypeus with rainbow-like pattern of alternating green, yellow, red, purple and blue metallic hues; apical half black. Face above clypeus and genal area with golden, green and/or blue metallic luster (Fig. 149). Anterior side of flagellomeres 5–10 orange (Fig. 148). Pronotum, mesonotum, scutellum and metanotum with blue to golden metallic luster (Fig. 150). Mesepisternum and propodeal corbicula dark, often with weak bluish metallic luster. Posterior part of propodeum black (Fig. 150). Legs dark brown. Wings slightly infusate, veins and stigma dark brown (Fig. 148). Tergal discs with weak to strong metallic luster, mostly bluish, sometimes weakly golden. Tergal marginal zones reddish-brown basally, golden apically (Fig. 151).

**Pubescence.** Body hair mostly golden to light brown, moderately plumose (Fig. 148). Clypeus with moderately dense short hairs, mostly golden, on apical half intermixed with black hairs. Frons, scape and paraocular area with moderately dense, medium-lengthed golden hairs and few short black hairs (Fig. 149). Facial foveae brown in dorsal view (Fig. 150). Vertex with short to long golden hair. Genal area with short to medium golden hair, slightly brighter ventrally. Mesonotum with short, thin, erect golden hairs, denser and thicker peripherally. Metanotum and lateral margins of scutellum with dense, medium-lengthed, erect, whitish to golden hair. Mesepisternum with long hair, golden dorsally, whitish medially and ventrally. Propodeal corbicula incomplete, dorsoposterior fringe with long, whitish-golden plumose hairs, corbicular surface with minute hairs and few long, whitish-golden, weakly plumose hairs. Legs with golden to yellowish hair; flocculus complete, yellowish; scopal hairs simple, golden (Fig. 148). Terga with golden hairs, minute medially, short laterally, denser on marginal zone 4. Tergal apical hair bands not developed. Prepygidial fimbria golden to light brown; pygidial fimbria dark brown (Fig. 151).

**Head** (Figs. 149–150). 1.2 times broader than long. Mandible bidentate. Galea shallowly and finely shagreened. Labral process broad, trapezoidal, basal margin transversely striated, otherwise mostly smooth, apical margin blunt to slightly emarginate. Clypeus convex, shagreened, moderately punctured, distance between punctures 0.5–2 puncture diameters (Fig. 149). Flagellomere 1 slightly shorter than 2+3+4, 2–4 more or less the same length. Frons and upper half of paraocular area longitudinally striated, distinctly punctured, area under medial ocellus more finely striated and densely and finely punctured. Facial foveae relatively short, of moderate, uniform width, extending from



**FIGURES 148–156.** *Andrena* (*Poecilandrena*) *veronicae* sp. nov. 148. female habitus, 149. female head, 150. female vertex and mesosoma, 151. female metasoma, 152. female mesonotum and scutellum, 153. female mesonotum and scutellum, 154. female mesonotum and scutellum. *Andrena* (*Poecilandrena*) *freidbergi* Pisanty & Scheuchl. 155. male habitus, 156. male head. *Andrena* (*Poecilandrena*) *semirubra* Morawitz. 154. female mesonotum and scutellum.



**FIGURES 157–166.** *Andrena (Poecilandrena) veronicae* **sp. nov.** 157. male vertex and mesosoma, 158. male metasoma, 159. male genitalia, dorsal view, 161. male genitalia, lateral view. *Andrena (Poecilandrena) semirubra* Morawitz. 160. male genitalia, dorsal view, 162. male genitalia, lateral view. *Andrena (Simandrena) ardentia* **sp. nov.** 163. female habitus, 164. female head, 165. female vertex and mesosoma, 166. female metasoma.

level of middle–lower end of medial ocellus to slightly below antennal socket, 0.4 times as broad as antennocular distance (Figs. 149–150). Distance of fovea from lateral ocellus about 2 ocellus diameters. Ocelloccipital distance 1.2 ocellus diameters. Vertex weakly carinate (Fig. 150).

**Mesosoma** (Figs. 150, 152). Dorsolateral angle of pronotum not to very slightly elevated, lateral carina absent. Mesonotum strongly shiny, smooth to very superficially shagreened, finely punctured, distance between punctures 0.5–2 puncture diameters. Scutellum similar, more strongly shagreened (Figs. 150, 152). Mesepisternum and propodeal corbicula finely reticulate, anterior part of mesepisternum shallowly, obliquely punctured. Posterolateral part of propodeum finely and shallowly alveolate, shallowly, obliquely punctured. Propodeal triangle weakly delineated by shallow carina, basal margin radially rugose, apical part gradually finely alveolate. Inner side of hind femur not significantly carinate. Hind pretarsal claw bidentate. Recurrent vein 1 meeting submarginal cell 2 at its middle or slightly distal to it. Nervulus interstitial to very slightly postfurcal (Fig. 148).

**Metasoma** (Fig. 151). Tergal discs shiny, smooth to weakly and very finely shagreened, finely punctured, distance between punctures 0.5–1 puncture diameters; vertical part of tergum 1 very shallowly shagreened, very sparsely and finely punctured. Tergal marginal zones narrow, weakly arched, weakly depressed, weakly and finely shagreened, very finely punctured, distance between punctures about 1 puncture diameter. Pygidial plate with raised margin, without elevated medial zone, apical margin blunt to weakly truncate.

**Male** (Fig. 155).

**Body length:** 6.5–7 mm.

**Colour.** Head dark, with variable degree of bluish-greenish metallic luster (Fig. 156). Clypeus mostly yellow, except for a narrow dark peripheral margin, in some specimens occupying up to 1/4 of clypeus length basally, and occasionally two dark mediolateral spots (Fig. 156). Anterior side of flagellomeres 5–10 mostly orange. Mesonotum, scutellum and metanotum with strong greenish-bluish metallic luster (Fig. 157). Pronotum, mesepisternum and propodeum with weak bluish metallic luster. Legs dark brown to black, apical tarsomeres brown. Wings hyaline, veins and stigma brown (Fig. 155). Tergal discs 1 and 5 black, 2–4 partly to fully orange. Tergal marginal zone 1 black to orange, 2–5 golden (Fig. 158).

**Pubescence.** Head and mesosoma mostly with moderately dense, medium-lengthed white to golden plumose hairs, usually brighter ventrally (Figs. 155–157). Legs with white to light brown hairs, long on ventral side of femora, elsewhere mostly short (Fig. 155). Tergal discs with minute, inconspicuous white hair. Tergal marginal zones 2–4 with very weak, inconspicuous bands of short white to yellowish hairs. Tergal marginal zone 5 and terminal fringe with distinct golden to light brown hairs (Fig. 158).

**Head** (Figs. 156–157). 1.3 times broader than long. Labral process very short and broad, apical margin slightly concave. Clypeus moderately convex, basal half shagreened, apical half smooth, moderately punctured, distance between punctures 1–2 puncture diameters, punctures sparser apically (Fig. 156). Lower part of supraclypeal area obliquely punctured; upper part and frons longitudinally striated with interspersed fine punctures. Flagellomere 1 longer than 2+3, 2 as long as 3 or slightly shorter. Ocelloccipital distance about 1.5 ocellus diameters (Fig. 157). Posterior margin of genal area rounded.

**Mesosoma** (Fig. 157). Dorsolateral angle of pronotum not to slightly elevated, pronotum not carinate. Mesonotum mostly smooth and shiny, anterior margin often shallowly and finely shagreened, punctation moderate, distance between punctures 1–3 puncture diameters. Scutellum finely punctured, anterior half often smooth, posterior half densely punctured (Fig. 157). Propodeal triangle radially rugose basally, finely reticulate to finely rugose apically. Mesepisternum and lateral part of propodeum reticulate, the former with shallow oblique punctures.

**Metasoma** (Fig. 158). Tergal disc 1 superficially shagreened basally and laterally, smooth medioapically, 2–4 mostly smooth, 5 weakly shagreened; tergal disc punctation fine, distinct, distance between punctures 1 puncture diameter. Tergal marginal zones very finely punctured basally, impunctate apically, 1 finely shagreened, 2–4 more or less smooth.

**Genitalia and hidden sterna** (Figs. 159, 161). Dorsal gonocoxite lobes and gonostyli elongate. Penis valves with lateral lamella, creating a spade shape (Figs. 159, 161). Sternum 8 columnar, of uniform width, apical process broadened.

**Diagnosis.** The female of *Andrena veronicae* is distinguished from most other *Poecilandrena* by the very shiny, more or less smooth mesonotum and terga. It most closely resembles *A. freidbergi* Pisanty & Scheuchl, known from high altitudes in Lebanon and Mount Hermon, and *A. segregata* Osytchnjuk, known from Central Asia. It differs from *A. freidbergi* in the finer, sparser mesonotal punctation (Figs. 152–153), interstitial nervulus (often

weakly postfurcal in *A. freidbergi*), and medial position of recurrent vein 1 in submarginal cell 2 (more distal in *A. freidbergi*). Unlike *A. semirubra* Morawitz, the terga of *A. veronicae* females are completely dark, without red colouration (Fig. 151). Females of *A. semirubra* also occasionally occur in a dark tergal form, although they can be distinguished by the denser mesonotal punctures (separated by 0.5–1 puncture diameters) compared to *A. veronicae* (Figs. 152, 154). The males of *A. veronicae* are very similar to *A. semirubra* and have been confused with the latter (Warncke 1969; Pisanty *et al.* 2018). The male of *A. veronicae* is larger than that of *A. semirubra*, and there are subtle differences in the genital capsule: the gonostylus blades are broader and more spatulate, the gonocoxite lobes broader and more rounded, and the lamella of the penis valves extends further apically (Figs. 159–162).

**Distribution:** Northern Israel (Golan Heights), Syria, southwestern Turkey. Likely present also in Lebanon.

**Flight period:** February–May.

**Flower records:** Plantaginaceae: *Veronica syriaca*. Most specimens were not collected directly from flowers, but *V. syriaca* was in abundant bloom at the two main collecting locations (Odem Forest and Mount Hermon), and is assumed to be the main host plant, as often seen in the *Andrena viridescens* species group (Pisanty *et al.* 2018).

**Holotype:** ISRAEL: Odem Forest Nature Reserve [Ya'ar Odem N.R.], 1.iii.2018, G. Pisanty, ♀ (SMNHNTAU:286348).

**Paratypes:** ISRAEL: Mount Hermon [Har Hermon], 1420 m, 33.2855°N 35.763°E, 7.iv.2021, G. Pisanty, pan trap (1♀); 1600 m, 33.300°N 35.767°E, 11.v.2020, G. Pisanty, pan trap (1♀); 1610 m, 33.300°N 35.767°E, 7.iv.2021, G. Pisanty, pan trap (17♀, 16♂); 1640 m, 33.300°N 35.7675°E, 7.iv.2021, G. Pisanty, sweeping (2♀, 5♂); 1642 m, 33.2996°N 35.7677°E, 16.iv.2022, G. Pisanty, pan traps (2♂); 1644 m, 33.2991°N 35.7667°E, 16.iv.2022, G. Pisanty, pan traps (1♀, 7♂); 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan traps (3♀, 14♂); 1645 m, 33.2994°N 35.7675°E, 16.iv.2021, G. Pisanty, pan traps (7♀, 1♂) and sweeping (2♀); [Hermon], 1500 m, 22.iv.1969, H. Bytinski-Salz (1♂); 1650 m, 20.iv.1969, H. Bytinski-Salz (6♂); [Hermon], Har Shezif, 1447 m, 33.286°N 35.7524°E, 16.iv.2022, G. Pisanty, pan trap (1♀); Odem Forest Nature Reserve [Ya'ar Odem N.R.], 1.iii.2018, G. Pisanty (9♀, 5♂); [Ya'ar Odem NR], 33.186°N 35.7356°E, 27.ii.2020, G. Pisanty, pan traps (1♀, 12♂); 33.206°N 35.736°E, 27.ii.2020, G. Pisanty, on *Veronica syriaca* (2♂) and from pan traps (2♀, 30♂) and sweeping (1♂); SYRIA: Latakia, Qaranjah, 750 m, 3.iv.1988, M. Schwarz (2♂); TURKEY: Akseki/Taurus, 1300 m, 25.iv.1973, K. Warncke (3♂) (ES, NHMUK, OLML, RMNH, SMNHNTAU, TJW, ZMHB, ZSMC).

**Etymology.** From the likely host plant, *Veronica syriaca*. The species epithet is an adjective.

**Other material examined (*A. semirubra*):** AZERBAIJAN: Araxesthal, 1890, Reitter (1♀); CRIMEA: Kara Dag [Karadagh], Vodianja balka, Wald, 10.v.2002, Y. Budaschkin (1♀, 4♂); GEORGIA: Tbilisi, 16.v.1978, M. Koucourek (1♀); RUSSIA: Kamyshin [Камышин], 14–19.v.1951, D. Panfilov (2♀); TURKEY: Ağrı, 20 km N Patnos, 1650 m, 29.v.1980, K. Warncke (1♀); 20 km N, 1800 m, 28.v.1980, K. Warncke (1♂); Erzurum, 11.v.1971, H. Ozbek (1♀); Erzurum: Ispir, 17.vi.1973, K. Warncke (8♀); Gürün, 1900 m, 12.vi.1973, K. Warncke (2♀, 2♂); Hakkari, pass Suvari Halil, 2500 m, 2.vi.1980, K. Warncke (1♂); Hakkari, 10 km SW Yüksekova, 1780 m, 10.vi.1981, K. Warncke (3♀); Kastamonu, between Tosya and İskilip, 1507 m, 40°56'18"N 34°15'10"E, 19.vi.2006, E. Scheuchl (1♀); Mount Nemrut [Nemrut Dagi mt.], 50 km NE of Kanta, 2–14.vi.1996, P. Jelinek (1♀); Şemdinli, 1700 m, 12.vi.1981, K. Warncke (1♀); UluDağ, bei Bursa, 200–1000 m, 15.v–10.vi.1959, Schweiger (2♀) (OLML, SMNHNTAU).

### *Andrena (Simandrena) ardentia* Pisanty sp. nov.

(Figs. 163–166)

**Female** (Fig. 163).

**Body length:** 7.5–8 mm.

**Colour.** Head, mesosoma and legs black to reddish-brown (Fig. 163). Anterior side of flagellomeres 4–10 orange. Wings slightly infusate, veins and stigma light brown. Tergal discs largely yellowish- to reddish-orange, darker colouration may appear mostly on base of tergum 1, apical parts of terga 2–3, and on terga 4–5. Tergal marginal zones orangish-yellow (Fig. 166).

**Pubescence.** Body hair usually relatively short, moderately dense, white to whitish, minutely plumose (Fig. 163). Clypeus, paraocular area, scape, vertex and genal area with short to medium, white to whitish hairs (Fig. 164). Facial foveae with dense minute hairs, dark in ventral view, whitish in dorsal view (Figs. 164–165). Mesonotum, scutellum and metanotum with whitish to yellowish hairs, short on disc, medium-lengthed on periphery (Fig. 165).

Mesepisternum with long white hairs. Propodeal corbicula complete, corbicular fringe with long, strongly plumose white hairs, corbicular surface hairless. Femora and tibiae with white to whitish hair; tarsi with white to golden hair. Scopal hair white, simple (Fig. 163). Flocculus incomplete, white. Tergal disc hair short, white, conspicuous mostly on lateral parts of terga and on more apical terga. Tergal marginal zones with strong, dense bands of white hair, limited to lateral patches on tergum 1, interrupted on 2, continuous on 3–4. Prepygidial fimbria white laterally, whitish-golden medially; pygidial fimbria whitish-golden (Fig. 166).

**Head** (Figs. 164–165). 1.3 times broader than long. Mandible bidentate. Galea shagreened, apex weakly pointed. Labral process weakly trapezoidal, much broader than long, basal 2/3 very finely transversely striated, apical margin weakly emarginate. Clypeus moderately convex, finely punctured, basal 3/4 shagreened to shiny, longitudinally striated, distance between punctures about 1 puncture diameter, a narrow, strongly shagreened, impunctate midline is indicated; apical 1/4 smooth, sparsely punctured (Fig. 164). Frons longitudinally striated. Flagellomere 1 slightly longer than 2+3, 2 slightly shorter than 3. Facial foveae broad and shallow on upper part, gradually tapering downwards, extending from level of middle of lateral ocellus to slightly below antennal sockets, 0.6 times as broad as antennocular distance (Figs. 164–165). Distance of fovea from lateral ocellus about 1 ocellus diameter. Ocellocapital distance 1.2 ocellus diameters. Vertex weakly carinate (Fig. 165).

**Mesosoma** (Fig. 165). Pronotum with weakly elevated dorsolateral angle, without lateral carina. Mesonotum finely shagreened, weakly shiny, moderately punctured, distance between punctures about 1 puncture diameter. Scutellum similar, somewhat shinier (Fig. 165). Mesepisternum and propodeal corbicula finely reticulate, mesepisternum finely obliquely punctured anteriodorsally. Posterolateral part of propodeum very finely rugose-areolate. Propodeal triangle delineated by weak carina, basal half finely rugose-areolate (somewhat coarser than flanking areas), apical half very finely alveolate. Inner side of hind femur with weak ventral carina. Hind pretarsal claw bidentate. Recurrent vein 1 meets submarginal cell 2 at about 2/3 of its length. Nervulus antefurcal.

**Metasoma** (Fig. 166). Tergal discs finely shagreened, weakly shiny, very finely punctured, distance between punctures 1 puncture diameter, punctures becoming obscure towards apical terga. Tergal marginal zones similar, shagreenation and punctation finer, becoming smooth near apex. Pygidial plate without elevated medial area.

**Male.** Unknown.

**Diagnosis.** *Andrena ardentia* is distinguished from most members of *Simandrena* by the largely reddish colouration of the metasoma (Fig. 166). It differs from *A. selena* Gusenleitner by its smaller size, broader and more distinct impunctate midline of clypeus, shagreened scutellum (more or less smooth centrally in *A. selena*), and most importantly, the imperceptible, very fine tergal punctation (coarser and much more distinct in *A. selena*).

**Distribution:** Israel (northern Negev), West Bank.

**Flight period:** March–April.

**Flower records:** Brassicaceae: *Erucaria microcarpa*.

**Holotype:** ISRAEL: Gilat Research Center, 500 m NNE, 31.341°N 34.6693°E, 2.iii.2022, G. Pisanty, pan trap, ♀ (SMNHTAU:386281).

**Paratypes:** ISRAEL: Beersheba, 15.iv.1970, H. Bytinski-Salz (1♀); Nevatim, 8.iv.1953 (1♀); Tel Qeriyot, 31.342°N 35.125°E, 27.iii.2015, G. Pisanty (1♀); WEST BANK: Za'atara, 6.iii.2015, T. Jumah, on *Erucaria microcarpa* (3♀) (OLML, RMNH, SMNHTAU).

**Styloped material:** ISRAEL: Beersheba, 15.iv.1970, H. Bytinski-Salz (1♀) (OLML).

**Etymology.** *ardentia* = Latin for “burning, on fire”, referring to the bright red integument of this species. The species epithet is an adjective.

**Other material examined (*A. selena*):** EGYPT: Sinai, Mitla, 13.iv.1973, M. Kaplan (1♀); ISRAEL: Nahal Ramon, 14.iv.2015, A. Gotlieb (4♀) (SMNHTAU).

### *Andrena (Simandrena) thomsonii* Ducke, 1898

**Distribution:** Southern Europe from France to Turkey, Lebanon, and Central Asia (Gusenleitner & Schwarz 2002; Wood *et al.* 2020a); newly recorded from Israel.

**Flight period:** March–August.

**Flower records:** Apiaceae: *Daucus* spp.; Asteraceae: *Crepis reuteriana*, *Inula* spp., *Sonchus oleraceus*; Brassicaceae spp.; Rosaceae: *Prunus* spp.; Salicaceae: *Salix* spp.; Sapindaceae: *Acer monspessulanum* (Ducke 1898; Warncke 1966; Gogala 2009; Wood *et al.* 2020a; new records).

**Material examined: ISRAEL:** Hermon Nature Reserve [Hermon NR], ‘En Kahal, 1251 m, 33.279°N 35.734°E, 28.v.2019, L. Friedman (1♀,1♂); Montfort, 2.iii.1987, I. Yarom (1♀); Mount Hermon, 1750 m, 25.v.1988, I. Yarom (2♀,2♂); 2000 m, 13.viii.1973, A. Freidberg (1♀); [Har Hermon], 1649 m, 33.2993°N 35.7679°E, 16.iv.2021, G. Pisanty, on *Acer monspessulanum* (1♂); 1700 m, 33°18′N 35°46′E, 24.v.2012, L. Friedman (1♂); 1820 m, 33.302°N 35.773°E, 17.vi.2020, G. Pisanty (1♀); [Har Hermon], Busheri turn, 1770 m, 1.vi.2016, A. Kazachenko (1♀) (SMNHTAU).

### *Andrena (Suandrena) mirna* Warncke, 1969

*Andrena cyanomicans mirna* Warncke, 1969

**Distribution:** Iran, Southern Israel, Jordan, Lebanon, West Bank (Warncke 1969; Khodaparast & Monfared 2012; Wood *et al.* 2020a).

**Flight period:** January–April.

**Flower records:** Brassicaceae: *Erucaria rostrata*, *Sinapis alba*; Fabaceae: *Retama raetam*.

**Material examined: PARATYPES: ISRAEL** [Palestine]: Yeruham [Bir Rechme], 13.iii.[no year], H. Bytinski-Salz (1♀,1♂); **WEST BANK** [Palestine]: Jericho, 25.i.2941, H. Bytinski-Salz (1♀) (SMNHTAU); **non-type material: ISRAEL:** Arad, 570 m, 31°15.346′N 35°11.958′E, 7.iii.2010, A. Freidberg (5♂); Avdat, 21.iii.1985, A. Freidberg (1♂); [Avedat], 16.iii.1988, A. Freidberg (1♀); Be’erotaim Bridge, 26.ii.1968, D. Gerling (1♂); Ein Gedi, 23.iii.1958, I. Kugler (1♂); Har Horesha, Rt. 171, 930 m, 2.iv.2014, A. Freidberg (1♀) & L. Friedman (1♂); Hatira, Negev, Israel, 8.ii.2002, E. Groner (1♀); Hazeva Field School, 30°43′N 35°15′E, 12.iii.1998, E. Ashkenazi, Malaise trap (2♂); Irus Yeroham Nature Reserve [Irus Yeroham NR], 31.021°N 34.9725°E, 13.ii.2022, G. Pisanty, on *Retama raetam* (1♂); Lehavim, 31.365°N 34.830°E, 28.i.2015, G. Pisanty, pan traps (2♀,1♂); Lehavim Junction [LehavimJun.], 5.iv.1988, F. Kaplan (1♀); Masua, 12.iii.1985, A. Hefetz (1♀); near Mount Tzaror, Hatira, Negev, Israel, 8.ii.2002, E. Groner (1♀); 14.ii.2002, E. Groner (1♀); Nahal Aqrabim, 9.iii.1991, R. Kasher (1♂); Nahal Loz [Nahal Lotz], 21.ii.2014, G. Pisanty (2♀); Nahal Zin [Zin 2], 6.iii.2007, Y. Hollander (1♂); Netiv HaGdud, 22.ii.1985, A. Hefetz (2♀); Park ha-Les Nature Reserve [Park ha-Les NR], 31.2575°N 34.5965°E, 19.iii.2022, G. Pisanty, pan trap (1♀); Sa’ad, 31.469°N 34.528°E, 21.i.2015, G. Pisanty, on Brassicaceae (1♀,1♂); Sde Boker, 17.iii.1970, Gasith (2♀); [Sede Boqer], 21.iii.1985, I. Yarom (1♂); 17.iii.1999, L. Friedman (1♂); [Sede Boqer], route 90, 30°51′N 34°46′E, 12.iv.2009, O. Avlas (1♀); 3 km N [Sede-Boqer], 19.ii.1995, R. Kasher (2♀,3♂); Shivta, 13.iii.1977, A. Freidberg (1♀); Yeruham [Kfar-Jerucham], 24.iii.1959, I. Kugler (3♀,2♂); **WEST BANK:** Almog, 20.i.1990, R. Kasher, on *Erucaria rostrata* (1♀); [Almog, 10 km S Jericho], –350 m, 3.ii.1990, R. Kasher, on *Erucaria rostrata* (2♀); Nahal Gilgal, 6.i.1973, Yehiam (1♀); Petza’el [Fza’el, 23 km SE Nablus], –300 m, R. Kasher, on *Sinapis alba* (1♀,1♂); [Peza’el], –200 m, 32°2′57″N 35°26′7″E, 18.ii.2020, G. Pisanty (1♀) (SMNHTAU).

**Remarks.** The taxonomy of the subgenus *Suandrena* is complex, and has had several different and variable interpretations through time (e.g. Warncke 1974a; Dylewska 1983; Gusenleitner & Schwarz 2002; Kratochwil *et al.* 2014; Kratochwil 2021). Warncke separated *A. cyanomicans* Pérez into three subspecies, the nominate in Iberia, *A. c. fratella* Warncke from northwestern Africa, and *A. c. mirna* from the southern Levant. Previous authors have stated that *A. mirna* is a valid species, and have used it as such (Khodaparast & Monfared 2012; Kratochwil *et al.* 2014; Kratochwil 2021). We agree with this interpretation; female *A. mirna* differ from the nominate form in the black terga which lack metallic reflections (terga with metallic blue-green reflections in *A. cyanomicans*), scopa almost entirely black with only a few slightly lightened hairs ventrally (scopa almost entirely orange with dark brown hairs dorsobasally at basitibial plate in *A. cyanomicans*), and pubescence of mesosoma generally whitish-greyish, dorsally with some intermixed black hairs (pubescence of mesosoma generally light brown, dorsally with abundant intermixed black hairs in *A. cyanomicans*). Males can be separated by their whitish mesosomal pubescence (light brown in *A. cyanomicans*) and more strongly produced hairbands (hairbands very weakly produced in *A. cyanomicans*). Due to the geographic separation and the lack of introgression between these forms, *A. mirna* should be treated as distinct from *A. cyanomicans*.

**Other material examined (*A. cyanomicans* Pérez): LECTOTYPE: SPAIN:** Barcelona [Barcelone] (♂) (MNHN); **non-type material: SPAIN:** Albaricoques env., 25.iii.2014, P. Bogusch (2♀,1♂); Altea, 10 km N Benidorm, 15.iv.1982 (1♂); Barcelona, Villaneueva y Geltru, 30.ix.1964, D. Drenth (1♀,2♂); Murcia, Los Alcazares, 11.ix.1977, J.A. Veenstra (1♀,3♂) (OLML, RMNH, TJW).

*Andrena (Truncandrena) dorchini* Pisanty sp. nov.

(Figs. 167–178)

**Female** (Fig. 170).

**Body length:** 8.5–9.5 mm.

**Colour.** Clypeus basolaterally with rainbow-like pattern of alternating metallic hues, black centrally. Rest of head black with slight bluish-metallic hue (Fig. 167). Anterior side of flagellomeres 2–10 reddish to reddish-brown. Pronotum, mesepisternum, mesonotum, scutellum, metanotum and propodeal corbicula distinctly bluish-metallic with some golden reflections, especially pronounced on mesonotum (Figs. 168, 175). Posterior part of propodeum bluish, hardly metallic. Legs moderate to dark brown. Wings hyaline, veins and stigma moderate to dark brown (Fig. 170). Tergal discs black with moderate metallic luster, more pronounced on 1–2. Tergal marginal zones reddish basally, yellowish apically (Fig. 169).

**Pubescence.** Body hair mostly brightly coloured, medium to long, minutely plumose (Fig. 170). Clypeus, supra-clypeal area, lower part of paraocular area and area around antennal sockets with dense short to medium white hair (Figs. 167, 170). Upper parts of paraocular area and frons with thin short to medium brown hair. Facial foveae brown. Vertex with medium to long erect hairs, brown on anterior part, white on posterior part. Genal area with few short brown hairs near upper margin of compound eye, otherwise with dense short to medium white hair, longer on ventral part. Mesonotum, scutellum and metanotum with moderately dense, short to medium, white to brownish-white erect hairs (Figs. 168, 170). Mesepisternum with minutely plumose long white hair (Fig. 170). Propodeal corbicula incomplete, posterodorsal fringe with medium-lengthed white plumose hairs, corbicular surface with few simple to weakly plumose medium-lengthed white hairs. Femora with mostly white hair. Tibia and scopae with white to golden hair, outer basal part of hind tibia with some brown hair. Flocculus absent. Femoral and tibial scopal hairs simple, white (Fig. 170). Tergal disc 1 with medium-lengthed, moderately dense white hair, 2 with short white hair, 3–4 with very short brown hair. Tergal marginal zone 1 with interrupted band of short greyish-white hair, 2–4 with distinct, continuous narrow bands of short dense white hair covering apical half of marginal zone. Prepygidial fimbria white laterally, brown centrally; pygidial fimbria brown (Fig. 169).

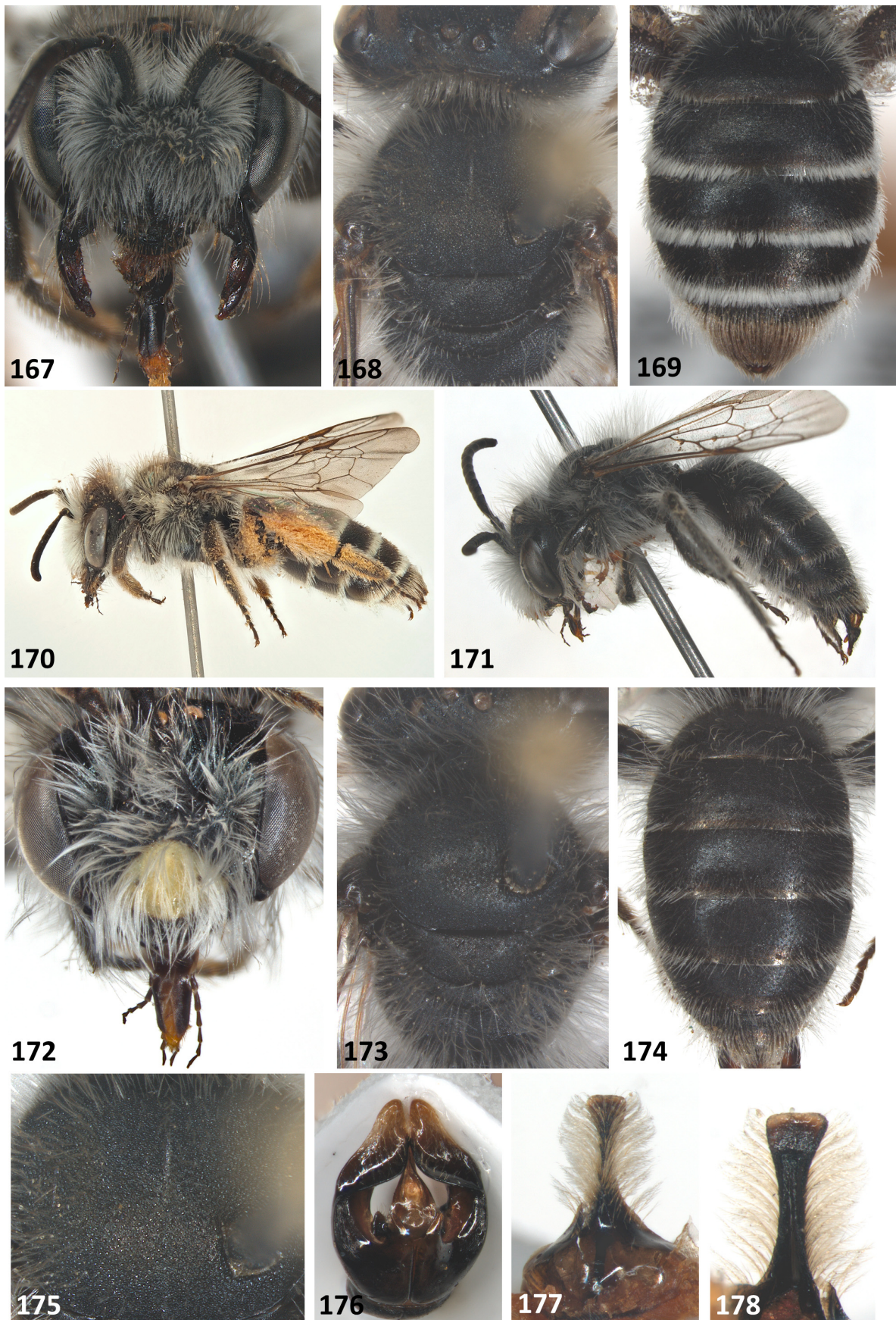
**Head** (Figs. 167–168). 1.2 times broader than long. Mandible bidentate. Galea shagreened. Labral process trapezoidal, not much broader than long, transversely striated mostly on basal half. Clypeus moderately convex, sculpturing obscured by pilosity, surface shagreened and matt, strongly and very densely punctured, distance between punctures 0–0.5 puncture diameters, with distinct, narrow impunctate midline. Lower part of paraocular area densely obliquely punctured. Flagellomere 1 longer than 2+3, 2 slightly shorter than 3 (Fig. 167). Frons and upper part of paraocular area longitudinally striated, interspersed with oblique punctures. Facial foveae moderately broad, almost rectangular, slightly tapering downwards, extending from level of middle of lateral ocellus to lower end of antennal socket, 0.5 times as broad as antennocular distance, narrowly separated from compound eye. Distance of fovea from lateral ocellus 1.2 ocellus diameters. Ocelli arranged in a strongly obtuse triangle, almost linear. Ocell-occiptal distance about 1.2 ocellus diameters. Vertex weakly carinate (Fig. 168).

**Mesosoma** (Figs. 168, 175). Dorsolateral angle of pronotum not to weakly elevated, in some specimens creating a transverse ridge that is distinctly separated from the mesonotum, not forming a lateral carina. Mesonotum, scutellum and metanotum with unique sculpturing of very dense, almost contiguous coarse punctures merging into a coarsely rugged background, creating a finely areolated appearance (Figs. 168, 175). Mesepisternum finely alveolate, finely and shallowly, obliquely punctured. Propodeal corbicula finely reticulate. Basal part of propodeum narrow and strongly sloping. Posterolateral part of propodeum finely alveolate, very densely and coarsely punctured. Propodeal triangle very finely alveolate, basal margin slightly to strongly rugose (Fig. 168). Inner hind tibial spur slightly broadened basally, more or less straight. Hind pretarsal claw with inner tooth. Nervulus interstitial to weakly postfurcal.

**Metasoma** (Fig. 169). Tergal discs uniformly, finely shagreened, disc 1 finely, obliquely punctured, distance between punctures 1–2 puncture diameters, discs 2–4 very finely and imperceptibly punctured, distance between punctures 2–3 puncture diameters. Tergal marginal zones narrow, of uniform width, weakly depressed, impunctate, shagreened basally, smooth apically, 2–4 occupying about 1/3 of tergal length. Pygidial plate without central elevated area.

**Male** (Fig. 171).





**FIGURES 167–178.** *Andrena (Truncandrena) dorchini* sp. nov. 167. female head, 168. female vertex and mesosoma, 169. female metasoma, 170. female habitus, 171. male habitus, 172. male head, 173. male vertex and mesosoma, 174. male metasoma, 175. male mesonotum, 176. male genitalia, 177. male eighth sternum, ventral view, 178. male eighth sternum, dorsal view.

**Body length:** 8–8.5 mm.

**Colour.** Clypeus yellow with narrow dark basolateral margin and two mediolateral black spots (Fig. 172). Rest of body similar to female.

**Pubescence.** Head and mesosoma with relatively long, mostly white hair, longer on dorsal side (Figs. 171–173). Clypeus and paraocular and supraclypeal areas with dense and long, minutely plumose white hair. Scape with short white hair (Fig. 172). Area around upper margin of compound eye with few brown hairs. Dorsal side of mesosoma with long, minutely plumose, erect white hair, denser peripherally, sparse on center of mesonotum (Figs. 171, 173). Mesepisternum and propodeum with long plumose white hairs. Femora and tibiae with mostly white hair, tarsi with white to yellowish hair (Fig. 171). Tergal discs with sparse but conspicuous, minutely plumose white hair, long on disc 1, gradually shorter on following terga. Tergal marginal zones 2–5 with distinct bands of sparse, short white hair arising from apical half of marginal zone and extending onto following disc, interrupted on 2–4, continuous on 5 (Fig. 174).

**Head** (Figs. 172–173). 1.3 times broader than long. Galea finely shagreened. Labral process broad and short, weakly trapezoidal, apical margin slightly emarginate. Clypeus convex, sculpturing obscured by pilosity, surface more or less smooth, densely and shallowly punctured, distance between punctures 0.5–1 puncture diameters, with distinct impunctate midline. Lower part of paraocular area densely obliquely punctured. Flagellomere 1 slightly shorter than 2+3, 2 shorter than 3. Frons and upper part of paraocular area longitudinally striated, interspersed with oblique punctures. Ocelli arranged in a strongly obtuse triangle, almost linear. Ocelloccipital distance 1.4 ocellus diameters. Vertex weakly carinate (Fig. 173).

**Mesosoma** (Fig. 173). Dorsolateral angle of pronotum weakly elevated, distinctly separated from mesonotum, not forming a lateral carina. Mesonotum and scutellum strongly and uniformly shagreened, densely and coarsely punctured, distance between punctures 0.5–1 puncture diameters (Fig. 173). Mesepisternum and anterolateral part of propodeum finely alveolate-reticulate, finely and shallowly, obliquely punctured. Basal part of propodeum narrow and strongly sloping. Posterolateral part of propodeum finely alveolate, coarsely punctured, distance between punctures 1–2 puncture diameters. Propodeal triangle narrow, very finely and shallowly alveolate, without rugae. Nervulus interstitial to weakly postfurcal.

**Metasoma** (Fig. 174). Tergal discs uniformly, finely shagreened, punctation fine, sparse, shallow and oblique, distance between punctures 2–4 puncture diameters. Tergal marginal zones narrow, of uniform width, weakly depressed, basal part shagreened, sparsely punctured to impunctate, apical part smooth.

**Genitalia and hidden sterna** (Figs. 176–178). Dorsal gonocoxite lobes well developed, elongate and pointed, pointing away from each other. Gonostylus blades very broad, triangular, dorsally concave, inner margin almost right angled, outer margin slightly concave, apex weakly pointed. Basal half of penis valves of moderate width, flanked by narrow, arched lamellae, apical half narrow (Fig. 176). Sternum 8 columnar, narrowed at mid length (Figs. 177–178).

**Diagnosis.** *Andrena dorchini* is closely related to the *Andrena doursana* species group. Five species are currently recognised in this group, the females of which are almost impossible to tell apart: *A. alchata* Warncke (female unknown), *A. derbentina* Morawitz, *A. doursana* Dufour, *A. mizorhina* Warncke and *A. mucronata* Morawitz. *Andrena dorchini* differs from members the *doursana* group by the blacker cuticle colour (usually strongly bluish-metallic in the *doursana* group), brown flagellum (flagellomeres 3–11 orange anteriorly in the *doursana* group), more triangular arrangement of ocelli (almost linear in the *doursana* group), stronger, coarser and denser mesonotal punctation especially in the female, and weaker and finer, almost imperceptible tergal punctation. Males are further separated by the yellow marked clypeus and black paraocular areas (with yellow on paraocular areas in *A. alchata*, only apex of clypeus yellow marked in *A. doursana* and *A. derbentina*, clypeus entirely dark in *mizorhina*) and the absence of a medioapical spine on the clypeus (clypeus with a clear spine in *A. mucronata*).

**Distribution:** Southern Israel, West Bank.

**Flight period:** February–March.

**Flower records:** Resedaceae: *Reseda* sp.

**Pollen analysis.** A single pollen load was analysed, containing 82% *Echium*-type (Boraginaceae), 14% Fabaceae 25µm in length, and 4% *Anthemis*-type (Asteraceae, Anthemideae).

**Holotype:** WEST BANK [ISRAEL]: Sartava Nature Reserve [Sartava NR], Wadi Jeruzaliya, –70–+300 m, 14.ii.2019, A. Dorchin, ♀ (SMNHATAU:300457).

**Paratypes:** ISRAEL: Judean Desert, 11.iii.1980, A. Hefetz (1♀); Nahal Ramon [Raman], 25.iii.1961, J. Ku-

gler (1♀); **WEST BANK:** Jericho, 5 km N, 20.iii.1988, Y. Zvik (1♀); Kfar Adumim [Kefar-Adomim], 3.iii.1990, R. Kasher (3♀); Nabi Musa Road, 1.iii.2015, T. Jumah, on *Reseda* (1♀); Peza'el, 18.ii.2020, O. Segal (1♂); Sartava Nature Reserve [Sartava NR], Wadi el-Ahmar, 2 km E Gittit, –80–+60 m, 13.ii.2019, A. Dorchin (2♀,2♂); [Sartava NR], Wadi Jeruzaliya, –70–+300 m, 14.ii.2019, A. Dorchin (5♀); Wadi Qelt [Wadi Kelt], –200 m, 6.iii.1975, K.M. Guichard (1♀) (NHMUK, OLML, RMNH, SMNH, TAU, TJW).

**Etymology.** Named in honour of our colleague, Israeli melittologist Achik Dorchin (born 1975), who collected this species. The species epithet is an adjective.

### *Andrena (Truncandrena) mizorhina* Warncke, 1975 stat. nov.

*Andrena doursana mizorhina* Warncke, 1975

**Distribution:** Israel, Lebanon, Turkey, West Bank (Wood *et al.* 2020a).

**Flight period:** February–April.

**Flower records:** None.

**Material examined: HOLOTYPE: TURKEY:** Adana, 7.v.[no year] (♀) (OLML); **PARATYPE: ISRAEL:** Ramla [Ramleh] (1♂) (OLML); **non-type material: ISRAEL:** Ben Shemen, 1.iii.1986, E. Shney-Dor (1♂); 'En Hemed [Aquabella], 15.iii.1969, H. Bytinski-Salz (1♂); Holot Nizzanim Nature Reserve [Holot Nizzanim NR], 10 m, 31.742°N 34.606°E, 10.iii.2021, A. Dorchin (2♂); Katzrin [Golan, Qazrin], 10.iv.1988, R. Leys (3♀,2♂); Lakhish, 18.ii.2013, T. Shapira, pan trap (1♂); 6.iii.2013, T. Shapira, pan trap (1♀); Pura Nature Reserve, 18.iii.2010, A. Freidberg (1♂); Tiberias, 26.iii.1996, H. Wolf (4♀,2♂); **WEST BANK:** Kedumim [Qedumim], 24.iii.2015, L. Friedman (1♀) (NHMUK, OLML, RMNH, SMNH, TAU, TJW).

**Remarks.** The identity of this taxon has been confused. Material from the Levant was originally reported as *A. doursana derbentina* Morawitz (Warncke 1969). Warncke later removed *A. derbentina* (a non-Mediterranean taxon described from the Caucasus) from combination with *A. doursana* and described Levant material as *A. doursana mizorhina* (Warncke 1975). The reason for this confusion is that female material is highly challenging if not impossible to separate; the key differences are in the male sex. Males of *A. mizorhina* have an entirely dark clypeus, whereas the clypeus is at least partially yellow-marked in *A. derbentina*, *A. doursana* Dufour, and the various subspecies of *A. doursana* described by Warncke from North Africa that require separate investigation as to their specific status. *Andrena mizorhina* males also lack the medioapical spine on the clypeus characteristic of *A. mucronata* Morawitz. They do not vary in the structure and colouration of their clypeus, and do not intrograde into the other known forms, and we therefore we treat them as a valid taxon. They are also geographically isolated from other similar species, which are restricted to the Caucasus (*A. derbentina*) or western Egypt westwards (*A. doursana* s.s., *A. doursana agadira* Warncke, *A. doursana bengasia* Warncke, and *A. doursana citreola* Warncke). *Andrena mucronata* does occur in sympatry with *A. mizorhina* in Israel, but we have confirmed the separation of the two species by DNA barcoding (Table 2). Because female identification is challenging, the range of *A. mizorhina* is established mostly based on male material, and records from females only should be treated with caution. It is regrettable that a female specimen was selected as the holotype of this species, with no associated males collected nearby; the possibility that the holotype belongs to *A. mucronata* cannot be totally excluded.

### *Andrena (Truncandrena) noacki* Alfken, 1935 sp. resurr.

(Fig. 179)

*Andrena noacki* Alfken, 1935

*Andrena oulskii noacki*: Warncke 1967

*Andrena oulskii* Radoszkowski, 1867: Gusenleitner & Schwarz 2001, 2002

**Distribution:** Turkey.

**Flight period:** May–June (Hazir *et al.* 2014).

**Material examined: HOLOTYPE: TURKEY:** Ankara, 1.vi.1934, A. Seitz (♀) (SMFM); **PARATYPES: TURKEY:** same as holotype (2♀) (ZMHB).



FIGURES 179–187. *Andrena (Truncandrena) noacki* Alfken **sp. resurr.**, holotype. 179. female metasoma. *Andrena (Truncandrena) ochraceohirta* Alfken **sp. resurr.**, holotype. 180. female metasoma. *Andrena (Truncandrena) oulskii* Radoszkowski, holotype. 181. female metasoma. *Andrena (Truncandrena) petrae* **sp. nov.** 182. female habitus, 183. female head, 184. female vertex and mesosoma, 185. female metasoma, 186. male habitus, 187. male head.

**Remarks.** Members of the *Truncandrena* with orange tarsi have been greatly confused; Warncke adopted a lumping approach and united most taxa (as subspecies) under either *A. minapalumboi* Gribodo or *A. oulskii* Radoszkowski. Subsequent authors have reinstated some of these names such as *A. delphiensis* Warncke (Greece, Gusenleitner & Schwarz 2002) or simply used them as good taxa (Hazir *et al.* 2014). Though confused (Schuberth *et al.* 2001), the use of the name *A. oulskii* was stabilised as a *Truncandrena* species by Wood (2021b). It is therefore necessary to reinstate the taxa *A. noacki* and *A. ochraceohirta* Alfken from their Warncke baseline of synonymy with *A. oulskii* and *A. minapalumboi* (Gusenleitner & Schwarz 2002). These changes bring the taxonomic baseline into line with current use of these names and concepts (Hazir *et al.* 2014).

*Andrena noacki* has dark terga and complete hair bands on terga 1–2 (Fig. 179), whereas *A. oulskii* has red-marked terga (Fig. 181), and in *A. ochraceohirta* sp. resurr. and *A. oulskii* the hair bands on terga 1–2 are always interrupted (Figs. 180–181). The latter character is independent of the age of the specimen, as fresh *A. ochraceohirta* never have complete hair bands on terga 1–2, so it is not the result of abrasion. *Andrena noacki* is currently known only from the Central Anatolian plateau of Turkey, and is therefore isolated from *A. ochraceohirta* in the southern Levant.

### ***Andrena (Truncandrena) ochraceohirta* Alfken, 1935 sp. resurr.**

(Fig. 180)

*Andrena ochraceohirta* Alfken, 1935

*Andrena oulskii ochraceohirta*: Warncke 1967, 1969

*Andrena minapalumboi* Gribodo, 1894: Gusenleitner & Schwarz 2002

**Distribution:** Israel, Jordan, Syria, West Bank.

**Flight period:** February–May.

**Flower records:** Apiaceae: *Ferula communis*; Asteraceae: *Calendula* spp., *Silybum marianum*, *Urospermum picroides*; Brassicaceae: *Hirschfeldia icana*, *Isatis lusitanica*, *Ochtodium aegyptiacum*, *Rapistrum rugosum*, *Sinapis alba*, *Sinapis arvensis*; Fabaceae: *Lens orientalis*.

**Material examined: HOLOTYPE: WEST BANK** [Palästina]: Jericho, 20–28.iv.1927, Dr. Enslin (♀) (ZMHB); **PARATYPE: WEST BANK:** Nablus, 19–26.iv.1934, Dr. Enslin (1♂) (ZMHB); **non-type material: ISRAEL:** Baniyas [Banyas], 12.v.1971, H. Bytinski-Salz (1♀); Beit Guvrin [Beit Govrin], 28.iii.2010, G. Pisanty, on Brassicaceae (1♀); Beit Nir, 11.iii.2018, T. Roth, pan trap (1♀); Beit Nir, 2 km NW, 31.658°N 34.855°E, 5.iv.2015, G. Pisanty (1♀); Binyamina [Benjamina], 7.iv.19??, H. Bytinski-Salz (1♀); Canada Park, 31.836°N 35.000°E, 18.iii.2016, G. Pisanty (4♀); Degania [Deganiah], 18.iii.1941, H. Bytinski-Salz (1♂); Degania Alef [Deganya A], 5.iv.1942, Y. Palmoni (1♂); Dvir [Devira], 12.iv.2009, L. Friedman (1♀); Ein Hemed [Aquabella], 15.iii.1969, H. Bytinski-Salz (3♀); ‘En Tina Nature Reserve, 77 m, 33.084°N 35.642°E, 24.iii.2019, A. Dorchin, T. Roth & A. Sviri (1♀); Gal’ on, 23.iii.2010, G. Pisanty, on *Rapistrum rugosum* (1♀) and from pan traps (5♀, 1♂); 4.iv.2018, T. Roth, on *Hirschfeldia incana* (3♀), *Isatis lusitanica* (3♀, 1♂) and *Silybum marianum* (2♀, 1♂); Gilat Forest, 31.35°N 34.66°E, 2.iii.2022, G. Pisanty, sweeping (1♀); Gilat Research Center, 31.3372°N 34.663°E, 2.iii.2022, G. Pisanty, sweeping (2♂); 500 m NNE, 31.3405°N 34.670°E, 2.iii.2022, G. Pisanty, sweeping (4♀); Horbat Kefar Lakhish, 220 m, 31.575°N 34.8532°E, 5.iii.2021, G. Pisanty, sweeping (2♂); Horbat Kefar Lakhish, 220 m, 31.5750°N 34.8530°E, 15.iii.2021, G. Pisanty, pan traps (1♀, 2♂); Jerusalem, 27.ii.1940, H. Bytinski-Salz (1♀); 7.iii.1940, H. Bytinski-Salz (4♀); 15.iii.1940, H. Bytinski-Salz (1♂); 28.iii.1940, H. Bytinski-Salz (1♀); 12.iii.1941, H. Bytinski-Salz (1♂); Jerusalem, Mt. Scopus, 15.iii.1946, on *Calendula* (1♀, 1♂) and *Sinapis* (2♀); Jerusalem, Rehavia West, 27.iv.1945, on *Sinapis* (1♀); Jerusalem env., 28.iii.1988, R. Leys (3♀); Jerusalem [Yerushalayim], 7.ii.2015, T. Jumah (1♀); Kfar Menahem [Kefar Menahem], 2.iii.2008, Y. Mandelik, on Brassicaceae (1♂); Kvutzat Kinneret [Kinneret], 9.iv.1942, Y. Palmoni (1♀); Lakhish, 3 km NE, 31.575°N 34.870°E, 11.iii.2016, G. Pisanty, sweeping (1♀); Lakhish, 3 km NE, 31.578°N 34.870°E, 26.ii.2016, G. Pisanty (1♂); Lakhish, 3 km NE, 31.579°N 34.871°E, 4.iii.2016, G. Pisanty, on *Sinapis* (8♀, 2♂); 11.iii.2016, G. Pisanty, on *Sinapis* (1♀, 1♂); Ma’agar Yeroham [Kfar-Yerukham Reservoir], 21.iii.1971, Galil (1♀); Malkia [Malkiyya], 13.iv.2014, O. Winberger (1♀); Merom Golan, 3.iv.1997, R. Kasher (1♀); Mikveh Israel [Mikve Israel], 10.iii.19??, H. Bytinski-Salz (1♀); Moradot HaGolan Nature Reserve, Nahal Neshef, 184 m, 33.094°N 35.650°E, 24.iv.2019, A. Dorchin, T. Roth & O. Halbershtat (1♀); Mount Gilboa [Gilboa], 17.iii.1978, D. Simon (1♂); [Hare Gilboa, Har Ahino’am], 450 m, 32°27.7’N 35°24.8’E, 11.iv.2011, L.

Friedman (1♀); 450 m, 32°28'N 35°25'E, 20.iii.2012, L. Friedman (1♀); Nahal Dishon, 1.iv.1991, R. Kasher, partly on *Ochtodiodium aegyptiacum* (3♀,3♂); ?Nahal Heq [Cheik W.], 20.iv.1985, E. Shney-Dor (1♀); Nahal Maresha, 220 m, 31.5773°N 34.8576°E, 15.iii.2021, G. Pisanty, sweeping (3♀,2♂); Nahal Me'arot, 8.iv.1988, I. Yarom (3♀); Nahal Poleg [Birquat Ramadan], 13.iv.1940, H. Bytinski-Salz (1♂); Nahal Sa'ar, 18.iv.1992, R. Kasher (1♀); Nahal Shemarya, 31.341°N 34.6568°E, 2.iii.2022, G. Pisanty, sweeping (1♂); 31.3412°N 34.657°E, 2.iii.2022, M. Ben-Yosef, sweeping (1♀); Nahshon, 26.iii.2018, T. Roth, on *Sinapis alba* (1♀); Nahshon Junction, 9.iii.2017, T. Roth (1♂); Netiv HaLamed-Heh [Netiv Halamed He], 27.iii.2017, T. Roth (1♀,1♂); Neve Shalom, 20.ii.2010, G. Pisanty, pan trap (1♀); Nurit, 120 m, 32°32'N 35°21'E, 11.iv.2011, L. Friedman (1♂); Park Rosh Ha'Ayin, 16.iv.1993, A. Freidberg & F. Kaplan (1♂); Pura Nature Reserve, 31.496°N 34.778°E, 27.iii.2015, G. Pisanty (1♀); 200 m, 31°29.659'N 34°46.755'E, 18.iii.2010, A. Freidberg (1♀); Ramat HaNadiv [Hasharon, Zikhron Ya'aqov, Ramas Hanadiv], 12.iii.1990, R. Leys (1♀,2♂); Ramla, 30.iv.1973, H. Bytinski-Salz (2♀); [Ramleh], 3.iii.1971, H. Bytinski-Salz (2♂); 24.iii.1971, H. Bytinski-Salz (9♂); Revadim, 15.iii.2018, T. Roth, on *Sinapis alba* (1♀) and *Urospermum picroides* (1♂); 27.iii.2018, T. Roth, on *Ferula communis* (1♀); Road 869, 1.85 km E Ma'ale Gamla, 32.895°N 35.708°E, 130 m, 11.iv.2019, A. Dorchin, O. Halbershtat & Y. Mersman (2♀); Road 869, 2.12 km NE Ma'ale Gamla Junction, -51 m, 32.895°N 35.676°E, 11.iv.2019, A. Dorchin, O. Halbershtat & Y. Mersman (1♂); Sha'alvim, 25.iii.2010, G. Pisanty (1♂); Sha'alvim, 2 km SSE, 31.8475°N 34.995°E, 18.iii.2016, G. Pisanty (1♂); Shoham, 12.iii.2010, T. Cohen (1♂); Tal Shahar, 2.iv.2010, G. Pisanty, on *Sinapis alba* (1♂); 20.iii.2017, T. Roth (1♂); Tel Aviv, 28.iii.1970, H. Bytinski-Salz (1♀); 30.iii.1970, H. Bytinski-Salz (3♀); Tel Aviv N., 27.iii.1973, H. Bytinski-Salz (2♀); Tel Hadid, 11.iv.1987, E. Shney-Dor (1♀); Tel Hadid, 31.968°N 34.95°E, 20.iii.2015, G. Pisanty (1♀,4♂); Tel Qeriyot, 31.342°N 35.125°E, 27.iii.2015, G. Pisanty (2♀); Tel Qeshet, 163 m, 31°32.491'N 34°45.841'E, 18.iii.2010, A. Freidberg (1♀); Zomet Goral, 363 m, 31°18.299'N 34°48.446'E, 18.iii.2010, A. Freidberg (1♀); Zomet Lehavim, 27.iii.1991, A. Freidberg (1♂); **JORDAN:** 30 km NW Ajloun [Aljun], 600 m, 29.iv.2006, K. Deneš (2♀); 20 km N Amman, 620 m, 23.iv.2006, K. Deneš (1♀); 20 km NW of Amman, 420 m, 5.v.2006, K. Deneš (1♀); 30 km N At-Tafilah [Tafila], 2.v.1996, Ma. Halada (1♀); Irbid, Saham vill, 19–25.iv.2003, I. Pljushtch (9♀,3♂); S of Irbid, 13.iv.2009, M. Snižek (1♂); 20 km N of Karak, 1000 m, 27.iv.2006, K. Deneš (3♀); 15 km W Madaba, 760 m, 27.iv.2006, K. Deneš (4♀); North Shuna env., 30.iv.1996, Mi. Halada (1♀); 20 km S of North Shuna, Tall Al Arbatin, 19.iv.1996, Ma. Halada (1♀); **SYRIA:** Apamea, 29.iv.1995, K. Deneš sen. (1♀); Faouar, [2001-04-03], J. Plass. (1♂); **WEST BANK:** Bet Me'kr, 18 km E Jerusalem, 25.iii.1990, T. Boker, on *Lens orientalis* (1♂); Elon More, 'En Kefir, 530 m, 17.iii.2015, L. Friedman (1♂); Har Brakha [Berakha], 1 km S, 'Amassa Spring, 595 m, 6.iii.2015, L. Friedman (1♀); 2 km S, Nabi Isma'il Terebinth Nature Reserve, 620 m, 6.iii.2015, L. Friedman (1♀); Har Gilo, 17.iv.1991, R. Kasher, Sweeping (1♀); Har Kabbir, 700 m, 17.iii.2015, L. Friedman (1♀); Jericho, 8.iii.1976, A. Freidberg (1♂); Kedumim [Qedumim], 1 km SW, Mizpe 'Ami, 390 m, 13.iii.2015, L. Friedman (2♀); Ma'ale Adumim [Ma'ale 'Adummim], 24/26?.ii.1979, M. Kaplan (1♀); Nahal Qana, Ein-el-Juze, 11.iii.2016, L. Friedman (1♀); Ubeidiya, 6.iv.2014, I. Arar (1♀); Za'atara, 7.iv.2014, I. Arar, on *Sinapis arvensis* (1♀); 14.iv.2014, I. Arar, on *Hirschfeldia incana* (1♀) (ES, OLML, RMNH, SMNHATAU).

**Remarks.** *Andrena ochraceohirta* can be immediately separated from *A. minapalumboi* by its light-coloured terminal fringe (Fig. 180); in *A. minapalumboi* it is black, and the overall pubescence of the bee is much darker. In this regard, *A. ochraceohirta* is much closer to *A. oulskii* and *A. noacki* sp. resurr. (Figs. 179, 181), so it is completely unclear why Warncke synonymised it with *A. minapalumboi*. The light terminal fringe also allows separation from *A. combusta* Morawitz, which has a dark terminal fringe. *Andrena oulskii* can be separated by its red-marked terga (Fig. 181), and *A. noacki* can be separated because it has complete hair bands on terga 1–4 (Fig. 179), whereas in *A. ochraceohirta* the hair bands on terga 1–2 are always very broadly interrupted (Fig. 180) (see also remarks under *A. noacki*).

### *Andrena (Truncandrena) petrae* Wood sp. nov.

(Figs. 182–190)

**Female** (Fig. 182).

**Body length:** 10–12 mm.

**Colour.** Body uniformly dark grey (Fig. 182). Flagellum dark basally, becoming orange from apex of segment 2 onwards, particularly ventrally (Figs. 182–183). Legs dark, apical tarsal segments slightly lightened brownish. Wings hyaline, stigma dark orange centrally, dark brown laterally, venation dark orange (Fig. 182). Tergal margins apically lightened brown-whitish hyaline (Fig. 185).

**Pubescence.** Face, gena, vertex, scape with long white hairs, becoming light brownish on vertex, longest on gena equaling length of scape. Clypeus apically, mandibles and labrum with faintly golden hairs (Figs. 183–184). Fovea with short brownish hairs. Mesonotum and scutellum with short white hairs, becoming longer on mesepisternum, not exceeding length of scape (Figs. 182–184). Propodeal corbicula weakly complete, composed of white plumose hairs; surface of propodeal corbicula almost hairless, with few simple white hairs laterally. Leg hair white to faintly golden apically, scopa white (Fig. 182). Flocculus weakly complete, composed of white plumose hairs. Tergal discs with short to long white hairs, marginal zones 1–4 with complete white hairbands, on 2–4 thick and obscuring underlying surface. Prepygidial fimbria golden centrally, white laterally; pygidial fimbria golden (Fig. 185).

**Head** (Figs. 183–184). 1.3 times broader than long. Labral process trapezoidal, slightly broader than long, apical margin straight. Clypeus weakly domed, basally shagreened, in apical half almost without shagreenation, shining. In apical 2/3 clypeus densely punctured with exception of impunctate longitudinal central line, punctures large and separated by <0.5–1 puncture diameters (Fig. 183). Paraocular area with inconspicuous punctures; frons with longitudinal striations, underlying surface very weakly shining. Flagellomere 1 exceeds 2+3, slightly shorter than 2+3+4. Facial fovea dorsally occupying half distance between lateral ocellus and compound eye, in length slightly exceeding level of antennal insertions, not narrowed below (Fig. 183). Fovea dorsally separated from lateral ocellus by 1.5 diameters of lateral ocellus. Ocelloccipital distance equal to 1.5 diameter of lateral ocellus. Genal area slightly exceeding width of compound eye.

**Mesosoma** (Fig. 184). Pronotum without elevated dorsolateral angle or lateral carina. Mesonotum and scutellum shagreened, very weakly shining, majority of surface with irregular extremely shallow and inconspicuous punctures, indicated by slightly raised margins, punctures separated by <0.5–1 puncture diameters. Mesepisternum with fine granular microreticulation, with faint raised reticulation above. Anterolateral face of propodeum with only fine granular microreticulation, posterolateral part of propodeum with fine granular microreticulation and faint raised reticulation above; propodeal triangle narrow, indicated by absence of raised reticulation. Inner side of hind femur rounded, not carinate. Tarsal claws with small inner tooth. Recurrent vein 1 reaching submarginal cell 2 clearly beyond its middle. Submarginal crossvein 1 meets marginal cell 5 vein widths from stigma. Nervulus interstitial (Fig. 182).

**Metasoma** (Fig. 185). Terga with fine microreticulation, weakly shining, strongest on tergum 1, becoming finer and weaker on following terga. Tergal discs with fine, sparse punctures, punctures separated by 3–4 puncture diameters. Marginal zones weakly depressed, occupying 0.2–0.3 of tergal disc, with denser punctures, separated by 2–3 puncture diameters. Pygidial plate rounded triangular, flat, internal surface dull.

**Male** (Fig. 186).

**Body length:** 10–10.5 mm.

**Colour.** Body uniformly dark grey (Fig. 186). Clypeus and lower paraocular areas yellow, clypeus entirely yellow with exception of two lateral black maculae (Fig. 187). Flagellum dark basally, strongly orange below from segment 2–11. Legs dark, apical tarsal segments slightly lightened brownish. Wings hyaline, stigma dark orange centrally, dark brown laterally, venation dark orange (Fig. 186). Tergal margins apically lightened brown-whitish hyaline (Fig. 189).

**Pubescence.** Face, gena, vertex and scape with long white hairs, on gena longest hairs equaling length of scape (Figs. 186–187). Mesosoma all over with long white hairs, becoming brownish above, majority equaling or exceeding length of scape (Figs. 186, 188). Leg hair white (Figs. 186). Tergal hairs as in female, though hair bands less dense (Fig. 189).

**Head** (Figs. 187–188). 1.3 times broader than long. Labral process short, slightly broader than long, apical margin emarginate. Clypeus weakly domed, finely shagreened, weakly shining. Clypeus punctate with exception of ill-defined longitudinal impunctate midline, punctures separated by 0.5–1 puncture diameters (Fig. 187). Paraocular area with inconspicuous punctures; frons with longitudinal striations, underlying surface very weakly shining. Flagellomere 1 as long as 2+3. Ocelloccipital distance equal to 1.5 diameter of lateral ocellus (Fig. 188). Genal area equaling width of compound eye.

**Mesosoma** (Fig. 188). Pronotum without elevated dorsolateral angle or lateral carina. Mesonotum and scutellum with fine granular shagreen, dull to weakly shining centrally, essentially impunctate. Mesosoma structure otherwise as in female. Tarsal claws with strong inner tooth. Recurrent vein 1 reaching submarginal cell 2 at its middle. Submarginal crossvein 1 meets marginal cell 5 vein widths from stigma. Nervulus interstitial (Fig. 186).



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**FIGURES 188–194.** *Andrena (Truncandrena) petrae* sp. nov. 188. male head and mesosoma, 189. male metasoma, 190. male genitalia. *Andrena (Truncandrena) syriensis* Wood. 191. female habitus, 192. female head, 193. female head and mesosoma, 194. female metasoma.



**Metasoma** (Fig. 189). As in female.

**Genitalia and hidden sterna** (Fig. 190). Gonocoxites with pronounced rounded dorsal lobes, gonostyli broadened apically, with strong raised internal margin, apically with slightly narrowed and rounded points. Penis valves centrally broad, with hyaline lateral extensions, narrowed apically (Fig. 190). Sternum 8 narrowed centrally, thus narrowly triangular, apically truncate. Ventral surface covered with plumose white hairs projecting laterally.

**Diagnosis.** *Andrena petrae* is superficially similar to the *Andrena doursana* species group and related species (in the Levant these include *A. dorchini* **sp. nov.**, *A. mizorhina* Warncke **stat. nov.**, *A. mucronata* Morawitz and *A. ulula* Warncke) but can quickly be separated by the punctuation of the mesonotum which is subtle (dense and essentially contiguous in the *doursana* group). It is very similar to *A. syriensis* Wood (female described below); females are almost identical and very difficult to separate, and more specimens are required in order to understand intra- and interspecific differences. The female of *A. petrae* can potentially be separated by a greater ocellocipital distance (1.5 times diameter of lateral ocellus versus 1 times diameter of lateral ocellus in *A. syriensis*), the slightly sparser mesonotal punctures, the position of the first recurrent vein, and the dark hind tarsi and basitarsi.

In the male sex, *A. petrae* is also most similar to *A. syriensis*, both possessing yellow facial markings extending onto the lower paraocular areas. However, the two taxa can be clearly separated by the construction of the genital capsule, specifically by the gonocoxal teeth which are pronounced and apically rounded, not strongly diverging apically (teeth weakly formed, very strongly diverging apically in *A. syriensis*), and by the lateral extensions of the penis valves which are hyaline but relatively short, thus forming lateral wings (elongate, finger-like, clearly extending laterally away from the penis valves in *A. syriensis*, compare illustrations in Wood 2021a).

**Distribution.** Southern Jordan and south-central Turkey. Likely present also in Syria.

**Flight period:** April.

**Flower records:** None.

**Holotype:** JORDAN: N of Petra, SE Shobak [Shawbak], 1.iv.2013, M. Snižek, ♂ (OLML).

**Paratypes:** JORDAN: same as holotype (1♂); TURKEY: Şanlıurfa [Harran/Urfa], 19.iv.1976, K. Warncke (1♀, 1♂) (OLML, SMNHTAU).

**Etymology.** Named after the ancient city of Petra in Jordan, the name of which means ‘rock’ in Ancient Greek. The species epithet is an adjective.

**Remarks.** There is some variation across this range, most obviously in the males where Jordanian specimens have two lateral black maculae on the clypeus, but these are absent in the sole Turkish specimen. However, the genital capsule is the same across this distance, so this is considered to be simple variation.

### *Andrena (Truncandrena) syriensis* Wood, 2021

(Figs. 191–194)

**Female** (Fig. 191).

**Body length:** 9 mm.

**Colour.** Body uniformly dark grey (Fig. 191). Flagellum dark basally, becoming orange from apex of segment 1 onwards, particularly ventrally. Legs dark; hind tibia, basitarsi and all apical tarsal segments orange. Wings hyaline, stigma orange centrally, dark orange laterally, venation orange (Fig. 191). Tergal margins apically lightened orange-whitish hyaline (Fig. 194).

**Pubescence.** Face, gena, vertex and scape with long white hairs, on gena longest equaling length of scape (Figs. 192–193). Clypeus apically, mandibles and labrum with faintly golden hairs. Fovea with short brownish hairs (Fig. 192). Mesonotum and scutellum with short white hairs, becoming longer on mesepisternum, not exceeding length of scape (Figs. 191, 193). Propodeal corbicula weakly complete, composed of white plumose hairs; surface of propodeal corbicula almost hairless, with few simple white hairs laterally. Leg hair white to faintly golden apically, scopa white (Fig. 191). Flocculus weakly complete, composed of white plumose hairs. Tergal discs with short white hairs, marginal zones 1–4 with complete white hairbands, on 2–4 thick and obscuring underlying surface. Prepygidial fimbria golden centrally, white laterally; pygidial fimbria golden (Fig. 194).

**Head** (Figs. 192–193). 1.3 times broader than long. Labral process narrowly trapezoidal, apical margin with small emargination. Clypeus weakly domed, shagreened except for small medioapical area, weakly shining. Surface densely punctured with exception of clear impunctate longitudinal line centrally, punctures otherwise separated by

<0.5 puncture diameters. Paraocular area with inconspicuous punctures; frons with longitudinal striations, underlying surface weakly shagreened, very weakly shining. Flagellomere 1 exceeds 2+3, shorter than 2+3+4. Facial fovea dorsally occupying half distance between lateral ocellus and compound eye, in length slightly exceeding level of antennal insertions, not narrowed below. Fovea dorsally separated from lateral ocellus by 1.5 diameters of lateral ocellus (Fig. 192). Ocelloccipital distance equals width of lateral ocellus. Genal area equals width of compound eye.

**Mesosoma** (Fig. 193). Pronotum without elevated dorsolateral angle or lateral carina. Mesonotum and scutellum shagreened, very weakly shining, entire surface with dense but extremely shallow and inconspicuous punctures, essentially contiguous, indicated by slightly raised margins. Mesepisternum with fine granular microreticulation, with faint raised reticulation above. Anterolateral face of propodeum with only fine granular microreticulation, posterolateral part of propodeum with fine granular microreticulation and faint raised reticulation above; propodeal triangle narrow, indicated by absence of raised reticulation. Inner side of hind femur rounded, not carinate. Tarsal claws with small inner tooth. Recurrent vein 1 reaching submarginal cell 2 at its middle. Submarginal crossvein 1 meets marginal cell 7 vein widths from stigma. Nervulus interstitial (Fig. 191).

**Metasoma** (Fig. 194). Terga with fine microreticulation, weakly shining, strongest on tergum 1, becoming finer and weaker on following terga. Tergal discs with fine, irregular punctures, punctures separated by 2–3 puncture diameters. Marginal zones weakly depressed, occupying 0.2–0.3 of tergal disc, with same irregular punctures. Pygidial plate rounded triangular, slightly raised centrally, internal surface roughened irregularly.

**Distribution:** Syria, in desert localities (Palmyra, As-Shuknah, east of Homs).

**Flight period:** March–April.

**Flower records:** None.

**Diagnosis:** see *Andrena petrae* sp. nov.

**Material examined:** **HOLOTYPE:** SYRIA: Homs, 22 km E, As-Shuknah, 250 m, 24.iii.1988, L. Blank (♂) (OLML); **PARATYPE:** Homs, 20 km E, 400 m, 1.iv.1988, L. Blank (1♂) (OLML); **non-type material:** SYRIA: 110 km E of Palmyra, 350 m, 21–22.iv.1992, K. Warncke, (1♀, 6♂) (OLML, TJW).

**Remarks.** Material of this species was found in undetermined material in the Warncke collection. It is very similar to *A. petrae* sp. nov., but can be separated as outlined above. It is slightly smaller than the *A. syriensis* males described in Wood (2021a), but was found with correspondingly smaller males which match all *A. syriensis* characters. It is therefore judged to be the true female, with the size differences potentially as a result of its collecting locality deep in the Syrian desert, where a shortage of water and hence plant growth may result in bees with smaller body sizes, due to reduced quantities of pollen placed in brood cells by adult female bees.

### *Andrena (incertae sedis) asluji* Pisanty sp. nov.

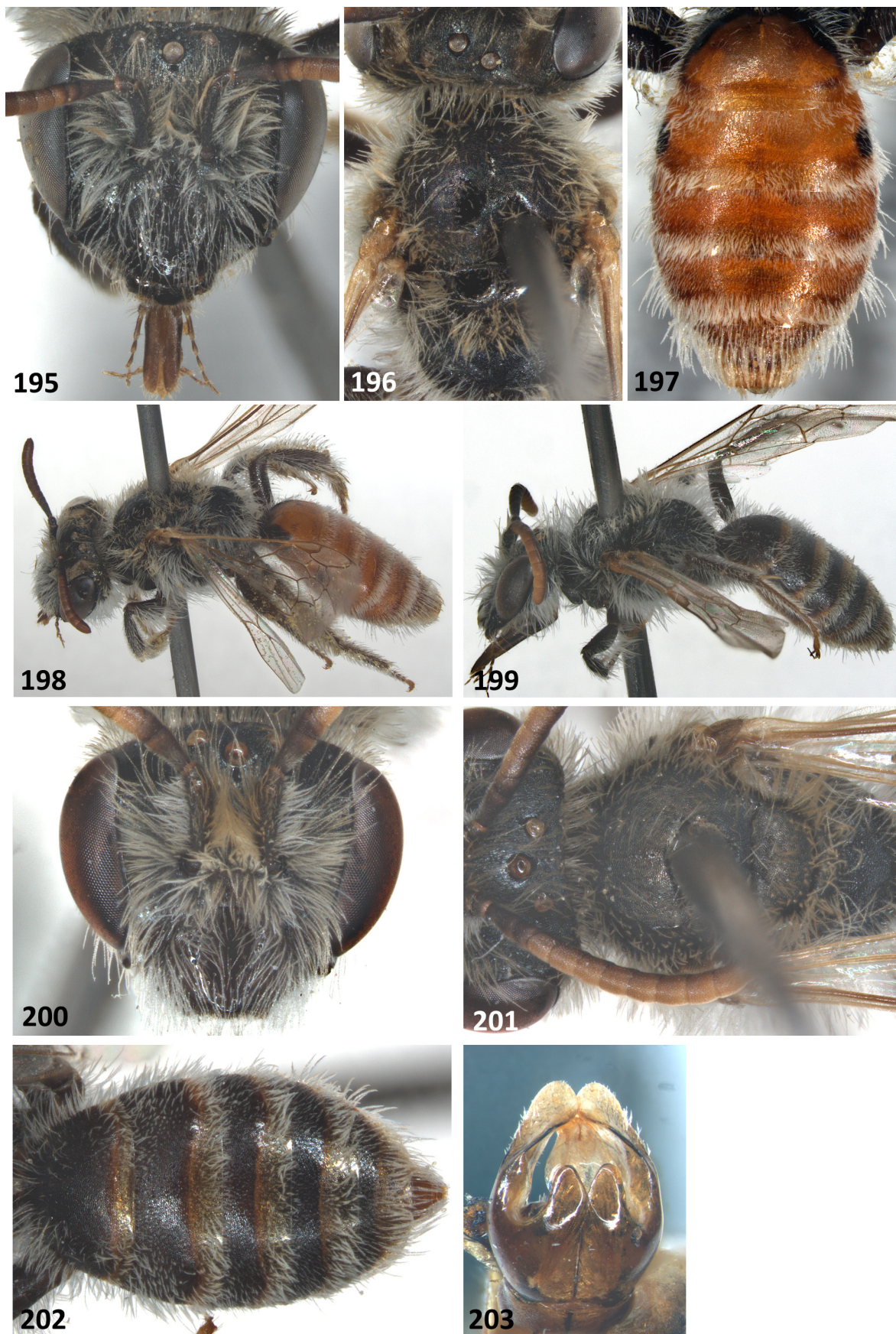
(Figs. 195–203)

**Female** (Fig. 198).

**Body length:** 6.5–7 mm.

**Colour.** Clypeus, supraclypeal area and lower half of paraocular area black. Frons and upper half of paraocular area dark with bluish-bronze metallic luster (Fig. 195). Anterior side of flagellomeres 4–10 orange (Figs. 195, 198). Genal area black, dorsal part sometimes with metallic luster. Mesosoma black, mesonotum with bronze-bluish metallic luster (Fig. 196). Legs dark brown, apical tarsomeres reddish-brown. Wings hyaline, veins brown, stigma orange to brown peripherally, yellowish-orange medially (Fig. 198). Tergal disc 1 reddish medially and apicolaterally, black basolaterally; 2 reddish with black lateral maculations; 3–5 ranging from fully reddish to mostly black. Tergal marginal zones yellowish (Fig. 197).

**Pubescence.** Clypeus with short, thin white hairs. Paraocular area and area around antennal sockets with thicker, medium white to yellowish hairs (Fig. 195). Facial foveae with dense minute hairs appearing black in ventral view, whitish to golden in dorsal view (Figs. 195–196). Vertex with short to medium, white to golden hairs. Genal area with dense, short to medium white hairs. Mesonotum with short, whitish to golden hairs. Posterolateral margin of scutellum with dense, medium yellowish to golden hairs (Fig. 196). Mesepisternum with long white hairs. Propodeal corbicula incomplete, dorsoposterior fringe with long, white plumose hairs. Corbicular surface with white simple hairs, mostly minute, a few medium-lengthed. Leg hair mostly white to whitish (Fig. 198). Scopal hairs simple,



**FIGURES 195–203.** *Andrena (incertae sedis) asluji* sp. nov. 195. female head, 196. female vertex and mesosoma, 197. female metasoma, 198. female habitus, 199. male habitus, 200. male head, 201. male vertex and mesosoma, 202. male metasoma, 203. male genitalia.

whitish, relatively short and sparse, underlying cuticle clearly visible. Flocculus incomplete, white. Tergal discs with minutely plumose white hairs, medium-lengthed on lateral parts, short on mediobasal parts of terga 2–4, minute and inconspicuous elsewhere. Tergal marginal zones 2–4 with distinct, continuous white hair bands covering entire zone length, 2–3 becoming sparser medially, 4 evenly dense. Prepygidial fimbria white laterally, whitish medially; pygidial fimbria whitish-golden (Fig. 197).

**Head** (Figs. 195–196). 1.2 times broader than long. Galea shagreened, apex weakly pointed. Labral process trapezoidal, apex distinctly narrower than base, shiny, basal half transversely striated. Clypeus slightly protuberant apically, slightly convex, very smooth and shiny except for narrow basolateral shagreenation, strongly punctured, distance between punctures 1–2 puncture diameters, a narrow impunctate midline is weakly indicated (Fig. 195). Flagellomere 1 slightly longer than 2+3, 2 slightly shorter than 3. Frons and upper half of paraocular area longitudinally striated, impunctate. Facial foveae broad, slightly tapering below, extending from level of upper end of lateral ocellus to upper end of antennal socket, 0.7 times as broad as antennocular distance, distance from lateral ocellus 1 ocellus diameter (Figs. 195–196). Ocelloccipital distance 1 ocellus diameter. Vertex slightly carinate, almost rounded (Fig. 196).

**Mesosoma** (Fig. 196). Pronotum with slightly elevated dorsolateral angle, without lateral carina. Mesonotum shiny, moderately shagreened, very shallowly and imperceptibly punctured, distance between punctures 1–2 puncture diameters. Scutellum smooth and shiny medially, shagreened posteriorly, with densely punctate midline (Fig. 196). Mesepisternum finely alveolate, impunctate. Propodeal corbicula finely reticulate, impunctate. Posterolateral part of propodeum finely rugose-alveolate. Propodeal triangle similar, becoming more rugose mediobasally. Inner side of hind femur rounded, not carinate. Hind pretarsal claw distinctly bidentate. Recurrent vein 1 meets submarginal cell 2 at its distal third. Nervulus strongly antefurcal (Fig. 198).

**Metasoma** (Fig. 197). Tergal discs shagreened, finely and very shallowly punctured, distance between punctures 1–2 puncture diameters. Tergal disc 1 strongly shagreened and matt, 2 and especially 3–4 more weakly so, somewhat shiny. Tergal marginal zones weakly depressed; marginal zone 1 shagreened basally, weakly shagreened apically; 2–4 weakly shagreened basally, smooth apically. Pygidial plate with elevated margin, without elevated medial area.

**Male** (Fig. 199).

**Body length:** 5.5 mm.

**Colour.** Head Black. Clypeus and lower half of paraocular area black (Fig. 200). Frons and upper half of paraocular area with slight metallic luster. Anterior side of flagellomeres 3–11 orange. Mesonotum, scutellum and metanotum black with weak metallic luster (Fig. 201). Legs moderate to dark brown, tarsi brown basally, reddish-brown apically. Wings hyaline, veins brown, stigma brownish-yellow medially (Fig. 199). Tergal discs brown to black, tergal marginal zones reddish-yellow basally, yellow apically (Fig. 202).

**Pubescence.** Head and dorsal part of mesosoma with white to yellowish, minutely plumose hairs (Figs. 199–201). Mesepisternum and propodeum with long white plumose hairs. Legs with short white to whitish hairs (Fig. 199). Tergal hair as in female. Terminal fringe white (Fig. 202).

**Head** (Figs. 200–201). 1.2 times broader than long. Labral process trapezoidal, shiny, apical margin weakly emarginate. Clypeus slightly protuberant apically, almost flat medially, very smooth and shiny, strongly punctured, distance between punctures 2 puncture diameters, without impunctate midline (Figs. 199–200). Flagellomere 1 about as long as 2+3, 2 slightly shorter than 3. Frons and upper half of paraocular area longitudinally striated, weakly punctate, puncture density increasing dorsolaterally. Ocelloccipital distance 1 ocellus diameter. Vertex moderately carinate (Fig. 201). Genal area rounded posteriorly.

**Mesosoma** (Fig. 201). Pronotum without or with slightly elevated dorsolateral angle, without lateral carina. Mesonotum and scutellum weakly shiny, distinctly shagreened, anterior half of mesonotum sparsely punctured, distance between punctures 2–4 puncture diameters (Fig. 201). Rest of mesosoma as in female.

**Metasoma** (Fig. 202). Similar to female.

**Genitalia and hidden sterna** (Fig. 203). Genital capsule more or less rounded. Dorsal gonocoxite lobe developed, weakly pointed. Gonostyli spatulate, apical half gradually broadening, apex rounded. Penis valves broad basally, basal part flanked by dorsal lamella, strongly tapering apically (Fig. 203). Sternum 8 simple, columnar, slightly narrowing apically, apical process slightly broadened.

**Diagnosis.** *Andrena asluji* belongs to a group of unclassified desert-dwelling *Andrena* characterised by a shiny, flattened female clypeus, smooth scutellum, usually reddish terga, and characteristic genitalia. This group includes

*A. gafsensis* Wood, *A. helouanensis* Friese, *A. maidaqi* Scheuchl & Gusenleitner and *A. tenebricorpus* Wood. The female of *Andrena asluji* differs from these species in the reddish tergal colouration (completely dark in *A. tenebricorpus*), shorter fovea (reaching level of lower end of antennal socket in *A. helouanensis* and *A. maidaqi*), ocelloccipital distance equalling 1 ocellus diameter (0.3 in *A. gafsensis*, 1.5 in *A. maidaqi*, 1.5–2 in *A. helouanensis*), shagreened mesonotum (completely smooth in *A. helouanensis*, smooth centrally in *A. gafsensis*, *A. maidaqi* and *A. tenebricorpus*), shagreened, almost impunctate terga (smooth and distinctly punctured in *A. gafsensis*, *A. helouanensis* and *A. tenebricorpus*), and brightly coloured scopa and terminal fringe (brown in *A. helouanensis* and *A. tenebricorpus*). The male of *A. asluji* differs from all these species (the male of *A. tenebricorpus* is unknown) in the fully dark clypeus. Additionally, flagellomere 1 is as long as 2+3 (shorter than 2+3 in *A. helouanensis* and *A. maidaqi*), the mesonotum and terga are shagreened (smooth in *A. helouanensis*), the dorsal gonocoxite lobes are straight (directed sideways in *A. helouanensis* and *A. maidaqi*), and the gonostyli are unmodified (blade strongly broadened in *A. gafsensis* and *A. maidaqi*). *Andrena asluji* also resembles *A. (incertae sedis) aegyptiaca* Friese, but differs in the simple-haired scopa and the more shagreened mesonotum and terga.

**Distribution:** Sandy habitats in southern Israel.

**Flight period:** February–March.

**Flower records:** Brassicaceae: *Eremobium aegyptiacum*; *Maresia* sp.; Thymelaeaceae: *Thymelaea hirsuta*.

**Holotype:** ISRAEL: Holot Mash'abbim Nature Reserve [Holot Mash'abbim], 30.999°N 34.758°E, 18.ii.2022, G. Pisanty, pan trap, ♀ (SMNHTAU:384650).

**Paratypes:** ISRAEL: Holot Mash'abbim Nature Reserve, 30.999°N 34.757°E, 10.iii.2017, G. Pisanty, on Brassicaceae (1♀); 17.iii.2017, G. Pisanty, on Brassicaceae (1♀); [Holot Mash'abbim], 14.ii.2012, G. Pisanty, partly on *Eremobium aegyptiacum* (4♂); 17.iii.2012, G. Pisanty, on *Thymelaea hirsuta* (1♂); 30.999°N 34.7578°E, 18.ii.2022, G. Pisanty, pan traps (2♂); 30.999°N 34.758°E, 18.ii.2022, G. Pisanty, pan traps (2♀); Mishor Rotem, 21.ii.1966, M. Weichselfish, on *Maresia* (1♂) (OLML, RMNH, SMNHTAU).

**Etymology.** Named after Bir 'Asluj (Be'er Mash'abim), a historical landmark located 2 km north of the type locality. The species epithet is an adjective.

### *Andrena (incertae sedis) guttata* Warncke, 1969

(Figs. 204–209)

**Male** (Fig. 204).

**Body length:** 7 mm.

**Colour.** Body black (Fig. 204). Flagellum black basally, flagellomeres 2–10 ventrally lightened brownish-orange (Fig. 205). Apical tarsal segments lightened orange. Wings hyaline, stigma orange centrally with dark orange margin, venation dark orange (Fig. 204). Tergal marginal zones lightened brown (Fig. 207).

**Pubescence.** Face, paraocular area, frons, gena and vertex with long white hairs (Figs. 204–205). Mesonotum and scutellum, mesepisternum and propodeum with long white hairs (Figs. 204, 206). Leg hair whitish (Fig. 204). Tergal discs with shortish white hair, longer laterally. Marginal zones of terga 2–4 with very weak hair fringes formed laterally (Fig. 207).

**Head** (Figs. 205–206). 1.4 times broader than long. Labral process short, slightly broader than long, with up-turned fore margin. Clypeus weakly domed, covered with slightly raised latitudinal wrinkles with interspersed punctures, punctures separated by 0.5–1 puncture diameters. Underlying surface shagreened, weakly shining. Paraocular area with clear and dense punctures, punctures separated by 0.5–1 puncture diameter. Frons with fine network of raised rugae, dull. Flagellomere 1 slightly longer than 2, clearly shorter than 2+3 (Fig. 205). Ocelloccipital distance 2 times diameter of lateral ocellus. Genal area equals width of compound eye (Fig. 206).

**Mesosoma** (Fig. 206). Pronotum without elevated dorsolateral angle. Mesonotum and scutellum with fine granular microreticulation, weakly shining. Surface unevenly punctured with shallow punctures, punctures laterally separated by 0.5 puncture diameters, becoming sparser centrally, here separated by 1–3 puncture diameters (Fig. 206). Mesepisternum and propodeum with fine granular microreticulation and fine network of raised rugae, weakly shining. Propodeal triangle laterally delineated by fine carinae, internal surface with finer-grained reticulation, basally with short longitudinal rugae. Hind pretarsal claws with strong inner tooth. Recurrent vein 1 reaching submarginal cell 2 distal to its middle. Submarginal crossvein 1 meets marginal cell 5 vein widths from stigma. Nervulus antefurcal (Fig. 204).



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FIGURES 204 –212. *Andrena (incertae sedis) guttata* Warncke. 204. male habitus, 205. male head, 206. male head and mesosoma, 207. male terga 1–3, 208. male genitalia, 209. male eighth sternum. *Andrena (incertae sedis) hulae* sp. nov. 210. female habitus, 211. female head, 212. female head and mesosoma.

**Metasoma** (Fig. 207). Tergal discs with very fine shagreen, generally shining. Tergum 1 finely and sparsely punctate, punctures separated by 2–4 puncture diameters, 2–4 with larger and denser punctures, punctures separated by 2–3 puncture diameters. Tergal margins weakly depressed, occupying 0.2 of tergal length.

**Genitalia and hidden sterna** (Figs. 208–209). Genital capsule with gonocoxites produced into large rounded dorsal lobes. Gonostyli narrow basally, broadening apically, flattened and spatulate. Penis valves broad basally, narrowing medially (Fig. 208). Sternum 8 columnar, parallel sided, apically truncate, ventral face densely covered with short whitish hairs (Fig. 209).

**Diagnosis.** The male of *A. guttata* bears little resemblance to the female, and is much smaller. Its true identity could only be confirmed with the aid of DNA barcoding (Table 2). It is difficult to diagnose, as it lacks clear and distinctive features, and resembles the male of the related *A. corax* Warncke. Both species share a dark integument, flagellomere 1 slightly longer than flagellomere 2, head broader than long, long ocelloccipital distance, weakly defined propodeal triangle that is primarily recognised by fine lateral carinae, the internal surface without the fine network of raised reticulation present on the dorsolateral faces of the propodeum, the finely punctured terga, and the genital capsule with strong but rounded apical gonocoxal teeth, penis valves that are broad basally and narrow apically, and elongate gonostyli that are apically spatulate and slightly narrowed medially with a slight kink in the inner margin subapically. The two species can be separated by the much smaller body size of *A. guttata* (*A. corax* males 10–11 mm in length), antefurcal nervulus (interstitial in *A. corax*), and the more strongly shagreened and more regularly punctate galea, punctures separated by 1–2 puncture diameters (shagreen of galea weaker, surface shining, punctures separated by 1–4 puncture diameters in *A. corax*).

**Distribution:** Southern Israel, Jordan, Morocco, Tunisia, West Bank.

**Flight period:** February–May.

**Flower records:** Resedaceae: *Caylusea hexagyna*.

**Material examined: PARATYPES: ISRAEL:** Beersheba, 28.iv.1940, H. Bytinski-Salz (1♀); Mishmar Ha-Negev [Mishm. Hanegev], 2.iii.19??, H. Bytinski-Salz (1♀) (SMNHTAU); **non-type material: ISRAEL:** Be'er Mash'abbim [Asluj], 10.iv.1946, H. Bytinski-Salz (8♀); Negev, Ramat Ovda, 16.iv.1997, Y. Nadler (1♀); **WEST BANK:** Nabi Musa, 1.iii.2015, T. Jumah (2♀); Nabi Musa Road, 22.ii.2014, A. Gotlieb (1♂); 12.iv.2014, A. Gotlieb, on *Caylusea hexagyna* (3♀); Nahal Darga, Mashash Morabat, 13.iii.2015, T. Jumah (1♀) (SMNHTAU).

**Remarks.** New COI barcode data (TJW, unpublished) suggests that *Andrena guttata* most likely belongs to the *Andrena relata* species group, which includes *A. corax* Warncke, *A. laurivora* Warncke, *A. leucura* Warncke, *A. macroptera* Warncke, *A. melaleuca* Pérez, *A. murana* Warncke, *A. relata* Warncke, and possibly *A. hibernica* Warncke (but not *A. farinosa* Pérez and *A. oviventris* Pérez). Multiple examined Central Asian *Andrena* species also clearly belong to this group, but type examination is required before their true names can be used confidently. Most of the species in this group have been formerly assigned to the polyphyletic subgenus *Poliandrena*, now a synonym of *Ulandrena* (Pisanty *et al.* 2022). We believe that this group most likely represents a monophyletic clade which is part of the early-diverging clade 7 of *Andrena* in the molecular phylogeny of Pisanty *et al.*, and thus merits erection of a new subgenus.

### *Andrena (incertae sedis) hulae* Pisanty sp. nov.

(Figs. 210–213)

**Female** (Fig. 210).

**Body length:** 8.5 mm.

**Colour.** Head and mesosoma dark brown to black (Figs. 210–212). Anterior side of flagellomeres 3–10 orange. Legs and metasoma brown (Figs. 210, 213). Last tarsal segment orange. Wings hyaline, veins brown, stigma dark orange to brown (Fig. 210). Tergal marginal zones reddish basally, yellowish apically (Fig. 213).

**Pubescence.** Clypeus with short and thin whitish hair. Paraocular area with medium-lengthed white hair. Scape with short white hair. Frons with short white hair. Foveae with short whitish hair. Vertex with medium yellowish-white hair (Figs. 211–212). Genal area with short to medium white hair. Mesonotum, scutellum and metanotum with short to medium yellowish-white hair, mostly on periphery (Figs. 210, 212). Mesepisternum with long white hair. Propodeal corbicula incomplete, posterodorsal fringe with long white plumose hairs, corbicular surface with medium to long white plumose hairs. Leg hair white to golden. Flocculus complete, white. Tibial scopal hairs simple, white (Fig. 210). Tergal discs almost hairless medially, laterally with short whitish hairs. Tergal marginal zones 2–4 with broadly interrupted bands of white hair. Terminal fringe golden (Fig. 213).

**Head** (Figs. 211–212). 1.2 times broader than long. Galea shagreened, matt. Labral process smooth, much broader than long, apical margin slightly arched. Clypeus moderately protuberant, strongly arched, basal half strongly and finely shagreened, apical half gradually smooth, punctation fine and dense, distance between punctures 1–1.5 puncture diameters (Fig. 211). Malar area length 0.2 times width of mandible base. Flagellomere 1 longer than 2+3. Frons longitudinally striated, interspersed with sparse, shallow fine punctures. Facial foveae broad, occupying slightly more than half distance between compound eye and lateral ocellus (Figs. 211–212). Distance of fovea from lateral ocellus 1.5 times width of lateral ocellus. Ocelloccipital distance 1.4 ocellus diameters. Vertex carinate. Genal area 1.2 times as broad as compound eye (Fig. 212).

**Mesosoma** (Fig. 212). Dorsolateral angle of pronotum not elevated, pronotum not carinate. Mesonotum strongly and uniformly shagreened, weakly shiny, with dense, shallow but distinct, coarse crater-like punctures, distance between punctures 0.5–1 puncture diameters. Scutellum shagreened peripherally, shiny and weakly shagreened centrally, with regular (not crater-like) punctures, distance between punctures 1 puncture diameter (Fig. 212). Mese-pisternum finely alveolate, densely and shallowly punctured, punctures merging onto underlying sculpture. Propodeal corbicula finely reticulate. Posterior part of propodeum clearly divided into basal, moderately sloping part, and apical vertical part. Posterolateral part of propodeum finely alveolate, shallowly, obliquely punctured. Propodeal triangle narrow, rugose basally, finely alveolate apically. Inner side of hind femur not carinate. Inner hind tibial spur almost straight, of uniform width. Hind pretarsal claw bidentate. Nervulus interstitial (Fig. 210). Submarginal crossvein 1 meets marginal cell 4 vein widths from stigma.

**Metasoma** (Fig. 213). Tergal discs impunctate, 1–2 finely shagreened, 3–4 weakly, finely shagreened and shiny. Tergal marginal zones similarly sculptured, smooth near apex, 2–4 slightly depressed, centrally occupying 1/3–1/2 of tergum length. Pygidial plate finely alveolate, rounded apically, without elevated central area.

**Male.** Unknown.

**Diagnosis.** *Andrena hulae* is most similar to *A. ramosa* Wood, recently described from southern Spain, which is morphologically related to the subgenus *Planiandrena* (Wood *et al.* 2022). However, recent molecular findings show that the COI barcode of *A. ramosa* falls closest to species of *Euandrena*, questioning its subgeneric placement (TJW, unpublished results). We therefore place both *A. hulae* and *A. ramosa* as *incertae sedis* for the time being. *Andrena hulae* is similar to *Planiandrena* species in its short and broad labral process and its relatively broad propodeal triangle with short longitudinal rugae basally, but its fovea is substantially broader, the hind tibial spur is not broadened submedially, and the pygidial plate lacks a centrally elevated area. Compared to *A. ramosa*, *A. hulae* can be separated by its smaller body size of 8.5 mm (12 mm in *A. ramosa*), its broad foveae that occupy over half the space between the compound eye and the lateral ocellus (occupying 1/3 of this space, separated from lateral ocellus by over two times diameter of lateral ocellus in *A. ramosa*), propodeal triangle with short basal longitudinal rugae (without rugae basally in *A. ramosa*), its flat and centrally alveolate pygidial plate (pygidial plate with smooth surface, with weakly raised longitudinal ridge in *A. ramosa*), and by its weakly plumose hairs on the mesepisternum, propodeal corbiculae, flocculus, and femoral scopae (these areas with extremely long and extremely plumose hairs in *A. ramosa*).

**Distribution:** Northern Israel.

**Flight period:** March.

**Flower records:** None.

**Holotype:** ISRAEL: Sde Eliezer [Sede Eli'ezer], N Rosh-Pina, 19.iii.1995, R. Kasher, ♀ (SMNHNTAU:367741).

**Paratypes:** ISRAEL: same as holotype (1♀) (SMNHNTAU).

**Etymology.** Named after the Hula Valley in northern Israel, where the species was collected. The species epithet is an adjective.

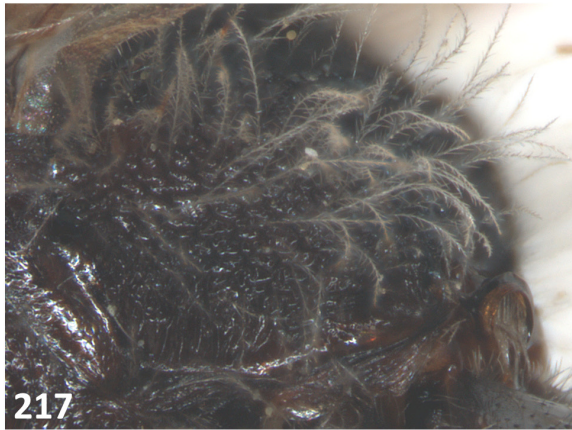
### *Andrena (incertae sedis) inusitata* Pisanty sp. nov.

(Figs. 214–221)

**Female.** Unknown.

**Male** (Fig. 214).





**FIGURES 213–221.** *Andrena (incertae sedis) hulae* **sp. nov.** 213. female metasoma. *Andrena (incertae sedis) inusitata* **sp. nov.** 214. male habitus, 215. male head, 216. male head and mesosoma, 217. male lateral part of propodeum, 218. male metasoma, 219. male genitalia, 220. male eighth sternum, ventral view, 221. male eighth sternum, dorsal view.

**Body length:** 8–9 mm.

**Colour.** Head and mesosoma dark brown to black (Figs. 214–216). Clypeus and paraocular area fully black (Fig. 215). Anterior side of flagellomeres 3–10 orange. Legs brown. Wings weakly infusate, veins and stigma brown (Fig. 214). Tergal discs brown. Tergal marginal zones brown to black basally, yellowish apically (Fig. 218).

**Pubescence.** Body hair mostly white to yellowish, moderately plumose (Fig. 214). Face, vertex and genal area with short to medium, white to yellowish hair (Figs. 215–216). Mesonotum with short white to yellowish erect hair, longer peripherally. Metanotum and periphery of scutellum with medium-lengthed white to golden erect hair. Mesepisternum and propodeum with long white to yellowish hair (Figs. 214, 216). Leg hair white to golden (Fig. 214). Tergal discs and basal half of tergal marginal zones with dense, minute inconspicuous bright hair. Apical part of tergal marginal zones with weak lateral bands of short white hair. Terminal fringe white to golden (Fig. 218).

**Head** (Figs. 215–216). 1.2 times broader than long. Mandible bidentate. Galea finely shagreened. Labral process much broader than long, apical margin slightly concave. Clypeus convex, smooth and shiny, densely and coarsely but shallowly punctured, punctures contiguous (distance between punctures <0.5 puncture diameter), without impunctate midline. Malar area length 0.1–0.2 times width of mandible base. Supraclypeal plate strongly, finely rugose, sparsely punctured. Lower half of paraocular area densely, obliquely punctured; upper half longitudinally striated, densely punctured. Flagellomere 1 slightly longer than 2, 2 equal to or slightly shorter than 3. Frons strongly rugose, densely punctured. Ocelloccipital distance 1.5–2 ocellus diameters. Vertex finely rugose, densely punctured, weakly carinate, almost rounded (Figs. 215–216). Genal area 1.1 times broader than compound eye, with wave-shaped wrinkles, posterior margin not pointed or carinate (Fig. 216).

**Mesosoma** (Figs. 216–217). Pronotum longitudinally striated posterolaterally, dorsolateral angle weakly elevated, lateral carina absent. Mesonotum and scutellum shiny and more or less smooth, strongly, coarsely and densely punctured, distance between punctures 0–0.5 puncture diameters on mesonotum and 0.5–1 on scutellum (Fig. 216). Metanotum dull, coarsely punctured, punctures contiguous. Mesepisternum shiny, punctuation strong and coarse, crater-like (with raised margins) and weakly oblique, distance between punctures 0–1 puncture diameters. Anterolateral part of propodeum rugose-areolate on dorsal half, obliquely striated on ventral half (Fig. 217). Posterolateral part of propodeum strongly rugose-areolate. Propodeal triangle delineated by carina, strongly radially rugose to rugose-areolate. Submarginal crossvein 1 meets marginal cell 8–9 vein widths from stigma. Nervulus interstitial to slightly postfurcal (Fig. 214).

**Metasoma** (Fig. 218). Tergal discs smooth, strongly and densely punctured, distance between punctures 0.5–1 puncture diameters, punctuation sparser and slightly finer towards apical terga. Tergal marginal zones only slightly depressed and hardly discernible from discs, sculpturing similar but punctuation slightly sparser, apical margin impunctate. Pygidial plate present.

**Genitalia and hidden sterna** (Figs. 219–221). Gonocoxites connected throughout, dorsal lobe weakly developed, rounded. Gonostyli gradually broadening apically, blade flattened, inner margin slightly raised, apical margin rounded. Penis valves of moderate width, basal half tapering apically, apical half narrow, columnar (Fig. 219). Sternum 8 simple, stem narrowing apically, apical process slightly broadened (Figs. 220–221).

**Diagnosis.** *Andrena inusitata* most likely merits erection of a new monotypic subgenus, but we abstain from describing it until the female is discovered. In the recent molecular phylogeny of Andreninae, this species was found to be the sister group to subgenus *Brachyandrena* (Pisanty *et al.* 2022). *Andrena inusitata* shares with *Brachyandrena* the unusual sculpturing of the anterolateral part of the propodeum (corresponding to the propodeal corbicula in the female), which is rugose-areolate dorsally and obliquely striated ventrally (Fig. 217). Moreover, the two taxa share a relatively densely, coarsely and strongly sculptured cuticle, although it is clearly coarser and denser in *Brachyandrena*. However, the most unusual feature of *A. inusitata*, which distinguishes it also from *Brachyandrena*, is the unusual, strong crater-like puncturing of the mesepisternum. The male of *A. inusitata* closely resembles that of *A. (incertae sedis) oviventris* Pérez, although it is unclear whether the two species are related phylogenetically. The male of *A. inusitata* differs from *A. oviventris* in the sparser crater-like puncturing of the mesepisternum (obliquely honeycombed in *A. oviventris*), rugosity of the anterolateral part of propodeum (finely reticulated, without rugae in *A. oviventris*), flagellomere 1 which is only slightly longer than 2 (distinctly longer in *A. oviventris*), and the appressed labral process (upturned in *A. oviventris*).

**Distribution:** Central Israel.

**Flight period:** February–April.

**Flower records:** None.

**Holotype:** ISRAEL: Kfar Shmuel [Kefar Shemuel], 7.iv.1968, S. Bleszynski, ♂ (SMNHTAU:374575).

**Paratypes:** ISRAEL: Kfar Shmuel [Kefar Shemuel], 25.ii.1968, S. Bleszynski (1♂); 1.iv.1968, S. Bleszynski (1♂) (CNC, SMNHTAU).

**Etymology.** *inusitata* = Latin for “unusual”, in reference for the unique morphology and phylogenetic placement of this taxon. The species epithet is an adjective.

*Andrena (incertae sedis) janthinoides* Pisanty sp. nov.

(Figs. 222–229)

**Female** (Fig. 222).

**Body length:** 5.5–6 mm.

**Colour.** Body and legs dark brown to black (Fig. 222). Anterior side of flagellomeres 4–10 gradually becoming reddish apically. Wings hyaline, veins dark brown, stigma dark brown peripherally, golden medially (Fig. 222). Tergal marginal zones light brown basally, whitish to yellowish apically (Fig. 225).

**Pubescence.** Body mostly with relatively sparse and short, white to yellowish plumose hair (Fig. 222). Clypeus and supraclypeal area with very sparse and short white hair. Paraocular area and scape with moderately dense, short to medium white hair. Frons with sparse, medium-lengthed white hair (Fig. 223). Upper 1/2–2/3 of facial fovea brownish, lower part whitish (Figs. 223–224). Vertex with short to medium, white to yellowish hair. Genal area with short yellowish hair dorsally, short to medium white hair ventrally. Mesonotum with sparse, short to medium, white to yellowish hair, denser peripherally. Metanotum and posterior margin of scutellum with medium-lengthed white to yellowish hair (Fig. 224). Mesepisternum with long white hair. Propodeal corbicula incomplete, dorsoposterior fringe with long white hair; corbicular surface with few long, white simple hairs. Leg hair mostly white; scopal hairs simple, white; flocculus complete, white (Fig. 222). Tergal discs laterally with sparse short white hair; basal part of tergal disc 1 with sparse short white hair; apical part hairless; the following tergal discs gradually with sparse, minute white hair. Tergal marginal zones 1–4 with dense narrow bands of white hair originating from apical half of marginal zone, slightly extending onto following tergal disc, broadly interrupted on tergum 1, gradually more continuous on 2–3, fully continuous on 4. Prepygidial fimbria white laterally, whitish-golden medially; pygidial fimbria whitish-golden (Fig. 225).

**Head** (Figs. 223–224). 1.3 times broader than long. Mandible bidentate. Galea superficially shagreened except on inner basal part. Labral process rectangular to weakly trapezoidal, much broader than long. Clypeus slightly convex, flattened medially, smooth except on basal margin, sparsely but distinctly punctured, distance between punctures 1–2 puncture diameters, without impunctate midline (Fig. 223). Flagellomere 1 slightly longer than 2+3, 2 shorter than 3. Frons longitudinally striated. Facial foveae moderately broad, strongly tapering downwards, very shallow on upper part, extending from level of middle–lower end of lateral ocellus to base of clypeus, 0.7 times as broad as antennocular distance (Figs. 223–224). Distance of fovea from lateral ocellus about 1 ocellus diameter. Ocelloccipital distance 1.2 ocellus diameters. Vertex weakly carinate (Fig. 224). Genal area as broad as compound eye.

**Mesosoma** (Fig. 224). Pronotum without elevated dorsolateral angle or lateral carina. Mesonotum shiny, finely shagreened, finely, sparsely and superficially punctured, distance between punctures 1–3 puncture diameters. Scutellum similar, punctures sparser and obscurer (Fig. 224). Mesepisternum finely alveolate. Propodeal corbicula finely reticulate. Posterior part of propodeum finely alveolate, triangle weakly demarcated, apical 2/3 of triangle slightly shinier compared to flanking regions, basal 1/3 very superficially and finely rugose-areolate (Fig. 224). Hind pretarsal claw bidentate. Recurrent vein 1 meets submarginal cell 2 at 1/2–2/3 of its length. Submarginal cross-vein 1 meets marginal cell 2–3 vein widths from stigma. Nervulus antefurcal (Fig. 222).

**Metasoma** (Fig. 225). Tergal discs shiny, basal 2/3–3/4 finely shagreened, apical part smooth, shagreenation of tergum 4 more superficial; punctuation mostly absent, very fine and sparse punctures can be noticed mostly on smooth apical areas. Tergal marginal zones very superficially shagreened to smooth, impunctate, 1 narrow and not depressed, the following gradually broader and more depressed. Pygidial plate without medial elevated zone.

**Male** (Fig. 226).

**Body length:** 5–5.5 mm.

**Colour.** Anterior side of flagellomeres 4–10 brown to reddish-brown (Fig. 226). Rest of body similar to female (clypeus and paraocular area black).



**FIGURES 222–229.** *Andrena (incertae sedis) janthinoides* sp. nov. 222. female habitus, 223. female head, 224. female vertex and mesosoma, 225. female metasoma, 226. male habitus, 227. male head, 228. male vertex and mesosoma, 229. male genitalia.

**Pubescence.** Apical 2/3 of clypeus with dense fringe of medium-lengthed white hairs, extending below clypeus to about 1/2 clypeus length. Paraocular area and scape with moderately dense, medium white to yellowish hair. Frons with sparse, medium-lengthed white to yellowish hair (Figs. 226–227). Vertex with short to long, white to yellowish hair. Genal area with short yellowish hair dorsally, gradually long white hair ventrally. Mesonotum with sparse, medium to long, white to yellowish hair, denser peripherally. Metanotum and posterior half of scutellum with long white to yellowish hair (Fig. 228). Mesepisternum and propodeum with long white hair (Figs. 226, 228). Legs mostly with short to medium, white to yellowish hair (Fig. 226). Tergal discs laterally with moderately dense short white hair; medially with sparse short white hair. Tergal marginal zones 1–4 with weak narrow bands of white hair originating from apical half of marginal zone, interrupted on 1–3, almost continuous on 4.

**Head** (Figs. 227–228). 1.3 times broader than long. Labral process rectangular to weakly trapezoidal, much broader than long. Clypeus slightly convex, flattened medially, smooth except on basal margin, strongly and densely punctured, distance between punctures 0.5–1 puncture diameters, without impunctate midline (Fig. 227). Flagellomere 1 about as long as 2+3, 2 shorter than 3. Frons longitudinally striated. Ocelloccipital distance 1.3 ocellus diameters. Vertex weakly carinate (Fig. 228). Genal area about as broad as compound eye, posterior margin rounded, not pointed or carinate.

**Mesosoma** (Fig. 228). Similar to female, but mesonotal punctation extremely shallow and obscure, propodeal triangle more distinctly rugose basally (Fig. 228).

**Metasoma.** Similar to female.

**Genitalia and hidden sterna** (Fig. 229). Dorsal gonocoxite lobe developed, moderately pointed. Gonostylus suddenly broadened apically, blade shaped as right triangle, apex weakly pointed. Penis valves moderately broad basally, strongly tapering apically (Fig. 229). Sternum 8 simple, columnar, apical process broadened, triangular.

**Diagnosis.** *Andrena janthinoides* is closely related to *A. janthina* Warncke. The two species belong to a unique, unclassified lineage of *Andrena*, which is related to *Fuscandrena* and *Micrandrena* (Pisanty *et al.* 2022). *Andrena janthinoides* is easily distinguished from *A. janthina* in its smaller size and apically smooth terga (uniformly shagreened in *A. janthina*) (Fig. 225). The female also differs in the trapezoidal labral process (arched in *A. janthina*) and almost completely smooth and flat clypeus, reminiscent of *A. (Ulandrena) dauma* Warncke (shagreened basally and transversely arched in *A. janthina*) (Fig. 223).

**Distribution:** Israel. Most specimens were collected in the Mediterranean habitat regions of northern and central Israel. However, a single male record exists from the extreme desert of the Arava Valley (Hazeva), which could be a labeling error.

**Flight period:** February–April.

**Flower records:** Apiaceae: *Ferula communis*; Rosaceae: *Prunus dulcis*.

**Holotype: ISRAEL:** Forest of the Martyrs [Ya’ar Kedoshim], 27.iii.2014, N. Shamir, on *Ferula communis*, ♀ (SMNHTAU:152552).

**Paratypes: ISRAEL:** Beit Jimal [Bet Jimal], 3.iv.1988, I. Yarom (1♀); Beit Nir [Bet Nir], 11.iii.2018, T. Roth, pan traps (2♀); Forest of the Martyrs [Ya’ar Kedoshim], 2.iii.2014, N. Shamir, pan traps (1♀); 26.ii.2017, Y. Farago, pan traps (1♀, 1♂); 8.iii.2017, Y. Farago (1♀); Hazeva, 4 km W, 11–17.iv.1988, R. Leys (1♂); Kfar Menahem [Kefar Menahem], 1.iii.2008, Y. Mandelik, pan traps (1♀); 2.iii.2008, U. Roll, pan traps (2♀, 1♂); 2.iii.2008, Y. Mandelik, on *Prunus dulcis* (1♀); Lakhish, 19.iii.2013, T. Shapira, pan traps (1♀); 8.iv.2013, T. Shapira, pan traps (1♀); Mount Meron [Har Meron], 4 km E, 9.iv.1988, R. Leys (2♂); Nahariya [Nahariyya], 10 km E, 9.iv.1988, R. Leys (5♂); Rehan Forest, south to Rangers’ House, 11.iv.2007, L. Friedman (1♀); Sheikh Ali, 20 km E Qiryat Gat, 17.iii.1990, R. Kasher (1♂); Tal Shazar, 2.iv.2010, G. Pisanty, pan traps (1♀); Valley of Elah [Emeq Ha’ela], 10.iv.2006, W. Mahagna (1♀) (OLML, RMNH, SMNHTAU, TJW).

**Etymology.** From *janthina* + *oides*, i.e. similar to *A. janthina*. The species epithet is an adjective.

### *Andrena (incertae sedis) limassolica* Mavromoustakis, 1948

**Distribution:** Cyprus, Jordan (Pisanty *et al.* 2018). Newly reported from Israel. Likely present also in Lebanon and Syria.

**Flight period:** The main flight period is January–April, but one specimen was collected in October.

**Flower records:** Liliaceae: *Gagea chlorantha* (Mavromoustakis 1948), *Gagea* sp. (new observations from Mount Hermon); Rosaceae: *Prunus dulcis* (Pisanty *et al.* 2018).

**Material examined:** CYPRUS: Cherkes, 7.x.1948, G.A. Mavromoustakis (1♀); ISRAEL: Mount Hermon [Har Hermon], 1640 m, 33.300°N 35.7675°E, 7.iv.2021, G. Pisanty, sweeping (1♀); 1644 m, 33.2991°N 35.7667°E, 16.iv.2022, G. Pisanty, pan traps (4♀, 8♂); 33.2992°N 35.7670°E, 16.iv.2022, G. Pisanty, pan traps (3♀, 3♂); [Hermon], 1642 m, 33.2992°N 35.7668°E, 16.iv.2022, G. Pisanty, sweeping (1♂) (NHMUK, SMNHTAU).

**Remarks.** This species was previously classified in subgenus *Poecilandrena* (Pisanty *et al.* 2018). However, the unusual head morphology (with enlarged mandibles) of the male, the finely reticulate propodeal triangle, and the COI barcode sequence which does not cluster with other *Poecilandrena*, lead us to exclude this species from the subgenus.

*Andrena (incertae sedis) ornithogali* Pisanty & Wood sp. nov.

(Figs. 230–241)

**Female** (Fig. 233).

**Body length:** 7–9 mm.

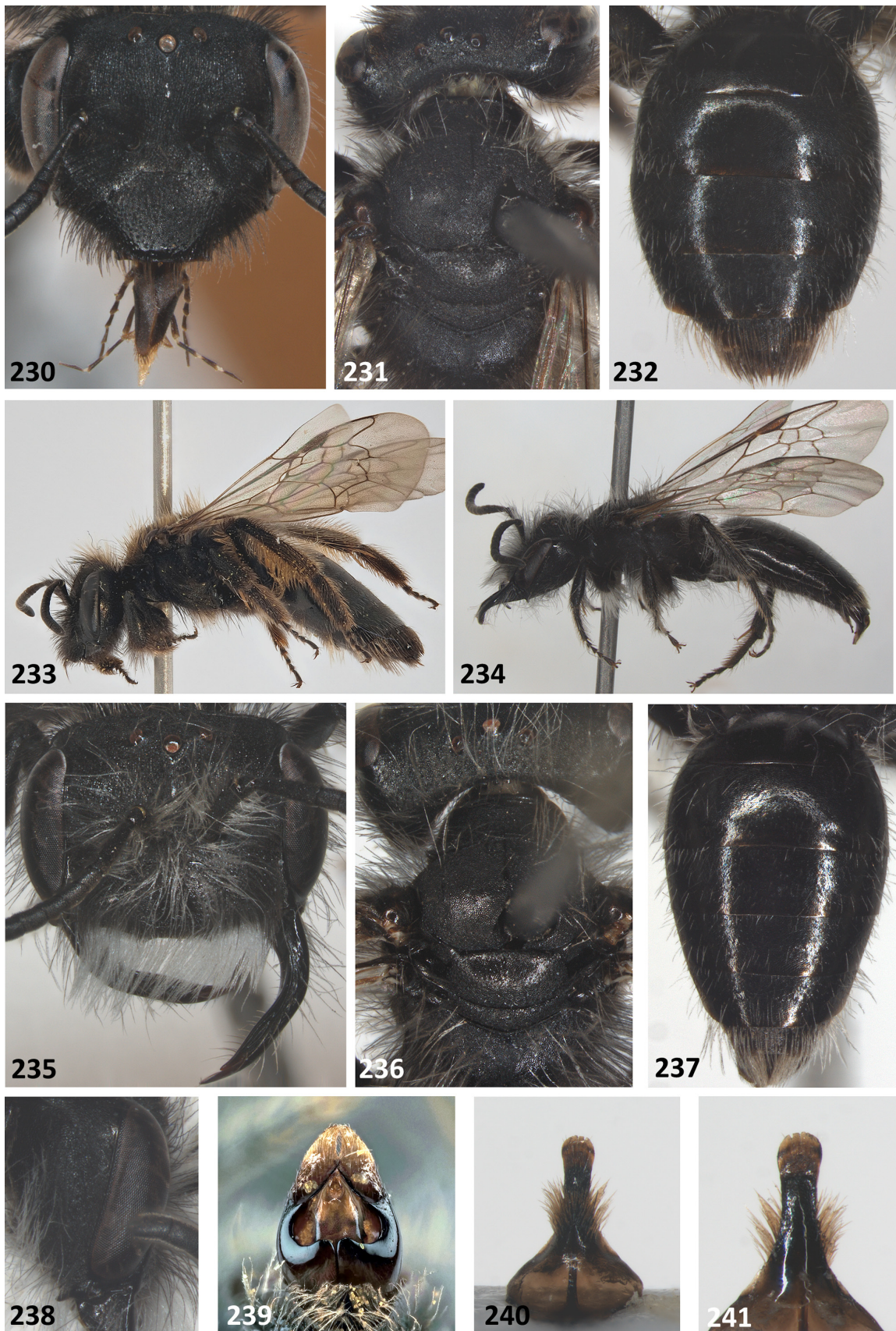
**Colour.** Body black (Fig. 233). Flagellomeres 3–10 greyish-black anteriorly. Legs dark brown to black. Wings hyaline, veins and stigma dark brown (Fig. 233). Tergal marginal zones brown (Fig. 232).

**Pubescence.** Head and dorsal side of mesosoma mostly with moderately dense, medium-lengthed, minutely plumose hair (Figs. 230, 231, 233). Clypeus, frons, paraocular and supraclypeal areas with black hair; some specimens with few bright hairs around antennal sockets (Figs. 230, 233). Facial foveae black in anterior view, somewhat brownish in dorsal view (Figs. 230–231). Vertex with mixed, short to long, black and brownish-white erect hairs. Genal area with short black hairs. Mesonotum, scutellum and metanotum with medium-lengthed white to brownish hairs interspersed with shorter, thinner black hairs (Figs. 231, 233). Mesepisternum with long black hairs, becoming more plumose towards ventral area. Propodeal corbicula incomplete, posterodorsal fringe with long, strongly plumose black hairs, corbicular surface with sparse, medium-lengthed, simple golden hairs. Foreleg and midleg femora and outer side of tibiae with black hairs; inner side of tibiae and all tarsi with brown to golden hairs. Floculus whitish to golden. Femoral and tibial scopae with moderately long, simple to weakly plumose golden hairs (Fig. 233). Tergal discs with sparse, minute inconspicuous white hairs medially, and weak tufts of short white hair laterally; disc 1 additionally with few short black hairs basolaterally. Tergal marginal zones 2–4 with weak, narrow interrupted bands of sparse short white hair. Terminal fringe light brown to black, with flanking white hairs (Fig. 232). Sternal marginal zones with distinct bands of medium-lengthed whitish to golden hair (Fig. 233).

**Head** (Figs. 230–231). 1.2–1.3 times broader than long. Mandible bidentate. Galea shagreened. Labral process rectangular, much broader than long, mostly smooth. Clypeus almost flat, shagreened and mat except for small medioapical area that is smooth and shiny, densely and distinctly punctured, distance between punctures 1–1.5 puncture diameters, with distinct narrow impunctate midline (Fig. 230). Lower part of paraocular area shagreened, densely and finely punctured; upper part and frons longitudinally striated, interspersed with fine punctures. Flagellomere 1 about as long as 2+3+4, 2 as long as 3 or slightly shorter. Facial foveae long and narrow, 0.4 times as broad as antennocular distance, extending from level of middle of lateral ocellus to slightly below antennal socket, outer margin almost reaching compound eye (Figs. 230–231). Distance of fovea from lateral ocellus 2–2.5 ocellus diameters. Ocelloccipital distance about 1.4 ocellus diameters. Vertex moderately carinate. Genal area 1.4 times broader than compound eye (Fig. 231).

**Mesosoma** (Fig. 231). Dorsolateral angle of pronotum distinctly elevated, not forming a lateral carina. Mesonotum fully shagreened, shallowly punctured, distance between punctures about 1 puncture diameter; scutellum similar, punctation stronger (Fig. 231). Mesepisternum and propodeum alveolate-reticulate, impunctate. Propodeal triangle narrow, very finely alveolate, medioapical area more finely sculptured, basal margin occasionally with very narrow band of radial rugae (Fig. 231). Inner side of hind tibia not carinate. Inner hind tibial spur straight and of uniform width, apex curved. Hind pretarsal claw with distinct inner tooth. Nervulus interstitial to slightly postfurcal (Fig. 233).

**Metasoma** (Fig. 232). Tergal discs shiny, sparsely and very finely punctured, distance between punctures about 4 puncture diameters; disc 1 very superficially shagreened to almost smooth, 2–4 weakly shagreened. Tergal marginal zones shiny, weakly shagreened, 2–4 weakly depressed. Pygidial plate with impunctate, slightly raised margin, without elevated medial area.



**FIGURES 230–241.** *Andrena (incertae sedis) ornithogali* sp. nov. 230. female head, 231. female head and mesosoma, 232. female metasoma, 233. female habitus, 234. male habitus, 235. male head, 236. male vertex and mesosoma, 237. male metasoma, 238. male head, lateral view, 239. male genitalia, 240. male eighth sternum, ventral view, 241. male eighth sternum, dorsal view.

**Male** (Fig. 234).

**Body length:** 7–7.5 mm.

**Colour.** Similar to female. Clypeus and paraocular areas black (Fig. 235).

**Pubescence.** Clypeus with dense, long, white plumose hairs, especially dense on apical margin (Figs. 234, 235). Paraocular area with thin, minutely plumose black hairs, becoming longer towards ventral part. Scape and area around antennal sockets with medium to long white hairs and few black hairs (Fig. 235). Vertex with long, erect, mostly white hairs. Genal area with medium-lengthed black hairs dorsally, longer white hairs ventrally. Scutellum, metanotum and periphery of mesonotum with mixed black and white, short to long, minutely plumose hairs (Figs. 234, 236). Mesepisternum with long plumose hairs, black on dorsal part, white on ventral part. Lateral part of propodeum with long plumose hairs, mostly black, a few white. Femora and fore- and mid-tibiae with black and white hairs. Hind tibia with white hairs. Tarsi with white to golden hairs (Fig. 234). Tergal discs with sparse, minute inconspicuous white hairs medially, and sparse short white hair laterally; disc 1 additionally with few medium black hairs basolaterally. Tergal marginal zones 2–5 with very sparse short white hair laterally, not forming distinct hair bands. Terminal fringe whitish-golden (Fig. 237).

**Head** (Figs. 235–236, 238). 1.3 times broader than long. Mandibles very long, significantly crossed (Fig. 235). Malar area with short apicoventral tooth at the base of the mandible (Fig. 238). Labral process short and broad, apressed and inconspicuous. Clypeus slightly elevated, apical part much broader than basal part, fully shagreened, distinctly punctured, distance between punctures 0.5–2 puncture diameters, punctures sparser medioapically, without impunctate midline (Fig. 235). Lower part of paraocular area shagreened, densely and finely punctured; upper part and frons longitudinally striated, interspersed with fine punctures. Flagellomere 1 longer than 2+3, 2 as long as 3 or slightly shorter. Ocelloccipital distance 2 ocellus diameters. Vertex moderately carinate. Genal area 1.7 times broader than compound eye, dorsoposterior margin weakly carinate (Fig. 236).

**Mesosoma** (Fig. 236). Dorsolateral angle of pronotum strongly elevated and pointed, forming a strong lateral carina. Mesonotum fully shagreened, very shallowly and inconspicuously punctured, distance between punctures about 1 puncture diameter; scutellum shagreened, densely and distinctly punctured (Fig. 236). Mesepisternum and propodeum alveolate-reticulate, impunctate. Propodeal triangle very narrow, very finely sculptured, without rugae (Fig. 236). Nervulus interstitial to slightly postfurcal (Fig. 234).

**Metasoma** (Fig. 237). Similar to female, but tergal discs shinier and very superficially shagreened.

**Genitalia and hidden sterna** (Figs. 239–241). Dorsal gonocoxite lobes weakly developed, rounded. Gonostyli broadening apically, blade flattened and spatulate, inner apical margin distinctly concave. Penis valves broad basally, gradually narrowing apically (Fig. 239). Sternum 8 columnar, apical process slightly broadened (Fig. 240–241).

**Diagnosis.** *Andrena ornithogali* is related to a group of species formerly classified under *Margandrena* or *Ptilandrena*, which possess elongate labial palpi, enlarged male gena and mandibles, and/or male genitalia with conspicuously widened penis valves (Wood 2021a; Pisanty *et al.* 2022). Four of these species (*A. karia* Wood, *A. krausiella* Gusenleitner, *A. menahemella* Scheuchl & Pisanty and *A. sibthorpi* Mavromoustakis) have at least partially red-marked terga, and thus cannot be confused with *A. ornithogali*. From the remaining five species (*A. crocusella* Pisanty & Scheuchl, *A. elsei* Scheuchl & Gusenleitner, *A. grossella* Grunwaldt, *A. hyacinthina* Mavromoustakis, *A. muscaria* Warncke), *A. ornithogali* differs in the shorter glossa, maxillary and/or labial palps (longer in *A. crocusella*, *A. grossella* and *A. hyacinthina*); toothed malar area (unique to this species); short, mostly shagreened and mat clypeus (shinier in *A. crocusella*, *A. grossella* and *A. hyacinthina*, more elongate in *A. hyacinthina* and *A. muscaria*); broader fovea (narrower in *A. crocusella*, *A. elsei* and *A. hyacinthina*, tapering below in *A. muscaria*); weakly carinate male gena, without modifications (strongly carinate in *A. hyacinthina*, pointed posteroventrally in *A. muscaria*, mostly unmodified in *A. crocusella* and *A. grossella*); almost impunctate mesonotum (more distinctly punctured in *A. crocusella* and *A. hyacinthina*); finely alveolate propodeal triangle, mostly lacking rugae (distinctly rugose basally in *A. crocusella*, *A. elsei*, *A. grossella* and *A. hyacinthina*); poorly developed dorsal gonocoxite lobe (strongly developed in *A. muscaria*); penis valves without pointed lateral extensions (present in *A. crocusella* and *A. grossella*); and hook-shaped apex of gonostylus, with concave inner margin (unique to this species).

The presence of a malar area tooth in the male (Fig. 238) is unusual and apparently unique among the *Chrysandrena*+*Euandrena*+*Margandrena*+*Ptilandrena* clade (Pisanty *et al.* 2022), and is characteristic of other subgenera, especially *Hoplendrena* and *Andrena s.s.* (in the latter, the tooth is present on the mandible itself, rather than the malar area). However, *A. ornithogali* is most probably unrelated to these lineages, which are also characterised by broad facial foveae, a complete propodeal corbicula (in *Andrena s.s.*), peripherally smooth propodeal triangle (in *Hopl-*



*drena*), distal position of recurrent vein 1, and centrally elevated pygidial plate. Similar instances of convergent trait evolution in *Andrena* have been documented in various other male characters (Pisanty *et al.* 2022).

**Distribution:** North and central Israel, Syria. Likely present also in Lebanon.

**Flight period:** December–April.

**Flower records:** Asparagaceae: *Ornithogalum lanceolatum*; Asteraceae: *Taraxacum cypricum*.

**Pollen analysis.** Eight pollen loads were examined, six from Odem Forest and two from Bloudan. The pollen loads from Odem Forest contained pure *Ornithogalum*-type pollen, confirming field observations. However, the two samples from Bloudan contained pure pollen from an unknown monocotyledon species (Liliaceae sensu lato). This should be further investigated, but the use of a different host plant could explain the different flight periods of the sampled populations which may be adapted to local conditions and plant availability in each area.

**Holotype: ISRAEL:** Odem Forest Nature Reserve [Ya'ar Odem NR], 27.ii.2020, G. Pisanty, pan trap, ♀ (SMNHNTAU:331858).

**Paratypes: ISRAEL:** Horbat Nappah [Golan, Nafech], 1.i.1974, A. Freidberg (1♀); Jerusalem, ?.ii.? (1♀); Mount Hermon [Har Hermon], 1645 m, 33.2994°N 35.7675°E, 16.iv.2021, G. Pisanty (1♀); Odem Forest Nature Reserve [Ya'ar Odem N.R.], 1.iii.2018, G. Pisanty (58♀); [Ya'ar Odem NR], 27.ii.2020, G. Pisanty, pan traps (241♀); 33.186°N 35.7356°E, 27.ii.2020, G. Pisanty, sweeping (6♀); 33.206°N 35.736°E, 27.ii.2020, G. Pisanty, on *Ornithogalum lanceolatum* (8♀); 33.207°N 35.736°E, 2.i.2021, on *Ornithogalum lanceolatum* (2♂); [Ya'ar Odem NR, Jubat Al Kabira], 33.206°N 35.736°E, 21.xii.2020, G. Pisanty, pan trap (1♂); 2.i.2021, pan traps (2♀, 22♂); 33.207°N 35.732°E, 21.xii.2020, G. Pisanty (1♂); 33.207°N 35.736°E, 2.i.2021, on *Taraxacum cypricum* (8♂); **SYRIA:** Bloudan [Bludan], 57 km NW Damaskus, 24.iv.1992, K. Warncke (3♀, 2♂) (ES, NHMUK, OLML, RMNH, SMNHNTAU, TJW, ZMHB, ZSMC).

**Etymology.** Named after the plant genus *Ornithogalum*, which seems to be the main pollen host for the Golan Heights population. The species epithet is an adjective. Not to be confused with *Andrena ornithogala* nomen nudum, an unpublished name applied by Warncke to a *Micrandrena* taxon from Turkey.

### *Andrena (incertae sedis) sulfurea* Wood sp. nov.

(Figs. 242–250)

**Female** (Fig. 242).

**Body length:** 8–8.5 mm.

**Colour.** Body black (Fig. 242). Flagellum black basally, becoming orange from segment 2 onwards, particularly ventrally (Fig. 243). Apical parts of basitarsi and tarsal segments orange brown. Wings hyaline, stigma and venation orange (Fig. 242). Tergal margins apically lightened translucent orange-yellow (Fig. 245).

**Pubescence.** Face, gena, vertex and scape with dense white hairs of moderate length, none substantially exceeding half of length of scape (Figs. 242–243). Clypeus apically, mandibles and labrum with short golden hairs (Fig. 243). Fovea with short white hairs. Mesonotum and scutellum with semi-squamous whitish-yellowish hairs, very short dorsally, longer anterolaterally (Figs. 242, 244). Mesepisternum with long white hairs. Propodeal corbicula complete, surface of corbicula with sparse, long white simple hairs. Leg hair white, scopal hairs white, simple (Fig. 242). Flocculus complete, short, composed of white plumose hairs. Tergal discs with very short white hairs visible in lateral view, margin of disc 1 laterally with small white hair tuft, 2–4 with complete or only slightly interrupted thick white hairbands that obscure underlying surface. Prepygidial fimbria whitish, pygidial fimbria golden (Fig. 245).

**Head** (Figs. 243–244). 1.3 times broader than long. Labral process narrow, slightly longer than wide. Clypeus very weakly domed, shagreened, dull, densely punctate, punctures separated by 0.5–1 puncture diameters (Fig. 243). Paraocular area and frons finely longitudinally ridged, dull. Flagellomere 1 as long as 2+3. Facial fovea dorsally occupying half distance between lateral ocellus and compound eye, very slightly narrowed below, essentially parallel-sided (Fig. 243). Fovea dorsally separated from lateral ocellus by 1.5 diameter of lateral ocellus. Ocelloccipital distance subequal to width of lateral ocellus. Genal area slightly exceeding width of compound eye (Fig. 244).

**Mesosoma** (Fig. 244). Pronotum without elevated dorsolateral angle or lateral carina. Mesonotum and scutellum smooth and shiny, almost without shagreen, densely punctured, punctures separated by 0.5–1 puncture diameters (Fig. 244). Mesepisternum and propodeal corbicula finely reticulate, impunctate, weakly shining. Propodeal

triangle wide, inner surface finely reticulate with delicate pattern of fine raised carinae, laterally delineated by fine carina; posterolateral part of propodeum with similar structure. Inner side of hind femur rounded, not carinate. Tarsal claws with small inner tooth. Recurrent vein 1 reaching submarginal cell 2 at its middle. Submarginal crossvein 1 meets marginal cell 2 vein widths from stigma. Nervulus slightly antefurcal (Fig. 242).

**Metasoma** (Fig. 245). Tergal discs densely and evenly shagreened, weakly shining. Marginal zones slightly depressed, structurally identical, occupying 0.3 of tergal length. Pygidial plate flat, rounded triangular.

**Male** (Fig. 246).

**Body length:** 6.5–7 mm.

**Colour.** Similar to female, though antennae darker brown, never becoming orange, pubescence more obviously white, never whitish-yellow (Fig. 246).

**Pubescence.** Hairs of head as in female, though longer, longest equaling length of scape (Figs. 246–248). Mesonotum and scutellum without semi-squamous hairs, hairs long, longest equaling length of scape (Figs. 246, 248). Terga with hair bands composed of longer hairs, covering margins of terga 2–5 and extending onto following terga by same distance again (Fig. 249).

**Head** (Figs. 247–248). As in female, though with labral process apically with strong emargination, flagellomere 1 exceeds 2, shorter than 2+3.

**Mesosoma** (Fig. 248). As in female, except nervulus slightly less clearly antefurcal (Fig. 246). Tarsal claws more obviously bidentate, with comparatively larger inner tooth.

**Metasoma** (Fig. 249). As in female, but with dense punctures on tergal discs in shagreenation, punctures separated by 0.5–1 puncture diameters, not extending onto tergal margins.

**Genitalia and hidden sterna** (Fig. 250). Gonocoxites produced into strong, blunt and apically rounded dorsal lobes. Gonostyli with raised internal margin, apically spatulate. Penis valves basally broad, apically narrowing abruptly to point (Fig. 250). Sternum 8 narrow, columnar, essentially parallel-sided throughout, apically truncate.

**Diagnosis.** Placement of *A. sulfurea* into a subgenus is difficult and cannot currently be done with confidence. In the female sex, the species is very close to *A. (Graecandrena) schwarzi* Warncke because of the small body size, propodeal triangle finely and delicately marked with raised reticulation, nervulus slightly antefurcal, dark integument throughout, strongly shagreened terga with thick, white apical hairbands, and shiny and densely punctured mesonotum and scutellum. However, *A. schwarzi* is placed into the *Graecandrena* on the basis of its male genitalia that are typical for this subgenus (see illustrations in Warncke 1975); the genitalia of *A. sulfurea* are completely different and resemble members of the former subgenus *Poliandrena* sensu Warncke which no longer exists and most members of which are *incertae sedis* (Pisanty *et al.* 2022), specifically the taxa *A. castanea* Warncke, *A. hibernica* Warncke, and *A. melanota* Warncke.

*Andrena sulfurea* females can be separated from *A. schwarzi* by the dense punctures of the clypeus which are separated by <1 puncture diameter, underlying surface predominantly shagreened and weakly shining (in *A. schwarzi* punctures separated by at least 1 puncture diameter, by >2 centrally, underlying surface smooth and polished, shining), by the presence of semi-squamiform hairs on the mesonotum (mesonotal hairs longer, of a normal type in *A. schwarzi*), and by the shape of the labral process which is narrow, slightly longer than wide (labral process trapezoidal, approximately twice as wide as long in *A. schwarzi*). It is superficially similar to certain members of the *Andrena aerinifrons* species group (*Carandrena* sensu Warncke, now included in *Notandrena*, Pisanty *et al.* 2022) which lack metallic reflections such as *A. pesleria* Gusenleitner, but can be separated by the reticulate propodeal triangle (smooth in comparative *aerinifrons*-group species). It can also be separated from the group of aforementioned ‘*Poliandrena*’ species by the absence of tergal punctures; all three taxa have clearly punctured terga.

*Andrena sulfurea* males can be separated from the three mentioned ‘*Poliandrena*’ species by the black clypeus, thick and long white tergal hairbands, white facial hairs, and penis valves which narrow abruptly apically (narrow more slowly, remaining comparatively wide throughout in the ‘*Poliandrena*’ species) (Figs. 250–253).

**Distribution:** Central Syria.

**Flight period:** March, presumably into April.

**Flower records:** None.

**Holotype:** SYRIA: Homs, 250 m, As Sukhnah [As-Shuknah], 22 km E, 24.iii.1988, L. Blank, ♂ (OLML).

**Paratypes:** SYRIA: Homs, 250 m, As Sukhnah [As-Shuknah], 22 km E, 24.iii.1988, L. Blank (2♀, 14♂); 80 km E of Palmyra, 450 m, 22.iv.1992, K. Warncke (19♀, 8♂); 110 km E of Palmyra, 350 m, 21–22.iv.1992, K. Warncke (1♂) (OLML, SMNHTAU, TJW).



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FIGURES 242–249. *Andrena (incertae sedis) sulfurea* sp. nov. 242. female habitus, 243. female head, 244. female head and mesosoma, 245. female metasoma, 246. male habitus, 247. male head, 248. male head and mesosoma, 249. male terga 1–4.

**Etymology.** *sulfurea* = Latin for “sulphurous”, in reference to the type locality’s nearby sulfur springs that also give As Sukhnah its name (literally ‘the warm’ in Arabic). The species epithet is an adjective.

**Other material examined:** (*A. castanea*): **PARATYPE: TURKEY:** Karadağ, Karaman Province [Karadagh], 1.vi.1920, (1♂) (OLML); (*A. hibernica caucasica*): **HOLOTYPE: CAUCASUS:** Arexesthal (unknown location, Arexes = Aras river, flows from Turkey to the Caspian Sea), 1889 [89], Reitter (♂) (OLML); (*A. melanota*): **PARATYPE: TURKEY:** Erzurum, 31.viii.1937, O. Ecevit [sic?] (1♂) (OLML).



**FIGURES 250–254.** *Andrena (incertae sedis) sulfurea* sp. nov. 250. male genitalia. *Andrena (incertae sedis) castanea* Warncke, paratype. 251. male genitalia. *Andrena (incertae sedis) hibernica caucasica* Warncke, holotype. 252. male genitalia. *Andrena (incertae sedis) melanota* Warncke, paratype. 253. male genitalia. *Andrena (Aenandrena) chaetogastra* Pittioni, paratype. 254. female metasoma.

### Dubious, erroneous and unverified species records from Israel

#### *Andrena (Aenandrena) chaetogastra* Pittioni, 1950

(Fig. 254)

**Distribution:** Cyprus.

**Material examined: PARATYPE: CYPRUS:** Troodos, 16-22.vi.1939, H. Lindberg (1♀) (NHMUK); (*A. bisulcata* Morawitz): **ISRAEL:** Alonim, 26.iv.1943, H. Bytinski-Salz (1♀); Dovrat, 18.iv.1970, H. Bytinski-Salz (1♀); Haifa, 22.iv.1973, A. Freidberg (1♀); Jerusalem, Rehavia West, 27.iv.1945, on *Astomaea seselifolia* (1♀) (SMNHSTA).

**Remarks.** Material cited by Warncke (1969) from Israel was reidentified as *A. bisulcata* Morawitz, and so *A. chaetogastra* is removed from the Israeli list and confirmed as endemic to the Troodos mountains in central Cyprus. In direct comparison, the depressed tergal marginal zones in *A. chaetogastra* occupy a noticeably greater proportion

of the visible surface, on tergum 4 occupying almost the entire area (Fig. 254). The hind tibiae and all the tarsi are also orange, whereas in *A. bisulcata* they are black.

### *Andrena (Brachyandrena) miegiella* Dours, 1873

**Distribution:** West Mediterranean: Algeria, France, Italy, Malta, Morocco, Portugal, Spain, Tunisia; a single Eastern Mediterranean locality is indicated from the Nile delta in Egypt (Gusenleitner & Schwarz 2002). Grace (2010) mentions this species from Lesbos, Greece, without a reference or specimen data.

**Remarks.** This species was reported from Israel without specimen data (Bodenheimer 1937, as *A. tingitana* Pérez; Warncke 1969, citing Bodenheimer). We have not seen any specimens or confirmed records from Israel or elsewhere in the Eastern Mediterranean. *Brachyandrena* are difficult to identify, and any unconfirmed records outside the main distributional range should be treated with caution. Unfortunately, Ariana *et al.* (2009) who revised this subgenus, did not indicate or discuss the exact distribution of *A. miegiella*.

### *Andrena (Chlorandrena) humilis* Imhoff, 1832

**Distribution:** Europe, north-western Africa, Turkey, Lebanon, and eastwards into Russia and the Caucasus (Gusenleitner & Schwarz 2002; Hazir *et al.* 2014; Wood *et al.* 2020a).

**Remarks.** The presence of this species in Israel is mentioned as questionable by Warncke, based on a single female collected by Schmiedeknecht, apparently in Jerusalem (Warncke 1969). We have not seen any verified records of *A. humilis* south of Lebanon, and the specimen mentioned by Warncke may belong to *A. tadauchii*, which he regarded as a subspecies of *A. humilis* (*A. h. prunella* Warncke, 1975 nec Warncke, 1974, see above).

### *Andrena (Chlorandrena) taraxaci* Giraud, 1861

**Distribution:** Eastern Europe, Turkey (Schwenninger 2015).

**Remarks.** Several literature records mention this species from Israel, without specifying collection data (Mavromoustakis 1958; Dylewska 1987; Osytshnjuk & al. 2005; Shebl & Tadauchi 2009; Proshchalykin *et al.* 2017). These unverified records may refer to *A. orientana* Warncke, originally described as a subspecies of *A. taraxaci* (Warncke 1965).

### *Andrena (Euandrena) vulpecula* Kriechbaumer, 1873

**Distribution:** Algeria, Croatia, France, Greece, Italy, Morocco, Portugal, Slovenia, Spain, Tunisia (Gusenleitner & Schwarz 2002).

**Material examined (*A. rufitibialis* Warncke species complex): ISRAEL:** Binyamina [Benjamina], 1.xii.1946, H. Bytinski-Salz, on *Colchicum* (2♀) (SMNHTAU).

**Remarks.** Israeli specimens identified as by Warncke *A. vulpecula* (Warncke 1969) actually belong to the species complex of *Andrena rufitibialis* Warncke. The easternmost verified records of *A. vulpecula* are from Greece.

### *Andrena (Fumandrena) fumida* Pérez, 1895

**Distribution:** Algeria, Italy, Morocco, Tunisia (Gusenleitner & Schwarz 2002).

**Remarks.** Priore (1982) mentions this species from Israel with no collection data, erroneously citing Warncke (1980). However, this is a West Mediterranean species, and the easternmost verified records are from Italy and Tunisia (Gusenleitner & Schwarz 2002).

### *Andrena (Graeandrena) graecella* Warncke, 1965

**Distribution:** Bulgaria, Greece, North Macedonia.

**Material examined** (*A. hyemala repressa* Warncke): ISRAEL: Nir Am, 14.iii.19??, H. Bytinski-Salz (1♂) (SMNHTAU).

**Remarks.** Israeli specimens identified by Warncke as *A. graecella* (Warncke 1969) actually belong to *A. hyemala repressa* Warncke, which he described six years later (Warncke 1975). *Andrena graecella* is limited to south-eastern Europe. This error derives from a period of time (1965–1973) during which Warncke used the name *A. graecella* for what was actually the undescribed *A. hyemala* Warncke, see discussion in Gusenleitner & Schwarz (2002).

### *Andrena (Melandrena) cineraria* (Linnaeus, 1758)

**Distribution:** In a very general sense (i.e. including the valid taxa *A. barbareae* Panzer and *A. danuvia* Stöckert), northern to southern Europe, Asia Minor, Russia, Central and Eastern Asia (Gusenleitner & Schwarz 2002). Revision is required to clarify range extents.

**Remarks.** This species occurs at more northern latitudes and has no verified records from the Levant. The literature record from Israel (Bodenheimer 1937; Warncke 1969) may refer to a misidentified *A. marmora* Nurse, which has a more southern distribution and is known from Israel.

### *Andrena (Melandrena) grandilabris* Pérez, 1903

**Distribution:** Turkey.

**Material examined** (*A. elmaria* Gusenleitner): ISRAEL: Eilon [Elon], 27.iii.1946, H. Bytinski-Salz (1♀); Jerusalem, 27.ii.1940, H. Bytinski-Salz (1♀); 5.iii.1940, H. Bytinski-Salz (1♂); ?Jerusalem [Jer], 27.ii.1940 (1♂); Kiryat Anavim [Qiryat 'Anawim], 5.iii.1937, on Sinapis (1♂) (SMNHTAU).

**Remarks.** Israeli specimens identified by Warncke as *A. grandilabris* (Warncke 1969) actually belong to the related *A. elmaria* Gusenleitner, which is common in Israel. A similar situation may exist with the record of *A. grandilabris* from Cyprus (Varnava *et al.* 2020), which remains to be confirmed.

### *Andrena (Micrandrena) minutula* (Kirby, 1802)

**Distribution:** North-western Africa, through Europe to Cyprus, Turkey and Lebanon (Gusenleitner & Schwarz 2002; Wood *et al.* 2020a).

**Remarks.** Zavattari (1905) mentions this species (as *A. parvula* Kirby) from Jericho, which is unlikely, given the northern distribution of *A. minutula* in the Levant. The mountain ranges of Lebanon seem to be the southernmost distributional limit of *A. minutula* in this region (Wood *et al.* 2020a). This questionable record could refer to another species of *Micrandrena* (e.g. *A. spreata* Pérez), as most of the species concepts of *Micrandrena* did not exist at the time of this publication.

### *Andrena (Poecilandrena) semirubra* Morawitz, 1876

**Distribution:** Armenia, Azerbaijan, Crimea, Georgia, southern part of European Russia, Turkey.

**Material examined** (*A. veronicae* sp. nov.): ISRAEL: Mount Hermon [Hermon], 1650 m, 20.iv.1969, H. Bytinski-Salz (6♂) (OLML, SMNHTAU).

**Remarks.** Israeli male specimens identified as *A. semirubra* (Warncke 1969; Pisanty *et al.* 2018) actually belong to the newly described *A. veronicae* sp. nov. This confusion has arisen due to the rarity of *A. veronicae* material in collections and the absence of females, which are radically different from those of *A. semirubra*.

### *Andrena (Simandrena) congruens* Schmiedeknecht, 1884

**Distribution:** South and Central Europe, Tunisia, Turkey, Caucasus, Western Russia.

**Remarks.** This species is mentioned from Israel (Grace 2010) without collection data. This unverified record possibly refers to a taxon identified as *A. aff. congruens*, mentioned by Warncke from Israel (1969). In southern Europe, *A. congruens* is restricted to montane habitats, and so is unlikely to occur in Israel.

### *Andrena (Truncandrena) derbentina* Morawitz, 1886

**Distribution:** The Caucasus, Southern Russia.

**Remarks.** See comments under *A. mizorhina* Warncke **stat. nov.**

### *Andrena (Truncandrena) seitzii* Alfken, 1935

**Distribution:** Turkey.

**Material examined (*A. urfanella* Scheuchl & Hazir): ISRAEL:** Dafna [Daphne], 20.ii.19??, H. Bytinski-Salz (2♂); Mikveh Israel [Mikwe Israel, Mikweh Israel], 10.iii.19??, H. Bytinski-Salz (3♂); Nir Am, 14.iii.19??, H. Bytinski-Salz (5♂); Rosh Pina, 19.iii.1943, H. Bytinski-Salz (1♂); Zikhron Ya'akov [Sichron Yaacov], 16.iv.19??, H. Bytinski-Salz (1♂) (SMNHTAU).

**Remarks.** Israeli male specimens assumed by Warncke to be *A. seitzii* (Warncke 1969) were reidentified as *A. urfanella* Scheuchl & Hazir.

## Discussion

The current paper brings the number of described *Andrena* species known from Israel to around 220. This is second only to the United States and Turkey, and on par with Greece, Russia and Spain (Ascher & Pickering 2021). Inclusion or exclusion of the West Bank has no effect on this comparison, as only one or two species (*A. pallidicincta* Brullé and possibly *A. paradisaea* Warncke) are recorded from the West Bank but not from Israel. Relative to their areas, Cyprus, Israel and Lebanon have the highest number of described *Andrena* species per square kilometre, much more than any other country (TJW, unpublished data). These findings corroborate previous accounts of Israel's extraordinary diversity of bees (O'Toole & Raw 1991) as well as overall wildlife (Tchernov & Yom-Tov 1988). In addition, they conform well to the hypothesis of the Levant as the biogeographical origin of the genus (Dubitzky *et al.* 2010; Pisanty *et al.* 2022). Further work is currently in progress to resolve some of the remaining difficult species complexes within East Mediterranean *Andrena*, most importantly in the subgenera *Aciandrena*, *Chlorandrena*, *Euandrena*, and *Micrandrena*. We estimate that at least 25 further *Andrena* species are to be reported or described from Israel alone (GP and TJW, unpublished data).

New Israeli *Andrena* findings continue to accumulate especially from northern temperate sites such as the Hermon, northern Golan Heights (the Odem Forest) and the central Upper Galilee (Mount Meron area), and from the sandy desert areas in the Western Negev. Beyond the obvious numerical increase in the number of *Andrena* species known from the country, our study documents several new niches exploited by local *Andrena* species, adding to the functional diversity of this important bee group. Our study benefited from early spring (early–mid April) surveys from lower elevations (1400–1700 m) on Mount Hermon that were especially fruitful in new species findings, and it seems that past collectors have overlooked this short seasonal window of extreme *Andrena* diversity on this well-known site. A rare seasonal pattern is exhibited by the activity of *A. ornithogali* which forages on *Ornithogalum lanceolatum* in the northern Golan Heights, starting from late December and continuing throughout winter until early-mid spring (March–April). This pattern is similar and complementary to the late autumn–early winter activity of the related species *Andrena crocusella* (Pisanty *et al.* 2016), which is present at the same collecting site, foraging on *Crocus* spp. Both species seem to specialise on autumn/winter geophytes which flower during the Mediterranean rainy season, and have accordingly adapted to forage during this unfavourable period (see also Wood 2021a). Our

study has also reported for the first time a bee species (*A. euphorbiae* **sp. nov.**) that utilises spurges (*Euphorbia* spp.), which are not considered typical bee forage plants, as a main pollen source. The use of maple flowers (*Acer* spp.) as a main foraging resource, although well-documented from temperate regions (Chambers 1946; Batra 1985), is also newly recorded for the Levantine *Andrena* fauna (especially in *A. divadicincta* **sp. nov.**, *A. rufula*, and *A. veterana* **sp. nov.**).

### The conservation status of Israeli *Andrena* species

The conservation of wild pollinators, bees in particular, has received much attention in recent years due to the presence of numerous threats and several documented reports of local and regional species decline (Potts *et al.* 2010; Dicks *et al.* 2021). Many of these threats exist also in the context of Israel and the Levant, jeopardising the high bee diversity of the area. In general, the anthropogenic factors which threaten Israeli wild bees can be summarised as belonging to either of two factors: population increase and climate change.

The number of people inhabiting Levantine countries has risen sharply in the last century, leading to extreme stress on natural habitats and radical change in the structure and function of ecosystems. This is especially apparent in the overpopulated Israel and West Bank (Tal 2016), where so many unique habitats in close proximity have led to an unmatched diversity of bee species, many of which are known to exist only in very limited areas (Dorchin *et al.* 2018). Israel has the highest birth rate in the Western World, and within a few decades will become its most densely populated country. The combination of a Third World birth rate with the economy of a developed country means that overall resource consumption is extremely high, as a high standard of living is sought for each person. With limited remaining space to build houses, roads and infrastructure, and to grow crops, Israel's open areas are continuously dwindling in a hopeless battle against a perpetual birth machine (Tal 2008, 2016). This is most evident in the coastal plain, which is the most populated area in the country, but which is also a unique habitat with many bee species known from nowhere else in the world (Levanony 2011; Dorchin *et al.* 2018). The taxa covered in the current manuscript present a fitting example to the fragility of the bee habitats in Israel. Many of these taxa are known from just a handful of individuals, and have been collected from poorly-protected sites that are subject to a plethora of anthropogenic threats such as: expansion of settlements, agriculture and infrastructure, competition from commercial honeybees, overgrazing by livestock, destruction by off-road vehicles, expansion of invasive plants, afforestation of open habitats, and heavy littering (Sorek & Shapira 2018).

A second major threat to Levantine bee diversity is the climate crisis (Soroye *et al.* 2020). With the prospect of rising temperatures and reduced rainfall, large regions with temperate and semi-arid climates are destined to become increasingly dry by the end of the 21<sup>st</sup> century (Masson-Delmotte *et al.* 2022), resulting in a drastic change in plant cover and composition, and an associated change in bee communities. The Eastern Mediterranean and Middle East regions are regarded as particularly vulnerable to the effects of severe climate change, and are already witnessing significant temperature rises and changes in precipitation patterns (Evans 2009; Lelieveld *et al.* 2012). As the most diverse bee communities are usually found in semi-arid areas, we expect major diversity losses in such areas as they undergo desertification.

As yet, there has been very limited evidence of bee diversity decline in the Eastern Mediterranean. However, there are no long-term surveys that can allow a meaningful comparison, particularly in under-resourced countries where few historical data were collected and preserved (Shebl *et al.* 2021). We expect several species traits to be most strongly associated with extinction risk in the Levant: 1) species which are narrow pollen specialists or which rely on rare plant taxa, or on taxa that are at their edge of distribution (Scheper *et al.* 2014), 2) species with small distribution areas or which have small populations to begin with, or which occupy isolated, fragmented or threatened habitats such as Israel's coastal plain (Dorchin *et al.* 2018), and 3) species occupying areas undergoing severe desertification or other ecosystem transformation (González-Varo *et al.* 2013). On the other hand, we expect desert species to be the most resistant to decline, considering the vast desert areas that exist in the Levant, the ongoing desertification trend, and the adaptation of desert species to extreme and irregular weather patterns (Dew *et al.* 2019). Many of the insect species described in recent years (including the current publication) are relatively rare (criterion 2), and should be regarded as susceptible to become locally or globally extinct by 2100, if not much earlier. We expect the overall diversity of *Andrena* in Israel to decline by at least several dozen species by the turn of the century, due to replacement of species-rich temperate and Mediterranean habitats with less species-rich desert habitats, combined with diverse local anthropogenic pressures.

In a region overwhelmed by political, economic, demographic and environmental pressures, the issue of polli-



nator conservation is very slow to gain hold, although some new reports and initiatives indicate an increasing awareness among policymakers and the public (e.g. Pe'er & Benyamini 2008; Dorchin 2017). Conservational policies will have to gain central place on the agenda of both governmental and independent conservation agencies, in order to minimise species losses and safeguard the future of the exceptionally rich bee fauna of Israel and the Levant.

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