

# The velvet ant genus *Pseudophotopsis* André, 1896 (Hymenoptera, Mutillidae) in the Arabian Peninsula, with the description of two new species

Ahmed Mostafa Soliman<sup>1,2</sup>

**1** Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, P.O. BOX 2460, Riyadh 11451, Saudi Arabia **2** Zoology Department, Faculty of Science (Boys), Al-Azhar University, P.O. Box 11884, Nasr City, Cairo, Egypt

Corresponding author: Ahmed Mostafa Soliman ([amsoliman@ksu.edu.sa](mailto:amsoliman@ksu.edu.sa), [ammsoliman@gmail.com](mailto:ammsoliman@gmail.com))

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## Abstract

The monotypic subfamily Pseudophotopsidinae Bischoff, 1920 (Hymenoptera: Mutillidae) from the Arabian Peninsula is revised. Six *Pseudophotopsis* species are reported from Saudi Arabia, Oman and Yemen. Two new species, *P. dhofarensis* **sp. nov.** (male) from Oman and *P. subaurea* **sp. nov.** (male) from Saudi Arabia, are described and illustrated. The hitherto unknown female of *P. mascatiana* Invrea, 1962 is described and *P. aegyptiaca* (Bischoff, 1920) (female) is associated and synonymized with *P. maura* Bischoff, 1920 (male). An illustrated key for the species and their distribution in the Arabian Peninsula are provided.

## Keywords

Faunistic list, Key, Male genitalia, New species, Oman, Saudi Arabia

## Introduction

The Arabian Peninsula encompasses a total area of 2.7 million km<sup>2</sup> making it the largest peninsula on Earth. It is a more or less rectangular plateau, bounded to the northeast by the Arabian (Persian) Gulf, to the south and southeast by the Arabian Sea, and to the west and southwest by the Red Sea (Engel et al. 2011). The Farasan and Socotra Archi-

pelagos are included in the present study, despite the fact that they are not geographically parts of the Arabian Peninsula, as they are politically parts of Saudi Arabia and Yemen respectively (Edmardash et al. 2020; Gadallah and Brothers 2020). While Saudi Arabia occupies almost two-thirds of the peninsula, Yemen, Oman, the United Arab Emirates, Qatar, Kuwait, and Bahrain share the remaining area (De Pauw 2002). Saudi Arabia is characterized by various ecosystems and a diversity of plant species; therefore, it is considered to be the country with the richest biodiversity (Aldhebiani and Howladar 2013).

The position of the Arabian Peninsula in relation to the faunal regions of the world is rather unique, as it is situated at the junction of three different biogeographical realms: the northern lowlands have Palaearctic affinities, the extreme east has Indo-Malayan (Oriental) affinities, and the south has Afrotropical affinities (Gadallah and Brothers 2020).

Species of the family Mutillidae are mainly tropical in their distribution (Brothers and Finnamore 1993). They exhibit extreme sexual dimorphism: the females are always apterous with mesosoma forming a fused box-like structure [except for a few cases in which the pronotum is articulated, as in Myrmosinae (including the tribe Kudakrumiini)]; most males are fully winged, but various degrees of wing reduction with mesosomal modification are observed (Brothers and Lelej 2017).

Unlike the situation in some other groups of insects with extreme sexual dimorphism, where only one sex is used as the basis for species description, in Mutillidae both sexes are used. Therefore, many species and even some genera in the family are known from one sex only. Often the male and female of a single species have been named separately, resulting in many synonyms (Brothers 1995).

The Pseudophotopsinae includes only the genus *Pseudophotopsis* André, 1896. The females vary in having functional ocelli, reduced ocelli, or a complete lack of ocelli (Brothers and Lelej 2017). The males of this genus were first placed in *Agama* Blake, 1871 (nom. praeocc.) and later in subgenus *Pseudophotopsis* André, 1896. The females are so unique that Ashmead (1899), based on an erroneous identification of the female of the type species, placed them in his new genus *Ephutomma* Ashmead, 1899. They were first associated with their males by Radoszkowski (1885), and this association was later confirmed by Schuster (1950) and Suárez (1965) who correctly placed females of *Ephutomma* in *Pseudophotopsis*. True males and females of *Ephutomma* belong to the subfamily Mutillinae (Lelej and Nemkov 1997; Brothers and Lelej 2017).

The genus *Pseudophotopsis* includes 31 valid species worldwide (Pagliano et al. 2020); they are mainly nocturnal and widely spread in arid areas of the Palaearctic, a few penetrate to the Afrotropical and Oriental regions (Brothers 1975; Lelej and van Harten 2006; Lelej 2007). The first focused step to study this group of wasps was by Bischoff (1920), in his monograph of the African mutillids, where he keyed many species and described seven valid ones, placing the males in the true genus, *Pseudophotopsis*, and assigning the females to the genus *Ephutomma*. Many years later, Lelej (1980, 1985) keyed and figured the *Pseudophotopsis* species from the East Mediterranean region (including Turkey, Greece), Iran, Afghanistan, and the former USSR

(including Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Turkmenistan, Armenia, Georgia, and Azerbaijan).

Gadallah et al. (2020) reported four *Pseudophotopsis* species in the Arabian Peninsula: *P. aurea* (Klug, 1829) (Saudi Arabia and Yemen), *P. binghami* Bischoff, 1920 (Oman), *P. mascatiana* Invrea, 1962 (Yemen), and *P. maura* Bischoff, 1920 (Yemen). *P. aurea* is known from both sexes, whereas the remaining species are known from males only (Lelej and van Harten 2006). El-Hawagry et al. (2016) incorrectly assigned the species *P. continua* (Fabricius, 1804) to the fauna of Saudi Arabia, via a misidentification of a single female specimen collected from Baljurashi (Al-Baha); however, after reexamination during the present study, it was found that this specimen undoubtedly belongs to *P. aegyptiaca* (Bischoff, 1920) which is associated and synonymized with *P. maura* Bischoff, 1920.

In the present study, two new species: *P. dhofarensis* sp. nov. (male) from Oman, and *P. subaurea* sp. nov. (male) from Saudi Arabia, are described and illustrated. Two new sex associations are also recognized; the hitherto unknown female of *P. mascatiana* is described for the first time from Saudi Arabia and *P. aegyptiaca* (female) is associated and synonymized with *P. maura* (male).

## Material and methods

### Sampling (Table 1, Figs 1, 2)

The present study is based on *Pseudophotopsis* specimens collected from various locations in the Kingdom of Saudi Arabia and Sultanate of Oman (mainly during 2007–2019) using light and pitfall traps or by hand-picking at dusk. For the material examined of previously and newly recorded species, the label data concerned with sampling locations are summarized, giving abbreviations to most of them. The data of these locations is presented in detail in Table 1. The collection data of the species from Yemen and Oman in previous studies were combined with the recent data to create distribution maps for *Pseudophotopsis* species in the Arabian Peninsula (Figs 1, 2).

### Examination and imaging

Specimens were examined using a MEIJI-EMZ-10 stereomicroscope (up to 180 × magnification) fitted with an ocular micrometer for measurements. The genitalia of some male specimens were extracted and left in cold 10% NaOH solution for 24 h, before being washed with distilled water and then with an ascending series of ethyl alcohol (70%–100%), and finally submerged in glycerol on a concave slide for photographing. The genitalia of other male specimens were partly extracted from the metasoma to confirm identification. Photographs were taken with a Canon EOS 70D camera attached to a LEICA MZ 125 stereomicroscope. Individual source images were then stacked using the extended depth-of-field software Helicon Focus (ver. 7.6). Fur-

**Table 1.** Data of sampling localities of *Pseudophotopsis* species in the Arabian Peninsula during present and previous studies (SA = Saudi Arabia; \* = collecting date gathered from previous studies).

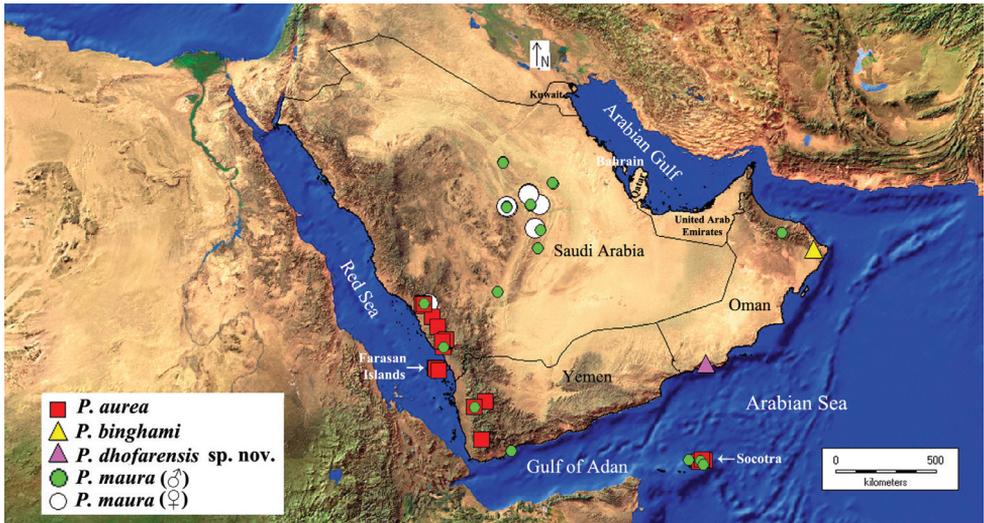
Abbreviation	Locality	Country	Region/ Governorate	Province/Wilayah	Latitude / Longitude	Altitude	Reference
DS	Dirab Station of Research	SA	Riyadh	Riyadh	24°25'22"N, 46°39'21"E	572 m	Present study
GR1	Garf Raydah Natural Reserve_1	SA	Asir	Abha	18°11'45"N, 42°23'21"E	1614 m	Present study
GR2	Garf Raydah Natural Reserve_2	SA	Asir	Abha	18°11'36"N, 42°23'25"E	1772 m	Present study
GR3	Garf Raydah Natural Reserve_3	SA	Asir	Abha	18°11'39"N, 42°23'42"E	1851 m	Present study
GR4	Garf Raydah Natural Reserve_4	SA	Asir	Abha	18°11'40"N, 42°23'49"E	1897 m	Present study
GR5	Garf Raydah Natural Reserve_5	SA	Asir	Abha	18°11'47"N, 42°24'19"E	2285 m	Present study
GR5	Garf Raydah Natural Reserve_6	SA	Asir	Abha	18°12'16"N, 42°24'44"E	2820 m	Present study
IR1	Ibex Reserve National Park_1	SA	Riyadh	Hutet bani Tamem	23°20'33"N, 46°27'28"E	675 m	Present study
IR2	Ibex Reserve National Park_2	SA	Riyadh	Hutet bani Tamem	23°21'16"N, 46°26'56"E	684 m	Present study
JA	Jabal Akhadar	Oman	Ad-Dakhiliyah	Nizwa	23°08'13"N, 57°44'04"E	1341 m	Present study
Jl	Jabal Ibrahim	SA	Makkah	Taif	20°25'00"N, 41°10'60"E	1540 m	Present study
KH1	Al-Khararah_1	SA	Riyadh	Al-Muzahimiyah	24°24'21"N, 46°14'40"E	691 m	Present study
KH2	Al-Khararah_2	SA	Riyadh	Al-Muzahimiyah	24°23'01"N, 46°14'14"E	699 m	Present study
RH1	Rawdet Al-Harmalyah_1	SA	Riyadh	Al-Quway'iyah	24°18'24"N, 45°10'46"E	769 m	Present study
RH2	Rawdet Al-Harmalyah_2	SA	Riyadh	Al-Quway'iyah	24°20'13"N, 45°09'15"E	774 m	Present study
RH3	Rawdet Al-Harmalyah_3	SA	Riyadh	Al-Quway'iyah	24°18'35"N, 45°10'02"E	774 m	Present study
RH4	Rawdet Al-Harmalyah_4	SA	Riyadh	Al-Quway'iyah	24°17'24"N, 45°08'34"E	796 m	Present study
RK1	Rawdat Khuraim_1	SA	Riyadh	Rimah	25°23'02"N, 47°17'07"E	561 m	Present study
RK2	Rawdat Khuraim_2	SA	Riyadh	Rimah	25°25'52"N, 47°13'56"E	572 m	Present study
RF1	Rawdet Farsher Sheal_1	SA	Riyadh	Al-Aflaj	22°25'20"N, 46°34'46"E	594 m	Present study
RF2	Rawdet Farsher Sheal_2	SA	Riyadh	Al-Aflaj	22°24'56"N, 46°35'17"E	602 m	Present study
RF3	Rawdet Farsher Sheal_3	SA	Riyadh	Al-Aflaj	22°25'29"N, 46°34'32"E	606 m	Present study
RS1	Rawdet al-Sabalh_1	SA	Riyadh	Az Zulfi	26°22'25"N, 44°58'14"E	660 m	Present study
RS2	Rawdet al-Sabalh_2	SA	Riyadh	Az Zulfi	26°21'33"N, 44°59'05"E	661 m	Present study
SH1	Shada Al-Ala Natural Reserve_1	SA	Al-Baha	Makhwah	19°52'36"N, 41°18'40"E	892 m	Present study
SH2	Shada Al-Ala Natural Reserve_2	SA	Al-Baha	Makhwah	19°51'46"N, 41°18'05"E	1225 m	Present study
SH3	Shada Al-Ala Natural Reserve_3	SA	Al-Baha	Makhwah	19°51'04"N, 41°18'02"E	1325 m	Present study
SH4	Shada Al-Ala Natural Reserve_4	SA	Al-Baha	Makhwah	19°51'43"N, 41°18'14"E	1399 m	Present study
SH5	Shada Al-Ala Natural Reserve_5	SA	Al-Baha	Makhwah	19°50'43"N, 41°18'16"E	1474 m	Present study
SH6	Shada Al-Ala Natural Reserve_6	SA	Al-Baha	Makhwah	19°50'20"N, 41°18'36"E	1563 m	Present study
SH7	Shada Al-Ala Natural Reserve_7	SA	Al-Baha	Makhwah	19°50'23"N, 41°18'40"E	1611 m	Present study
SH8	Shada Al-Ala Natural Reserve_8	SA	Al-Baha	Makhwah	19°50'34"N, 41°18'41"E	1666 m	Present study
WBD	Wadi Badawah	SA	Asir	Al-Namas	19°14'18"N, 42°09'59"E	1996 m	Present study
WBQ	Wadi Baqrah	SA	Asir	Saloo Al-Manzar	18°47'31"N, 42°01'05"E	422 m	Present study
WBR	Wadi Barq	SA	Riyadh	Hutet bani Tamem	23°15'52"N, 46°43'20"E	608 m	Present study
WD	Wadi Al-Dawaser	SA	Riyadh	Wadi Al-Dawaser	20°25'30"N, 44°43'35"E	700 m	Present study
WH1	Wadi Hanifah_1	SA	Riyadh	Riyadh	24°54'18"N, 46°10'45"E	810 m	Present study
WH2	Wadi Hanifah_2	SA	Riyadh	Riyadh	24°53'56"N, 46°10'32"E	818 m	Present study
WK	Wadi Kasan, 2 km N. Al-Habeel	SA	Asir	Rijal Almaa	18°06'56"N, 42°13'53"E	475 m	Present study
WM1	Wadi Marabah_1	SA	Asir	Abha	18°10'14"N, 42°22'12"E	1131 m	Present study
WM2	Wadi Marabah_2	SA	Asir	Abha	18°10'06"N, 42°22'16"E	1177 m	Present study
WMS	Wadi Mashwas	SA	Asir	Abha	18°10'06"N, 42°22'05"E	1219 m	Present study
WN2	Wadi Neera_1	SA	Al-Baha	Makhwah	19°44'53"N, 41°20'01"E	449 m	Present study

Abbreviation	Locality	Country	Region/ Governorate	Province/Wilayah	Latitude / Longitude	Altitude	Reference
WN1	Wadi Neera_2	SA	Al-Baha	Makhwah	19°44'53"N, 41°20'01"E	471 m	Present study
WR2	Wadi Reem_1	SA	Jazan	Aldarb	17°52'34"N, 42°16'40"E	144 m	Present study
WR1	Wadi Reem_2	SA	Jazan	Aldarb	17°52'35"N, 42°16'45"E	145 m	Present study
WR1	Wadi Reyam	SA	Al-Baha	Makhwah	19°50'48"N, 41°22'40"E	470 m	Present study
WY1	Wadi Yabah_1	SA	Makkah	Ardiya Al-Janubiyah	19°14'54"N, 41°47'15"E	402 m	Present study
WY2	Wadi Yabah_2	SA	Asir	Ardiya Al-Janubiyah	19°16'31"N, 41°48'35"E	424 m	Present study
-	12 km NW of Manakhah *	Yemen	-	Sana'a	15°05'00"N, 43°42'00"E	1500 m	Lelej and van Harten 2006
-	25 km SE Bajil *	Yemen	-	Al-Hudaydah	14°53'00"N, 43°27'00"E	1370 m	Lelej and van Harten 2006
-	Al-Huseis	SA	Jazan	Farasan Islands	16°45'22"N, 42°04'08"E	4 m	Present study
-	Al-Kowd *	Yemen	-	Abyan	13°05'00"N, 45°22'00"E	20 m	Lelej and van Harten 2006
-	Al-Lahima *	Yemen	-	Sana'a	15°24'00"N, 43°32'00"E	1200 m	Lelej and van Harten 2006
-	Al-Mashoor	SA	Jazan	Farasan Islands	16°51'02"N, 41°55'17"E	4.5 m	Present study
-	Al-Sajid	SA	Jazan	Farasan Islands	16°52'60"N, 41°54'35"E	13 m	Present study
-	Al-Shafa	SA	Makkah	Taif	21°08'21"N, 40°21'43"E	1972 m	Present study
-	Al-Soudah	SA	Asir	Abha	18°13'21"N, 42°24'08"E	2717 m	Present study
-	Al-Wesam	SA	Makkah	Taif	21°12'05"N, 40°21'29"E	1808 m	Present study
-	As-Saleel National Park *	Oman	Ash-Sharqiyah S.	Al Kamil Wal Wafi	22°21'20"N, 59°11'47"E	215 m	Monks et al. 2019
-	Ayn Hamran	Oman	Dhofar	Taqah	17°05'51"N, 54°16'59"E	1097 m	Present study
-	Baljurashi	SA	Al-Baha	Baljurashi	19°52'40"N, 41°34'18"E	1931 m	Present study
-	Detwa *	Yemen	-	Socotra	12°41'00"N, 53°29'42"E	9 m	Lo Cascio et al. 2012
-	Di Hamri *	Yemen	-	Socotra	12°38'52"N, 54°12'45"E	16 m	Lo Cascio et al. 2012
-	Hadibo *	Yemen	-	Socotra	12°37'00"N, 54°01'00"E	30 m	Lelej and van Harten 2006
-	Ma'bar *	Yemen	-	Dhamar	14°47'00"N, 44°17'00"E	2450 m	Lelej and van Harten 2006
-	Qa al-Boun *	Yemen	-	Amran	15°44'00"N, 44°00'00"E	2200 m	Lelej and van Harten 2006
-	Sana'a *	Yemen	-	Sana'a	15°21'00"N, 44°13'00"E	2300 m	Lelej and van Harten 2006
-	Ta'izz *	Yemen	-	Ta'izz	13°35'00"N, 44°02'00"E	1400 m	Lelej and van Harten 2006
-	Wadi Ayhaft *	Yemen	-	Socotra	12°36'30"N, 53°58'54"E	200 m	Lo Cascio et al. 2012
-	Wadi Difarroha *	Yemen	-	Socotra	12°27'42"N, 54°08'43"E	100 m	Lo Cascio et al. 2012
-	Wadi Kam *	Yemen	-	Socotra	12°40'10"N, 54°07'10"E	30 m	Lo Cascio et al. 2012

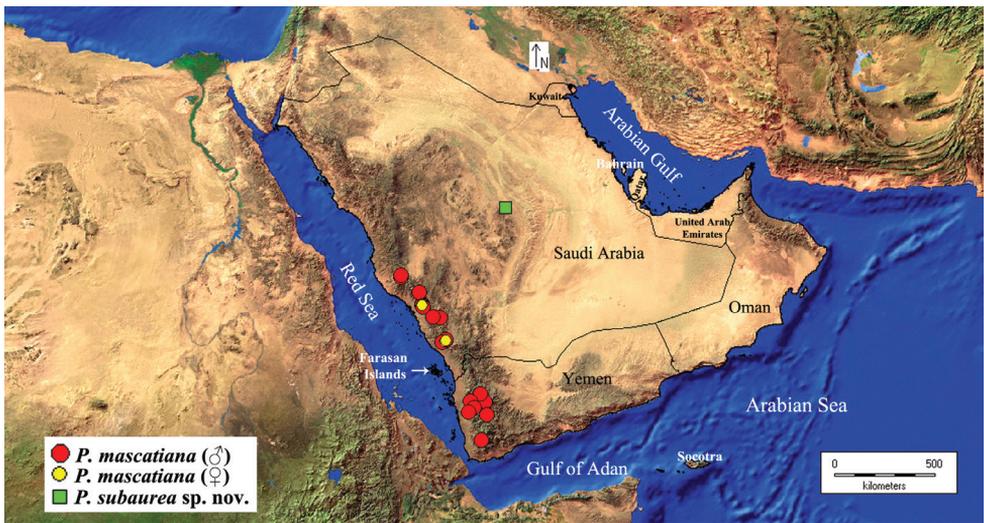
ther image processing was completed with Adobe Photoshop CS5.1 (ver. 12.1.0.0) and Adobe Photoshop Lightroom 5.2 x64 (ver. 5.2.0.10) software programs. The geographical distribution of *Pseudophotopsis* species is based mainly on Gadallah et al. (2020). The distribution of the species in the Arabian Peninsula was plotted using DIVA-GIS (ver.7.5) software.

### Morphological terminology

Morphological terms are based on Brothers (1975) and Brothers and Lelej (2017), and body sculpture terminology on Harris (1979).



**Figure 1.** Distribution map of *P. aurea* (Klug), *P. binghami* Bischoff, *P. dhofarensis* sp. nov., and *P. maura* Bischoff in the Arabian Peninsula.



**Figure 2.** Distribution map of *Pseudophotopsis mascatiana* Invrea, and *P. subaurea* sp. nov. in the Arabian Peninsula.

### Species identification

The keys and descriptions provided by Bischoff (1920), Lelej (1985) and Lelej and van Harten (2006) were used for comparison of species collected from Saudi Arabia and Oman to the relevant species in the Palearctic and the Afrotropical regions. Identifications of some species were confirmed with the help of Denis J. Brothers (University

of KwaZulu-Natal, South Africa) and Arkady S. Lelej (Russian Academy of Sciences, Russia). The “type” specimen of *P. kassalina* f. *semiaurata* Bischoff, 1920 was examined and photographed by Roberto Poggi (Museo Civico di Storia Naturale “Giacomo Doria”, Genova, Italy) and Marcello Romano (Italy) to clarify the identity of the new species, *P. subaurea*, described here.

## Abbreviations

**Morphological: Fore wing venation** (see Fig. 5A) – cell 1M = first discal cell; cell 2R1 = radial (= marginal) cell; vein Cu = cubital vein; vein 1M = medial (= basal) vein; vein R = radial vein; vein Rs = radial sector vein; vein Sc = subcostal vein. **Other morphology** – F1, F2, F3, etc. = antennal flagellomeres 1, 2, 3, etc.; OOD = distance between posterior ocellus and inner eye margin; POD = distance between posterior ocelli; S1, S2, S3, etc. = metasomal sterna 1, 2, 3, etc.; T1, T2, T3, etc. = metasomal terga 1, 2, 3, etc.

**Collecting technical methods:** HP = hand-picking; LT = light trap; PT = pit-fall trap.

### Depositories:

- ESEC** Egyptian Entomological Society collection, Cairo, Egypt;  
**KSMA** King Saud University Museum of Arthropods, Riyadh, Saudi Arabia;  
**MSNG** Museo Civico di Storia Naturale “Giacomo Doria”, Genova, Italy;  
**NHMB** Naturhistorisches Museum Basel, Basel, Switzerland;  
**PPDD** Ministry of Agriculture collection, Giza, Egypt.

## Results

### Subfamily Pseudophotopsidinae Bischoff, 1920

Pseudophotopsini Bischoff, 1920: 22 (as tribe).

### Genus *Pseudophotopsis* André, 1896

*Pseudophotopsis* André, 1896: 266 (as subgenus of *Mutilla* Linnaeus, 1758). Type species: *Agama komarovii* Radoskowski, 1885 (male), by subsequent designation of Ashmead, 1903: 305 (misspelled as *Kamarovi*).

*Alloneurion* Ashmead, 1899: 59. Type species *Agama kokpetica* Radoszkowski, 1885 (male), by original designation (misspelled as *kotepetica*). Junior subjective synonym of *Pseudophotopsis* André, 1896 according to André, 1904: 31.

*Sphinctomutilla* André, 1899: 7. Type species *Mutilla continua* Fabricius, 1804 (female), by subsequent designation of Mickel, 1928: 37. Junior subjective synonym of *Ephutomma* Ashmead, 1899 according to André, 1900: 136. Junior subjective synonym of *Pseudophotopsis* André, 1896 according to Brothers, 1975: 590.

**Diagnosis.** Eyes asetose, distinctly widened at lower pole in males (e.g., see Fig. 4A); clypeal free margin bituberculate (e.g., see Fig. 3C); tarsal claws with a ventral denticle (e.g., see Fig. 3A); mid and hind tibiae apically with a pair of unequal spurs (serrate in females) (e.g., see Figs 3A; 8B, C); second metasomal segment with felt lines deposited laterally on tergum and sternum (e.g., see Fig. 9C). **MALES.** Fully winged forms; fore and hind wings with anal lobes; metanotum mostly provided with a pair of more or less developed dentiform horns (e.g., see Fig. 4C). **FEMALES.** Apterous forms; mesosomal dorsum with visible sutures (e.g., see Fig. 7D); pronotum wider than fused meso-metanota, the latter more or less contracted and narrower than propodeum (e.g., see Fig. 7D); propodeal dorsal face rounded or truncate behind, without scutellar scale (e.g., see Figs 7D; 20B); T6 subconvex, with pygidial area having poorly expressed sculpture (e.g., see Fig. 9A, B) (Lelej 1985, 2002).

**Key to species of the genus *Pseudophotopsis* André, 1896 in the Arabian Peninsula**

Females unknown for *P. subaurea*, *P. dhofarensis*, and *P. binghami*.

- 1 **Males:** Fully winged forms; mesosomal dorsum with normally articulated plates (e.g., see Fig. 4C) ..... **2**
- **Females:** Apterous forms; mesosomal dorsum with fused meso- and metanota delimited by distinct pronotum and propodeum (e.g., see Fig. 7D) ..... **7**
- 2 Posterior metasomal segments (4<sup>th</sup> to 7<sup>th</sup>) with integument more or less brownish-yellow, distinctly contrasting with darkened anterior segments (Figs 5B, C; 10B, C; 32A, C); antennal flagellomeres blackish-brown, at most F11 pale at the tip (Figs 4B; 30B)..... **3**
- All metasomal segments darkened, at most 7<sup>th</sup> segment yellowish-brown to red (e.g., see Fig. 14A, B, D); antennal flagellomeres more or less light brown (e.g., see Fig. 12B) ..... **4**
- 3 Head blackish-brown, tegula testaceous (Fig. 29B–D); metasoma wholly clothed with white setae (Figs 31C; 32C); T1–T3 and S2–S3 with apical fringes of sparse white setae (Figs 31C; 32C); T1 foveate-reticulate (Fig. 31C); fore wing slightly infumate on distal half, with pale brown to yellow veins (except brown Sc+R) (Fig. 31B); 3<sup>rd</sup> abscissa of Rs at most as long as crossvein r-rs (Fig. 31B); metanotal horns parallel to subparallel (Fig. 30C); cuspis of volsella rather wide subapically (Fig. 35B); parapenial lobe subtriangular, with narrowly rounded apex (Fig. 35A); genital ventral lobe tapering apically (Fig. 35B)..... ***P. subaurea* sp. nov.**
- Head and tegula dark red (Figs 3C, D; 4C; 10A); first metasomal segment and S2 clothed with long white setae, remaining metasoma densely clothed with golden setae (Figs 5B, C; 10A–C); T1 with apical fringe of sparse white setae, T2–T6 and S2–S6 with apical fringes of dense golden setae (Figs 5B, C; 10B, C); T1 rather sparsely foveate (Fig. 5B); fore wing wholly deeply infumate in most specimens, with dark brown veins (Fig. 5A); 3<sup>rd</sup> abscissa of Rs distinctly longer than crossvein r-rs (usually 1.3–1.4 ×, in few specimens reaches 2 ×) (Fig. 5A); metanotal horns distinctly diverging toward the apex (Fig. 4C); cuspis of volsella narrow api-

- cally, digitate (Fig. 33B); parapenial lobe subrounded, with broadly rounded apex (Fig. 33A); genital ventral lobe rounded apically (Fig. 33B) ..... ***P. aurea* (Klug)**
- 4 Metanotal horns weakly developed, slightly longer than wide (1.15 ×) (Fig. 12D); genital ventral lobes strongly bent inward, with outer margins strongly convex (Fig. 33D).....***P. dhofarensis* sp. nov.**
- Metanotal horns well developed, distinctly longer than wide (about 1.5 ×) (Figs 16C; 24C); genital ventral lobes at most oblique inward, with outer margins straight or obtusely angulate (Figs 34B, D; 35D) ..... **5**
- 5 Distance between apex of lower mandibular tooth and upper mandibular ridge less than mandibular height at base (about 0.85 ×) (Fig. 16B); S2 with extremely small median basal tubercle (mostly absent) (Fig. 17C); outer margin of genital ventral lobe obtusely angulate (Fig. 34B) ..... ***P. mascatiana* Invrea**
- Distance between apex of lower mandibular tooth and upper mandibular ridge longer than mandibular height at base (Fig. 24A; fig. 30 (8) in Lelej 1985); S2 with more or less prominent median basal tubercle (Fig. 25B); outer margin of genital ventral lobe straight (Figs 34D; 35D) ..... **6**
- 6 F1 as long as F2 (Fig. 24B); head convergent behind eyes (Fig. 23D); genital ventral lobe robust, oblique inward (Fig. 34D) ..... ***P. maura* Bischoff**
- F1 shorter than F2 (0.9 ×); temples prolonged, head less convergent behind eyes; genital ventral lobe rather cylindrical, extending directly posteriorly (Fig. 35D).. ..... ***P. binghami* Bischoff**
- 7 T1–T5 and S2–S5 with apical fringes of compact white setae (Fig. 28A–D); discs of propodeum, T2 and T3 with brown setae (Figs 27E; 28D)..... ***P. maura* Bischoff**
- T1–T5 and S2–S5 with apical fringes of compact golden setae (Figs 8D; 9C; 21C, D); propodeum, T2 and T3 with yellowish-white to golden setae (Figs 7D; 8D; 20C; 21C) ..... **8**
- 8 Only weakly developed posterior ocelli present, anterior ocellus absent (Fig. 19B); distance between apex of mandibular lower tooth and upper mandibular ridge 0.86–0.88 × as long as mandibular height at base (Fig. 19D); interspaces between foveae or punctures on frons, vertex and mesosomal dorsum smooth, not tuberculate (Figs 19A, B; 20B, C); propodeal dorsal face slightly widened laterally (subparallel sided), gently declivitous posteriorly (rounded), 0.70–0.77 × as long as maximal width (Fig. 20B, C); meso- and metapleura mostly smooth (Fig. 20C); mid and hind tibiae without prolongation at their apices (Fig. 21A, B); hind tibia with shallow groove extending along inner face (Fig. 21B); T6 with bell-shaped, finely wrinkled pygidial area (Fig. 22B) ..... ***P. mascatiana* Invrea**
- Distinct anterior and posterior ocelli present (Fig. 7A); distance between apex of mandibular lower tooth and upper mandibular ridge nearly as long as mandibular height at base; interspaces between foveae or punctures on frons, vertex and mesosomal dorsum irregularly coarsely tuberculate (Figs 7A, B, D; 8A); propodeal dorsal face distinctly widened laterally, sharply declivitous posteriorly (truncate), 0.50–0.55 × as long as maximal width (Figs 7D; 8A); meso- and metapleura punctate (Fig. 8A); mid and hind tibiae with strong prolongation at their

apices (Fig. 8B, C); hind tibia without such groove on inner face (Fig. 8C); T6 with oval-shaped pygidial area, finely rugose on disc and obliquely striate laterally (Fig. 9B) ..... *P. aurea* (Klug)

***Pseudophotopsis aurea* (Klug, 1829)**

Figures 3–10; 33A, B

*Mutilla aurea* Klug, 1829: [18], (♀), “Ex Habissinia et Arabia deserta” (Ethiopia and Arabia).

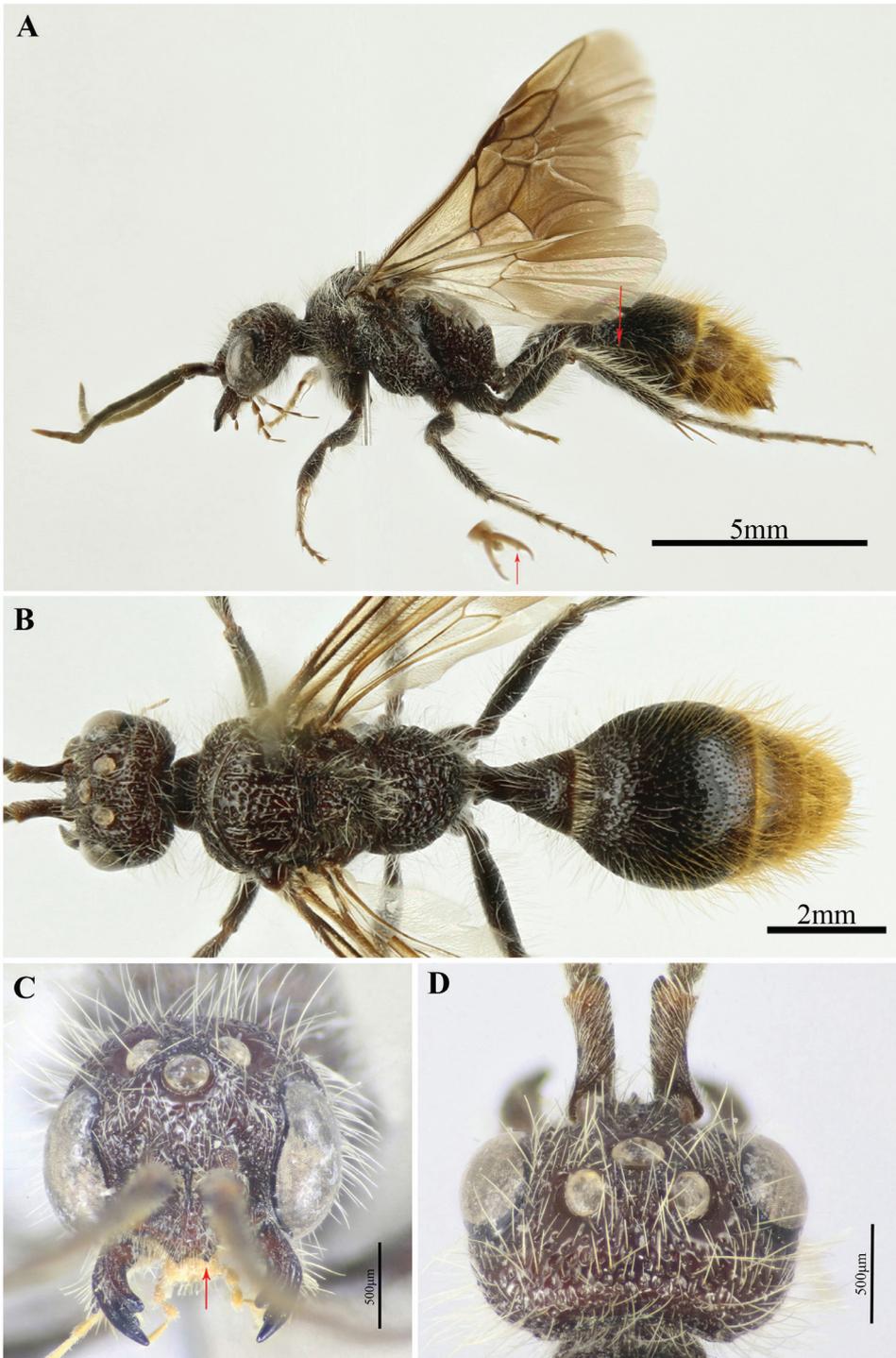
*Mutilla kassalina* Magretti, 1898: 42, (♂ holotype), “Kassala” (Sudan). Junior subjective synonym of *Mutilla aurea* Klug, 1829 according to Lelej and van Harten 2006: 7.

*Pseudophotopsis kassalina* f. *semiaurata* Bischoff, 1920: 99, (♂ holotype), “Arafali” (Eritrea). Invalidly considered a junior subjective synonym of *Mutilla aurea* Klug, 1829 according to Lo Cascio et al. 2012: 527, although this is an unavailable name according to Article 45.6.4 of ICZN.

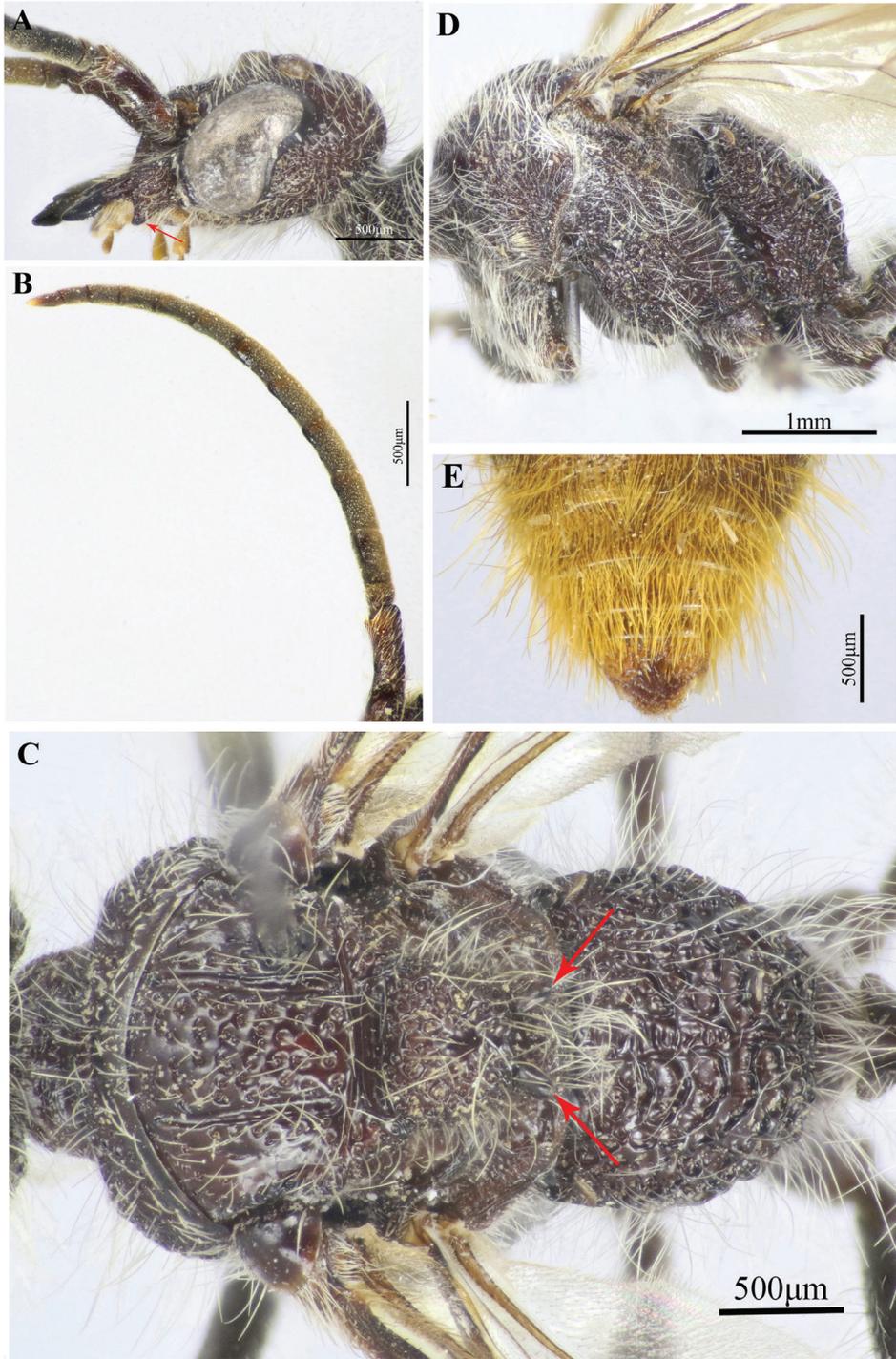
*Pseudophotopsis continua* subsp. *arabica* Hammer, 1962: 2, (♀ holotype), “Sufean, Lahej, Aden” (Yemen). Junior subjective synonym of *Mutilla aurea* Klug, 1829 according to Lelej and van Harten 2006: 7.

**Diagnosis. Male** (Figs 3–5; 10A–C; 33A, B). Body length 12.3–18 mm. Head and mesosoma including tegula dark red (Figs 3C, D; 4A, C, D); antennal flagellomeres blackish-brown, at most F11 pale at the tip (Fig. 4B); posterior metasomal segments (4<sup>th</sup> to 7<sup>th</sup>) more or less brownish-yellow, distinctly contrasting with darkened anterior segments (Fig. 5B, C). First metasomal segment and S2 (except posteriorly) clothed with long white setae, remaining metasoma densely clothed with golden setae (Figs 5B, C; 10B, C); T1 with apical fringe of sparse white setae, T2–T6 and S2–S6 with apical fringes of dense golden setae (Figs 5B, C; 10B, C). POD 1.5–1.85 × OOD (Fig. 3D); distance between apex of lower mandibular tooth and upper mandibular ridge slightly longer than mandibular height at base (1.08–1.15 ×) (Fig. 4A); T1 rather sparsely foveate (Fig. 5B); metanotal horns well developed (1.7–1.8 × as long as wide), distinctly diverging toward the apex (Fig. 4C); fore wing wholly deeply infumate in most specimens, with dark brown veins (Fig. 5A), with 3<sup>rd</sup> abscissa of Rs distinctly longer than crossvein r-rs (usually 1.3–1.4 ×, in few specimens reaches 2 ×) (Fig. 5A). Cuspis of volsella narrow apically, digitate (Fig. 33B); parapenial lobe subrounded, with broadly rounded apex (Fig. 33A); genital ventral lobe, rounded apically, with outer margin slightly concave (Fig. 33B).

**Female** (Figs 6–9). Body length 15.5–17 mm. Propodeum, T2 and T3 with yellowish-white to golden setae (Fig. 6A); T1–T5 and S2–S5 with apical fringes of compact golden setae (Figs 8D; 9C). Vertex with distinct anterior and posterior ocelli (Fig. 7A); distance between apex of mandibular lower tooth and upper mandibular ridge nearly as long as mandibular height at base; interspaces between foveae or punctures on frons, vertex and mesosomal dorsum irregularly coarsely tuberculate (Figs 7A, B, D;



**Figure 3.** *Pseudophotopsis aurea* (Klug) (Male) **A, B** habitus, lateral and dorsal views, respectively (lateral felt line on T2 indicated, ventral denticle on tarsal claw in magnified pretarsus indicated) **C** head, frontal view (denticulations on clypeal free margin indicated) **D** head and antennal scape, dorsal view.



**Figure 4.** *Pseudophotopsis aurea* (Klug) (Male) **A** head, lateral view (mandibular basal lower tooth indicated) **B** antenna **C, D** mesosoma, dorsal and lateral views, respectively (metanotal horns indicated) **E** T3–T7, dorsal view.

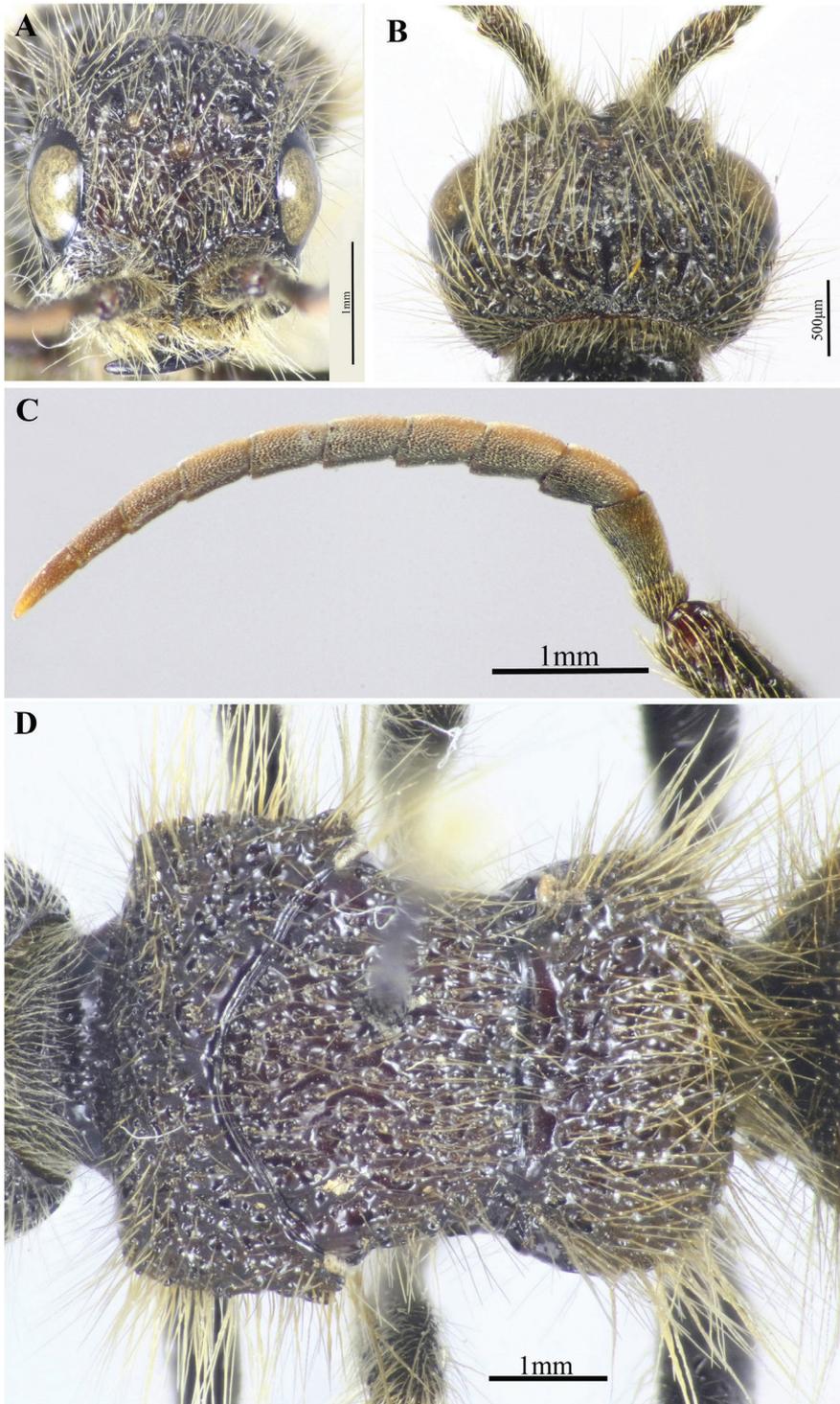


**Figure 5.** *Pseudophotopsis aurea* (Klug) (Male) **A** right fore wing (relevant veins and cells labelled) **B, C** metasoma, dorsal and ventral views, respectively.

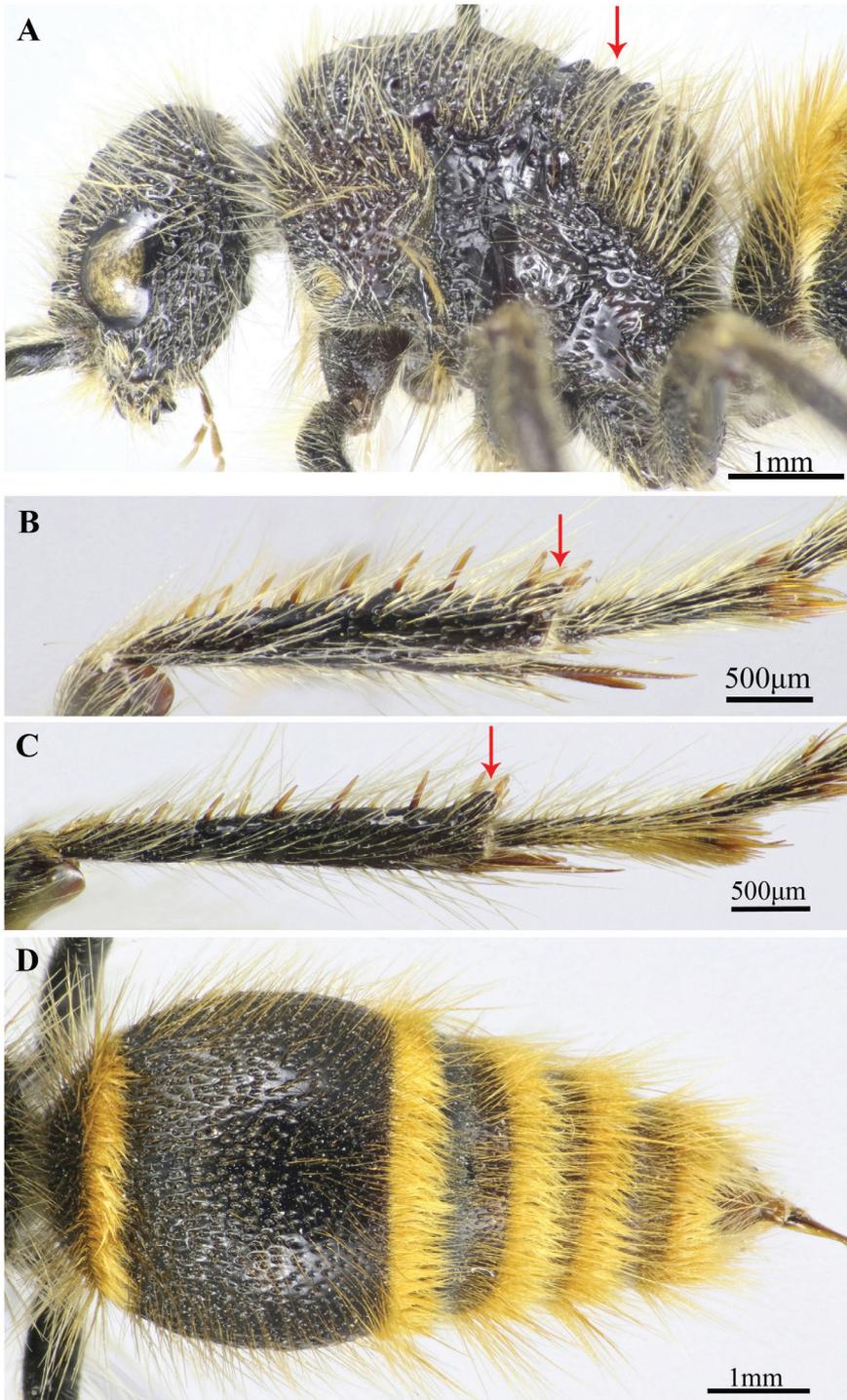


**Figure 6.** *Pseudophotopsis aurea* (Klug) (Female) **A, B** habitus, lateral and dorsal views, respectively.

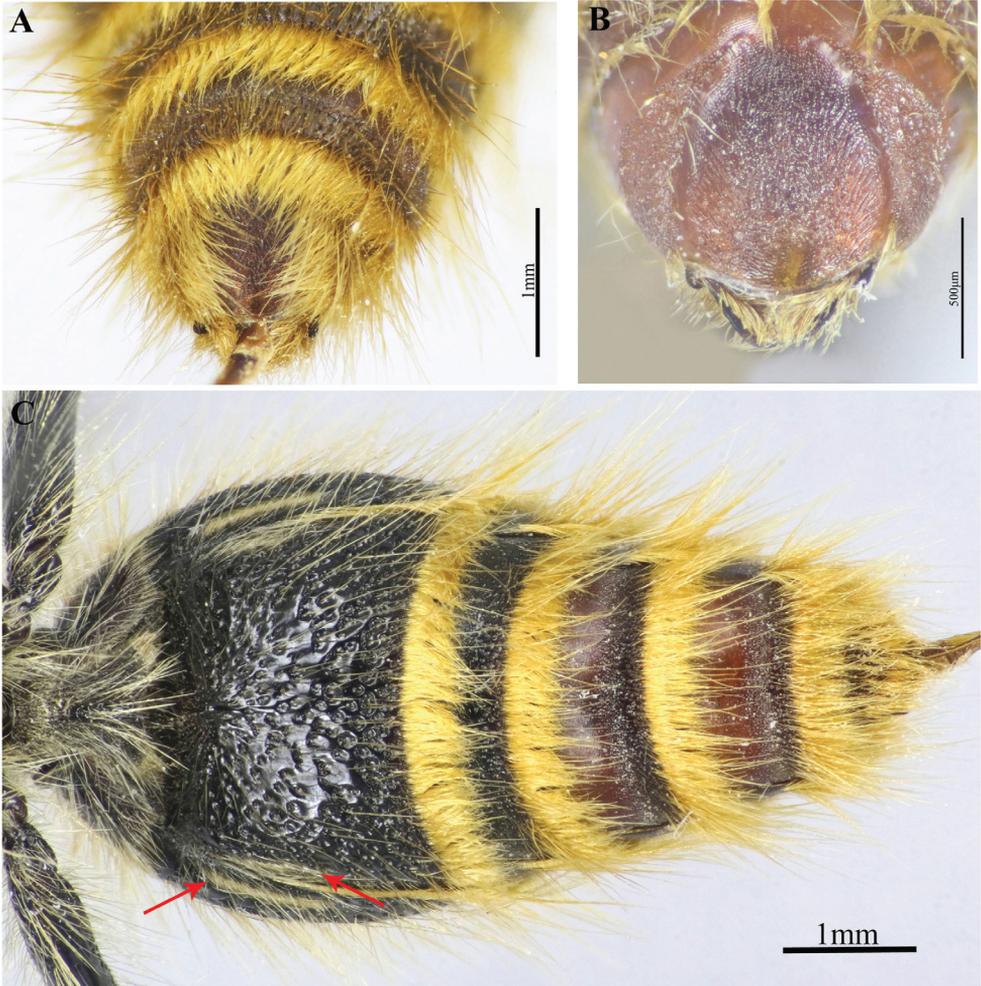
8A); propodeal dorsal face distinctly widened laterally, sharply declivitous posteriorly (truncate),  $0.50\text{--}0.55 \times$  as long as maximal width (Figs 7D; 8A); meso- and metapleura punctate (Fig. 8A); mid and hind tibiae with strong prolongation at their apices (Fig. 8B, C); hind tibia without a groove on inner face (Fig. 8C); T6 with oval-shaped pygidial area, finely rugose on disc and obliquely striate laterally (Fig. 9B).



**Figure 7.** *Pseudophotopsis aurea* (Klug) (Female) **A** head, frontal view **B** head and antennal scape, dorsal view **C** antenna (with only part of scape) **D** mesosoma, dorsal view.



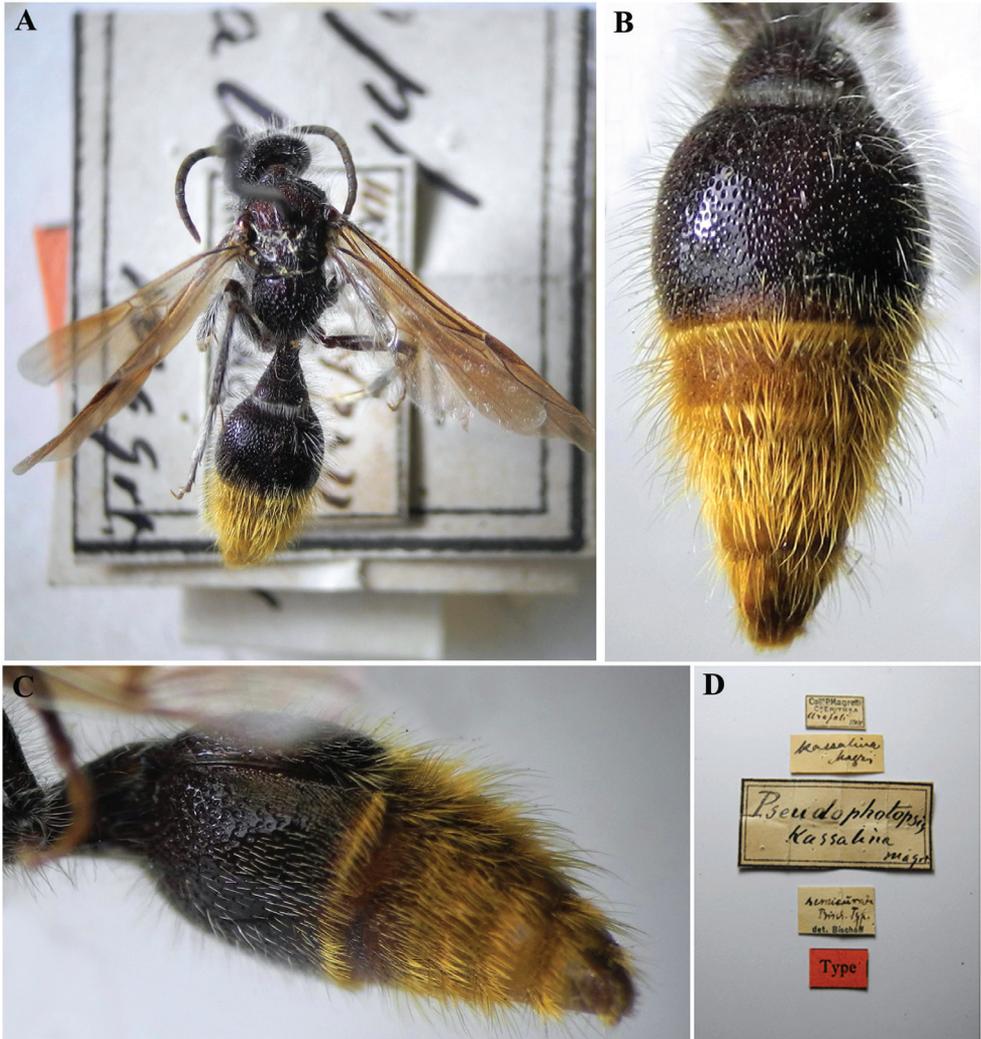
**Figure 8.** *Pseudophotopsis aurea* (Klug) (Female) **A** head and mesosoma, lateral view (tubercles on propodeal dorsum indicated) **B, C** mid and hind tibiae and basitarsomeres, respectively (prolongation at the apices of mid and hind tibiae indicated) **D** metasoma, dorsal view.



**Figure 9.** *Pseudophotopsis aurea* (Klug) (Female) **A** T4–T6, dorsal view **B** T6 (after removing setae surrounding pygidial area) **C** metasoma, ventral view (felt lines on T2 and S2 indicated).

**Remarks.** Examination of *Pseudophotopsis kassalina* f. *semiaurata* Bischoff, 1920 (Fig. 10A–D), through a series of photos taken of the “type” specimen kept in MSNG, confirm synonymizing of this form with *P. aurea* (Klug) as proposed by Lo Cascio et al. (2012), and contributes to reinforcing the identity of the new *P. subaurea* described here. On the other hand, the same authors (2012) considered this form as unavailable infrasubspecific name according to the article 45.6.4 of ICZN, where Bischoff (1920) specified it as a form, but specified other taxa in the genus (e.g. *maura*) as subspecies, showing that he considered *semiaurata* to be infrasubspecific.

**Material examined.** 1♂ (Eritrea, Arafali), Leg. Magretti P. [“Holotype” of *P. kassalina* f. *semiaurata* Bischoff, MSNG]; 1♂ (WY1), 11.x.2013, LT, leg. Rasool I. [KSMA]; 1♂ (WBQ), 04.xi.2013, LT, leg. Al-Dhafer et al. [KSMA]; 2♂ (SH5), 2♂ (SH6), 2♂ (SH7), 1♂ (SH8), 21.iv.2014, LT, leg. Al-Dhafer et al. [KSMA]; 1♂



**Figure 10.** *Pseudophotopsis aurea* (Klug) (“Holotype” male of *P. kassalina* f. *semiaurata* Bischoff (MSNG)) **A** habitus, dorsal view **B** metasoma, dorsal view **C** metasoma, latero-ventral view **D** labels.

(SH5), 6♂ (SH8), 3.vi.2014, LT, leg. Al-Dhafer et al. [KSMA]; 1♀ (SH5), 1♀ (SH8), 5.vi.2014, PT, leg. Al-Dhafer et al. [KSMA]; 1♂ (GR1), 1♂ (GR2), 8.vi.2014, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (GR2), 26.viii.2014, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (WR2), 20.x.2014, LT, leg. Al-Harbi M. & Rasool I. [KSMA]; 1♂ (WN2), 10.xii.2014, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (SH5), 2♂ (SH6), 2♂ (SH7), 3.vi.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (SH8), 27.vii.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (GR3), 2♂ (GR4), 31.vii.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1♀ (GR2), 31.vii.2015, PT, leg. Al-Dhafer et al. [KSMA]; 1♂ (SH2), 1♂ (SH3), 1♂ (SH7), 2.ix.2015, LT, leg. Al-Dhafer et al. [KSMA]; 2♂ (SH2), 12.xi.2015, LT, leg.

Al-Dhafer et al. [KSMA]; 1♂ (SH5), 1♂ (SH6), 15.xi.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1♀ (SH1), 15.xi.2015, HP, leg. AMS [KSMA]; 1♂ (SH1), 14.xi.2015, LT, leg. Ahmed M. Soliman (AMS) [KSMA]; 1♂ (SH3), 18.xi.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ & 1♀ (SH4), 24.iii.2017, LT for ♂ and HP for ♀, leg. AMS [KSMA]; 1♂ (WM1), 4.iv.2017, LT, leg. AMS [KSMA]; 1♂ (Al-Sajid), 28.iv.2017, LT, leg. Abu-Elghiet U. & El-Sheikh T. [KSMA]; 1♀ (Al-Huseis), 28.iv.2017, PT, leg. Abu-Elghiet U. & El-Sheikh T. [KSMA]; 1♀ (Al-Mashoor), 29.iv.2017, PT, leg. Abu-Elghiet U. & El-Sheikh T. [KSMA]; 1♀ (WRY), 7.iv.2019, HP, leg. AMS [KSMA]; 1♂ (WM2), 11.iv.2019, LT, leg. AMS [KSMA]; 1♂ (WK), 12.iv.2019, LT, leg. AMS [KSMA].

**Distribution in the Arabian Peninsula.** Sana'a, Socotra and Ta'izz provinces (Yemen) (Lelej and van Harten 2006; Lo Cascio et al. 2012; Madl 2018); Al-Baha, Asir, Jazan, and Makkah regions (southwestern Saudi Arabia) (Fig. 1).

**Global distribution.** Djibouti, Eritrea, Ethiopia, Saudi Arabia, Somalia, Sudan, Yemen (Gadallah et al. 2020).

### *Pseudophotopsis binghami* Bischoff, 1920

Figure 35C, D

*Pseudophotopsis binghami* Bischoff, 1920: 96, (♂ holotype), "Perso-Baluch. Frontier" (Iran).

*Pseudophotopsis komarovii* subsp. *zarudnyi* Skorikov, 1935: 292, (♂), "Kerman, strana Sargad, Tshah-i-Zaman" (Iran). Junior subjective synonym of *Pseudophotopsis binghami* Bischoff, 1920 according to Lelej, 1985: 83.

**Diagnosis. Male.** Body length 8–17 mm. Head and mesosoma (including legs) brown; metasoma black, 1<sup>st</sup> segment entirely and S2–S7 lighter; flagellomeres light brown; fore wing hyaline, with brown veins. Head with prolonged temples, weakly convergent behind eyes; distance between posterior ocellus and posterior head margin longer than longitudinal posterior ocellus diameter; POD 2.1–2.5 × OOD; F1 slightly shorter than F2 (0.9 ×); basal lower mandibular tooth significantly bent downwards, distance between apex of lower tooth and upper mandibular ridge slightly longer than mandibular height at the base (see fig. 30 (8) in Lelej 1985); S2 with well developed median basal tubercle; T2 basally and laterally with small dense foveae, becoming sparse on disc (several diameters distance apart); cuspis of volsella narrow at tip (Fig. 35D); parapenial lobe slightly oblique inward, with broadly rounded apex (Fig. 35C); genital ventral lobe rather cylindrical, extending directly posteriorly, with broadly rounded apex (Fig. 35D). (Bischoff 1920; Lelej 1985).

**Female.** Unknown.

**Material examined.** No specimens examined.

**Distribution in the Arabian Peninsula.** Ash Sharqiyah South province (Oman) (Monks et al. 2019) (Fig. 1).

**Global distribution.** Central Asia, India, Iran, Oman (Gadallah et al. 2020).

***Pseudophotopsis dhofarensis* sp. nov.**

<http://zoobank.org/E1A86436-C79A-4F9E-AE08-5B74488C979C>

Figures 11–14; 33C, D

**Type material.** *Holotype* ♂, SULTANATE OF OMAN, Ayn Hamran (Taqah, Dhofar province) [17°05'51"N, 54°16'59"E, alt. 1097 m], 20.xi.2017, LT, leg. AMS [KSMA].

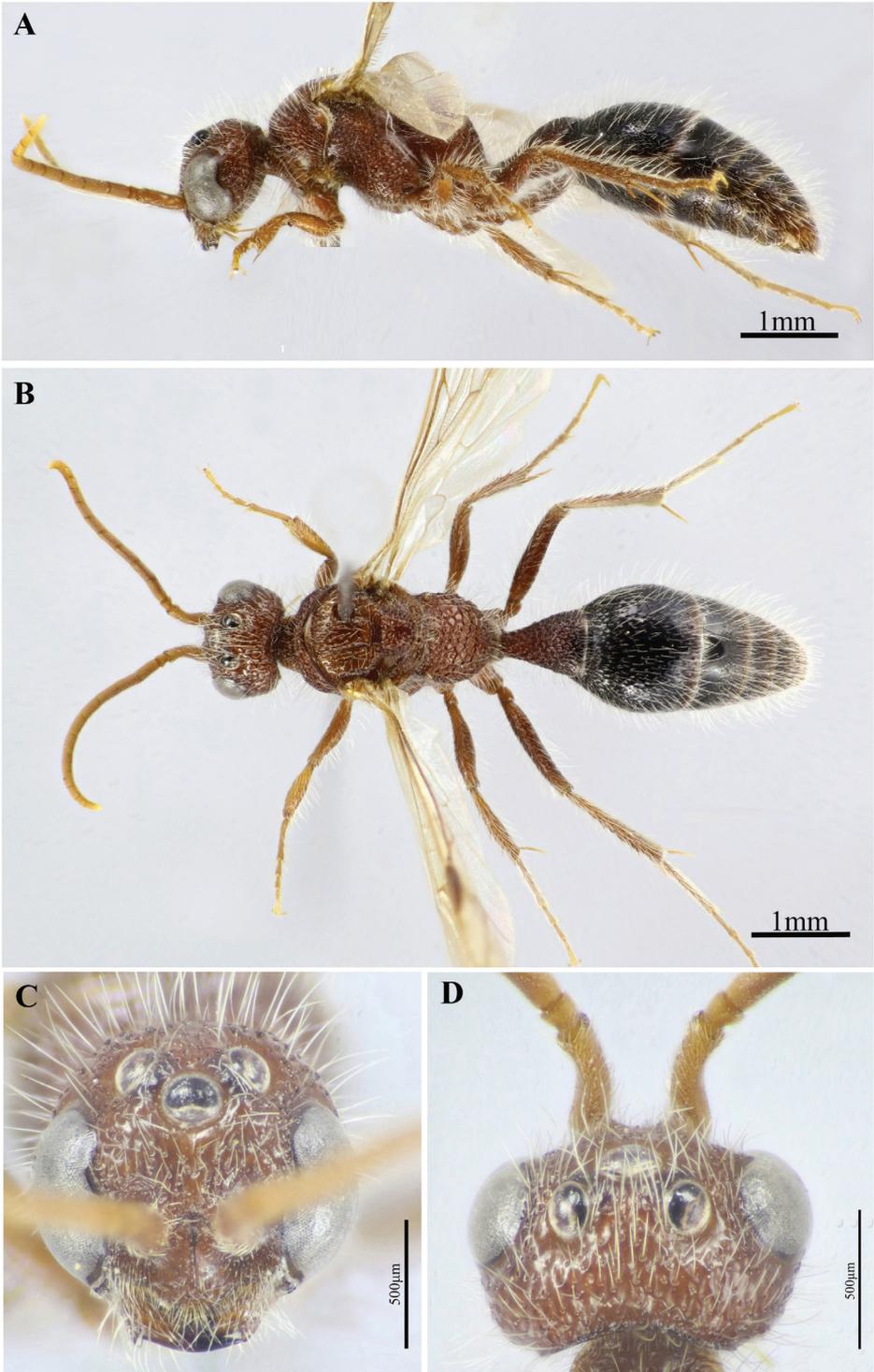
**Diagnosis. Male.** Distance between posterior ocellus and posterior head margin longer than longitudinal posterior ocellus diameter (1.8 ×) (Fig. 11D); distance between apex of lower mandibular tooth and upper mandibular ridge distinctly less than mandibular height at base (0.73 ×) (Fig. 12C); metanotal horns weakly developed, short, slightly longer than wide (1.15 ×), parallel (Fig. 12D); T1 rather long, 1.3 × as long as its maximal width (Fig. 14A); second metasomal segment with apical fringe of sparse fine white setae (Fig. 14A, B); lateral felt line on T2 about 0.85 × as long as distance between felt line and posterior tergal margin (Fig. 14C); S2 without median basal tubercle (Fig. 14B, C); genitalia with ventral lobes strongly bent inward, with outer margins strongly convex and apices directed posteriorly (Fig. 33C, D).

**Description of male holotype.** Body length 9.5 mm. *Color* (Figs 11A–C; 12B, C; 14B, D). Head, mesosoma, and first metasomal segment reddish-brown, T1 darkened at posterior margin; metasomal segments 2–6 blackish-brown to black, with posterior margins narrowly more or less yellow; last metasomal segment yellowish-brown, T7 lighter than S7 and S8 (hypopygium); antenna, palps, basal two-thirds of mandible, tegula and fore leg testaceous; mid and hind legs reddish-brown; apical third of mandible polished-chestnut colored, basal lower mandibular tooth darkened. Wings hyaline with yellowish-brown veins, pterostigma and Sc+R vein brown.

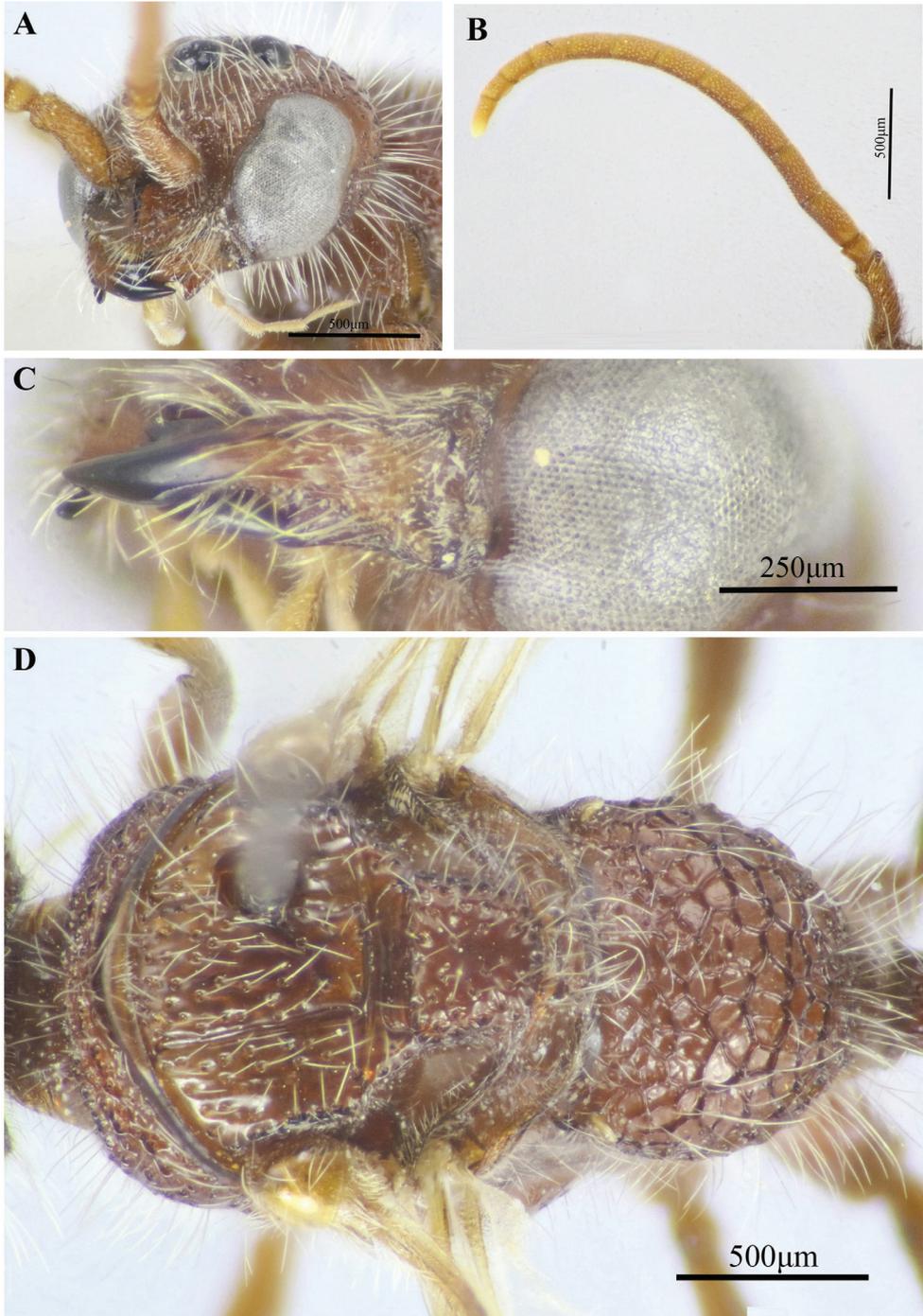
**Setation** (Figs 11C, D; 12A, C, D; 13A; 14A–D). Body including legs and basal third of mandible clothed with long erect white setae mixed with short suberect to recumbent setae on metasomal segments 2–7; T2 and S2 with apical fringes of sparse (not compact) white fine setae.

**Head** (Figs 11C, D; 12A–C). Densely setiferous punctate; head height (from free clypeal margin to vertex) 0.94 × maximal width; POD 2 × OOD; distance between posterior ocellus and posterior head margin 2 × as long as longitudinal posterior ocellus diameter; vertex broadly emarginate posteriorly; clypeus with well developed, lamellate, longitudinal median carina; distance between apex of mandibular lower tooth and upper mandibular ridge about 0.73 × as long as mandibular height at the base, subapically with two teeth, preapical tooth extremely small; pedicel as long as wide, 0.52 × as long as F1; F1 1.8 × as long as wide, as long as F2 and F3.

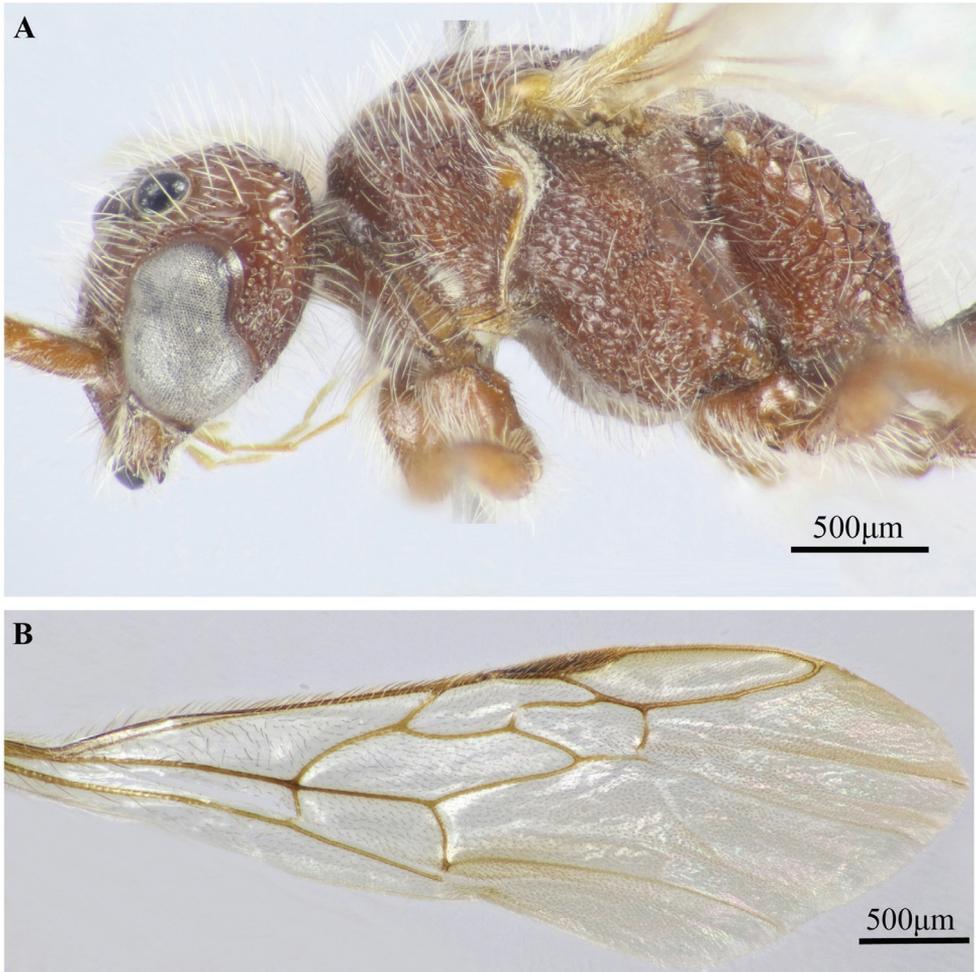
**Mesosoma** (Figs 12D; 13A). In dorsal view 1.8 × as long (excluding pronotal flange) as its maximal width; pronotal dorsal face setiferous foveate-reticulate, except for smooth and polished posterior margin, with humeral angles gently rounded, and lateral face horizontally carinulate near posterior margin; mesoscutum sparsely setiferous punctate, with complete notauli slightly diverging anteriorly; scutellum smooth on disc, densely setiferous foveolate laterally; metanotal horns short, parallel, scarcely longer than wide (1.15 ×); propodeum setiferous areolate, gently sloping posteriorly; mesopleuron foveate-reticulate, except the smooth posterior margin of mesepimeron.



**Figure 11.** *Pseudophotopsis dhofarensis* sp. nov. (Male) **A, B** habitus, lateral and dorsal views, respectively **C** head, frontal view **D** head, antennal scape and pedicel, dorsal view.



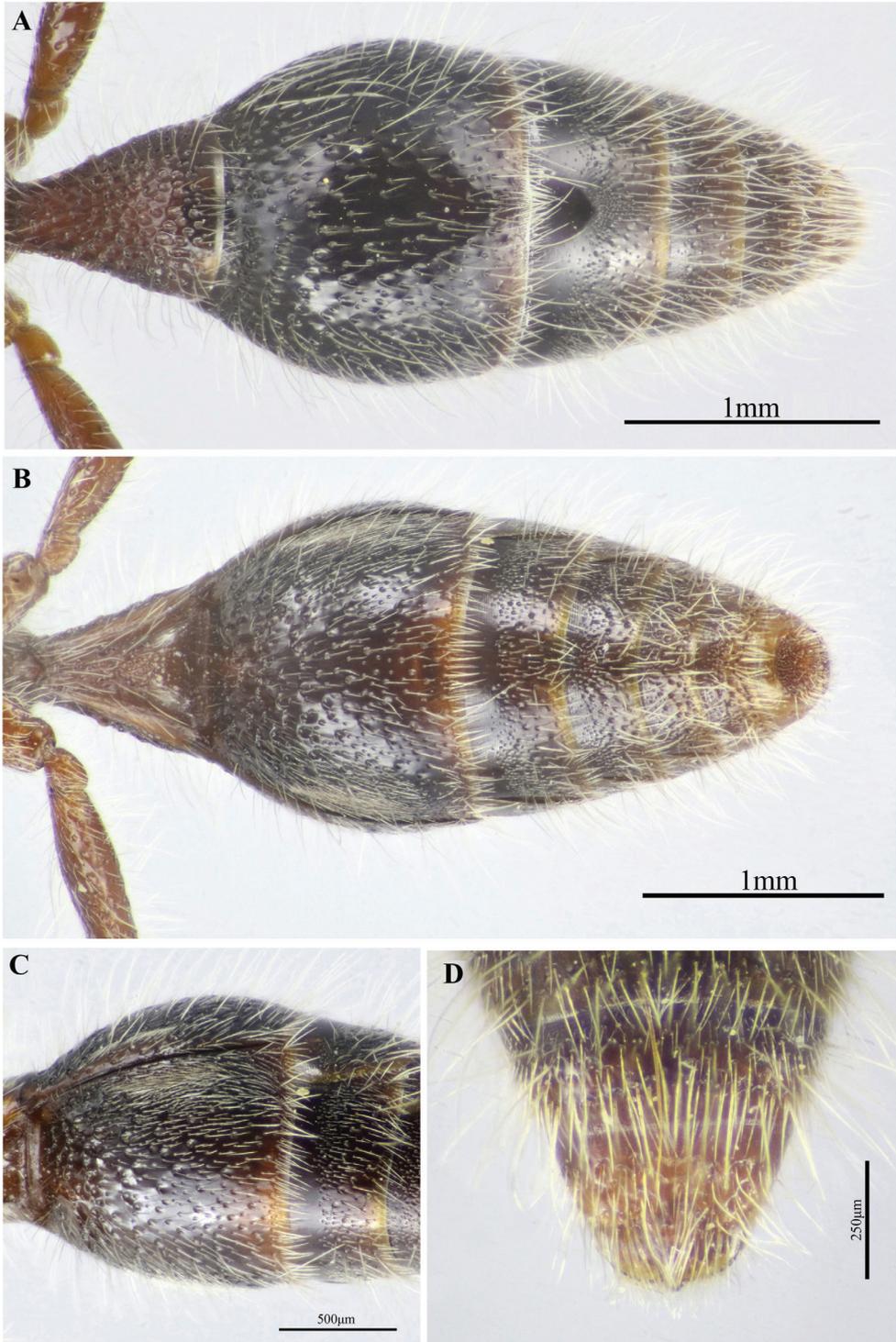
**Figure 12.** *Pseudophotopsis dhofarensis* sp. nov. (Male) **A** head, fronto-lateral view **B** antenna **C** mandible, lateral view **D** mesosoma, dorsal view.



**Figure 13.** *Pseudophotopsis dhofarensis* sp. nov. (Male) **A** head and mesosoma, lateral view **B** right fore wing.

**Fore wing** (Fig. 13B). Cell 2R1  $1.9 \times$  as long as pterostigma, with rounded apex; anterior margin of 2R1  $1.5 \times$  as long as pterostigma; first discal cell (1M) about  $0.75 \times$  as long as 2R1; 3<sup>rd</sup> abscissa of Rs as long as crossvein r-rs; vein 1M convex.

**Metasoma** (Fig. 14A–D). T1  $1.3 \times$  as long as maximal width, setiferous foveate-reticulate; T2  $0.9 \times$  as long as its maximal width, densely setiferous foveate laterally mixed with small punctures, sparsely setiferous punctate basally and on disc, puncticulate along posterior margin, with polished interspaces between punctures; length of lateral felt line on T2 less than distance between felt line and posterior tergal margin ( $0.85 \times$ ); T3–T7 and S3–S6 setiferous punctulate (T7 with vague longitudinal median polished ridge); S2 foveate, foveae mixed with dense fine punctures, especially on sides; S2 without median basal tubercle; S8 (hypopygium) with median apical small tubercle.



**Figure 14.** *Pseudophotopsis dhofarensis* sp. nov. (Male) **A, B** metasoma, dorsal and ventral views, respectively **C** 2<sup>nd</sup> and 3<sup>rd</sup> metasomal segments, ventro-lateral view **D** T6–T7, dorsal view.

**Genitalia** (Fig. 33C, D). Cuspis of volsella narrow, digitate, not reaching apex of paramere, with few long setae; parapenial lobe oblique inward, with broadly rounded apex; ventral lobe extremely bent inward, having apex directed anteriorly, with strongly convex outer edge and serrulate inner edge.

**Female.** Unknown.

**Recognition.** The new species, *P. dhofarensis*, resembles the Asian species, *P. caucasica* (Radoszkowski, 1885), in having the fore wing with yellow veins, S2 without a median basal tubercle, and T2 with the lateral felt line shorter than the distance between the felt line and the posterior tergal margin. However, it differs from *P. caucasica* in the following aspects: the distance between the posterior ocellus and posterior head margin  $2 \times$  as long as the longitudinal posterior ocellus diameter (Fig. 11D) (this distance slightly larger than the longitudinal posterior ocellus diameter in *P. caucasica*); cuspis of volsella narrow, digitate, not reaching apex of paramere (Fig. 33C, D) (somewhat broad, reaching apex of paramere in *P. caucasica* (see fig. 32(3) in Lelej 1985); genital ventral lobe extremely bent inward, with a strongly convex outer edge and an apex directed anteriorly (Fig. 33C) (this lobe only slightly bent inward, with the outer edge nearly straight, and an apex directed posteriorly in *P. caucasica* (see fig. 32(3) in Lelej 1985).

**Etymology.** The new species, *P. dhofarensis*, is named after Dhofar province (Oman) where the holotype male specimen was collected.

**Distribution in the Arabian Peninsula.** Dhofar province (Oman) (Fig. 1).

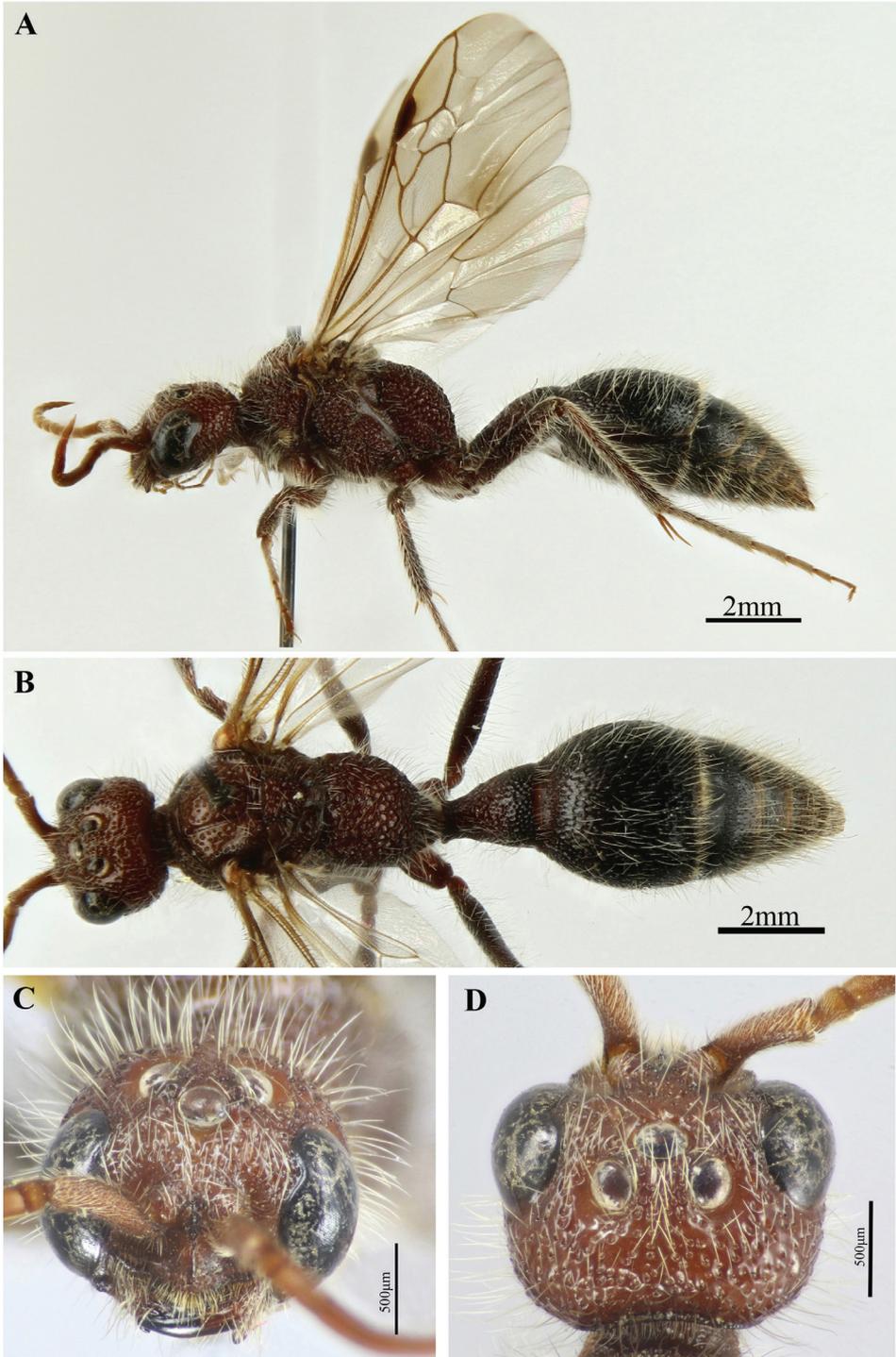
### *Pseudophotopsis mascatiana* Invrea, 1962

Figures 15–22; 34A, B

*Pseudophotopsis mascatiana* Invrea, 1962: 324, (♂ holotype), “Migiurtinia” (Somalia).

**Diagnosis. Male** (Figs 15–17; 34A, B). Body length 8.8–16 mm. Metasomal segments darkened, at most 7<sup>th</sup> segment yellowish-brown to red (Fig. 17B, C); fore wing slightly infusate on distal half, with brown veins (Sc+R and pterostigma darker) (Fig. 17A); antennal flagellomeres more or less light brown (Fig. 16A). Distance between apex of lower mandibular tooth and upper mandibular ridge less than mandibular height at base (about  $0.85 \times$ ) (Fig. 16B); POD  $1.3\text{--}1.6 \times$  OOD (Fig. 15D); metanotal horns well developed, distinctly longer than wide (about  $1.5 \times$ ) (Fig. 16C); T1 distinctly long, about  $1.45\text{--}1.65 \times$  as long as maximal width (Fig. 15B); lateral felt line on T2 about  $0.6\text{--}0.75 \times$  as long as distance between felt line and posterior tergal margin; S2 with extremely small median basal tubercle (mostly absent) (Fig. 17C); parapenial lobe slightly oblique inward, with subrounded apex (Fig. 34A); genital ventral lobes at most oblique inward, with outer margin obtusely angulate (Fig. 34B).

**Female** (Figs 18–22). Body length 10.8–16.5 mm. Anterior ocellus absent, only a pair of poorly developed posterior ocelli present (Fig. 19B); distance between apex of mandibular lower tooth and upper mandibular ridge  $0.86\text{--}0.88 \times$  as long as mandibular height at the base (Fig. 19D); F1 about  $1.2 \times$  as long as F2 (Fig. 20A); mesosomal



**Figure 15.** *Pseudophotopsis mascatiana* Invrea (Male) **A, B** habitus, lateral and dorsal views, respectively **C** head, frontal view **D** head and antennal scape, dorsal view.

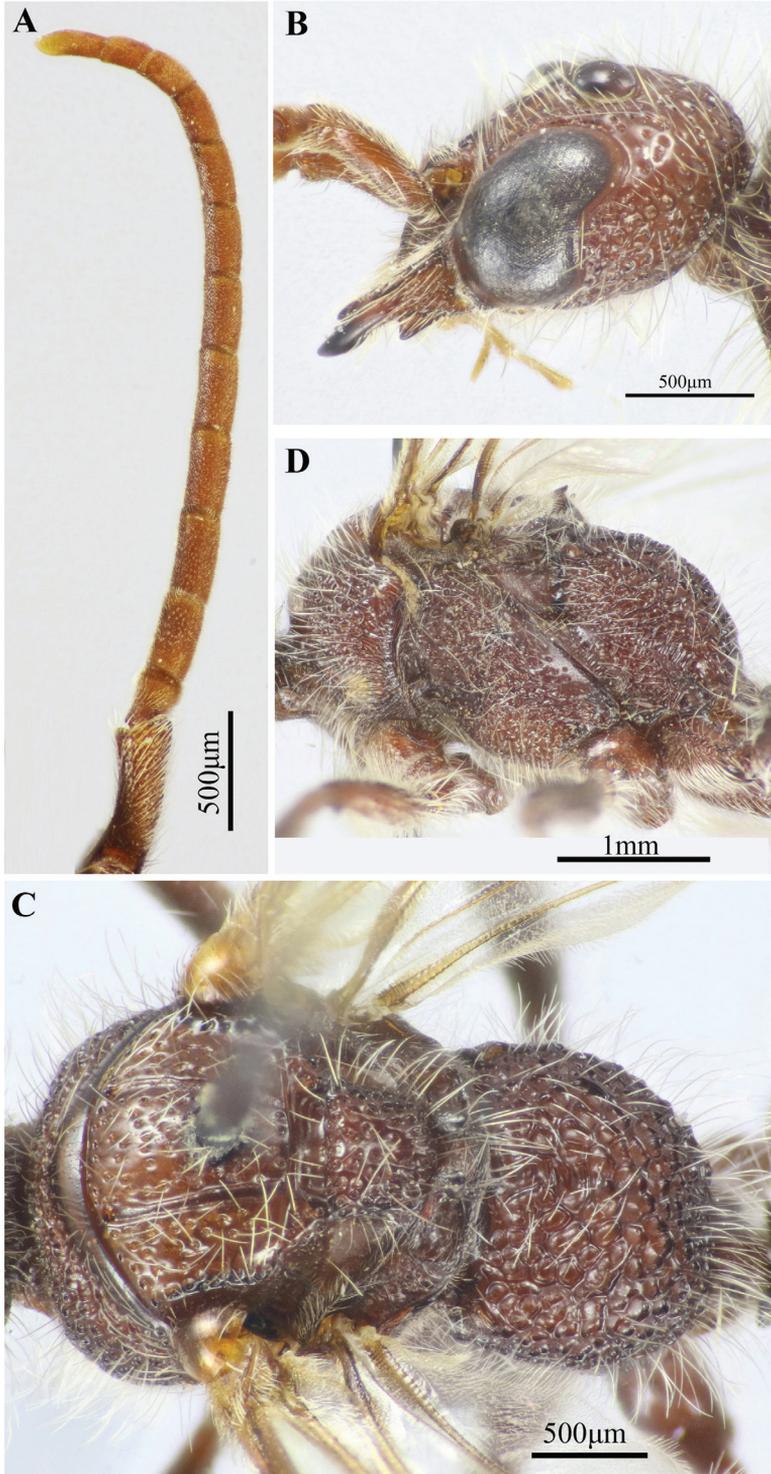
dorsum regularly punctate, with interspaces between punctures ridged but not tuberculate (smooth), clothed with long erect to suberect golden setae (Fig. 20B, C); pronotal dorsal face (excluding anterior flange) gently declivitous antero-medially, with convex anterior border (Fig. 20B); propodeal dorsal face gently declivitous (rounded) posteriorly,  $0.70\text{--}0.77 \times$  as long as maximal width (Fig. 20B); meso- and metapleura mostly smooth (with scattered fine punctures) (Fig. 20C); mid and hind tibiae without prolongation at their apices (Fig. 21A, B); hind tibia with narrow shallow groove extending along inner face (Fig. 21B); T1–T5 and S2–S5 with apical fringe of compact golden setae (Figs 18A, B; 21C, D); T2 densely punctate, punctures 1–2 diameters apart (Fig. 21C); T6 with bell-shaped, finely wrinkled pygidial area (Fig. 22B).

**Description of female (hitherto unknown) allotype (Figs 18–22).** Body length 10.8 mm. *Color* (Figs 18A, B; 19A, D; 20A; 21D). Head (including antennal scape, pedicel and F1 and basal third of mandible) and mesosoma (including legs) dark red (mid and hind legs darker); remaining flagellomeres light brown, F11 yellowish apically; mandible black apically; metasomal terga black (except blackish-red T6), sterna blackish-red to black.

**Setation** (Figs 18A, B; 19A–D; 20C; 21C, D; 22A). Head (including scape, pedicel and F1 of antenna and basal third of mandible), pronotal lateral face, meso- and metapleura, legs, T1 and S1–S2 clothed with long erect white setae; mesosomal dorsum and T2–T5 with long erect to suberect golden setae; T1–T5 and S2–S5 with apical fringe of extremely dense (compact) golden setae, paler on sterna.

**Head** (Figs 18B; 19A–D; 20A). In dorsal view, subquadrangular, scarcely narrower than pronotum, convergent behind eyes, with broadly rounded temple; head height slightly greater than width; only a pair of poorly developed posterior ocelli present, anterior ocellus absent; frons, vertex, and gena densely setiferous foveate, interspaces between foveae thick (ridged) without tubercles; eye rather oval-shaped, widely separated from mandibular articulation (malar space about  $0.85 \times$  mandibular basal height); scrobal carina well developed, polished and thick; clypeal longitudinal median carina ridged, free margin with a pair of small tubercles; mandible with strong subbasal lower tooth, distance between apex of tooth and upper mandibular ridge about  $0.86 \times$  as long as mandibular height at base, subapically with distinctly small inner tooth. F1  $1.7 \times$  as long as maximal width,  $1.2 \times$  as long as F2, hardly longer than F3 ( $1.1 \times$ ).

**Mesosoma** (Figs 20B, C; 21A, B). Dorsum regularly setiferous punctate, with interspaces between punctures ridged and polished, not tuberculate; pronotal dorsal face slightly wider than propodeum ( $1.15 \times$ ), rather gently declivitous anteromedially, with slightly convex anterior border and broadly rounded humeral angles; pronotal lateral face foveate-reticulate; promesonotal suture gently arched; mesonotum suddenly contracted behind pronotum (about  $0.75 \times$  as wide as pronotum), with posterior suture nearly straight; propodeal dorsal face about  $0.77 \times$  as long as maximal width, subparallel at sides, gently declivitous (rounded) posteriorly; propodeal posterior face foveate-reticulate (interspaces between foveae not tuberculate); meso- and metapleura shiny, mostly smooth (with scattered fine punctures), mesepisternum with vertical row of close foveae on ventral half of strong mesopleural ridge; mid and hind tibiae



**Figure 16.** *Pseudophotopsis mascatiana* Invrea (Male) **A** antenna **B** head and antennal scape, lateral view **C, D** mesosoma, lateral and dorsal views, respectively.



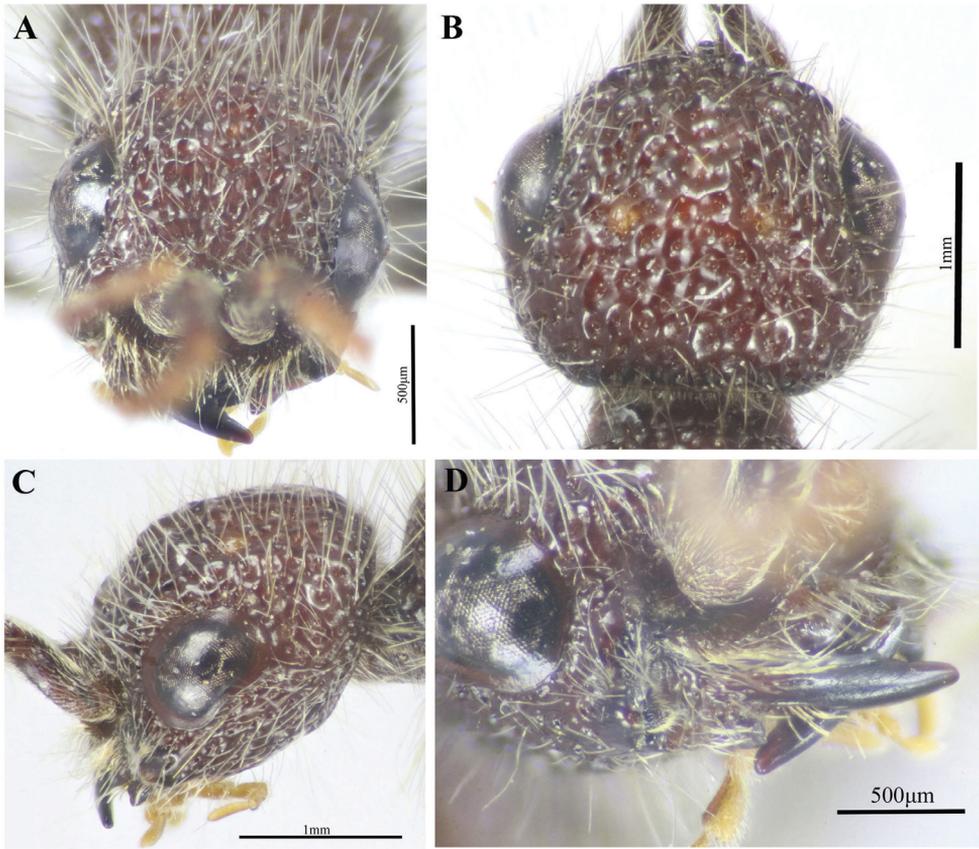
**Figure 17.** *Pseudophotopsis mascatiana* Invrea (Male) **A** right fore wing **B, C** metasoma, dorsal and ventral views, respectively.

with a double row of 5–7 strong spines on outer faces, both tibiae without prolongation at their apices; hind tibia with longitudinal narrow and shallow groove extending along inner face.



**Figure 18.** *Pseudophotosis mascatiana* Invrea (Female) **A, B** habitus, lateral and dorsal views, respectively.

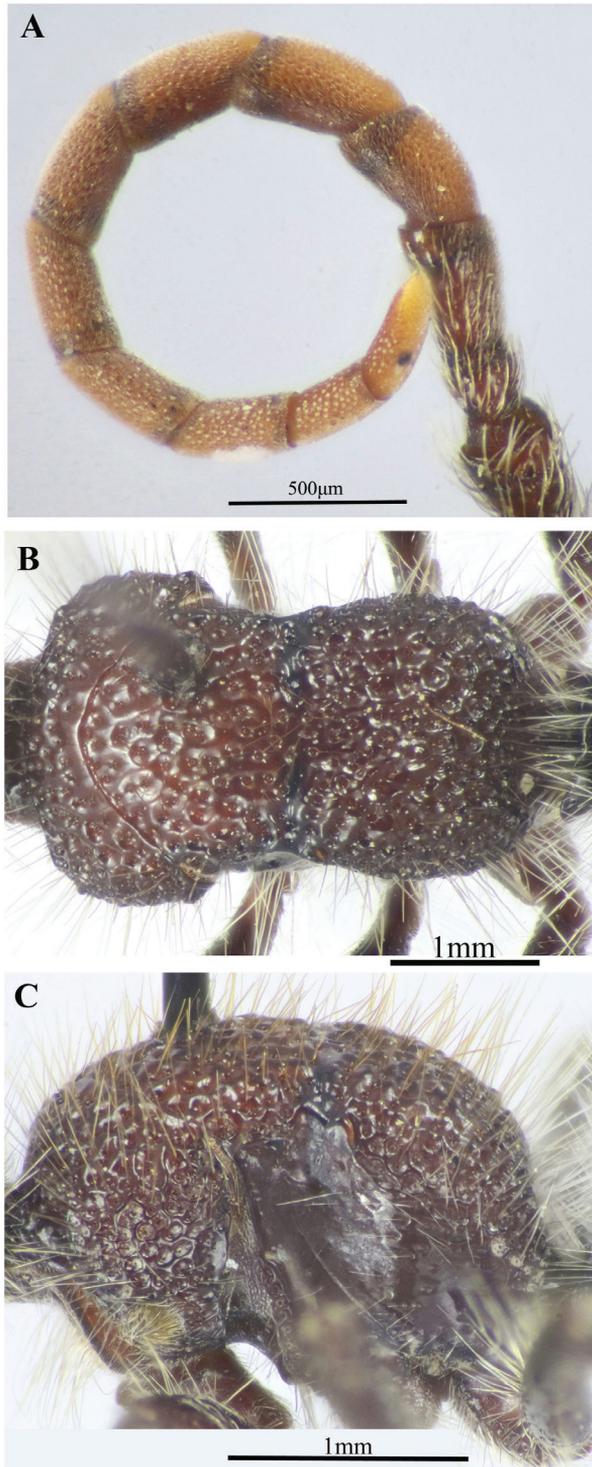
*Metasoma* (Figs 21C, D; 22A, B). Sessile; T1 without distinct dorsal face (sharply sloping forward), wider than long (1.3 ×), densely finely punctate apically (punctures 1–2 diameters apart), sparsely punctate at the base; T2 densely punctate throughout (punctures larger than those on T1, 1–2 diameters apart); exposed parts of T3–T5 finely punctate; T6 nearly entirely covered with long golden setae arising from apical fringe of T5 and laterally on T6 (removal of setae shows finely wrinkled, bell-shaped



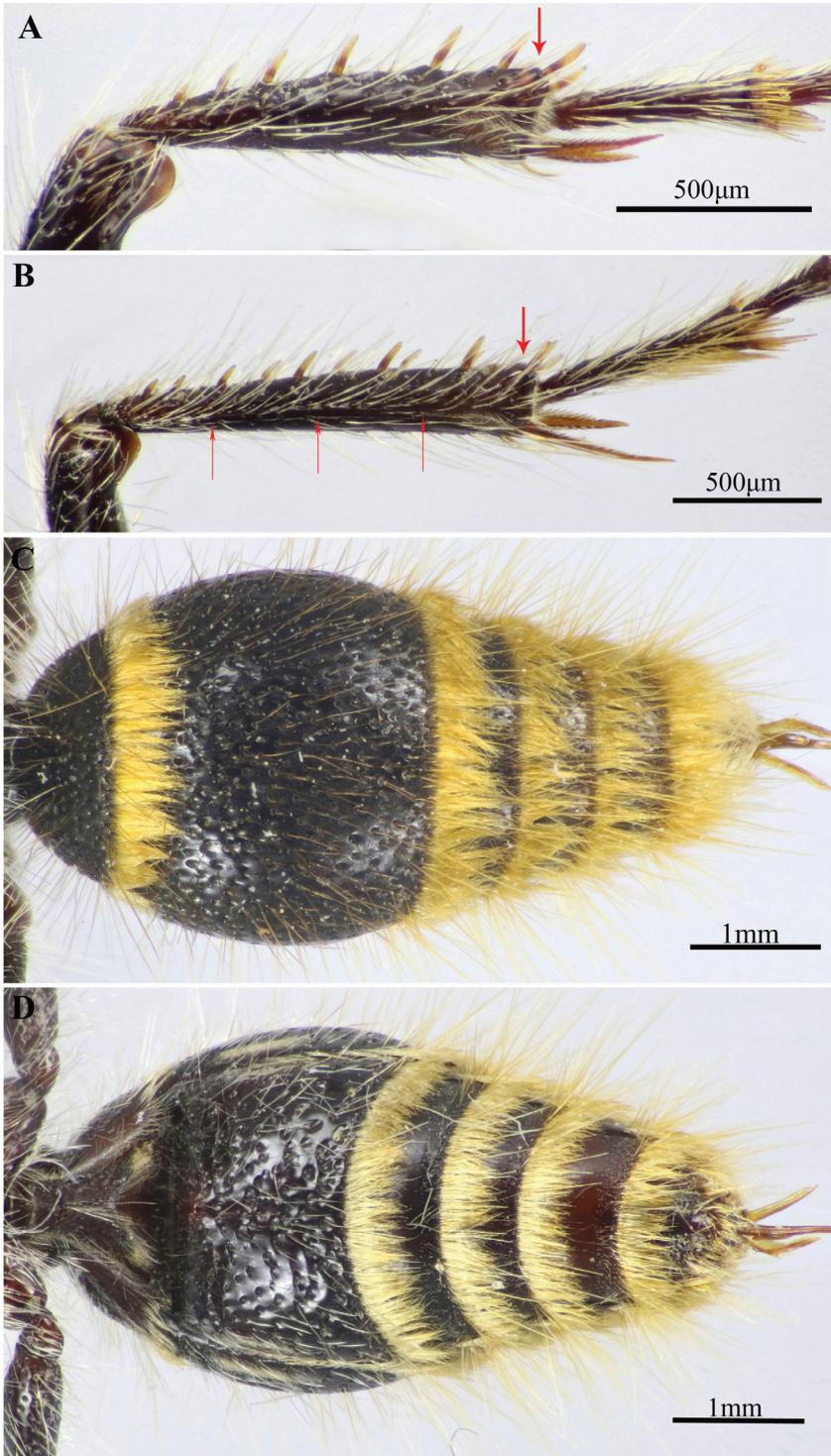
**Figure 19.** *Pseudophotopsis mascatiana* Invrea (Female) **A–C** head, frontal, dorsal and lateral views, respectively **D** mandible, fronto-lateral view.

pygidial area of T6); S1 with strongly elevated inverted Y-shaped carina; S2 densely punctate, basally with large median tubercle.

**Material examined (174 males, 11 females).** 1 ♀ (WM2), 11.iv.2019, HP, leg. AMS [KSMA]; 1 ♂ (JB), 10.ix.1983, leg. Buttiker W. [NMB]; 1 ♂ (Al-Wesam), 11.x.2010, leg. AlDhafer et al. [allotype KSMA]; 2 ♂ (Al-Shafa), 12.x.2010, LT, leg. Al-Dhafer et al. [KSMA]; 1 ♀ (GR2), 1 ♀ (GR3), 8.iv.2014, PT, leg. Al-Dhafer et al. [KSMA]; 2 ♂ (SH6), 1 ♂ (SH7), 21.iv.2014, LT, leg. Al-Dhafer et al. [KSMA]; 6 ♂ (GR1), 24.iv.2014, LT, leg. Al-Dhafer et al. [KSMA]; 8 ♂ (SH2), 2 ♂ (SH5), 2 ♂ (SH6), 6 ♂ (SH7), 3.vi.2014, LT, leg. Al-Dhafer et al. [KSMA]; 18 ♂ (GR1), 12 ♂ (GR2), 3 ♂ (GR3), 8.vi.2014, LT, leg. Al-Dhafer et al. [KSMA]; 4 ♂ (GR1), 1 ♂ (GR2), 1 ♂ (GR6), 26.viii.2014, LT, leg. Al-Dhafer et al. [KSMA]; 2 ♂ (GR1), 1 ♂ (GR3), 20.x.2014, LT, leg. Al-Dhafer et al. [KSMA]; 1 ♂ (WK), 30.x.2014, LT, leg. Al-Harbi M. & Rasool I. [KSMA]; 1 ♀ (SH7), 26.i.2015, PT, leg. Al-Dhafer et al. [KSMA]; 1 ♂ (SH2), 27.i.2015, LT, leg. Al-Dhafer et al. [KSMA]; 2 ♀ (SH3), 1 ♀ (SH8), 2.iii.2015, PT, leg.



**Figure 20.** *Pseudophotopsis mascatiana* Invrea (Female) **A** antenna (only part of scape) **B, C** mesosoma, dorsal and lateral views, respectively.



**Figure 21.** *Pseudophotopsis mascatiana* Invrea (Female) **A, B** mid and hind tibiae and basitarsomeres, respectively (apices of mid and hind tibiae indicated) **C, D** metasoma, dorsal and ventral views, respectively.



**Figure 22.** *Pseudophotopsis mascatiana* Invrea (Female) **A** T4–T6, dorsal view **B** T6 (after removing setae surrounding pygidial area).

ElTorkey et al. [KSMA]; 1 ♀ (SH8), 3.v.2015, PT, leg. Al-Dhafer et al. [KSMA]; 1 ♂ (SH3), 4 ♂ (SH5), 5.v.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1 ♂ (GR2), 7.v.2015, LT, leg. Al-Dhafer et al. [KSMA]; 5 ♂, (WY2), 22.v.2015, LT, leg. AMS [KSMA]; 1 ♂ (Al-Soudah), 23.v.2015, LT, leg. AMS [KSMA]; 3 ♂ (SH2), 2 ♂ (SH5), 1 ♂ (SH6), 1 ♂ (SH7), 2 ♂ (SH8), 27.vii.2015, LT, leg. Al-Dhafer et al. [KSMA]; 5 ♂ & 1 ♀ (GR1), 1 ♂ (GR2), 4 ♂ & 1 ♀ (GR3), 10 ♂ (GR4), 1 ♂ (GR5), 31.vii.2015, LT for males PT for females, leg. Al-Dhafer et al. [KSMA]; 1 ♂ (SH3), 1 ♂ (SH6), 1 ♂ (SH7), 1 ♂ (SH8), 2.ix.2015, LT, leg. Al-Dhafer et al. [KSMA]; 2 ♂ (GR1), 1 ♂ (GR2), 1 ♂ (GR3), 1 ♂ (GR4), 5.ix.2015, LT, leg. Al-Dhafer et al. [KSMA]; 5 ♂ (SH1), 3 ♂ (SH2), 4 ♂ (SH5), 1 ♂ (SH8), 14.xi.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1 ♂ (WN1), 15.xi.2015, LT, leg. AMS [KSMA]; 1 ♂ (GR1), 3 ♂ (GR2), 1 ♂ (GR4), 18.xi.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1 ♂ (Wadi Mashwas), 20.xi.2015, LT, leg. AMS [KSMA]; 3 ♂ (WM1), 16.iv.2016, LT, leg. AMS [KSMA]; 1 ♂ (WBD), 19.x.2016, LT, leg. AMS [KSMA]; 1 ♂ & 1 ♀ (WM2), 11.iv.2019, LT for ♂ and HP for ♀, leg. AMS [KSMA]; 1 ♂ (WK), 12.iv.2019, LT, leg. AMS [KSMA].

**Remarks.** Prior to the present study, *P. mascatiana* was known only from males and restricted in its distribution to the Afrotropical region in Somalia and Yemen (Lelej and van Harten 2006). Here this species is recorded from Saudi Arabia with discovery of the opposite sex (female) for the first time. The sex association is based on the overlapping distribution areas of males and females (frequently both sexes were collected from the same locality at the same time or within a short period) (Fig. 2), and the general color pattern in both sexes. On the other hand, there is another species, *P. aurea*, common to southwestern Saudi Arabia and known from both sexes; the females of these two species are similar in having T1–T5 and S2–S5 with apical fringes of compact golden setae; however, *P. mascatiana* differs from *P. aurea* in the following aspects: the head and mesosoma are dark red (Fig. 18A, B) (they are dark brown with slight reddish tint in *P. aurea* (Fig. 6A, B)); the frons and vertex with smooth (not tuberculate) ridges between the foveae (Fig. 19A, B) (with coarsely tuberculate ridges between the foveae in *P. aurea* (Fig. 7A, B)); the anterior ocellus is absent, only a pair of poorly developed posterior ocelli being present (Fig. 19A, B) (three well developed ocelli are present in *P. aurea* (Fig. 7A, B)); the mesosomal dorsum is clothed with golden setae, regularly punctate, with smooth (not tuberculate) ridges between the punctures (Fig. 20B, C) (in *P. aurea* the mesosomal dorsum clothed with pale (yellowish-white) setae, coarsely foveate, with ridges between foveae tuberculate (Figs 7D; 8A)); the pronotal dorsal face gently declivitous antero-medially, with a convex anterior border (Fig. 20B) (sharply declivitous antero-medially, with a straight anterior border in *P. aurea* (Fig. 7D)); the propodeal dorsal face is subparallel at its sides, gently declivitous (rounded) posteriorly, and 0.70–0.77 × as long as its maximal width (Fig. 20B, C) (in *P. aurea* the propodeal dorsal face is strongly expanded at the sides, sharply declivitous (truncate) posteriorly, and 0.50–0.55 × as long as its maximal width (Figs 7D; 8A)); meso- and metapleura are mostly smooth (Fig. 20C) (sparsely punctate in *P. aurea* (Fig. 8A)); the mid and hind tibiae lack prolongation at their apices, hind tibia with a groove extending along inner face (Fig. 21A, B) (the mid and hind tibiae with strong prolongation at their apices, hind tibia without such groove on inner face in *P. aurea* (Fig. 8B, C)); T6 with a

bell-shaped, finely wrinkled pygidial area (Fig. 22B) (T6 with an oval-shaped pygidial area that is minutely rugose on the disc and obliquely striate laterally (Fig. 9A, B)).

**Distribution in the Arabian Peninsula.** Sana'a, Dhamar, Amran, Ta'izz, and Al-Hudaydah (Yemen) (Lelej and van Harten 2006); Asir, Al-Baha, and Makkah regions (southwestern Saudi Arabia) (Fig. 2).

**Global distribution.** Somalia, Yemen (Gadallah et al. 2020); Saudi Arabia (new record).

### *Pseudophotopsis maura* Bischoff, 1920

Figures 23–28; 34C, D

*Pseudophotopsis kokpetica* subsp. *maura* Bischoff, 1920: 98, (♂), “Gabes” (Tunisia).

*Ephutomma continua* subsp. *aegyptiaca* Bischoff, 1920: 151, (♀), (Egypt). New synonymy.

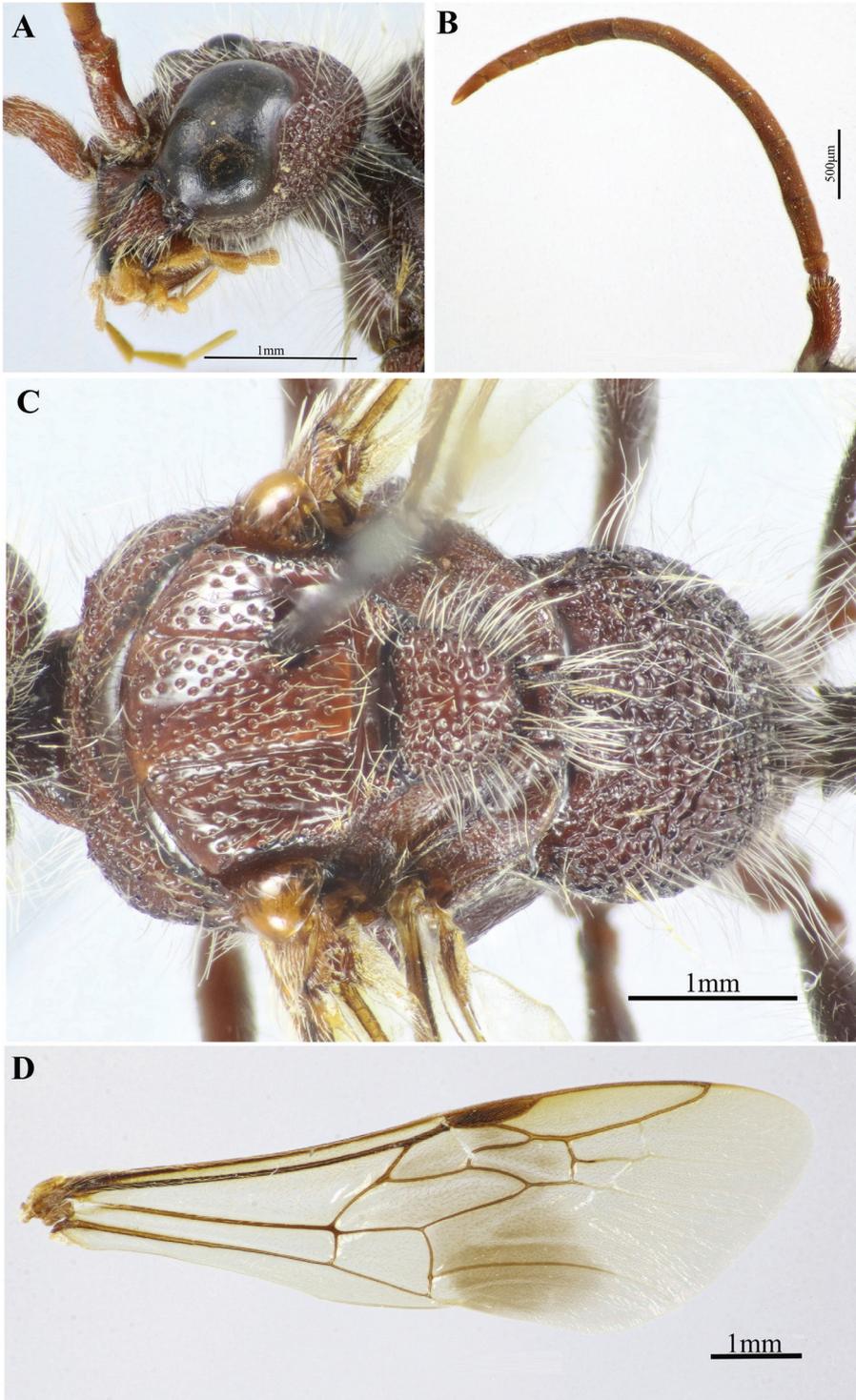
**Diagnosis. Male** (Figs 23–25; 34C, D). Body length 11–16.5 mm. Metasomal segments darkened, at most 7<sup>th</sup> segment yellowish-brown to red (Fig. 23A, B); antenna brown (Fig. 24B); fore wing hyaline, frequently with brownish tint around first cubital vein (Cu1) (Fig. 24D); POD 2.15–2.6 × OOD (Fig. 23D); head convergent behind eyes (Fig. 23D); distance between apex of lower mandibular tooth and upper mandibular ridge slightly longer than mandibular height at base (1.1–1.15 ×) (Fig. 24A); F1 as long as F2 (Fig. 24B); metanotal horns well developed, parallel to slightly diverging distally, distinctly longer than wide (about 1.5 ×) (Fig. 24C); T1 as long as maximal width or slightly shorter (Fig. 25A); lateral felt line on T2 nearly as long as distance between felt line and posterior tergal margin; S2 with small median basal tubercle (Fig. 25B); cuspis of volsella narrow apically, digitate, not reaching apex of paramere (Fig. 34D); parapenial lobe slightly oblique inward, with rounded apex (Fig. 34C); genital ventral lobe short, robust, oblique inward, with outer margin straight (Fig. 34D).

**Female** (Figs 26–28). Body length 13–18 mm. Head and mesosoma (including legs) dark red (Figs 26A, B; 27A, B, D); metasoma black, T6 with reddish tint (Figs 26A, B; 28A–D); flagellomeres bright red to orange, F9–F10 lighter (Fig. 27C). Propodeal disc, T2 and T3 with erect dark brown setae (Figs 27E; 28D); T1–T5 and S2–S5 with apical fringes of a belt of compact white setae (Fig. 28A–D). Distance between apex of mandibular lower tooth and upper mandibular ridge nearly as long as mandibular height at base; S2 with large median basal tubercle (Fig. 28D).

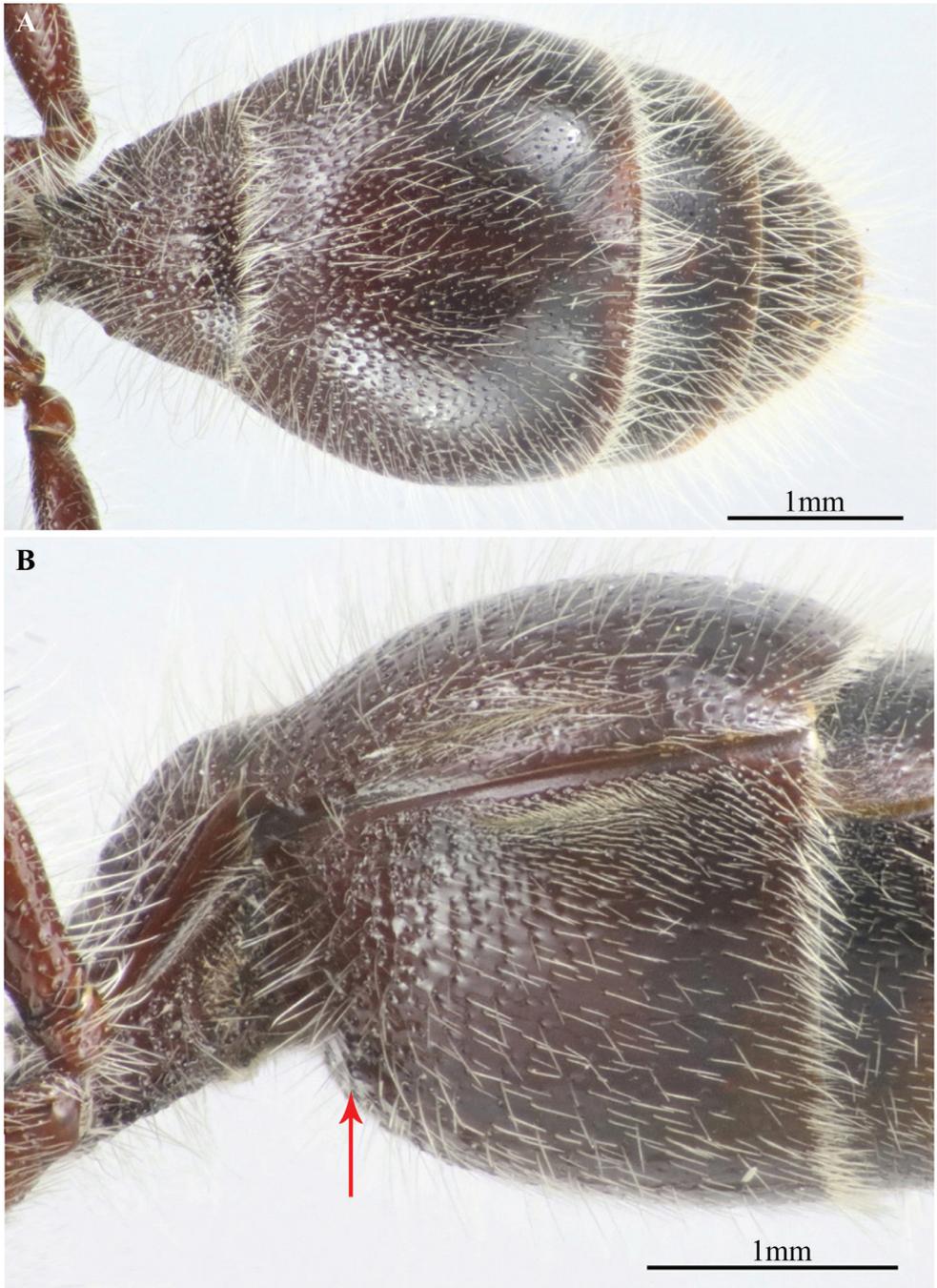
**Material examined (22 males, 8 females) from Saudi Arabia.** 1♂ (JA), 28.v.1987, leg. M. D. Gallagher [NMB]; 1♀ (IR2), 16.vi.2007, PT, leg. Al-Dryhim et al. [KSMA]; 1♀ (IR1), 5.xi.2007, PT, leg. Al-Dryhim et al. [KSMA]; 1♀ (Baljurashi), 17.v.2010, SW, leg. Al-Dhafer H. & El-Torkey A. [KSMA]; 1♀ (DS), 20.vi.2010, PT, Al-Dhafer et al. [KSMA]; 1♂ (KH1), 13.iv.2011, LT, leg. Al-Drahim et al. [KSMA]; 1♂ (KH2), 7.vi.2011, LT, leg. Al-Drahim et al. [KSMA]; 1♂ (KH1), 14.xi.2011, LT, leg. Al-Drahim et al. [KSMA]; 2♂ (RK1), 27.v.2012, LT, leg. Al-Dhafer et al. [KSMA]; 1♂



**Figure 23.** *Pseudophotopsis maura* Bischoff (Male) **A, B** habitus, lateral and dorsal views, respectively **C, D** head, frontal and dorsal views, respectively.



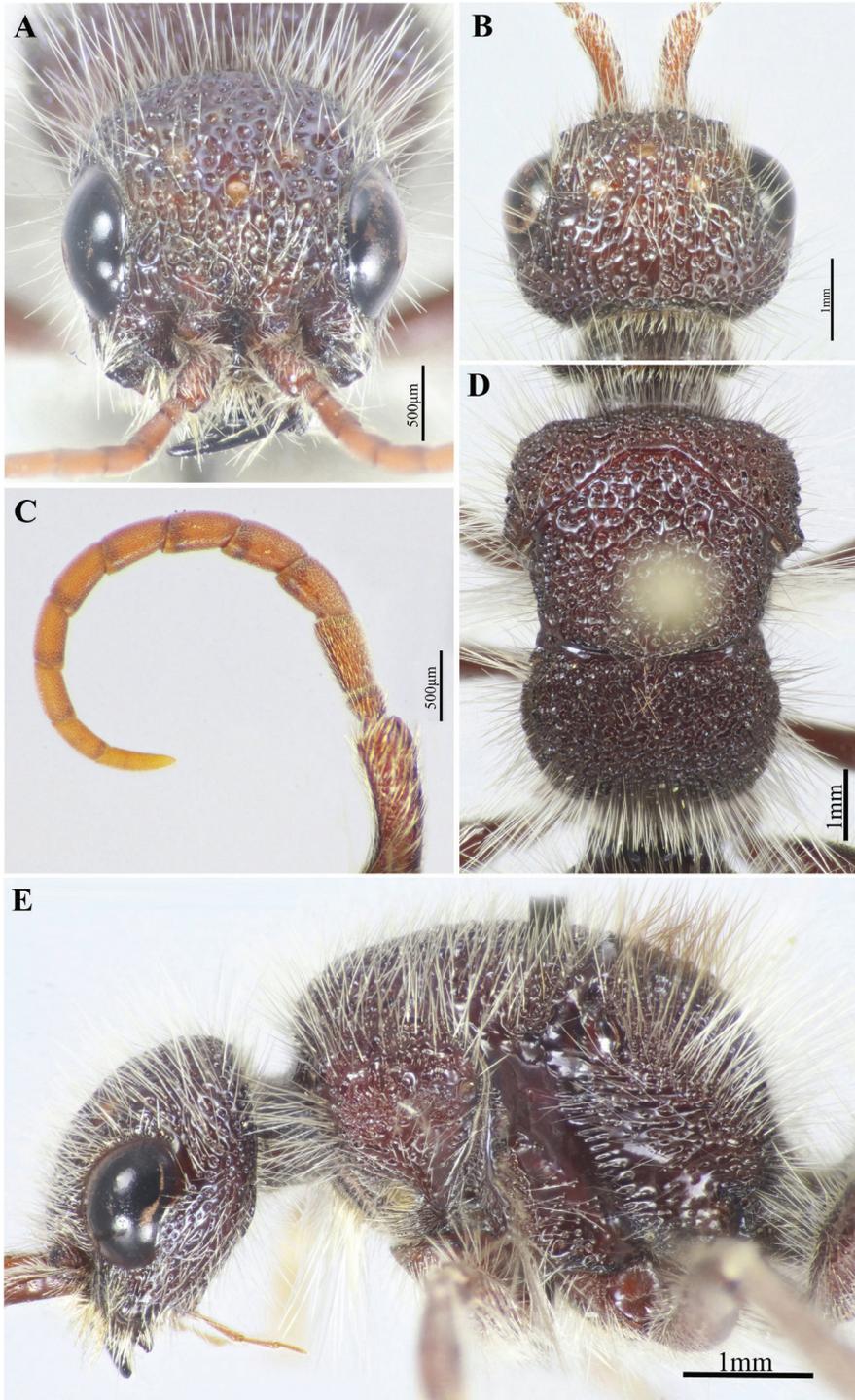
**Figure 24.** *Pseudophotopsis maura* Bischoff (Male) **A** head, lateral view **B** antenna **C** mesosoma, dorsal view **D** right fore wing.



**Figure 25.** *Pseudophotopsis maura* Bischoff (Male) **A** metasoma, dorsal view **B** 1<sup>st</sup> and 2<sup>nd</sup> metasomal segments latero-ventral view (median basal tubercle on S2 indicated).



**Figure 26.** *Pseudophotopsis maura* Bischoff (Female) **A, B** habitus, lateral and dorsal views, respectively.

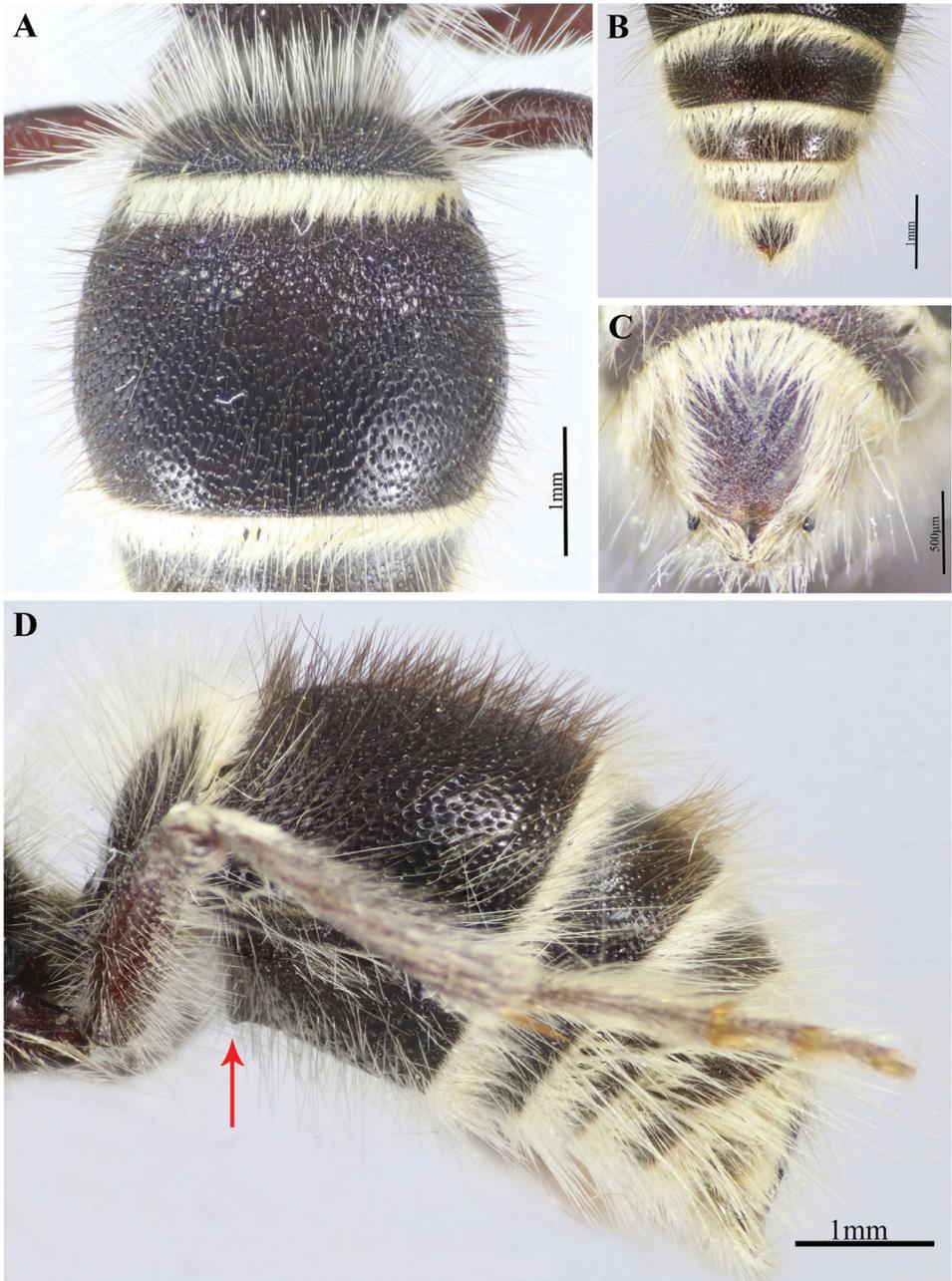


**Figure 27.** *Pseudophotopsis maura* Bischoff (Female) **A** head, frontal view **B** head and antennal scape, dorsal view **C** antenna **D** mesosoma, dorsal view **E** head and mesosoma, lateral view.

(RK2), 27.v.2012, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (RF3), 10.iv.2015, LT, leg. Al-Dhafer et al. [KSMA]; 2♂ (RS1), 20.v.2015, LT, leg. Abdel-Dayem M. [KSMA]; 1♂ (RS2), 20.v.2015, LT, leg. Abdel-Dayem M. [KSMA]; 1♂ (RH2), 26.viii.2015, PT, leg. Al-Dhafer et al. [KSMA]; 1♀ (WH1), 12.x.2015, PT, leg. Abdel-Dayem M. [KSMA]; 1♀ (WH2), 12.x.2015, PT, leg. Abdel-Dayem M. [KSMA]; 1♀ (RH1), 26.x.2015, PT, leg. Al-Dhafer et al. [KSMA]; 1♀ (RH2), 26.x.2015, PT, leg. Al-Dhafer et al. [KSMA]; 3♂ (RH4), 27.x.2015, LT, leg. Al-Dhafer et al. [KSMA]; 3♂ (RF2), 15.x.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (RF1), 15.x.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (SH6), 15.xi.2015, LT, leg. Al-Dhafer et al. [KSMA]; 1♂ (WR1), 18.xi.2015, LT, leg. AMS [KSMA]; 1♂ (WD), 9.v.2018, LT, leg. AMS [KSMA]; 1♂ (WBR), 8.vi.2018, LT, leg. AMS [KSMA].

**Material examined (6 males, 18 females) from Egypt.** 1♀, Zeitoun (Cairo), 31.x.1909, leg. Ferrnt [ESEC]; 3♀, Pyramids (Giza), 3.viii.1913 [PPDD]; 1♀, El-Alag (Qalyubiyah), 22.viii.1913 [PPDD]; 2♀, Ain Shams (Cairo), 12.x.1914 [PPDD]; 1♀, Ein Romani (North Sinai), 5.xii.1916 [PPDD]; 1♂, Wadi Digla (Cairo), 29–31.v.1924, LT [PPDD]; 1♂, Wadi Gharaba (South Sinai), 30.iv.1925, LT [PPDD]; 2♀, Borqash (Giza), 8.vii.1925 [PPDD]; 1♀, Helwan, 12.viii.1926 [PPDD]; 2♀, Kafr Hakim (Giza), 24.xi.1926 [PPDD]; 2♀, Salloum (Matruh), 11.viii.1928 [PPDD]; 1♀ Wadi Um Elek (Helwan), 17.xi.1934, leg. Farag [PPDD]; 1♂, Gabal Elba (Red Sea), 16.i.1933, LT [PPDD]; 1♀; 100 Km Cairo-Suez road (Suez), Dec. 1937 [ESEC]; 2♂, Wadi Arbaein (South Sinai), March 1990 [AMS collection]; 1♀, Wadi Isla (South Sinai), March 1990 [AMS collection]; 1♂, Al-Manayif (Ismailiyah), 17.viii.2007, LT [AMS collection].

**Remarks.** *P. aegyptiaca* which is known from females only, has a very similar local (Fig. 1) and global distribution as *P. maura*, which is known from males only. For the current study, seven *P. aegyptiaca* specimens were collected from the Riyadh region (central Saudi Arabia), and a single specimen from Baljurashi (Al-Baha). The same is true for *P. maura*, except for two specimens collected from Shada Al-Ala Natural Reserve (Al-Baha region, Saudi Arabia) and Jabal Akhadar (Oman), the remaining 20 specimens were collected from the Riyadh region (sometimes from the same sites and within a short period of time when females *P. aegyptiaca* were collected as in the site RH2). In terms of global distribution, both species are distributed in North Africa and Israel, while *P. maura* has recently been recorded in Yemen (Lelej and van Harten 2006), and both species are now recorded in Saudi Arabia (in addition to Oman for *P. maura*). In terms of morphological characteristics (color pattern and body shape), both species have the head and mesosoma dark red and the metasoma blackish-brown to black, and a robust body. Based on these findings, *P. aegyptiaca* (Bischoff) (female) and *P. maura* Bischoff (male) are conspecific, and should be synonymized. Since both available names were published simultaneously, and both as subspecies (although of different species in different genera), the choice of the name to be considered valid rests with the “first reviser”. I hereby synonymize *Ephutomma continua* subsp. *aegyptiaca* Bischoff, 1920 with *Pseudophotopsis kokpetica* subsp. *maura* Bischoff, 1920 for the following reason: *maura* was originally described in *Pseudophotopsis*, whereas *aegyptiaca* was not.



**Figure 28.** *Pseudophotopsis maura* Bischoff (Female) **A** T1 and T2, dorsal view **B** T3–T6, dorsal view **C** T6 (showing pygidial area) **D** metasoma, lateral view (median basal tubercle on S2 indicated).

**Distribution in the Arabian Peninsula.** Abyan, Sana'a, and Socotra provinces (Yemen) (Lelej and van Harten 2006; Lo Cascio et al. 2012); Ad-Dakhiliyah province (Oman) (new record); Al-Baha, Jazan & Riyadh regions (southwestern and central Saudi Arabia) (new record) (Fig. 1).

**Global distribution.** Algeria, Chad, Israel, Libya, Sudan, Tunisia, Yemen (including Socotra Island) (Lelej 2002; Pagliano et al. 2020; Gadallah et al. 2020); Egypt (Bischoff 1920 as *Ephutomma continua aegyptiaca*; Lelej 2002 & Pagliano et al. 2020 as *Pseudophotopsis aegyptiaca*), Oman (new record); Saudi Arabia (new record).

***Pseudophotopsis subaurea* sp. nov.**

<http://zoobank.org/2842A651-5EC8-4C5D-B392-9F64A335EEBF>

Figures 29–32; 35A, B

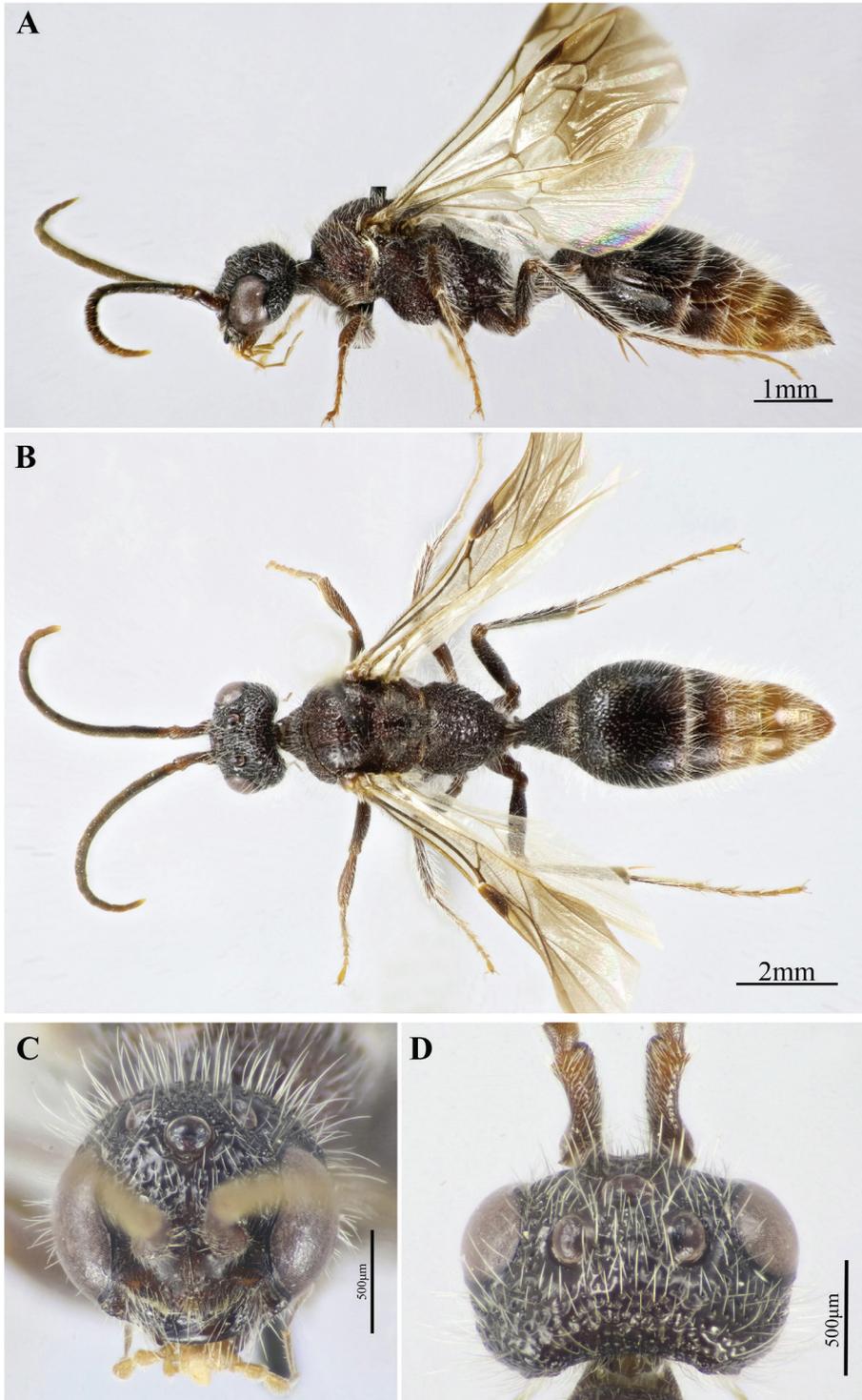
**Type materials.** *Holotype* ♂, KINGDOM OF SAUDI ARABIA, Rawdet Al-Harmalyiah (Al-Quway'iyah, Riyadh region) [24°18'35"N, 45°10'02"E, alt. 774 m], 17.iv.2015, LT, leg. Abdel-Dayem M. [KSMA]; Paratype: 1♂, same data as holotype [KSMA].

**Diagnosis. Male.** Distance between posterior ocellus and posterior head margin about  $2.3 \times$  longitudinal posterior ocellus diameter (Fig. 29D); distance between apex of lower mandibular tooth and upper mandibular ridge longer than mandibular height at the base ( $1.15 \times$ ) (Fig. 30A); metanotal horns well developed, divergent posteriorly, about  $1.6 \times$  as long as wide (Fig. 30C); F1 about  $2.15 \times$  as long as its maximal width, shorter than F2 (about  $0.9 \times$ ) (Fig. 30B); T1–T3 apically with fringes of rather sparse white setae (Fig. 31C); lateral felt line on T2 about  $0.75 \times$  as long as distance between felt line and posterior tergal margin (Fig. 32B); S2 with median basal very small tubercle (Fig. 32B); genitalia with cuspis of volsella wide apically (not digitate) (Fig. 35B); parapenial and ventral lobes directly posteriorly directed, the former subtriangular, with apex narrowly rounded and extended beyond apex of penis valve, the latter digitate, with apex tapering and inner edge distinctly serrate (Fig. 35A, B).

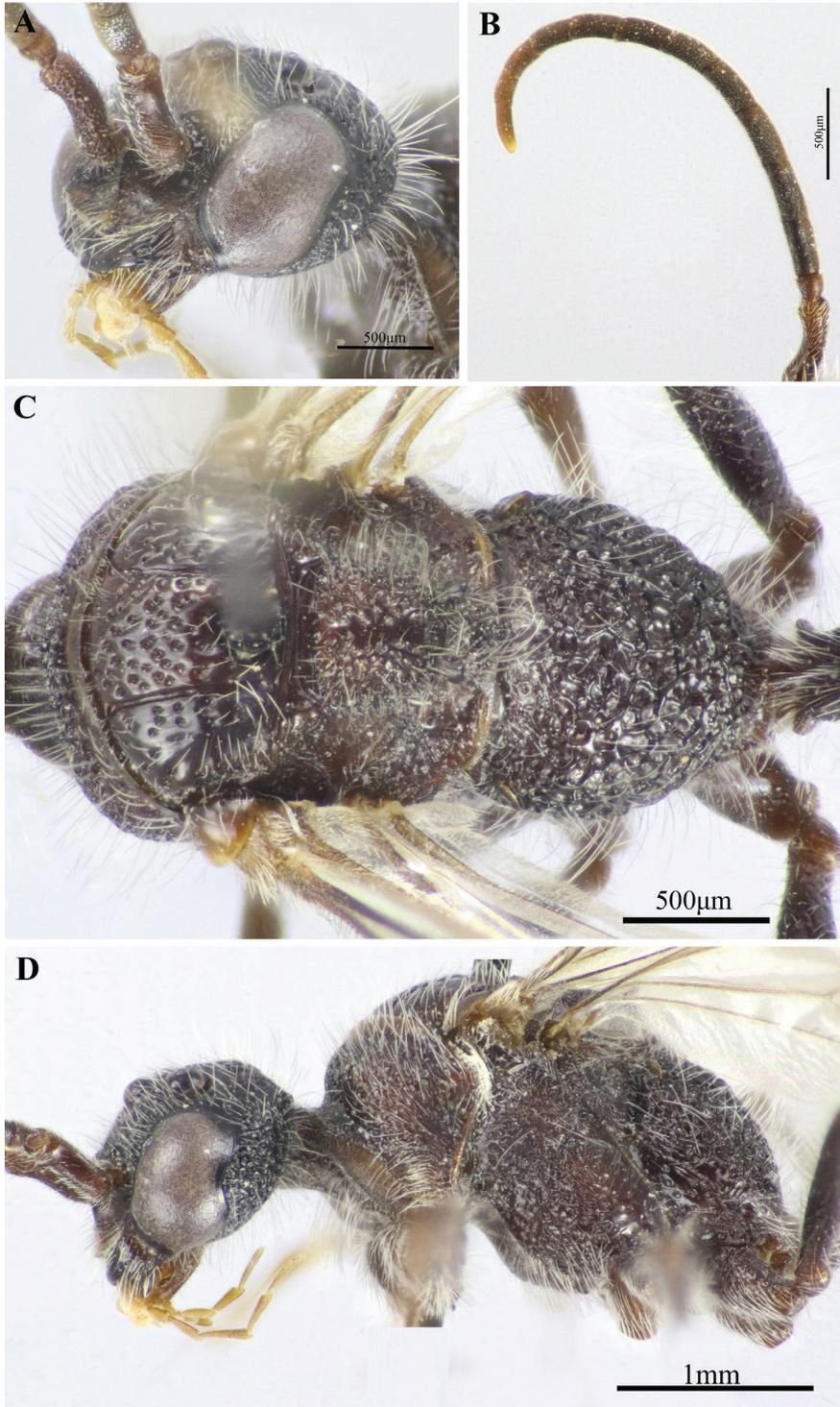
**Description of male holotype.** Body length 11 mm. *Color* (Figs 29C, D; 30B–D; 31A–C; 32C). Head including mandible blackish-brown; mesosoma, first and second metasomal segments and basal two-thirds of third segment dark reddish-brown; remainder of metasomal segments brownish-yellow; antenna brown (scape, pedicel and F9–11 lighter); palps and tegula testaceous; legs brown (femora and hind tibia darker). Fore wing hyaline on about basal two-thirds, infumate (brown-stained) apically, with yellowish veins (Sc+R and pterostigma brown).

**Setation** (Figs 29C, D; 30C, D; 31A, C; 32C). Body, including legs and basal third of mandible clothed with long erect white setae mixed with suberect to recumbent white setae on metasomal segments 3–7; T1–T3 and S2–S3 with apical fringes of sparse (not compact) white setae. Fore wing sparsely setose on basal half, densely setose apically.

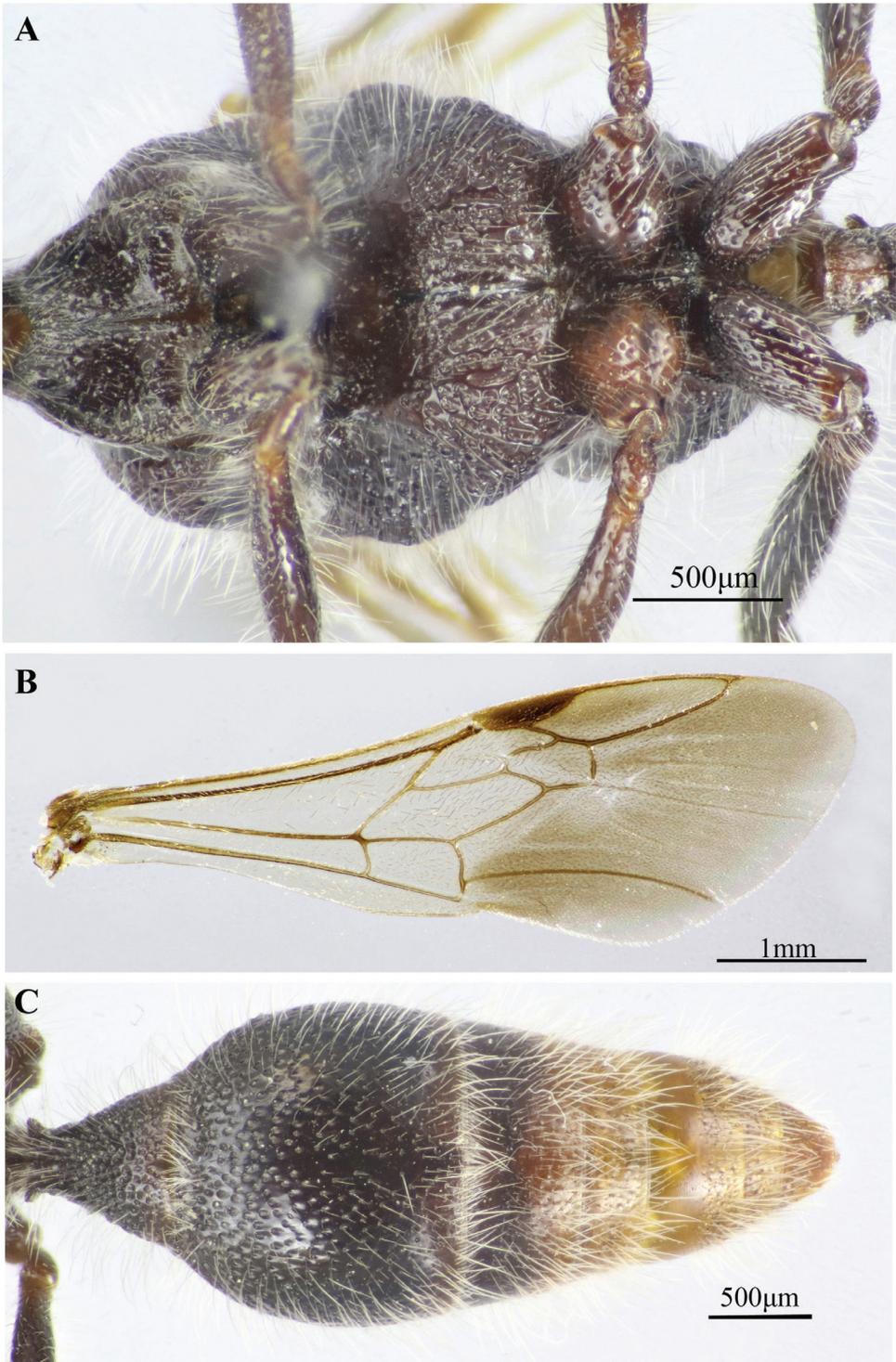
**Head** (Figs 29C, D; 30A, B, D). Setiferous punctate-subreticulate to reticulate; head height  $0.92 \times$  maximal width; POD  $2.0 \times$  OOD; distance between posterior ocellus and posterior head margin  $2.3 \times$  longitudinal posterior ocellus diameter; vertex posteriorly broadly emarginate; clypeus with well developed longitudinal median lamellate carina, free margin with a pair of acute small tubercles; mandibles deeply excised beneath, with large tooth subbasally, distance between apex of tooth and upper mandibular ridge about  $1.15 \times$  as long as mandibular height at base, with two teeth



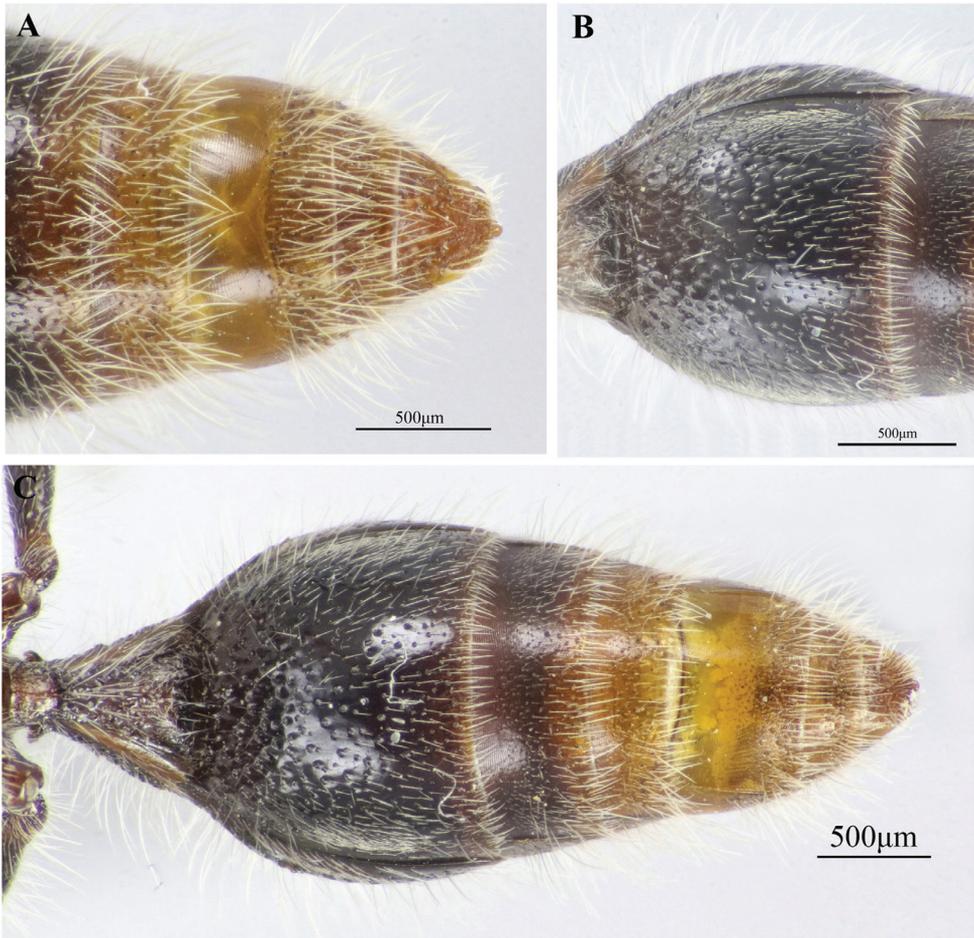
**Figure 29.** *Pseudophotopsis subaurea* sp. nov. (Male) **A, B** habitus, lateral and dorsal views, respectively **C** head, frontal view **D** head and antennal scape, dorsal view.



**Figure 30.** *Pseudophotopsis subaurea* sp. nov. (Male) **A** head, fronto-lateral view **B** antenna **C** mesosoma, dorsal view **D** head and mesosoma, lateral view.



**Figure 31.** *Pseudophotopsis subaurea* sp. nov. (Male) **A** mesosoma, ventral view **B** right fore wing **C** metasoma, dorsal view.

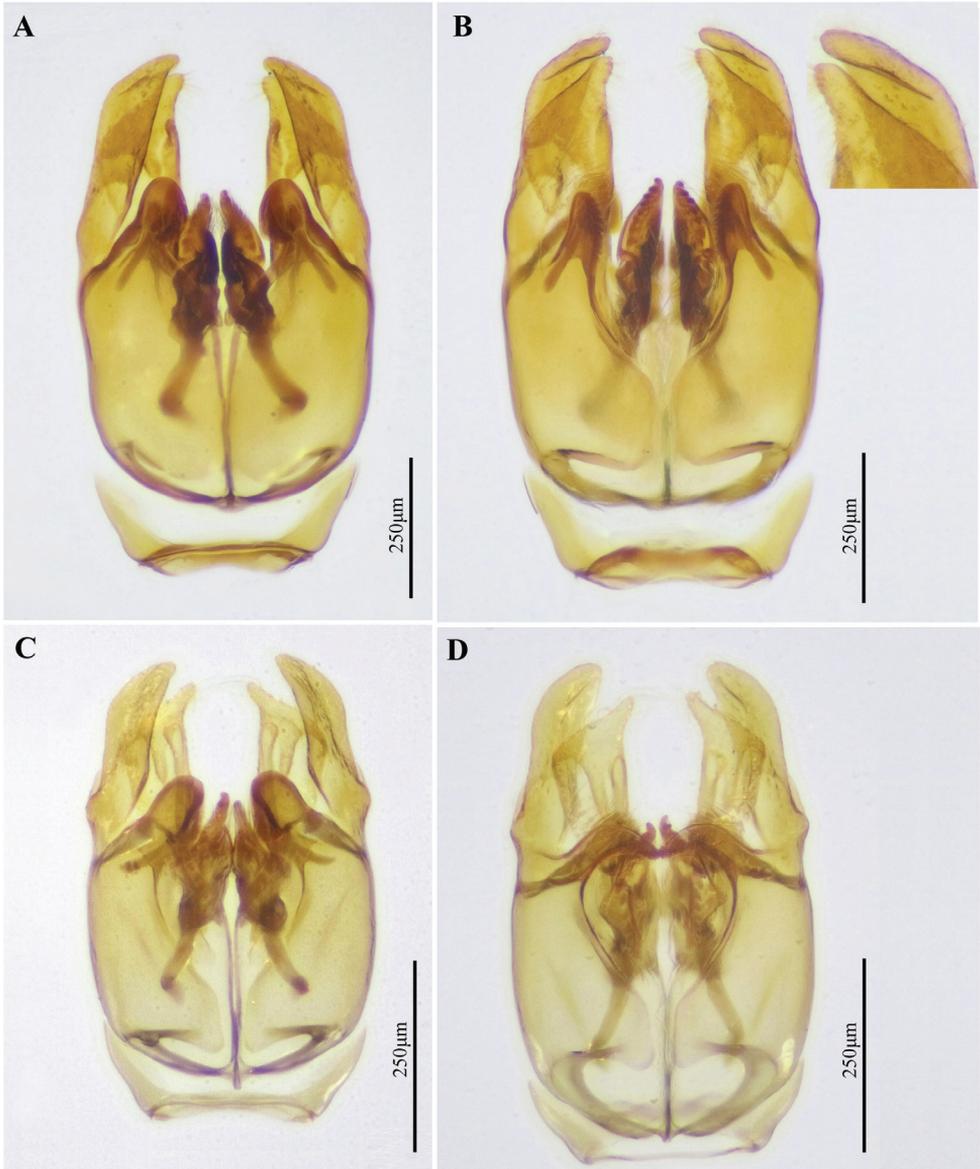


**Figure 32.** *Pseudophotopsis subaurea* sp. nov. (Male) **A** T4–T7, dorsal view **B** 2<sup>nd</sup> metasomal segment (ventro-lateral view) **C** metasoma, ventral view.

subapically, preapical one extremely small; pedicel 1.3 × as long as wide, 0.65 × as long as F1; F1 1.8 × as long as wide, 0.87 × as long as F2 and F3.

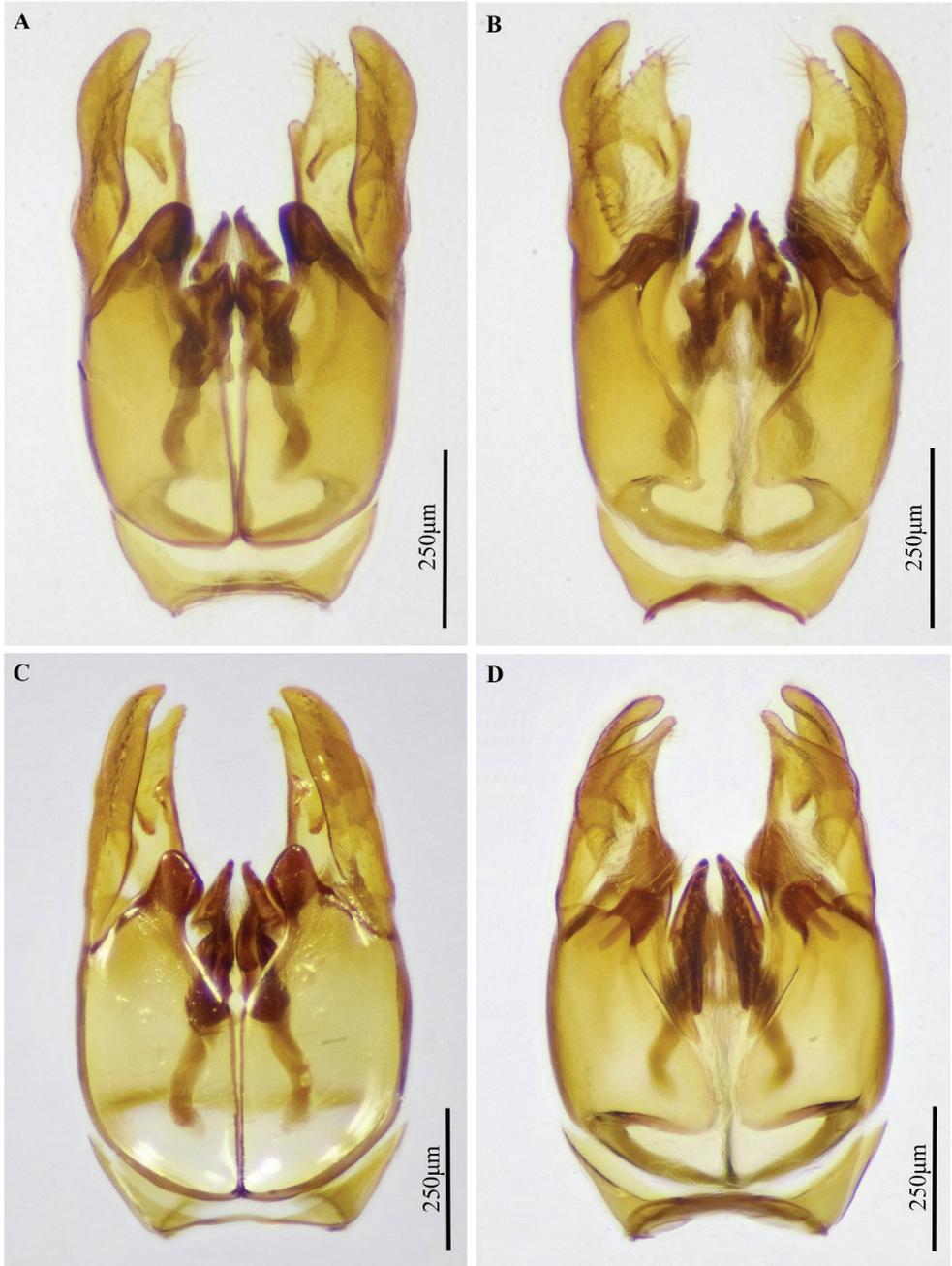
**Mesosoma** (Figs 30C, D; 31A). In dorsal view about 1.85 × as long (excluding pronotal flange) as its maximal width; pronotal dorsal face setiferous foveate-reticulate except for smooth and polished posterior margin, with humeral angles gently rounded, and lateral face largely foveate; mesoscutal median area densely punctate, lateral areas rather sparsely punctate; notauli complete and parallel; scutellum with smooth longitudinal median strip, densely setiferous foveolate laterally; metanotal horns well developed, subparallel, horn about 1.6 × as long as wide; propodeum setiferous areolate, strongly sloping posteriorly; mesopleuron foveate-reticulate except for smooth posterior margin of mesepimeron.

**Fore wing** (Fig. 31B). Cell 2R1 1.85 × as long as pterostigma, with truncate apex; anterior side of 2R1 1.4 × as long as pterostigma; first discal cell (1M) slightly shorter than 2R1 (0.93 ×); vein 1M straight.



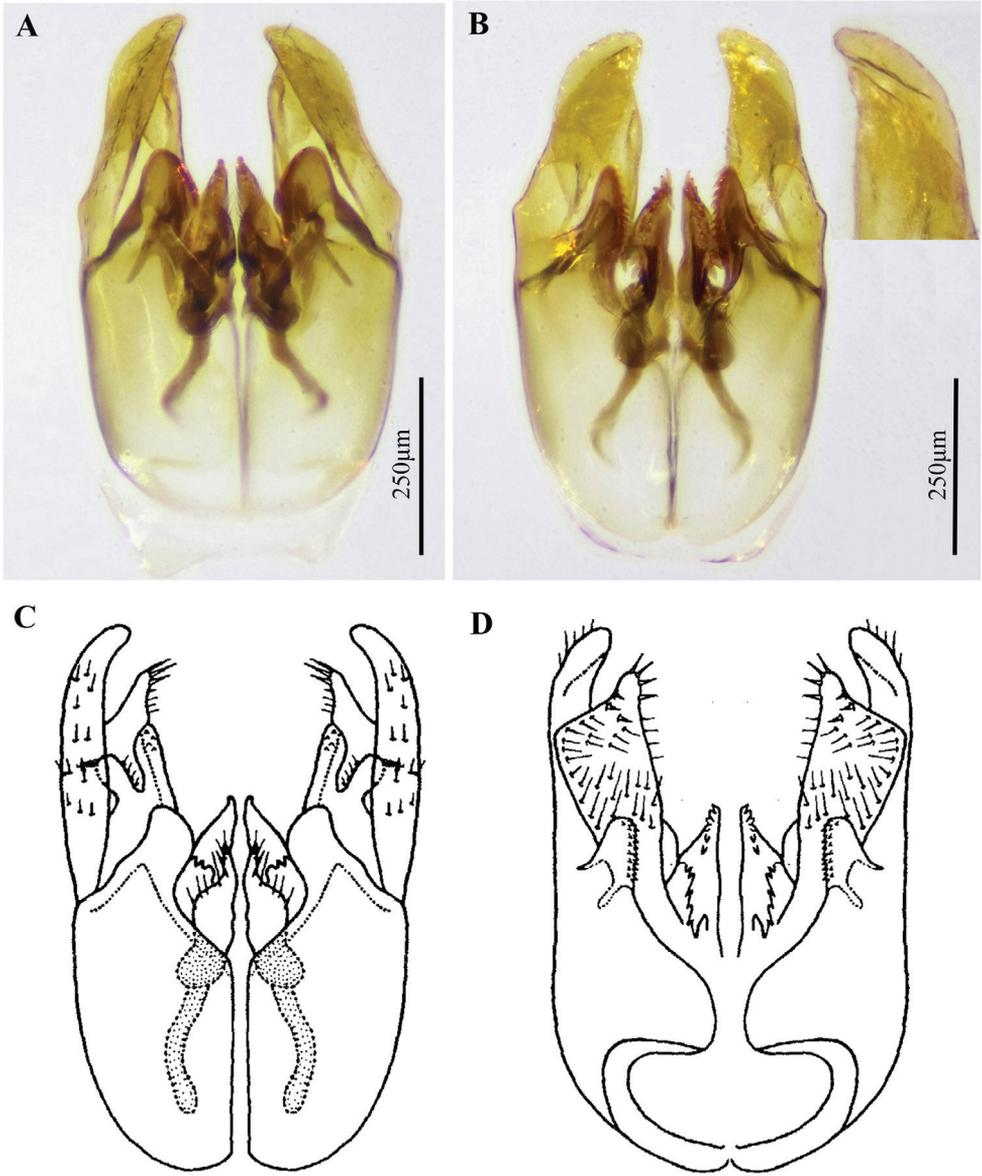
**Figure 33.** Male genitalia **A, B** *Pseudophotopsis aurea* (Klug), dorsal and ventral views, respectively **C, D** *P. dhofarensis* sp. nov., dorsal and ventral views, respectively.

*Metasoma* (Figs 31C; 32A–C). T1 1.2 × as long as its maximal width, setiferous foveate reticulate, sublaterally with strong ridge extending along anterior third or slightly more of its length; T2 0.9 × as long as its maximal width, densely setiferous punctate laterally and basally, sparsely setiferous punctate on disc and apically, with polished interspaces between punctures, apico-medially slightly swollen; length of lateral felt line on T2 less than distance between felt line and posterior tergal margin (0.75 ×); T3–T6 as well as S2–S7 setiferous punctulate, S2 with large



**Figure 34.** Male genitalia **A, B** *Pseudophotopsis mascatiana* Invrea, dorsal and ventral views, respectively **C, D** *P. maura* Bischoff, dorsal and ventral views, respectively.

foveae mixed with fine punctures; T7 largely foveate on basal half, impunctate apically; S2 with small median basal tubercle; S8 (hypopygium) with median apical small tubercle.



**Figure 35.** Male genitalia **A, B** *Pseudophotopsis subaurea* sp. nov., dorsal and ventral views, respectively **C, D** *P. binghami* Bischoff, dorsal and ventral views, respectively (modified from Lelej (1985)).

**Genitalia** (Fig. 35A, B). Cuspis of volsella rather wide subapically (not digitate), ending a short distance before apex of paramere; parapenial lobe subtriangular, directly posteriorly directed, with narrowly rounded apex; ventral lobe directly posteriorly directed, digitate, with apex tapering and inner edge distinctly serrate.

**Female.** Unknown.

**Recognition.** The new species, *P. subaurea* resembles the Afrotropical *P. aurea* (Klug) in having brownish-yellow posterior metasomal segments. However, it differs from *P. aurea* in the following: head blackish-brown, tegula testaceous (Figs 29B–D; 30C, D) (head and tegula dark red in *P. aurea* (Figs 3C, D; 4A, C)); metasoma wholly clothed with sparse white setae, T2–T3 and S2–S3 with apical fringes of short sparse white setae (Figs 31C; 32A–C) (first metasomal segment and S2 with white setae, remaining metasoma densely clothed with golden setae, T2–T6 and S2–S6 with apical fringe of long dense golden setae in *P. aurea* (Figs 5B, C; 10B, C)); fore wing slightly infumate on distal half, with yellowish veins (except brown Sc+R) (Fig. 31B) (deeply infumate wholly in most specimens of *P. aurea*, with all veins dark brown (Fig. 5A)); metanotum with parallel to subparallel horns (Fig. 30C) (horns distinctly diverging in *P. aurea* (Fig. 4C)); cuspis of volsella rather wide apically (Fig. 35B) (narrow in *P. aurea* (Fig. 33B)); parapenial lobe subtriangular, with narrowly rounded apex (Fig. 35A) (subrounded, with broadly rounded apex in *P. aurea* (Fig. 33A)); genital ventral lobe tapering apically (Fig. 35B) (rounded apically in *P. aurea* (Fig. 33B)).

**Etymology.** The name *subaurea* refers to the similarity between this species and *P. aurea* (Klug).

**Distribution in Arabian Peninsula.** Saudi Arabia (Riyadh region) (Fig. 2).

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