



Contributions to the cuckoo wasp fauna (Hymenoptera: Chrysididae) of Yemen with description of five new species and updated checklist

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ABSTRACT. New data on the Chrysididae fauna from Yemen are presented. Based on recently collected material, eleven species are recorded for the first time in the country: *Elampus afer* (Mocsáry, 1889); *Hedychridium scutellare* (Tournier, 1878); *Hedychrum coelestinum* Spinola, 1838; *Holophris coriacea* (Dahlbom, 1850); *Holopyga subglabrata* Linsenmaier, 1994; *H. vicissituda* Linsenmaier, 1994; *H. parvicavitale* Linsenmaier, 1994; *Chrysidea pumila* (Klug, 1845); *Chrysis elegantula* Spinola, 1838; *C. nilensis* Linsenmaier, 1959; *Chrysis robertsi* Rosa, 2020. Notably, *Elampus afer*, *Hedychrum coelestinum* and *Holophris coriacea*, previously considered African species, are now documented in the Arabian Peninsula for the first time. Additionally, five species new to science are described: *Hedychridium eudaimon* **sp. nov.** (from Yemen and Saudi Arabia); *Hedychrum harteni* **sp. nov.**; *Chrysis bilqis* **sp. nov.** (*leachii* group); *Chrysis felix* **sp. nov.**, and *Chrysis yemenita* **sp. nov.** (*succincta* group). Furthermore, the male of *Trichrysis longispina* (Mocsáry, 1912) is illustrated for the first time.

Keywords: Afrotropical, Arabian Peninsula, distribution, new records, taxonomy

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INTRODUCTION

The Chrysididae fauna of Yemen is poorly known, with only 32 species recorded from the country out of the 127 identified species in the Arabian Peninsula (Linsenmaier, 1994; Rosa et al., 2020; 2024b; Soliman et al., 2022; van Loon & Soliman, 2023). The most comprehensive work on the Arabian fauna, including that of Yemen, was published by Linsenmaier (1994). This important work provided useful keys and descriptions for species that had previously been described sporadically by European authors such as Mocsáry (1911, 1912). More recent resources for studying the local fauna include contributions by Strumia (2008, 2014) and the checklist of Arabian species compiled by Rosa et al. (2020). One of the most remarkable discoveries in recent years is the identification of an Arabian and Yemenite species from the subfamily Amiseginae, which was previously unknown in the West Palearctic region (van Loon & Soliman, 2023). This species, *Anachrysis arabica* van Loon & Soliman, 2023, belongs to a genus earlier known only from two species in southern African. Another recent study on Arabian species (Rosa et al., 2024b) includes a taxonomic revision of the hexadentate *Chrysis* species, adding new records for Yemen: *Chrysis lyncea* Fabricius, 1775, *C. oxyacantha* Mocsáry, 1913, and *C. smithii* Gribodo, 1879.

The Hymenopteran fauna of Yemen is often considered Afrotropical, as seen with the Mutillidae family (Lelej & van Harten, 2006), and some newly recorded Afrotropical species of cuckoo wasps confirm this trend. However, based on the limited distributional data available, only 23.5% of the

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Yemenite fauna is related to African fauna, including species distributed in the Afrotropical region and North Africa, while 39% is considered endemic to the Arabian Peninsula.

The goal of this paper is to summarise the existing knowledge of the Chrysididae fauna of Yemen and to provide new records, primarily based on material collected by Antonius van Harten during his research excursions between 2000 and 2002.

MATERIAL AND METHODS

The present study is largely based on specimens collected between 2000 and 2002 by A. van Harten using Malaise traps and light traps in the Lahej and Sana'a governorates (Fig. 1). Van Harten's specimens are currently deposited at Naturalis in Leiden, The Netherlands (RMNH). Additional material was examined from various collections, including W. Linsenmaier's collection at the NaturMuseum in Luzern, Switzerland (NMLU), the Natural History Museum in London, England (NHMUK), where some of Linsenmaier's (1994) types specimens for the Arabian fauna are deposited, the Efllatoun Bey Collection in the Entomology Department of the Faculty of Science, at Cairo University in Giza, Egypt (EFC); the Muséum National d'Histoire Naturelle in Paris, France, (MNHN); the Museum für Naturkunde in Berlin, Germany (ZMB); the Museum of Natural History in Prague, Czech Republic (MNHP) and the private collection of Marek Halada in České Budějovice, Czech Republic (MHPV), as well as and author's collection. Collecting localities in Yemen were A. van Harten conducted his research, are as follows (Fig. 1):

1. Sana'a (15°21'N 44°13'E, 2300 m): A light trap (1991 and 1998–1999) was placed within the compound of the General Department of Plant Protection (GDPP), in the Shaub quarter, near the town centre. The compound includes offices and laboratories surrounded by agricultural fields growing cereals and vegetables.
2. Suq Bani Mansour (15°06'N 43°50'E, 1500 m): A Malaise trap (2001) was placed in the garden of houses belonging to the Ministry of Agriculture & Irrigation on the outskirts of the village near natural vegetation with *Ziziphus* and *Acacia*. The area is in a valley between rather dry mountains.
3. 12 km NW of Manakhah (15°05'N 43°42'E, 1500 m): A Malaise trap (2001–2003) was placed in a tree nursery of the Ministry of Agriculture & Irrigation at the bottom of a steep road descending from the Manakhah Pass (2100 m). The valley is used for cultivating qat (*Catha edulis*) and coffee, with the arid slopes sparsely covered by *Acacia* and *Ziziphus* trees.
4. Al-Lahima (15°24'N 43°32'E, 1200 m): A Malaise trap (2000–2002) was placed in a tree nursery of the Ministry of Agriculture & Irrigation at the bottom of a steep valley, near a small permanent stream of water bordered by *Ficus* trees. The arid valley slopes are sparsely covered with *Acacia* and *Ziziphus* trees.
5. Ta'izz (13°35'N 44°02'E, 1400 m): A light trap (1998–2002) was placed within the AREA experimental farm in the Usaifira town quarter, on the northern outskirts of town. Farming includes permanent fruit crops (citrus, mango) and fields for cereals and vegetables.
6. Lahj (13°04'N 44°53'E, 150 m): A Malaise trap (1999–2003) was placed within the compound of the Naser Agricultural College of the University of Aden on the southern outskirts of Lahj. The compound has flower beds, ornamental trees and stables for farm animals.
7. Al-Kowd (13°05'N 45°22'E, 20 m): A Malaise trap (1992) was placed in a garden and a light trap (1999–2003) set on the first floor of the regional Agricultural Office, situated in the middle of an agricultural area where mainly fruit crops (mango, banana, guava), sorghum, cotton, sesame and some vegetables are grown. The Gulf of Aden is only a few kilometres away.

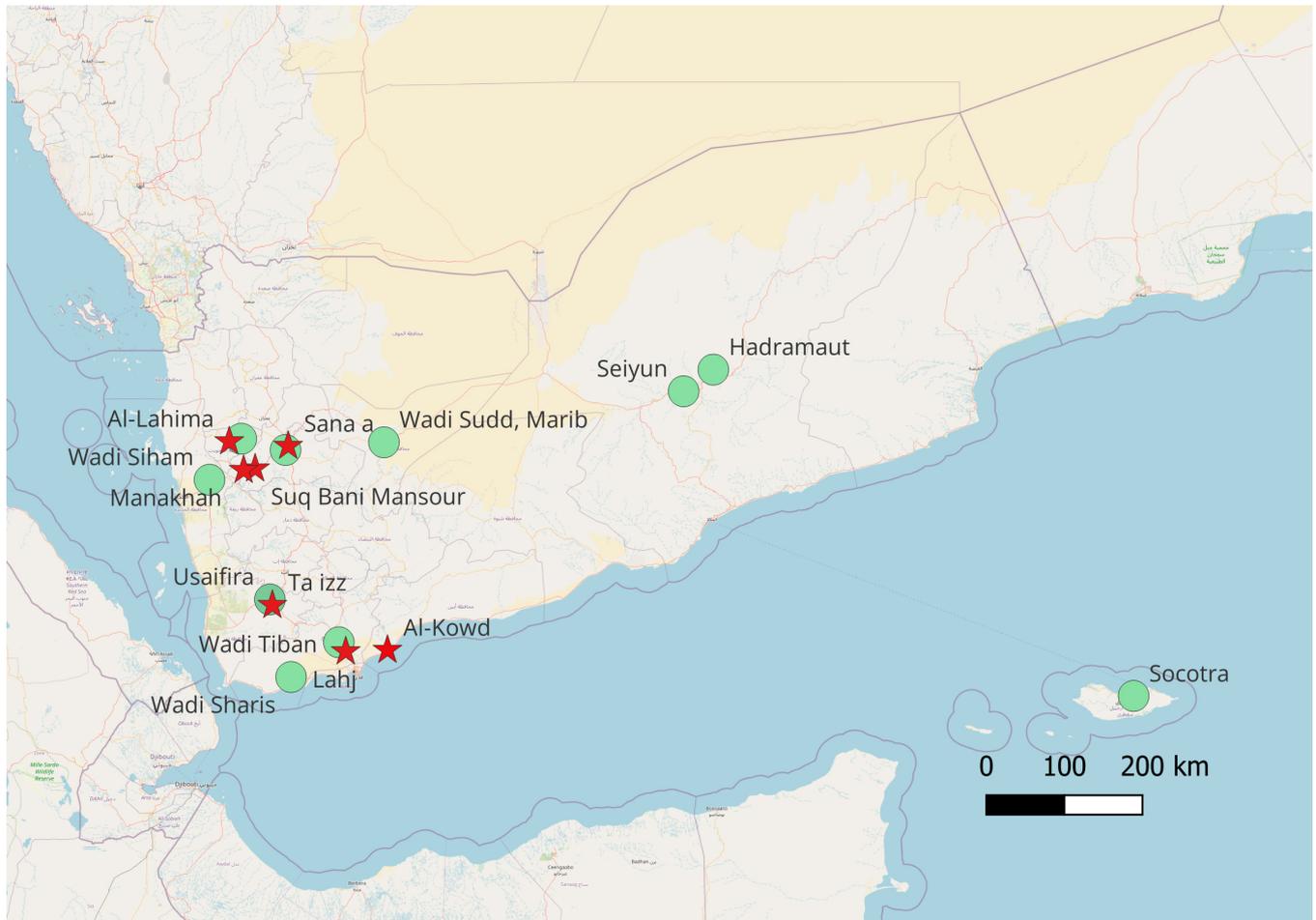


Figure 1. Distributional map of the collecting localities cited in this article. Red stars are localities where A. van Harten positioned Malaise traps; green circles are other collecting localities mentioned in the text.

The specimens were examined using an Olympus SZ40 stereomicroscope. Photographs of the specimens were taken with a Keyence VHX-970F with a VHX-7020 photo camera and the objective VH-Z20R/Z20T. Morphological terminology follows Kimsey & Bohart (1991). Abbreviations used in the taxonomic part and the descriptions are as follows: F1, F2, F3, etc. = flagellomeres 1, 2, 3, etc., respectively; MOD = median ocellus diameter (measured in frontal view); MS = malar space (the shortest distance between base of mandible and lowest margin of compound eye); OOL = oculo-ocellar line (the shortest distance between posterior ocellus and compound eye); P = pedicel; POL = posterior ocellar line (the shortest distance between posterior ocelli).

RESULTS

Taxonomic hierarchy

Class Insecta Linnaeus, 1758

Family Chrysididae Latreille, 1802

Subfamily Amiseginae Mocsáry, 1889

Genus *Anachrysis* Krombein, 1986

Anachrysis Krombein, 1986:509. Type species: *Anachrysis paradoxa* Krombein, 1986, by original designation.

***Anachrysis arabica* van Loon & Soliman, 2023**

Anachrysis arabica van Loon and Soliman, 2023:837. Holotype ♂; Saudi Arabia: Jazan.

Distribution in Yemen. Lahj and 12 km NW Manakhah (van Loon & Soliman, 2023)

Distribution in the Arabian Peninsula. Yemen. Saudi Arabia (van Loon & Soliman, 2023).

Extralimital distribution. No records.

Subfamily Chrysidinae Latreille, 1802**Tribe Elampini Dahlbom, 1854****Genus *Colpopyga* Semenov-Tian-Shanskij, 1954**

Colpopyga Semenov-Tian-Shanskij, 1954:139. Type species: *Hedychrum flavipes* Eversmann, 1858:552 [= *Colpopyga flavipes* (Eversmann, 1858)], by original designation.

***Colpopyga flavipes rugulosa* (Linsenmaier, 1959)**

Hedychridium flavipes rugulosum Linsenmaier, 1959:57. Holotype ♀; Cyprus: Limassol.

Distribution in the Arabian Peninsula. Saudi Arabia (Farasan) (Strumia & Dawah, 2019 as *Hedychridium flavipes* (Eversmann, 1858)).

Extralimital distribution. Eastern Mediterranean, Middle East and Western Asia: Cyprus, Iran, Türkiye, Central Asia, Egypt (Linsenmaier, 1999; Rosa, 2017).

Remarks. Strumia & Dawah (2019) included Yemen and the United Arab Emirates in the distribution of this subspecies, citing localities referenced in Strumia et al. (2016). However, Yemen and United Arab Emirates are not mentioned in the latter article. Therefore, a confirmation of the occurrence of *Colpopyga* in Yemen is still needed.

Genus *Elampus* Spinola, 1806

Elampus Spinola, 1806:10. Type species: *Chrysis panzeri* Fabricius, 1804:172 [= *Elampus panzeri* (Fabricius, 1804)], by subsequent designation of Latreille (1810).

Elampus afer* (Mocsáry, 1889)

Elampus (*Notozus*) *afer* Mocsáry, 1889:75. Holotype ♀; Kenya: Mombassa.

Material examined. 1♀, Yemen: Lahj, III.-V.2002, Malaise trap, leg. A. van Harten & A. Sallum (RMNH).

Distribution in Yemen. Lahj (new record).

Distribution in the Arabian Peninsula. Yemen (new record).

Extralimital distribution. Cameroon, Kenya, South Africa, Tanzania (Tanzania, Zanzibar), Uganda (Madl & Rosa, 2012).

***Elampus albipennis* (Mocsáry, 1889)**

Elampus (*Notozus*) *albipennis* Mocsáry, 1889:80. Holotype ♀; Russia: Sarepta.

Distribution in Yemen. Yemen (with no specific locality) (Strumia, 2014).

Distribution in the Arabian Peninsula. Saudi Arabia (Linsenmaier, 1994 as *Omalus* (*Elampus*) *albipennis*; Strumia & Dawah, 2010, 2012, 2019), Oman (Strumia & Dawah, 2019), United Arab Emirates (Linsenmaier, 1994 as *Omalus* (*Elampus*) *albipennis*; Howarth & Gillett, 2008 as *Omalus albipennis*; Strumia, 2008, 2014).

Extralimital distribution. South-East Europe, Middle East, Türkiye, Southern Russia, Central Asia to Mongolia (Kimsey & Bohart, 1991; Linsenmaier, 1994, Strumia & Dawah, 2019; Rosa et al., 2020).

Genus *Hedychridium* Abeille de Perrin, 1878

Hedychridium Abeille de Perrin, 1878:3. Type species: *Hedychrum minutum* Lepeletier, 1806:122 (= *Chrysis ardens* Coquebert, 1801), by subsequent designation of Ashmead (1902).

Hedychridium eudaimon Rosa, sp. nov. (Figs 2A–2D, 3A–3D)

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Material examined. **Holotype** ♀, Yemen: Lahj, VII-IX.2001, Malaise trap, leg. A. van Harten & A. Sallum (RMNH). **Paratypes:** 2♂♂, Yemen: Ibb province, 20 km S Ta'izz, 1200m, 24.X. 2005, leg. J. Halada (MHC, PRC); 1♂, Saudi Arabia: Jizan province, Farasan Island, Sajid Island: 16°51'52"N 41°56'04"E, 16.IX.2023, leg. J. Halada (MHC); 1♀, Saudi Arabia, Jizan province: N of Ayban, Smad, 17°20'42"N 43°02'20"E, 1000m, 26.II.2024, leg. B. Halada (MHC).

Diagnosis. *Hedychridium eudaimon* sp. nov. is closely related to only one species in the Western Palaearctic, *Hedychridium chakouri* du Buysson, 1907 (Figs 2E, 2F). Both species belong to the subgenus incorrectly named *Acrotoma* Mocsáry, 1902 (*nec* Boettger, 1881) by Linsenmaier (1959, 1999). These two species can be readily separated from other northern African and Arabian *Hedychridium* by the median notch on the apical margin of the third tergum. Compared to the other Afrotropical species in this group, they are both small ranging 3.0 to 4.5 mm. *H. eudaimon* sp. nov. can be differentiated from *H. chakouri* by the large, sparse punctures on the mesosoma (Fig. 2B) and on the second metasomal tergum (Figs 2D, 3B) in contrast to *H. chakouri* (Figs 2E, 2F) which has smaller, denser punctures. The colour pattern is also distinct: *H. eudaimon* sp. nov. is bluish medially, consistent with the colour pattern of several Afrotropical species (Fig. 3A), while *H. chakouri* has a colour pattern more similar to the widespread Palaearctic *H. monochroum* du Buysson, 1888, with darker median area of the mesoscutum and a darker disk on the second metasomal tergum (Fig. 2E). *H. eudaimon* sp. nov. can be further distinguished from other Afrotropical species traditionally included in “*Acrotoma*” by the following characteristics: *H. arnoldii* (Edney, 1940) and *H. braunsii* (Mocsáry, 1902) have the apical margin of the third tergum with two distinct teeth and a the carinate margin of the second metasomal tergum; *H. discrepans* (Edney, 1940) has a similar apical margin, but is a larger species (6.5 mm) with a different colour pattern, being entirely red dorsally, with the face, sides of the mesosoma and propodeal angles greenish, while the subspecies *H. discrepans candida* (Edney, 1940) is entirely flame red; *H. dybowskii* has two small apical teeth on the apical margin and dense punctation, with very small punctures similar to *H. chakouri* (Fig. 2F); *H. heymonsi* Bischoff, 1910 is similar to *H. dybowskii* but has a thin hyaline rim along the apical margin of the third tergum and a distinct angle between the apical tooth and the tergal base.

Description. — **Holotype** ♀ (Fig. 2A–D). body length 4.4 mm; fore wing length 2.8 mm.

Head. Vertex and frons finely and densely punctate, with small (0.3 MOD) subcontiguous punctures; scapal basin with smaller, dense punctures, each puncture bearing a whitish seta, altogether covering the side of face; scapal basin transversally slightly wrinkled medially; ocellar triangle isosceles; OOL = 2.8 × MOD; POL = 2.4 × MOD; relative length of P:F1:F2:F3 = 1.0:1.2:0.9:0.8.

Mesosoma. Pronotal antero-median line shallow; punctation double with deep, small punctures (0.2–0.3 × MOD) intermixed with smaller dots on interspaces; median area of mesoscutum with larger punctures (up to 0.5 × MOD), without interspaces, becoming smaller and more spaced (up to 1 puncture diameter) at sides; mesoscutum largely polished postero-medially; lateral areas of mesoscutum with deep, large punctures, spaced and with small deep punctures on interspaces; notauli as fine lines, barely visible among punctures, parapsidal furrow deep and elongate; mesoscutellum with large, sparse punctures, separated up to 1.5 puncture diameter, and polished interspaces, punctures smaller laterally and posteriorly (Fig. 2B); metanotum with foveate-reticulate punctures; mesopleuron with large, round punctures, separate by polished interspaces with small punctures. Propodeal projection like acute triangle, pointing downwards; fore femur slightly carinate ventrally, hind femur only partially metallic; hind tarsus unmodified, with second and third tarsomeres subequal in length. Tarsal claws with sharp submedian tooth.

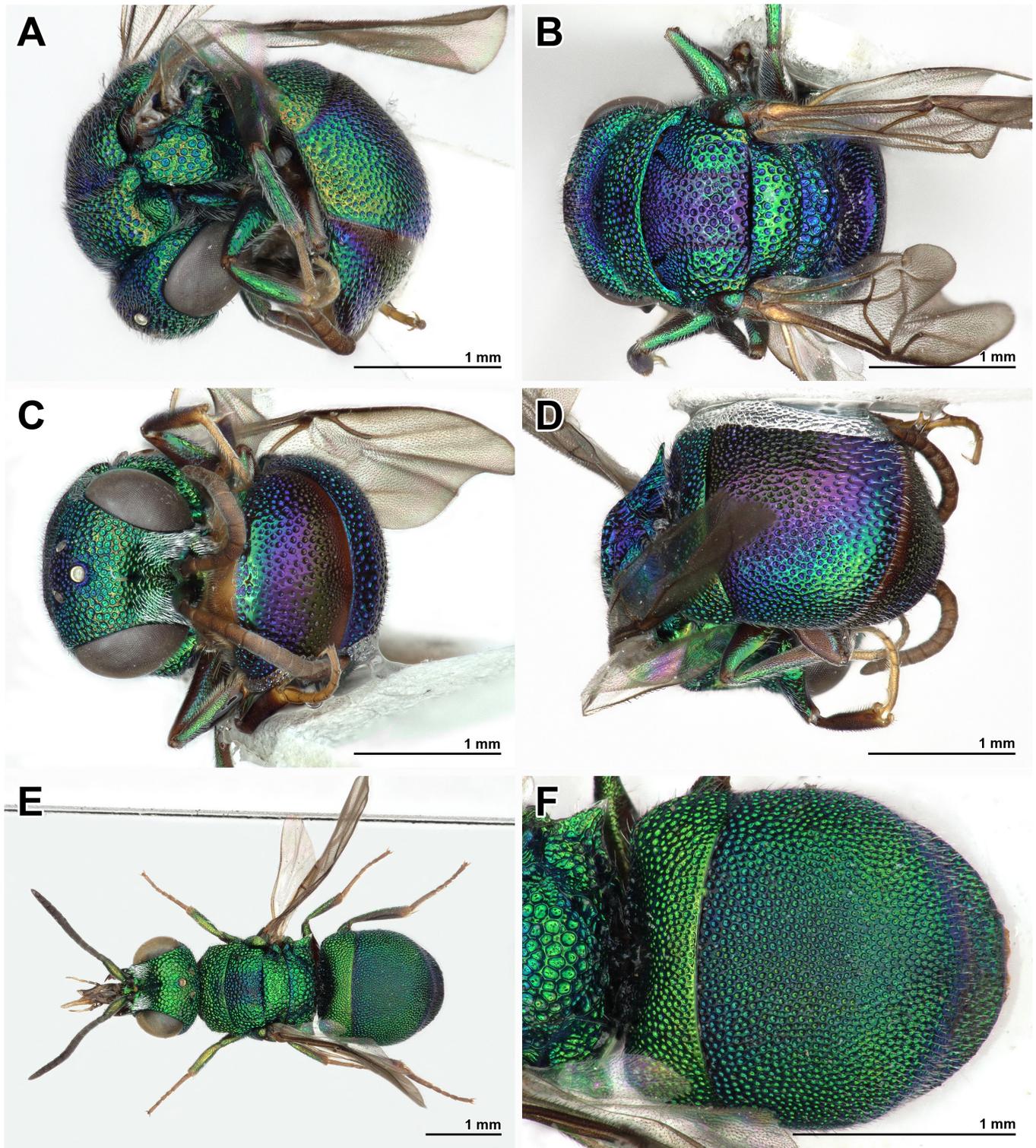


Figure 2. *Hedychridium eudaimon* Rosa, **sp. nov.**, holotype, female. **A.** Habitus, lateral view; **B.** Habitus, dorsal view; **C.** Habitus, ventral view; **D.** Metasoma, dorso-lateral view; **E.** *Hedychridium chakouri* du Buysson, 1907, female, from Tunisia (PRC), habitus, dorsal view; **F.** *H. chakouri*, metasoma, dorsal view.

Metasoma. Metasomal terga with deep punctures, denser apico-medially on second tergum becoming very sparse on the second half of the segment, with polished interspaces up to 2–3 puncture diameters (Fig. 2D); third tergum with spaced puncture becoming smaller toward apex and slightly bulging before the apical margin; apical margin with narrow hyaline rim and medially notched (Figs 2C, 3B, 3C).

Colour. Body green to blue; dark blue to purplish on ocellar area, median area of mesoscutum, anteromedially on second and third tergum; sterna entirely metallic green (Fig. 3C). Pedicel and flagellomeres brown; tegula metallic green; legs metallic green; tarsi brownish to light brown.

Vestiture. Erect, whitish short setae on head (less than 1 MOD); longer ventrally and on coxae; pronotum and mesoscutum with short and appressed, erect on scutellum and metanotum; metasoma with short and adpressed setae.

Male. Similar to female (Fig. 3A–D).

Etymology. The specific epithet is derived from the Old Greek name of Yemen Εὐδαιμών Ἀραβία (*Eudaemon Arabia*), Latinized into *Eudaimon*, better known as *Arabia Felix*, name attributed to Eratosthenes of Cyrene (c. 276 BC – c. 195/194 BC), which has the meaning of both fertile and blessed, being this area well irrigated in the Arabian Peninsula.

Distribution. Saudi Arabia (Jizan), Yemen (Lahj, Ibb).

Hedychridium modestum du Buysson, 1900

Hedychridium modestum du Buysson, 1900:129. Lectotype ♂ designated by Kimsey in Kimsey & Bohart (1991); Egypt: Elephantine.

Distribution in Yemen. Yemen (with no specific locality) (Strumia, 2008, 2014).

Distribution in the Arabian Peninsula. Oman, United Arab Emirates (Strumia, 2008, 2014), Yemen (Strumia, 2008, 2014).

Extralimital distribution. Palestine (Linsenmaier, 1999); Egypt, Iran, Pakistan (Kimsey & Bohart, 1991; Strumia, 2008, 2014; Strumia et al., 2016).

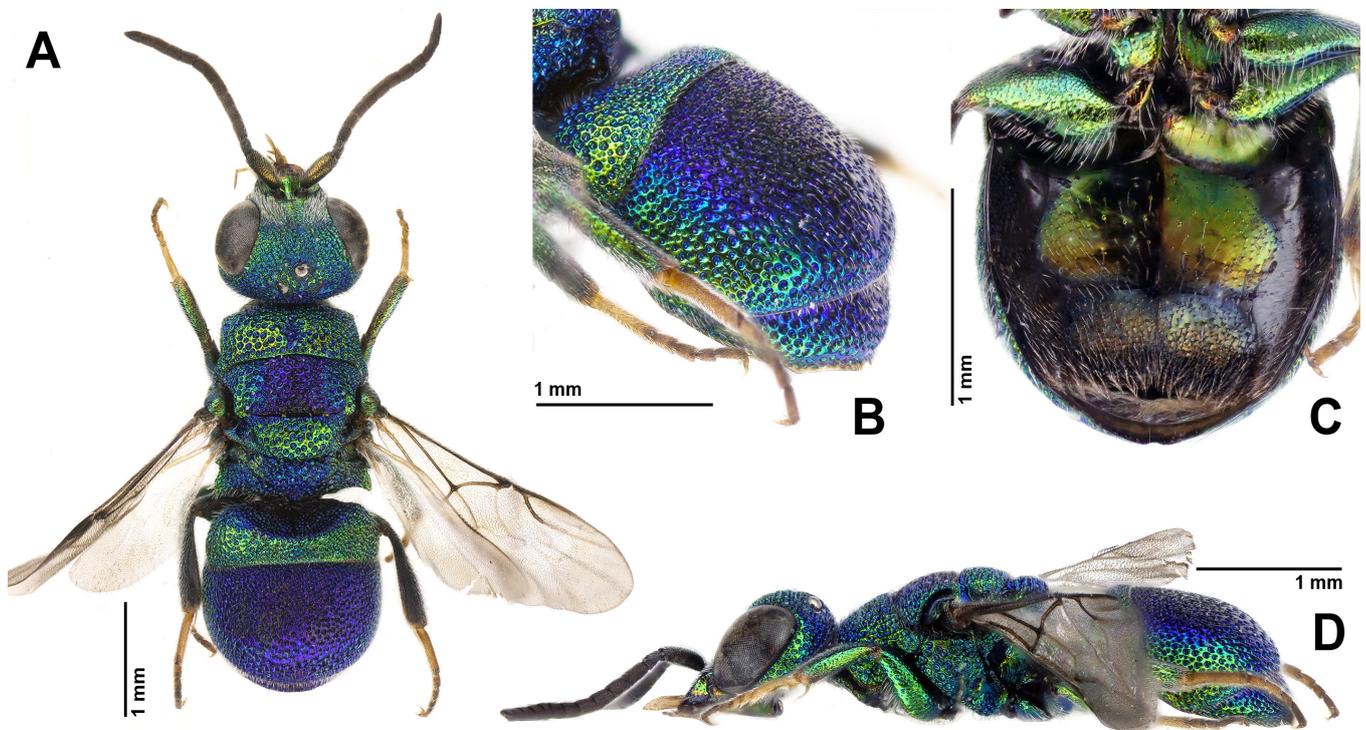


Figure 3. *Hedychridium eudaimon* Rosa, sp. nov., paratype (MHC), male. **A.** Habitus, dorsal view; **B.** Metasoma, postero-lateral view; **C.** Metasoma, ventral view; **D.** Habitus, lateral view. Photos by Arnošt Kudrna (CZ).

***Hedychridium monochroum* du Buysson, 1888**

Hedychridium monochroum du Buysson, 1888:3. Holotype ♀; France: Marseille.

Material examined. 1♀, Yemen: N Yemen Hadda 30.V.1967 leg. Mühle / *Hedychridium monochroum* Buyss. det. Linsenmaier 1989 / NML_ENT GBIF_Chr0009715 (NMLU).

Distribution in Yemen. Hadda (Linsenmaier, 1994).

Distribution in the Arabian Peninsula. United Arab Emirates (Strumia, 2014).

Extralimital distribution. widespread in the Palaearctic Region; also known from the Oriental Region (Kimsey & Bohart, 1991).

Hedychridium scutellare* (Tournier, 1878)

Hedychrum scutellare Tournier, 1878:309. Syntypes ♂; Italy: Sicily.

Material examined. 1♀, Yemen: Al-Lahima, 16.X.-31.XI.2000, Malaise trap, leg. A. van Harten (RMNH); 1♀, Al-Lahima, 9.IV.-5.VI.2001, Malaise trap, leg. A. van Harten (RMNH); 1♀, Yemen: 12 km NW of Manakhah, 21.VIII.-29.X.2002, Malaise trap, leg. A. van Harten (RMNH).

Distribution in Yemen. Al-Lahima, Manakhah (**new record**).

Distribution in the Arabian Peninsula. Yemen (**new record**); United Arab Emirates (Strumia, 2014).

Extralimital distribution. South Europe and North Africa (Kimsey & Bohart, 1991; Linsenmaier, 1959).

Remarks. *Hedychridium scutellare* was first recorded for the Arabian Peninsula (UAE) by Strumia (2014). The Arabian specimens can be temporarily attributed to this species only, however more analyses must be conducted to confirm the identity.

Genus *Hedychrum* Latreille, 1802

Hedychrum Latreille, 1802:317. Type species: *Chrysis lucidula* Fabricius, 1775:358 (= *Sphex nobilis* Scopoli, 1763), by monotypy.

***Hedychrum alfierii* Trautmann, 1926 (Fig. 4A-F)**

Hedychridium alfierii Trautmann, 1926:90. Syntypes ♂; Egypt.

Distribution in Yemen. Yemen (with no specific locality) (Strumia, 2008).

Distribution in the Arabian Peninsula. Arabia (with no specific locality, Linsenmaier, 1999), Oman (Strumia, 2014), Saudi Arabia, United Arab Emirates (Linsenmaier, 1994; Howarth & Gillett, 2008 as *Hedychridium alfierii*).

Extralimital distribution. North Africa, Palestine (Linsenmaier, 1999).

Remarks. Records must be double checked, because they could have been confused with *Hedychrum harteni* **sp. nov.** (see below).

Hedychrum coelestinum* Spinola, 1838

Hedychrum coelestinum Spinola, 1838:454. Holotype ♀; Egypt.

Material examined. 2♀♀, Yemen: Al-Lahima, 16.X.-31.XII.2000, Malaise trap, leg. A.v.Harten & A.M. Hager (RMNH); 3♀♀, Al-Lahima, 1.I.-9.IV.2001, Malaise trap, leg. A. van Harten & A.M. Hajer (RMNH); 4♀♀, Al-Lahima, 9.IV.-5.VI.2001, Malaise trap, leg. A. van Harten (RMNH).

Distribution in Yemen. Al-Lahima (**new record**).

Distribution in the Arabian Peninsula. Yemen (**new record**). Saudi Arabia (Linsenmaier, 1994).

Extralimital distribution. Egypt and sub-Saharan Africa (Madl & Rosa, 2012).

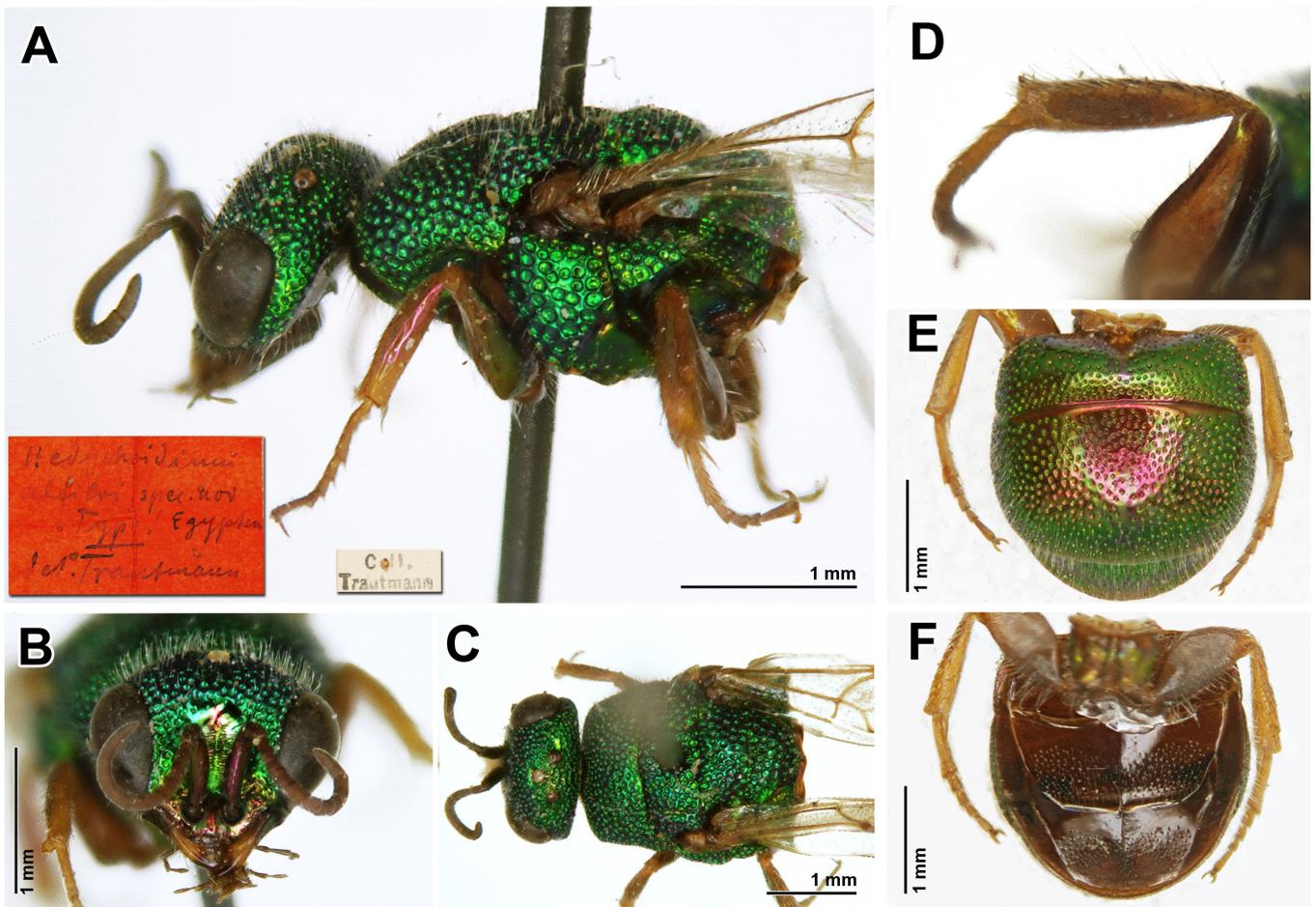


Figure 4. *Hedychrum alfierii* Trautmann, syntype, male (MfN). **A.** Head and mesosoma, lateral view; **B.** Head, frontal view; **C.** Head and mesosoma, dorsal view; **D.** Midleg, postero-lateral view; **E.** Metasoma, dorsal view; **F.** Metasoma, ventral view.

Hedychrum harteni Rosa, sp. nov. (Fig. 5A–F)

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Material examined. **Holotype** ♀, Yemen: Al-Lahima, 16.X.-31.XII.2000, Malaise trap, leg. A.v.Harten & A.M. Hager (RMNH); **Paratypes** 2♀♀, same data and collectors of the holotype (RMNH).

Diagnosis. *Hedychrum harteni* sp. nov. may initially resemble a species related to *H. rutilans* Dahlbom, 1854 due to its elongate pronotum (longer than the combined mesonotum and metanotum) and the coloration of the mesosoma, with a light green pronotum and mesonotum contrasting with a blue metanotum and propodeum. However, the shape of the apical margin of the female third sternum (Fig. 4F) is typical of species closely related to *H. alfierii* Trautmann, 1926. *Hedychrum harteni* sp. nov. shares several characteristics with *H. alfierii* (Fig. 4), which ranges from Egypt to Palestine and Arabia. These shared features include its small size, 5 mm, the apical margin of the female third sternum, which is apically digitate on each hemisternum and medially sinuate along the midline, and the discoloured legs and sterna (Fig. 4A). However, *H. harteni* sp. nov. can be distinguished from *H. alfierii* by the following traits: an elongate pronotum (slightly longer than the scutellum in *H. alfierii*); dense, small punctures on the pronotum without polished interspaces (Fig. 5C) (round and separated punctures on mesosoma, with polished interspaces in *H. alfierii*, Fig. 4C); first tergum densely punctate basally (Fig. 5D) (largely polished in *H. alfierii*, Fig. 4E); metallic blue outer tibiae (non-metallic yellow with a weak rose hue in *H. alfierii*, Fig. 4A); and contrasting green and blue coloration on the mesosoma (head and mesosoma unicolored green in *H. alfierii*, Figs 4A, 5C).

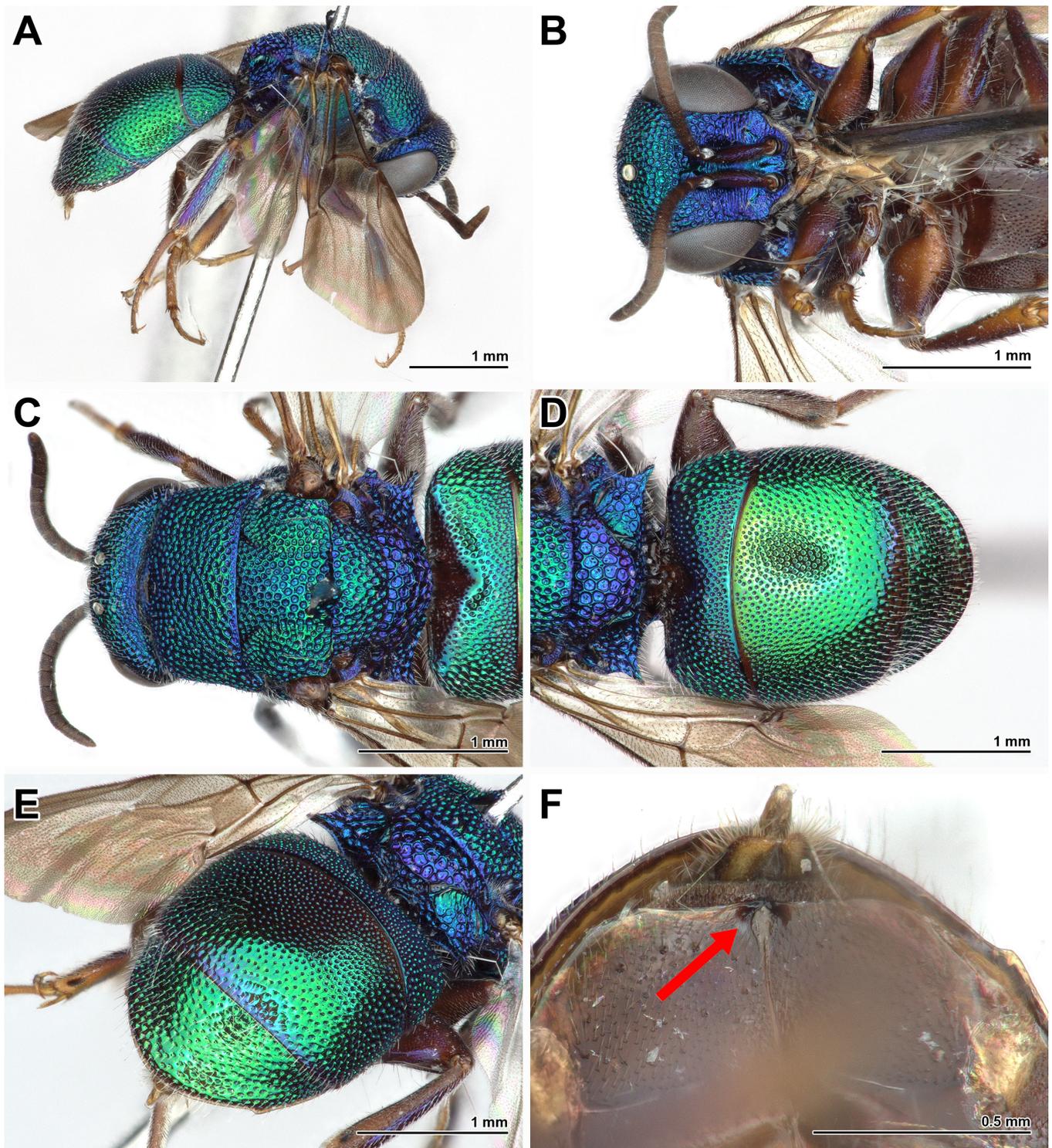


Figure 5. *Hedychrum harteni* Rosa, **sp. nov.**, holotype, female. **A.** Habitus, lateral view; **B.** Head and mesosoma, ventral view; **C.** Head and mesosoma, dorsal view; **D.** Scutellum, propodeum and metasoma, dorsal view; **E.** Metasoma, postero-lateral view; **F.** Metasomal third sternum, ventral view.

Description. — **Holotype** ♀ (Fig. 5A-F). Body length 5.0 mm.

Head. Vertex, frons and temples densely punctate, with small ($0.3\text{--}0.4 \times \text{MOD}$) subcontiguous punctures; without polish spaces; large impunctate area ($1 \times \text{MOD}$) laterad posterior ocelli; scapal basin deep, with sharp wrinkles; clypeus medially impunctate to slightly wrinkled, laterally with dense, rugose sculpture and undefined punctures; subantennal distance short ($0.5 \times \text{MOD}$); clypeal margin

with median dark brown thickened apex, laterally with expanded hyaline rim; OOL = $2.4 \times \text{MOD}$; POL = $2.2 \times \text{MOD}$; MW = 0.7 MOD ; relative length of P:F1:F2:F3 = 1.0:1.2:0.9:0.8.

Mesosoma. Pronotum elongate, as long as scutellum and metanotum together (Fig. 5A); pronotal antero-median line shallow; punctation even, deep, subcontiguous, with small punctures ($0.3\text{--}0.4 \times \text{MOD}$) (Fig. 5B); median area of mesoscutum with similar punctures but with larger, polished interspaces, becoming narrower on lateral sides of mesoscutum; notauli as fine lines, barely visible between punctures, parapsidal furrow deeper, more visible than notauli and elongate; mesoscutellum with smaller and sparser puncture, with polished interspaces; punctures on scutellum larger and subcontinuous laterally and posteriorly; metanotum with large, foveate-reticulate punctures, as large as $1 \times \text{MOD}$; mesopleuron with large, polygonal punctures, subcontinuous without polished interspaces. Propodeal projection as acute triangle, pointing outwards; tarsal claws with pointed submedian tooth.

Metasoma. Metasomal first tergum with relatively small punctures dorsally, becoming larger and deeper at sides; punctures smaller and dense basally on second tergum, becoming very sparse on second half of segment, with polished interspaces up to 2–3 puncture diameter (Figs 5D, 5E); on third tergum with spaced and relatively shallow puncture; third tergum regularly slightly bulging before the apical margin; margin with narrow hyaline rim and two lateral evident angles. Second sternum densely punctate at sides and sparsely punctate medially; third sternum densely micropunctate, with scattered large punctures; apical margin of the third sternum digitate on each hemisternum, sinuate along the midline before the apical teeth (Fig. 5F).

Colour. Head and mesosoma blue, with a light green hue on pronotum and mesonotum contrasting with blue metanotum and propodeum; metasomal sterna brown without metallic reflections; scape iridescent, pedicel and flagellomeres brown; tegula brown; legs brown on ventral side, with metallic colour on outer side; tarsi brownish to light brown; wings brownish.

Vestiture. Head and mesosoma with short ($0.5 \times \text{MOD}$), appressed and whitish setae, longer on propodeum laterally, $1.0 \times \text{MOD}$. Scattered longer setae on mid and hind femora ($1.0\text{--}3.0 \times \text{MOD}$) (Fig. 5B) and scattered, erect setae on mid and hind tibiae; thick and longer setae on first and second terga laterally and on the third posterolaterally ($1.0 \times \text{MOD}$).

Male. Unknown.

Etymology. The specific epithet *harteni* is dedicated to Antonius van Harten, who has made significant contributions to the collection of the material examined in this study and to the broader knowledge of the entomological fauna of the Arabian Peninsula over the past three decades.

Remarks. The previous identifications of *Hedychrum alferii* in Palestine and Arabia need to be reassessed due to existing uncertainties regarding this species (types examined, Fig. 4), for example Kimsey & Bohart (1991) classified this species in the genus *Hedychridium* Abeille de Perrin, 1878.

Distribution. Yemen (Al-Lahima).

Hedychrum parvicavitale Linsenmaier, 1994

Hedychrum parvicavitale Linsenmaier, 1994:157. Holotype ♀; Saudi Arabia: Wadi Majarish.

Material examined. 1♀, Yemen: Al-Lahima, 16.X.2000–31.XII.2000, Malaise trap, leg. A. van Harten & A.M. Hager (RMNH); 1♀, Al-Lahima, I–9.IV.2001, Malaise trap, leg. A. van Harten & A.M. Hojer (RMNH); 2♂♂, 1♀, Al-Lahima, 9.IV.–5.VI.2001, Malaise trap, leg. A. van Harten (RMNH).

Distribution in Yemen. Al-Lahima (new record).

Distribution in the Arabian Peninsula. Yemen (new record). Saudi Arabia (Linsenmaier, 1994).

Extralimital distribution. No records.

Remarks. *Hedychrum parvicavitale* is considered an Arabian endemic, previously known only from females in the type series. In a Malaise trap located at Lahima, both females of this species and males of a closely related *Hedychrum* were collected. I have identified these males as *H. parvicavitale*; however,

notable differences, such as the larger and sparser punctation on the metasoma, raise some doubts on their real attribution. Sex associations in Chrysididae are often challenging, and this interpretation may be revised or confirmed with further findings and molecular analyses.

Genus *Holophris* Mocsáry, 1890

Holophris Mocsáry, 1890:51 (as subgenus of *Ellampus* [!] Spinola, 1806). Type species: *Ellampus* (*Holophris*) *marginellus* Mocsáry, 1890:51 [= *Holophris marginella* (Mocsáry, 1890)], by monotypy.

Holophris coriacea (Dahlbom, 1850) (Fig. 6A)

Omalus coriaceus Dahlbom, 1850:135. Holotype ♀; South Africa.

Material examined. 1♂, Yemen: Sana'a, I.1991, leg. A. van Harten, *Holophris coriaceus* Dahlbom ♂ det. F. Strumia (RMNH); 1♂ and 2♀♀, Sana'a, XII.2002, yellow waver traps, leg. A. van Harten (RMNH); 1♂, Al-Lahima, 1.I.-9.IV.2001, Malaise trap, leg. A. van Harten (RMNH); 1♀, Al-Lahima, 9.IV.-5.VI.2001, Malaise trap, leg. A. van Harten (RMNH); 2♀♀, 12 km NW of Manakhah, 3.VII.-21.VIII.2001, leg. A. van Harten (RMNH); 2♀♀, Ar Rujum, 9.IV.5.VI.2001, leg. A. van Harten (RMNH).

Distribution in Yemen. Sana'a, Al-Lahima, Ar Rujum, Manakhah (new record).

Distribution in the Arabian Peninsula. Yemen (new record).

Extralimital distribution. Guinea Bissau, Kenya, Lesotho, Rwanda, Senegal, South Africa, Tanzania, Uganda (Madl & Rosa, 2012).

Holophris mochiana Strumia, 1995 (Fig. 6B)

Holophris mochianus Strumia, 1995:54. Holotype ♀; Tanzania: Zanzibar.

Material examined. 2♀♀, Yemen: Al-Lahima, 9.IV.-5.VI.2001, Malaise trap, leg. A. van Harten (RMNH); 1♀, Al Kowd, 27.X.-15.XI.1992, Malaise trap, leg. A. van Harten, *Holophris coriaceus* Dahlbom ♀ det. F. Strumia (RMNH).

Distribution in Yemen. Al-Lahima, Al Kowd (Strumia & Dawah, 2012, 2019 as *Holophris mochianus*).

Distribution in the Arabian Peninsula. Yemen (Strumia & Dawah, 2012, 2019). Saudi Arabia (Strumia & Dawah, 2012, 2019 as *Holophris mochianus*).

Extralimital distribution. Tanzania: Zanzibar, Senegal (Strumia, 1995 as *Holophris mochianus*).

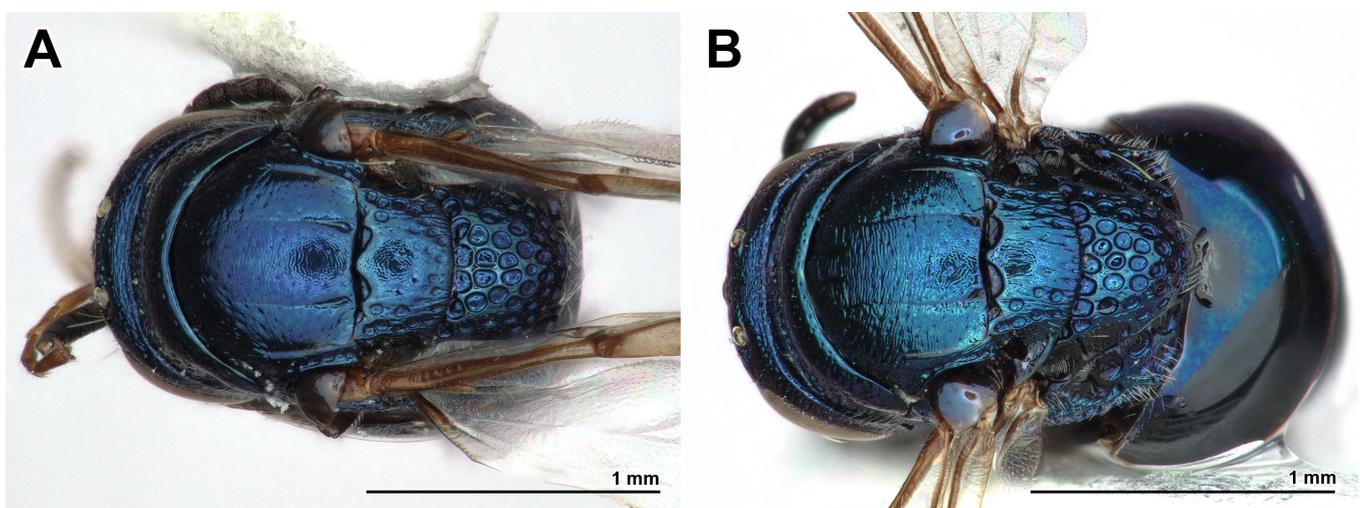


Figure 6. Mesosoma, dorsal view. **A.** *Holophris coriacea* (Dahlbom); **B.** *H. mochiana* Strumia.

Genus *Holopyga* Dahlbom, 1845

Holopyga Dahlbom, 1845:4. Type species: *Holopyga amoenula* Dahlbom, 1845:4, by subsequent designation of Ashmead (1902).

Holopyga arabica Linsenmaier, 1994

Holopyga arabica Linsenmaier, 1994:155. Holotype ♀; Saudi Arabia: Riyadh.

Material examined. 1♂, 1♀, Yemen: Usaifira, 1 mile N of Ta'izz ca. 4,500 ft 21.XII.1937 / B.M. Exp. to S.W. Arabia H. Scott E.B. Britton, B.M. 1938-246 / Paratypes *Holopyga arabica* Lins. Dett. Linsenmaier 1989 / NML_ENT GBIF_Ch0005374, 5375 (NMLU); 1♂, 1♀, N Yemen Wadi Siham 7.VI.1987 leg. Mühle / Paratypes *Holopyga arabica* Lins. Dett. Linsenmaier 1989 / NML_ENT GBIF_Ch0005376, 5377 (NMLU); 1♀, 12 km NW of Manakhah, 21.VIII.-29.X.2002, Malaise trap, leg. A. van Harten (RMNH); 1♀, Al-Lahima, 9.IV.-5.VI.2001, Malaise trap, leg. A. van Harten (RMNH); 1♂, Lahj, 1.IV.-17.V.2000, Malaise trap, leg. A. van Harten & A. Sallam (RMNH); Lahj, III.-V.2002, Malaise trap, leg. A. van Harten (RMNH).

Distribution in Yemen. Al-Lahima, Manakhah, Wadi Siham; Usaifira; Yemen (Linsenmaier, 1994, present study).

Distribution in the Arabian Peninsula. Oman (Linsenmaier, 1994), Saudi Arabia (Linsenmaier, 1994; Strumia & Dawah, 2010, 2012, 2019), United Arab Emirates (Linsenmaier, 1994; Howarth & Gillett, 2008; Strumia, 2014).

Extralimital distribution. Iran (Farhad et al., 2017).

Holopyga beaumonti Balthasar, 1953

Holopyga beaumonti Balthasar, 1953:131. Syntypes ♀, ♂; Palestine: Jordan Valley.

Distribution in Yemen. Yemen (with no specific locality) (Strumia, 2008, 2014; Strumia & Dawah, 2019).

Distribution in the Arabian Peninsula. Oman, Saudi Arabia (Strumia & Dawah, 2012), United Arab Emirates (Strumia, 2014; Farhad et al., 2017).

Extralimital distribution. Egypt, Eritrea, Iran, Palestine, Türkiye (Farhad et al., 2017).

Holopyga speciosissima du Buysson, 1892

Holopyga speciosissima du Buysson (in André), 1892:174, Syntypes ♂, ♀; Uzbekistan: Chodzikent, Türkiye: Ağrı Dagi.

Distribution in Yemen. Yemen (Socotra) (Kohl, 1906).

Distribution in the Arabian Peninsula. Yemen (Socotra) (Kohl, 1906).

Extralimital distribution. Türkiye (Yıldırım & Strumia, 2006).

Remarks. This identification by Kohl (1906) is outdated and questionable and should be re-evaluated, especially given that several species have been described from Arabia and the Middle East since then.

Holopyga subglabrata Linsenmaier, 1994

Holopyga subglabrata Linsenmaier, 1994:153. Holotype ♀; United Arab Emirates: Al Ala (B'low).

Material examined. 1♀: Yemen: Al Kowd, 27.X.-15.XI.1992, Malaise trap, leg. A. Van Harten, *Holopyga subglabrata* Linsenmaier ? det. F. Strumia (RMNH).

Distribution in Yemen. Al Kowd (**new record**).

Distribution in the Arabian Peninsula. Yemen (**new record**). Oman (Strumia, 2008, 2014), Saudi Arabia (Strumia & Dawah, 2012), United Arab Emirates (Linsenmaier, 1994; Howarth & Gillett, 2008; Strumia, 2008, 2014).

Extralimital distribution. No records.

***Holopyga vicissituda* Linsenmaier, 1994**

Holopyga vicissituda Linsenmaier, 1994:155. Holotype ♀; Saudi Arabia: Al Jubail (Arabian Gulf).

Material examined. 1♀, Yemen: Lahj, XI.-XII.1999, Malaise trap, leg. A. van Harten & A. Sallum (RMNH); 1♂, Lahj, III.2000, Malaise trap, leg. A. van Harten (RMNH); 1♂, Lahj, 1.IV.-17.V.2000, Malaise trap, leg. A. van Harten & A. Sallum (RMNH); 1♂, Lahj, 1.X.-17.XII. 2001, Malaise trap, leg. A. van Harten & A. Sallum (RMNH); 2♂♂, 1♀, Lahj, III.-V.2002, Malaise trap, leg. A. van Harten & A. Sallum (RMNH).

Distribution in Yemen. Lahj (**new record**).

Distribution in the Arabian Peninsula. Yemen (**new record**). Oman, Saudi Arabia (Linsenmaier, 1994), United Arab Emirates (Linsenmaier, 1994; Howarth & Gillett, 2008; Strumia, 2014).

Extralimital distribution. Iran (Farhad et al., 2016).

Genus *Philoctetes* Abeille de Perrin, 1879

Philoctetes Abeille de Perrin, 1879:27. Type species: *Elampus micans* Klug, 1835:90, by subsequent designation of Ashmead (1902).

***Philoctetes deflexus* (Abeille de Perrin, 1878)**

Holopyga deflexa Abeille de Perrin, 1878:2. Lectotype ♀ designated by Kimsey (1986); Egypt.

Material examined. 1 ex., Yemen: Near Ta'izz, field on road to Mocha, ca 4,100ft 16.XII.1937 / B.M. Exp. to S.W. Arabia H. Scott & E.B. Britton. B.M. 1938-246 / NML_ENT GBIF_Chr0001612 / *Omalus* (*Philoctetes*) *deflexus* Ab. det. Linsenmaier 1964 (NMLU).

Distribution in Yemen. Ta'izz (Linsenmaier, 1994 as *Omalus* (*Philoctetes*) *deflexus*; present study); no specific locality (Strumia & Dawah, 2019)

Distribution in the Arabian Peninsula. Saudi Arabia (Linsenmaier, 1994 as *Omalus* (*Philoctetes*) *deflexus*; Strumia & Dawah, 2019), United Arab Emirates (Strumia, 2014).

Extralimital distribution. Greece, Northern Africa, Sudan, Palestine, Syria (Kimsey & Bohart, 1991; Linsenmaier, 1994).

***Philoctetes jemenensis* (Linsenmaier, 1994)**

Omalus (*Philoctetes*) *jemenensis* Linsenmaier, 1994:151. Holotype ♂; Yemen: Wadi Siham.

Material examined. 1♂, Yemen: N Jemen Wadi Siham 7.VI.1987 leg. Mühle / Type *Omalus* (*Philoctetes*) *jemenensis* Lins det. Linsenmaier 1989 / NML_ENT GBIF_Chr0001694 (NMLU).

Distribution in Yemen. Wadi Siham (Linsenmaier, 1994 as *Omalus* (*Philoctetes*) *jemenensis*, present study).

Distribution in the Arabian Peninsula. Yemen. United Arab Emirates (Strumia, 2014).

Extralimital distribution. No records.

Remarks. The type is illustrated in Rosa et al. (2023).

Subfamily Chrysidinae Latreille, 1802**Tribe Chrysidini Latreille, 1802****Genus *Chrysidea* Bischoff, 1913**

Chrysidea Bischoff, 1913:34 repl. name for *Chrysogona* Mocsáry, 1882, *nom. praeocc., nec* Förster, 1853. Type species: *Chrysis pumila* Klug, 1845:tav. 45 [= *Chrysidea pumila* (Klug, 1845)], by original designation.

***Chrysidea pumila* (Klug, 1845)**

Chrysis pumila Klug, 1845: Plate 45, fig. 13. Neotype ♂ designated by Rosa & Xu (2015); Egypt: Fayoum.

Material examined. 1♀, Yemen: Al-Lahima, 16.X.-31.XII.2000, Malaise trap, leg. A. van Harten & A.M. Hager (RMNH).

Distribution in Yemen. Al-Lahima (new record).

Distribution in the Arabian Peninsula. Yemen (new record). Saudi Arabia (Strumia & Dawah, 2012).

Extralimital distribution. South Palaearctic and Afrotropical (Kimsey & Bohart, 1991).

Genus *Chrysis* Linnaeus, 1761

Chrysis Linnaeus, 1761:414. Type species: *Sphex ignita* Linnaeus, 1758:571 [= *Chrysis ignita* (Linnaeus, 1758)], by subsequent designation of Latreille (1810).

Chrysis adenica Mocsáry, 1912

Chrysis adenica Mocsáry, 1912:549. Holotype ♀; Yemen: Aden.

Distribution in Yemen. Aden (Mocsáry, 1912).

Distribution in the Arabian Peninsula. Yemen (Mocsáry, 1912; Rosa et al., 2017); Oman (Strumia, 2008), United Arab Emirates (Linsenmaier, 1994 as *Chrysis* (*Cornuchrysis*) *adenica*; Howarth & Gillett, 2008; Strumia, 2008, 2014; Rosa et al., 2017).

Extralimital distribution. No records.

Remarks. *Chrysis adenica* is likely a synonym of *Chrysis quadrispina* du Buysson, 1887, as suggested by Linsenmaier (1968) and Kimsey & Bohart (1991).

Chrysis alternans Dahlbom, 1854

Chrysis alternans Dahlbom, 1854:236. Lectotype ♀ designated by Bohart in Kimsey & Bohart (1991); South Africa: Cape of Good Hope.

Material examined. 1♀, Yemen: Al-Lahima, 16.X.-31.XII.2000, Malaise trap, leg. A. van Harten & A.M. Hager (RMNH).

Distribution in Yemen. Al-Lahima, Yemen (Strumia, 2008, 2014).

Distribution in the Arabian Peninsula. Oman, Saudi Arabia, United Arab Emirates (Linsenmaier, 1994, 1999; Howarth & Gillett, 2008; Strumia, 2014).

Extralimital distribution. North Africa, sub-Saharan Africa (Kimsey & Bohart, 1991; Linsenmaier, 1999).

Chrysis arabica Mocsáry, 1911

Chrysis (*Olochrysis*) *arabica* Mocsáry, 1911:470. Holotype ♂; Aden: Lahij.

Distribution in Yemen. Yemen (Kimsey & Bohart, 1991; Rosa et al., 2017).

Distribution in the Arabian Peninsula. Arabia (with no specific locality, Mocsáry, 1911 as *Chrysis* (*Holochrysis*) *arabica*), Yemen (Kimsey & Bohart, 1991; Rosa et al., 2017).

Extralimital distribution. No records.

Chrysis bilqis Rosa, sp. nov. (Fig. 7A–F)

<https://zoobank.org/urn:lsid:zoobank.org:act:F67DB298-1A58-41E2-926F-A3401FB2BD56>

Material examined. Holotype ♀, Yemen: Lahj, III.-V.2002, Malaise trap, A. van Harten & A. Sallum (RMNH).

Diagnosis. *Chrysis bilqis* sp. nov. belongs to the *leachii* group. Species in this group are very small to small (2.5–5.0 mm), usually brightly colored, with the apex of third metasomal tergum either edentate or with short median tooth, sometimes lanceolate; the transverse frontal carina is faint; the malar spaces are short and strongly convergent; the scapal basin is broadly microridged in both sexes; the black spots on the second sternum vary from medium (covering about half the segment length) to large

(covering two-thirds of the segment length), and are subsquare or subrectangular, normally separated by a narrow metallic line. Aside from a few dark species endemic to the Canary Islands, only two species have both sexes with a completely green to blue body colour and are distributed in Africa and Central Asia: *Chrysis nilensis* Linsenmaier, 1959 and *C. infantula* Semenov-Tian-Shanskij, 1967 (Rosa, 2021). *Chrysis bilqis* **sp. nov.** can be distinguished from the females of *C. nilensis* and *C. infantula* by the following characteristics: even punctation with polished interspaces becoming larger on the second half of the second tergum (vs. coarse, dense punctation, without distinct polished interspaces in the other two species, Fig. 8A); black spots on the second sternum entirely fused medially, laterally and basally, extending under the first sternum (Fig. 7F) (in *C. nilensis* female, the spots are largely separated medially and basally, Fig. 8B; while in *C. infantula* the spots are separated by a narrow metallic line and are expanded below the first tergum).

Description. — **Holotype** ♀ (Fig. 7A–F). Body length: 4.7 mm.

Head. Frons between scapal basin and anterior ocellus with dense, polygonal, large (about $0.6\text{--}0.7 \times \text{MOD}$) and contiguous punctures, without polished interspaces; punctures arranged radially around anterior ocellus with their size regularly decreasing towards ocellus; head posterior to ocelli with smaller punctures; impunctate postero-laterally to ocelli; transverse frontal carina faint; scapal basin deep, with median sharp wrinkles; face between scapal basin and eye margin with large, contiguous punctures like those on frons (Fig. 7B); genal carina straight, sharp, fully developed from temples to mandibular insertion; malar spaces relatively long ($1.4 \times \text{MOD}$); subantennal space short, $0.6 \times \text{MOD}$; apex of clypeus with thin brown rim. OOL $1.9 \times \text{MOD}$; POL $2.8 \times \text{MOD}$; MS $1.4 \times \text{MOD}$; relative length of P: F1: F2: F3 = 1.0: 1.3: 0.8: 0.7.

Mesosoma. Medial pronotal line large and elongate, reaching two-thirds of pronotal length; pronotum as long as mesoscutellum, with deep, large punctures, as large as those on frons, rounded and with narrow, polished interspaces; mesoscutum with double punctation, larger punctures on median area; punctures separated by polished interspaces up to 1 puncture diameter; notauli formed by deep, subrectangular foveae, larger at base, their width smaller than larger adjacent punctures; parapsidal signum as deep line; mesoscutellum with shallow punctures, slightly smaller than those on mesoscutum with wider interspaces; scutellar-metanotal suture deep; metanotum antero-medially with large and deep fovea (Fig. 7C); metanotal punctures denser, without large, polished interspaces; posterior propodeal projections slightly divergent; mesopleuron with punctures similar to those at sides of propodeum; episternal sulcus formed by row of round to subsquare foveae, partially confluent with other punctures.

Metasoma. First tergum densely micropunctate on interspaces; punctures larger dorsally, distinctly smaller and aligned along apical margin (Fig. 7D); largest punctures smaller than those on mesoscutellum; antero-median concavity deep and wide; second tergum with dense, double punctation on disc, with small punctures on interspaces; even, large interspaces between punctures, up to 1 puncture diameter, on remaining tergum, with only scattered small punctures on interspaces; median longitudinal carina indicated by punctate line, composed by small punctures; punctation on third tergum denser, double; apical area without slight pre pit swelling; pits of pit row large, deep, as large as 2–3 puncture diameters (Fig. 7E); apical margin with blunt median tooth (Fig. 7E); apico-median margin bordered by thin, hyaline rim; black spots on second sternum fused medially, forming subrectangular black stripe (Fig. 7F).

Colour. Body entirely blue; scape, pedicel and first flagellomere metallic blue, remaining flagellomeres brown; tegula metallic blue; wings hyaline with brown nervures; legs blue on femur and outer tibia, tarsi brown; sterna metallic blue.

Vestiture. Head and mesosoma with short, whitish setae (up to $1 \times \text{MOD}$); metasoma laterally and posteriorly with long, erected setae, as long as $2 \times \text{MOD}$. Femora and tibiae with scattered, elongate and whitish setae, as long as $2 \times \text{MOD}$ (Fig. 7F).

Male. Unknown.

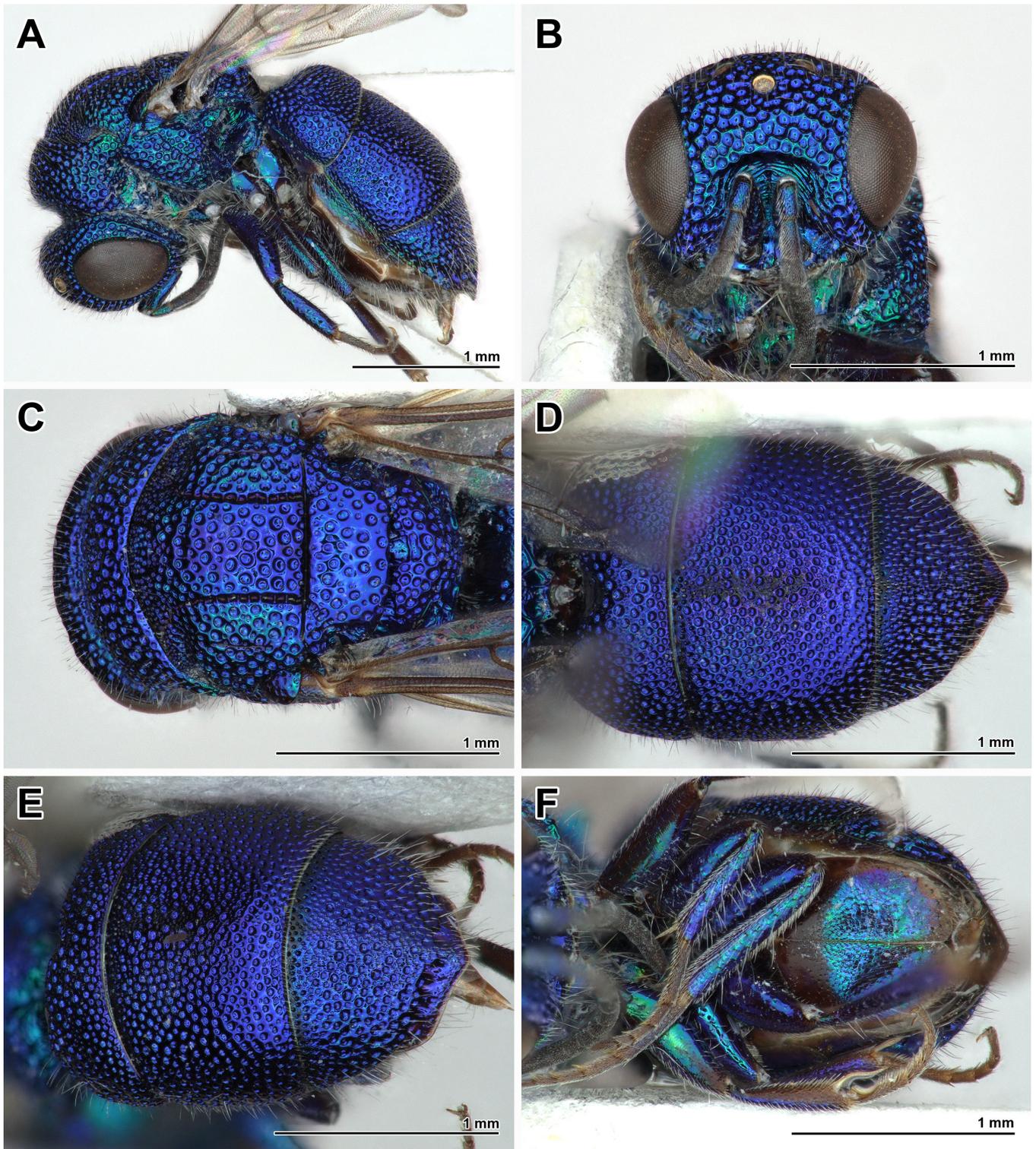


Figure 7. *Chrysis bilqis* Rosa, **sp. nov.** **A.** Habitus, lateral view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, dorsal view; **E.** Metasoma, posterior view; **F.** Metasoma, ventral view.

Etymology. The specific epithet *belqis* is dedicated to Belqis, the Yemenite and Islamic name for the Queen of Sheba, who has become the subject of one of the most widespread and fertile cycles of legends in Asia and Africa. Sheba was the ancient South Arabian kingdom of Saba'a.

Distribution. Yemen.

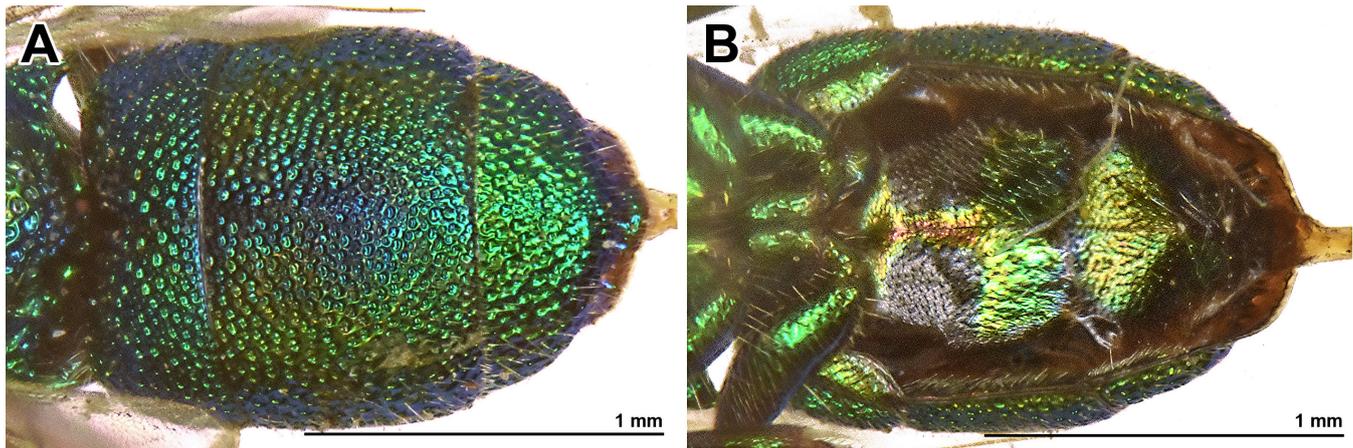


Figure 8. *Chrysis nilensis* Linsenmaier, Egypt, female. **A.** Metasoma, dorsal view; **B.** Metasoma, ventral view.

Chrysis convexianalis Linsenmaier, 1994

Chrysis (*Chrysis*) *convexianalis* Linsenmaier, 1994:179, ♀; Yemen: Hadda.

Material examined. 1♀, Yemen: N Yemen Hadda 30.V.87 leg. Mühle / 459 / Type *Chrysis convexianalis* Lins. det. Linsenmaier 1990 / NML_ENT GBIF_Chr0019414 (NMLU); 1♀, paratype, same data of holotype, NML_ENT GBIF_Chr0019412 (NMLU); 1♀, N Yemen Wadi Siham 7.VI.1987 leg. Mühle / Paratype *Chrysis convexianalis* Lins. det. Linsenmaier 1990 / NML_ENT GBIF_Chr0019413 (NMLU).

Distribution in Yemen. Hadda, Wadi Siham (Linsenmaier, 1994; present study).

Distribution in the Arabian Peninsula. Yemen (Linsenmaier, 1994).

Extralimital distribution. No records.

Chrysis elegantula Spinola, 1838

Chrysis elegantula Spinola, 1838:451. Holotype ♂; Egypt.

Material examined. 1♀, Yemen: Al-Lahima, 16.X.-31.XII.2000, Malaise trap, leg. A. van Harten & A.M. Hager (RMNH); 1♀, Lahj, III.-V.2002, Lalaise trap, A. van Harten & A. Sallum (RMNH).

Distribution in Yemen. Al-Lahima, Lahj (**new record**).

Distribution in the Arabian Peninsula. Saudi Arabia (Linsenmaier, 1994; Strumia & Dawah, 2010, 2012), United Arab Emirates (Strumia, 2014).

Extralimital distribution. Egypt, sub-Saharan Africa (Linsenmaier, 1994, 1999).

Chrysis felix Rosa, sp. nov. (Figs 9A–9F, 10A–10G)

<https://zoobank.org/urn:lsid:zoobank.org:act:836E0F7A-BA42-46D1-8809-45167D79E3BE>

Material examined. **Holotype** ♀, Yemen: 12 km NW of Manakhah, 3.VII.-21.VIII.2001, Malaise trap, leg. A. van Harten (RMNH). **Paratypes** 1♀, same data (RMNH); 1♂, Al-Lahima, I.2009-9.IV.2001, Malaise trap, leg. A. van Harten & A. M. Hager (RMNH).

Diagnosis. *Chrysis felix* sp. nov. belongs to the *succincta* group. It is closely related to the Arabian species *Chrysis maidaquensis* Strumia, 2014, which was originally described from United Arab Emirates and later reported from Iran (Tavasoli & Fallahzadeh, 2015, Farhard et al., 2015; Rosa et al., 2024a). The female of *Chrysis felix* sp. nov. can be easily distinguished by the following combination of characters: frons without transverse frontal carina (Fig. 9B) (*vs.* double carina in *C. maidaquensis*); apical margin of the third tergum with a blunt, large median tooth and two lateral blunt corners (Fig. 9E) (*vs.* three long and pointed teeth in *C. maidaquensis*); black spots on the second sternum rounded and separated medially (Fig. 9F), covering about two-thirds of sternal length (*vs.* black spots fused in a transverse rectangle, covering about half sternal length). The male shares a similar habitus, colour pattern, and sculpture; the median apical tooth of the third tergum is more of an undulation rather than a distinct

lobe or pointed tooth (Figs 10E, 10G); the genital capsule has the inner margin of gonocoxa forming a right angle with the apical margin (Fig. 10F) (the male of *Chrysis maidaquensis* is still unknown).

Description. — **Holotype** ♀ (Fig. 9A–F). Body length: 4.0 mm (female paratype body length: 3.6 mm).

Head. Frons with dense small to medium punctures ($0.3\text{--}0.5 \times \text{MOD}$), subcontiguous without interspaces; frontal carina faint (Fig. 9B); scapal basin deep, fully wrinkled; area between scapal basin and eye with large punctures from frons to malar space; malar space long ($1.4 \times \text{MOD}$) covered by dense, large punctures (Fig. 9C); subantennal space short ($0.7 \times \text{MOD}$); genal carina sharp, fully developed from temple to mandible insertion; clypeal apex with thin brown rim; mandible simple. Distance from anterior ocellus to scapal basin $2.8 \times \text{MOD}$; OOL $1.6 \times \text{MOD}$; POL $2.3 \times \text{MOD}$; MS $1.4 \times \text{MOD}$. Holotype missing both flagella; relative length of P: F1: F2 measured on paratype = 1.0: 1.3: 0.9.

Mesosoma. Medial pronotal line deep and elongate, as long as two thirds of pronotal length; pronotum as long as scutellum; pronotal punctation double with punctures of variable size, with narrow interspaces; punctures smaller along basal margin; mesonotum with double punctation, larger punctures situated medially on mesoscutum and mesoscutellum; punctures separated by polished interspaces; notauli formed by subsquare foveae, relatively small (Fig. 9D); parapsidal signum as deep line; scutellar-metanotal suture deep, formed by longitudinally elongate foveae, longer than larger punctures on mesonotum; metanotal punctures denser, with large anteromedian fovea; posterior propodeal projections subparallel, downwardly directed; mesepimeron with punctures similar to those at sides of propodeum, mesepisternon with smaller punctures; episternal sulcus formed by relatively small irregular foveae, partially confluent each other, as large as punctures on mesepimeron.

Metasoma. First tergum with even, relatively small punctures, smaller than those on mesoscutum, with micropunctate interspaces; second tergum with denser, larger, geminate punctation, becoming shallower, smaller and sparser on the second half of tergum; third tergum with denser punctures, as large as those at base of second tergum, with corrugate interspaces; median longitudinal carina weak, on second tergum formed by aligned micropunctures; pits of pit row deep, round, and black (Fig. 9E); apical margin of third tergum bordered by thick hyaline margin; median tooth as a large lobe or convexity, lateral teeth like blunt angles (Fig. 9E); black spots on second sternum large, covering about two thirds of sternum length and separated medially (Fig. 9F).

Colour. Head blue, green on frons and face; pronotum blue with anterolateral green band; mesoscutum pinkish to purplish, metanotum and propodeum green; notauli, axillae and sutures blue; metasomal first tergum olive green, second and third terga purplish with apical margin green to blue; sterna golden-green. Scape golden-red, pedicel and flagellomeres non-metallic brown; wings hyaline with brown nervures.

Male (Fig. 10). Similar to female for habitus, colour pattern, and sculpture. Sexual dimorphism can be observed in metallic pedicel, longer POL $2.4 \times \text{MOD}$, apical margin of third tergum with three undulations, being the median tooth aligned to lateral ones. Inner margin of gonocoxa fully developed, forming a right angle with apical margin (Fig. 10F).

Etymology. The specific epithet *felix* is derived from the Old Latin name of Yemen *Arabia Felix*, one of the three regions into which the Romans subdivided the Arabian Peninsula: Arabia Deserta, Arabia Felix, and Arabia Petraea. The meaning of *Felix* is both fertile but also happy, fortunate or blessed, being this area well irrigated in the Arabian Peninsula with significant vegetation and river beds (wadis).

Distribution. Yemen (Al-Lahima, Manakhah).

Remarks. The holotype is damaged missing both flagella, fore and mid legs, right hind leg. These damages are likely due to the prolonged stay in the Malaise trap. The paratype is conversely complete. The choice to designate the damaged specimen as holotype is due to the preparation that allows the study of diagnostic characters, such as face and black spots on second sternum which are not visible clearly on the paratype, being prepared rolled up. All the other diagnostic characters like sculpture, relative lengths, colour and shape of apical margin is anyway conforming between the two females.

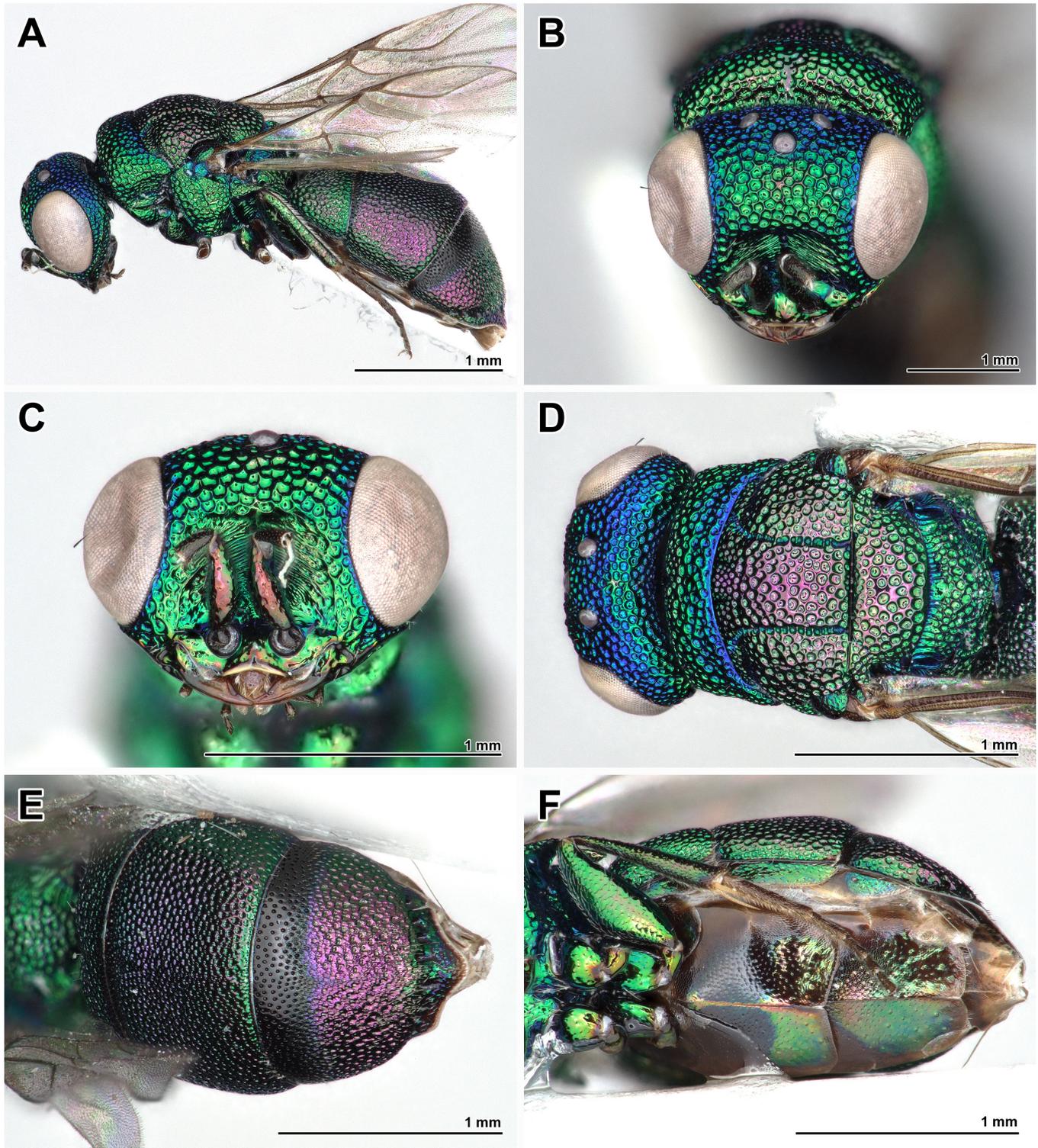


Figure 9. *Chrysis felix* Rosa, **sp. nov.**, holotype, female. **A.** Habitus, lateral view; **B.** Head, frontodorsal view; **C.** Head, frontal view; **D.** Head and mesosoma, dorsal view; **E.** Metasoma, postero-dorsal view. **F.** Metasoma, ventral view.

***Chrysis hadramauta* Linsenmaier, 1994**

Chrysis (*Chrysis*) *hadramauta* Linsenmaier, 1994:185. Holotype ♀; Yemen: Hadramaut.

Material examined. 1♀, Yemen: Hadramaut Coll. Linsenmaier / 460 / Type *Chrysis hadramauta* Lins. det. Linsenmaier 1992 / NML_ENT GBIF_Chr0023418 (NMLU).

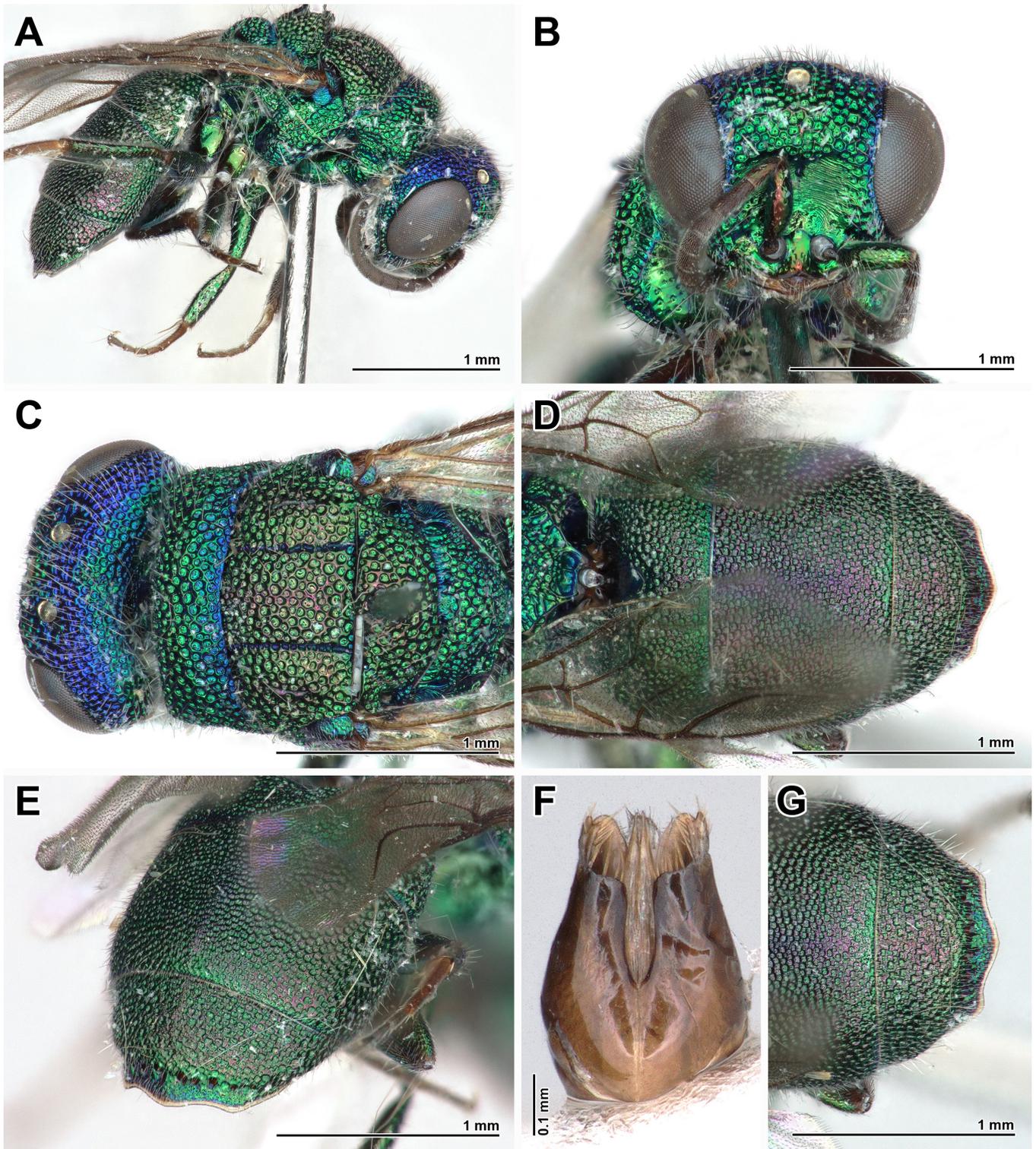


Figure 10. *Chrysis felix* Rosa, *sp. nov.*, paratype, male. **A.** Habitus, lateral view. **B.** Head, frontal view. **C.** Head and mesosoma, dorsal view; **D.** Metasoma, dorsal view; **E.** Metasoma, postero-lateral view; **F.** Genital capsule; **G.** Third metasomal tergum, dorsal view.

Distribution in Yemen. Hadramaut (Linsenmaier, 1994).

Distribution in the Arabian Peninsula. Saudi Arabia (Strumia & Dawah, 2010, 2019).

Extralimital distribution. No records.

***Chrysis jousseaumei* du Buysson, 1898**

Chrysis jousseaumei du Buysson, 1898b:538. Holotype ♂; Djibouti.

Material examined. 3♂♂ and 1♀, Yemen: Lahj, III.-V.2002, Malaise trap, leg. A. van Harten & A. Sallum (RMNH); 1♀, Seiyun, light trap, 12.-14.VII.2002, leg. A. van Harten (RMNH).

Distribution in Yemen. Lahj, Seiyun (present study); Aden (Linsenmaier, 1994 as *Chrysis (Hexachrysis) jousseaumei*).

Distribution in the Arabian Peninsula. Yemen. United Arab Emirates (Linsenmaier, 1994 as *Chrysis (Hexachrysis) jousseaumei*; Howarth & Gillett, 2008; Strumia, 2008; Madl, 2018).

Extralimital distribution. Northern Africa, Somalia to South Africa (Kimsey & Bohart, 1991; Linsenmaier, 1999; Madl, 2018).

***Chrysis lyncea* Fabricius, 1775**

Chrysis lyncea Fabricius, 1775:357. Holotype ♀; West Africa.

Material examined. 2♀♀, Yemen: Wadi Higgan, 7.VIII.1936 (EFC).

Distribution in Yemen. Wadi Higgan (Rosa et al., 2024b; present study).

Distribution in the Arabian Peninsula. Oman, United Arab Emirates (Linsenmaier, 1994 as *C. (Pyria) lyncea*; Howarth & Gillett, 2008; Strumia, 2008), Yemen (Rosa et al., 2024b).

Extralimital distribution. Cyprus, Sub-Saharan Africa (Linsenmaier, 1959, 1994, 1999), Northern Africa.

***Chrysis nilensis* Linsenmaier, 1959 (Fig. 11A-G)**

Chrysis nilensis Linsenmaier, 1959:121. Replacement name for *Chrysis leachii cyanea* du Buysson, 1908.

Material examined. 1♀, Yemen: Seiyun, 12.-14.VII.2002, light trap, leg. A. van Harten (RMNH).

Distribution in Yemen. Seiyun (new record).

Distribution in the Arabian Peninsula. Yemen, Saudi Arabia (Strumia & Dawah, 2012).

Extralimital distribution. Egypt, Sudan and Ivory Coast (Rosa, 2021).

Remarks. I tentatively identify this male specimen (Fig. 11) as *Chrysis nilensis* based on the habitus, sculpture and separated black spots on the second sternum (Fig. 11E). This species is known only from females and therefore the sex attribution is given doubtfully. Males from the type locality in Egypt (around Cairo) are needed for comparison and confirmation.

***Chrysis oxyacantha* Mocsáry, 1913**

Chrysis oxyacantha Mocsáry, 1913:41. Holotype ♀; Eritrea: Keren.

Material examined. 1♀, Yemen: Wadi Hirran, 28.iv.1936 (EFC); 1♂, Sana'a University Campus, 2300m, 3.XI.2005, leg. J. Halada (MHC); 1♂, Wadi Sudd 10 km W Marib, 1120m, 15°24'N, 45°16'E, 8.X.2005, leg. J. Halada (MHC).

Distribution in Yemen. Hajjah Governorate, Sana'a, Wadi Sudd (Rosa et al., 2024b).

Distribution in the Arabian Peninsula. Oman, Yemen (Rosa et al., 2024b).

Extralimital distribution. Eritrea (Mocsáry, 1913).

***Chrysis palliditarsis* Spinola, 1838**

Chrysis palliditarsis Spinola, 1838:449. Holotype ♂; Egypt.

Material examined. 1♂, Yemen: Lahj, III.-V.2002, Malaise trap, leg. A. van Harten & A. Sallum (RMNH); 1♂, Seiyun, 12.-14.VIII.2002, light trap, leg. A. van Harten (RMNH); 1♀, Al Kowd, I.2000, light trap, leg. A. van Harten & S. Al Haruri (RMNH).

Distribution in Yemen. Al Kowd, Lahj, Seiyun (present study).

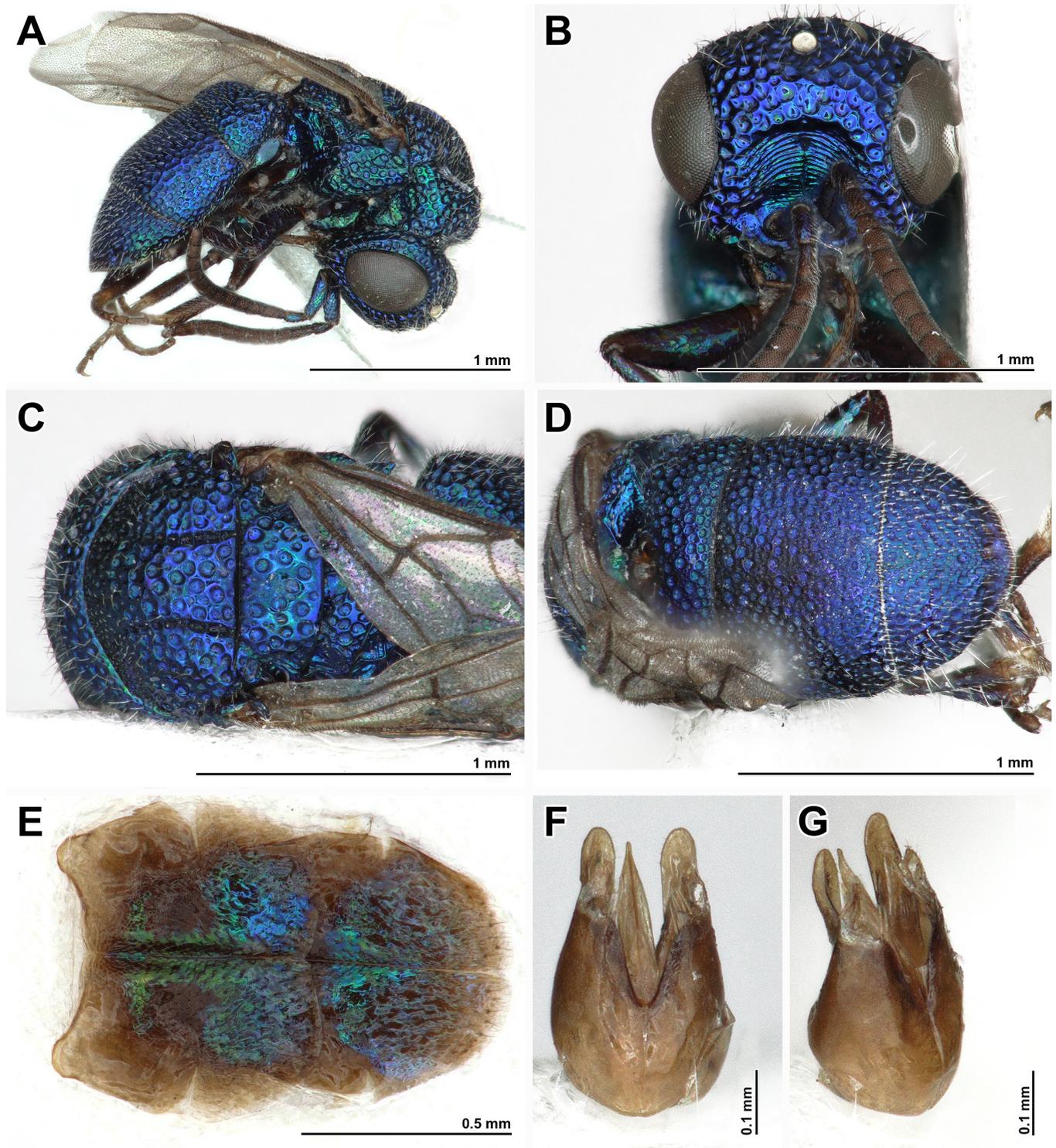


Figure 11. *Chrysis nilensis* Linsenmaier, male. **A.** Habitus, lateral view; **B)** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, dorsal view; **E.** Metasoma, ventral view; **F-G.** Genital capsule, dorsal and lateral view.

Distribution in the Arabian Peninsula. Yemen (Madl, 2018). Oman, Saudi Arabia (Linsenmaier, 1994; Strumia & Dawah, 2019), United Arab Emirates (Linsenmaier, 1994; Howarth & Gillett, 2008; Strumia, 2008, 2014).

Extralimital distribution. Central Asia, Northern Africa, widespread in sub-Saharan Africa (Kimsey & Bohart, 1991; Linsenmaier, 1994, 1999).

***Chrysis quadrispina* du Buysson, 1887**

Chrysis quadrispina du Buysson, 1887:187. Holotype ♀; Egypt.

Material examined. 1♀, Yemen: Sana'a gov., 5 km SW of Matnah vill., stream valley, 15°13'48"N 43°59'42"E, 2750m, 19.xi.2010, leg. J. Hájek (MNHP).

Distribution in Yemen. Sana's (present study), Yemen (Mocsáry, 1912)

Distribution in the Arabian Peninsula. Saudi Arabia (Farasan) (Strumia & Dawah, 2019); Arabia (with no specific locality, Linsenmaier, 1999).

Extralimital distribution. Egypt, Palestine (Kimsey & Bohart, 1991; Linsenmaier, 1999).

***Chrysis robertsi* Rosa, 2021**

Chrysis robertsi Rosa [in Rosa & Greef], 2021, replacement name for *Chrysis (Chrysis) viridicyanea* Linsenmaier, 1968, nec Giebel (1862).

Material examined. 1♀, Yemen: Lahj, III.-V.2002, Malaise trap, leg. A. van Harten & A. Sallum (RMNH).

Distribution in Yemen. Lahj (new record).

Distribution in the Arabian Peninsula. Yemen (new record). Oman (Linsenmaier, 1994), Saudi Arabia (Linsenmaier, 1994; Strumia & Dawah, 2010, 2019), United Arab Emirates (Strumia, 2008, 2014).

Extralimital distribution. Egypt, Libya (Linsenmaier, 1968, 1994; Kimsey & Bohart, 1991).

***Chrysis serva* du Buysson, 1898**

Chrysis serva du Buysson, 1898a:132, Holotype ♂; Egypt: Cairo.

Distribution in Yemen. Yemen (with no locality cited) (Strumia, 2014).

Distribution in the Arabian Peninsula. Yemen (Strumia, 2014). Arabia (with no specific locality, Linsenmaier, 1999), Qatar (Linsenmaier, 1994), United Arab Emirates (Strumia, 2008, 2014).

Extralimital distribution. North Africa, Palestine (Kimsey & Bohart, 1991; Linsenmaier, 1999).

***Chrysis smithii* Gribodo, 1879**

Chrysis smithii Gribodo, 1879:132. Holotype ♀; Egypt: Cairo.

Material examined. 1♀, Yemen: Wadi Hirran, 28.IV.1930 (EFC).

Distribution in Yemen. Hajjah Governorate (Rosa et al., 2024b).

Distribution in the Arabian Peninsula. Yemen (Rosa et al., 2024b). Saudi Arabia (Linsenmaier, 1994 as *Chrysis (Pyria) simillima*).

Extralimital distribution. West Africa and East Africa, from Mali to Sudan (Rosa et al., 2024b).

***Chrysis stilboides* Spinola, 1838**

Chrysis stilboides Spinola, 1838:446. Holotype ♀; Egypt.

Material examined. 1♀, Yemen: Gabal El Mogash (s.w. Sana'a), 31.v.1936 (EFC); 1♂, Wadi Sharis, 1936 (EFC); 3♀, Wadi Higgan, 7.viii.1936 (Manahla-Hajila) (EFC).

Distribution in Yemen. Gabal El Mogash, Wadi Sharis, Wadi Higgan (Rosa et al., 2024b); Yemen (no specific locality) (Madl, 2018).

Distribution in the Arabian Peninsula. Yemen (Madl, 2018). Kuwait (Al-Houty, 1989 as *Stilbum splendidum*), Oman, Saudi Arabia (Linsenmaier, 1994 as *Chrysis (Pyria) stilboides*), United Arab Emirates (Strumia, 2014).

Extralimital distribution. Widespread in sub-Saharan Africa to South Asia (Kimsey & Bohart, 1991; Linsenmaier, 1994; Madl, 2018).

***Chrysis yemenita* sp. nov.** (Fig. 12A–F)

<https://zoobank.org/urn:lsid:zoobank.org:D1513F8E-D995-41BC-A779-F757D9133D2F>

Material examined. **Holotype** ♀, Yemen: Al-Lahima, I.2001–9.IV.2001, in Malaise trap, A. van Harten & A.M. Hajer, RMNH Leiden ex collection ZMAN (RMNH).

Diagnosis. *Chrysis yemenita* sp. nov. belongs to the *succincta* group and is closely related to the Central Asian *Chrysis irenes* Semenov-Tian-Shanskij & Nikol'skaya, 1954, known from Tajikistan. The type is illustrated in Rosa et al. (2017, plate 67). *Chrysis yemenita* sp. nov. can be distinguished by its colour pattern, an important diagnostic character in this species group, as well as by the shape of the apical margin of the third tergum, the pit row and the body punctation. The body colour of *Chrysis yemenita* sp. nov. is blue with red to golden-green areas on the mesosoma and metasoma rather than green with red to purplish areas (Fig. 12A). However, this coloration may have been altered due to prolonged preservation in ethanol from a Malaise trap. Nonetheless, the colour pattern remains a key character for this species: the mesoscutum, scutellum and metascutum and propodeum are red to greenish, contrasting with the blue colour of the basal pronotum, tegula, and mesopleuron (whereas *C. irenes* has only the red mesoscutum contrasting with green scutellum, metascutum and propodeum); pronotum largely greenish anteriorly and laterally (almost entirely green in *C. irenes*); sterna blue (Fig. 12F) (flame red in *C. irenes*); black spots on second sternum separated medially (Fig. 12F) (fused in *C. irenes*); transverse frontal carina fully developed, sharp (Fig. 12B) (faint to barely visible in *C. irenes*); metasomal punctation denser, with larger and deeper punctures (Fig. 12E); third tergum with long, pointed teeth and small, shallow pits of the pit row (short and blunt apical teeth, deep and elongate pits of the pit row in *C. irenes*). It is also similar to *C. chamrosh* Rosa, 2024 [in Rosa et al., 2024a] but immediately distinguishable by the blue colour of the sterna instead of red.

Description. — **Holotype** ♀ (Fig. 12A–F). Body length: 6.2 mm.

Head. Frons with dense small punctures (0.2–0.4 MOD), larger and more spaced on vertex between lateral ocelli and eyes, denser and smaller on ocelli area, occipital area and temples; punctures between scapal basin and transverse frontal carina longitudinally elongate; lateral ocelli with deep lateral fovea; frontal carina sharp, slightly downcurved medially and with curved lateral branches arriving at declivity of scapal basin (Fig. 12B); scapal basin deep, impunctate medially with dense, small to medium punctures laterally; malar space long (1.1 × MOD) covered by this dense punctation; subantennal space short, half as long as malar space; genal carina sharp, fully developed from temple to mandible insertion; apex of clypeus with thin brown rim. OOL 1.8 × MOD; POL 2.3 × MOD; MS 1.1 × MOD; relative length of P: F1: F2: F3 = 1.0: 1.2: 0.8: 0.7.

Mesosoma. Medial pronotal line weak and elongate, reaching one third of pronotal length; pronotum as long as scutellum, with spaced, small to medium punctures, as large as those on vertex, rounded and with polished interspaces; mesoscutum with larger punctures on median area; punctures separated by polished interspaces up to 1 puncture diameter; notauli formed by deep foveae subrectangular at base, small and rounded towards apex (Fig. 12C), parapsidal signum as deep line; mesoscutellum with spaced and shallow punctures, slightly larger than those on mesoscutum; scutellar-metanotal suture deep, formed by longitudinally elongate foveae; metanotal punctures denser, with anteromedian polished area; posterior propodeal projections slightly divergent; mesopleuron with punctures similar to those at sides of propodeum; episternal sulcus formed by subsquare foveae, partially confluent each other.

Metasoma. First and second terga with even punctures, smaller than those on mesoscutum; on first tergum denser, on second tergum with small punctures on interspaces; punctures relatively smaller and sparser only apically and laterally; punctures on third tergum larger than on second tergum; median longitudinal carina weak, on first tergum marked by a black line on the first half, on third tergum more distinct; pits of the pit row deep, black and elongate (Fig. 12E); apical teeth long, sharp with hyaline apical tip; black spots on second sternum separated medially (Fig. 12F), covering half sternum length.

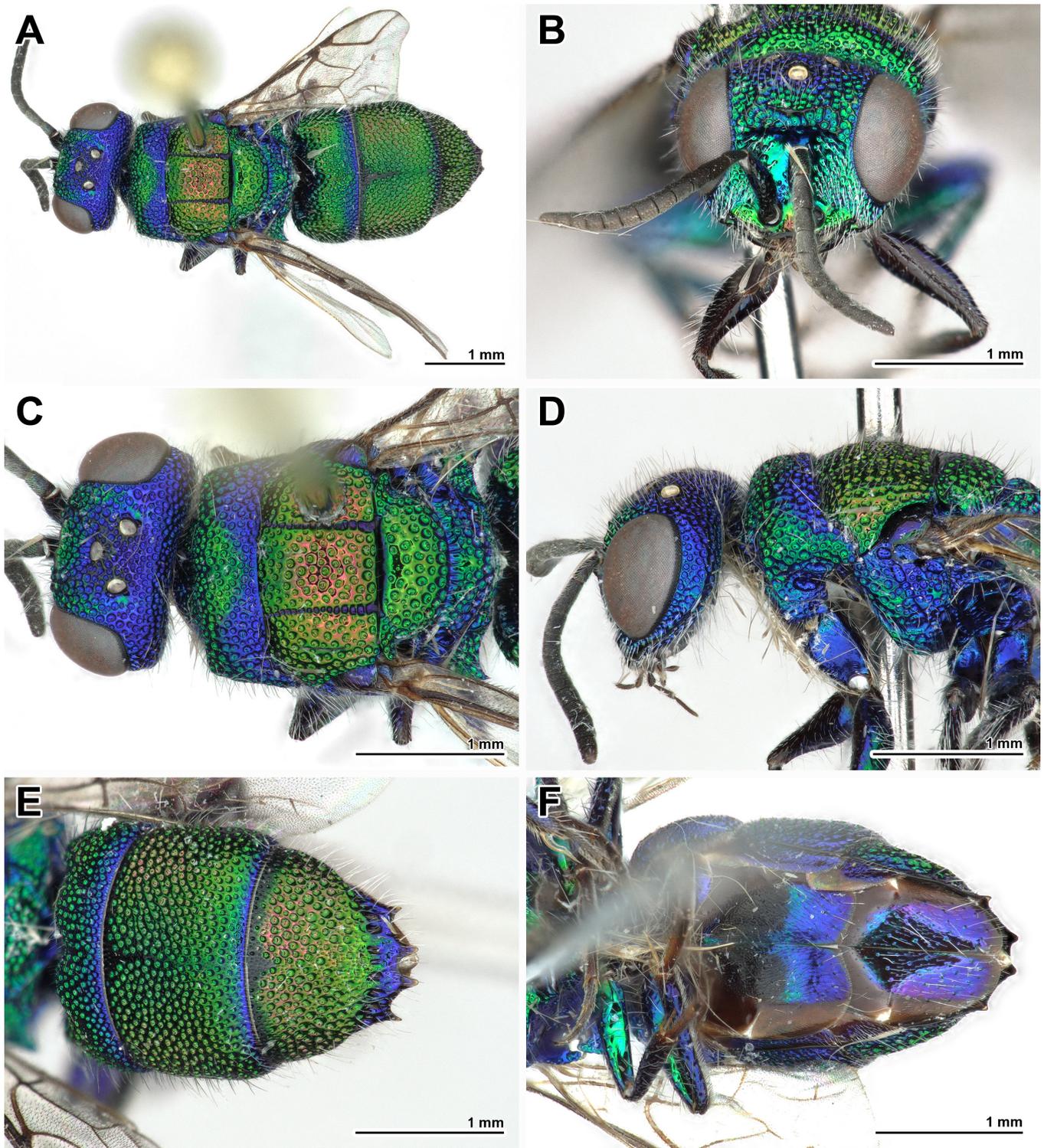


Figure 12. *Chrysis yemenita* Rosa, *sp. nov.*, holotype, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Head and mesosoma, dorsal view; **D.** Head and mesosoma, lateral view; **E.** Metasoma, posterior view; **F.** Metasoma, ventral view.

Colour. Head blue with golden-greenish area on frons, between anterior ocellus and eyes, clypeus; pronotum blue with extended golden-green area anteromedially and laterally; mesoscutum, scutellum, metanotum and propodeum red to golden-greenish; tegula, mesopleuron, legs, notauli, axillae and sutures blue; metasoma golden-green with apical margin of all tergite blue; sterna blue; wings hyaline with brown nervures.

Male. Unknown.

Etymology. The specific epithet *yemenita* is derived from the country name.

Distribution. Yemen (Al-Lahima)

***Chrysis zobeida* du Buysson, 1896**

Chrysis zobeida du Buysson (in André), 1896:474. Holotype ♀; Yemen: Aden.

Distribution in Yemen. Aden (du Buysson, 1896).

Distribution in the Arabian Peninsula. Yemen (du Buysson, 1896) Saudi Arabia (Farasan) (Strumia & Dawah, 2019); Arabia (with no specific locality, Linsenmaier, 1968, 1994 as *Chrysis* (*Cornuchrysis*) *zobeida*).

Extralimital distribution. Egypt, Iran, Palestine (Linsenmaier, 1968, 1994).

Genus *Odontochrydium* Brauns, 1928

Odontochrydium Brauns, 1928:389. Type species: *Odontochrydium trautmanni* Brauns, 1928 [= *Odontochrydium irregulare* (Mocsáry, 1914)], by monotypy.

***Odontochrydium arabicum* Soliman & Rosa, 2022**

Odontochrydium arabicum Soliman & Rosa [in Soliman et al., 2022:290 Holotype ♂; Saudi Arabia: Asir region, Abha, Wadi Mashwas.

Material examined. 1 ♀: Yemen: Al-Lahima, 16.X.-31.XII.2000, Malaise trap, leg. A. van Harten & A.M. Hager, ex coll. ZMAN (RMNH); 1 ♀: Yemen, Al-Lahima, 5.VI.2001, Malaise trap, leg. A. van Harten & A.M. Hager (RMNH). Both specimens are paratypes.

Distribution in Yemen. Al-Lahima (Soliman et al., 2022).

Distribution in the Arabian Peninsula. Yemen (Soliman et al., 2022). Saudi Arabia, Oman (Soliman et al., 2022).

Extralimital distribution. No records.

Genus *Praestochrysis* Linsenmaier, 1959

Praestochrysis Linsenmaier, 1959:164 (as subgenus of *Chrysis* Linnaeus, 1761). Type species: *Chrysis shanghaiensis* Smith, 1874 [= *Praestochrysis shanghaiensis* (Smith, 1874)], by original designation.

***Praestochrysis amplifera* (Linsenmaier, 1994)**

Chrysis (*Praestochrysis*) *amplifera* Linsenmaier, 1994:192. Holotype ♀; Yemen: West Aden, Jebel Jihaf.

Distribution in Yemen. Jebel Jihaf (Linsenmaier, 1994 as *Chrysis* (*Praestochrysis*) *amplifera*).

Distribution in the Arabian Peninsula. Yemen (Linsenmaier, 1994).

Extralimital distribution. No records.

Genus *Spintharina* Semenow, 1892

Spintharina Semenow, 1892:485. Type species: *Chrysis vagans* Radoszkowski, 1877 [= *Spintharina vagans* (Radoszkowski, 1877)], by original designation.

***Spintharina dubai* Bohart, 1987**

Spintharina dubai Bohart, 1987:96. Holotype ♂; United Arab Emirates: Dubai.

Distribution in Yemen. Yemen (Strumia, 2008, 2014).

Distribution in the Arabian Peninsula. Oman, Saudi Arabia, UAE (Linsenmaier, 1994; Strumia, 2008, 2014).

Extralimital distribution. Iran (Farhad et al., 2016).

***Spintharina integerrima* (Klug, 1845)**

Chrysis integerrima Klug, 1845: Plate 45, fig. 14. Type unknown; 'Arabia'.

Distribution in Yemen. Yemen (no specific locality) (Strumia, 2008, 2014).

Distribution in the Arabian Peninsula. "Arabia deserta" (Mocsáry, 1889); Oman (Linsenmaier, 1994 as *Chrysis* (*Spintharina*) *integerrima*; Strumia, 2008), Saudi Arabia (Linsenmaier, 1994 as *Chrysis* (*Spintharina*) *integerrima*; Strumia & Dawah, 2010, 2012, 2019), United Arab Emirates (Linsenmaier, 1994 as *Chrysis* (*Spintharina*) *integerrima*; Howarth & Gillett, 2008 as *Chrysis integerrima*; Strumia, 2014).

Extralimital distribution. Palestine, Iran (Farhad et al., 2016), Sudan (Strumia, 2008).

Genus *Stilbum* Spinola, 1806

Stilbum Spinola, 1806:9. Type species: *Chrysis calens* Fabricius, 1781 [= *Stilbum calens* (Fabricius, 1781)], by subsequent designation of Latreille (1810).

***Stilbum cyanurum cyanurum* (Forster, 1771)**

Chrysis cyanura Forster, 1771:89. Holotype ♂; Spain.

Material examined. 1♀, Yemen: Sana'a, ca. 7900ft Dr. Carl Rathjens 17.-18.IX.1937 B.M. 1938-396 (NMLU).

Distribution in Yemen. Sana'a (present study). Yemen (Kirby, 1903, Socotra; Kohl, 1906, including Socotra; Linsenmaier, 1994; Madl, 2018).

Distribution in the Arabian Peninsula. Yemen (Kirby, 1903, Socotra; Kohl, 1906, including Socotra; Linsenmaier, 1994; Madl, 2018). Kuwait (Walker & Pittaway, 1987; Al-Houty, 1989, 2011), Oman (Walker & Pittaway, 1987; Linsenmaier, 1994; Madl, 2018), Saudi Arabia (Walker & Pittaway, 1987; Linsenmaier, 1994; Strumia & Dawah, 2012; Madl, 2018), United Arab Emirates (Gillett & Gillett, 2005; Howarth & Gillett, 2008; Strumia, 2008, 2014; Madl, 2018),

Extralimital distribution. Afrotropical, Australian, Indo-Malaysian, Palaearctic (Kimsey & Bohart, 1991; Madl, 2018).

***Stilbum cyanurum sokotranum* Linsenmaier, 1987**

Stilbum cyanurum sokotratum Linsenmaier, 1987:156. Holotype ♀; Socotra.

Material examined. 1♀, Socotra: Hadibo Plain. S.L. 19.III.1967 K. Guichard / B.M. 1967-455 / Paratypes *Stilbum cyanurum sokotranum* Lins det. Linsenmaier 1973 / NML_ENT GBIF_Ch0045804, 45805 (NMLU).

Distribution in Yemen. Socotra (Linsenmaier, 1987, 1994).

Distribution in the Arabian Peninsula. Yemen (Socotra) (Linsenmaier, 1987, 1994).

Extralimital distribution. No records for this subspecies.

Genus *Trichrysis* Lichtenstein, 1876

Trichrysis Lichtenstein, 1876:27 (as subgenus of *Chrysis* Linnaeus, 1761). Type species: *Chrysis cyanea* Linnaeus, 1758 [= *Trichrysis cyanea* (Linnaeus, 1758)], by monotypy.

***Trichrysis longispina* (Mocsáry, 1912) (Fig. 13A–G)**

Chrysis longispina Mocsáry, 1912:377, ♀; Yemen: Lahej.

Material examined. 1♀, Yemen: 12 km NW of Manakhah, 6.VII.-21.VIII.2002, Malaise trap, leg. A. van Harten (RMNH); 2♀♀, Suq Bani Mansour, Malaise trap, 28.VIII.-14.XI.2001, leg. A. van Harten (RMNH); 1♀, Al-Lahima, 9.IV.-5.VI.2001, Malaise trap, leg. A. van Harten (RMNH); 1♂, Lahj, 1.IV.-17.V.200, Malaise trap, leg. A. van Harten & A. Sallum (RMNH); 1♀, Lahj, VII.-XI.2001, Malaise trap, leg. A. van Harten & A. Sallum (RMNH); 5 ♂♂, 4 ♀♀, Lahj, III.-V.2002, Malaise trap, leg. A. van Harten & A. Sallum (RMNH); 1♂, Seiyun, 12-14.VIII.2002, leg. A. van Harten, light trap (RMNH).

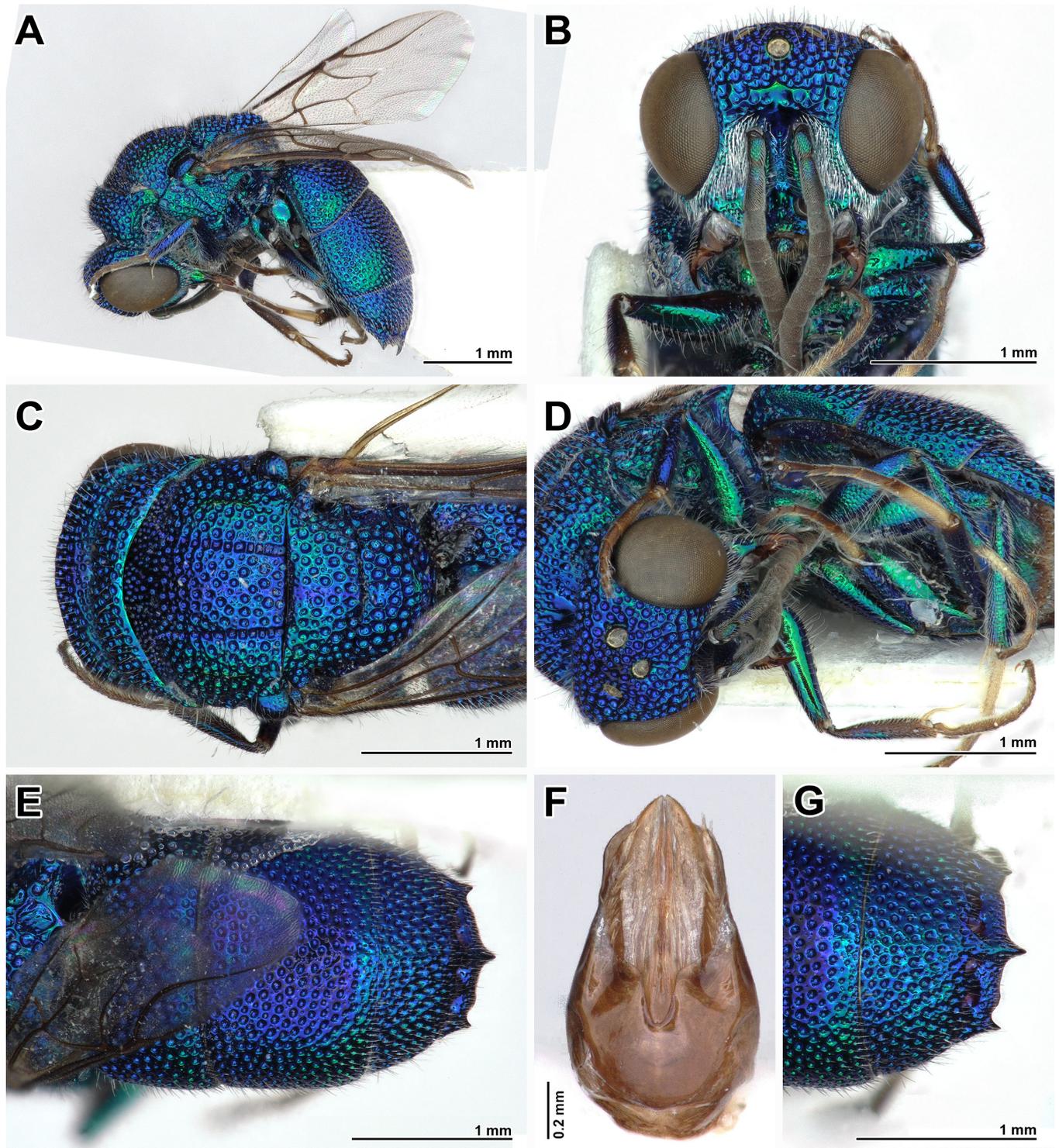


Figure 13. *Trichrysis longispina* (Mocsáry), male. **A.** Habitus, lateral view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Habitus, ventral view; **E.** Metasoma, dorsal view; **F.** Genital capsule; **G.** Third metasomal tergum, postero-dorsal view.

Distribution in Yemen. Manakhah, Suq Bani Mansour, Al-Lahima, Lahj, Seiyun (present study).

Distribution in the Arabian Peninsula. Yemen (Mocsáry, 1912 as *Chrysis* (*Trichrysis*) *longispina*; Strumia, 2009). Oman (Linsenmaier, 1994 as *Chrysis* (*Trichrysis*) *longispina*; Strumia, 2009), Saudi Arabia (Strumia & Dawah, 2010, 2012, 2019), United Arab Emirates (Strumia, 2014; Rosa et al., 2017).

Extralimital distribution. Iran (Farhad et al., 2016).

Remarks. The male of *Trichrysis longispina* was not yet illustrated and described. It can be easily distinguished by males of other species by the hind basitarsus distinctly pale, lighter than other tarsi (Fig. 13D), and by the shape of the genital capsule, with narrow gonocoxae leaving the enlarged edeagus fully visible (Fig. 13F); apical teeth of third tergum are shortened compared to female, yet triangular and pointed (Fig. 13G).

Trichrysis scioensis (Gribodo, 1879)

Chrysis scioensis Gribodo, 1879:344. Holotype ♀; Eastern Africa.

Distribution in Yemen. Aden (Linsenmaier, 1994 as *Chrysis (Trichrysis) scioensis*); no specific locality (Madl, 2018).

Distribution in the Arabian Peninsula. Yemen (Linsenmaier, 1994; Madl, 2018). Oman (Strumia, 2009; Madl, 2018), Saudi Arabia (Strumia & Dawah, 2010; Madl, 2018).

Extralimital distribution. Cameroon, Djibouti, Egypt, Ethiopia, Tanzania to South Africa (Kimsey & Bohart, 1991; Madl, 2018).

Genus *Cephaloparnops* Bischoff, 1910

Cephaloparnops Bischoff, 1910:435. Type species: *Parnopes elegans* Klug, 1845 [= *Cephaloparnops denticulatus* (Spinola, 1838)], by monotypy.

Cephaloparnops denticulatus (Spinola, 1838)

Parnopes denticulatus Spinola, 1838:455. Holotype ♂; Egypt.

Distribution in Yemen. Aden (Mocsáry, 1913 as *Parnopes arabs*; Linsenmaier, 1994 as *Parnopes (Cephaloparnops) denticulatus*; Rosa et al., 2017).

Distribution in the Arabian Peninsula. Yemen (Mocsáry, 1913; Rosa et al., 2017).

Extralimital distribution. Egypt, Sudan (Khartoum), Iran (Rosa et al., 2013).

Genus *Parnopes* Latreille, 1797

Parnopes Latreille, 1797:126 (no species included); Latreille, 1802:317. Type species: *Chrysis carnea* Fabricius, 1775 [= *Parnopes grandior* (Pallas, 1771)], by subsequent designation of Latreille (1802).

Parnopes grandior jemenensis Linsenmaier, 1987

Parnopes grandior jemenensis Linsenmaier, 1987:156. Holotype ♀; Yemen: Wadi Tiban.

Material examined. 1♀, Yemen: Süd Yemen Wadi Tiban coll. Linsenmaier / Type *Parnopes grandior jemenensis* Lins. det. Linsenmaier 1977 / NML_ENT GBIF_Chr0046204 (NMLU).

Distribution in Yemen. Wadi Tiban (Linsenmaier, 1987, 1994).

Distribution in the Arabian Peninsula. Yemen (Linsenmaier, 1987, 1994).

Extralimital distribution. No records for this subspecies.

DISCUSSION

Thanks to recent findings (Rosa et al., 2024b) and the material collected by van Harten, the number of known taxa in Yemen has increased from 32 (Rosa et al., 2020) to 51, including one subspecies. However, this number remains far from comprehensive, partly due to the challenges posed by instability and civil war in recent years, which have made field research difficult to impossible in the country. In contrast, other Arabian countries have seen intensive research activity, including Saudi Arabia (A. Soliman, M. Halada), Oman (M. Halada, C. Schmid-Egger), and the UAE (M. Halada, C. Schmid-Egger, and recent publications by Strumia, 2008, 2014, based on van Harten's collections) with ongoing taxonomic research.

The fauna of Yemen is predominantly Afrotropical for certain hymenopteran families, such as Mutillidae (Lelej & van Harten, 2006). However, based on the limited records available for Chrysididae, we cannot make the same assertion. Currently, 39% of the Yemeni fauna comprises Arabian endemics (20 taxa). Only twelve taxa are shared with the Afrotropical region or with the combined Afrotropical and Northern African fauna (primarily from Egypt), constituting 23.5% of the Yemeni fauna. Other taxa are shared with the Middle East (20 %) or they have broad West Palearctic distribution or even subcosmopolitan (widely distributed and present in more geographical regions). In detail, the Yemeni taxa can be grouped in the following categories, excluding taxa largely distributed in the West Palearctic region:

- Arabian endemics (20 taxa): *Anachrysis arabica* van Loon & Soliman, 2023; *Chrysis adenica* Mocsáry, 1912; *C. arabica* Mocsáry, 1911; *C. bilqis* Rosa, **sp. nov.**; *C. convexianalis* Linsenmaier, 1994; *C. felix* Rosa, **sp. nov.**; *C. hadramauta* Linsenmaier, 1994; *C. yemenita* Rosa, **sp. nov.**; *Hedychrum eudaimon* Rosa, **sp. nov.**; *H. harteni* Rosa, **sp. nov.**; *H. parvicavitale* Linsenmaier, 1994; *Holopyga arabica* Linsenmaier, 1994; *H. subglabrata* Linsenmaier, 1994; *H. vicissituda* Linsenmaier, 1994; *Odontochrydium arabicum* Soliman & Rosa, 2022; *Parnopes grandior jemenensis* Linsenmaier, 1987; *Philoctetes jemenensis* (Linsenmaier, 1994); *Praestochrysis amplifera* (Linsenmaier, 1994); *Stilbum cyanurum sokotranum* Linsenmaier, 1987; *Trichrysis longispina* (Mocsáry, 1912).
- African fauna (both Afrotropical or Afrotropical and Northern African) (12 taxa): *Chrysis alternans* Dahlbom, 1854; *C. elegantula* Spinola, 1838; *C. jousseaumei* du Buysson, 1898; *C. lyncea* Fabricius, 1775; *C. oxyacantha* Mocsáry, 1913; *C. quadrispina* du Buysson, 1887; *C. smithii* Gribodo, 1879; *Elampus afer* (Mocsáry, 1889); *Hedychrum alfieri* (Trautmann, 1927); *H. coelestinum* Spinola, 1838; *Holophris coriacea* (Dahlbom, 1850); *H. mochiana* Strumia, 1995.
- Northern African to Middle East, or Arabian to Middle East (10 taxa): *C. nilensis* Linsenmaier, 1959; *Chrysis robertsi* Rosa, 2020; *Chrysis serva* du Buysson, 1898; *Chrysis zobeida* du Buysson, 1896; *Hedychridium modestum* du Buysson, 1900; *Holopyga beaumonti* Balthasar, 1953; *Philoctetes deflexus* (Abeille de Perrin, 1878); *Spintharina dubai* Bohart, 1987; *Spintharina integerrima* (Klug, 1845); *Trichrysis scioensis* (Gribodo, 1879).

The high rate of endemism and the limited sharing of species with the Afrotropical region in Yemen's fauna raises questions about the underlying causes of these patterns. One plausible explanation is the historical lack of comprehensive records from Africa concerning Chrysididae. The available knowledge on Afrotropical Chrysididae remains sparse and fragmented, primarily consisting of scattered and occasional data that were published mainly in the nineteenth and twentieth centuries (Madl & Rosa, 2012). Hopefully future research conducted in Arabian countries and in Eastern Africa will provide a better understanding of the cuckoo wasp distribution and assemblage in this area.

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The author confirms his contribution to the whole processing steps in the research, conceptualization, preparation, illustration, and correction of this paper. He read and approved the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited at RMNH, NMLU and NHM and are available from the curators, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The author declares that there is no conflict of interest regarding the publication of this paper.

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مطالعه فون زنبورهای فاخته‌ای (Hymenoptera: Chrysididae) یمن با توصیف پنج گونه جدید و فهرست روزآمد گونه‌ها

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چکیده: یافته‌های جدید از فون زنبورهای Chrysididae کشور یمن ارائه شد. با بررسی نمونه‌های جمع‌آوری شده، اخیراً، یازده گونه برای اولین بار در این کشور ثبت شده‌اند: *Hedychridium Elampus afer* (Mocsáry, 1889)؛ *Holophris coriacea* (Dahlbom, 1838)؛ *Hedychrum coelestinum* Spinola, 1838؛ *scutellare* (Tournier, 1878)؛ *H. parvocavitale*؛ *H. vicissituda* Linsenmaier, 1994؛ *Holopyga subglabrata* Linsenmaier, 1994؛ *C. nilensis*؛ *Chrysis elegantula* Spinola, 1838؛ *Chrysidea pumila* (Klug, 1845)؛ Linsenmaier, 1994؛ *Hedychrum Elampus afer*؛ *Chrysis robertsi* Rosa, 2020 و Linsenmaier, 1959. لازم به ذکر است که *Holophris coriacea* و *coelestinum* که قبلاً به عنوان گونه‌های آفریقایی در نظر گرفته می‌شدند، اکنون برای اولین بار در شبه جزیره عربی نیز ثبت شدند. علاوه بر این، پنج گونه جدید شامل موارد ذیل برای علم توصیف شده‌اند: *Hedychridium eudaimon* sp. nov. (از یمن و عربستان سعودی)؛ *Chrysis Hedychrum harteni* sp. nov.؛ *Chrysis bilqis* sp. nov. (گروه *leachii*)؛ *Chrysis yemenita* sp. nov. و *Chrysis felix* sp. nov. (گروه *succincta*) همچنین تصاویر نمونه نر گونه *Trichrysis longispina* (Mocsáry, 1912) برای اولین بار ارائه شد.

واژگان کلیدی: آفروتروپیکال، شبه جزیره عربی، توزیع، ثبت‌های جدید، طبقه‌بندی