J. Insect Biodivers. Syst. 10 (4), 827–951 *https://jibs.modares.ac.ir*

OPEN ACCESS

Tarbiat Modares University Press | Monograph | https://doi.org/10.61186/jibs.10.4.827 | **ISSN**: 2423-8112
Entomological Society of Iran | Taxonomy | *https://zoobank.org/urn:lsid:zoobank.org:A2E0867D-FBD6-4095-9B7D-A4EC255DBDBB*

Journal of
Insect Biodiversity and Systematics

The Iranian Chrysididae (Hymenoptera), the current state of the art, with an updated checklist and description of eleven new species

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Published by **T**arbiat **M**odares **U**niversity
& **E**ntomological **S**ociety of **I**ran

TMU PRESS

Citation: Rosa, P., Farhad, A., Talebi, A.A., Ameri, A., Baiocchi, D., Halada, M. & Rakhshani, E. (2024) The Iranian Chrysididae (Hymenoptera), the current state of the art, with an updated checklist and description of eleven new species. *Journal of Insect Biodiversity and Systematics*, 10 (4), 827–951.

Published: 14 August 2024

Accepted by: Majid Fallahzadeh

TMU PRESS, 2024
P.O. Box: 14115–336
TARBIAT MODARES UNIVERSITY
TEHRAN, I.R. IRAN
https://jibs.modares.ac.ir
Email: jibs@modares.ac.ir
ISSN: 2423-8112

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ABSTRACT. In recent years, the research on the Iranian Chrysididae has been extremely prolific, thanks to the efforts of different teams. After the first checklist published by Rosa et al. (2013), more than one hundred taxa of cuckoo wasps have been recorded as new for Iran, including nine taxa described as new for science. Moreover, major modifications impacted the taxonomy of the family with two genera revaluated (*Chrysellampus* Semenov-Tian-Shanskij, 1932 and *Colpopyga* Semenov-Tian-Shanskij, 1954), *Pseudochrysis* Semenow, 1891 reintroduced for *Pseudospinolia* Linsenmaier, 1951; the description of the genus *Morphochrysis* Rosa & Pavesi, 2023 and several taxonomical changes to species level which were published and that deeply changed the first checklist, namely. As a consequence of all these fragmented changes, we propose a new, updated checklist of the Iranian species, to summarize all the new findings published in the last years. We describe eleven new species for science, *Chrysis amerii* Rosa & Farhad, **sp. nov.**, *C. chamrosh* Rosa, **sp. nov.**, *C. crenulata* Rosa, **sp. nov.**, *C. edentata* Rosa & Baiocchi, **sp. nov.,** *C. peri* Rosa & Baiocchi, **sp. nov**. and *C. titanica* Rosa, **sp. nov.** (*succincta* group), *C. mediasignata* Rosa, **sp. nov.** (*leachii* group), *C. heimi* Rosa, **sp. nov.** (*maculicornis* group), *C. simurgh* Rosa, **sp. nov.** (*subsinuata* group), *Chrysura filidichroa* Rosa, **sp. nov.** (*dichroa* group) and *Hedychridium personatum* Rosa, **sp. nov.** with its own new species-group. We report twenty-six new records of Chrysidinae for Iran: *Chrysidea disclusa* (Linsenmaier, 1959); *Chrysis afghanica* Linsenmaier, 1968; *C. cylindrica* Eversmann, 1858; *C. echidna* Semenov-Tian-Shanskij, 1967; *C. grohmanni bolivari* Mercet, 1902; *C. klio* Balthasar, 1953; *C. laetula* Semenov-Tian-Shanskij & Nikol'skaya, 1954; *C. leuconoe* Semenov-Tian-Shanskij, 1967; *C. maracandensis* Radoszkowski, 1877; *C. mirabilis* Radoszkovsky, 1877; *C. mossulensis* Abeille de Perrin-du Buysson, 1887; *C. pseudobrevitarsis* Linsenmaier, 1951; *C. robertsi* Rosa, 2020; *C. rutilans* Olivier, 1791; *C. turcomana* Semenov-Tian-Shanskij & Nikol'skaya, 1954; *Chrysura laodamia laodamia* (du Buysson, 1900); *Euchroeus pellucidus* (Radoszkowski, 1877); *Hedychridium bytinskii* Linsenmaier, 1959; *H. mochii* Strumia, 1994; *H. plagiatum* (Mocsáry, 1883); *Hedychrum concinnum* (Mocsáry, 1909); *H. semicyaneum* Mocsáry, 1889; *Spinolia stchurovskyi* (Radoszkowski, 1877); *Spintharina extrema* (Semenov-Tian-Shanskij & Nikol'skaya, 1954), and *S. houskai* (Balthasar, 1953). The current number of known taxa has therefore increased from 185 (179 species and 6 subspecies) to 315 (306 species + 9 subspecies). *Hedychrum persicum* Mocsáry, 1914 **stat. nov.** is upgraded to species rank. *Chrysis chrysophora* Semenow, 1892 and *Hedychrum cyaneum* Brullé, 1846 are considered ***nomina dubia*** and the latter as ***incertae sedis***. *Chrysis dawahi* Strumia, 2012 is considered ***nomen nudum***. The majority of chrysidid species in Iran (77.64%) are found exclusively in the Western Palaearctic region. Among these, 21% are restricted to the Western Palaearctic. A thorough discussion is also provided on unreliable and doubtful species records.

Received:
20 July 2024

Accepted:
01 August 2024

Published:
14 August 2024

Subject Editor:
Majid Fallahzadeh

Key words: Cleptinae, Chrysidini, cuckoo wasps, distribution, Elampini, Parnopini

INTRODUCTION

In recent years, the study of cuckoo wasps in the Iranian fauna has attracted unprecedented interest, even surpassing that observed in neighboring countries. In about a decade, thanks to the efforts of various research groups, the number of known taxa has increased from 185 (179 species and 6 subspecies) known before this article, to 279 cited herein (271 species and 8 subspecies). The initial milestone in this rapid advancement was the publication of the first preliminary checklist of Iranian Chrysididae by Rosa et al. (2013), which marked the outset of an ongoing expansion in understanding this group's faunal diversity within Iran. In recent years, over twenty articles have been published to emphasize the richness of chrysidid fauna in Iran (Rosa & Lotfalizadeh, 2013; Rosa et al., 2013; Torabipour et al., 2013a, 2013b; Ebrahimi, 2015; Farhad et al., 2015a, 2015b; 2016a, 2016b, 2017, 2018, 2019; Tavasoli & Fallahzadeh, 2015; Strumia & Fallahzadeh, 2015, 2016; Strumia et al., 2016a, 2016b; Farzaneh et al., 2016,

2017; Iranmanesh et al., 2017; Falahatpisheh et al., 2019, 2020, 2021; Rosa, 2020). Furthermore, numerous discoveries and revisions in nomenclature and taxonomy involving Iranian chrysidids have significantly changed the previous classification of genera and species, compared to just a few years ago, and to the framework of the main world catalogue by Kimsey & Bohart (1991) (e.g. Rosa, 2017, 2018a, 2018b; Rosa & Vårdal, 2015, Rosa et al., 2015d, 2017a, 2017c, 2017d, 2023a, 2023b; Boustani & Rosa, 2022). In particular, some major changes impacted the classification of the chrysidid genera after the publication of the checklist by Rosa et al. (2013): *Chrysellampus* Semenov-Tian-Shanskij, 1932 and *Colpopyga* Semenov-Tian-Shanskij, 1954 were reinstated (Rosa et al., 2015c; Rosa, 2017); the name *Pseudochrysis* Semenow, 1891 was reintroduced for *Pseudospinolia* Linsenmaier, 1951 (Rosa et al., 2017c); the genus *Morphochrysis* Rosa & Pavesi, 2023 was described to accommodate the species of the *pulchella* species-group (Rosa et al., 2023a), while members of the *inaequalis* species-group were confirmed to be *Pentachrysis* Lichtenstein, 1876 (Pauli et al., 2019), as previously suggested by Linsenmaier (1959a, 1968, 1999). Further changes involved species names and species concepts, as outlined in detail in the final discussions.

This publication aims to consolidate and summarize the diverse changes concerning the Iranian fauna, encompassing species composition, taxonomy, and nomenclature. These modifications, previously dispersed across various journals, are synthesized to offer an updated version of the previous checklist.

MATERIAL AND METHODS

The present checklist includes data gathered from literature, museums and private collections. New materials were collected mostly in northern provinces (Gilan, Mazandaran, Alborz, and Qazvin) and southern provinces (Hormozgan, Kerman, and Fars) using the Malaise traps and sweep netting during the years 2010–2013, and are mostly conserved in the Iranian collections of the Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran (**TMUC**). Other type specimens are deposited in the collection of the Museo Civico di Storia Naturale in Milan, Italy (**MSNM**). Important collections outside Iran with referenced Iranian materials are Natural History Museum Prague, Czech Republic (**NHMP**); NaturMuseum, Luzern, Switzerland (**NMLU**); Biodiversitätszentrum Oberösterreichische, Linz, Austria (**BZL**); Zoological Institute, St. Petersburg, Russia (**ZIN)** and the private collections of the first author (**PRC**), Daniele Baiocchi (Roma, Italy, **DBC**) and Marek Halada (Czech Republic, **MHC**).

In the present paper, we follow Linsenmaier (1968, 1987, 1997, 1999) for the definition of the geographic concept of Palestine, intended as the area currently composed of the modern State of Israel, the West Bank, and the Gaza Strip. In this sense, "Palestine" is considered as the geographical region in Western Asia without any reference to the current land claimed by the State of Israel. The definitions of holotype, neotype, lectotype, etc. are used according to the International Code of Zoological Nomenclature (ICZN, 1999), fourth edition. Names of genera are listed alphabetically within tribes, and species names are listed alphabetically within genera. New records for Iran are asterisked (*) in the distribution. The present checklist is intended as an emendation of the first one (Rosa et al., 2013), which is considered as the base-line for old citations. Historical records and citations for species already mentioned in the first checklist are therefore not reported here. Personal comments are enclosed in square brackets [ ]. Photographs of the specimens were taken with a Keyence VHX-970F with a VHX-7020 photo camera and the objective VH-Z20R/Z20T. Abbreviations used in the taxonomic part and the descriptions are as follows: descr. = description; fig. = figure; 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); S = metasomal sternum; T = metasomal tergum; tax. = taxonomic discussion.

RESULTS

A total of 315 species of the family Chrysididae are recorded from Iran, divided into 25 genera, belonging to two subfamilies and three tribes, among which eleven new species are listed.

Taxonomic hierarchy

Class Insecta Linnaeus, 1758

Order Hymenoptera Linnaeus, 1758

Superfamily Chrysidoidea Latreille, 1802

Family Chrysididae Latreille, 1802

Subfamily Cleptinae Latreille, 1802

Genus *Cleptes* Latreille, 1802

Cleptes Latreille, 1802:316. Type species: *Sphex semiaurata* Linnaeus, 1761 [= *Cleptes semiauratus* (Linnaeus, 1761)], by monotypy.

***Cleptes semiauratus* (Linnaeus, 1761)**

Sphex semiauratus Linnaeus, 1761:413. Lectotype ♀ designated by Day, 1979:72; Sweden: Scania (type depository: London, Linnean Society).
Cleptes semiauratus: Strumia & Fallahzadeh, 2015:17 (Alborz).

Distribution. Iran (Alborz). Widely distributed from Europe to Caucasus and Türkiye (Móczár, 2001).

Remarks. The specimen listed by Strumia & Fallahzadeh (2015) may refer to *Chrysis striatipleuris* Rosa, Forshage, Paukkunen & Soon, 2015, which is mostly distributed in the Southern Palaearctic. The identification of the two specimens cited by Strumia & Fallahzadeh (2015) was done before the revision of these two *Cleptes* species by Rosa et al. (2015b). A confirmation of the identification is needed.

***Cleptes splendidus* (Fabricius, 1794)**

Ichneumon splendidus Fabricius, 1794:457. Holotype ♂; Italy (Copenhagen).
Cleptes hyrcanus Semenov-Tian-Shanskij, 1920:322. Holotype ♂; Iran: Gorgan [former Astrabad], 3.v.1914, A. Kirichenko (St. Petersburg).
Cleptes splendidus: Rosa et al., 2013:4 (Golestan); Farzaneh et al., 2017:495 (Fars).

Distribution. Iran (Fars, Golestan). Widespread in the Palaearctic, namely Europe, Georgia, Türkiye, and Southern Russia (Móczár, 1997, 1998).

***Cleptes striatipleuris* Rosa, Forshage, Paukkunen & Soon, 2015**

Cleptes striatipleuris Rosa, Forshage, Paukkunen & Soon, 2015:547. Holotype ♂; Hungary: Verőce, 35 km N Budapest (Tartu).
Cleptes striatipleuris: Falahatpisheh et al., 2021:138 (Fars).

Material examined. 1♂, Fars: SE of Khomer, Kuh-e Barm Firuz, 30°25'24"N, 51°53'38"E, 2600m, 15.v.2013, leg. D. Baiocchi (PRC).

Distribution. Iran (Fars). South-eastern Europe, Caucasus, Russia, and USA (Rosa et al., 2015b, 2019).

Subfamily Chrysidinae Latreille, 1802

Tribe Elampini Dahlbom, 1854

Genus *Chrysellampus* Semenov-Tian-Shanskij, 1932

Chrysellampus Semenov-Tian-Shanskij, 1932:5. Type species: *Ellampus heros* Semenow, 1892, by original designation. Junior subjective synonym of *Philoctetes* Abeille de Perrin, 1879 according to Kimsey & Bohart (1991) and Rosa et al. (2013). Genus revalidated by Rosa et al. (2015c).

Chrysellampus medanae (du Buysson, 1890)

Ellampus medanae du Buysson [in Magretti], 1890:531. Lectotype ♀ designated by Rosa, 2009:244; Lebanon: Alei (Genoa).
Philoctetes medanae: Rosa et al., 2013:13 (Alborz, Golestan, Markazi, Qazvin).
Chrysellampus medanae: Iranmanesh et al., 2017:296 (key); Farhad et al., 2018:192 (key, Alborz, Qazvin).

Distribution. Iran (Alborz, Golestan, Markazi, Qazvin). Lebanon, Syria, Türkiye (Rosa et al., 2013).

Chrysellampus pici (du Buysson, 1900)

Ellampus pici du Buysson, 1900:126. Holotype ♂; Türkiye: Smyrne [currently İzmir] (Paris).
Omalus (*Chrysellampus*) *nigromaculatus* Linsenmaier, 1997:249. Holotype ♂; Türkiye: Ankara (Luzern).
Chrysellampus shestakovi Semenov-Tian-Shanskij, 1967:119. Holotype ♂; Turkmenistan: Firyuza (St. Petersburg).
Chrysellampus pici: Iranmanesh et al., 2017:296 (key); Farhad et al., 2018:192 (key), 193 (Fars, Tehran).

Distribution. Iran (Fars, Tehran). Greece (Peloponnese and Rhodes) (Arens, 2014), Türkiye (du Buysson, 1900).

Chrysellampus tatianae (Semenov-Tian-Shanskij, 1967)

Chrysellampus tatianae Semenov-Tian-Shanskij, 1967:120. Holotype ♂; Iran: East-Azarbaijan: Tabriz (St. Petersburg).
Philoctetes tatianae: Rosa et al., 2013:13.
Chrysellampus tatianae: Iranmanesh et al., 2017:294 (Kerman), 296 (key, fig. 2). Farhad et al., 2018:193 (Alborz Province); Farhad et al., 2018:192 (key), 193 (Alborz, East-Azarbaijan).

Distribution. Iran (Kerman, Alborz, East-Azarbaijan). Central Asia (Kimsey & Bohart, 1991).

Genus *Colpopyga* Semenov-Tian-Shanskij, 1954

Colpopyga Semenov-Tian-Shanskij, 1954:137. Type species: *Hedychrum flavipes* Eversmann, 1858, by original designation. Junior subjective synonym of *Hedychridium* Abeille de Perrin, 1878 according to Linsenmaier (1959a), Kimsey & Bohart (1991) and Rosa et al. (2013). Palaearctic species revised by Rosa (2017).

Colpopyga flavipes rugulosa (Linsenmaier, 1959)

Hedychridium (*Hedychridium*) *flavipes rugulosum* Linsenmaier, 1959a:57. Holotype ♀; Cyprus: Limassol (Luzern).
Hedychridium flavipes rugulosum: Torabipour et al., 2013a (East-Azarbaijan); Ebrahimi, 2015:57 (East-Azarbaijan); Rosa et al., 2013:5 (East-Azarbaijan); Strumia et al., 2016b:52 (Fars); Farzaneh et al., 2017:495 (Fars); Falahatpisheh et al., 2019:2 (Fars).

Distribution. Iran (East-Azarbaijan, Fars). West-Palaearctic, Cyprus, Palestine, Middle East; Central Asia: Kazakhstan, Kyrgyzstan, Turkmenistan; Northern Africa: Egypt (Linsenmaier, 1999).

Genus *Elampus* Spinola, 1806

Elampus Spinola, 1806:10. Type species: *Chrysis panzeri* Fabricius, 1804 [= *Elampus panzeri* (Fabricius, 1804)], by subsequent designation of Latreille, 1810:437.

Elampus constrictus (Förster, 1853)

Notozus constrictus Förster, 1853:336. Holotype ♂; Germany: Aachen (Berlin).
Elampus constrictus: Rosa et al., 2013:4 (Markazi); Rosa, 2020:462 (Gilan).

Distribution. Iran (Gilan, Markazi). Palaearctic, from Northern Africa (Linsenmaier, 1959a, 1968) to Europe, Russia and China (Rosa et al., 2014).

Elampus eversmanni (Mocsáry, 1889)

Elampus ambiguus Eversmann, 1858:549. Holotype ♂; Russia: Saratov Prov. (Kraków), *nom. praeocc.*, *nec* Dahlbom, 1854.
Ellampus (*Notozus*) *eversmanni* Mocsáry, 1889:80. Replacement name for *Elampus ambiguus* Eversmann, 1858.
Elampus eversmanni: Rosa et al., 2013:4 (Esfahan).

Distribution. Iran (Esfahan). Russia, Caucasus, Central Asia: Kazakhstan (Rosa et al., 2013).

Elampus hyrcanus (Semenov-Tian-Shanskij, 1967)

Notozus hyrcanus Semenov-Tian-Shanskij, 1967:126. Holotype ♂; Iran: near Gorgan [former Astrabad], 27.iv.1914, A. Kirichenko (St. Petersburg).
Elampus hyrcanus: Rosa et al., 2013:4 (Golestan).

Distribution. Iran (Golestan) (Semenov-Tian-Shanskij, 1967).

Elampus kashmirensis (Nurse, 1902)

Notozus kashmirensis Nurse, 1902:305. Lectotype ♀ designated by Kimsey, 1986; Pakistan: Kashmir, on the banks of Jhelum (London).
Elampus kashmirensis: Iranmanesh et al., 2017:296 (Kerman), 301 (fig. 3E–F); Falahatpisheh et al., 2019:2 (Fars).

Distribution. Iran (Fars, Kerman). Pakistan (Nurse, 1902).

Elampus panzeri (Fabricius, 1804)

Chrysis scutellaris Panzer, 1798:11, *nom. praeocc.*, *nec* Fabricius, 1794. Type unknown; Germany (type depository probably Berlin).
Chrysis Panzeri Fabricius, 1804:172, replacement name for *Chrysis scutellaris* Panzer, 1798.
Elampus panzeri: Rosa, 2020:462 (Kordestan).

Distribution. Iran (Kordestan). Euroasiatic, from Europe to China (Heilongjiang) (Rosa et al., 2014).

Elampus sidus (Semenov-Tian-Shanskij, 1967)

Notozus sidus Semenov-Tian-Shanskij, 1967:121. Holotype ♂; Iran: Shakhrud [Shahrud, Semnan province] (St. Petersburg).
Elampus sidus: Rosa et al., 2013:5 (Semnan).

Distribution. Iran (Semnan) (Semenov-Tian-Shanskij, 1967).

Elampus spina (Lepeletier, 1806)

Hedychrum spinus Lepeletier, 1806:121. Holotype ♀ [not ♂]; France: Meudon (Paris or Turin).
Elampus spina: Rosa, 2020:462 (Hamadan).

Distribution. Iran (Hamadan). West Palaearctic, from Southern Europe and Northern Africa to Russia and Central Asia (Rosa et al., 2013).

Elampus violascens (Mocsáry, 1889)

Ellampus (*Notozus*) *violascens* Mocsáry, 1889:81. Holotype ♀; Uzbekistan: Taschkent (Krakow).
Elampus violascens: Ebrahimi, 2015:55 (Khorasan-e Razavi).

Distribution. Iran (Khorasan-e Razavi). Central Asian countries (du Buysson, 1891–1896; Semenov-Tian-Shanskij & Nikol'skaya, 1954; Linsenmaier, 1959a; Kimsey & Bohart, 1991).

Remarks. *Elampus violascens* was also recorded by Torabipour et al. (2013a), as it was already examined and confirmed. However, figure 1C refers to another species, *Chrysis insperata* Chevrier, 1870, possibly due to incorrect labelling and photographing of these two taxa.

Genus *Haba* Semenov-Tian-Shanskij, 1954

Haba Semenov-Tian-Shanskij, 1954:143. Type species: *Holopyga almasyana* Mocsáry, 1911. Original designation.

Haba colonialis (Mocsáry, 1911)

Holopyga colonialis Mocsáry, 1911:449. Holotype ♂; Eritrea, Keren (Budapest).
Haba colonialis: Falahatpisheh et al., 2019:3 (Fars).

Distribution. Iran (Fars). Eritrea, UAE, and Saudi Arabia, appear to be widespread in the Arabian Peninsula (Falahatpisheh et al., 2019).

Haba persica Strumia & Fallahzadeh, 2016

Haba biroi: Strumia & Fallahzadeh, 2015:16 (Buyer Ahmad, Fars).
Haba persica Strumia & Fallahzadeh, 2016:359. Holotype ♀; Iran: Kohgiluyeh and Buyer Ahmad, Sisakht, 2370 m, 30°52'N, 51°25'E, 7.v.2008, leg. D. Gianasso (paratype from Fars) (Pisa).

Distribution. Iran (Fars, Kohgiluyeh and Buyer Ahmad).

Genus *Hedychridium* Abeille de Perrin, 1878

Hedychridium Abeille de Perrin, 1878:3. Type species: *Hedychrum minutum* Lepeletier, 1806 [= *Hedychridium ardens* (Coquebert, 1801)], by subsequent designation of Ashmead, 1902:227.

Hedychridium biskranum Linsenmaier, 1999

Hedychridium (*Hedychridium*) *biskranum* Linsenmaier, 1999:85. Holotype ♀; Algeria: Biskra, 25.v.1948, leg. R.M. Naef (Luzern).
Hedychridium biskranum: Tavasoli & Fallahzadeh, 2015:82 (Fars); Strumia et al., 2016b:52 (Fars); Falahatpisheh et al., 2019:3 (Fars).

Distribution. Iran (Fars). Algeria (Linsenmaier, 1999), Türkiye (Strumia et al., 2016b).

Remarks. The identification of *Hedychridium biskranum* is considered doubtful and the recorded specimens may refer to another species of the *H. roseum* species-group based on biogeographical data. At the moment, *Hedychridium biskranum* is known with certainty only on the holotype, collected in Biskra (Algeria) (Rosa et al., 2022). The identification was based on Linsenmaier's (1999) key for the Chrysididae of Northern Africa, without type examination. However, the species concept is unclear because *H. biskranum* belongs to the most complicated species-group in the genus *Hedychridium*, and its description is challenging as it is based on variable diagnostic characters. Strumia et al. (2016b) reported the discovery of an additional two specimens of *H. biskranum* collected in Türkiye. However, no further details such as descriptions, illustrations, or images were provided to substantiate their identification. We suppose that the specimens examined may belong to one of the other species recently described by Arens (2010) for Anatolia, and therefore not keyed in Linsenmaier (1999), or to a Central Asian species described by Semenov-Tian-Shanskij (Rosa et al., 2017a). Strumia did not consider Semenov's publications (Strumia & Fallahzadeh, 2015) and Arens' work (2010).

Hedychridium bytinskii Linsenmaier, 1959 (Fig. 1A–F)

Hedychridium bytinskii Linsenmaier, 1959a:53. Holotype ♀; Palestine: Bet Lid (NMLU).

Material examined. 1♀, IRAN (Zanǧān) 1660m., SW of Sorkhed Dizaj, 36°47'42"N, 48°52'15"E, 2.vi.2011, leg. D. Baiocchi (PRC).

Distribution. *Iran (Zanjan). Greece, Palestine, Türkiye (Linsenmaier, 1968).

Hedychridium coriaceum (Dahlbom, 1854)

Hedychrum coriaceum Dahlbom, 1854:88. Lectotype ♀ designated by Morgan, 1984:10; Poland: Glogovia (Lund).
Hedychridium coriaceum: Strumia et al., 2016b:52 (Khuzestan, Fars).

Distribution. Iran (Khuzestan, Fars). West Palaearctic, known from Europe and Türkiye, with a subspecies in Northern Africa (Linsenmaier, 1999).

Hedychridium davydovi (Semenov-Tian-Shanskij, 1967)

Zarudnidium davydovi Semenov-Tian-Shanskij, 1967:111. Holotype ♂; Palestine: Wadi-Kumera (St. Petersburg).
Hedychridium moricei davydovi: Rosa et al., 2013:6 (East-Azarbaijan).
Hedychridium moricei chrysurum Linsenmaier, 1969:373; Strumia et al., 2016b:55 (Fars); Farzaneh et al., 2017:895 (Fars).
Holopyga chrysonota appliata Linsenmaier, 1959a:186; Iranmanesh et al., 2017:298 (Kerman), 301 (fig. 3G).

Distribution. Iran (East-Azarbaijan, Fars, Kerman). Palestine (Semenov-Tian-Shanskij, 1967).

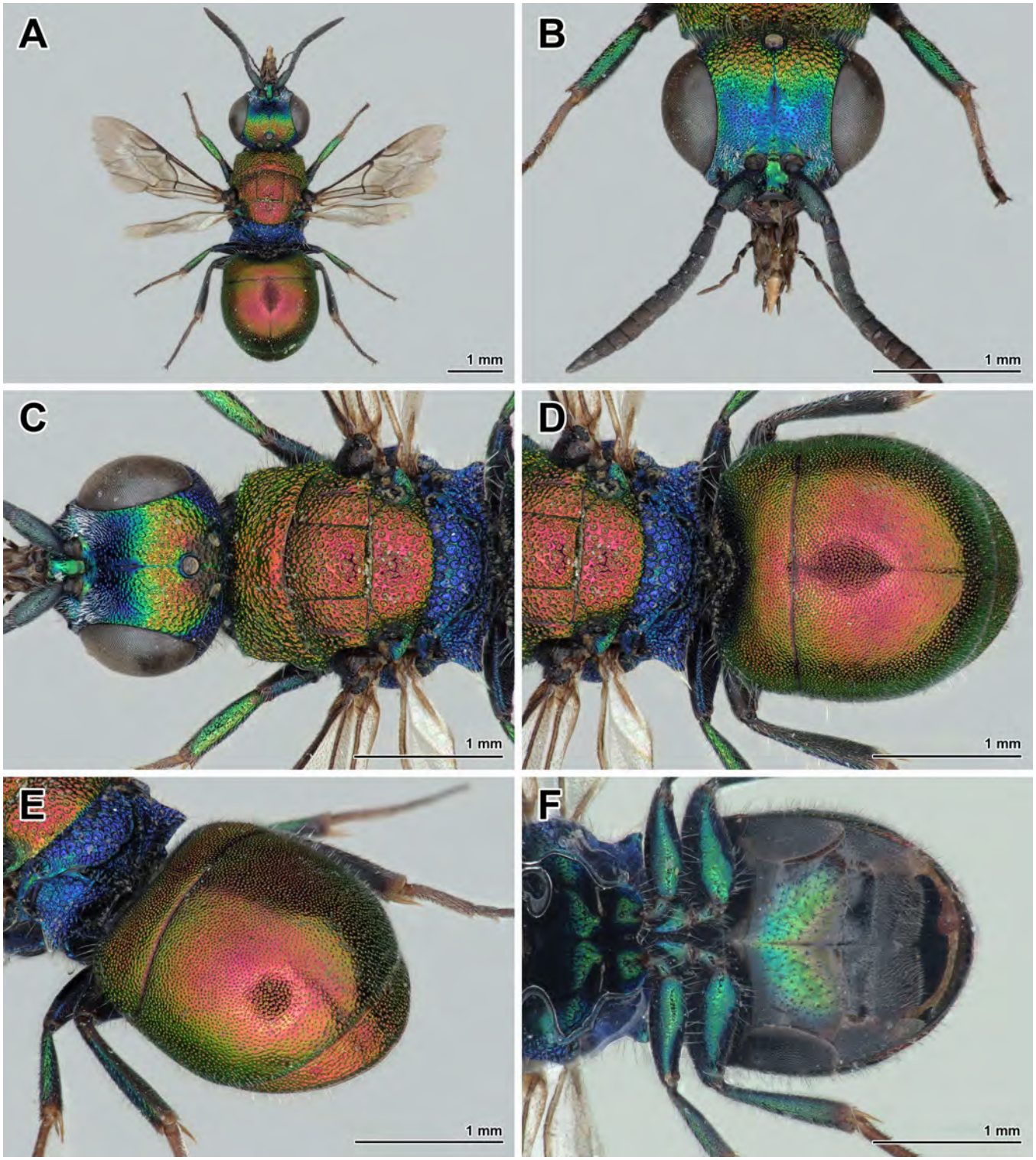

Figure 1. *Hedychridium bytinskii* Linsenmaier, 1959, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metanotum, scutellum, propodeum and metasoma, dorsal view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Hedychridium dzhanelidzei Semenov-Tian-Shanskij, 1967

Hedychridium (*Hedychridium*) *dzhanelidzei* Semenov-Tian-Shanskij, 1967:128. Holotype ♀; Georgia: Tbilisi (St. Petersburg).
Hedychridium dzhanelidzei: Rosa et al., 2013:5 (East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). Georgia (Rosa et al., 2017a).

Hedychridium erschovi (Radoszkowski, 1877)

Hedychrum erschovi Radoszkowski, 1877:6. Syntypes ♀♀ [not ♂♂]; Uzbekistan: Zarafshan valley & Fergana (Moscow).
Euchrum turanum Semenov-Tian-Shanskij [in Semenov-Tian-Shanskij & Nikol'skaya], 1954:103. Holotype ♂; Kazakhstan: Djulek Syr-Darja Geb.[iet], 12.VI.1912, leg. L. Wollmann (St. Petersburg) [Iran is given in the type series, without precise locality].
Hedychridium chloropygum var. *caputaureum* Trautmann & Trautmann, 1919:32; Rosa et al., 2013:5.

Distribution. Iran (without locality). Central Asia: Kyrgyzstan, Tadjikistan, Turkmenia, Uzbekistan (Rosa et al., 2017a).

Remarks. Kimsey & Bohart (1991) synonymised *Hedychridium erschovi* (Radoszkowski, 1877) and *Hedychridium turanum* (Semenov-Tian-Shanskij, 1954) with *Hedychridium roseum* (Rossi, 1790). The first was revalidated by Rosa et al. (2015a) and the second was considered conspecific with *H. erschovi* by Rosa et al. (2017a). In the previous checklist of Iran, *H. turanum* was considered a synonym of *H. caputaureum* following the interpretation of Linsenmaier (1968).

Hedychridium femoratum (Dahlbom, 1854)

Hedychrum femoratum Dahlbom, 1854:90. Holotype ♀; Austria (Vienna) (*ardens* group).
Hedychridium femoratum: Farhad et al., 2016b:4 (Hormozgan), 5 (fig. 4); Falahatpisheh et al., 2019:3 (Fars).

Distribution. Iran (Fars, Hormozgan). Central and Southern Europe (Linsenmaier, 1959a, 1987), Türkiye (Linsenmaier, 1959a).

Hedychridium feritatum Linsenmaier, 1959

Hedychridium aheneum feritatum Linsenmaier, 1959b:235. Holotype ♂; Palestine (Luzern).
Hedychridium aheneum (Dahlbom, 1854): Torabipour et al., 2013a:5 (East-Azarbaijan); Ebrahimi, 2015:56 (East-Azarbaijan); Tavasoli & Fallahzadeh, 2015:82 (Fars). Strumia et al., 2016b:52 (Fars).
Hedychridium feritatum: Rosa, 2020:462 (Mazandaran), 473 (figs 1, 3, 5).

Distribution. Iran (East-Azarbaijan, Fars, Mazandaran). Palestine (Linsenmaier, 1959b).

Hedychridium flos (Semenov-Tian-Shanskij, 1954)

Cyrteuchrum flos Semenov-Tian-Shanskij [in Semenov-Tian-Shanskij & Nikol'skaya], 1954:105. Holotype ♀; Kazakhstan: Imam-baba, 25.V.1912, leg. W. Koshantschikoff (St. Petersburg).
Cyrteuchrum redikortzevi Semenov-Tian-Shanskij, 1967:135. Holotype ♀; Iran: Gorgan [former Astrabad], 9–12.viii. 1912 (ZIN).

Distribution. Iran (Golestan). Tajikistan, Turkmenistan, Uzbekistan (Rosa et al., 2017a).

Remarks. The specimen listed by Rosa et al. (2013) in "material examined" was misidentified and belongs to the species herein described as *Hedychridium personatum* Rosa, **sp. nov.** (see below).

Hedychridium hofferi Balthasar, 1953

Hedychridium hofferi Balthasar, 1953:139. Holotype ♀; Jordan: Wadi el Kelt (Prague).
Hedychridium hofferi: Linsenmaier, 1959a:61 (Palestine).
Hedychridium hofferi: Falahatpisheh et al., 2019:3 (Fars).

Distribution. Iran (Fars). Palestine (Linsenmaier, 1959a).

Hedychridium jucundum (Mocsáry, 1889)

Holopyga (*Hedychridium*) *iucunda* Mocsáry, 1889:150. Syntypes ♂, ♀; Hungary; Austria (Budapest) (*ardens* group).
Holopyga (*Hedychridium*) *jucundum*: Dalla Torre, 1892:27. Incorrect subsequent spelling in current use.
Hedychridium jucundum: Móczár, 1964:446. Lectotype designation: ♀; Hungary [not France]: Isaszeg (Budapest).
Hedychridium jucundum: Strumia et al., 2016b:53 (Fars).

Distribution. Iran (Fars). Euroasiatic, from Southern and Central Europe (Linsenmaier, 1959a) to Russia and Türkiye (Rosa et al., 2013).

Hedychridium meda (Semenov-Tian-Shanskij, 1954)

Psacas meda Semenov-Tian-Shanskij, 1954:145. Holotypus ♂; Iran: Luristan [currently Khuzestan], near Akhvaz, upstream of Karun River (St. Petersburg).
Hedychridium meda: Rosa et al., 2013:5 (Khuzestan).

Distribution. Iran (Khuzestan).

Hedychridium miramae Semenov-Tian-Shanskij, 1967

Hedychridium miramae Semenov-Tian-Shanskij, 1967:128. Holotype ♀; Iran: Nerduali, Meshkhed (St. Petersburg).
Hedychridium miramae: Rosa et al., 2013:6 (Khorasan-e Razavi); Farhad et al., 2016b:5 (Hormozgan).

Distribution. Iran (Hormozgan, Khorasan-e Razavi).

Hedychridium mochii Strumia, 1994 (Fig. 2A–F)

Hedychridium mochii Strumia, 1994:155. Holotype ♀; Myanmar: Rangoon, 24.ii.1972, leg. A. Mochi (Turin).

Material examined. 1♀, Kermanshah Province: Bar Aftar, 3.iv.2011, leg. A. Ameri (TMUC).

Distribution. *Iran (Kermanshah). Myanmar (Strumia, 1994).

Remarks. *Hedychridium mochii* was known only from the holotype collected in Myanmar. The type was examined in Turin and matches the Iranian specimen for its outstanding diagnostic characters, such as the arched median vein of the anterior wing (straight in *Hedychridium monochroum* du Buysson, 1888), the length of the second tarsus of the posterior leg, much shorter than the third (as long as the third in *H. monochroum*); the mesosomal punctation with large and deep punctures when compared to the similar *Hedychridium monochroum*. The species is very likely distributed in all countries between Iran and Myanmar, as in the case of *H. monochroum*, but has never been recorded before for its small dimensions and probably for its unknown ecology and biology.

Hedychridium modestum du Buysson, 1900

Hedychridium modestum du Buysson, 1900:129. Lectotype ♂ designated by Kimsey in Kimsey & Bohart, 1991:199; Egypt: Elephantine (Paris).
Hedychridium modestum: Strumia et al., 2016b:53 (Fars).

Distribution. Iran (Fars). Egypt, Palestine (Linsenmaier, 1999).

Hedychridium monochroum du Buysson, 1888

Hedychridium monochroum du Buysson, 1888:3. Holotype ♀; France: Marseille (Paris?) (*monochroum* group).
Hedychridium monochroum: Strumia et al., 2016b:53 (Fars); Tavasoli & Fallahzadeh, 2015:82 (Fars); Farzaneh et al., 2017:495 (Fars).
Hedychridium monochroum farsensis Strumia & Fallahzadeh, 2016:53 (Fars). Holotype ♀; Iran: Fars Province, Kheramh, 29°30'42''N, 53°18'55''E, 25.vi.2013, leg. E. Izadi (Pisa), **syn. nov.** Iranmanesh et al., 2017:297 (Kerman); Falahatpisheh et al., 2019:3 (Fars).

Distribution. Iran (Fars, Kerman). Trans-Palaearctic from Europe to Armenia, Southern Caucasus, Tajikistan, Uzbekistan and the Oriental Region (Rosa et al., 2017a).

Remarks. *Hedychridium monochroum* is well known for being a chromatically variable species (Martynova, 2017), which is widespread and distributed from Western Europe to the Oriental region (Kimsey & Bohart, 1991). The finding of a sympatric subspecies, *H. monochroum farsensis*, in the same localities of *H. monochroum monochroum* arises some doubts on the real status of this taxon, considering that the very short description of *farsensis* is based solely on colouration. Waiting for molecular analysis and a morphological re-evaluation of *H. m. farsensis*, we consider it as one of the colour variations and therefore a synonym of *H. monochroum*.

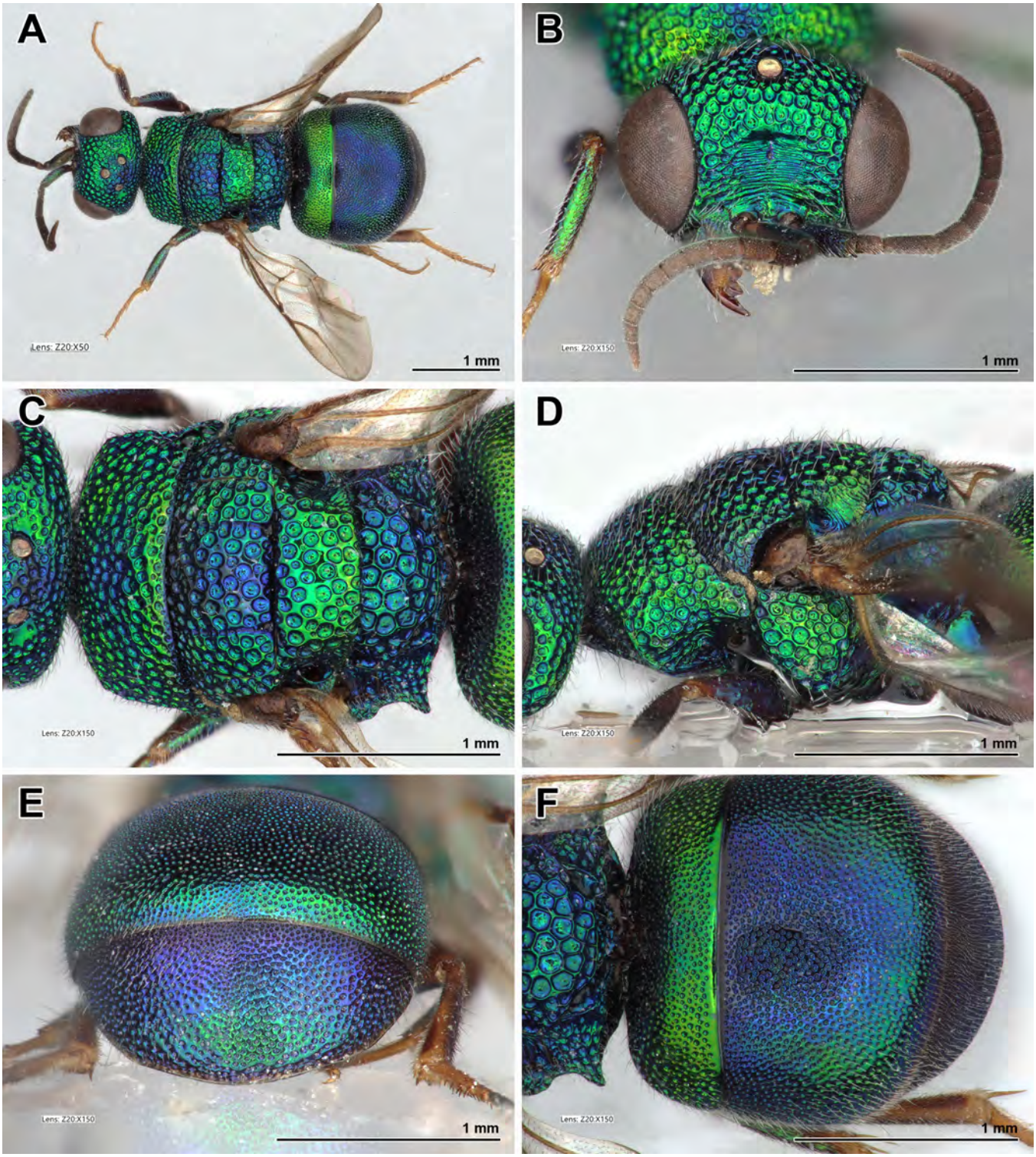

Figure 2. *Hedychridium mochii* Strumia, 1994, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, posterior view; **F.** Metasoma, dorsal view.

Hedychridium moricei du Buysson, 1904

Hedychridium moricei du Buysson, 1904:256. Holotype ♂; Greece: Zakinthos (Oxford).
Hedychridium moricei: Strumia et al., 2016b:55 (Fars).

Distribution. Iran (Fars) (Strumia et al., 2016b). Southern Europe, Azerbaijan, Caucasus, Türkiye and the Middle East (Rosa et al., 2013).

Hedychridium mysticum Semenov-Tian-Shanskij, 1912

Hedychridium mysticum Semenov-Tian-Shanskij, 1912:177. Holotype ♂; Iran: Bampur (St. Petersburg).
Hedychridium mysticum: Rosa et al., 2013:6 (Sistan & Baluchestan).

Distribution. Iran (Sistan & Baluchestan). India (Rosa & Halada, 2021).

Hedychridium palestinense Balthasar, 1953

Hedychridium sculpturatum var. *palestinense* Balthasar, 1953:145. Syntypes ♂, ♀; Palestine: Jerusalem (Prague).
Hedychridium maculiventre Linsenmaier, 1959a:63. Unnecessary replacement name for *H. palestinense* Balthasar, 1953.
Hedychridium palestinense: Rosa et al., 2013:6 (Qazvin, Markazi); Falahatpisheh et al., 2019:4 (Fars).
Hedychridium maculisternum: Arens, 2011:316 (replacement name for *Hedychridium maculiventre* Linsenmaier, 1959): Strumia & Fallahzadeh, 2015:17 (Fars); Strumia et al., 2016b:53 (Fars); Iranmanesh et al., 2017:297 (Kerman).

Distribution. Iran (Fars, Kerman, Markazi, Qazvin). Armenia, Palestine (Balthasar, 1953); Central Asia: Kyrgyzstan (Linsenmaier, 1997).

Remarks. The name *Hedychridium palestinense* Balthasar, 1953 is the valid name for this taxon (Arens, 2010). The replacement name *Hedychridium maculisternum* Arens, 2011 was given to replace the name of *Hedychridium maculiventre* Linsenmaier, 1959 proposed for a Balkan species, which is not present in Iran.

Hedychridium personatum Rosa, sp. nov. (Figs 3A–F, 4A–D)

https://zoobank.org/urn:lsid:zoobank.org:act:9661EA3C-E56F-4233-A272-81ED779BE9EC

Material examined. **Holotype** ♀; IRAN, Hormozgan province: Bandar Abbas, Zakin, 27°28'53"N, 56°18'27"E, 680 m, 23.V.2011, leg. A. Ameri (TMUC).

Diagnosis. *Hedychridium personatum* **sp. nov.** belongs to a new species-group characterised by the combination of the following characters, such as (in order of importance): metapectal-propodeal complex with a unique structure of the metapostnotum, the median area delimited by metanotum and the metapostnotal-propodeal suture, strongly raised and angulate, mask-shaped (Fig. 3F); third tergum with swollen apical margin (Fig. 4C), as in the genus *Hedychrum* Latreille; apex of clypeus medially with wide, brown, triangular truncation, laterally with two yellowish-hyaline substraight expansions (Figs 3B, C); elongate pedicel (l/w = 3.1) and first flagellomere (l/w = 4.7) (Fig. 3B). The following diagnostic characters are shared with one or more species-groups, but in different combinations: head transversal (Fig. 3B) (l/w = 1.8, measured from anterior ocellus to anterior clypeal margin/the widest eye distance); scapal basin narrow, transversely deeply striate (Fig. 3B); metaleg with second tarsomere elongate, as long as third tarsomere; antennae light brown with scape weakly metallic (Fig. 3B); legs with femur and tarsi yellowish; costal vein, stigma, medial vein + cubitus medio-distally dark brown, other veins light brownish (Figs 3A, F).

Description. — **Holotype** ♀ (Figs 3A–F, 4A–D). Body length 4.1 mm, wing length 3.1 mm (Fig. 3A).

Head. Head transversal (Fig. 3B) (l/w = 1.8, measured from anterior ocellus to anterior clypeal margin/the widest eye distance); vertex, ocellar area, brow between anterior ocellus and scapal basin with shallow and small punctures (0.1–0.3× MOD), denser towards compound eye and between scapal basin and eye, with dense punctures until malar space; area between brow apically and on upper margin of scapal basin dotted, without large punctures; scapal basin with median area transversely deeply striate (2.4× MOD), laterally micropunctate (Fig. 3B), each puncture bringing short white seta; punctation from posterior ocelli to temples scattered, with wide impunctate area postero-laterad posterior ocelli; fovea adjacent to posterior ocellus deep and elongate, as long as ocellus (Fig. 3C); posterior ocelli connected by thin line; subantennal space short, 0.7× MOD; apex of clypeus medially with wide, brown, triangular truncation, laterally with two yellowish-hyaline substraight expansions; clypeus largely polished or with scattered dots. Distance between anterior ocellus and upper margin of scapal basin = 2.0× MOD. OOL 1.4× MOD; POL 1.5× MOD; MS 1.0× MOD; relative length of P:F1:F2:F3 = 1.0:1.2:0.7:0.7.

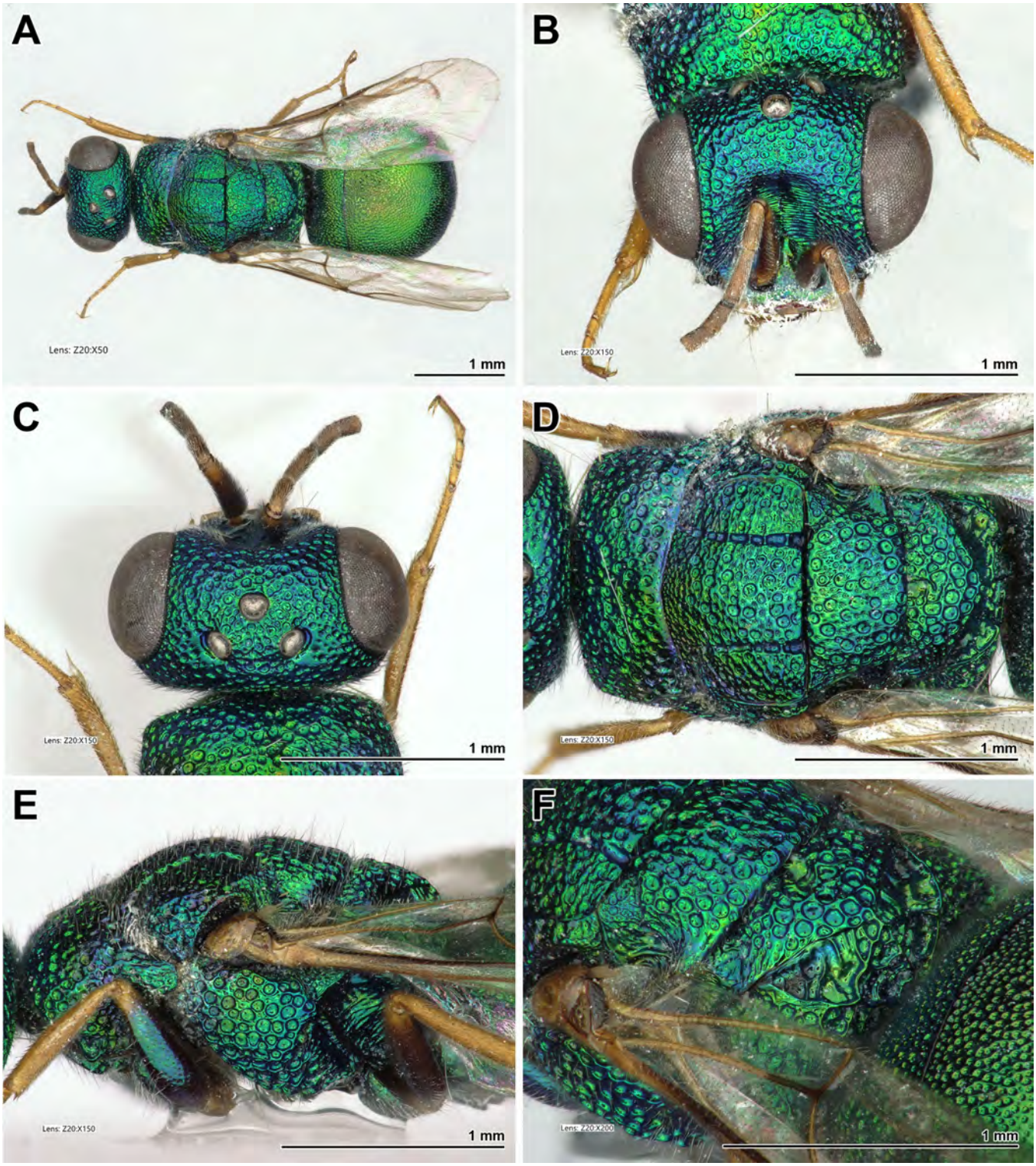

Figure 3. *Hedychridium personatum* Rosa, **sp. nov.**, female, holotype. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Mesosoma, dorsal view; **E.** Mesosoma, lateral view; **F.** Mesosoma, postero-lateral view.

Mesosoma. Medial pronotal furrow shallow, as median, wide antero-depression; pronotum with small punctures (0.2–0.3× MOD), from contiguous to largely separated by 1 puncture diameter, with transversally weakly wrinkled interspaces medially; punctation on mesonotum similar, with small to medium punctures up to 0.5× MOD distinctly separated; weakly wrinkled interspaces on mesoscutum

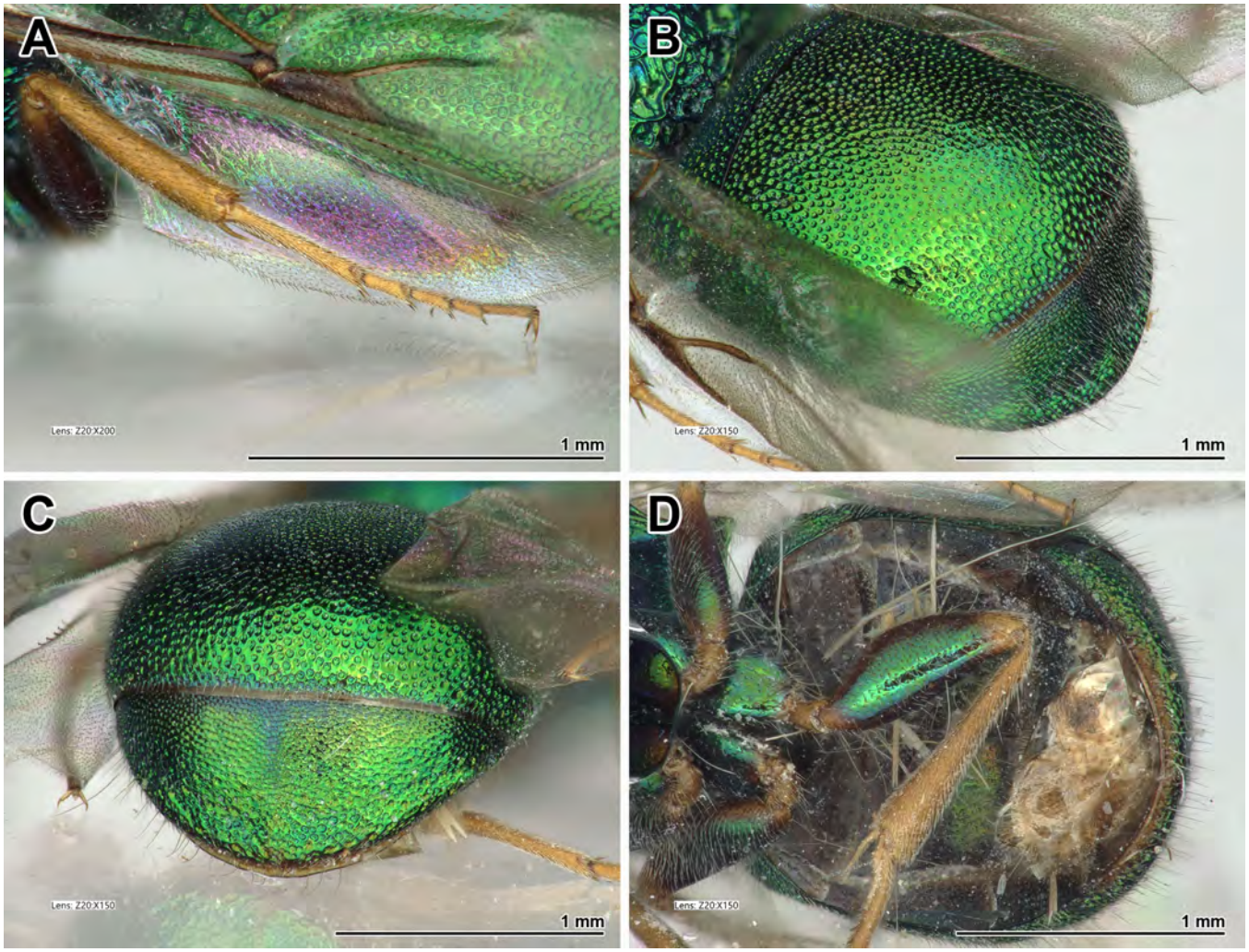

Figure 4. *Hedychridium personatum* Rosa, **sp. nov.**, female, holotype. **A.** Mesoleg, lateral view; **B.** Metasoma, postero-lateral view; **C.** Metasoma, posterior view; **D.** Metasoma, ventral view.

and weakly rugose on scutellum; notauli formed by deep, metallic, sub-rectangular foveae, as large as largest punctures on mesoscutum; parapsidal signum deep and distinct; mesoscutellum antero-medially largely polished; scutellar-metanotal suture deep, elongate and almost overposed and continuing the mesoscutal-scutellar suture; posterior propodeal projections straight angled, blunt; mesopleuron without sulci, with large punctures contiguous along margins. Radial 1 vein short and as long as Radial 2 vein; Radial 2 continues towards wing margin as thin vein; medial vein gently arched.

Metasoma. Frontal declivity straight, without depressions; first tergum with even, dense, contiguous, and small punctures; second tergum with small and dense punctures on basal half, becoming smaller and scattered on second half, whereas along margins punctures are larger and denser (Fig. 4B); third tergum with very small, aligned punctures on basal half, becoming larger and denser towards apical margin; apical margin swollen before extended, dark hyaline marginal rim (Fig. 4C); second sternum fully green metallic on second half, with small, dense puncture.

Colouration. Body entirely green metallic; antennae light brown with scape weakly metallic (Fig. 3B); tegula brown, non-metallic; legs with femur and tarsi yellowish; costal vein, stigma, medial vein + cubitus medio-distally dark brown, other veins light brownish (Fig. 3A–F).

Vestiture. Head and mesosoma with short, dense greyish to whitish setae as long as 1× MOD; metasoma laterally with longer, erect setae (1.5× MOD).

Male. Unknown.

Etymology. The specific epithet *personatum* derives from the Latin adjective *personatus* (masked) and refers to the mask-shaped metapostnotum, strongly raised and angulate, which is the modified structure of metapectal-propodeal complex characterizing this self-standing species-group.

Distribution. *Iran (Hormozgan).

Remarks. The newly described *Hedychridium personatum* species-group can be immediately separated from other groups by the shape of the metapectal-propodeal complex, which is a key character. Only another species-group within *Hedychridium*, namely the *plagiatum* group, has a highly modified metapectal-propodeal complex not conform to the type species of the genus *Hedychridium*. It was already observed that the *plagiatum* group is the most basal of all the Elampini genera, based on multigene molecular analyses (Pauli et al., 2019) and we expect that also the *personatum* group can be considered as a monophyletic group. The classification of the genus *Hedychridium* requires major revision, including the revalidation of Semenov-Tian-Shanskij's (1954) genera, currently placed in the synonymy of *Hedychridium* by Linsenmaier (1968) and Kimsey & Bohart (1991). The structure of the metapectal-propodeal complex was always neglected in the study of Chrysididae, but it is a key character, as in the sister family of Bethylidae (Kawada et al., 2015; Lanes et al., 2020), based on morphological examination of all the Old World species-groups.

Hedychridium plagiatum (Mocsáry, 1883) (Fig. 5A–D)

Hedychrum plagiatum Mocsáry, 1883:14. Holotype ♂; Türkiye: Brussa [= Bursa] (Budapest).

Material examined. 1♀, Fars, E of Khomer Kuh-e Barm Firuz, 2730 m, 30°26'31"N, 51°54'13"E, 15.v.2013, leg. D. Baiocchi (PRC).

Distribution. *Iran (Fars). South-eastern Europe to Türkiye (Linsenmaier, 1959a).

Hedychridium smaragdinum (Semenov-Tian-Shanskij, 1954)

Homaleuchrum smaragdinum Semenov-Tian-Shanskij, 1954:143. Holotype ♂; Iran: Bampur, 27.IV.1901, N. Zarudnij (St. Petersburg).
Hedychridium smaragdinum: Rosa et al., 2013:6 (Sistan & Baluchestan).

Distribution. Iran (Sistan & Baluchestan).

Hedychridium subaheneum Linsenmaier, 1959

Hedychridium (*Hedychridium*) *incrassatum* ssp. *subaheneum* Linsenmaier, 1959a:55. Holotype ♀; Morocco: Tafraout (Lausanne).
Hedychridium (*Hedychridium*) *subaheneum*: Linsenmaier, 1999:76 (*incrassatum* group).
Hedychridium subaheneum: Tavasoli & Fallahzadeh, 2015:82 (Fars); Strumia et al., 2016b:56 (Fars).

Distribution. Iran (Fars). Morocco and Palestine (Linsenmaier, 1999).

Remarks. Iranian records need confirmation.

Hedychridium verhoeffi Linsenmaier, 1959

Hedychridium (*Hedychridium*) *verhoeffi* Linsenmaier, 1959a:50. Holotype ♂; Greece: Corfu lsI. (Luzern).
Hedychridium verhoeffi: Farhad et al., 2016b:2 (Hormozgan), 4 (fig. 3).

Material examined. 1♂, Tehran, 10 km N of Ziaran, 36°07'00"N, 50°39'25"E, 2100m, 4.vi.2012, leg. D. Baiocchi (PRC).

Distribution. Iran (Hormozgan, Tehran). Greece, Rhodes Is., Palestine, Türkiye; Egypt (Linsenmaier, 1968, 1987).

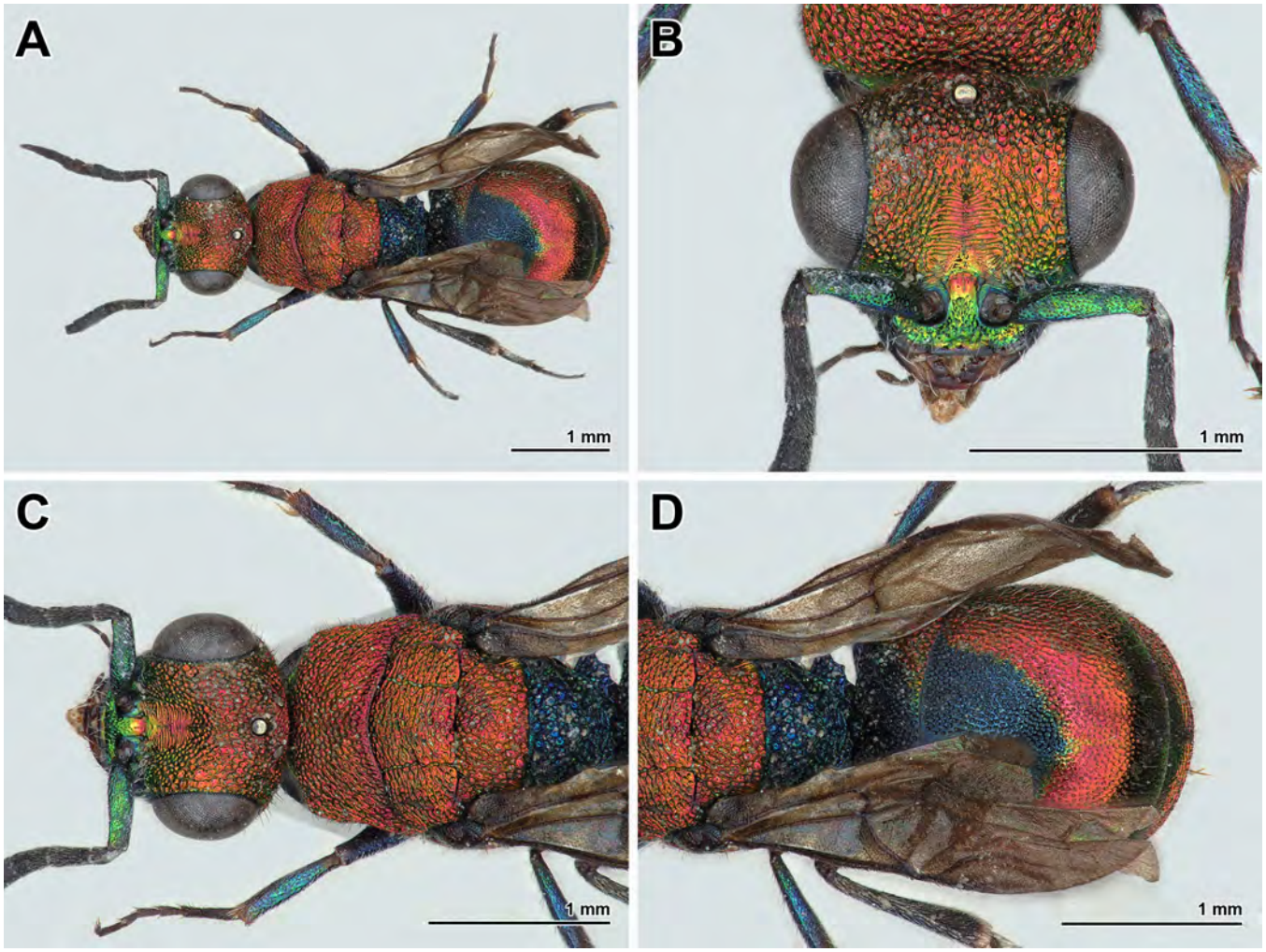

Figure 5. *Hedychridium plagiatum* (Mocsáry, 1883), female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, dorsal view.

Hedychridium virescens (du Buysson, 1908)

Hedychridium aheneum var. *virescens* du Buysson, 1908a:23. Lectotype ♂ designated by Strumia, 2004:482. Egypt: El Marg (Ezbet El Nahl) (Paris).
Hedychridium (*Hedychridium*) *virescens*: Linsenmaier, 1968:34.
Hedychridium virescens: Farhad et al., 2016b:2 (diag., Hormozgan), 3 (fig. 2).

Distribution. Iran (Fars, Hormozgan). Palestine, Saudi Arabia; Northern Africa: Egypt, Tunisia, with a subspecies in Algeria (Linsenmaier, 1999).

Genus *Hedychrum* Latreille, 1802

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

Hedychrum aureicolle Mocsáry, 1889

Hedychrum aureicolle Mocsáry, 1889:168. Lectotype ♀ designated by Móczár, 1964:440; Greece: Rhodes (Budapest).
Hedychrum aureicolle: Torabipour et al., 2013a:7; Ebrahimi, 2015:60 (Ardabil).
Hedychrum aureicolle: Rosa et al., 2013:6 (Gilan).

Distribution. Iran (Ardabil, Gilan). Caucasus, Cyprus, Greece, Palestine, Türkiye (Linsenmaier, 1959a, 1968).

Hedychrum azrael Semenov-Tian-Shanskij, 1967

Hedychrum azrael Semenov-Tian-Shanskij, 1967:141. Holotype ♀; Iran: Khuzestan (St. Petersburg).
Hedychrum azrael: Rosa et al., 2013:7 (Khuzestan).

Material examined. 1♂, Kurdistan province: Paniran, 35°01'19.2"N, 46°59'06"E, 1430m, 15.v.2016, leg. M. Kafka (MHC).

Distribution. Iran (Khuzestan, Kurdistan).

Hedychrum caucasicum Mocsáry, 1889

Hedychrum virens var. *caucasicum* Mocsáry, 1889:171. Holotype ♂; Azerbaijan: Helenendorf [= Goygol] (Vienna).
Hedychrum virens caucasicum: Rosa et al., 2013:8 (East-Azarbaijan).
Hedychrum caucasicum: Rosa, 2018a:9.

Distribution. Iran (East-Azarbaijan). Caucasus (Rosa, 2018a).

Hedychrum concinnum (Mocsáry, 1909)

Wollmannia concinna Mocsáry, 1909:2. Holotype ♂; Kazakhstan: Baigakum, Djulek (Budapest).

Material examined. 2♂♂, Golestan province: 70 km E Minudasht, 37°15'36"N, 55°59'24"E, 1050m, 12.vi.2010, leg. Mi. Halada (MHC).

Distribution. *Iran (Golestan). Central Asia: Kazakhstan (Mocsáry, 1909).

Hedychrum frivaldszkyi Mocsáry, 1889

Hedychrum frivaldszkyi Mocsáry, 1889:164. Holotype ♂; Turkmenistan: Kranowodsk [= Türkmenbaşy] (Budapest).
Hedychrum frivaldskyi: Kimsey & Bohart, 1991:214. Incorrect subsequent spelling.
Hedychrum frivaldszkyi: Rosa et al., 2013:7 (Golestan).

Distribution. Iran (Golestan). Central Asia: Kazakhstan, Turkmenistan (Rosa, 2019).

Hedychrum gerstaeckeri Chevrier, 1869

Hedychrum gerstaeckeri Chevrier, 1869:47. Syntypes ♂♂, ♀♀ [not holotype]; Switzerland (Geneva).
Hedychrum gerstaeckeri: Rosa et al., 2013:7 (Golestan, Gilan, Qazvin, Mazandaran).

Distribution. Iran (Golestan, Gilan, Qazvin, Mazandaran). Euroasiatic and Oriental, from Western Europe to Far East Russia, Japan, China and Taiwan (Rosa et al., 2013).

Hedychrum hyrcanum Semenov-Tian-Shanskij, 1967

Hedychrum hyrcanum Semenov-Tian-Shanskij, 1967:137. Holotype ♀; Iran: Astrabad [currently Gorgan], leg. A. Kiritshenko (St. Petersburg).
Hedychrum hyrcanum: Rosa et al., 2013:7 (Golestan).

Distribution. Iran (Golestan).

Hedychrum longicolle Abeille de Perrin, 1877

Hedychrum longicolle Abeille de Perrin, 1877:65. Lectotype ♀ designated by Kimsey, 1986; France: Marseille (Paris).
Hedychrum longicolle: Strumia & Fallahzadeh, 2015:17 (Fars); Tavasoli & Fallahzadeh, 2015:82 (Fars); Strumia et al., 2016b:56 (Fars).

Distribution. Iran (Fars). Palaearctic, from Southern Europe and Northern Africa to Western Asia, Siberia and China (Rosa et al., 2013).

Hedychrum luculentum Förster, 1853

Hedychrum luculentum Förster, 1853:343. Syntypes ♂♂; Italy; Crete (Budapest).
Hedychrum luculentum: Rosa et al., 2013:7 (Persia).

Distribution. Iran (Linsenmaier, 1959a). East Mediterranean, Crete, Türkiye; Middle East (Rosa et al., 2013).

Hedychrum mavromoustakisi Trautmann, 1929 (Figs 16B, 16E)

Hedychrum mavromoustakisi Trautmann, 1929:57. Holotype ♂; Cyprus: Limassol (Berlin).
Hedychrum mavromoustakisi: Rosa et al., 2013:8 (Fars, Mazandaran); Falahatpisheh et al., 2019:4 (Fars); Rosa, 2020:463 (Mazandaran).

Distribution. Iran (Fars, Mazandaran). South-eastern Europe, Cyprus, Palestine, Türkiye (Rosa et al., 2013).

Hedychrum menzbieri Semenov-Tian-Shanskij, 1967

Hedychrum menzbieri Semenov-Tian-Shanskij, 1967:143. Holotype ♀; Iran: Luristan, 28.vi.1904, N. Zarudny (St. Petersburg).
Hedychrum menzbieri: Rosa et al., 2013:8 (Lorestan).

Distribution. Iran (Lorestan).

Hedychrum niemelai Linsenmaier, 1959

Hedychrum aureicolle ssp. *niemeläi* Linsenmaier, 1959a:38. Holotype ♀; Switzerland: Wallis (Luzern).
Hedychrum niemelai: Strumia & Fallahzadeh, 2015:17 (Golestan, Khorasan-e Razavi).

Distribution. Iran (Golestan, Khorasan-e Razavi). Euroasiatic, from Europe to China (Rosa et al., 2013).

Hedychrum nobile (Scopoli, 1763)

Sphex nobile Scopoli, 1763:297. Holotype ♀; Italy [not Austria] (lost).
Hedychrum nobile: Rosa et al., 2013:8 (Persia).

Distribution. Iran (Radoszkowski, 1889). Palaearctic from Europe to Siberia; Northern Africa (Rosa et al., 2013).

Hedychrum persicum Mocsáry, 1914 stat. nov. (Figs 6A–F, 7A)

Hedychrum rutilans var. persicum Mocsáry, 1914:11. Holotype ♂; "Persia meridionali-occidentalis" [SW Iran] (London).
Hedychrum rutilans: Rosa et al., 2013:8 (South-eastern Persia).

Material examined. 1♂, Golestan province: 20km E of Minudasht, 37°13'12"N, 55°34'12"E, 750m, 1.vi.2014, leg. J. Halada (MHC); 3♂♂, 1♀, Mazandaran province: 10 km S Chaloos, 36°30'00"N, 51°19'48"E, 380m, 15.vi.2010, leg. Mi. Halada (MHC).

Distribution. Iran (Mocsáry, 1914, Golestan, Mazandaran).

Remarks. *Hedychrum persicum* was traditionally considered as a variety of *Hedychrum rutilans* (Linsenmaier, 1959a). However, the recent examination of the type has allowed us to better understand the real taxonomic position of this species. *Hedychrum persicum* is clearly separate from *H. rutilans* and *H. viridiauratum* by the combination of the following diagnostic characters; body sculpture deep, larger and spaced; head profile rounded (Fig. 6B) instead of triangular; body colour distinctly green, without red or golden areas (Fig. 6A). This species can be immediately separated by all the other taxa related to *H. rutilans* by its unique punctation, which is deeper, larger and more spaced (Figs 6D, F, 7A) compared to *H. rutilans* from Europe and the other two closer taxa known from Middle East, *H. rutilans viridiauratum* Mocsáry, 1889 (Fig. 7B) and *H. rutilans veterrimum* Mocsáry, 1914 (Fig. 7C), with fine and dense punctation, well visible on metasomal terga. A recent molecular study (Rosa et al., 2023b) revealed that the genetic distance between the two Western European subspecies of *H. rutilans*, namely *rutilans* s. str. and *viridaureum* Tournier, 1877, was sufficient to consider them as separate species (> 5%), probably related to different host selection in their southern distributional range. We expect that further molecular analyses on all the varieties and subspecies of *H. rutilans* will provide similar results.

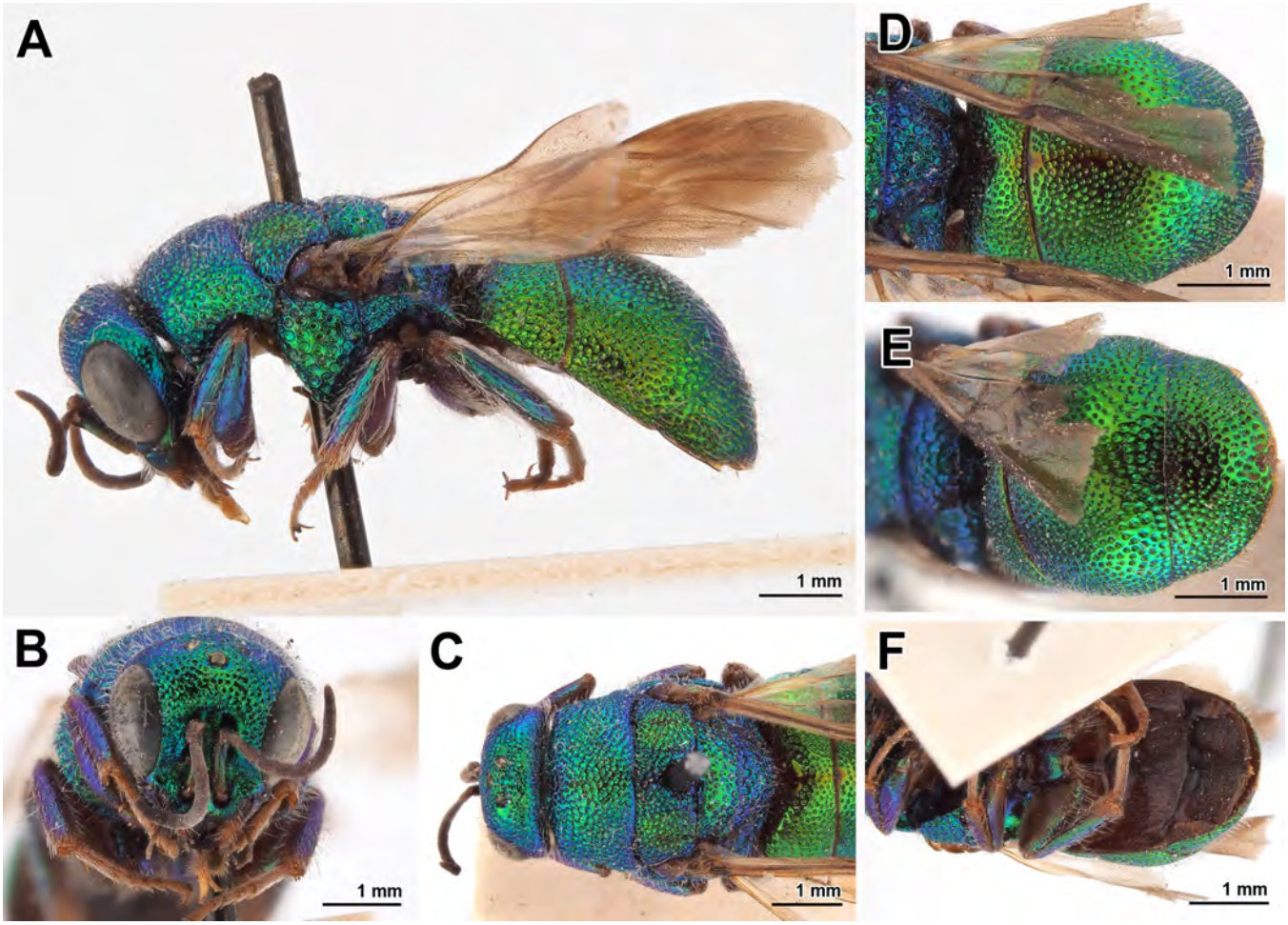

Figure 6. *Hedychrum persicum* Mocsáry, 1914, holotype, female. **A.** Habitus, lateral view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, dorsal view; **E.** Metasoma, posterior view; **F.** Metasoma, ventral view.

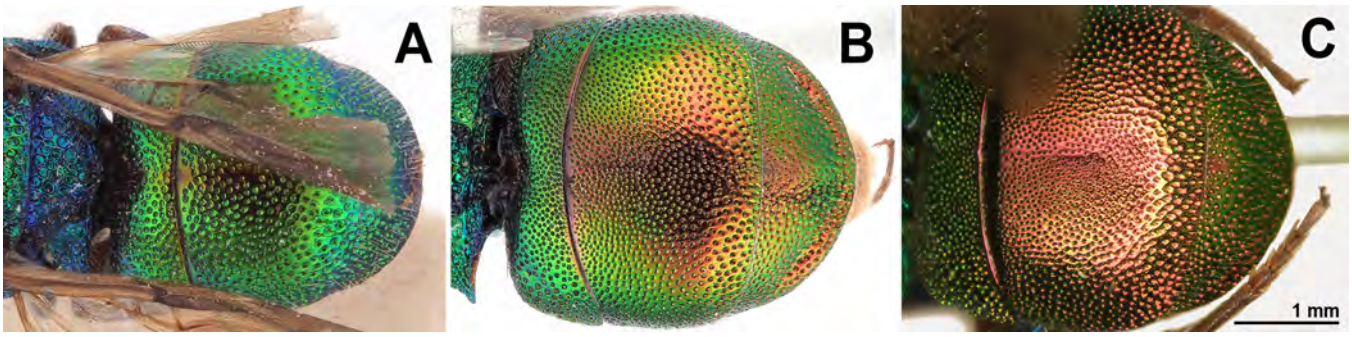

Figure 7. Metasoma, dorsal view. **A.** *Hedychrum persicum* Mocsáry, 1914, holotype, female; **B.** *Hedychrum rutilans* var. *viridiauratum* Mocsáry, 1889, syntype, male; **C.** *Hedychrum rutilans* var. *veterrimum* Mocsáry, 1914, lectotype, male.

Hedychrum semicyaneum Mocsáry, 1889

Hedychrum semicyaneum Mocsáry, 1889:168. Holotype ♀; Uzbekistan: Tashkent (Budapest).

Material examined. 2♂♂, 3♀♀, Kerman province: Bardsir, 29°57'00"N, 56°34'48"E, 2050m, 6.vi.2010, leg. Mi. Halada (MHC).

Distribution. *Iran (Kerman). Central Asia: Tajikistan, Turkmenistan, Uzbekistan (Semenov-Tian-Shanskij & Nikol'skaya, 1954).

Genus *Holopyga* Dahlbom, 1845

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

Holopyga amoenula oriensa Linsenmaier, 1959

Holopyga amoenula oriensa Linsenmaier, 1959a:31. Holotype ♂; Türkiye: Konya prov.: Akşehir (Luzern).
Holopyga amoenula oriensa: Rosa et al., 2013:9 (Qazvin, Alborz); Strumia & Fallahzadeh, 2015:17 (Fars): Farhad et al., 2017:878 (Mazandaran); Rosa, 2020:463 (Kordestan).

Distribution. Iran (Alborz, Fars, Kordestan, Mazandaran, Qazvin). West-Palaearctic from south-eastern Europe to the Middle East (Rosa et al., 2013).

Holopyga arabica Linsenmaier, 1994

Holopyga arabica Linsenmaier, 1994:155. Holotype ♀; Saudi Arabia: Riyad, 15.x.1958, leg. Diehl (Luzern).
Holopyga arabica: Farhad et al., 2016b:5–6 (Hormozgan), 6 (fig. 5); Farhad et al., 2017:878 (Hormozgan).

Distribution. Iran (Hormozgan). Saudi Arabia, United Arab Emirates, Oman, and Yemen (Rosa et al., 2020a).

Holopyga assecula Linsenmaier, 1999

Holopyga assecula Linsenmaier, 1999:39. Holotype ♀; Egypt: Cairo: El Giza, v.1988, leg. Sidler (Luzern).
Holopyga assecula: Strumia et al., 2016b:56 (Fars).

Distribution. Iran (Fars). Egypt (Linsenmaier, 1999).

Holopyga beaumonti Balthasar, 1953

Holopyga beaumonti Balthasar, 1953:131. Syntypes ♂♀; Palestine: Jordan Valley (Prague).
Holopyga beaumonti: Farhad et al., 2017:878 (Hormozgan), 879 (fig. 1).

Distribution. Iran (Hormozgan). Türkiye, Jordan, Palestine; Egypt, Eritrea; Saudi Arabia, U.A.E., Yemen (Strumia, 2014).

Holopyga bifigurata Linsenmaier, 1968

Holopyga bifigurata Linsenmaier, 1968:18. Holotype ♀; Palestine: Tel Aviv (Luzern) (examined).
Holopyga bifigurata: Rosa et al., 2013:9 (East-Azarbaijan); Farhad et al., 2017:879.

Distribution. Iran (East-Azarbaijan). Palestine, Türkiye (Rosa et al., 2013).

Holopyga caucasica Mocsáry, 1889

Holopyga (*Holopyga*) *gloriosa* var. *caucasica* Mocsáry, 1889:131. Neotype designated by Rosa et al., 2020b:117: ♀; Azerbaijan: Ganja (Vienna).
Holopyga (*Holopyga*) *gloriosa* var. *caucasica* = *Holopyga amoenula* Dahlbom, 1845: Kimsey & Bohart, 1991:229.
Holopyga inflammata caucasica: Rosa et al., 2013:10 (Qazvin); Farhad et al., 2017:88.
Holopyga caucasica: Rosa et al., 2020b:117. Upgraded to species rank.

Distribution. Iran (Qazvin). Caucasus, Cyprus, Palestine, and Türkiye (Rosa et al., 2013).

Holopyga chrysonota (Förster, 1853)

Ellampus chrysonotus Förster, 1853:347. Holotype ♀; Hungary (Berlin).
Holopyga ovata var. h Dahlbom, 1854:53. Syntypes ♂♂, ♀♀ [not holotype]; Austria; Greece: Rhodes Is. (Vienna, Berlin).
Holopyga ignicollis Eversmann, 1858:549. Lectotype ♀ designated by Rosa et al., 2020b:100. Russia: "*campis*

Orenburgensibus et in promontor Uralensib." (Krakow).
Holopyga ignicollis Dahlbom, 1854 *sensu auctorum* (see Rosa et al., 2020b); Farzaneh et al., 2017:496 (Fars); Farhad et al., 2017:881 (Alborz, Hormozgan, Kerman, Mazandaran), 882 (fig. 3); Falahatpisheh et al., 2019:4 (Fars).

Distribution. Iran (Alborz, Hormozgan, Kerman, Mazandaran). West-Palaearctic, from Western Europe to Central Asia; Northern Africa (Linsenmaier, 1999).

Remarks. *Holopyga similis* was synonymised by Bischoff (1913) with *H. chrysonota* (Förster, 1853). Rosa et al. (2020b) pointed out that *H. chrysonota* is a different species and *H. similis* is the first available name for *H. chrysonota* sensu Linsenmaier (1959a, 1968, 1987, 1997, 1999). Dahlbom's (1854) name *H. ignicollis* [actually given as var. h] is invalid. Eversmann (1858:549) was the first author to treat "var. *ignicollis* Klug" (the name given by Dahlbom (1854) to one of the specimens examined in Berlin) as a valid subspecific name, thus making the name available as a species-group name (ICZN, 1999: Article 45.6). As a consequence, Eversmann (1858) is the author of the species (Rosa et al., 2020b).

Holopyga cypruscula detrita Linsenmaier, 1959

Holopyga cypruscula ssp. *detrita* Linsenmaier, 1959a:34. Holotype ♂; Iran: Kamal Abad (paratype from Qazvin) (Luzern).
Holopyga cypruscula detrita: Torabipour et al., 2013a:8 ([East-] Azarbaijan); Ebrahimi, 2015:61 ([East-] Azarbaijan); Rosa et al., 2013:10 (Alborz, East-Azarbaijan, Qazvin, Mazandaran); Farzaneh et al., 2017:496 (Fars); Farhad et al., 2017:879 (Alborz, Hormozgan); Iranmanesh et al., 2017:298 (Kerman); Rosa, 2020:463 (Mazandaran).
Holopyga cypruscula: Strumia & Fallahzadeh, 2015:18 (Kordestan).

Distribution. Iran (Alborz, East-Azarbaijan, Fars, Hormozgan, Kerman, Kordestan, Qazvin, Mazandaran). Türkiye (Linsenmaier, 1968).

Remarks. Strumia & Fallahzadeh (2015) listed *Holopyga cypruscula* without subspecific rank. In the distributional range of this species, they listed "Türkiye, Syria, Lebanon, Palestine and Iran (Linsenmaier, 1959a)". Actually, only Cyprus is given by Linsenmaier (1959a) as a locality of *H. cypruscula*. For other localities, Linsenmaier (1959a, 1987) described other two subspecies, not mentioned by Strumia & Fallahzadeh (2015). We temporarily place this record under *H. cypruscula detrita* waiting for another examination of the studied material.

Holopyga cypruscula turca Linsenmaier, 1987

Holopyga cypruscula ssp. *turca* Linsenmaier, 1987:136. Holotype ♀; Türkiye: Şanlıurfa prov.: Urfa [=Şanlıurfa] (Luzern).
Holopyga cypruscula turca: Rosa et al., 2013:10 (Tehran); Strumia et al., 2016b:56 (Fars); Farhad et al., 2017:880.

Distribution. Iran (Fars, Tehran). Türkiye (Linsenmaier, 1987).

Holopyga fascialis Linsenmaier, 1959

Holopyga fascialis Linsenmaier, 1959a:28. Holotype ♂; Palestine: Beersheba (Luzern).
Holopyga fascialis: Strumia et al., 2016b:56 (Fars); Farhad et al., 2017:880 (Hormozgan), 881 (fig. 2).

Distribution. Iran (Fars). Palestine, Northern Africa: Morocco and Tunisia (Linsenmaier, 1959a).

Holopyga fervida (Fabricius, 1781)

Chrysis fervida Fabricius, 1781:456. Neotype ♀ designated by Kimsey, 1988:272; Spain (Copenhagen).
Holopyga fervida: Rosa et al., 2013:10 (Qazvin); Farhad et al., 2016b:6 (Hormozgan); Farhad et al., 2017:880 (Hormogan); Rosa, 2020:463 (Gilan).
Holopyga fervid: Iranmanesh et al., 2017:298 (Kerman).

Distribution. Iran (Gilan, Hormozgan, Kerman, Qazvin). West-Palaearctic, from Europe to Southern Russia, the Middle East, Türkiye, and Northern Africa (Rosa et al., 2013).

Holopyga generosa asiatica Trautmann, 1926

Holopyga gloriosa var. *asiatica* Trautmann, 1926:5. Holotype ♀; Türkiye [not Yugoslavia]: Smyrne [currently İzmir] (Berlin).
Holopyga ovata ssp. *proviridis* Linsenmaier, 1959a:31. Holotype ♂; Syria: Homs (Luzern).
Holopyga ovata var. *asiatica* Trautmann, 1926:5 = *Holopyga amoenula* Dahlbom, 1845; Kimsey & Bohart, 1991:229.
Holopyga fastuosa proviridis: Linsenmaier, 1999:36. Strumia & Fallahzadeh, 2015:18 (Alborz, Fars); Farhad et al., 2017:880 (Alborz); Iranmanesh et al., 2017:299 (Kerman).
Holopyga proviridis: Rosa et al., 2013:11 (Iran).
Holopyga ovata proviridis Linsenmaier, 1959a:36 = *Holopyga generosa asiatica* Trautmann, 1926; Rosa et al., 2017e:9.

Distribution. Iran (Alborz, Fars, Kerman). Euroasiatic from Southern Europe to Caucasus and China (Rosa et al., 2013).

Holopyga generosa generosa (Förster, 1853)

Ellampus generosus Förster, 1853:349. Holotype ♂; Germany: Aachen (Berlin).
Holopyga generosa: Torabipour et al., 2013a:8 (East-Azarbaijan); Ebrahimi, 2015:62 (East-Azarbaijan).
Holopyga fastuosa generosa: Farhad et al., 2017:880.

Distribution. Iran (East-Azarbaijan). Euroasiatic, from Western Europe to China and Korea (Rosa et al., 2014).

Remarks. The name *fastuosa generosa* was given by Linsenmaier (1987) but all the modern authors used only "*generosa*" or "*generosa generosa*" for this taxon, considering "*fastuosa*" from North Africa a different species.

Holopyga inaurata Mocsáry, 1914

Holopyga mlokosiewitzi var. *inaurata* Mocsáry, 1914:3. Holotype ♂; Armenia: Yerevan (Budapest).
Holopyga inaurata: Falahatpisheh et al., 2019:5 (Fars).

Distribution. Iran (Fars). Armenia, Palestine, Türkiye; Northern Africa: Egypt (Linsenmaier, 1968).

Holopyga inflammata (Förster, 1853)

Ellampus inflammatus Förster, 1853:348. Syntypes ♂, ♀; Italy; Hungary (Berlin).
Holopyga inflammata: Strumia & Fallahzadeh, 2015:18 (Khorasan-e Razavi); Farhad et al., 2017:883 (diag., Alborz, fig. 4).
Holopyga inflammata inflammata: Falahatpisheh et al., 2019:4 (Fars).

Distribution. Iran (Alborz, Fars, Khorasan-e Razavi). West-Palaearctic, from Europe and Northern Africa to Western Asia (Rosa et al., 2013).

Holopyga jurinei Chevrier, 1862

Holopyga jurinei Chevrier, 1862:95. Holotype ♂ [not ♀]; Switzerland (Geneva).
Holopyga jurinei: Farhad et al., 2017:884 (diag., Alborz, Qazvin, fig. 5); Falahatpisheh et al., 2019:5 (Fars).

Distribution. Iran (Alborz, Fars, Qazvin). West-Palaearctic, from Europe and Northern Africa to Caucasus, Russia, Türkiye and Western Asia (Rosa et al., 2013).

Holopyga kuthyana Mocsáry, 1911

Holopyga Kuthyana Mocsáry, 1911:446. Holotype ♀; Türkiye: Mersin prov.: Gülek, Taurus (Budapest).
Holopyga kuthyana: Rosa, 2020:463 (Mazandaran), 473 (fig. 6).

Distribution. Iran (Mazandaran). Türkiye (Mocsáry, 1911).

Holopyga minuma Linsenmaier, 1959

Holopyga minuma Linsenmaier, 1959a:31. Holotype ♀; Türkiye: Niğde prov.: Niğde (Luzern).
Holopyga minuma: Rosa et al., 2013:10 (Iran). Farhad et al., 2017:885; Rosa, 2020:463 (Mazandaran).

Distribution. Iran (Mazandaran). South-eastern Europe, Russia, Middle East, Türkiye (Rosa et al., 2013).

Holopyga numidica (Lucas, 1849)

Hedychrum numidicum Lucas, 1849:311. Syntypes ♂♂; Algeria: Tonga Lake (Paris).
Holopyga numidica: Strumia et al., 2016b:56 (Fars); Falahatpisheh et al., 2019:5 (Fars).

Distribution. Iran (Fars). Palestine; Northern Africa: Algeria, Morocco, Egypt (Linsenmaier, 1999).

Holopyga punctatissima Dahlbom, 1854

Holopyga punctatissima Dahlbom, 1854:50. Syntypes ♂♂, ♀ [not holotype]; Greece: Rhodes (Berlin).
Holopyga punctatissima: Torabipour et al., 2013a:8 (Fars); Rosa et al., 2013:11 (Kordestan, Qazvin); Ebrahimi, 2015:63 (Fars); Strumia & Fallahzadeh, 2015:18 (Fars); Strumia et al., 2016b:56 (Fars); Farhad et al., 2017:885 (Alborz, Hormozgan).

Distribution. Iran (Alborz, Fars, Hormozgan, Kordestan, Qazvin). South-eastern Europe, Caucasus, Türkiye; Northern Africa: Egypt (Rosa et al., 2013).

Holopyga similis discolor Linsenmaier, 1959

Holopyga chrysonota ssp. *discolor* Linsenmaier, 1959a:32. Holotype ♂; Morocco (Lausanne).
Holopyga chrysonota discolor: Rosa et al., 2013:9 (Alborz); Farhad et al., 2017:879.

Distribution. Iran (Alborz). Cyprus, Lebanon, Türkiye, Northern Africa (Rosa et al., 2013).

Holopyga turkestanica Mocsáry, 1909

Holopyga punctatissima var. *turkestanica* Mocsáry, 1909:1. Lectotype ♂ designated by French in Bohart & French, 1986:341; Kazakhstan [not Turkmenistan]: Mt. Karatau (Budapest).
Holopyga punctatissima var. *turkestanica* = *Holopyga amoenula* Dahlbom, 1845; Kimsey & Bohart, 1991:229.
Holopyga crassepuncta Semenov-Tian-Shanskij, 1954:110; Rosa et al., 2013:9 (East-Azarbaijan, Khorasan, Mazandaran). Farhad et al., 2017:879.
Holopyga crassepuncta Semenov-Tian-Shanskij, 1954 = *Holopyga turkestanica* Mocsáry, 1909; Rosa et al., 2017e:111.
Holopyga turkestanica: Rosa et al., 2017e:110. Reinstated and upgraded to species level.

Distribution. Iran (East-Azarbaijan, Khorasan, Mazandaran). Kazakhstan (Semenov-Tian-Shanskij & Nikol'skaya, 1954), Türkiye (Kimsey & Bohart, 1991).

Holopyga vicissituda Linsenmaier, 1994

Holopyga vicissituda Linsenmaier, 1994:155. Holotype ♀; Saudi Arabia: Al Jubail (Arabian Gulf), xi.1986, leg. Menrad (Luzern).
Holopyga vicissituda: Farhad et al., 2016b:6–7 (Hormozgan), 7 (fig. 6); Farhad et al., 2017:885 (Hormozgan).

Distribution. Iran (Hormozgan). Saudi Arabia, United Arab Emirates, Oman (Rosa et al., 2020a).

Holopyga vigora Linsenmaier, 1959

Holopyga vigora Linsenmaier, 1959a:31. Holotype ♂; Türkiye: Akschehir [not Nigde] (Luzern).
Holopyga vigora: Rosa et al., 2013:11 (Persia); Farhad et al., 2017:885.

Distribution. Iran. Bulgaria, Greece (Linsenmaier, 1968); Türkiye (Linsenmaier, 1959a).

Holopyga zarudniana Semenov-Tian-Shanskij, 1967

Holopyga zarudniana Semenov-Tian-Shanskij, 1967:145. Holotype ♂; Iran: Mekran, near Kambil (St. Petersburg).
Holopyga zarduniana: Rosa et al., 2013:11 (Sistan & Baluchestan); Farhad et al., 2017:885 (Fars).

Distribution. Iran (Fars, Sistan & Baluchestan).

Genus *Omalus* Panzer, 1801

Omalus Panzer, 1801:13. Type species: *Chrysis aenea* Fabricius, 1787 [= *Omalus aeneus* (Fabricius, 1787)]. Monotypic. Farhad et al., 2018:193.

Omalus aeneus (Fabricius, 1787)

Chrysis aenea Fabricius, 1787:284. Holotype ♀; Germany: Hala Saxonum [= Halle] (Copenhagen).
Omalus aeneus: Strumia et al., 2016b (Fars); Farhad et al., 2016a (Mazandaran); Farzaneh et al., 2016, 2017:496 (Fars); Farhad et al., 2018:195 (key), 196 (Alborz, Golestan, Mazandaran), 194 (figs 1A, 2A), 195 (fig. 3A); Falahatpisheh et al., 2019:5 (Fars); Rosa, 2020:463 (Golestan).

Distribution. Iran (Alborz, Fars, Golestan, Mazandaran). Widespread from the Holarctic Region (Bohart & Kimsey, 1982) to the Oriental Region (Rosa et al., 2014).

Omalus biaccinctus (du Buysson, 1892)

Ellampus biaccinctus du Buysson, 1892:152. Syntypes ♂, ♀; France (Paris).
Omalus biaccinctus: Rosa et al., 2013:11 (East-Azarbaijan); Strumia & Fallahzadeh, 2015:18 (Alborz, Lorestan); Farzaneh et al., 2017:496 (Fars); Farhad et al., 2018:195 (key), 196 (Alborz), 194 (fig. 1B), 195 (fig. 3B).

Distribution. Iran (Alborz, East-Azarbaijan, Fars, Lorestan). Europe, Iran, Syria, Türkiye; Central Asia (Rosa et al., 2013).

Omalus imbecillus (Mocsáry, 1889)

Ellampus (*Ellampus*) *imbecillus* Mocsáry, 1889:98. Lectotype ♀ designated by French in Bohart & French, 1986:341); Tadjikistan [not Turkmenistan]: Pendgikent [= Panjakent] (Budapest).
Omalus imbecillus: Torabipour et al., 2013a:9 (Khorasan-e Razavi); Rosa et al., 2013:12 (Persia); Ebrahimi, 2015:64 (Khorasan-e Razavi); Farhad et al., 2018:196 (key), 196 (Khorasan, Sistan and Baluchestan).

Distribution. Iran (Khorasan-e Razavi, Sistan and Baluchestan). Türkiye, Oman, Saudi Arabia, United Arab Emirates; Central Asia: Tadjikistan (Rosa et al., 2014).

Omalus margianus (Semenov-Tian-Shanskij, 1932)

Ellampus margianus Semenov-Tian-Shanskij, 1932:15. Lectotype ♀ designated by Kimsey, 1986; Turkmenistan: Imam-baba, Mary (Merv) (St. Petersburg).
Omalus margianus: Rosa et al., 2013:12 (Sistan & Baluchestan); Iranmanesh et al., 2017:297 (Kerman); Farhad et al., 2018:194 (fig. 1C), 195 (fig. 3C), 196 (key, Fars, Hormozgan).

Distribution. Iran (Fars, Hormozgan, Kerman, Sistan & Baluchestan). Central Asia: Turkmenistan (Kimsey & Bohart, 1991).

Omalus politus du Buysson, 1887

Omalus politus du Buysson, 1887:168. Lectotype ♀ designated by Kimsey in Kimsey & Bohart, 1991:249; Lebanon: Beirut (Paris).
Omalus politus: Rosa et al., 2013:12 (Fars, Lorestan); Farhad et al., 2018:196 (key), 197 (Fars, Lorestan).

Distribution. Iran (Fars, Lorestan). South-eastern Europe, Middle East; Central Asia, and Northern Africa (Linsenmaier, 1959a; Rosa et al., 2013).

Genus *Philoctetes* Abeille de Perrin, 1879

Philoctetes Abeille de Perrin, 1879:27. Type species: *Holopyga cicatrix* Abeille de Perrin, 1879 [= *Philoctetes micans* (Klug, 1835)], by subsequent designation of Ashmead, 1902:228. Farhad et al., 2018:197.

Philoctetes bidentulus (Lepeletier, 1806)

Hedychrum bidentulum Lepeletier, 1806:121. Neotype ♂ designated by Rosa & Xu, 2015:81; France: Loire-Atlantique department, Machecoul (Luzern).
Philoctetes bidentulus: Strumia & Fallahzadeh, 2015:19 (Lorestan); Farhad et al., 2018:197 (key), 198 (Lorestan).

Distribution. Iran (Lorestan). Palaearctic, from Europe to Western Asia and probably Siberia; Northern Africa (Rosa et al., 2013).

Remarks. The occurrence of *Philoctetes bidentulus* in Iran needs confirmation. Apparently, the very similar species *Philoctetes kuznetzovi* is common in the country and the identification of *P. bidentulus* may be related to this species.

Philoctetes bogdanovii (Radoszkowsky, 1877)

Holopyga bogdanovii Radoszkowsky, 1877:5. Holotype ♂; Uzbekistan: Zarafshan (Moscow).
Philoctetes bogdanovii: Rosa et al., 2013:12 (Lorestan); Farhad et al., 2018:194 (fig. 1D), 195 (fig. 3D), 197 (key), 198 (Alborz, Qazvin).

Material examined. 1♂, Tehran, 10 km N of Ziaran, 36°07'00''N, 50°39'25''E, 4.vi.2012, leg. D. Baiocchi (PRC); 1♀, Golestan, env. Dasht junction 970m, 37°18'47''N, 56°01'07''E, 21.v.2013, leg. D. Baiocchi (PRC).

Distribution. Iran (Alborz, Golestan, Lorestan, Qazvin, Tehran). Euroasiatic, from Southern Europe to Caucasus, Russia, and Western Asia (Rosa et al., 2013).

Philoctetes deflexus (Abeille de Perrin, 1878)

Holopyga deflexa Abeille de Perrin, 1878:2. Lectotype ♂ [not ♀] designated by Kimsey, 1986:109; Egypt (Paris).
Philoctetes deflexus: Tavasoli & Fallahzadeh, 2015:82 (Fars); Strumia et al., 2016b:59 (Fars); Farhad et al., 2018:197 (key), 198 (Fars, fig. 4); Falahatpisheh et al., 2019:5 (Fars).

Distribution. Iran (Fars). Palestine, Syria; Arabia Saudita, Yemen; Northern Africa: Egypt, Sudan (Linsenmaier, 1999).

Philoctetes horvathi (Mocsáry, 1889)

Ellampus wesmaeli Mocsáry, 1882:27. Syntypes ♂, ♀; Austria (Budapest), *nom. praeocc.*, *nec* Chevrier, 1862.
Ellampus horváthi Mocsáry, 1889:82. Replacement name for *Ellampus wesmaeli* Mocsáry, 1882, *nom. praeocc.*, *nec* Chevrier, 1862.
Philoctetes horvathi: Rosa et al., 2013:12 (Golestan); Farzaneh et al., 2017:497 (Fars); Farhad et al., 2018:197 (key, Golestan).

Distribution. Iran (Fars, Golestan). Palaearctic: Central and Eastern Europe; Middle East; Far East to Mongolia, China and Korea; Northern Africa (Morocco) (Farhad et al., 2018).

Philoctetes kuznetzovi (Semenov-Tian-Shanskij, 1932)

Ellampus kuznetzovi Semenov-Tian-Shanskij, 1932:25. Lectotype ♂ designated by Kimsey, 1986; Georgia: Kodzhory Prov., Tiblisi (St. Petersburg).
Philoctetes kuznetzovi: Farhad et al., 2018:197 (key), 199 (Fars, Zanjan, Esfahan), 200 (fig. 5); Rosa, 2020:464 (Esfahan).

Distribution. Iran (Fars, Zanjan, Esfahan). Caucasus (Rosa et al., 2013).

Philoctetes punctulatus (Dahlbom, 1854)

Omalus punctulatus Dahlbom, 1854:35. Syntypes ♀♀; France: Landes; Italy: Sicily (Lund).
Philoctetes punctulatus: Rosa et al., 2013:14 (Qazvin); Farhad et al., 2018:197 (key), 200 (Qazvin).

Distribution. Iran (Qazvin). West-Palaearctic, from South-western Europe to Western Asia; Northern Africa (Linsenmaier, 1999).

Philoctetes sareptanus (Mocsáry, 1889)

Ellampus sareptanus Mocsáry, 1889 83. Holotype ♂; Russia: Sarepta (Vienna).
Philoctetes sareptanus: Falahatpisheh et al., 2019:5 (Fars).

Distribution. Iran (Fars). Southern Russia (Rosa et al., 2013).

Philoctetes tarnanii (Semenov-Tian-Shanskij, 1932)

Ellampus tarnanii Semenov-Tian-Shanskij, 1932:40. Lectotype ♂ designated by Kimsey, 1986; Uzbekistan: Termez (St. Petersburg).
Philoctetes tarnanii: Rosa et al., 2013:14; Farhad et al., 2018:194 (Alborz, figs 1E, 2B), 195 (fig. 3E), 197 (key); Rosa, 2020:464 (Esfahan).

Distribution. Iran (Alborz, Esfahan). Central Asia: Uzbekistan (Kimsey & Bohart, 1991).

Genus *Pseudomalus* Ashmead, 1902

Pseudomalus Ashmead, 1902:229. Type species: *Omalus semicircularis* Aaron, 1885 [= *Pseudomalus janus* (Haldeman, 1844)], by original designation. Farhad et al., 2018:201.

Pseudomalus auratus (Linnaeus, 1758)

Sphex aurata Linnaeus, 1758:572. Holotype ♀; Europe (London-Linnean Society).
Pseudomalus auratus: Rosa et al., 2013:13 (Lorestan); Strumia & Fallahzadeh, 2015:19 (Tehran); Farhad et al., 2018:201 (key, Lorestan); Rosa, 2020:464 (Kermanshah, Lorestan).

Distribution. Iran (Kermanshah, Lorestan, Tehran). Holarctic, from Europe and Northern Africa to Japan and accidentally introduced into North America (Bohart & Kimsey, 1982).

Pseudomalus bergi (Semenov-Tian-Shanskij, 1932)

Ellampus bergi Semenov-Tian-Shanskij, 1932:43. Holotype ♂; Kazakhstan: Dzhungar Alatau Mts., Kora River [near Tekeli] (St. Petersburg).
Pseudomalus bergi: Rosa et al., 2013:14 (East-Azarbaijan); Farhad et al., 2018:201 (key, East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). Caucasus; Central Asia: Kazakhstan (Rosa et al., 2013).

Pseudomalus turkestanicus (Mocsáry, 1889)

Ellampus (*Ellampus*) *turkestanicus* Mocsáry, 1889:101. Holotype [sex unknown]; Uzbekistan: Tashkent (Kraków).
Ellampus (*Ellampus*) *masalskii* Semenov-Tian-Shanskij, 1932:47. Holotype ♂; Uzbekistan: Samarkand, Katty-kurgan (Moscow). Synonymised by Farhad et al., 2018:210.
Pseudomalus turkestanicus: Strumia & Fallahzadeh, 2015:19 (Alborz); Tavasoli & Fallahzadeh, 2015:82 (Fars); Strumia et al., 2016b:59 (Fars); Farzaneh et al., 2017:497 (Fars); Iranmanesh et al., 2017:297 (Kerman). Farhad et al., 2018:194 (figs 1F, 2C), 195 (fig. 3F); Farhad et al., 2018:201 (key, Alborz, Fars, Gilan, Hormozgan, Mazandaran, Qazvin), 202 (fig. 6); Falahatpisheh et al., 2019:6 (Fars); Rosa, 2020:464 (Esfahan, Mazandaran).

Distribution. Iran (Alborz, Fars, Gilan, Hormozgan, Esfahan, Kerman, Mazandaran, Qazvin). Türkiye; Central Asia: Tajikistan, Uzbekistan (Rosa et al., 2017a; Farhad et al., 2018).

Pseudomalus violaceus (Scopoli, 1763)

Sphex violacea Scopoli, 1763:298. Type lost; Europe (depository unknown).
Pseudomalus violaceus: Samin et al., 2014:123 (Mazandaran); Strumia & Fallahzadeh, 2015:19 (Kordestan); Farhad et al., 2018:201 (key), 204 (Khordestan, Mazandaran); Rosa, 2020:464 (Tehran).

Distribution. Iran (Kordestan, Mazandaran, Tehran). Euroasian, from Western Europe to the Russian Far East and China (Rosa et al., 2013).

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 disclusa (Linsenmaier, 1959)

Chrysis (*Chrysidea*) *pumila* ssp. *disclusa* Linsenmaier, 1959a:171. Holotype ♂; Spain: Almeria (Luzern).
Chrysidea disclusa: Farzaneh et al., 2016:439 (Fars- Shiraz).

Distribution. *Iran (Fars). West Mediterranean Countries only (Linsenmaier, 1959a, 1997, 1999).

Chrysidea pumila (Klug, 1845)

Chrysis pumila Klug, 1845. Neotype ♂ designated by Rosa & Xu, 2015:10; Egypt: Fayoum (Luzern).
Chrysidea pumila: Rosa et al., 2013:14 (East-Azarbaijan); Strumia & Fallahzadeh, 2015:19 (Fars); Tavasoli & Fallahzadeh, 2015:82 (Fars); Farhad et al., 2016b:8 (Hormozgan); Farzaneh et al., 2017:497 (Fars); Iranmanesh et al., 2017:299 (Kerman); Rosa, 2020:465 (Gilan).

Distribution. Iran (East-Azarbaijan, Fars, Gilan, Hormozgan, Kerman). Palaearctic and Afrotropical (Kimsey & Bohart, 1991; Madl & Rosa, 2012).

Genus *Chrysis* Linnaeus, 1761

Chrysis Linnaeus, 1761:414. Type species: *Sphex ignita* Linnaeus, 1758, by subsequent designation of Latreille, 1810:437.
Chrysogona Förster, 1853:327. Type species: *Chysogona gracillima* Förster, 1853 [= *Chrysis gracillima* (Förster, 1853)], by monotypy. Junior subjective synonym of *Chrysis* Linnaeus, 1761 according to Kimsey & Bohart, 1991.
Dichrysis Lichtenstein, 1876:27. Type species: *Chrysis bihamata* Spinola, 1843 by subsequent designation of Bodenstein, 1939:126. Junior subjective synonym of *Chrysis* Linnaeus, 1761 according to Linsenmaier, 1951.
Tetrachrysis Lichtenstein, 1876:27. Type species: *Chrysis aeruginosa* Dahlbom, 1854, by subsequent designation of Ashmead, 1902:226. Junior subjective synonym of *Chrysis* Linnaeus, 1761 according to Linsenmaier, 1951.
Hexachrysis Lichtenstein, 1876:27. Type species: *Chrysis micans* Rossi, 1792 [= *Chrysis sexdentata* Christ, 1791], by subsequent designation of Bodenstein, 1939:127. Junior subjective synonym of *Chrysis* Linnaeus, 1761 according to Kimsey & Bohart, 1991.

Chrysis acceptabilis Radoszkowski, 1891

Chrysis acceptabilis Radoszkowski, 1891:197. Lectotype ♂ designated by Rosa et al., 2015d:7; Iran: Sarakhs (Kraków) (*maculicornis* group).
Chrysis acceptabilis: Rosa et al., 2013:14 (Khorasan-e Razavi); Ebrahimi, 2015:24 (Sistan & Baluchestan); Farhad et al., 2015b:36 (Hormozgan).

Distribution. Iran (Hormozgan, Khorasan-e Razavi, Sistan & Baluchestan). Afghanistan, Pakistan, North-western India, Saudi-Arabia; Northern Africa: Egypt; Afrotropical: Chad, Sudan (Rosa et al., 2013, Farhad et al., 2015b).

Chrysis aestiva Dahlbom, 1854

Chrysis aestiva Dahlbom, 1854:286. Holotype ♀; Greece: Rhodes Is. (Loew collection, depository unknown) (*aestiva* group).
Chrysis aestiva: Farhad et al., 2015b:36 (Hormozgan); Rosa, 2020:465 (Mazandaran).

Distribution. Iran (Hormozgan, Mazandaran). Caucasus; Greece, Iran, Palestine, Rhodes, Türkiye (Rosa et al., 2013).

Chrysis afghanica Linsenmaier, 1968 (Fig. 8A–F)

Chrysis succincta komareki var. *uldarichi* Balthasar, 1957:152. Holotype ♀; Afghanistan: Duab (Prague)*. Invalid quadrinomial name.

Chrysis afghanica Linsenmaier, 1968:68. Holotype ♂; Afghanistan: Duab, based on the type and description of *C. succincta komaeriki* var. *uldarichi* Balthasar, 1957 (Luzern) (*succincta* group).

Material examined. 1♀, Qazvin, Zeresh, 36°25'33"N, 50°06'37"E, 11.viii.2011, leg. M. Khayrandish (TMUC).

Distribution. *Iran (Qazvin). Afghanistan (Linsenmaier, 1968).

Chrysis albanica alia Linsenmaier, 1959

Chrysis albanica alia Linsenmaier, 1959a:160 [not 100]. Holotype ♂; Türkiye: Konya (*succincta* group).
Chrysis albanica alia: Rosa et al., 2013:15 (Alborz); Iranmanesh et al., 2017:299 (Kerman).

Distribution. Iran (Alborz, Kerman). Türkiye (Linsenmaier, 1959a).

Chrysis altaica Mocsáry, 1912

Chrysis (*Tetrachrysis*) *analis* f. *altaica* Mocsáry, 1912b:586. Holotype ♀; Kazakhstan: Semipalatinsk [=Semey] (Budapest) (*comparata* group).
Chrysis altaica: Farzaneh et al., 2017:497 (Fars).

Distribution. Iran (Fars). Kazakhstan (Rosa et al., 2013).

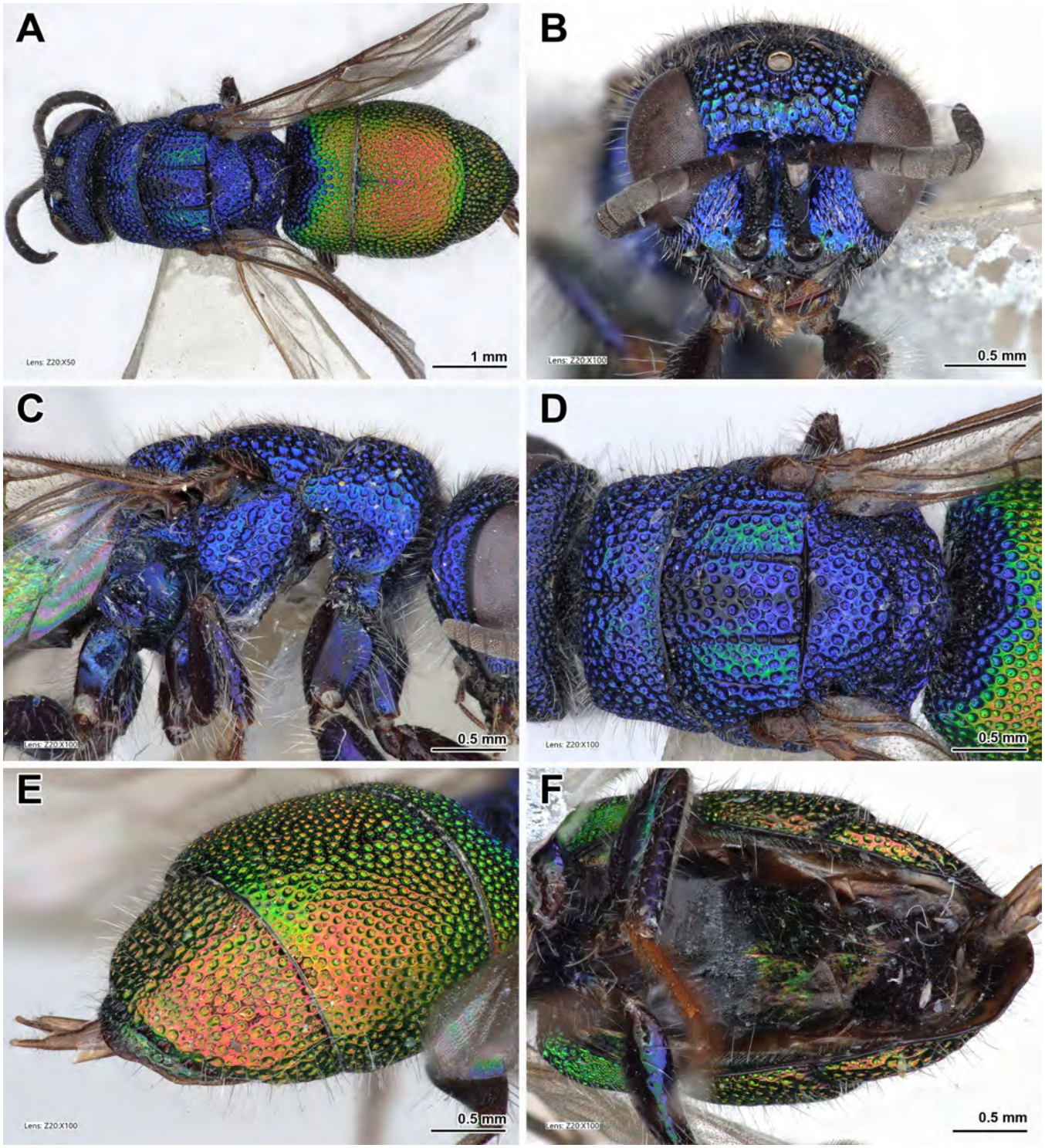

Figure 8. *Chrysis afghanica* Linsenmaier, 1968, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, lateral view; **D.** Mesosoma, dorsal view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Chrysis ambigua Radoszkowski, 1891

Chrysis ambigua Radoszkowski, 1891:188. Holotype ♀; Turkmenistan: Ashgabat (Kraków) (*cerastes* group).
Chrysis ambigua: Rosa et al., 2013:15 (Khorasan-e Razavi, Tehran); Strumia & Fallahzadeh, 2015:20 (Fars).

Distribution. Iran (Fars, Khorasan-e Razavi, Tehran). Euroasiatic, South-eastern Europe, Palestine, Rhodes, Türkiye, Middle East; Central Asia: Turkmenistan (Rosa et al., 2013).

***Chrysis amerii* Rosa & Farhad, sp. nov.** (Fig. 9A–F)

https://zoobank.org/urn:lsid:zoobank.org:act:10A6C3C8-204A-4C56-BC19-A7F6795AE72F

Material examined. **Holotype** ♀; IRAN, Hormozgan province: Chelo, 27°10'30"N, 57°01'09"E, 23.iii.2012, leg. A. Ameri (TMUC). **Paratype** 1♀, same locality, 18.v.2012, leg. A. Ameri (PRC).

Diagnosis. *Chrysis amerii* **sp. nov.** belongs to the *Chrysis succincta* species group which includes medium to large species (5.0–9.0 mm) with apical margin of the third metasomal tergum edentate, bidentate, tridentate or quadridentate; scapal basin microridged in male, and completely polished and smooth in female; transverse frontal carina normally developed; black spots on second metasomal sternum various, usually covering large part of sternum. *Chrysis amerii* **sp. nov.** can be immediately separated by other species of this group by the combination of the following diagnostic characters: metallic blue body, with greenish spots at sides of second tergum (Fig. 9E); apical margin of third tergum with a median protrusion, apically truncate (Fig. 9D, E); transverse frontal carina double (Fig. 9A), with the upper carina crescent and sharp medially; pronotum with shallow, barely visible antero-median depression, composed by short row of small punctures. *Chrysis amerii* can be separated from the other green to blue species of *succincta* group by simple apical margin of third tergum, with a single, median protrusion, whereas apical margin of *C. robertsi* Rosa, 2021 is quadridentate and apical margin of *C. maidaquensis* Strumia, 2014 is tridentate. Outside Iran, other blue species can be separated by *Chrysis amerii* **sp. nov.** for triadentate apical margin, such as *C. minutissima* Radoszkowski, 1876, or for quadridentate apical margin, as *C. friesei* du Buysson, 1900.

Description. — **Holotype** ♀ (Fig. 9A–F). Body length 7.6 mm; anterior wing length 4 mm.

Head. Brow with dense and small punctures between anterior ocellus and upper branch of transverse frontal carina; punctation denser, with small punctures on ocellar area; spaced between posterior ocelli and compound eye; postero-laterad posterior ocelli with punctures separated by polished, wide interspaces up to 2 puncture diameter; posterior ocelli with postero-lateral deep, round and small fovea; temple largely polished, with small, scattered punctures; scapal basin typically deep and medially polished, laterally densely and finely punctate, each puncture bearing white seta; malar space finely and densely punctate; upper transverse frontal carina vaguely M-shaped, with median part distinctly raised, almost straight, and laterally downcurved connecting lower part of frontal carina, toping scapal basin (Fig. 9A); genal carina sharp, straight, fully developed from occiput to mandibular insertion; subantennal space short, 0.5× MOD; apex of clypeus arcuate inward with narrow dark brown rim. Clypeus medially polished; with a row of small punctures before apical rim; punctures small and dense laterally, bearing a white seta. Distance between anterior ocellus and upper margin of frontal carina 1.2× MOD; distance between anterior ocellus and upper margin of scapal basin = 2.0× MOD. OOL 1.7× MOD; POL 2.5× MOD; MS 1.0× MOD; relative length of P:F1:F2:F3 = 1.0:1.5:0.9:0.9.

Mesosoma. Medial pronotal furrow shallow, barely visible, apicomedially as short row of small punctures; pronotum with small punctures, irregularly sized from very small to small (0.1–0.4× MOD); polished interspaces as large as 1 to 2 puncture diameters along anterior margin; puncture denser on posterior half with very small punctures (not dots) between larger ones; punctation on mesoscutum and scutellum shallow and spaced medially (Fig. 9B), with small punctures, at most 0.5× MOD; interspaces polished, as large as 1 to 2 puncture diameters; punctation on lateral area of mesoscutum contrasting, denser and deeper; notauli formed by deep, metallic, sub-square foveae, as large as larger punctures on mesonotum; parapsidal signum deep and distinct; scutellum antero-medially largely polished, punctation denser along margins; scutellar-metanotal suture deep, with large median fovea; posterior propodeal projections divergent; mesopleuron with episternal sulcus formed by large subsquare foveae, larger than other punctures on segment (Fig. 9C).

Metasoma. First tergum with even, medium sized punctures, equally spaced (Fig. 9D); second tergum with slightly smaller punctures, denser antero-dorsally, almost without interspaces; laterally and on second half of tergum with spaced and shallower punctures, with larger, polished interspaces up to 2 puncture diameters; longitudinal median carina weak; third tergum with small, scattered punctures,

with small punctures on interspaces; apical margin almost continuous, apico-medially protruding and truncate at apex protrusion (Fig. 9E); apical margin of tergum with narrow, brownish rim; pits of pit row small, shallow, black, only slightly larger than larger punctures on tergum (Fig. 9E); black spots on second sternum relatively small, covering about half sternum length; posterior margin of black spots obliquous; spots medially fused (Fig. 9F).

Colouration. Body dark blue with purplish reflections; scutellum and posterior margin of second tergum with greenish reflections; scape, pedicel and first flagellum basally metallic, other flagellomere blackish; wings hyaline, with brown veins.

Vestiture. Head dorsally with short, dense greyish to whitish setae as long as 1× MOD; ventrally with long white setae, at least 2× MOD long; mesosoma and metasoma dorsally with short (1× MOD) greyish setae, laterally on metasoma and on legs with erect, very long white hairs, as long as 2–3× MOD.

Male. Unknown.

Etymology. The specific epithet *amerii* (masculine noun in genitive) is dedicated to Ali Ameri (Tehran, Iran), for his contribution to the study of Iranian Chrysididae, having collected a large number of new species for the country and for science in the last decade.

Distribution. *Iran (Hormozgan).

Chrysis amneris Balthasar, 1953

Chrysis (*Tetrachrysis*) *amneris* Balthasar, 1953:227. Holotype ♂; Palestine: Wadi el Kelt (Prague) (*amneris* group).
Chrysis amneris: Falahatpisheh et al., 2020:30 (Fars).

Distribution. Iran (Fars). Palestine, Russia; Sudan; Saudi Arabia, United Arab Emirates (Rosa et al., 2017b, 2020a).

Chrysis angustifrons agitata Linsenmaier, 1959

Chrysis (*Chrysis*) *angustifrons agitata* Linsenmaier, 1959a:138. Holotype ♀; Türkiye: Sullan Dagh (Luzern) (*elegans* group).
Chrysis angustifrons agitata: Rosa et al., 2013:15 (cat, East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). Türkiye (Linsenmaier, 1959a).

Chrysis angustifrons angustifrons Abeille de Perrin, 1878

Chrysis angustifrons Abeille de Perrin, 1878:5. Syntypes ♂, ♀ [not holotype ♂]; France (Paris) (*elegans* group).
Chrysis (*Holochrysis*) *pyrrha* Semenov-Tian-Shanskij, 1967:153. Holotype ♀; Georgia: Lagodekhi (St. Petersburg).
Chrysis (*Holochrysis*) *poetarum* Semenov-Tian-Shanskij, 1967:154. Holotype ♂; Iran: Luristan (St. Petersburg).
Chrysis (*Holochrysis*) *sappho* Semenov-Tian-Shanskij, 1967:153. Holotype ♂; Georgia: Lagodekhi (St. Petersburg).
Chrysis pyrrha: Rosa et al., 2013:27 (Khuzestan, Lorestan).

Distribution. Iran (Khuzestan, Lorestan). Southern Europe from Spain to Greece, Caucasus (Rosa et al., 2013).

Remarks. *Chrysis pyrrha* Semenov-Tian-Shanskij was synonymised with *Chrysis angustifrons* Abeille de Perrin by Rosa et al. (2017a:48).

Chrysis annulata du Buysson, 1887

Chrysis annulata du Buysson, 1887:192. Holotype ♂; Palestine: Tiberias (Paris) (*maculicornis* group).
Chrysis annulata: Rosa et al., 2013:16 (East-Azarbaijan, Fars, Khuzestan); Ebrahimi, 2015:25 (Alborz) Farhad et al., 2015b:37 (Hormozgan).

Material examined. 1♀, Alborz, Shahrestanak, 35°55'34''N, 51°22'20''E, 8.vi.2010, leg. M. Khayrandish (TMUC); 1♂, Alborz, Karaj, 35°46'20''N, 50°56'4''E, 16.vi.2010, leg. M. Khayrandish (TMUC); 1♀, idem, 6.vii.2010 (TMUC).

Distribution. Iran (Alborz, East-Azarbaijan, Fars, Hormozgan, Khuzestan). South-eastern Europe, Cyprus, Palestine, Syria, Pakistan; Northern Africa (Rosa et al., 2013).

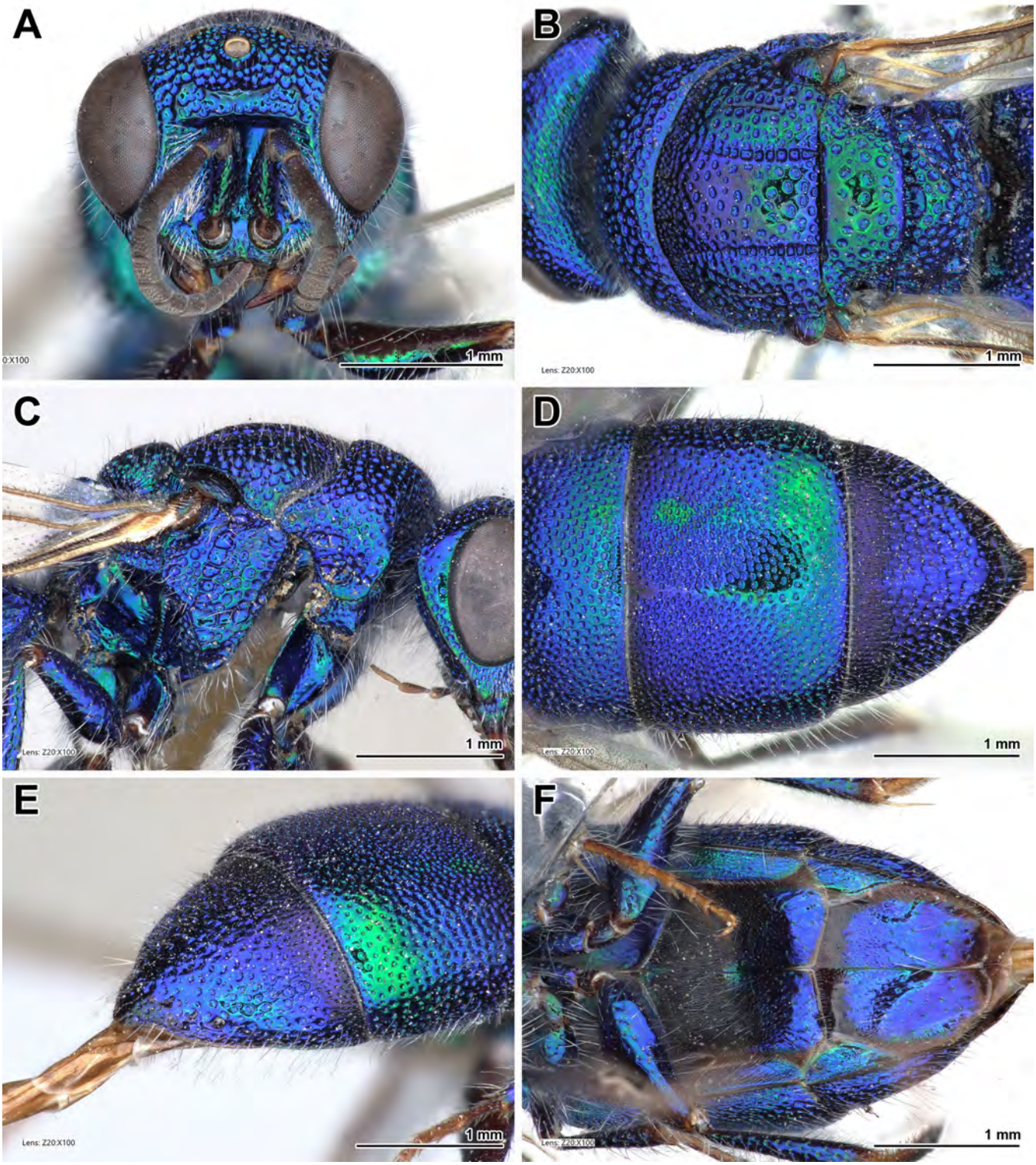

Figure 9. *Chrysis amerii* Rosa & Farhad, **sp. nov.**, female, holotype. **A.** Head, frontal view; **B.** Mesosoma, dorsal view; **C.** Mesosoma, lateral view; **D.** Metasoma, dorsal view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Chrysis apiata du Buysson, 1900

Chrysis apiata du Buysson, 1900:149. Holotype ♂; Iran: Tehran (Paris) (*comparata* group).
Chrysis apiata: Rosa et al., 2013:16 (Khorasan-e Razavi, Fars).

Distribution. Iran (Khorasan-e Razavi, Fars) (du Buysson, 1900).

Chrysis araratica Radoszkowski, 1890

Chrysis araratica Radoszkowski, 1890:509. Holotype ♂; Türkiye: Buyuk Agri Dagh [Mt. Ararat] (Krakow) (*scutellaris* group).
Chrysis araratica: Rosa et al., 2013:16 (West-Azarbaijan - Kamal-Abad).

Distribution. Iran (West-Azarbaijan). Türkiye (Radoszkowski, 1890).

Chrysis asiatica Radoszkowski, 1889

Chrysis asiatica Radoszkowski, 1889:26. Holotype ♂; Uzbekistan: Tashkent (Krakow) (*comparata* group).
Chrysis asiatica: Rosa et al., 2013:17 (Khorasan-e Razavi).

Distribution. Iran (Khorasan-e Razavi). Central Asia: Turkmenistan, Uzbekistan (Radoszkowski, 1891).

Chrysis batyamensis Linsenmaier, 1969

Chrysis batyamensis Linsenmaier, 1969:376. Holotype ♀; Palestine: Bat Yam (Luzern) (*curta* group).
Chrysis batyamensis: Rosa, 2020:465 (Hormozgan), 473 (Fig. 7).

Distribution. Iran (Hormozgan). Palestine.

Chrysis brunneamarginata Farhad, Rosa & Talebi [in Farhad et al., 2019]

Chrysis varidens sillensis Linsenmaier, 1987: Farhad et al., 2015b:40 (Hormozgan).
Chrysis brunnemarginata Farhad et al., 2019:1008 (key, figs 2B, C, J), 1009 (figs 3G, H, I), 1010 (fig. 4), 1011 (fig. 5). Holotype ♂; Iran: Hormozgan Minab, Chelo, 27° 10'30''N, 57°01'09''E, 16m, 20.iv.2012, leg. A. Ameri (Tehran) (*varidens* group).

Remarks. This species was initially identified as *Chrysis varidens sillensis*, but later described and recognized as distinct species (Farhad et al., 2019).

Distribution. Iran (Hormozgan).

Chrysis capito Semenov-Tian-Shanskij, 1967

Chrysis (*Gonodontochrysis*) *capito* Semenov-Tian-Shanskij, 1967:159. Holotype ♂; Iran: Arysh env. [Arisht in Qazvin, not Azerbaijan, rajon Khojavend] (St. Petersburg) (*bihamata* group).
Chrysis (*Gonodontochrysis*) *capito*: Rosa et al., 2013:17 (Qazvin).

Distribution. Iran (Qazvin).

Chrysis caucasicola Balthasar, 1953

Chrysis (*Tetrachrysis*) *analis* var. *caucasica* Mocsáry, 1912b:586, *nom. praeocc.*, *nec* Radoszkowski, 1877. Holotype ♀; Azerbaijan: Adjikent (Budapest) (*comparata* group).
Chrysis (*Tetrachrysis*) *analis* f. *caucasicola* Balthasar, 1953:228. Replacement name for *Chrysis analis* var. *caucasica* Mocsáry, 1912, *nec* Mocsáry, 1889.
Chrysis (*Chrysis*) *analis* ssp. *caucasiensis* Linsenmaier, 1959a:146. Replacement name for *Chrysis analis caucasica* Mocsáry, 1912, *nec* Mocsáry, 1889.
Chrysis perrinii Radoszkowski, 1889:25; Rosa et al., 2013:26 (Tehran).

Distribution. Iran (Tehran). Caucasus, Azerbaijan, Georgia (Rosa et al., 2013).

Remarks. The record of *Chrysis simplonica* Linsenmaier, 1951 from Gilan (Samin et al., 2014) is considered doubtful (see below) and should refer to *C. caucasicola*.

Chrysis chamrosh Rosa, sp. nov. (Fig. 10A–F)

https://zoobank.org/urn:lsid:zoobank.org:act:C41CA5B7-231D-46D9-B612-3D41F96542E8

Material examined. **Holotype** ♀; IRAN, Mazandaran province: 75 km S of Chalus [Elburs], 2400m, 12.vii.1977, leg. J. Gusenleitner (NMLU).

Diagnosis. *Chrysis chamrosh* **sp. nov.** belongs to the *succincta* group. It is closely related to the Central

Asian *Chrysis irenes* Semenov-Tian-Shanskij & Nikol'skaya, 1954, known from Tajikistan, whose type is illustrated in Rosa et al. (2017a, plate 67). *Chrysis chamrosh* **sp. nov.** can be separated by its colour pattern, an important diagnostic character in this species group (Linsenmaier, 1959a; Rosa & Makris, 2023), by the shape of the apical margin of the third tergum, the pit row and the body punctation. The body colour is green with red to purplish areas on anterior margin of pronotum, mesonotum, metanotum and propodeum (Fig. 10A) (*vs.* red only on mesonotum, with a small golden hue anteromedially on scutellum in *C. irenes*); the scapal basin is largely polished (Fig. 10B) (*vs.* densely micropunctate laterally); the mesonotal punctation is spaced and shallow (Fig. 10C) (*vs.* dense and deeper); the metasomal punctation is distinctly shallower and sparser in the second half of the tergite (*vs.* uniformly dense); the third tergum has small, shallow and spaced pits of the pit row (Fig. 10E) (*vs.* pits of the pit row deep and elongate); the black spots on second sternum are fused medially in both species, but in *C. chamrosh* there is a greenish median spot before the apical margin (Fig. 10F).

Description. — **Holotype** ♀ (Fig. 10A–F). Body length: 6.3 mm; wing length: 3.8 mm.

Head. Frons with dense, weakly impressed, small punctures (0.2–0.4 MOD), larger and more spaced on temples between lateral ocelli and eyes, denser and smaller on ocelli area and occipital area; lateral ocelli with two deep lateral foveae; frontal carina weak, as a dark line with vaguely M-shaped between frontal punctures (Fig. 10B); punctures between scapal basin and frontal carina larger than on those between anterior ocellus and frontal carina, not elongate; scapal basin deep, impunctate and polished medially with scattered, small punctures laterally (Fig. 10B); malar space long (1.1.MOD) covered by small, dense punctation; subantennal space short (0.6 × MOD); genal carina sharp, fully developed from temple to mandible insertion; apex of clypeus with thin brown rim. OOL 1.8 × MOD; POL 2.0 × MOD; MS 1.1 × MOD; relative length of P: F1: F2: F3 = 1.0: 1.6: 1.0: 0.8.

Mesosoma. Medial pronotal line weak, reaching 1/3rds of pronotal length; pronotum as long as scutellum, with small to medium punctures (0.1 – 0.6 × MOD), the latter larger than punctures of head; punctures on pronotal scutum weak and irregularly shaped; mesoscutum with similar puncture, sparser and weaker on median area and between notauli and parapsidal lines, with wide polished interspaces; notauli formed by small, deep foveae, subrectangular basesally and small and rounded towards apex, parapsidal signum as deep, dark line; mesoscutellum with spaced and shallow punctures; scutellar-metanotal suture deep, formed by longitudinally elongate foveae; metanotal punctures denser, without polished interspaces; posterior propodeal projections slightly divergent; with blunt apex; mesopleuron with punctures larger and shallower on mesepimeron; episternal sulcus formed by small, subsquare foveae, partially confluent each other.

Metasoma. Terga with even, geminate punctures (punctures appearing as two merged together, as the typical metasomal sculpture of *Trichrysis* Lichtenstein, 1876), smaller than those on mesoscutum; on first tergum slightly larger, on second tergum smaller and sparser on second half; on third tergum sparser; median longitudinal carina faint; pits of the pit row small, black and rounded (Fig. 10E); apical teeth short, triangular, bordered with hyaline rim; black spots on second sternum fused medially, covering almost 2/3rd of sternal length and with greenish median spot before the apical margin (Fig. 10F).

Colour. Head and mesosoma green with red to purplish areas on anterior and lateral margin of pronotum, mesonotum, metanotum and propodeum; tegula slightly metallic red along inner margin; notauli blue; scutellar-metanotal suture blue to green; mesopleuron green with golden hue medially; legs pinkish; metasoma red to purplish with apical margin of all tergites green; sterna red; wings hyaline with brown nervures.

Male. Unknown.

Etymology. The specific epithet *chamrosh* (masculine, in apposition) is the name of a mythological bird in Persian mythology said to live on the summit of Mount Alborz, close to the type locality area where the holotype of this *Chrysis* species was collected, in Mazandaran Province.

Distribution. Iran (Mazandaran).

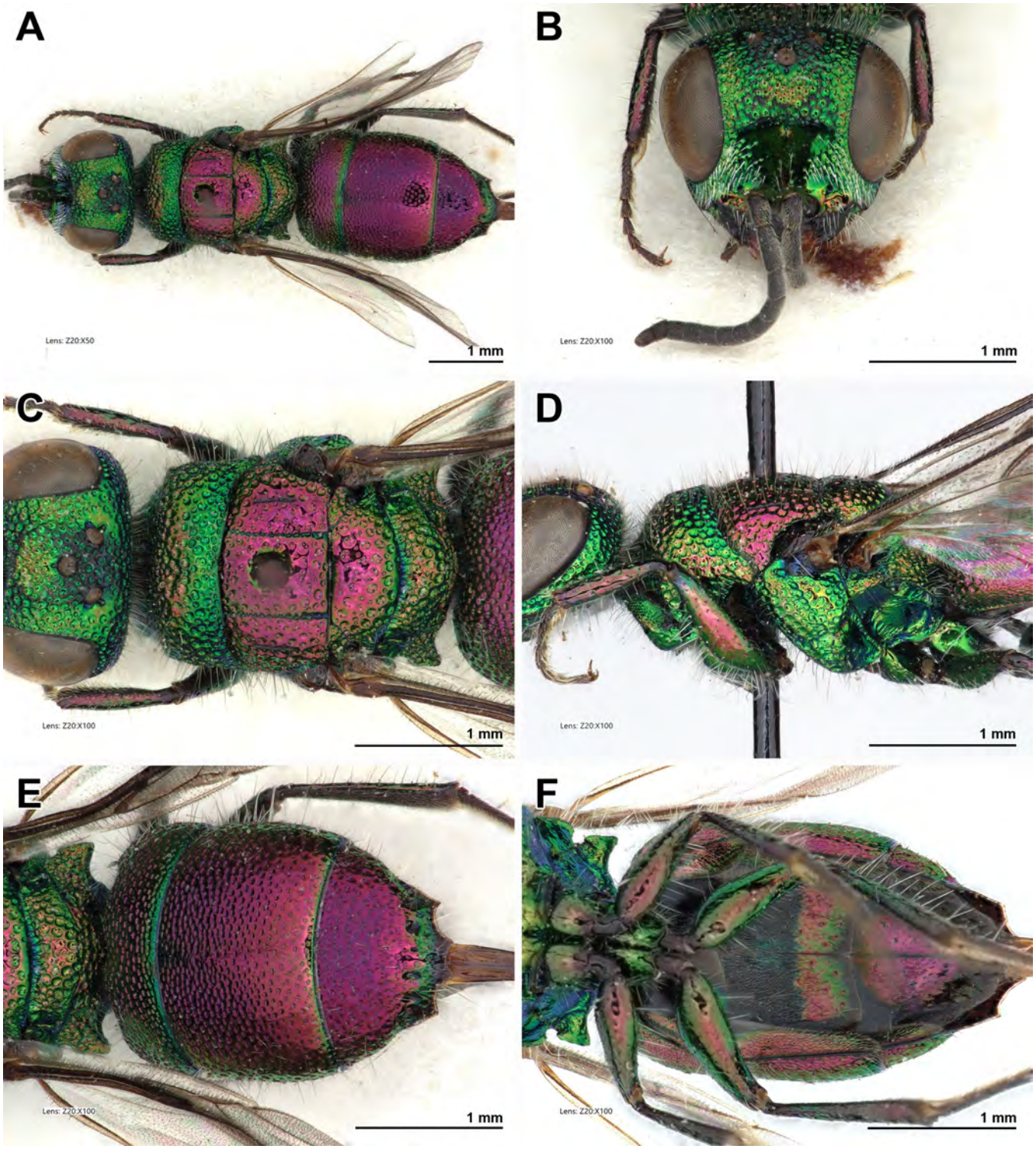

Figure 10. *Chrysis chamrosh* Rosa, **sp. nov.**, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, posterior view; **F.** Metasoma, ventral view.

Chrysis chlorochrysa Mocsáry 1889

Chrysis (*Tetrachrysis*) *chlorochrysa* Mocsáry [in Radoszkowski], 1889:23. Syntypes ♂, ♀; Turkmenistan [not Iran]: Askhabad (Kraków) (*viridissima* group).
Chrysis subcoerulea Radoszkowski, 1891:191; Rosa et al., 2013:31 (East-Azarbaijan, Mazandaran); Farhad et al., 2015b:40 (Hormozgan).

Material examined. 1♂, Hormozgan, Minab, 27°08'39''N, 57°04'31''E, 2.vii.2012, leg. A. Ameri.

Distribution. Iran (East-Azarbaijan, Hormozgan, Mazandaran). Greece (Linsenmaier, 1968), Türkiye (Strumia & Yildirim, 2009); Central Asia: Turkmenistan (Mocsáry in Radoszkowski, 1889).

Remarks. *Chrysis subcoerulea* Radoszkowski was synonymised by Rosa et al. (2015d:60).

Chrysis cingulicornis libanoensis Linsenmaier, 1968

Chrysis cingulicornis libanoensis Linsenmaier, 1968:81. Holotype ♀; Lebanon (Luzern) (*viridula* group).
Chrysis cingulicornis libanoensis: Linsenmaier, 1987:149 (Mazandaran).
Chrysis cingulicornis: Rosa et al., 2013:18 (Mazandaran).

Distribution. Iran (Mazandaran) (Linsenmaier, 1987). Lebanon, Türkiye (Strumia & Yildirim, 2009).

Chrysis clarinicollis Linsenmaier, 1951

Chrysis ignita var. *clarinicollis* Linsenmaier, 1951:77 [not 78]. Lectotype ♀ designated by Linsenmaier, 1959a:154; Switzerland: Wallis (Luzern) (*ignita* group).
Chrysis ignita var. *clarinicollis*: Farzaneh et al., 2017:498 (Fars).

Distribution. Iran (Fars). West Palaearctic: from Southern and Central Europe to Ural; Northern Africa (Rosa et al., 2013).

Chrysis coa Invrea, 1939 (Fig. 16D)

Chrysis coa Invrea, 1939:108. Holotype ♂; Greece: Kos Is. (Triest) (*succincta* group).
Chrysis coa: Strumia & Fallahzadeh, 2015:20 (Kordestan); Tavasoli & Fallahzadeh, 2015:82 (Fars).

Distribution. Iran (Kordestan). Greece (Kos Is., Rhodes Is.) (Linsenmaier, 1959a).

Chrysis comparata Lepeletier 1806

Chrysis comparata Lepeletier, 1806:127. Neotype ♂ designated by Rosa & Xu, 2015:13; France: Meudon (Turin) (*comparata* group).
Chrysis comparata: Rosa, 2020:465 (Alborz, Mazandaran), 474 (fig. 11).

Distribution. Iran (Alborz, Mazandaran). West-Palaearctic from Europe to Caucasus, Ural, and Siberia; Northern Africa (Rosa et al., 2013; Linsenmaier, 1999).

Chrysis comta Förster, 1853

Chrysis comta Förster, 1853:314. Holotype ♂; Türkiye (type depository unknown) (*ignita* group).
Chrysis comta: Rosa et al., 2013:18 (East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). Euroasian, from Central and Southern Europe to Türkiye, Caucasus, Ural, and China (Rosa et al., 2014).

Chrysis confluens (Dahlbom, 1845)

Chrysura confluens Dahlbom, 1845:6. Holotype ♂; Greece: Rhodes Is. (Stockholm) (*elegans* group).
Gonochrysis elegans var. *smaragdula* Trautmann, 1926, *nom. praeoccup.*, *nec* Fabricius, 1775. Lectotype ♂ designated by Bohart in Kimsey & Bohart, 1991:407. Greece: Rhodes Is. (Berlin).
Chrysis (*Chrysis*) *elegans* ssp. *interrogata* Linsenmaier, 1959a:137. Replacement name for *Gonochrysis elegans* var. *smaragdula* Trautmann, 1926, *nec* Fabricius, 1775.
Chrysis elegans ssp. *interrogata* Linsenmaier, 1959 = *Chrysis confluens* (Dahlbom, 1845): Rosa & Vårdal, 2015:96.
Chrysis elegans interrogata: Rosa et al., 2013:20 (Fars).
Chrysis elegans ssp. *smaragdula*: Strumia & Fallahzadeh, 2015:21 (Kordestan).

Distribution. Iran (Fars, Kordestan). Rhodes (Linsenmaier, 1959a), Türkiye (Linsenmaier, 1968).

Remarks. *Chrysis elegans interrogata* Linsenmaier, 1959 was synonymised with *Chrysis confluens* Dahlbom by Rosa & Vårdal (2015).

Chrysis consanguinea Mocsáry, 1889

Chrysis (*Gonochrysis*) *consanguinea* Mocsáry, 1889:299. Syntypes ♀♀ [not ♂ and ♀]; Italy: Sicily; Algeria (Geneva) (*viridula* group).
Chrysis consanguinea: Strumia & Fallahzadeh, 2015:20 (Khorasan-e Razavi).

Distribution. Iran (Khorasan-e Razavi). Palaearctic, from Southern Europe to Caucasus and Siberia; Northern Africa (Rosa et al., 2013).

Chrysis consobrina Mocsáry, 1889

Chrysis (*Tetrachrysis*) *consobrina* Mocsáry, 1889:458. Lectotype ♀ designated by Bohart in Bohart & French, 1986:341; Turkmenistan: Ashgabat (Budapest) (*scutellaris* group).
Chrysis soror consobrina: Rosa et al., 2013:30 (Demabend [=Demavand]); Farzaneh et al., 2017:499 (Fars).

Distribution. Iran (Alborz, Fars), as Persia (Bischoff, 1913; Balthasar, 1953). Transcaspia (Linsenmaier, 1959a).

Remarks. *Chrysis consobrina* was ranked as a valid species by Rosa et al. (2017e).

Chrysis corusca Valkeila, 1971

Chrysis corusca Valkeila, 1971:84. Holotype ♀; Sweden: Åsbro Lerbäck (Stockholm) (*ignita* group).
Chrysis corusca: Rosa et al., 2013:18 (Mazandaran).

Distribution. Iran (Mazandaran). Central and Northern Europe (Paukkunen et al., 2015).

Chrysis crenulata Rosa, sp. nov. (Fig. 11A–F)

https://zoobank.org/urn:lsid:zoobank.org:act:42A61BB7-CA6A-429D-A7F8-9877A127FA45

Material examined. **Holotype** ♀; IRAN, Golestan province: Elburs 40 km S of Shahpasand Tilabad, 1600m, 16.vii.1977, leg. A.W. Ebmer / bei *heraklionica* spec.? Coll. Linsenmaier / GBIF_Chr 00019822 (NMLU).

Diagnosis. *Chrysis crenulata* **sp. nov.** belongs to the *succincta* group and is related to *Chrysis heraklionica* Linsenmaier, 1968 from Crete, as already noticed by Linsenmaier on his identification label. The main differences between these two species are body punctation, spaced in *C. crenulata* **sp. nov.**, in particular well visible on mesonotum and metasoma (*vs*. deep, dense, without polished interspaces in *C. heraklionica*); scapal basin medially crenulate and not typically polished as in all the other species of the *succincta* group; impuncate area of scapal basin T-shaped, not largely polished as in other species (Fig. 11B); colour pattern with scutellum green, contrasting mesoscutum (Fig. 11C); green to golden-green on head, pronotum posteriorly, metanotum and propodeum (red non-contrasting and other segments blue in *C. heraklionica*); antenna with scape, pedicel and first flagellomere basally metallic (non-metallic in *C. heraklionica*).

Description. — **Holotype** ♀ (Fig. 11A–F). Body length 7.4 mm; anterior wing length 4.2 mm (Fig. 11A).

Head. Vertex, ocellar area and brow with dense and small punctures (0.2–0.3× MOD); from posterior ocelli to temples with similar punctures but separated by polished wide interspaces of 1 puncture diameter; posterior ocelli with postero-lateral deep fovea confluent in a lateral, narrow fovea, as long as ocellus length; postero-laterad posterior ocelli with larger polished area as large as 1× MOD; scapal basin deep below upper margin, medially and apically relatively flat for females in this group; impunctate T-shaped area below upper margin and medially (width of 2× MOD) not fully polished, but unusually crenulated; laterally densely and finely punctate as in males of this group, each puncture bearing white short seta, but pilosity not covering face and malar spaces, still clearly visible; malar space finely and densely punctate; frontal carina weak (Fig. 11B), irregular, barely visible as impunctate stripe between punctures, with darker coloration; genal carina sharp, straight, fully developed from middle eye to mandibular insertion; subantennal space short, 0.6× MOD; apex of clypeus straight, slightly arcuate upward with narrow, dark brown rim. Distance between anterior ocellus and margin of upper transverse frontal carina = 2.5× MOD. OOL 1.6× MOD; POL 2.0× MOD; MS 0.9× MOD; relative length of P:F1:F2:F3 = 1.0:1.7:0.8:0.7.

Mesosoma. Medial pronotal furrow deep, reaching 3/4 of pronotal length; pronotum with uneven punctures, small to medium sized (0.1–0.5× MOD), shallow on anterior margin, denser and deeper laterally, with occasional dots on interspaces; on mesoscutum with relatively shallow punctures, larger postero-medially on median area, distinctly smaller antero-medially (Fig. 11C); median area with polished interspaces without small punctures or dots; lateral area of mesoscutum with denser punctures, in particular denser and deeper at sides; notauli formed by deep, blue metallic, round, and very small foveae, as large as the smaller adjacent punctures; parapsidal signum deep and distinct; scutellum with punctures similar to those at base of mesoscutum, with large triangular, polished area antero-medially; scutellar-metanotal suture deep, formed by longitudinally elongate foveae; metanotum densely and deeply punctate, with small punctures on narrow interspaces; posterior propodeal projections subparallel; mesopleuron with episternal sulcus formed by large, subrectangular foveae, as large as two punctures and confluent with adjacent points (Fig. 11D).

Metasoma. Punctures on terga even, deep without dots or small punctures on interspaces; longitudinal median carina faint; third tergum with large, deep pits of pit row, two median pits larger than other punctures on tergum, others as large or slightly larger than largest punctures on tergum (Fig. 11E); apical margin quadridentate, with median ones closer each other than lateral and median one; median teeth blunt, lateral ones acute; black spots on second sternum large, covering half of sternum length; spots fused only medially with posterior margin convex (Fig. 11F).

Colouration. Body with typical colour pattern of *succincta*, with pronotum anteriorly, mesoscutum and metasoma red, excluding the apical margin blue; head and other parts green to golden green; legs greenish to reddish; black on median area of metascutum and antero-medially on second tergum; tegula non-metallic; scape, pedicel, and first flagellomere basally metallic.

Vestiture. Setae whitish and long (at least 1.5× MOD) on head and mesosoma dorsally; longer (up to 3× MOD) on metasoma laterally and on femora and tibiae, here erect on both and outer side.

Male. Unknown.

Etymology. The specific epithet *crenulata* derives from the New Latin adjective *crenulatus* (crenulate) and refers to the microsculpture on the scapal basin of the female, usually polished in the *succincta* species-group.

Distribution. *Iran (Golestan).

Chrysis cylindrica Eversmann, 1858 (Fig. 12A–F)

Chrysis cylindrica Eversmann, 1858:554. Holotype ♀; Russia: Kazan (Kraków) (*viridula* group).

Material examined. 1♂, Kordestan, 1500 m, 22 km N of Kamyaran, 34°57'20''N, 46°58'38''E, 18.v.2013, leg. D. Baiocchi (PRC).

Distribution. *Iran (Kordestan). South-East Europe, Caucasus, Russia (Rosa et al., 2013).

Chrysis daphnis syriensis Linsenmaier, 1959

Chrysis (*Chrysis*) *daphnis syriensis* Linsenmaier, 1959a:133. Holotype ♀; Syria: Homs (Luzern) (*viridula* group).
Chrysis daphnis syriensis: Rosa et al., 2013:18 (Fars, Qazvin); Strumia & Fallahzadeh, 2015:20 (Fars, Khorasan-e Razavi); Rosa, 2020:465 (Mazandaran).

Distribution. Iran (Fars, Khorasan-e Razavi, Mazandaran, Qazvin). Palestine, Syria, Türkiye (Linsenmaier, 1959a).

Chrysis dauriana Linsenmaier, 1959

Chrysis (*Chrysis*) *cavaleriei dauriana* Linsenmaier, 1959a:112. Holotype ♀; Russia: Dauria (Luzern) (*succincta* group).
Chrysis cavaleriei dauriana: Rosa et al., 2013:17 (Alborz).

Distribution. Iran (Alborz). Central Asia (Linsenmaier, 1959a), Siberia, Russian Far East, Mongolia (Rosa et al., 2013).

Remarks. *Chrysis dauriana* Linsenmaier was ranked as a valid species by Rosa et al. (2017a:40). Re-examination of the specimen in Linsenmaier's collection is requested.

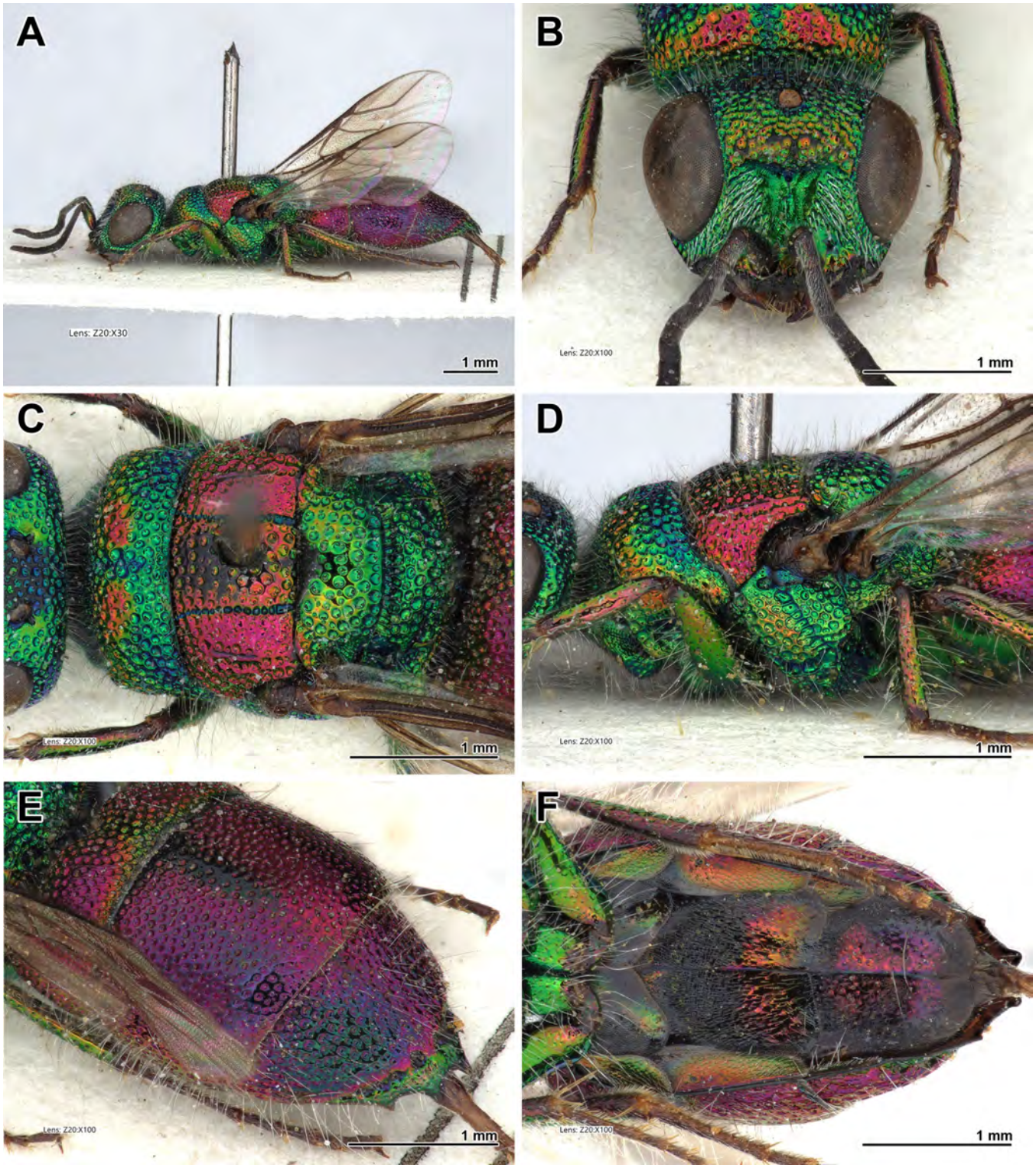

Figure 11. *Chrysis crenulata* Rosa, **sp. nov.**, female, holotype. **A.** Habitus, lateral view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Chrysis demavendae Radoszkowski, 1881 (Fig. 13A–F)

Chrysis demavendae Radoszkowski, 1881:v. Syntypes ♂, ♀; Iran: Damavend Mt. (Tehran/Mazandaran) (Berlin) (*smaragdula* group).
Chrysis demabendae (!): Radoszkowski, 1889:33.
Chrysis demavendae: Rosa et al., 2013:19 (Tehran/Mazandaran).

Material examined. 1♂, Hormozgan, Bastak, 30.iii.2011, leg. A. Ameri (TMUC); 1♀, Fars, Goldamcheh, 28°39'31''N, 53°32'17''E (TMUC).

Distribution. Iran (Fars, Hormozgan, Mazandaran, Tehran).

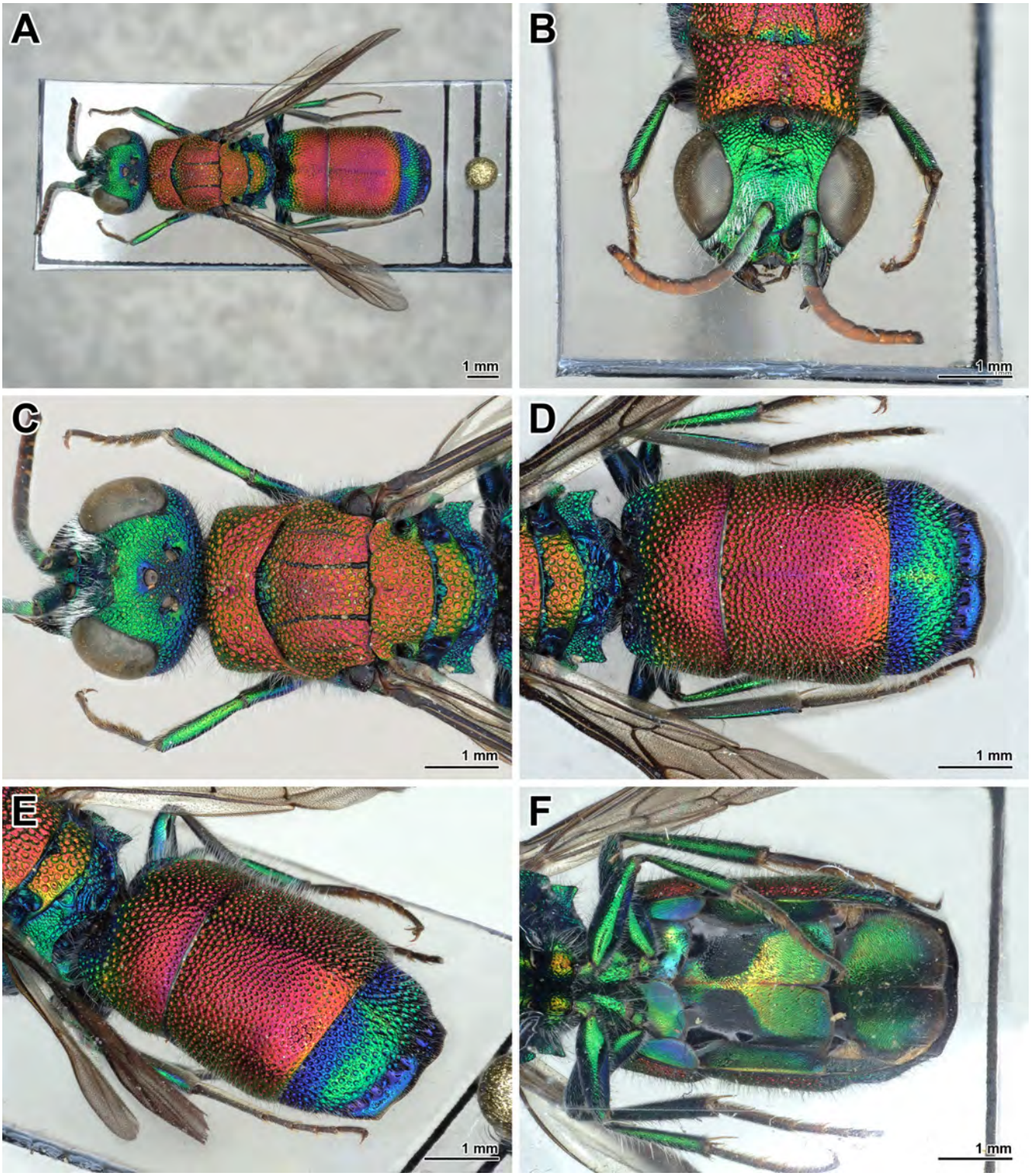

Figure 12. *Chrysis cylindrica* Eversmann, 1858, male. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, dorsal view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

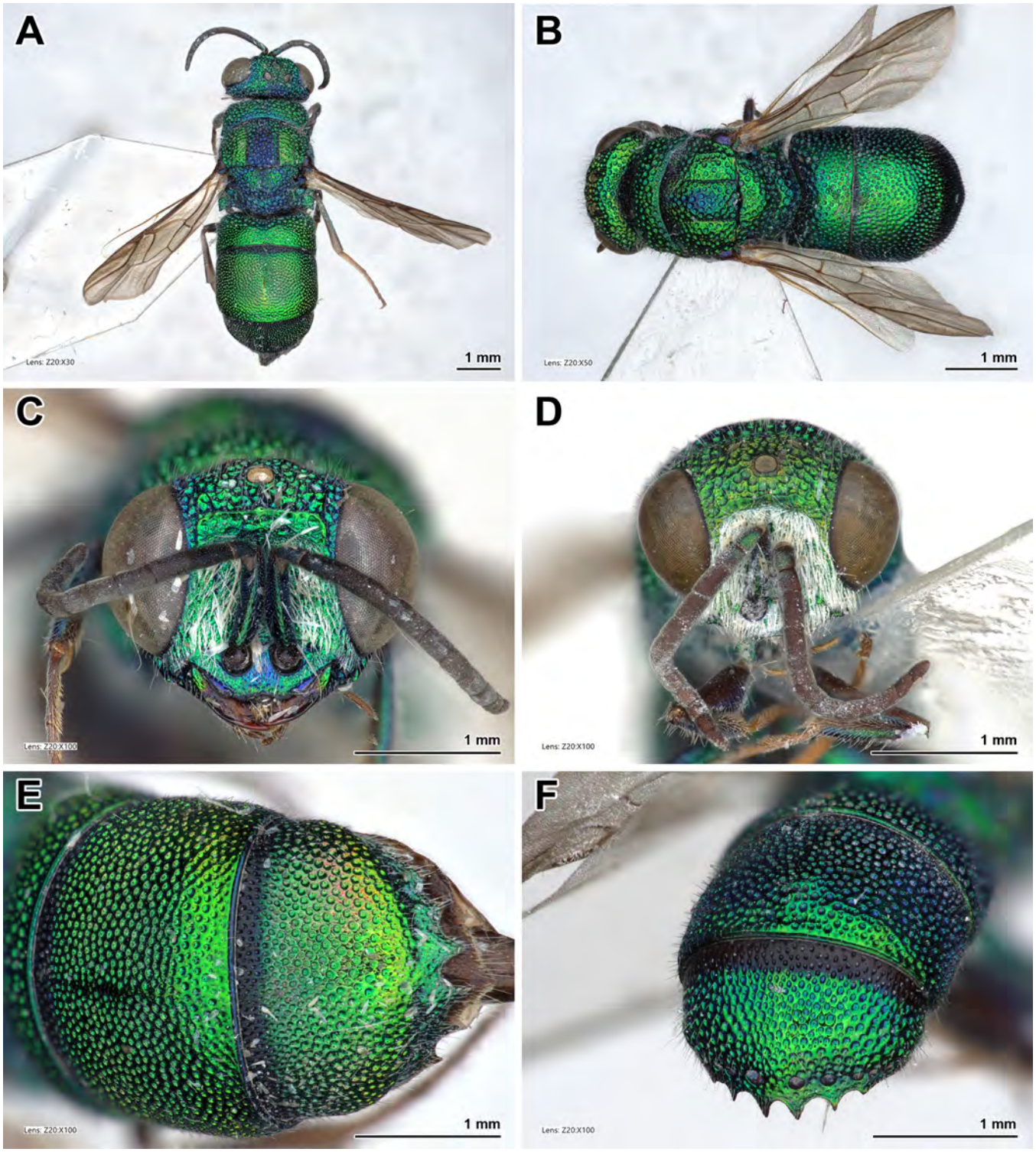

Figure 13. *Chrysis demavendae* Radoszkowski, 1881, **A.**, **C.**, **E.** Female; **B.**, **D.**, **E.** Male. **A–B.** Habitus, dorsal view; **C–D.** Head, frontal view; **E–F.** Mesosoma, posterior view;.

Chrysis dentipes dentipes Radoszkowski, 1877

Chrysis dentipes Radoszkowski, 1877:15. Lectotype ♀ designated by Bohart in Kimsey & Bohart, 1991; Uzbekistan: Sarafschan (Moscow) (*taczanovskyi* group).
Chrysis iraniensis du Buysson, 1900:150. Holotype ♀; Iran: Tehran (Paris).
Chrysis eversmanni Mocsáry, 1912a:407. Holotype ♂; Turkmenistan (Budapest).
Chrysis dentipes: Rosa et al., 2013:19 (Tehran); Farhad et al., 2015b:37 (Hormozgan).

Material examined. 1 ♀, Hormozgan, Chelo, 27°10'30"N, 57°10'09"E, 11.iv.2011, leg. A. Ameri (TMUC).

Distribution. Iran (Hormozgan, Tehran). Central Asia: Tadjikistan, Turkmenistan, Uzbekistan, Kyrgyzstan (Tarbinsky, 2002a).

Chrysis diacantha diacantha Mocsáry, 1889

Chrysis (*Dichrysis*) *diacantha* Mocsáry, 1889:318. Lectotype ♀ designated by Móczár, 1965; Caucasus (Budapest) (*varidens-ragusae* group).
Chrysis diacantha diacantha: Falahatpisheh et al., 2020:31 (Fars).

Distribution. Iran (Fars). South-East Europe, Caucasus, Middle East, Central Asia, Russia (Rosa et al., 2013).

Chrysis distincta distincta Mocsáry, 1887

Chrysis analis var. *incerta* Radoszkovsky, 1880:145, *nom. praeoccup.*, *nec* Dahlbom, 1854. Type ♀; Caucasus (Krakow) (*maculicornis* group).
Chrysis distincta Mocsáry, 1887:13. Replacement name for *analis incerta* Radoszkovsky, 1880.
Chrysis distincta: Rosa et al., 2013:19 (Sistan & Baluchestan); Rosa, 2020:465 (Kerman, North Khorasan).

Distribution. Iran (Kerman, North Khorasan, Sistan & Baluchestan), Caucasus, Palestine, Türkiye, Pakistan; Central Asia; Northern Africa: Algeria (Rosa et al., 2013).

Chrysis distincta exigua Mocsáry, 1889

Chrysis (*Tetrachrysis*) *exigua* Mocsáry, 1889:454. Holotype ♀; Uzbekistan: Tashkent (Kraków) (*maculicornis* group).
Chrysis distincta exigua: Strumia & Fallahzadeh, 2015:20 (Alborz).

Distribution. Iran (Alborz). Central Asia (Mocsáry, 1889).

Chrysis echidna Semenov-Tian-Shanskij, 1967 (Figs 14A–F; 31B, 31F)

Chrysis (*Tetrachrysis*) *echidna* Semenov-Tian-Shanskij, 1967:163. Holotype ♀; Turkmenistan: Ashkhabad (St. Petersburg) (*subsinuata* group).

Material examined. 1♀, Hormozgan, Bastak, 30.iii.2011, leg. Ameri (TMUC); 1♂, Ilam province: SW of Abdanan, 32°54'54"N, 47°18'3.6"E, 1830m, 12.v.2016, leg. M. Kafka (MHC).

Distribution. *Iran (Hormozgan, Ilam). Turkmenistan (Semenov-Tian-Shanskij, 1967).

Chrysis edentata Rosa & Baiocchi, sp. nov. (Figs 15A–F, 16A)

https://zoobank.org/urn:lsid:zoobank.org:act:58D52AB7-E844-4DED-86FB-0BDDCD83702A

Material examined. **Holotype** ♂; IRAN, Kerman province: N of Deh Bakri, 29°07'40"N, 57°55'99"E, 1825m, 26–27.v.2012, leg. D. Baiocchi (MSNM).

Diagnosis. *Chrysis edentata* **sp. nov.** belongs to the *succincta* group and is somehow related to *Chrysis mavromoustakisi* Trautmann, 1929 from Cyprus due to the general habitus, similar to *Chrysis grohmanni* Dahlbom, 1854 and without apical teeth on the last visible tergum. Also the short second flagellomere (shorter than the third) and male genitalia are related to *C. mavromoustakisi*, but the genital capsule of *C. edentata* is narrower, the gonostylus shorter and the apex of gonostylus simple, digitate, not bifurcate as in *C. mavromoustakisi* (Figs 16A, B); apical margin of third tergum edentate, unmodified (Fig. 15E), whereas in *C. mavromoustakisi* is pulled out, with elongate pits of the pit row (Fig. 16G); black spots on second tergum medially fused in *C. edentata*, with straight margin, covering less than half sternum (vs. separate medially, with oblique margin and covering more than half sternum); besides other characters, also the colour pattern of *Chrysis edentata* **sp. nov.** is significantly different, being entirely green (Fig. 15A) and clearly distinct from the contrasting red and blue colour of *Chrysis mavromoustakisi* (Figs 16G, compare also the picture in Rosa et al., 2017d:fig. 7B).

Description. — **Holotype** ♂ (Figs 15A–F). Body length 6.3 mm; anterior wing length 3.5 mm (Fig. 15A).

Head. Vertex, ocellar area and brow between anterior ocellus and upper branch of transverse frontal carina with dense and small punctures; postero-laterad posterior ocelli with polished area as large as 1×

MOD; posterior ocelli with postero-lateral deep and small fovea (Fig. 15C); scapal basin deep and medially polished for a width of 1× MOD, laterally densely and finely punctate, each puncture bearing white seta; white pilosity covering face and malar spaces (Fig. 15B); malar space finely and densely punctate; frontal carina double, upper transverse frontal carina substraight, slightly curved downwards medially, downcurved to connect lower part laterally (Fig. 15B); lower carina toping scapal basin and weakly produced, compared to upper one; genal carina sharp, straight, fully developed from middle eye to mandibular insertion; subantennal space short, 0.6× MOD; apex of clypeus arcuate upward with narrow, dark brown rim. Clypeus sparsely micropunctate with white setae laterally. Distance between anterior ocellus and upper margin of frontal carina 1.2× MOD; distance between anterior ocellus and upper margin of scapal basin = 2.0× MOD. OOL 2.0× MOD; POL 2.1× MOD; MS 1.0× MOD; relative length of P:F1:F2:F3 = 1.0:1.0:0.7:1.2.

Mesosoma. Medial pronotal furrow deep, narrow, reaching half of pronotal length; pronotum with dense, deep and even punctures of medium size (0.5× MOD), with occasional small punctures between punctures; row of smaller punctures along posterior margin; punctation on mesoscutum and scutellum deep, with larger punctures (up to 0.8× MOD) postero-medially, spaced medially on mesoscutum, with polished interspaces (Fig. 15C); punctation on lateral areas of mesoscutum denser; notauli formed by deep, black, round, and small foveae, as large as half of larger punctures on mesonotum; parapsidal signum deep and distinct; punctures on scutellum denser with polished area along posterior margin; scutellar-metanotal suture deep, with large, irregular median fovea; posterior propodeal projections pointed, divergent, with lateral sides slightly concave; mesopleuron with episternal sulcus formed by large, irregular foveae, as large as two or three punctures and confluent with adjacent points (Fig. 15D).

Metasoma. Punctures on terga dense, deep and slightly smaller than those on metanotum, with dots on interspaces; punctures becoming smaller towards apical margin; longitudinal median carina weak and barely visible at base of second tergum (Fig. 15E); third tergum with small, deep pits of pit row; apical margin sinuous, with a lateral concavity before weak median indentation; margin bordered by narrow but distinct hyaline rim; black spots on second sternum relatively small, covering less than first half of sternum length; spots medially fused with posterior margin straight (Fig. 15F); genital capsule narrow, elongate, with simple gonostylus, digitate distally, not bifurcate (Fig. 16A).

Colouration. Body entirely emerald green including tegulae, legs, scape, pedicel, first and second flagellomere.

Vestiture. Setae whitish and long (at least 2× MOD) on head and mesosoma dorsally, on metasoma laterally; on femora; on tibia long and erect only on outer side.

Female. Unknown.

Etymology. The specific epithet *edentata* derives from the Latin adjective *edentatus* (toothless) and refers to the simple apical margin of the last metasomal tergum without teeth.

Distribution. *Iran (Kerman).

Chrysis equestris Dahlbom, 1854

Chrysis equestris Dahlbom, 1854:307. Holotype ♀; type locality unknown [most likely Sweden] (Stockholm) (*smaragdula* group).
Chrysis equestris: Rosa et al., 2013:20 (Golestan).

Distribution. Iran (Golestan). Euroasian, from Europe to Russian Far East (Rosa et al., 2013).

Chrysis erubescens Linsenmaier, 1997

Chrysis (*Platycelia*) *erubescens* Linsenmaier, 1997:283. Holotype ♀; Iran: Khuzestan, Haft Tapeh, 300 km N Abadan, Choca Zambil, 29.vi–1.vii.1965, leg. A. Mavromoustakis (Luzern) (*ehrenbergi* group).

Material examined. 3♂♂, 3♀♀, Golestan province: 70 km E of Minudasht, 37°15'36"N, 55°59'24"E, 1050m, 12.vi.2010, leg. Mi. Halada (MHC).

Distribution. Iran (Golestan, Khuzestan).

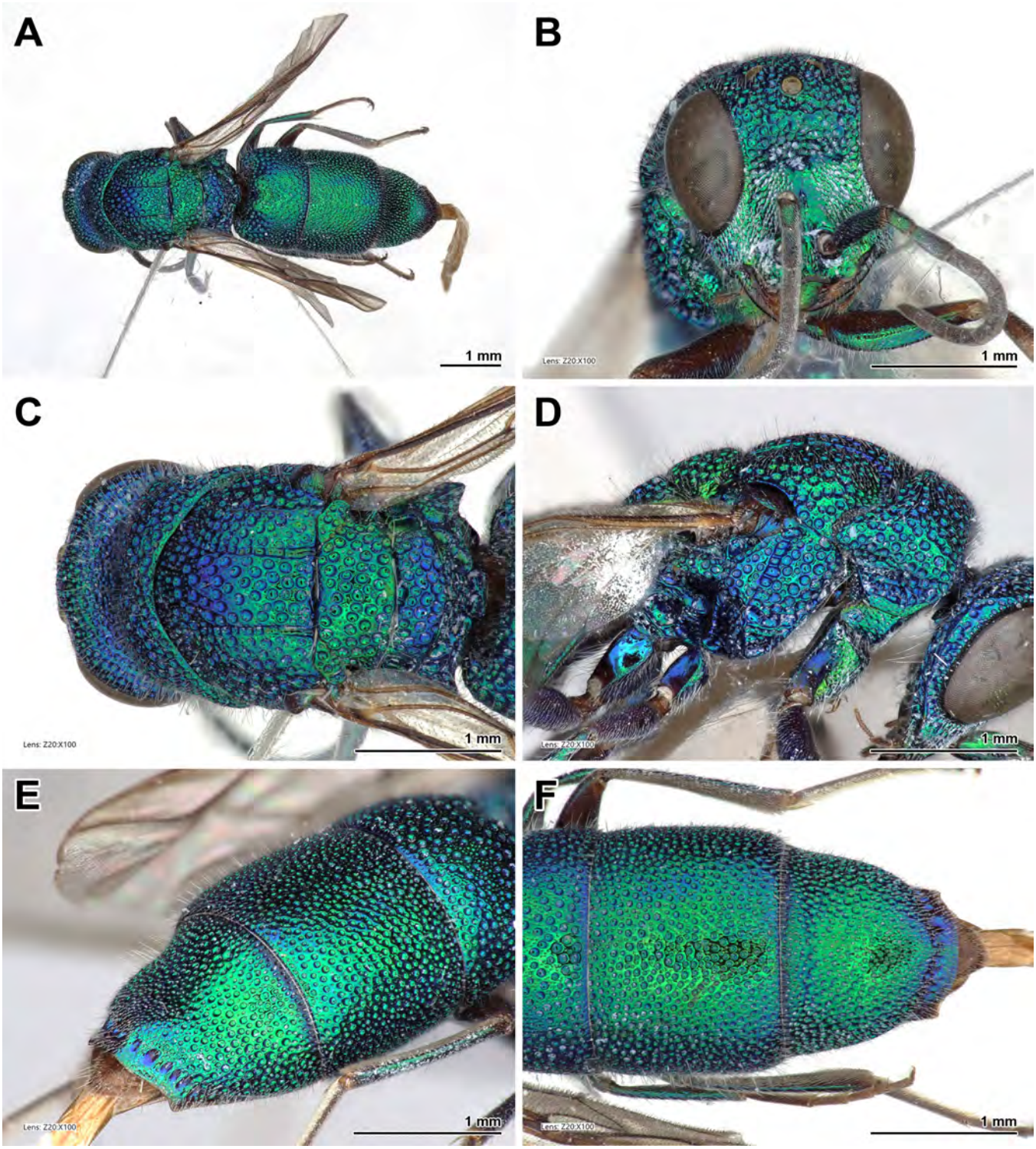

Figure 14. *Chrysis echidna* Semenov-Tian-Shanskij, 1967, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, dorsal view.

Chrysis frivaldszkyi frivaldszkyi Mocsáry, 1882

Chrysis frivaldszkyi Mocsáry, 1882:52 [descr. in Hungarian], 84 [descr. in Latin]. Lectotype ♂ designated by Móczár, 1965:171; Hungary (Budapest) (*succincta* group).
Chrysis frivaldszkyi: Samin et al., 2014:122 (Khorasan, Semnan); Rosa, 2020:466 (Mazandaran).

Distribution. Iran (Fars, Khorasan, Semnan, and Mazandaran).

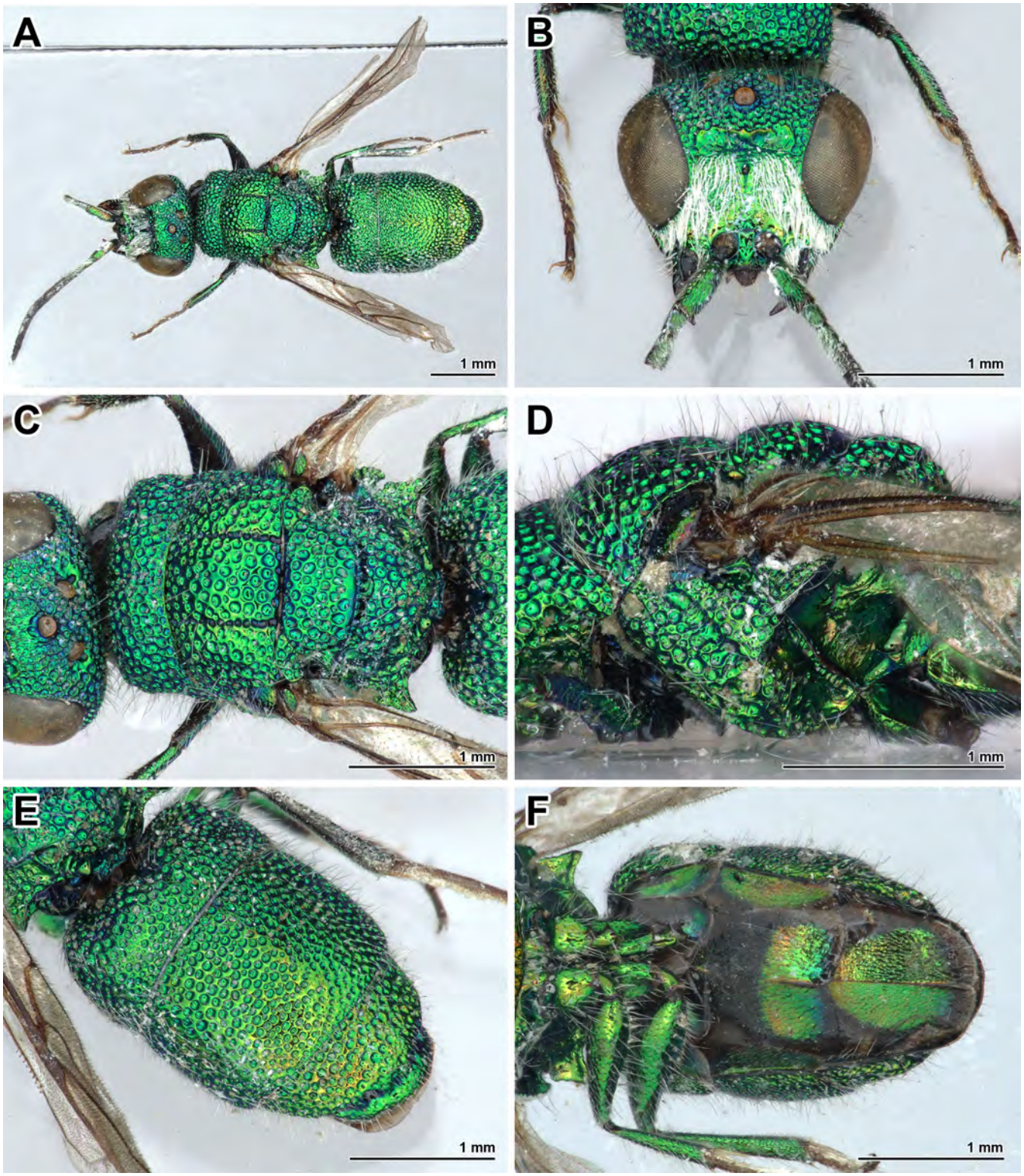

Figure 15. *Chrysis edentata* Rosa & Baiocchi, **sp. nov.**, male, holotype. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Remarks. Strumia & Fallahzadeh (2015) listed *Chrysis succincta* Linnaeus for Iran; neverthess, the identification is based on females only. It is known (e.g. Linsenmaier, 1959a, Rosa & Makris, 2023) that females of *Chrysis succincta*, *C. tristicula* and *C. frivaldszkyi* are impossible to be identified based on

external morphological features. Since *C. succincta* is currently known with certainty only for the northern part of Central Europe, Scandinavia and part of Russia, the occurrence in Iran is doubtful. On the other hand, several similar species are found in Iran, in particular *Chrysis frivaldszkyi* seems to be very common and we suppose that Strumia & Fallahzadeh's specimens belong to this species. Strumia & Fallahzadeh (2015) postulated that these females could belong to *C. prosuccincta*. We exclude *C. succincta* from the checklist until male specimens of *Chrysis succincta* are found.

Chrysis frivaldszkyi sparsepunctata du Buysson, 1895

Chrysis succincta var. *sparsepunctata* du Buysson, 1895:422. Holotype ♀; Turkmenistan: Serakhs (Kraków) (*succincta* group).
Chrysis frivaldszkyi var. *sparsepunctata*: Rosa et al., 2013:20 (Fars, Golestan, Kuhgiloyeh Boyerahmad, Mazandaran). Farhad et al., 2015b:38 (Hormozgan); Tavasoli & Fallahzadeh, 2015:82 (Fars); Iranmanesh et al., 2017:299 (Kerman).

Distribution. Iran (Fars, Golestan, Hormozgan, Kerman, Kuhgiloyeh Boyerahmad, Mazandaran). Palestine, Syria, Türkiye (Linsenmaier, 1959a); Central Asia: Turkmenistan (du Buysson, 1895).

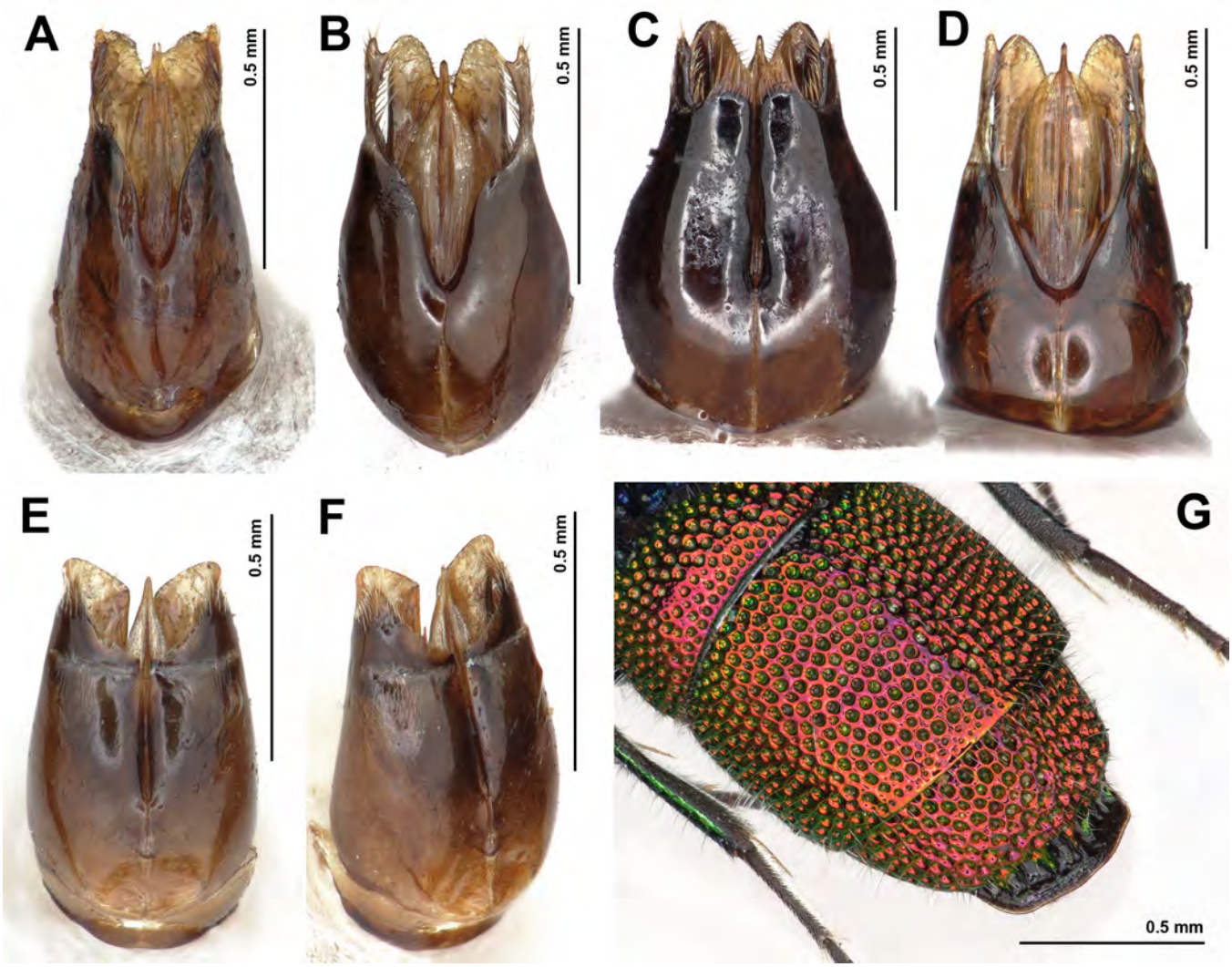

Figure 16. A–F. Genital capsule **A.** *Chrysis edentata* Rosa & Baiocchi, **sp. nov. B.** *C. mavromoustakisi* Trautmann, 1929. **C.** *C. titanica* Rosa, **sp. nov. D.** *C. coa* Invrea, 1939. **E–F.** *Chrysura filidichroa* Rosa & Baiocchi, **sp. nov.**; **G.** *C. mavromoustakisi* Trautmann, 1929, metasoma, postero-lateral view.

Chrysis fulgida Linnaeus, 1761

Chrysis fulgida Linnaeus, 1761:415. Lectotype ♀ designated by Morgan, 1984:9; Sweden: Uppsala (London) (*ignita* group).
Chrysis fulgida: Rosa et al., 2013:20 (East-Azarbaijan and Tehran); Ebrahimi, 2015:27 (Tehran).

Distribution. Iran (East-Azarbaijan and Tehran). Euroasian, from Europe to Russian Far East; Central Asia (Rosa et al., 2017a).

Chrysis gianassoi Strumia, 2015

Chrysis gianassoi Strumia in Strumia & Fallahzadeh, 2015:14. Holotype ♀; Iran: Fars, 7 km West of Dasht-e-Arzhan, 2050 m, 29°38'N, 51°54'E, 4–6.v.2008 (Strumia private coll.) (*facialis* group).

Material examined. 1♀, Hormozgan, Zakin, 23.v.2011, leg. Ameri (PRC).

Distribution. Iran (Fars, Hormozgan).

Chrysis gorislava Semenov-Tian-Shanskij, 1967

Chrysis (*Glossochrysis*) *gorislava* Semenov-Tian-Shanskij, 1967:156. Holotype ♀; Iran, Sistan & Baluchestan: Bampur, Shishapust, 8–9.iv.1901, N. Zarudny (St. Petersburg) (*pallidicornis* group).
Chrysis gorislava: Rosa et al., 2013:21 (Sistan & Baluchestan).

Distribution. Iran (Sistan & Baluchestan).

Chrysis gracillima Förster, 1853

Chrysis gracillima Förster, 1853:328. Holotype ♂; Germany (Berlin) (*gracillima* group).
Chrysis gracillima: Rosa et al., 2013:21 (East-Azarbaijan); Farhad et al., 2019:1007 (key), 1008 (figs 2F, G), 1009 (figs 3A, B), 1011 (diag., East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). West Palaearctic, from Europe to Middle East; Northern Africa (Linsenmaier, 1959a, 1999).

Chrysis grohmanni bolivari Mercet, 1902 (Figs 17A–D, 18A–D)

Chrysis grohmanni var. *bolivari* Mercet, 1902:222. Holotype ♂; Syria: Marache [currently Türkiye (Kahraman) Maras] (Madrid) (*succincta* group).
Chrysis singula Radoszkowski, 1891:187; Rosa et al., 2013:30 (East-Azarbaijan, Qazvin).
Chrysis grohmanni bolivari: Rosa, 2020:466 (Mazandaran).

Material examined. 1♂, Alborz, Karaj, 35°46'20''N, 50°56'44''E, 10.viii.2010, leg. M. Khayrandish (TMUC); 1♀ Arangeh, 35°55'07''N, 51°05'09''E, 10.viii.2010, leg. M. Khayrandish (TMUC).

Distribution. *Iran (Alborz, East-Azarbaijan, Mazandaran, Qazvin) (Linsenmaier, 1959a:109). Palestine, Rhodes, Syria, Türkiye (Linsenmaier, 1959a, 1968).

Remarks. This species was misidentified as *Chrysis singula* Radoszkowski by Rosa et al. (2013). Previous citations of *Chrysis grohmanni* for Iran are related to *Chrysis grohmanni bolivari*.

Chrysis hafisi Semenov-Tian-Shanskij, 1967

Chrysis (*Gonodontochrysis*) *hafisi* Semenov-Tian-Shanskij, 1967:159. Holotype ♀; Iran: Gilan, Tachinar, 16.v.1904, N. Zarudny (St. Petersburg) (*rufitarsis* group).
Chrysis hafisi: Rosa et al., 2013:21 (Gilan).

Distribution. Iran (Gilan).

Chrysis heimi Rosa, sp. nov. (Fig. 19A–F)

https://zoobank.org/urn:lsid:zoobank.org:act:5C2C10D9-F8BC-42CA-B550-E570E6B249DE

Material examined. **Holotype** ♀; IRAN, Hormozgan province: Zakin, 27.vi.2011, leg. A. Ameri (TMUC).

Diagnosis. *Chrysis heimi* **sp. nov.** belongs to the *maculicornis* species group for the shape of the head

with round profile; with very short malar space; transverse frontal carina with long branches downwards directed along inner margin of compound eyes; proximal flagellomeres short; apical teeth of third metasomal tergum well defined. Its particular colour pattern, one of the most spectacular in this family, is shared with the females of *Chrysis blanchardi* Lucas, 1849, which is distributed from the Iberian Peninsula and Morocco to Egypt, where two varieties were described, var. *rubescens* du Buysson, 1895 and var. *abbreviaticornis* du Buysson, 1895. At the moment, all these taxa, including *Chrysis superba* Tournier, 1879 (likely originated from Morocco) and *C. fertoni* du Buysson, 1895 are all considered synonyms of *C. blanchardi* (Kimsey & Bohart, 1991). Compared to these forms, *Chrysis heimi* **sp. nov.** can be immediately recognised by the black spots on the second sternum, which are differently shaped, being large, subtrapezoidal and connected to lateral margins (Fig. 19F), whereas in taxa related to *C. blanchardi* they are very small and elongate, never connected to lateral margins. Moreover, it is diagnostic the combination of following characters: profile of the head sub-rectangular, with wider face (l/w = 0.7, ratio measured from margin of anterior ocellus to clypeus and the shortest distance between eyes) (*vs*. round profile with subsquare face, l/w = 0.6 in *C. blanchardi*); transverse frontal carina shallow, M-like, with two sinuosities (Fig. 19B), medially curved downwards (*vs*. frontal carina sharp with three angles and three branches directed upwards in *C. blanchardi*, medially right angled upwards); apical metasomal margin with median teeth largely separate (*vs.* separated by narrow space in *C. blanchardi*); finally, body colour not exactly the same, as all vivid red parts in *C. blanchardi* are golden-greenish in *C. heimi* **sp. nov**.

Description. — **Holotype** ♀ (Fig. 19A–F). Body length 6.4 mm, anterior wing length 3.4 mm (Fig. 19A).

Head. Brow and ocellar area with dense and small punctures (0.2–0.3× MOD), without interspaces on brow, more spaced on ocellar area medially; punctures on vertex slightly larger and sparser between ocelli and eye, with occasional dots on interspaces; head posteriorly and temples densely punctate to contiguous with small punctures in between punctures; fovea lateral to posterior ocelli deep, as long as ocellus itself (Fig. 19C); with scapal basin densely micropunctate at sides, each puncture bearing a short white seta, altogether covering facial sculpture (Fig. 19B); medial longitudinal line with 1× MOD width, without hairs, finely, transversally wrinkled; micropunctation at sides continuing on supraclypeal area and malar spaces; clypeus with sparser, shallower punctures, not covered by setae, apically with triangular, brown rim; transverse frontal carina vaguely M-shaped (Fig. 19B); weak but still well visible on upper part and slightly contrasting with more vivid, golden colour; lateral ending going downwards at sides of scapal basin, but slightly visible; genal carina sharp, gently curved, fully developed from occiput to mandibular insertion; malar space short (0.4× MOD), convergent; subantennal space short, 0.6× MOD; distance between anterior ocellus and upper margin of frontal carina 1.6× MOD; OOL 1.7× MOD; POL 2.3× MOD; MS 0.4× MOD; relative length of P:F1:F2:F3 = 1.0:1.2:0.8:0.8.

Mesosoma. Medial pronotal furrow as shallow, slightly depressed area; pronotum with deep and dense punctures variable in size from small dots to 0.4× MOD; punctation on mesoscutum deep and dense anteriorly, more spaced basally with slightly larger punctures (0.5× MOD) separated by polished interspaces; notauli formed by deep, metallic, sub-rectangular foveae, smaller or as large as surrounding punctures, decreasing towards apical margin (Fig. 19C); parapsidal signum as deep line; even punctures on lateral area of mesoscutum; scutellum with punctation similar to that of mesoscutum, with punctures becoming larger towards margins; metanotum antero-medially with deep and wide fovea, punctures larger than those on mesoscutum, with dotted interspaces; posterior propodeal projections triangular, slightly divergent; mesopleuron with deep sulci formed by large subsquare foveae, larger than punctures on the segment (Fig. 19D).

Metasoma. First tergum with deep and even punctures equally spaced becoming smaller and denser along margins, interspaces dotted; similar even and dotted punctation on second tergum, with more small punctures, besides dots, on interspaces; longitudinal median carina distinct, continuing on third tergum (Fig. 19E); third tergum similarly sculptured as second; pits of pit row round, deep as large as two punctures together; post pit row area short, as long as pit of pit row; apical margin with four short

teeth equally spaced, interval as long as 3–4 pits of pit row; black spots on second sternum large, subtrapezoidal, connected to lateral margins (Fig. 19F).

Colouration. Body multicoloured (Fig. 19A), predominantly golden-red (likely red in nature) with green and blue head (green on vertex laterally and face); blue median area of mesoscutum (medially with green reflections), tegulae blue; metanotum and propodeum greenish; metasoma golden-red, with apical margin blue; legs and sterna green; scape, pedicel green, the rest of flagellum brownish; wings hyaline, with light brown veins.

Vestiture. Body dorsally and laterally covered with short (1× MOD) white setae, distinctly erect on mesoleg.

Male. Unknown.

Etymology. The specific epithet *heimi* (masculine noun in genitive) is dedicated to René Heim (Luzern, Switzerland), for his generosity and unconditional help in the study of the Chrysididae collection of Walter Linsenmaier, friendly hosting PR in Luzern for twenty years of continuous research. The choice of this species is motivated by the colour pattern, similar to that of *Chrysis gertiana* Rosa, 2018, named after his wife Gerti, who prematurely passed away, and who also supported PR for several years.

Distribution. *Iran (Hormozgan).

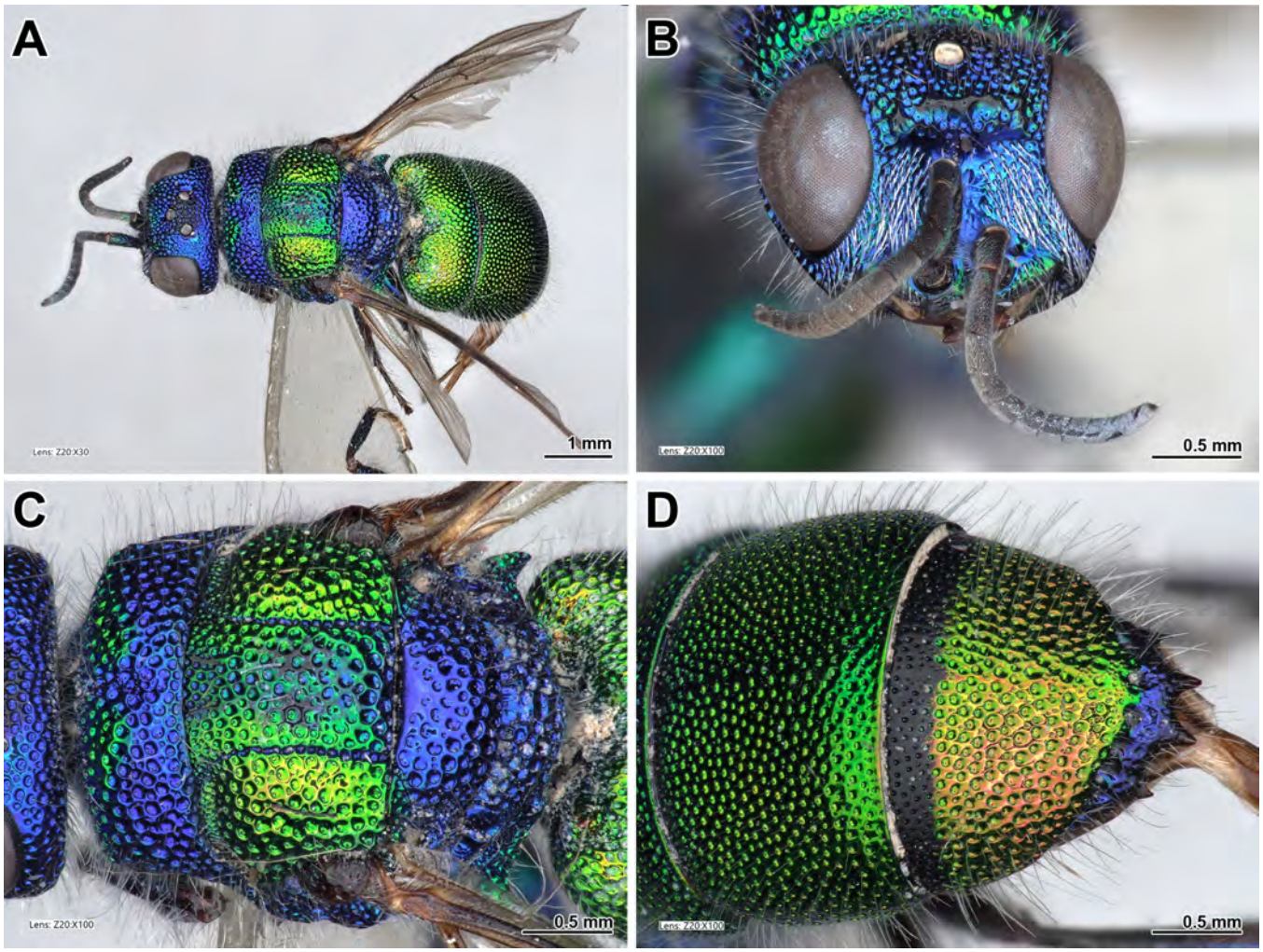

Figure 17. *Chrysis grohmanni bolivari* Mercet, 1902, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, posterior view

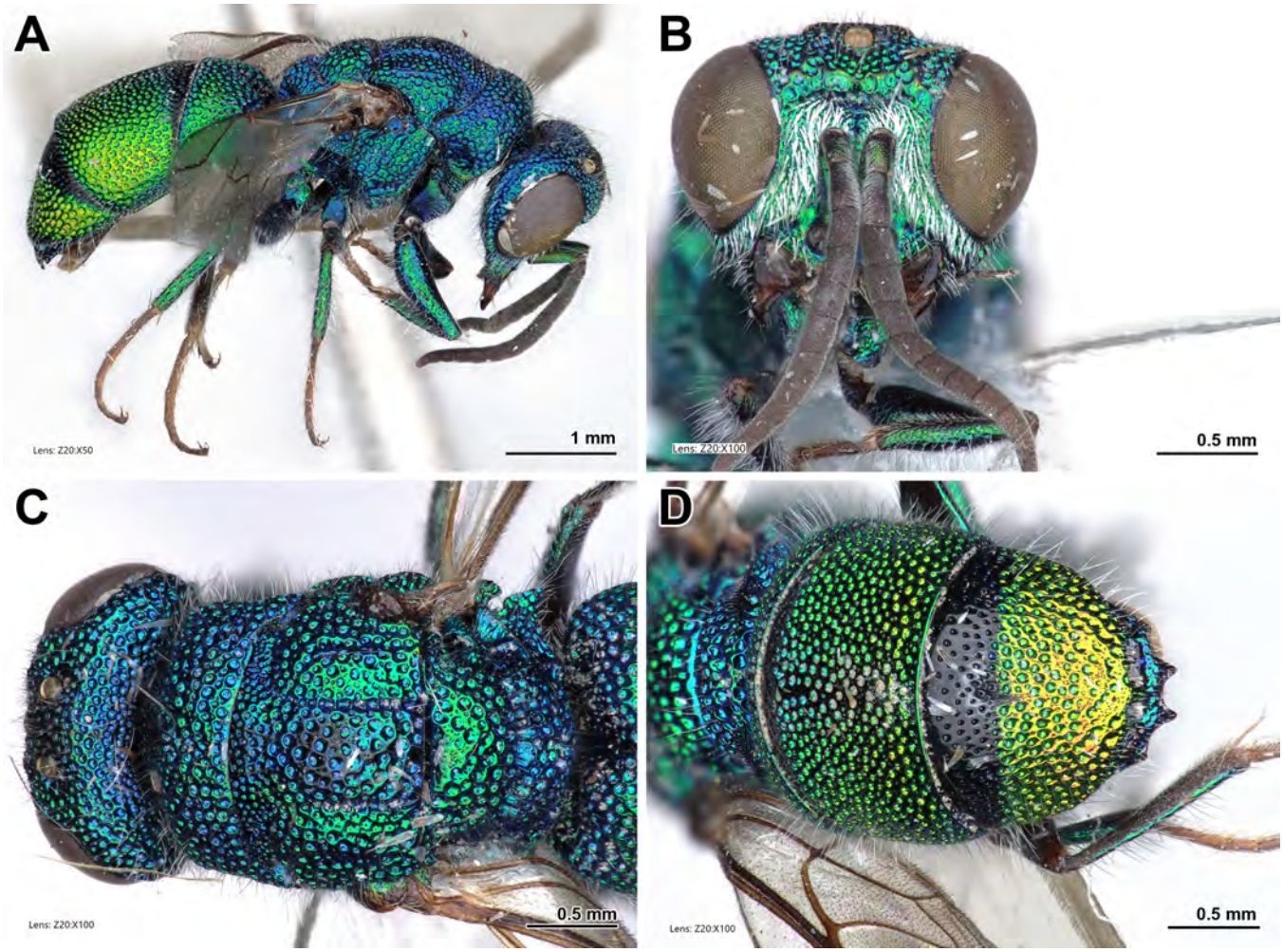

Figure 18. *Chrysis grohmanni bolivari* Mercet, 1902, male. **A.** Habitus, lateral view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, posterior view.

Chrysis herzensteini Semenow, 1892

Chrysis (*Hexachrysis*) *herzensteini* Semenow, 1892a:94. Holotype ♂; Persia borealis [possibly Alborz province] (St. Petersburg) (*rufitarsis* group).
Chrysis herzensteini: Rosa et al., 2013:21 (Persia, without locality).

Distribution. Iran (without locality).

Chrysis hydra Semenov-Tian-Shanskij, 1967

Chrysis (*Tetrachrysis*) *hydra* Semenov-Tian-Shanskij, 1967:164. Holotype ♂; Iran: South Khorasan, Khouz-Muzafyr, 20.iv.1896, N. Zarudny (St. Petersburg) (*subsinuata* group).
Chrysis hydra: Rosa et al., 2013:22 (South Khorasan).

Distribution. Iran (South Khorasan).

Chrysis ignita (Linnaeus, 1758) s.l.

Sphex ignita Linnaeus, 1758:571. Lectotype ♀ designated by Richards, 1935; Europe (London - Linnean Society) (*ignita* group).
Chrysis ignita: Rosa et al., 2013:22 (Golestan).

Distribution. Iran (Golestan). Widespread in the Palaearctic Region.

Remarks. Old records of *Chrysis ignita* (like in Radoszkowsky, 1877) should be treated as *sensu lato*, because under the name *Chrysis ignita* we currently identify different, separate species.

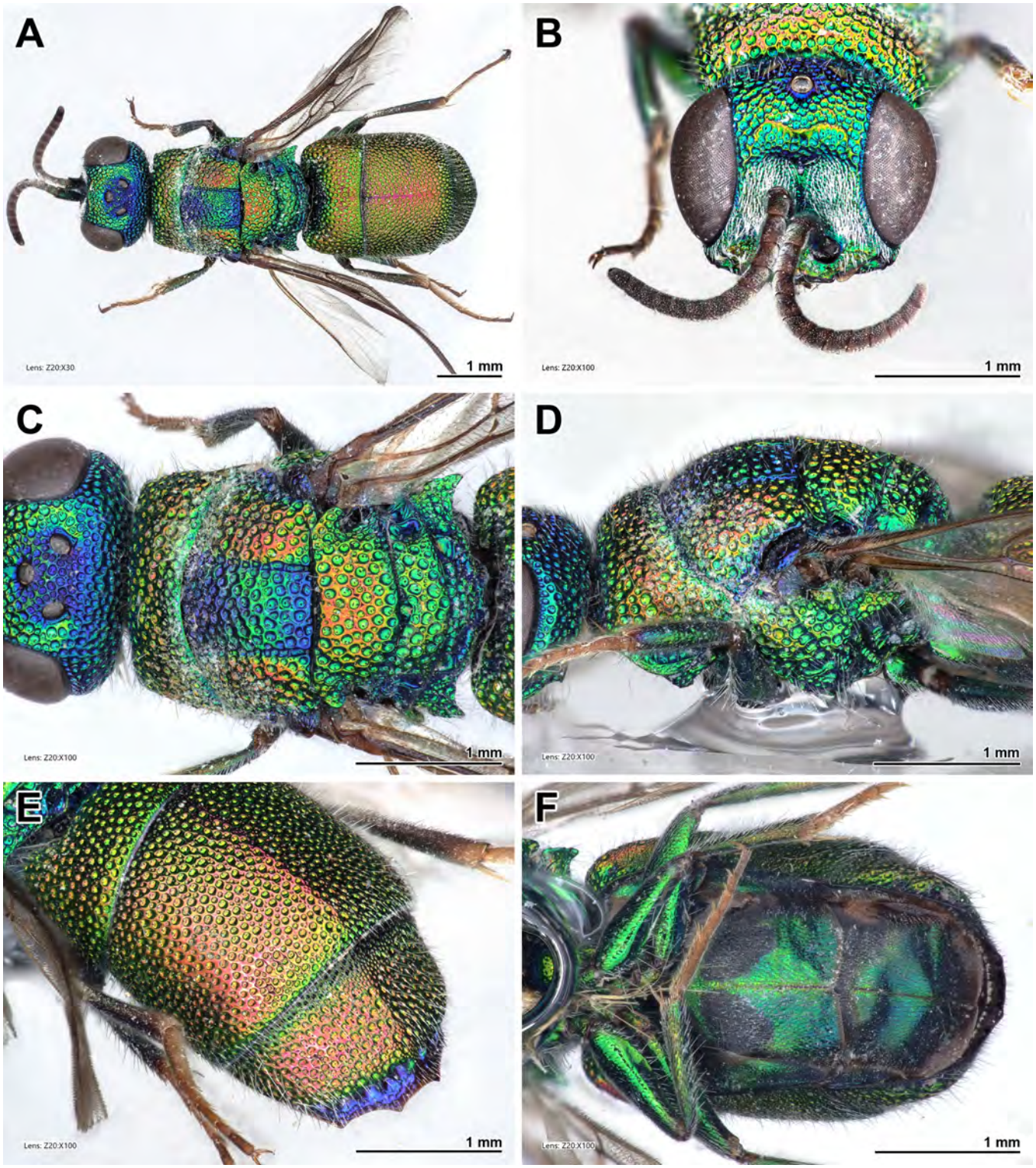

Figure 19. *Chrysis heimi* Rosa, **sp. nov.**, female, holotype. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Head and mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Chrysis imperatrix du Buysson, 1887

Chrysis imperatrix du Buysson, 1887:190. Holotype ♂; Russia (Paris) (*comparata* group).
Chrysis imperatrix: Rosa et al., 2013:22 (Persia).

Distribution. Iran. Central Asia (Linsenmaier, 1968).

Chrysis impressa Schenck, 1856

Chrysis impressa Schenck, 1856:29. Lectotype ♀ designated by Morgan, 1984:9; Germany (Frankfurt) (*ignita* group).
Chrysis impressa: Rosa et al., 2013:22 (Golestan).

Distribution. Iran (Golestan). Europe (Linsenmaier, 1959a).

Chrysis indigotea Dufour & Perris, 1840

Chrysis indigotea Dufour & Perris, 1840:38. Holotype ♂; France (Paris) (*ignita* group).
Chrysis indigotea: Rosa et al., 2013:22 (Golestan); Ebrahimi, 2015:28 (Ardabil)

Distribution. Iran (Ardabil, Golestan). Southern and Central Europe; Central Asia: Kyrgyzstan; Northern Africa (Rosa et al., 2013).

Chrysis infantula Semenov-Tian-Shanskij, 1967

Chrysis infantula Semenov-Tian-Shanskij, 1967:155. Holotype ♀; Turkmenistan: Imam-Baba (St. Petersburg) (*leachii* group).
Chrysis infantula: Rosa et al., 2013:23 (Esfahan). Farhad et al., 2015b:38 (Hormozgan).
Chrysis nilensis Linsenmaier, 1959a:Tavasoli & Fallahzadeh, 2015:82 (Fars).
Chrysis nilensis: Falahatpisheh et al., 2021:31 (Fars).

Distribution. Iran (Esfahan, Fars, Hormozgan). Turkmenistan, Uzbekistan (Semenov-Tian-Shanskij, 1967).

Remarks. *Chrysis infantula* Semenov-Tian-Shanskij and *Chrysis nilensis* Linsenmaier, 1959 (replacement name for *Chrysis leachii* var. *cyanea* du Buysson, 1908a:49, *nom. praeocc.*, *nec* Villers 1789) are almost identical and possibly synonyms. We examined both female types in Paris and St. Petersburg and the main difference is found in the shape of the apical margin of metasomal third tergum. In *Chrysis infantula* the post pit-row area is longer and slightly concave in lateral view, whereas in *Chrysis nilensis* it is shorter and straight in lateral view. The first record examined for Iran (Rosa et al., 2013) was based on a male specimen. Examination of more material is needed to confirm the occurrence of *Chrysis infantula* or *Chrysis nilensis* in the country. In any case, the taxon observed in Southern Iran and identified as *infantula* by Rosa et al. (2013) and *nilensis* by Tavasoli & Fallahzadeh (2015) could belong to the same species.

Chrysis interjecta hemichlora Linsenmaier, 1951

Chrysis interjecta var. *hemichlora* Linsenmaier, 1951:66. Syntypes ♂, ♀; Greece: Rhodes (NML) (*aestiva* group).
Chrysis interjecta var. *hemichlora*: Rosa et al., 2013:23 (Qazvin); Rosa, 2020:466 (Mazandaran).

Distribution. Iran (Mazandaran, Qazvin). Cyprus, Iraq, Palestine, Rhodes, Türkiye (Linsenmaier, 1959a, 1968, 1997).

Chrysis keriensis Radoszkowski, 1887

Chrysis (*Tetrachrysis*) *keriensis* Radoszkowski, 1887:47. Holotype ♂ [not ♀]; China: Xinjiang, Keria-Daria (Kraków) (*ignita* group).
Chrysis chrysochlora Mocsáry, 1889:515. Lectotype ♀ designated by Bohart in Kimsey & Bohart, 1991; Uzbekistan: Tashkent (Budapest).
Chrysis chrysochlora: Rosa et al., 2013:17 (East-Azarbaijan, Tehran).
Chrysis quadrispina du Buysson, 1887:187, Iranmanesh et al., 2017:300 (Kerman), 301 (figs 3C, D).

Distribution. Iran (East-Azarbaijan, Kerman, Tehran). Lebanon, Türkiye (Linsenmaier, 1959a, 1968); Central Asia: Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan, China (Rosa et al., 2013).

Remarks. *Chrysis chrysochlora* Mocsáry was synonymised with *Chrysis keriensis* Radoszkowski by Rosa et al., 2015d:20. Iranmanesh et al. (2017) recorded *Chrysis quadrispina* for Iran, but pictures given in the article are related to a female of *Chrysis keriensis*.

Chrysis klio Balthasar, 1953 (Fig. 20A–F)

Chrysis (*Tetrachrysis*) *klio* Balthasar, 1953:257. Holotype ♂; Palestine: Jerusalem [not holotype ♀ from Afghanistan, Schau, Kokscha-Tal, Badakschar Mts.] (Prague) (*varidens* group).
Chrysis (Tetrachrysis) klio Balthasar, 1953 = *Chrysis varidens* Abeille de Perrin, 1878:6; Kimsey & Bohart, 1991:474.
Chrysis klio: Boustani & Rosa, 2022:16. Reinstated.

Material examined. 1♀, Qazvin, Zereshk, 36°25'23''N, 50°06'37''E, 27.vii.2011, leg. M. Khayrandish (TMUC).

Distribution. *Iran (Qazvin). Caucasus (Rosa et al., 2013).

Remarks. The species photograph (Fig. 20) shows a green and blue colour pattern instead of red and blue of the type and other specimens recently collected in nature (Boustani & Rosa, 2022). This green colouration is considered to be given by an alteration of the cuticle due to the collecting method in the Malaise trap and the preservation in ethanol.

Chrysis komarowi Radoszkowski, 1891

Chrysis komarowi Radoszkowski, 1891:190. Holotype ♀; Turkmenistan: Ashkabad (Krakow) (*maculicornis* group).
Chrysis komarowi: Rosa et al., 2013:24 (Bushehr); Iranmanesh et al., 2017:299 (Kerman).

Distribution. Iran (Bushehr; Kerman). Turkmenistan, Pakistan (Rosa et al., 2013).

Chrysis laetula Semenov-Tian-Shanskij & Nikol' skaya, 1954

Chrysis (*Allochrysis*) *laetula* Semenov-Tian-Shanskij & Nikol'skaya, 1954:124. Holotype ♂, Tajikistan: Dzhili-kul, (St. Petersburg).
Allochrysis laetula: Kimsey & Bohart, 1991:288.
Chrysis laetula: Rosa, 2018c:277 (*ear* group).

Material examined. 1♂, Golestan province: 70 km E Minudasht, 37°15'36"N, 55°59'24"E, 1050m, 12.vi.2010, leg. Mi. Halada (MHC); 1♂, Golestan province: 70 km E of Minudasht, 37°15'36"N, 55°59'24"E, 1050m, 11.vi.2010, leg. P. Tyrner (MHC)

Distribution. *Iran (Golestan). Turkmenistan, Tajikistan (Rosa, 2018c).

Chrysis leachii Shuckard, 1836

Chrysis leachii Shuckard, 1836:168. Type unknown, locality unknown [not England] (lost ?) (*leachii* group).
Chrysis leachii: Rosa et al., 2013:24 (East-Azarbaijan); Falahatpisheh et al., 2021:31 (Fars).

Distribution. Iran (East-Azarbaijan, Fars). West Palaearctic, from Europe and Northern Africa to the Middle East (Rosa et al., 2013).

Chrysis lepida Mocsáry, 1889

Chrysis (*Olochrysis*) *lepida* Mocsáry, 1889:278. Syntypes ♀♀; Armenia: Yerevan (Kraków, Budapest) (*elegans* group).
Chrysis (*Holochrysis*) *horatiana* Semenov-Tian-Shanskij, 1967:153. Holotype ♀; Azerbaijan [not Armenia]: Ordubad (St. Petersburg).
Chrysis lepida: Rosa et al., 2013:24 (Qazvin).

Material examined. 1♂, 1♀, Fars, Sedeh, 30°44'08''N, 52°09'09''E, 24.v.2014, leg. A. Ameri (TMUC).

Distribution. Iran (Fars, Qazvin). Azerbaijan, Türkiye (Strumia & Yildirim, 2009).

Chrysis leuconoe Semenov-Tian-Shanskij, 1967

Chrysis leuconoe Semenov-Tian-Shanskij, 1967:176 Holotype ♂; Turkmenistan: Pereval (St. Petersburg) (*comparata* group).

Material examined. 2♂♂, 10♀♀, Kerman province: 25 km E Jiroft, 28°42'N, 57°57'E, 27.v.2014, leg. J. Halada (MHC).

Distribution. *Iran (Kerman). Turkmenistan (Semenov-Tian-Shanskij, 1967).

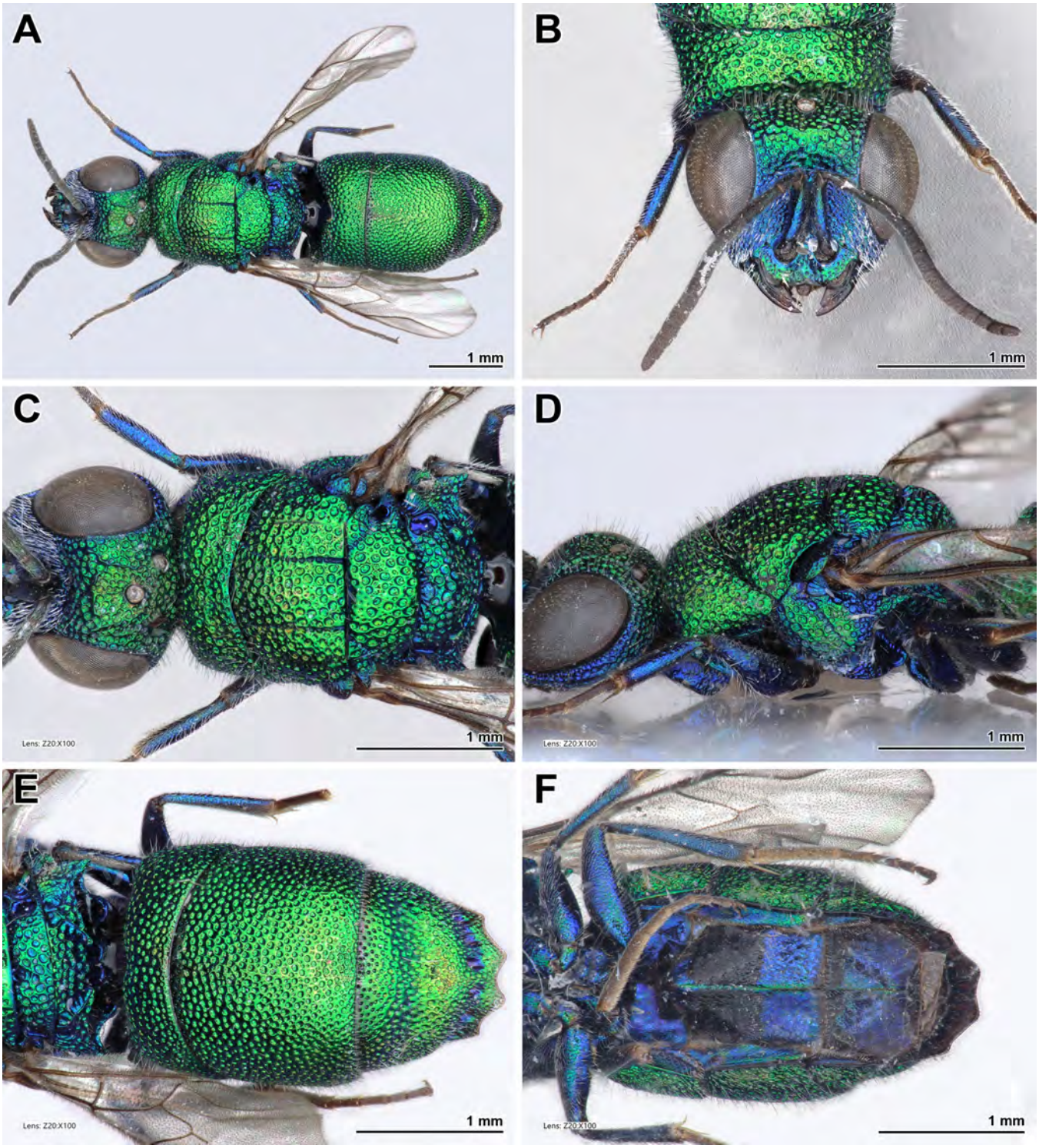

Figure 20. *Chrysis klio* Balthasar, 1953, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, dorsal view; **F.** Metasoma, ventral view.

Chrysis maculicornis Klug, 1845

Chrysis maculicornis Klug, 1845:tav. 45. fig. 6. Holotype ♂; Egypt: Alexandria (Berlin).
Chrysis maculicornis: Rosa et al., 2013:24 (Khuzestan); Strumia & Fallahzadeh, 2015:21 (Fars); Tavasoli & Fallahzadeh, 2015:82 (Fars); Iranmanesh et al., 2017:299 (Kerman).

Distribution. Iran (Fars, Kerman, Khuzestan). Palestine, Türkiye, Saudi Arabia; Northern Africa (Linsenmaier, 1959a, 1994); Central Asia: Tadjikistan (Radoszkowski, 1891).

Chrysis maidaquensis Strumia, 2014 (Fig. 21A–F)

Chrysis maidaquensis Strumia, 2014:488. Holotype ♀; United Arab Emirates: Wadi Maidaq, 07–14.iii.2006, leg. A. van Harten (Strumia private coll.) (*succincta* group).
Chrysis maidaquensis: Tavasoli & Fallahzadeh, 2015:82 (Fars); Farhad et al., 2015a:97 (Hormozgan).

Material examined. 1♀, Hormozgan, Rahbari, 27°27'02''N, 57°08'84''E, vi.2011, leg. A. Ameri (TMUC).

Distribution. Iran (Fars, Hormozgan). United Arab Emirates (Strumia, 2014).

Chrysis majidi Strumia, 2015

Chrysis majidi Strumia in Strumia & Fallahzadeh, 2015:5. Holotype ♂; Iran: Kerman, 2300 m, 29°03'39''N, 57°53'24''E, 23.v.2011, leg. D. Gianasso (paratype from Lorestan) (Strumia private coll.) (*millenaris* group).
Chrysis majidi: Tavasoli & Fallahzadeh, 2015:82 (Fars).
Chrysis majidi: Iranmanesh et al., 2017:299 (Kerman); *Chrysis laeta*: Falahatpisheh et al., 2021:31 (Fars).

Material examined. 1♂, Fars, Goldamcheh, 28°39'31''N, 58°32'17''E, 16.vii.2013, leg. A. Ameri (TMUC).

Distribution. Iran (Fars, Kerman, Lorestan). Saudi Arabia, United Arab Emirates (Rosa et al., 2020a).

Chrysis mandibularis du Buysson, 1901

Chrysis mandibularis du Buysson, 1901:101. Holotype ♀; Kenya [not Tanzania]: Waboniland (Vienna) (*delicatula* group).
Chrysis mandibularis: Strumia & Fallahzadeh, 2015:21 (Lorestan).

Distribution. Iran (Lorestan). Afrotropical (Madl & Rosa, 2012).

Chrysis manicata Dahlbom, 1854

Chrysis manicata Dahlbom, 1854:276. Syntypes ♂♂; Greece: Rhodes Is. (Stockholm, Berlin) (*pallidicornis* group).
Chrysis manicata: Rosa et al., 2013:25 (Qazvin).

Distribution. Iran (Qazvin). Cyprus, Greece, former Yugoslavia, Palestine, Russia, Türkiye, Uzbekistan; Northern Africa; Central Asia: Kazakhstan, Kyrgyzstan: Tian-Shan (Rosa et al., 2013).

Chrysis maracandensis Radoszkowski, 1877 (Fig. 22A–F)

Chrysis maracandensis Radoszkowski, 1877:14. Lectotype ♂ designated by Bohart in Kimsey & Bohart, 1991:436; Uzbekistan: *Zarafshan* (Moscow) (*scutellaris* group).

Material examined. 1♂, Hormozgan, Ramkan, 26°52'25''N, 56°01'07''E, 18.vi.2012, leg. A. Ameri (TMUC); 1♂, idem, 28.v.2012 (TMUC); 1♂, idem, 14.vi.2012 (TMUC).

Distribution. *Iran (Hormozgan). Central Asia: Kazakhstan, Kyrgyzstan, Tadjikistan, Turkmenistan, Uzbekistan (Radoszkowski, 1889; Mocsáry, 1889; du Buysson, 1895; Kimsey & Bohart, 1991; Tarbinsky 2002c).

Remarks. All examined specimens of *Chrysis maracandensis* from Iran to Central Asia in several collections are males. Based on museum specimens and collecting localities, females of *Chrysis maracandensis* should be similar to *Chrysis consobrina* and to other species of the *scutellaris* group, yet any association was proposed before, and never observed in nature. Sex associations in this subgroup are still unclear and females of different species cannot be yet associated to the corresponding males. The specimens of *Chrysis maracandensis* (Fig. 22) from Iran are slightly different from the typical Central Asian form for the well-defined apical teeth of the third tergum, contrasting with the typical form with the two median teeth normally undulate. In this sense, the Iranian specimens of *C. maracandensis* could also be the so far unknown males of *Chrysis subdistincta* (see below). New taxonomic research should be addressed on this species-group, also with the help of molecular analysis, which can probably better associate the two sexes, otherwise difficult to observe in copula, for example, in nature.

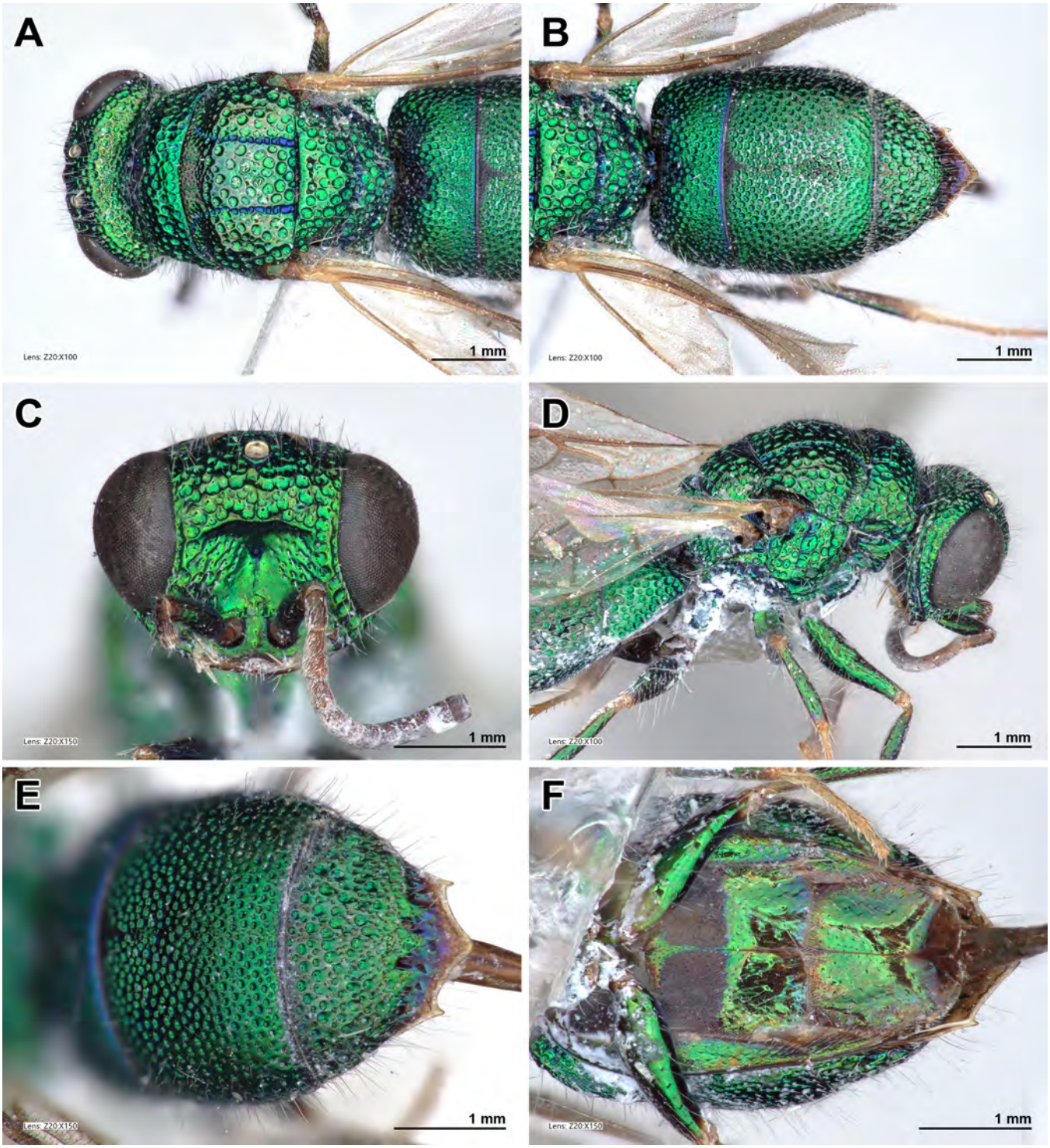

Figure 21. *Chrysis maidaquensis* Strumia, 2014, female. **A.** Mesosoma and first tergum, dorsal view; **B.** Scutellum, metanotum, propodeum and metasoma, dorsal view; **C.** Head, frontal view; **D.** Mesosoma and terga 1, 2, lateral view; **E.** Metasoma, posterior view; **F.** Metasoma, ventral view.

Chrysis marani Balthasar, 1953

Chrysis marani Balthasar, 1953:217. Holotype ♀; Palestine: Jerusalem (Prague) (*succincta* group).
Chrysis centropunctata Linsenmaier, 1968:66. Holotype ♀; Türkiye: Kayseri (Luzern).
Chrysis marani: Rosa et al., 2013:25 (Fars).

Distribution. Iran (Fars). Palestine, Türkiye, and Northern Africa (Linsenmaier, 1959a, 1968, 1987, including distribution of subspecies).

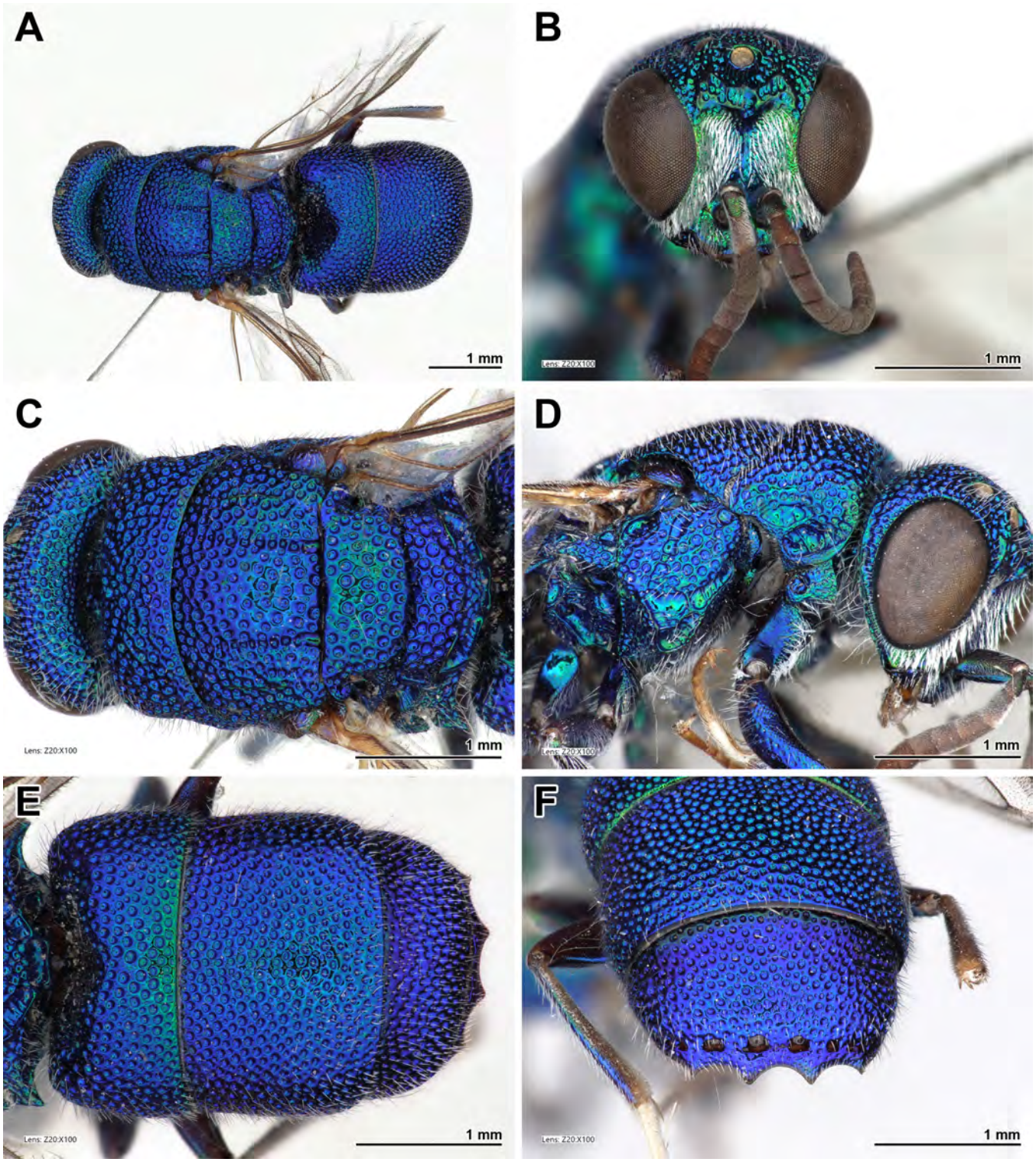

Figure 22. *Chrysis maracandensis* Radoszkowski, 1877, male. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, dorsal view; **F.** Metasoma, posterior view.

Chrysis marginata marginata Mocsáry, 1889

Chrysis (*Tetrachrysis*) *marginata* Mocsáry, 1889:451. Holotype ♀; Turkestania (Kraków) (*comparata* group).
Chrysis marginata: Rosa et al., 2013:25 (East-Azarbaijan, Kerman); Farhad et al., 2015b:38 (Hormozgan); Iranmanesh et al., 2017:299 (Kerman).

Material examined. 1♂, Qazvin, Tarem, 36°40'09''N, 49°25'37''E, 07.vi.2011, leg. M. Khayrandish (TMUC); 1♂, Alborz, Karaj, 35°46'20''N, 50°56'44''E, 1.vi.2010, leg. M. Khayrandish (TMUC); 1♀, Tehran, Shahriar, 35°40'03''N, 50°56'52''E, 24.viii.2010, leg. M. Khayrandish (TMUC); 1♀, Hormozgan, Zakin, 4.vi.2012, leg. A. Ameri (TMUC).

Distribution. Iran (Alborz, East-Azarbaijan, Hormozgan, Kerman, Qazvin, Tehran). South-eastern Europe, Cyprus, Greece, Palestine, Türkiye, Central Asia: Kazakhstan, Kyrgyzstan, Tadjikistan, Turkmenistan, Uzbekistan (Rosa et al., 2013).

Chrysis martinella du Buysson, 1900

Chrysis martinella du Buysson, 1900:142. Holotype ♀; Iran: Tehran (Paris) (*aestiva* group).
Chrysis martinella: Rosa et al., 2013:25 (Tehran). Farhad et al., 2015b:39 (Hormozgan).

Distribution. Iran (Hormozgan, Tehran). Greece, Lebanon, Palestine, and Türkiye (Rosa et al., 2013).

Chrysis mediasignata Rosa, sp. nov. (Figs 23A–G, 24A–F)

https://zoobank.org/urn:lsid:zoobank.org:act:9DCB2A7B-41C9-4D6E-A1C5-38F2E0283A8B

Material examined. **Holotype** ♂; IRAN, Qazvin province: Zereshk, 36°25'23"N, 50°06'37"E, 6.vii.2011, leg. M. Khayrandish (TMUC). **Paratype** ♀, same locality, 27.vii.2011, leg. M. Khayrandish (PRC).

Diagnosis. *Chrysis mediasignata* **sp. nov.** belongs to the *leachii* group which includes very small to small species (2.5–5.0 mm) with apical margin of the third metasomal tergum edentate or with a single median tooth; scapal basin broadly microridged in both sexes, whereas in the similar *C. succincta* group the female scapal basin is completely smooth; malar space short and convergent; faint transverse frontal carina; black spots on second metasomal sternum covering half-length or a larger part of the sternum. The male of *Chrysis mediasignata* **sp. nov.** can be immediately separated from other males of this group by unique shape of genital capsule, which is piriform, with apexes of gonocoxae convergent to aedeagus (Fig. 23F) and with simple and slender gonostylus, unusually not apically bifurcate (Fig. 23G). The female of *Chrysis mediasignata* **sp. nov.** can be separated from other similar females of this group by a green, median stripe on scutellum, becoming larger basally, contrasting the typical colouration of *Chrysis leachii* Shuckard, 1836. Colour pattern is an important diagnostic character for the identification of species in the *leachii* group as well as in the *succincta* group (Linsenmaier, 1959a, Rosa & Makris, 2023).

Description. — **Holotype** ♂ (Fig. 23A–G). Body length 3.7 mm, anterior wing length 1.9 mm (Fig. 23A).

Head. Brow between scapal basin and anterior ocellus with dense, irregular and somewhere confluent punctures, medium to large (about 0.4–0.7× MOD), without interspaces (Fig. 23B); similar sculpture between scapal basin and eye, with row of punctures aligned along eye, reaching clypeus and malar space; scapal basin deep, with sharp transverse ridges, shallower on longitudinal midline and medially weak on lower scapal basin; medial longitudinal line deep, starting from median pit and ending 1× MOD to clypeus; vertex and head posterior to ocelli with smaller round punctures and narrow, polished interspaces; with small, deep fovea posterior to posterior ocelli; transverse frontal carina faint; genal carina sharp, straight, fully developed from mid-eye to mandibular insertion; subantennal space short, 0.5× MOD; apex of clypeus arcuate upwards with dark brown rim. Clypeus medially polished; with row of small punctures apically, before apical rim. Distance between anterior ocellus and upper margin of scapal basin 2.1× MOD. OOL 1.3× MOD; POL 2.1× MOD; MS 1.3× MOD; relative length of P:F1:F2:F3 = 1.0:1.3:0.7:0.6.

Mesosoma. Medial pronotal furrow shallow and reaching half of pronotal length (Fig. 23C); pronotum as long as mesoscutellum, with deep punctures, irregularly sized from very small to medium size (0.1–0.5× MOD); punctation on mesoscutum deep, both on median and lateral areas (Fig. 23C); postero-medially with larger, irregular punctures; notauli formed by small, deep, metallic, sub-rectangular foveae, as large as half size of larger points on mesoscutum, decreasing anteriorly; parapsidal signum distinct; mesoscutellum with punctures similar to mesoscutum; scutellar-metanotal suture deep,

formed by large foveae; posterior propodeal projection subparallel, punctate similarly as side of propodeum, pointing backwards; mesopleuron with episternal sulcus aligned foveae, as large as punctures on mesepimeron (Fig. 23D).

Metasoma. Metasoma with even, medium sized punctures, with narrow, polished interspaces dorsally, becoming wider at sides, with interspaces up to 1 puncture diameter; second tergum with weak longitudinal median carina (Fig. 23D); apical margin of third tergum almost continuous, weakly angulate medially and with narrow, yet distinct, hyaline rim (Fig. 23E); black spots on second sternum elongate, as long as three-quarters of segment length, medially widely separate.

Colouration. Male blue with green hints on vertex, and green on anterior margin of pronotum, mesosonotum, second and third tergum, excluding blue apical margin of third tergum after pit row (Fig. 23A). The green parts could be more golden to red when the specimen is alive. Overall, the colouration is similar to that of *Chrysis lanceolata* male, which is a species expected for Iran, considering its wide distribution.

Female (Paratype)**.** Body length 3.9 mm, anterior wing length 2.4 mm (Fig. 24A).

Head. Similar to male; differences in measures can be sexual dimorphism. Distance between anterior ocellus and upper margin of scapal basin 2.5× MOD. OOL 1.6× MOD; POL 2.5× MOD; MS× 1.3 MOD; relative length of P:F1:F2:F3 = 1.0:1.3:0.6:0.6.

Mesosoma. Similar to male. Medial pronotal furrow shallow and reaching half of pronotal length, in correspondence of posterior margin of golden area (Fig. 24C); mesoscutellum with small punctures on antero-median triangular area; scutellar-metanotal suture deep, formed by large punctures; mesopleuron with episternal sulcus formed by small foveae.

Metasoma. Metasoma with even, medium sized punctures, smaller than those on male metasoma, with narrow, polished interspaces (Fig. 24D); apical margin of third tergum with weak median indentation (Fig. 24E); black spots on second sternum subrectangular, as long as two-thirds of segment length, medially fused (Fig. 24F).

Coloration. Female has a basic colour pattern of *Chrysis leachii* female (Fig. 24A) with two main deviations: scutellum with contrasting green median line (fully golden in *C. leachii*) and first metasomal tergum with anterior golden area interrupted medially by blue colour (Fig. 24D) (continuous in *C. leachii*). Scapus and pedicel metallic green in both sexes, first flagellomere metallic green in male; other flagellomeres blackish.

Vestiture. Both sexes with head and mesosoma dorsally with relatively long, dense greyish to whitish setae as long as 1× MOD to 1.5× MOD; legs with short (1× MOD), erect, whitish setae; metasoma dorsally with short (1× MOD) whitish setae, laterally erect, longer, as long as 1.5× MOD.

Etymology. The specific epithet *media* derives from the Latin adjective *medius* (middle) and the Latin adjective *signatus* (spotty) and refers to the scutellar colour pattern of female, golden-red with a green median stripe becoming larger at base.

Distribution. *Iran (Qazvin).

Chrysis mesasiatica Semenov-Tian-Shanskij, 1912

Chrysis rutilans var. *asiatica* Mocsáry, 1889:448, *nom. praeocc.*, *NEC* RADOSZKOWSKI, 1889. Syntypes ♀♀; Turkmenistan: Ashkabad (depository unknown) (*splendidula* group).
Chrysis rutilans var. *mesasiatica* Semenov-Tian-Shanskij, 1912:194. Replacement name for *C. asiatica* MOCSÁRY, 1889, *NEC* RADOSZKOWSKI, 1889.
Chrysis rutilans var. *asiatica* MOCSÁRY, 1889 = *Chrysis decora* Radoszkowski, 1877: Kimsey & Bohart, 1991:402.
Chrysis decora Mocsáry, 1887; Rosa et al., 2013:19 (Tehran); Ebrahimi, 2015:26 (Markazi).
Chrysis mesasiatica: Rosa, 2018a:2. Reinstated and upgraded to species rank.

Distribution. Iran (Markazi, Tehran). Caucasus, Palestine, Türkiye; Central Asia: Kazakhstan, Turkmenistan (Rosa et al., 2013).

Remarks. *Chrysis mesasiatica* Semenov was reinstated and upgraded to species rank by Rosa (2018a).

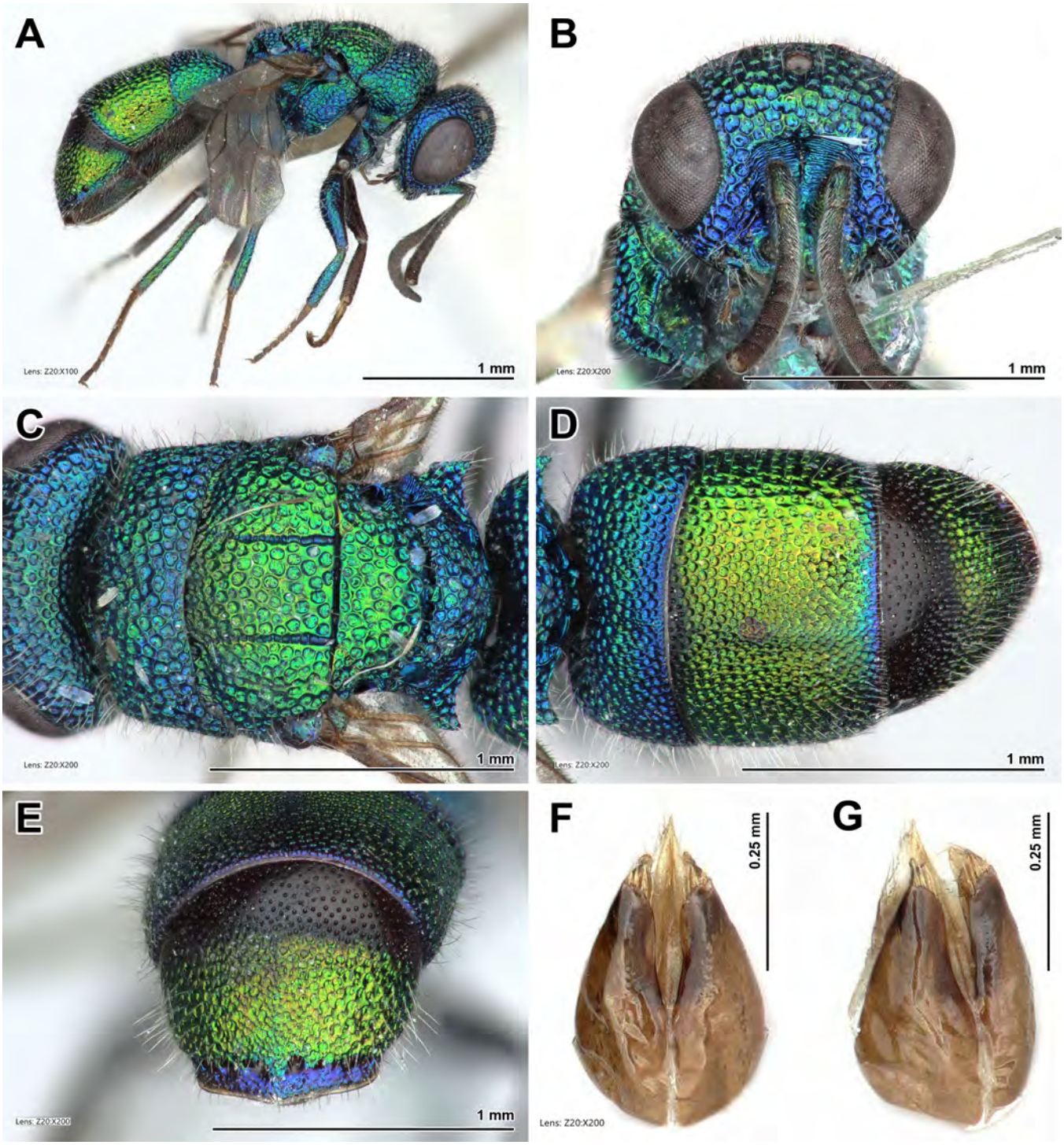

Figure 23. *Chrysis mediasignata* Rosa, **sp. nov.**, male, holotype. **A.** Habitus, lateral view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, dorsal view; **E.** Metasoma, posterior view; **F–G.** Genital capsule.

Chrysis millenaris Mocsáry, 1897

Chrysis millenaris Mocsáry, 1897:645. Lectotype ♀ designated by Móczár 1965:166; Hungary: Budapest (Budapest) (*millenaris* group).
Chrysis millenaris: Rosa et al., 2013:25 (Kerman).

Distribution. Iran (Kerman). Central and South-eastern Europe (Linsenmaier, 1959a), Türkiye (Linsenmaier, 1968).

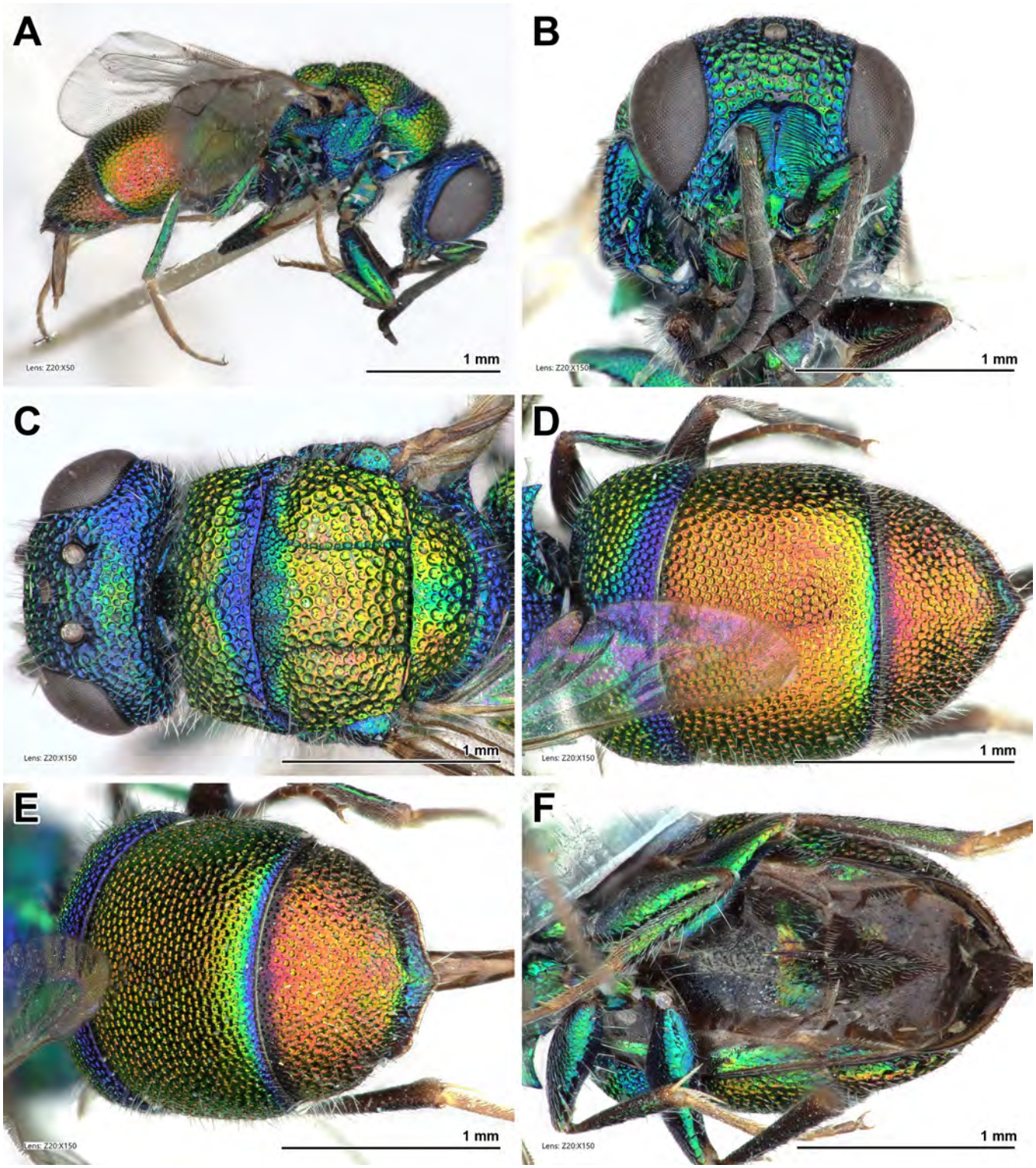

Figure 24. *Chrysis mediasignata* Rosa, **sp. nov.**, female, paratype. **A.** Habitus, lateral view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, dorsal view; **E.** Metasoma, posterior view; **F.** Metasoma, ventral view.

Chrysis minutissima Radoszkowski, 1876

Chrysis minutissima Radoszkowski, 1876:147. Holotype ♀; Egypt (Krakow) (*succincta* group).
Chrysis minutissima: Strumia & Fallahzadeh, 2015:21 (Fars); Farzaneh et al., 2017:498 (Fars).

Distribution. Iran (Fars). Northern Africa, Middle East (Kimsey & Bohart, 1991).

Chrysis mirabilis Radoszkowsky, 1877

Chrysis mirabilis Radoszkowsky, 1877:106. Syntypes ♂♂ [not holotype]; Caucasus (Berlin, Kraków) (*facialis* group).

Material examined. 1♂, 1♀, Kohgiluyeh and Buyer Ahmad, Sisaht env., 2400m, Dena Nat. Reserve, 30°52'46''N, 51°25'12''E, 14–16.v.2013, leg. D. Baiocchi (PRC); 1♀, Lorestan province: 10km SW of Dorud, 1520m, 27.v.2014, leg. J. Halada (MHC); 1♀, Gilan province: 5 km E Rudbar, 400m, 8.vi.2014, leg. J. Halada (MHC).

Distribution. *Iran (Gilan, Lorestan, Kohgiluyeh and Buyer Ahmad). Caucasus (Radoszkowsky, 1877), Crimea (Rosa et al., 2017b).

Chrysis mirifica Balthasar, 1953

Chrysis mirifica Balthasar, 1953:264. Holotype ♂; Palestine: Wadi el Kelt (Prague) (*exsecata* group).
Chrysis dawahi Strumia in Strumia & Dawah, 2012:174 (Saudi Arabia); Falahatpisheh et al., 2020:31 (Fars).

Distribution. Iran (Fars). Palestine (Balthasar, 1953), Saudi Arabia (Strumia & Dawah, 2012), United Arab Emirates (Strumia, 2014).

Remarks. *Chrysis dawahi* Strumia (listed by Falahatpisheh et al., 2020 for Iran) was synonymised with *C. mirifica* Balthasar by Rosa et al. (2020a). However, this action was unnecessary because in the original description of *C. dawahi*, the name and location of the collection housing the holotype were omitted, thereby not complying with Article 16.4.2 of the International Code of Zoological Nomenclature (ICZN, 1999). Consequently, *Chrysis dawahi* is not correctly described and must be considered as unavailable and *nomen nudum*.

Chrysis mossulensis Abeille de Perrin & du Buysson, 1887 (Figs 25A–E, H)

Chrysis erratica mossulensis Abeille de Perrin & du Buysson [in du Buysson], 1887:190. Syntypes ♀; Iraq: Mosul (Paris).

Material examined. 1♂, Khorasan-e Razavi province: 33 km W of Sabzvaran [=Sabzevar], 1100m, 6.-7.v.1973, locality n°189, Exp. Nat. Mus. Praha (NHMP).

Distribution. *Iran (Khorasan-e Razavi). Iraq (Rosa, 2024).

Remarks. The specimen examined is a male and its identification is doubtful. As recently shown by Rosa (2024), the *fuscipennis* group (ex *angolensis* group) includes several species whose distinction is based on the shape of the genital capsule, the transverse frontal carina, the body punctation and the shape of the lower mesopleuron. The Iranian specimen does not match the African specimen of *C. callaina* Gribodo, 1884 for the different shape of the head (Fig. 25A), which is similar to *C. fuscipennis*, and the genital capsule (Fig. 25E), which is more elongate with acute inner angles of gonocoxae. It does not match the Oriental *C. erratica* Abeille de Perrin & du Buysson, 1887 for the shape of the transverse frontal carina curved and the genital capsule elongate and it does not match *C. fuscipennis* s.str. for the dense, coarse punctures. The only possibility is that this is the unknown male of *C. mossulensis*, which is separated from the female by the downcurved frontal carina, and pointed teeth of the lower mesopleuron. More material of both sexes is needed for a correct identification and sex association.

Chrysis musa Semenov-Tian-Shanskij, 1954 (Figs 26A–E, 27A–F)

Chrysis (*Hexachrysis*) *musa* Semenov in Semenov-Tian-Shanskij & Nikol'skaya, 1954:133. Lectotype ♀ designated by Bohart in Kimsey & Bohart, 1991:441; Iran: Megas [possibly Magas Khani in Gilan province) (St. Petersburg) (*smaragdula* group).
Chrysis musa: Rosa et al., 2013:25 (Iran).

Material examined. 1♀, Hormozgan, Ramkan, 26°52'25''N, 56°01'07''E, 14.v.2012, leg. A. Ameri (TMUC); 1♀, idem, 24.iv.2012; 1♂, Zakin, 3.viii.2012, leg. A. Ameri (TMUC).

Distribution. Iran (Hormozgan, Gilan). Turkmenistan, Uzbekistan (Semenov-Tian-Shanskij & Nikol'skaya, 1954).

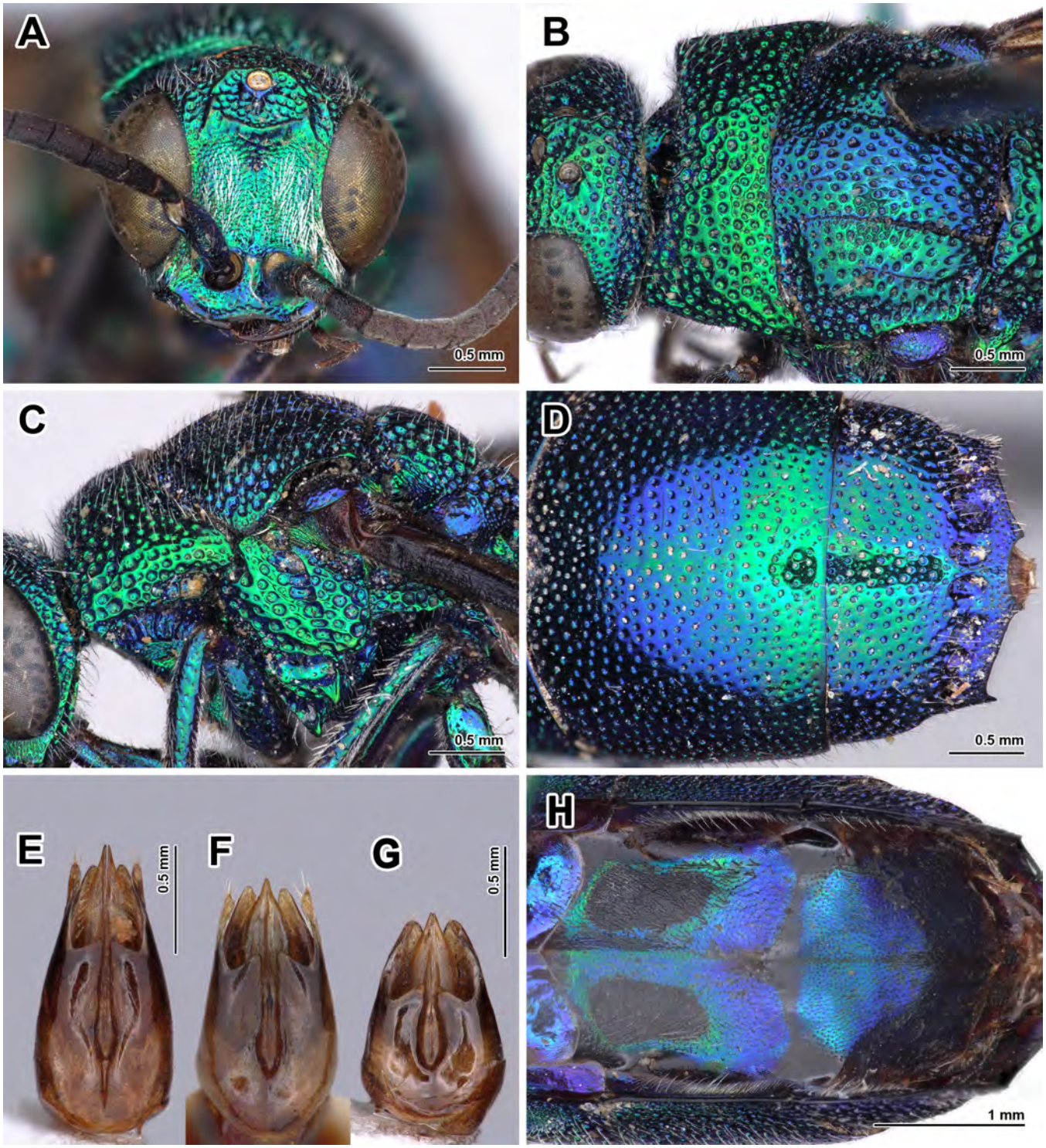

Figure 25. *Chrysis mossulensis* Abeille de Perrin & du Buysson, 1887, male. **A.** Head, frontal view; **B.** Pronotum and mesoscutum, dorsal view; **C.** Mesopleuron, lateral view; **D.** Metasoma, dorsal view; **E.** Genital capsule, dorsal view; **F.** Genital capsule of *Chrysis callaina* Gribodo, 1879, from Zambia, dorsal view; **G.** Genital capsule of *Chrysis fuscipennis* Brullé, 1846 from Cina, dorsal view; **H.** Metasoma, ventral view.

Remarks. The coloration of the specimens collected in Hormozgan is remarkably different, being fully purplish (Figs 26, 27) similarly to *Chrysis jousseaumei* du Buysson, 1898 (Fig. 26F), instead of green with blue bands, as in the type series. This unusual colour form was recently observed in specimens

collected in India from Hyderabad (Rosa, 2023b). Also in this case, the habitus and body colour are similar to *Chrysis jousseaumei* but the body sculpture and the saw-like lower mesopleuron (Fig. 26E) are similar to *C. musa* and not to *C. jousseaumei,* which is characterised by a single, sharp tooth on mesopleuron (Fig. 26F). More material is needed to confirm the identification of these Iranian and Indian specimens, which could belong to an undescribed species.

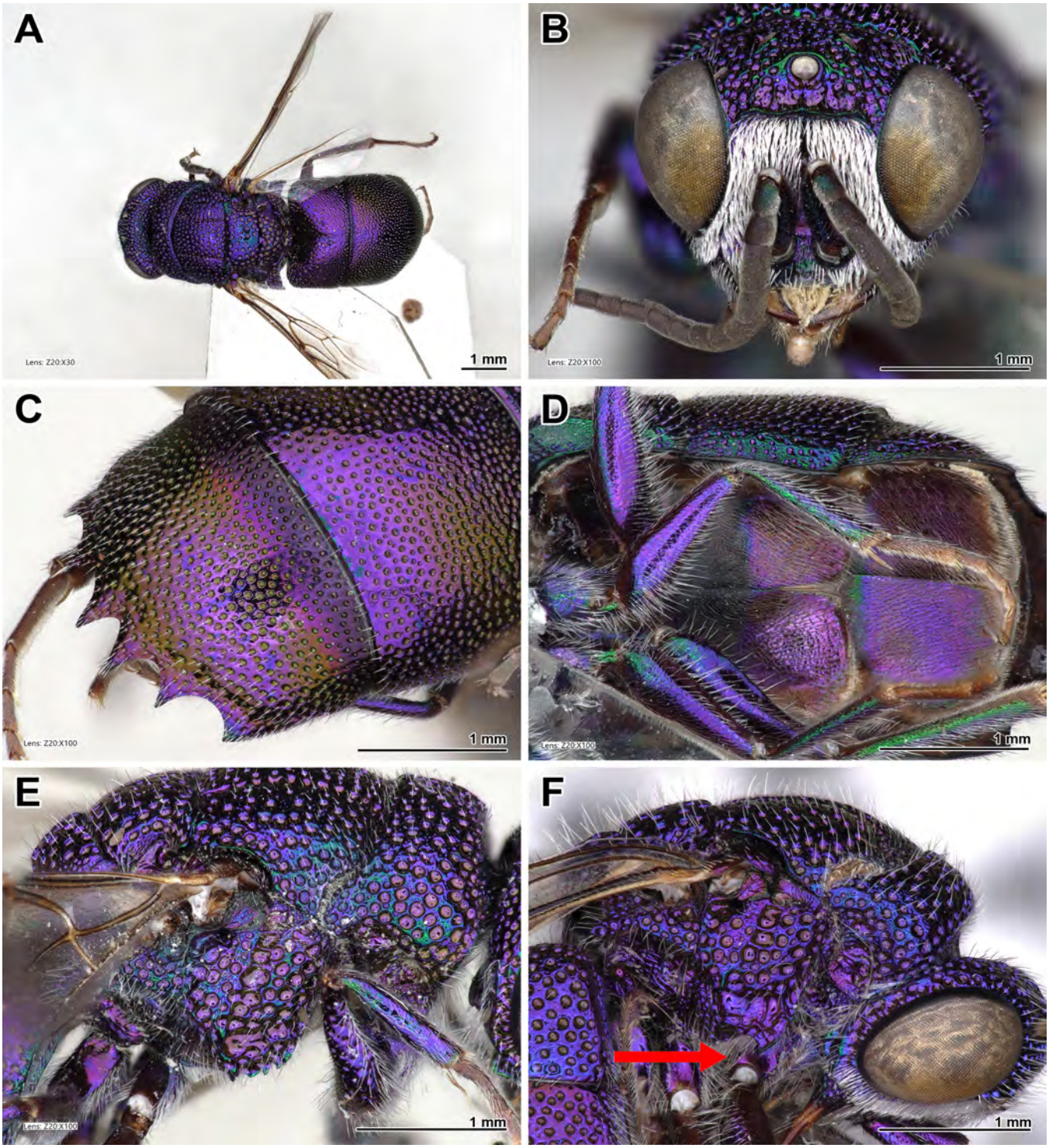

Figure 26. *Chrysis musa* Semenov-Tian-Shanskij, 1954, male. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Third tergum, posterior view; **D.** Metasoma, ventral view; **E.** Mesopleuron, lateral view; **F.** Mesopleuron of *C. jousseaumei*, lateral view, the arrow pointing to the single, sharp tooth.

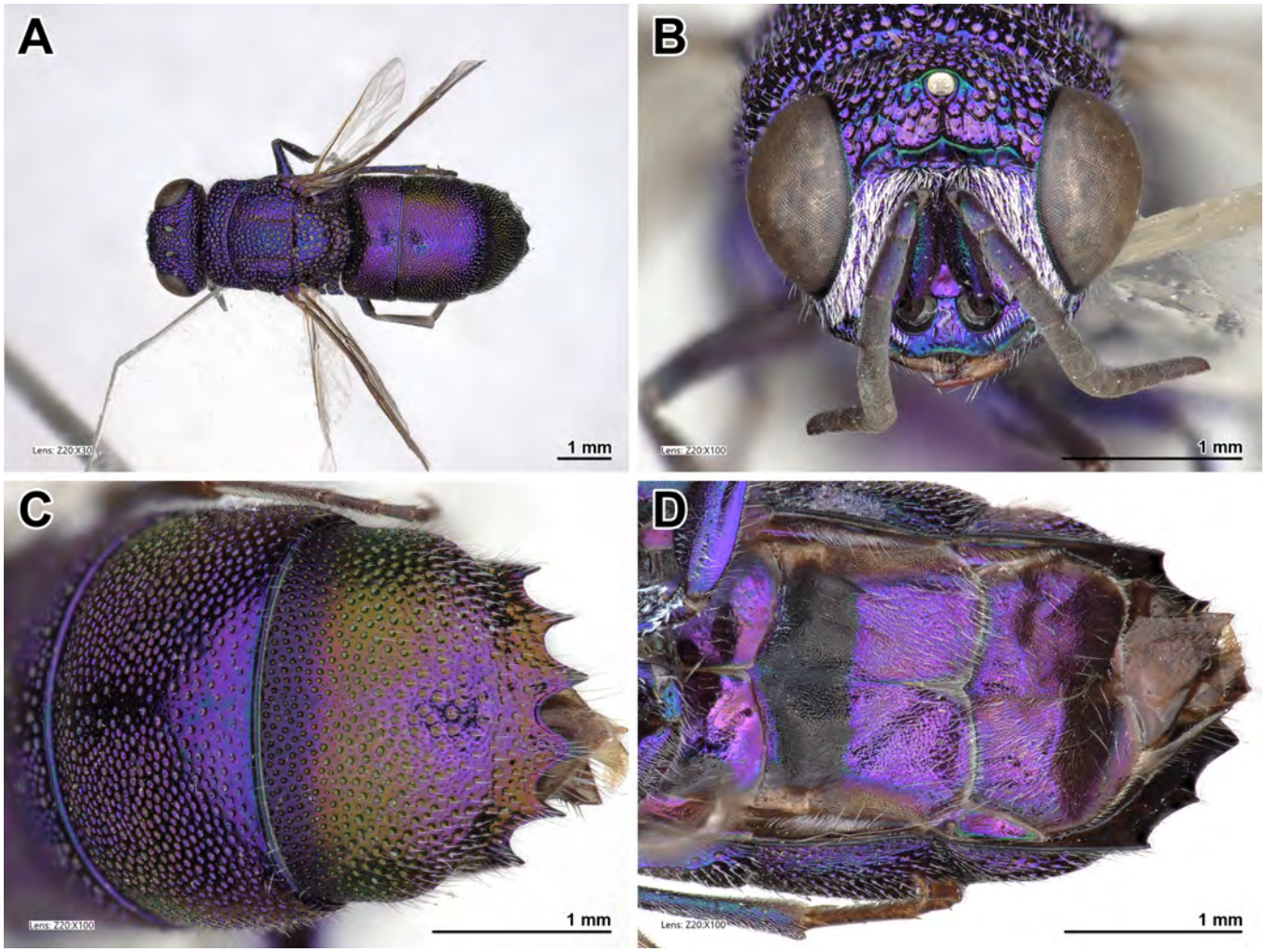

Figure 27. *Chrysis musa* Semenov-Tian-Shanskij, 1954, female. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Third tergum, postero-lateral view; **D.** Metasoma, ventral view.

Chrysis mutabilis du Buysson, 1887

Chrysis mutabilis du Buysson, 1887:194. Lectotype ♂ designated by Bohart in Kimsey & Bohart, 1991:441; Palestine: Tiberias (Paris) (*cerastes* group).
Chrysis hyrcana Semenov-Tian-Shanskij, 1967:167. Holotype ♀♀; Iran: Gorgan [former Astrabad] (St. Petersburg).
Chrysis mutabilis: Rosa et al., 2013:26 (East-Azarbaijan); Ebrahimi, 2015:29 (Ardabil).

Distribution. Iran (Ardabil, East-Azarbaijan). Cyprus, Caucasus, Middle East, Palestine, Türkiye, Kazakhstan (Rosa et al., 2013).

Chrysis mysta du Buysson, 1900

Chrysis mysta du Buysson, 1900:152. Holotype ♀; Palestine: Jericho (Paris) (*succincta* group).
Chrysis mysta: Farhad et al., 2015b:39 (Hormozgan); Strumia & Fallahzadeh, 2015:22 (Fars).

Distribution. Iran (Fars, Hormozgan). Palestine, Southern Russia, Syria, Türkiye, Middle East and Central Asia (Rosa et al., 2013).

Chrysis orienticola Linsenmaier, 1994 (Figs 32C, 32G)

Chrysis (*Chrysis*) *orienticola* Linsenmaier, 1994:175. Holotype ♀; Iran: Bandar Abbas (London) (*subsinuata* group).
Chrysis orienticola Rosa et al., 2013:26 (Hormozgan).

Distribution. Iran (Hormozgan). Oman (Linsenmaier, 1994).

Chrysis palliditarsis Spinola, 1838

Chrysis palliditarsis Spinola, 1838:449. Holotype ♂; Egypt (Turin) (*scutellaris* group).
Chrysis palliditarsis: Farhad et al., 2015b:39 (Hormozgan); Strumia & Fallahzadeh, 2015:22 (Fars); Tavasoli & Fallahzadeh, 2015:82 (Fars); Farzaneh et al., 2017:498 (Fars); Falahatpisheh et al., 2020:31 (Fars).

Distribution. Iran (Fars, Hormozgan). Palestine, Middle East; Central Asia; Northern Africa (Linsenmaier, 1959a); Arabian Peninsula (Rosa et al., 2020a); Afrotropical (Madl & Rosa, 2012).

Chrysis parthorum Semenov-Tian-Shanskij, 1967

Chrysis (*Gonodontochrysis*) *parthorum* Semenov-Tian-Shanskij, 1967:161. Holotype ♂ [nec ♀]; Iran: Semnan province, Shahrud, 15.v.1914, A. Kirichenko (St. Petersburg) (*rufitarsis* group).
Chrysis parthorum: Rosa et al., 2013:26 (Semnan).

Distribution. Iran (Semnan) (Semenov-Tian-Shanskij, 1967).

Chrysis peri Rosa & Baiocchi, sp. nov. (Fig. 28A–F)

https://zoobank.org/urn:lsid:zoobank.org:act:F9B51A42-D6D9-46F5-9603-0B03BC49630F

Material examined. **Holotype** ♀; IRAN, Kerman province: env. Kangari, 29°17'52"N, 57°00'03"E, 2490m, 26.v.2015, leg. D. Baiocchi (MSNM).

Diagnosis. *Chrysis peri* **sp. nov.** belongs to the *Chrysis succincta* species-group. Main diagnostic characters are given by the combination of metasomal apical margin continuous, without teeth, undulations or incisions, and body colour greenish-red, red to rosy. This coloration can be found in other species distributed in the Middle East and Central Asia, such as *Chrysis glasunovi* Semenov-Tian-Shanskij, 1967 and *C. mysta* du Buysson, 1900, but they have metasomal apical margin with four teeth. Several other species in the Mediterranean, the Middle East and Central Asia have continuous and edentate apical margin; however, *Chrysis peri* **sp. nov.** can be separated from: *Chrysis israelia* Linsenmaier, 1959 by its colour pattern similar to that of the *C. leachii* group, with head and pronotum blue, the latter with golden anterior margin; *C. aurimaculifrons* Linsenmaier, 1968 by its colour pattern, with head, metanotum, apical margin of third tergum and propodeum blue to green and with flame red, contrasting brow; *C. striatifacialis* Linsenmaier, 1968 by head with scapal basin largely micropunctate at sides, and by its colour pattern; finally, *C. schousboei* Dahlbom, 1854, often cited for the Middle East yet to be confirmed, has completed dark blue head, propodeum, apical margin after pit row and body ventral, and can also be separated by apical margin medially slightly trisinuate, in particular with a weak median notch.

Description. — **Holotype** ♀ (Fig. 28A–F). Body length 6.0 mm, anterior wing length 3.0 mm (Fig. 28A).

Head. Brow with two rows of small (0.2–0.3× MOD) and medium punctures (0.5× MOD), between anterior ocellus and transverse frontal carina and with medium to large punctures (0.5–0.8× MOD) between carina and the upper margin of scapal basin (Fig. 28C); punctures below frontal carina irregular, contiguous to confluent each other (Fig. 28B); puncture on vertex and temples spaced, polished interspaces with small to medium punctures; punctation denser on ocelli area; posterior ocelli with lateral fovea, sinuous and as long as ocellus length; scapal basin typically deep and polished medially, densely and finely punctate laterally, each puncture bearing white seta; malar space finely and densely punctate; transverse frontal carina irregularly M-shaped, weak but clearly visible as a swollen, black line between punctures; genal carina sharp, fully developed from occiput to mandibular insertion; subantennal space short, 0.5 MOD; apex of clypeus straight, arcuate upwards with narrow dark brown rim; clypeus medially polished; punctures small and dense laterally, bearing a white seta. Distance between anterior ocellus and upper margin of frontal carina 1.3× MOD; distance between anterior ocellus and upper margin of scapal basin = 2.6× MOD. OOL 1.6× MOD; POL 2.0× MOD; MS 0.8× MOD; relative length of P:F1:F2:F3 = 1.0:1.5:0.8:0.8.

Mesosoma. Medial pronotal furrow deep, reaching ¾ of pronotal length; pronotum with small to large punctures (0.2–07× MOD), with deep punctures becoming shallow towards basal margin; with narrow

polished interspaces; apical margin with row of small punctures; punctures on median area of mesoscutum spaced, large (up to 0.8× MOD) and shallow basally, with scattered small punctures, at most 0.3× MOD on polished interspaces (Fig. 28C); punctation on lateral areas of mesoscutum with denser and deeper punctures, anyway becoming shallower basally; notauli formed by deep, metallic, small sub-square to round foveae; parapsidal signum deep and distinct; punctation on scutellum with large, shallow and spaced punctures anteromedially, denser and deeper along margins; scutellar-metanotal suture deep, formed by deep and elongate foveae; metanotum with dense and deep large punctures medially, with dense and small punctures along margins; posterior propodeal projections divergent; mesopleuron with episternal sulcus formed by large subsquare foveae, confluent each other and as large as other punctures on mesepimeron (Fig. 28D).

Metasoma. First tergum with even, medium sized punctures, denser on first half and becoming sparser on the second half, laterally; second tergum with slightly larger punctures basally, denser apico-medially, with narrow interspaces between punctures; laterally and on second half of tergum with spaced and smaller punctures, and larger, polished interspaces up 2 puncture diameters; longitudinal median carina weak, in the first half marked by row of dense dots (Fig. 28E); third tergum with shallow punctures, with small punctures on interspaces; apical margin continuous, without protrusion or sinuosities, with narrow brownish rim; pits of pit row large, shallow, metallic; black spots on second sternum large, covering 2/3 of sternum length; spot margin straight; spots completely fused medially (Fig. 28F).

Colouration. Body colour greenish-red, red to rosy; head greenish with golden reflections dorsally, face green; metanotum and propodeum greenish with rosy reflections, as legs and lateral side of mesosoma; metasoma red to rosy dorsally and ventrally; scape, pedicel and first flagellum basally metallic green, the rest of flagellum blackish; wings hyaline, with brown veins.

Vestiture. Head dorsally with short, dense greyish to whitish setae as long as 1× MOD; ventrally with long white setae, at least 1.5× MOD long; mesosoma dorsally with setae as long as 1.5× MOD, long and erects on metasoma laterally with erect and long (1.5–2.0× MOD) whitish setae.

Male. Unknown.

Etymology. The specific epithet *peri* (noun in apposition) is named after *peris* (*peri* singular), beautiful winged spirits originating in Iranian mythology. They became benevolent spirits under Islamic influence, in contrast to demons, such as *jinn* and *divs*. The world *parī* comes from the Middle Persian *parīg*, itself from Old Persian *parikā*. The word may stem from the same root as the Persian word *par* (wing). Peris can be found in Persian folklore and poetry, in romances and epics and with the spread of Islam through Persia, *peri* was integrated into Islamic folklore.

Distribution. *Iran (Kerman).

Chrysis pharaonum Mocsáry, 1882

Chrysis refulgens Klug, 1845:fig. 8, Tav. 45, *nom. praeocc.*, *nec* Spinola, 1808. Type unknown; Somalia (Berlin) (*pallidicornis* group).
Chrysis pharaonum Mocsáry, 1882:46. Replacement name for *Chrysis refulgens* Klug, 1845.
Chrysis pharaonum: Rosa et al., 2013:26.

Distribution. Iran (Linsenmaier, 1959a). Palestine, Egypt, Ethiopia, Somalia, and Sudan (Linsenmaier, 1959a, 1999).

Chrysis prosuccincta Linsenmaier, 1968

Chrysis (*Chrysis*) *prosuccincta* Linsenmaier, 1968:70. Holotype ♂; Türkiye: Konya (Luzern) (*succincta* group).
Chrysis prosuccincta: Rosa et al., 2013:27 (Qazvin).
Chrysis succincta Linnaeus, 1761:947; Strumia & Fallahzadeh, 2015:23 (Fars, misidentification).

Distribution. Iran (Qazvin). Türkiye (Linsenmaier, 1968).

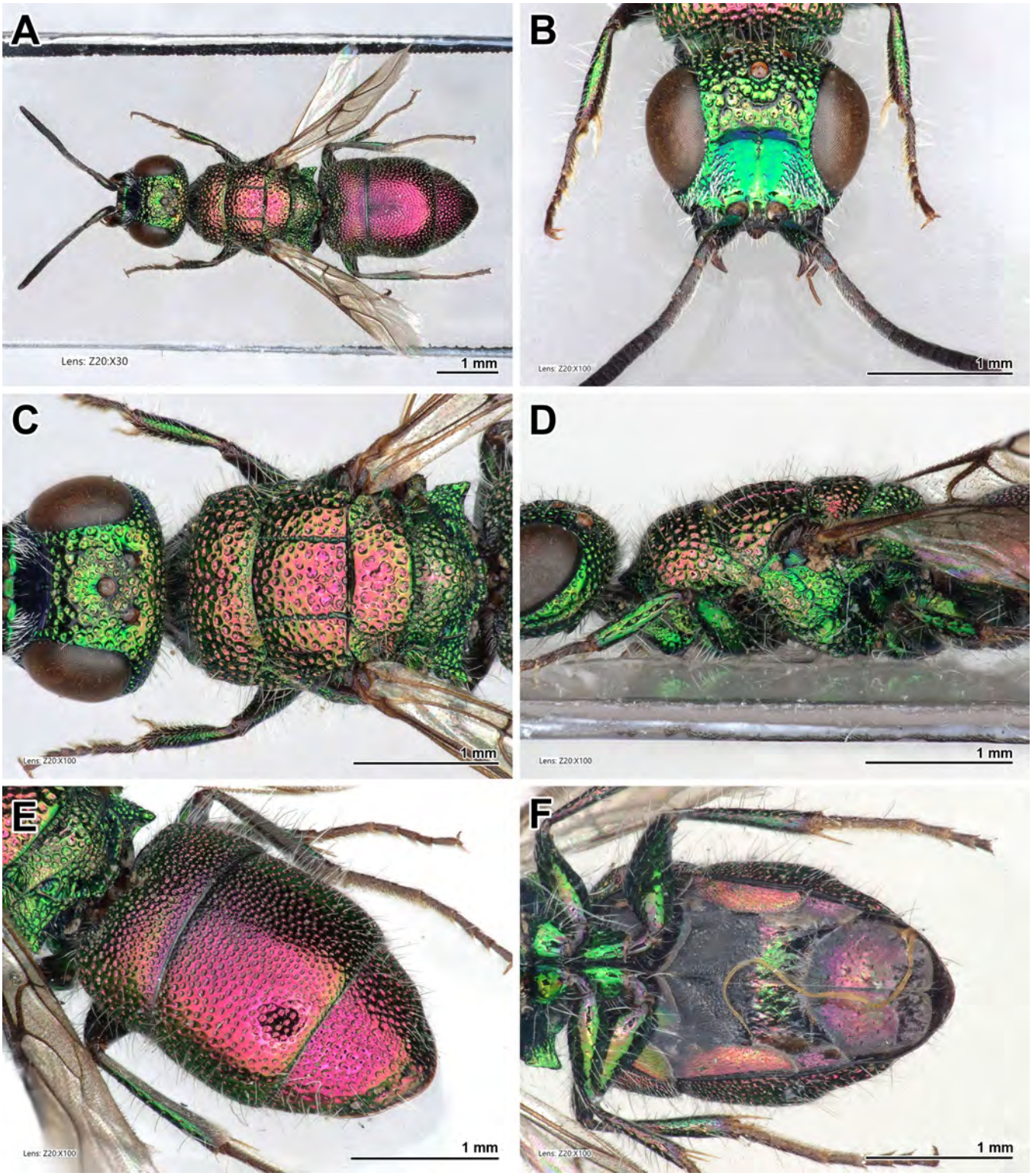

Figure 28. *Chrysis peri* Rosa & Baiocchi, **sp. nov**., female, holotype. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Head and mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Chrysis pseudobrevitarsis Linsenmaier, 1951

Chrysis ignita var. *pseudobrevitarsis* Linsenmaier, 1951:79. Lectotype ♀ designated by Linsenmaier, 1959a:158; Switzerland: Wallis (Luzern) (*ignita* group).

Material examined. 2♀♀, Mazandaran province: 1 km NW Kinj, 36°24'14.4"N, 51°30'54"E, 22.iv.2019, 1600m, leg. O. Šauša (MHC).

Distribution. *Iran (Mazandaran). Palaearctic species, known from Western Europe to Siberia and Mongolia (Rosa et al., 2013).

Chrysis pseudoincisa Balthasar, 1953

Chrysis pseudoincisa Balthasar, 1953:272. Holotype ♀; Palestine: Jerusalem (Prague) (*rufitarsis* group).
Chrysis pseudoincisa: Rosa, 2020:466 (Mazandaran), 474 (fig. 10).

Distribution. Iran (Mazandaran). Cyprus, Middle East (Rosa, 2020).

Chrysis regina du Buysson, 1887

Chrysis regina du Buysson, 1887:186. Lectotype ♂ designated by Bohart in Kimsey & Bohart, 1991:456; Persia (Paris) (*cerastes* group).
Chrysis regina: Rosa et al., 2013:28 (Mazandaran).
Chrysis psittacina du Buysson, 1887: Rosa et al., 2013:27 (Persia).

Distribution. Iran (Mazandaran).

Remarks. *Chrysis psittacina* was synonymised with *Chrysis regina* by Rosa (2024).

Chrysis remota Mocsáry, 1889

Chrysis (*Tetrachrysis*) *remota* Mocsáry in Radoszkowski, 1889:21. Lectotype ♂ designated by Rosa et al., 2015d:50; Caucasus; Iran: Demavend (Kraków) (*graelsii* group).
Chrysis remota: Rosa et al., 2013:28 (Demavend).

Distribution. Iran (Tehran).

Chrysis robertsi Rosa, 2020 (Fig. 29A–D)

Chrysis (*Chrysis*) *viridicyanea* Linsenmaier, 1968:63, *nec* Giebel, 1862. Holotype ♀; Egypt: Cairo (*succincta* group) (NMLU). Linsenmaier, 1999:150 (key), 155 (descr.).
Chrysis viridicyanea Kimsey & Bohart, 1991:477.
Chrysis robertsi Rosa [in Rosa & Greef], 2020: replacement name for *Chrysis viridicyanea* Linsenmaier, 1959, *nec* Giebel, 1862.

Material examined. 1♀, Fars province: Shiraz, 29.V.2013, leg. A. Ameri (TMUC).

Distribution. *Iran (Fars). Egypt, Lybia, Saudi Arabia (Linsenmaier, 1999).

Chrysis rubricata Mocsáry, 1902

Chrysis rubricata Mocsáry, 1902:340. Lectotype ♂, designated by Bohart in Kimsey & Bohart, 1991:457; Egypt: Cairo (Budapest) (*rubricata* group).
Chrysis rubricata: Rosa et al., 2013:28 (East-Azarbaijan, Fars, Kuhgiloyeh & Boyerahmad).

Distribution. Iran (East-Azarbaijan, Fars, Kuhgiloyeh & Boyerahmad). Egypt (Rosa, 2004a).

Remarks. Iranian records do not match the typical Egyptian *Chrysis rubricata*, nevertheless, they do not match the similarly coloured *Chrysis darii* Mocsáry either. They possibly belong to an undescribed species.

Chrysis ruddii Shuckard, 1837

Chrysis ruddii Shuckard, 1837:163. Syntypes [series unknown]; England (lost) (*ignita* group).
Chrysis ruddii: Rosa et al., 2013:28 (Persia).

Distribution. Iran (without locality). Euroasian, from Europe to Türkiye, Caucasus and Urals; in the south only on mountains (Rosa et al., 2013).

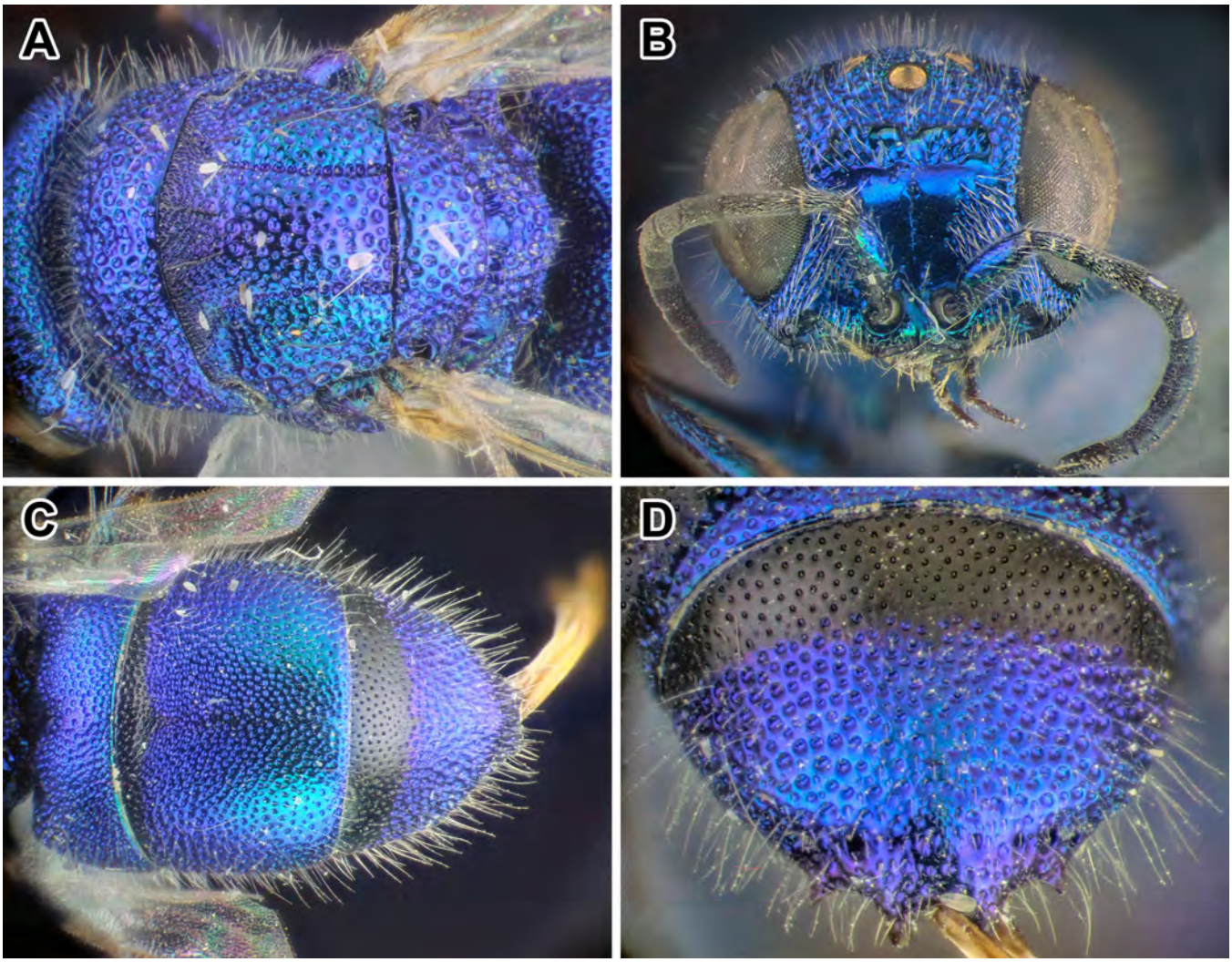

Figure 29. *Chrysis robertsi* Rosa, 2000, female. **A.** mesosoma, dorsal view; **B.** Head, frontal view; **C.** Metasoma, dorsal view; **D.** Metasoma, posterior view.

Chrysis rufitarsis Brullé, 1833

Chrysis rufitarsis Brullé, 1833:375. Syntypes ♂, ♀♀; Greece: Peloponnese: "forêt de Koubeh" (Paris) (*rufitarsis* group).
Chrysis rufitarsis: Rosa et al., 2013:28 (Persia).

Distribution. Iran (without locality). West-Palaearctic, from Europe to the Caucasus; Northern Africa: Morocco, Tunisia (Linsenmaier, 1959a, 1968, 1999); Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan (Tarbinsky, 2002b).

Chrysis rufitarsis progressa Linsenmaier, 1959

Chrysis (*Chrysis*) *rufitarsis progressa* Linsenmaier, 1959a:138. Holotype ♀; Palestine (Luzern) (*rufitarsis* group).
Chrysis rufitarsis progressa: Rosa et al., 2013:29 (Fars).

Distribution. Iran (Fars). Palestine (Linsenmaier, 1959a, 1968), Türkiye (Strumia & Yildirim, 2009).

Chrysis rutilans Olivier, 1790 (Fig. 30A–F)

Chrysis rutilans Olivier, 1790:676. Type unknown; France: Angoumois (Paris?) (*splendidula* group).

Material examined. 1♀, Gilan, Astaneh, Ashrafiye, 37°22'03"N, 49°57'57"E, 13.ix.2010, leg. M. Khayrandish (TMUC).

Distribution. *Iran (Gilan). Palaearctic, from Europe and Northern Africa to China and Japan (Rosa et al., 2013).

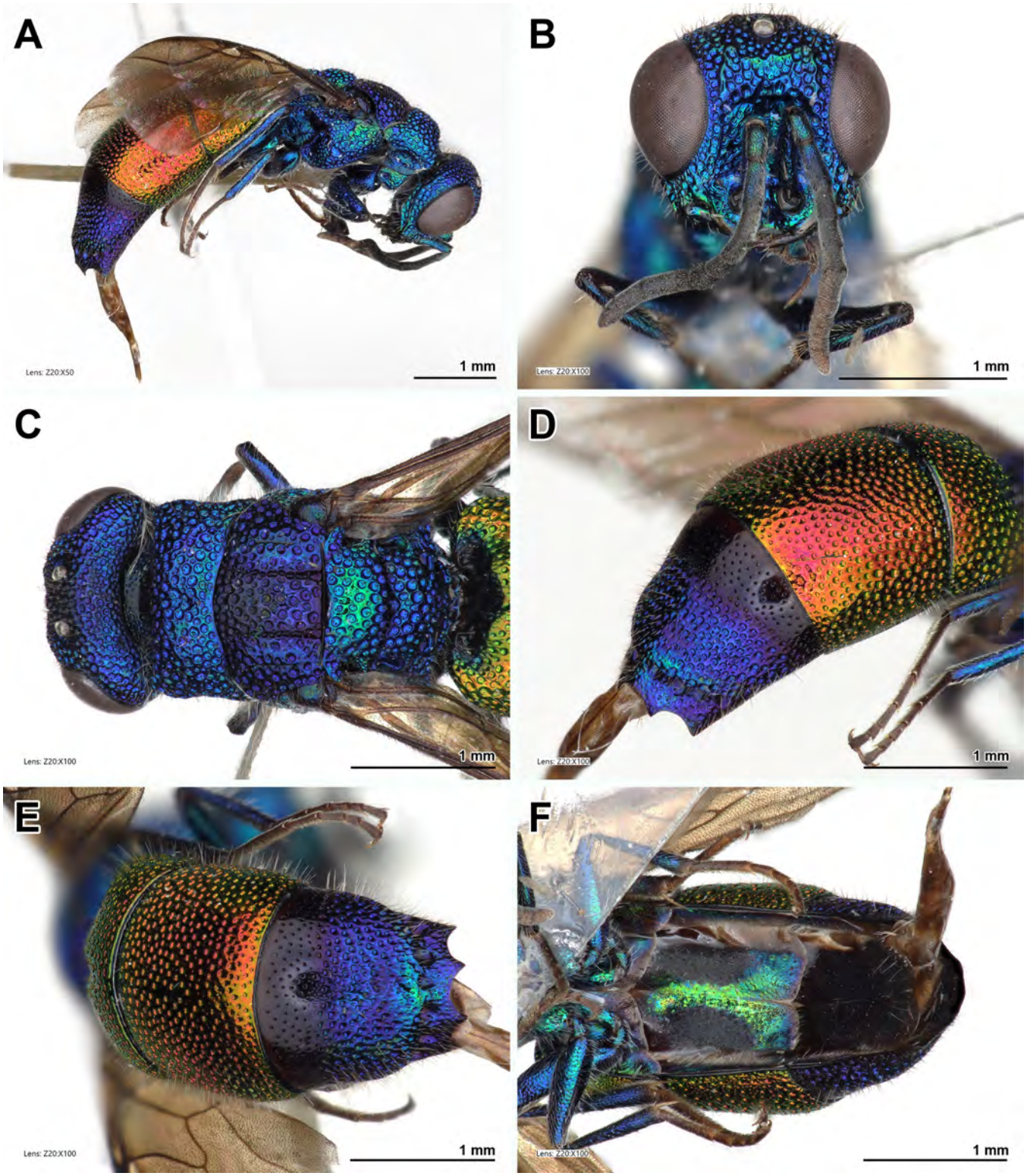

Figure 30. *Chrysis rutilans* Olivier, 1791, female. **A.** Habitus, lateral view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Metasoma, postero-lateral view; **E.** Metasoma, posterior view; **F.** Metasoma, ventral view.

Chrysis sacrata du Buysson, 1898

Chrysis sacrata du Buysson, 1898a:140. Holotype ♀; Algeria: Biskra (Paris) (*maculicornis* group).
Chrysis sacrata: Iranmanesh et al., 2017:300 (Kerman), 301 (figs 3A, B).

Material examined. 15♂♂, 1♀, Golestan province: 70 km E of Minudasht, 37°15'36"N, 55°59'24"E, 1050m, 12.vi.2010, leg. Mi. Halada (MHC); 18♂♂, 6♀♀, Kerman province: Bardsir, 29°57'00"N, 56°34'48"E, 2050m, 6.vi.2010, leg. Mi. Halada (MHC).

Distribution. Iran (Golestan, Kerman).

Chrysis santschii Linsenmaier, 1959

Chrysis santschii Linsenmaier, 1959a:120. Holotype ♀; Tunisia (Zurich) (*leachii* group).
Chrysis santschii: Falahatpisheh et al., 2020:31 (Fars).

Distribution. Iran (Fars). Northern Africa (Linsenmaier, 1999).

Chrysis saraksensis Radoszkowski, 1891

Chrysis saraksensis Radoszkowski, 1891:195. Holotype ♂; Iran [not Turkmenistan]: Sarakhs (Kraków) (*maculicornis* group).
Chrysis seraxensis: Radoszkowski, 1893:81. Unjustified emendation (ICZN, 1999: Article 32.5.1).
Chrysis sarakhsensis: Bingham, 1908:349. Incorrect subsequent spelling.
Chrysis saraksensis: Rosa et al., 2013:23 (East-Azarbaijan).

Distribution. Iran (East-Azarbaijan, Khorasan-e Razavi). Central Asia: Kyrgyzstan, Turkmenistan, Uzbekistan; U.A.E. (Rosa et al., 2020a)

Chrysis schencki Linsenmaier, 1968

Chrysis (*Chrysis*) *ignita* ssp. *schenckiana* Linsenmaier, 1959a:156, *nom. praeocc.*, *nec* Mocsáry, 1912a. Holotype ♀; Switzerland: Graubundens (Luzern) (*ignita* group).
Chrysis (*Chrysis*) *ignita* ssp. *schencki* Linsenmaier, 1968:99. Replacement name for *C. ignita schenckiana* Linsenmaier, 1959, *nom. praeocc.*, *nec* Mocsáry, 1912a.
Chrysis schencki: Rosa et al., 2013:29 (Golestan, Mazandaran); Rosa, 2020:466 (Gilan).

Distribution. Iran (Gilan, Golestan, Mazandaran). Europe, Türkiye; Northern Africa (Rosa et al., 2013).

Chrysis schousboei Dahlbom, 1854

Chrysis schousboei Dahlbom, 1854:272. Syntypes, sex unknown; Morocco: Tangier (Copenhagen) (*succincta* group).
Chrysis schousboei: Strumia & Fallahzadeh, 2015:22 (Khorasan).

Distribution. Iran (Khorasan). Caucasus, Türkiye; Northern Africa (Rosa et al., 2013).

Chrysis schwarzi Linsenmaier, 1968

Chrysis concolor schwarzi Linsenmaier, 1968:51. Holotype ♀; Türkiye (Luzern) (*varidens* group).
Chrysis concolor schwarzi: Rosa et al., 2013:18 (East-Azarbaijan, Lorestan); Farhad et al., 2015b:37 (Hormozgan).
Chrysis schwarzi: Farhad et al., 2019:1008 (key, fig. 2A), 1009 (fig. 3C), 1011 (diag., East-Azarbaijan, Lorestan).

Distribution. Iran (East-Azarbaijan, Hormozgan, Lorestan). Middle East, Palestine (Rosa et al., 2013).

Chrysis sefrensis du Buysson, 1900

Chrysis sefrensis du Buysson, 1900:150. Holotype ♀; Algeria (Paris) (*facialis* group).
Chrysis sefrensis: Strumia & Fallahzadeh, 2015:22 (Fars, Khorasan).

Distribution. Iran (Fars, Khorasan). North-western Africa: Algeria, Morocco, Tunisia, Libya (Linsenmaier, 1999).

Chrysis semenovi Radoszkowski, 1891

Chrysis semenovi Radoszkowski, 1891:193. Lectotype ♀ designated by Bohart in Kimsey & Bohart, 1991:461; Iran: Sarakhs (Krakow) (*maculicornis* group).
Chrysis semenovi: Rosa et al., 2013:29 (Khorasan-e Razavi).

Distribution. Iran (Khorasan-e Razavi) (Radoszkowski, 1893).

Chrysis serva du Buysson, 1898

Chrysis serva du Buysson, 1898a:132. Holotype ♂; Egypt (Paris) (*millenaris* group).
Chrysis serva: Rosa et al., 2013:29 (Qazvin).

Distribution. Iran (Qazvin). Palestine, Saudi Arabia; Northern Africa (Rosa et al., 2020a).

Chrysis sexdentata Christ, 1791

Chrysis sexdentata Christ, 1791:404. Type [type series unknown]; type locality unknown (depository unknown) (*smaragdula* group).
Chrysis sexdentata: Rosa et al., 2013:29 (Khorasan-e Razavi).

Distribution. Iran (Khorasan-e Razavi). West-Palaearctic: from Southern Europe to Türkiye and Central Asia (Rosa et al., 2013).

Chrysis simurgh Rosa, sp. nov. (Figs 31A–F, 32A, 32E)

https://zoobank.org/urn:lsid:zoobank.org:act:7F3D8892-EAC2-471A-A5A3-AC296F1AC6B1

Material examined. **Holotype** ♀; IRAN, Qazvin province: Zereshk, 36°25'23"N, 50°06'37"E, 7.vii.2011, leg. M. Khayrandish (TMUC).

Diagnosis. *Chrysis simurgh* **sp. nov.** belongs to the *subsinuata* species group for: habitus; the peculiar shape of its first metasomal tergum, with a pair of submedian humps at front of dorsal area; apical margin of third tergum medially sinuate and laterally with corners; elongate structure of third tergum, and subparallel malar spaces; elongate black spots on second sternum. In the Middle East and Central Asia there are three species with similar shape and colouration: *C. echidna* Semenov-Tian-Shanskij, 1967, *C. hydra* Semenov-Tian-Shanskij, 1967, and *C. orienticola* Linsenmaier, 1994. Compared to these species, *Chrysis simurgh* **sp. nov.** can be recognised by the combination of following characters: deep and coarse punctation, in particular on metasomal terga (Figs 31E, 32A); punctation on first and second tergum antero-dorsally with large punctures, up to 0.8× MOD, decreasing in size towards apical margin (*vs.* even or small punctures in other species, Fig. 32B–D); interspaces on first and second tergum antero-dorsally narrow, somewhere with contiguous punctures (*vs.* punctures separated by even interspaces or with aligned punctures in *C. orienticola*, Fig. 32C); black spots on second sternum well visible, trapeziform larger apically than at base (Fig. 32E) (*vs.* greenish to faint in *C. hydra* and *C. orienticola* (Figs 32G, H), barely visible only under a certain light; or vaguely subrectangular in *C. echidna,* Fig. 32F); vestiture elongate and greyish dorsally (*vs.* whitish and short). Other diagnostic characters to separate *Chrysis simurgh* **sp. nov**. from *C. echidna* are: shape of mesopleural sulci, distinctly larger, and shape of genal carina, with different angle; however, these characters are based on limited number of specimens and should be evaluated on a larger number of records. The first group of characters is anyway considered enough to separate *simurgh* **sp. nov.** from other species.

Description. — Holotype ♀ (Fig. 31A–F). Body length 7.9, anterior wing length 4.3 mm (Fig. 31A).

Head. Brow with dense and small punctures (0.2–0.4× MOD); punctures below the transverse frontal carina irregular and confluent; punctures on ocellar area smaller, on vertex slightly larger and sparser, with micropunctate interspaces; scapal basin impunctate medially but finely transversally wrinkled, at sides with dense micropunctures covering scapal basin and crescent in size towards compound eye; malar space fully and densely punctate with small punctures; clypeus fully micropuntate; apical rim slightly arcuate inwards and with a wide, triangular, brown apical rim medially; transverse frontal carina weakly defined but still visible and with slightly contrasting green colour, inverted-V shaped (Fig. 31B); genal carina sharp, straight, fully developed from occiput to mandibular insertion; malar space long (2.0× MOD) and convergent to clypeus; subantennal space long, 1.2× MOD; distance between anterior ocellus and upper margin of frontal carina 0.7× MOD; OOL 1.8× MOD; POL 2.3× MOD; MS 2.0× MOD; relative length of P:F1:F2:F3 = 1.0:1.4:1.1:0.9.

Mesosoma. Medial pronotal furrow very deep, similarly to species in the *rufitarsis* group, exceeding half of pronotal length; humeral angle straight; pronotum with deep and large punctures (0.5× MOD), with

small dots and punctures on interspaces; punctation on mesoscutum deep, with large punctures (0.6× MOD) always separated by polished interspaces (0.2–1.0 puncture diameter) with small dots (Fig. 31C); notauli formed by deep, metallic, sub-rectangular foveae, as large as punctures at base of mesoscutum, decreasing towards apical margin; basal foveae of notauli fused to form an elongate one; parapsidal signum as deep line; lateral area of mesoscutum sculptured as median one, with large and deep punctures separated by dotted interspaces; scutellum with punctation similar to that of mesoscutum, with slightly smaller punctures; metanotum antero-medially with deep and wide fovea, punctures similar to those on mesoscutum, contiguous, almost without polished interspaced; posterior propodeal projections triangular, stubby, apically blunt; mesopleuron with deep sulci formed by large subsquare foveae, larger than punctures on segment (Fig. 31D).

Metasoma. First tergum typically elongate as for other members of this species group, almost as long as the second, with deep and coarse punctures at base and on two anteromedian humps; punctures becoming sparser and smaller laterally and apically, micropunctate on interspaces; first tergum with two wide micropunctate areas, without large punctures (Fig. 31E); densely punctate along apical margin; second tergum with deep, large and dense punctures dorsally, on basal half, decreasing in size towards apical margin, with wider interspaces; laterally with same sculpture, and more micropunctate on interspaces; longitudinal median carina faint, but along mid-line with aligned dense micropunctures (Fig. 31E); third tergum typically elongate (1.3 times longer than second tergum); punctation dense, deep, but with smaller punctures; pits of pit row large, deep and longitudinally elongate; apical margin medially sinuous and laterally with blunt angle; black spots on second sternum reaching half segment length; spots trapezoid, with inner margins distinctly obliquous and conspicuously distant each other (Fig. 32E).

Colouration. Body dark blue with greenish reflections; scape, pedicel and first flagellum metallic blue, the rest of flagellum blackish; wings hyaline, with light brown veins.

Vestiture. Head and mesosoma dorsally with dark, greyish long setae, as long as 1 to 1.5× MOD on head and 2× MOD on mesosoma; on metasoma dorsally with short, whitish setae (1× MOD), on second and third tergum laterally longer; very short, whitish setae on legs.

Male. *Unknown.*

Etymology. The specific epithet *simurgh* (noun in apposition) recalls the mythological bird Simurgh, equated with another mythological bird such as the phoenix. This mythological figure is found in all periods of Iranian art and the etymology probably derives from Middle Persian and originally means a raptor, like an eagle, a falcon, anyway a bird of prey. Another Asian cuckoo wasp was named after the phoenix by Semenov-Tian-Shanskij (1967): *Spinolia phoenix*.

Distribution. *Iran (Qazvin).

Chrysis singula Radoszkowski, 1891 (Fig. 33A–F)

Chrysis singula Radoszkowski, 1891:187. Syntypes ♀; Turkmenistan: Ashkabad (Berlin, Krakow) (*succincta* group).

Material examined. 1♀, Tehran province: Ab Ali [= Abali], 9–10.vii.[19]65, leg. Giordani Soika & Mavromoustakis (NMLU).

Distribution. Iran (Tehran). Caucasus, Central Asia, Russia (European part).

Remarks. The species listed in Rosa *et al*. (2013) was actually *Chrysis grohmanni bolivari* (see above), whereas the real *Chrysis singula* was located among the unidentified material and its identification was possible only after examination and comparison with the syntypes deposited in the Radoszkowski collection in Krakow and in Berlin. The Iranian specimen shows anyway some minor differences, such as the extremely large, confluent and shallow punctures on mesonotum that may suggest that this specimen belongs to another undescribed species. However, we could not find any other relevant diagnostic characters to separate it from the typical form, and we prefer to examine further material before taking any other action.

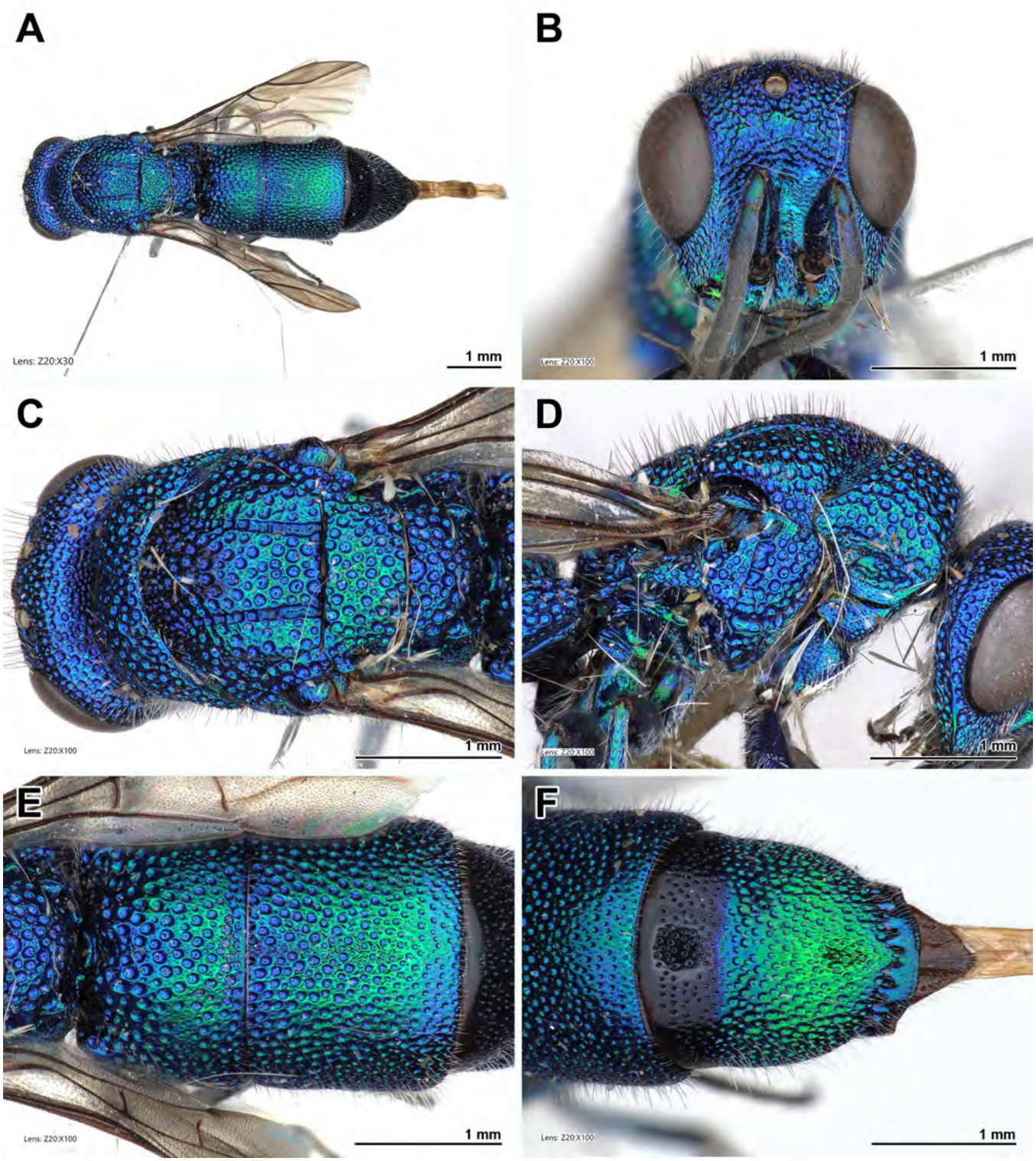

Figure 31. *Chrysis simurgh* Rosa, **sp. nov.**, female, holotype. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Head and mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasomal first and second tergum, dorsal view; **F.** Metasomal third tergum, posterior view.

Chrysis soror Dahlbom, 1854

Chrysis soror Dahlbom, 1854:240. Syntypes ♂♂; Greece: Rhodes Is. (Stockholm) (*scutellaris* group).
Chrysis scutellaris var. *gracilis* Trautmann, 1927:177, *nom. praeocc.*, *nec* Schenck, 1856. Type unknown; Türkiye: Anatolia (Berlin?).

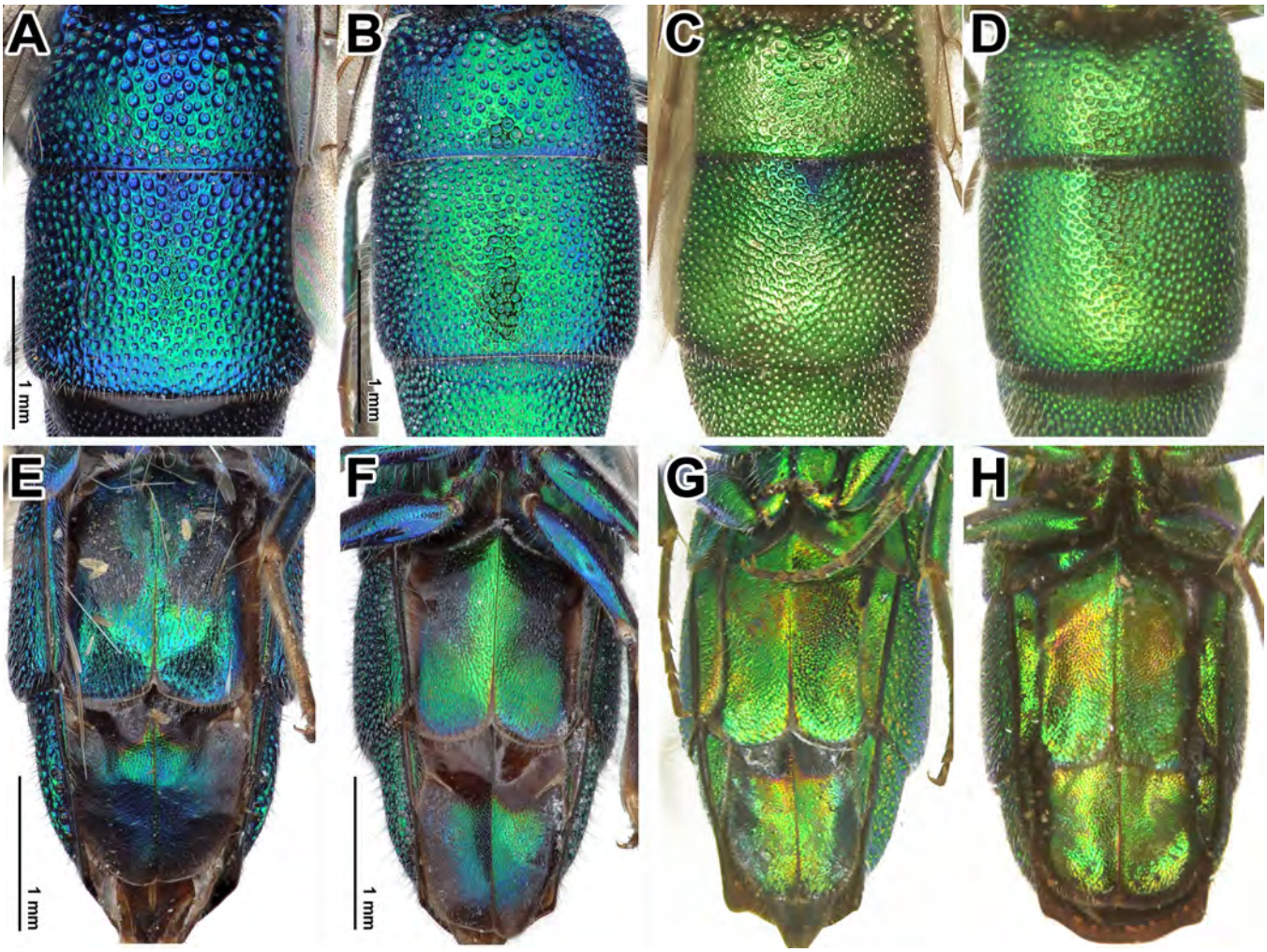

Figure 32. A–D. Metasoma, dorsal view; **A.** *Chrysis simurgh* Rosa, **sp. nov.**; **B.** *C. echidna* Semenov-Tian-Shanskij, 1967; **C.** *C. orienticola* Linsenmaier, 1994; **D.** *C. hydra* Semenov-Tian-Shanskij, 1967; **E–H.** Metasoma, ventral view; **E.** *Chrysis simurgh* Rosa, **sp. nov.**; **F.** *C. echidna* Semenov-Tian-Shanskij, 1967; **G.** *C. orienticola* Linsenmaier, 1994; **H.** *C. hydra* Semenov-Tian-Shanskij, 1967.

Chrysis (*Chrysis*) *soror gracilia* Linsenmaier, 1959a:125. Repl. name for *gracilis* Trautmann, 1927.
Chrysis soror calandra Semenov-Tian-Shanskij, 1967:167; Rosa et al., 2013:30 (Alborz, East-Azarbaijan, Golestan); Ebrahimi, 2015:31 (East-Azarbaijan).
Chrysis soror gracilia: Iranmanesh et al., 2017:300 (Kerman).
Chrysis soror: Rosa, 2020:467 (Golestan).

Material examined. 1♂, Qazvin, Zereshk, 361m., 36°25'23''N, 50°06'37''E, 6.vii.2011, leg. M. Khayrandish (TMUC).

Distribution. Iran (Alborz, East-Azarbaijan, Golestan, Kerman). From South-eastern Europe, to Middle-East and Central Asia (Rosa et al., 2013).

Chrysis speciosa Radoszkowski, 1877

Chrysis speciosa Radoszkowski, 1877:17. Lectotype ♂, designated by Bohart in Kimsey & Bohart, 1991:464; Uzbekistan: Tashkent desert (Moscow) (*maculicornis* group).
Chrysis fulvicornis Mocsáry, 1889:373; Rosa et al., 2013:21; Farhad et al., 2015b:38 (Hormozgan).

Material examined. 1♀, Hormozgan, Ramkan, 26°52'25''N, 56°01'07''E, 13.vii.2012, leg. A. Ameri (TMUC); 1♀, idem, 24.iv.2012 (TMUC); 1♂, Zakin, 3.viii.2012, leg. A. Ameri (TMUC).

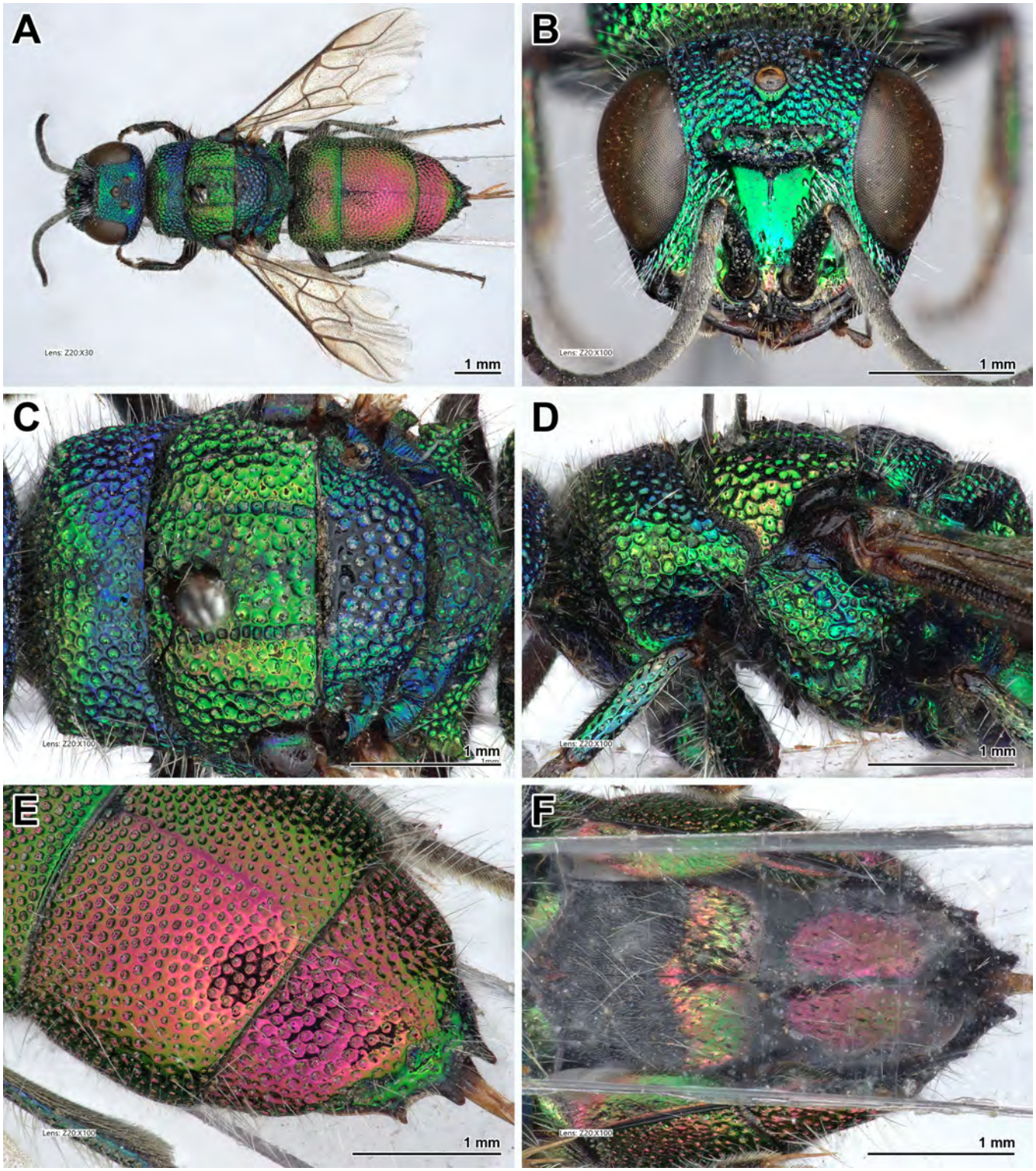

Figure 33. *Chrysis singula* Radoszkowski, 1891. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Distribution. Iran (Hormozgan). Greece, Jordan, Palestine; Central Asia: Kyrgyzstan, Turkmenistan (Rosa et al., 2013).

Remarks. *Chrysis fulvicornis* Mocsáry was synonymised with *Chrysis speciosa* Radoszkowski by Rosa et al. (2015d).

Chrysis splendidula Rossi, 1790

Chrysis splendidula Rossi, 1790:78. Syntypes [not holotype] ♂♂ ; Italy: Tuscany (Berlin) (splendidula group).
Chrysis cyanopyga var. *chlorisans* du Buysson, 1895:534. Holotype ♂; Greece: Aegina (Paris) (*splendidula* group).
Chrysis splendidula chlorisans: Rosa et al., 2013:31 (Gilan, Tehran); Ebrahimi, 2015:32 (Alborz).
Chrysis splendidula: Rosa, 2020:467 (Khorasan-e Razavi).

Distribution. Iran (Alborz, Gilan, Khorasan-e Razavi, Tehran). Caucasus, Cyprus, Palestine, and Western Asia (Linsenmaier, 1959a).

Remarks. The Iranian specimens belong to *Chrysis splendidula chlorisans*, which is the eastern colour form of *Chrysis splendidula* Rossi, 1790 with greenish males.

Chrysis stilboides Spinola, 1838

Chrysis stilboides Spinola, 1838:446. Holotype ♀; Egypt (Turin) (*oculata* group).
Chrysis stilboides: Ebrahimi, 2015:32 (Alborz); Farzaneh et al., 2017:499 (Fars).

Distribution. Iran (Alborz, Fars). Palaearctic: from Northern Africa to Türkiye and India; Afrotropical: widespread; Oriental: from India to Thailand (Kimsey & Bohart, 1991).

Chrysis subanalis Linsenmaier, 1968

Chrysis subanalis Linsenmaier, 1968:94. Holotype ♂; Greece: Lidoriki (Luzern) (*comparata* group).
Chrysis subanalis: Rosa et al., 2013:31 (East-Azarbaijan, Mazandaran).

Distribution. Iran (East-Azarbaijan, Mazandaran). Greece (Linsenmaier, 1968), Türkiye (Strumia & Yildirim, 2009).

Chrysis subdistincta Linsenmaier, 1968

Chrysis (*Chrysis*) *subdistincta* Linsenmaier, 1968:110. Holotype ♂; Transcaspia (Luzern) (*maculicornis* group).
Chrysis subdistincta: Ebrahimi, 2015:33 (Alborz).

Distribution. Iran (Alborz). Asiatic, from Transcaspia to China (Rosa et al., 2017f).

Chrysis subincisa Linsenmaier, 1959

Chrysis (*Chrysis*) *subincisa* Linsenmaier, 1959a:140. Holotype ♂; Palestine (Luzern) (*rufitarsis* group).
Chrysis (*Chrysis*) *subincisa*: Rosa et al., 2013:31 (Mazandaran).

Distribution. Iran (Mazandaran). Palestine and Türkiye (Strumia & Yildirim, 2009); Northern Africa (Linsenmaier, 1959a, 1999).

Chrysis sybarita persis Semenov-Tian-Shanskij, 1967

Chrysis (*Tetrachrysis*) *sybarita* var. *persis* Semenov-Tian-Shanskij, 1967:166. Holotype ♂; Kizaabad [according to Bobrinskoi, 1940: between Qazvin and Manjil], 16.v.1904, N. Zarudny (St. Petersburg) (*graelsii* group).
Chrysis graelsii Guérin-Meneville, 1842:148; Rosa et al., 2013:21 (Qazvin).
Chrysis jaxartis Semenov-Tian-Shanskij, 1910:222; Rosa et al., 2013:23 (Tehran).

Distribution. Iran (Qazvin, Tehran) (Semenov-Tian-Shanskij, 1967).

Remarks. In Rosa et al. (2013) two similar species were listed: *Chrysis graelsii* (with *Chrysis sybarita persis* as one of its synonyms, following the interpretation of Kimsey & Bohart, 1991) and *C. jaxartis* (based on Linsenmaier's identification of a specimen from Elburz found at the Luzern Museum). The type of *Chrysis sybarita persis* was examined later in St. Petersburg (Rosa et al., 2017a) and is not conspecific with *C. graelsii* but is more closely related to the Central European and Western Asian *Chrysis sybarita* (revalidated by Wiesbauer et al., 2020) based, among the others, on the shape of the apical teeth. Linsenmaier didn't know and never reported *Chrysis sybarita persis* in his publications, therefore the identification of the Iranian specimen in his collection needs to be newly evaluated. For the moment, we consider only *Chrysis sybarita persis* in Iran, pending a complete morphological and genetic study, and taking into consideration that more species of this group may be anyway present in the country.

Chrysis sznabli Radoszkowski, 1891

Chrysis sznabli Radoszkowski, 1891:196. Holotype [sex unknown]; Iran: Sarakhs (Krakow) (*viridula* group).
Chrysis Schnabli: Radoszkowski, 1893:81. Invalid emendation of *Chrysis sznabli* Radoszkowski, 1891.
Chrysis sznabli: Rosa et al., 2013:31 (Khorasan-e Razavi).

Distribution. Iran (Khorasan-e Razavi) (Radoszkowski, 1891).

Chrysis taczanovskii Radoszkowsky, 1877

Chrysis taczanovskii Radoszkowsky, 1877:146. Holotype ♀; Egypt (Kraków) (*taczanovskii* group).
Chrysis taczanowskyi: Dalla Torre, 1892:101. Incorrect subsequent spelling.
Chrysis taczanovskii: Rosa et al., 2013:32 (East-Azarbaijan); Ebrahimi, 2015:34 (East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). Cyprus, South-eastern Europe, Portugal, Spain; Palestine, Syria, Türkiye; Northern Africa: Egypt (Rosa et al., 2013).

Chrysis taurica Mocsáry, 1889

Chrysis (*Tetrachrysis*) *taurica* Mocsáry, 1889:345. Holotype ♀; Ukraine: Crimea (Kraków) (*varidens-ragusae* group).
Chrysis taurica: Falahatpisheh et al., 2021:31 (Fars).

Distribution. Iran (Fars). Crimea, Cyprus, Crete, South-European Russia, Türkiye (Kimsey & Bohart, 1991; Özbek & Strumia, 2018).

Remarks. Strumia & Yıldırım (2009) treated *Chrysis ragusae* and *C. taurica* as separate species, which were later regarded as synonyms by Rosa et al. (2015d). The two taxa have different male genitalia according to Linsenmaier (1959a, figs. 264–265) yet recent findings of the first author do not support Linsenmaier's interpretation of the species. *C. ragusae* was listed from East Anatolia and the Mediterranean region by Özbek & Strumia (2018). Species inquirenda.

Chrysis titanica Rosa, sp. nov. (Figs 16C, 34A–H, 35A–G)

https://zoobank.org/urn:lsid:zoobank.org:act:D235865C-127D-48A2-A112-CC639C9670E6

Material examined. **Holotype** ♂; IRAN, Kerman province: env. Jebel Barez Mts, 2500m, 35 km N of Balvard, env. of Shaldan village, 6.vi.2017, leg. J. Simandl (MSNM). **Paratypes:** 1♀: same data, locality and collector (PRC); 1♂, Kerman province: env. Jebel Barez Mts, 2500m, 35 km N of Balvard, env. of Shaldan village, 6.vi.2017, leg. J. Simandl (MHC); 2♂♂, 1♀, East Azerbaijan province: 10 km E Shabestar, Sis, 38°15'36"N, 45°51'36"E, 1540m; 19.vi.2010, leg. Michal Halada (MHC).

Diagnosis. *Chrysis titanica* **sp. nov.** belongs to the *succincta* species group and is related to another two species known for the Middle East, *Chrysis coa* Invrea, 1939, and Caucasus, *Chrysis vinokurovi* Rosa, 2017. The male can be immediately recognised by the unique shape of its genital capsule (Figs 16C, 34A), with inner margins on gonocoxae subparallel, fully covering the aedeagus, excluding its pointed apical part, and ending with a convex upper margin and short gonostylus (*vs*. inner margins oblique, leaving the aedeagus fully exposed and with elongate gonostylus in the other two species: *C. coa* (Figs 16D), *C. vinokurovi*, see online images at Chrysis.net; it can be also separated by the shape of the black spots on second tergum, which are round and clearly separate medially (Fig. 34H) (*vs*. rectangular and fully fused medially), whereas it can separated from Iranian males of *C. coa* by the trisinuate apical margin (Fig. 34G) (*vs*. continuous in *C. coa*). The female can be separated from *C. coa* by bisinuate apical margin with median protrusion (Fig. 35E) (*vs*. simple, continuous, arched) and from *C. vinokurovi* for the sparse and large punctures on the metasoma (*vs*. small and dense punctures) and the colour pattern typical of *C. succincta*, with green head and mesosoma, and red scutum, and metasoma (*vs*. dark blue to black on head and mesosoma, with golden anterior margin of pronotum; with a large, median black spot on first and second tergum basally, and apical margin after pit row blackish, contrasting with the red colour of third tergum). Finally, both male and female of *C. titanica* measure 11.0 mm, being the largest species in the *succicnta* group (*vs*. *C. vinokurovi* maximum length recorded = 10.0 mm and *C. coa* = 9.0 mm).

Description. — **Holotype** ♂ (Figs 16C, 34A–H). Body length 11.0 mm, wing length 5.5 mm (Fig. 34A).

Head. Brow, vertex and ocelli area with dense and small punctures (0.2–0.3× MOD); punctures sparser and larger between posterior ocellus and compound eye, with small punctures on interspaces; posterior ocelli with postero-lateral deep and elongate fovea, as long as ocellum length, appearing as two large foveae medially fused each other (Fig. 34D); transverse frontal carina with unique shape in this species-group, weakly raised, circular and embracing anterior ocellus (Fig. 34C); scapal basin deep and densely micropunctate, each puncture bearing white, long seta; scapal basin impunctate below declivitous part and along median longitudinal line; impunctate and polished on preclypear area; malar space finely and densely punctate; genal carina sharp, fully developed from occiput to mandibular insertion; subantennal space short, 0.7× MOD; apex of clypeus straight, slightly arcuate upwards with parallel, narrow dark brown rim. Distance between anterior ocellus and upper margin of scapal basin = 2.2× MOD. OOL 2.1× MOD; POL 2.0× MOD; MS 0.8× MOD; relative length of P:F1:F2:F3 = 1.0:1.9:1.0:1.0.

Mesosoma. Medial pronotal furrow as deep line, reaching half pronotal length; pronotal punctures dense, contiguous with small punctures intermixed, punctures as large as those on temples or slightly larger; punctures on mesonotum widely spaced (Fig. 34A), with polished interspaces up to 1 puncture diameter, relatively denser on lateral areas of mesoscutum; notauli formed by deep, black, sub-rectangular foveae, as large as larger punctures on mesoscutum and decreasing towards anterior margin; parapsidal signum deep and elongate; scutellum antero-medially largely polished, on average with larger punctures, distinctly spaced and small punctures on interspaces; scutellar-metanotal suture deep, formed by longitudinally elongate foveae; metanotum with larger, deeper and denser punctures; posterior propodeal projections sub-parallel, pointing downwards; mesopleuron with episternal sulcus formed by large sub-square foveae, larger than other punctures on segment, as large as two mesopleural punctures together (Fig. 34B).

Metasoma. First tergum with even, larger punctures on basal half, equally spaced, becoming smaller on marginal area; second tergum with large, even punctures covering almost all segment (Fig. 34G), denser antero-dorsally, with small punctures on interspaces; longitudinal median carina on second tergum weak, but visible as golden-red line (Fig. 34F); third tergum with similar punctures, pits of pit row round, black, considerably deep and large, as large as two of the larger punctures together; apical margin with three undulations and with narrow, brownish rim (Fig. 34G); spots on second sternum oval, relatively small compared to similar species, medially separated by at least 1× MOD (Fig. 34H).

Colouration. Body entirely green, with golden-green reflection on face and vertex, lateral areas of mesoscutum and metasoma dorsally; third tergum red, probably due to post mortem effect (whole metasoma expected to be red in nature); metasomal venter red; scape, pedicel and first flagellomere metallic green, rest of flagellum blackish; wings ambrate medially, with dark brown veins.

Vestiture. Head and mesosoma dorsally with short, sparse whitish setae as long as 1.0 to 1.5× MOD; legs with long (1.5× MOD), erect and whitish setae; metasoma laterally with sparse, whitish setae.

Female (Paratype)**.** Body length 11.0 mm, wing length 6.2 mm (Fig. 34A, 34B).

Head. Brow, vertex and ocelli area with slightly larger punctures (0.3–0.4× MOD); similar punctation on temples and with elongate fovea, as long as ocellum length; transverse frontal carina weakly raised, similar to male; scapal basin deep and polished, laterally punctate, each puncture bearing short, white seta; malar space densely punctate, as clypeus laterally; genal carina sharp similar to male; subantennal space short, 0.8× MOD; apex of clypeus straight, slightly arcuate upwards with parallel, narrow dark brown rim. Distance between anterior ocellus and upper margin of scapal basin = 2.5× MOD. OOL 1.6× MOD; POL 1.8× MOD; MS 1.0× MOD; relative length of P:F1:F2:F3 = 1.0:1.2:0.6:0.6.

Mesosoma. Medial pronotal furrow, punctures on pronotum and mesonotum and metanotum, posterior propodeal projections and other characters as in male.

Metasoma. Sculpture as in male, apical margin of third tergum appearing triangulate, with two lateral blunt corners and a median protrusion apically truncate; apical margin bordered by brownish rim; spots on second large, covering ¾ of sternum length, medially fused and with oblique margin (Fig. 35G).

Colouration. Female with mesoscutum golden-red to golden-greenish.

Vestiture. Head and mesosoma dorsally with short, sparse whitish setae as long as 1.0 to 1.5× MOD; legs with long (1.5× MOD), erect and whitish setae; metasoma laterally with sparse, whitish setae. Pubescence denser in female.

Etymology. The specific epithet *titanica* (feminine adjective) is related to the exceptional size of this species, reaching 11.0 mm.

Distribution. *Iran (Kerman, East-Azerbaijan).

Chrysis transcaspica Mocsáry, 1889

Chrysis (*Gonochrysis*) *transcaspica* Mocsáry, 1889:306. Holotype ♀; Transcaspia (Kraków) (*elegans* group).
Chrysis transcaspica: Rosa et al., 2013:32 (Iran).

Distribution. Iran (without locality). Middle East, Palestine; Central Asia (Linsenmaier, 1968).

Chrysis turcica (du Buysson, 1908b)

Gonochrysis peninsularis var. *turcica* du Buysson, 1908b:208. Holotype ♀; Türkiye (Paris) (*succincta* group).
Chrysis turcica: Strumia & Fallahzadeh, 2015:23 (Golestan).

Distribution. Iran (Golestan). Türkiye (du Buysson, 1908b).

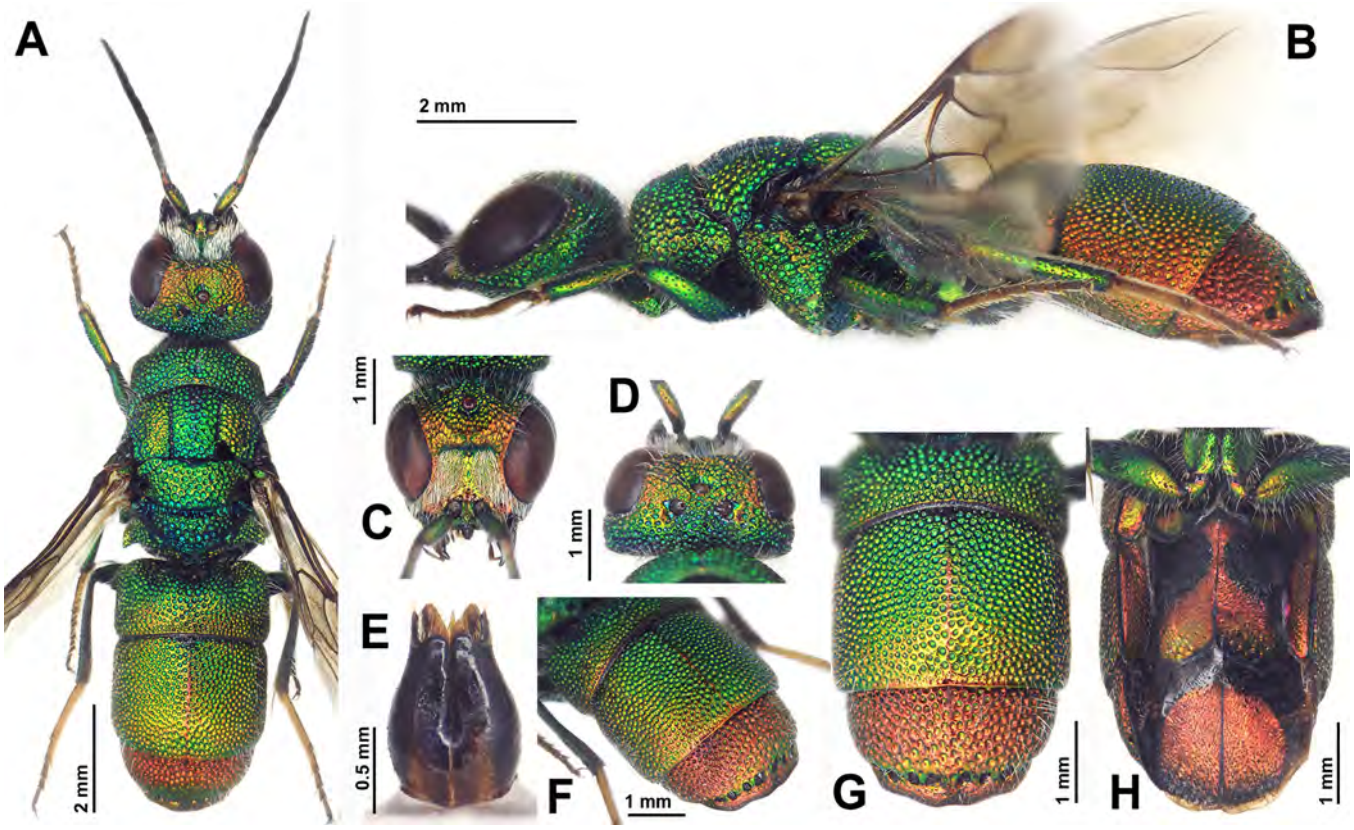

Figure 34. *Chrysis titanica* Rosa, **sp. nov.**, male, holotype. **A.** Habitus, dorsal view; **B.** Habitus, lateral view; **C.** Head, frontal view; **D.** Head, dorsal view; **E.** Genital capsule, dorsal view; **F.** Metasoma, postero-lateral view; **G.** Metasoma, dorsal view; **H.** Metasoma, ventral view.

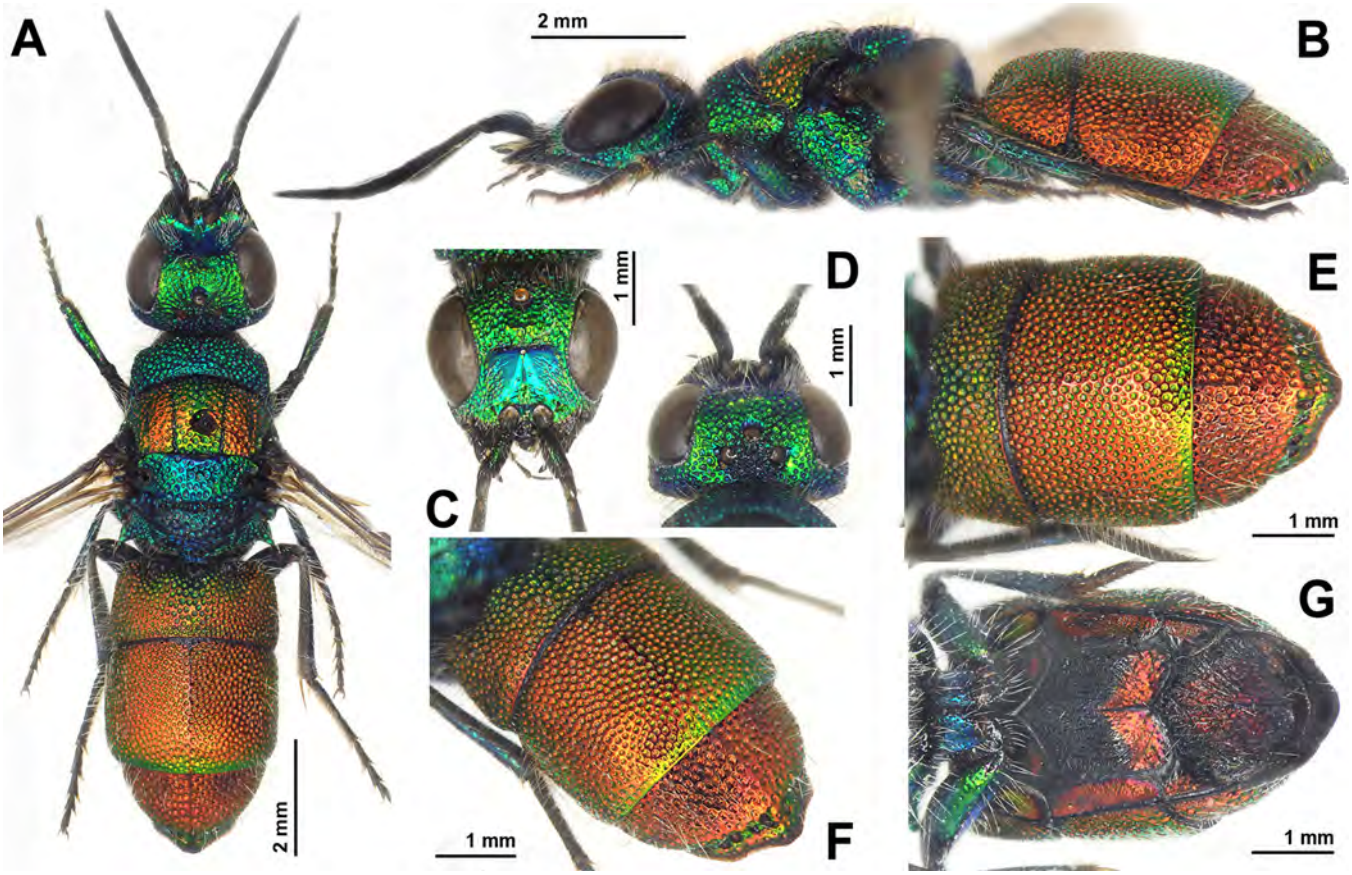

Figure 35. *Chrysis titanica* Rosa, **sp. nov.** female, holotype. **A.** Habitus, dorsal view; **B.** Habitus, lateral view; **C.** Head, frontal view; **D.** Head, dorsal view; **E.** Metasoma, dorsal view; **F.** Metasoma, postero-lateral view; **G.** Metasoma, ventral view.

Chrysis turcomana Semenov-Tian-Shanskij & Nikol'skaya, 1954

Chrysis (*Glossochrysis*) *turcomana* Semenov-Tian-Shanskij & Nikol'skaya, 1954:117. Holotype ♂; Turkmenistan: Imam-baba (St. Petersburg) (*ehrenbergi* group).
Chrysis turcomana: Bohart in Kimsey & Bohart, 1991:473. Lectotype designation: ♂; Turkmenistan: Imam-baba (St. Petersburg).

Material examined. 3♂♂, 2♀♀, Golestan province: 70 km E Minudasht, 37°15'36"N, 55°59'24"E, 1050m, 12.vi.2010, leg. Mi. Halada (MHC).

Distribution. *Iran (Golestan). Turkmenistan (Semenov-Tian-Shanskij & Nikol'skaya, 1954).

Chrysis unirubra Strumia, 2015

Chrysis unirubra Strumia in Strumia & Fallahzadeh, 2015:10. Holotype ♀; Iran: Fars, 7 km West of Dasht-e-Arzhan, 2050 m, 29˚38'N, 51˚54'E, 04–06.v.2008, leg. D. Gianasso (Strumia private coll.) (*millenaris* group).

Distribution. Iran (Fars).

Chrysis vachali du Buysson, 1900

Chrysis vachali du Buysson, 1900:140. Lectotype ♀ designated by Bohart in Kimsey & Bohart, 1991; Tunisia: Sfax (Paris) (*bihamata* group).
Chrysis vachali: Strumia & Fallahzadeh, 2015:24 (Fars).

Distribution. Iran (Fars). North-western Africa: Algeria, Morocco, Tunisia (Linsenmaier, 1999).

Chrysis verna Dahlbom, 1854

Chrysis verna Dahlbom, 1854:285. Holotype ♀; Greece: Rhodes Is. (depository unknown) (*comparata* group).
Chrysis verna: Farzaneh et al., 2017:499 (Fars).

Distribution. Iran (Fars). South-eastern Europe, Crimea, Caucasus, Greece, Rhodes, Palestine (Rosa et al., 2013).

Chrysis villosa Rosa, 2022

Chrysis (*Chrysis*) *ashabadensis*: Linsenmaier, 1968:85 *nec* Radoszkowski, 1891 (*elegans* group).
Chrysis ashabadensis: Rosa et al., 2013:16 (Khorasan-e Razavi).
Chrysis villosa Rosa in Boustani & Rosa, 2022:25. Holotype ♀; Türkiye: Mut, 9.–13.vi.1965, leg. J. Gusenleitner (Luzern) (*elegans* group).

Distribution. Iran (Khorasan-Razavi). Lebanon, Türkiye.

Remarks. Rosa et al. (2013) listed *Chrysis ashabadensis* for Iran as a member of the *elegans* group, following Linsenmaier (1959a, 1968) interpretation. Examination of the type in Krakow (Rosa et al., 2015d) revealed that the species actually belongs to the *C. succincta* species-group and that the species identified by Linsenmaier in the *elegans* group was undescribed. This taxon was later described as *Chrysis villosa* Rosa, 2022 [in Boustani & Rosa, 2022] based on a holotype from Türkiye deposited in the Linsenmaier collection in Luzern.

Chrysis viridissima Klug, 1845

Chrysis viridissima Klug, 1845:tav. 45 fig. 11. Holotype ♂; Egypt (Berlin) (*viridissima* group).
Chrysis viridissima: Rosa et al., 2013:32 (East-Azarbaijan, Khuzestan); Strumia & Fallahzadeh, 2015:24 (Fars); Tavasoli & Fallahzadeh, 2015:82 (Fars); Farzaneh et al., 2017:499 (Fars); Falahatpisheh et al., 2021:31 (Fars).

Distribution. Iran (East-Azarbaijan, Fars, Khuzestan). Jordan, Middle East; Northern India; Northern Africa; Afrotropical region (Linsenmaier, 1959a, 1999); Arabian Peninsula (Rosa et al., 2020a).

Chrysis xanthocera Klug, 1845

Chrysis xanthocera Klug, 1845:Tab. 45, Fig. 5. Holotype ♂; Egypt (Berlin) (*comparata* group).
Chrysis barrei Radoszkowski, 1891:194. Holotype ♂; Iran: Sarakhs (Berlin).
Chrysis xanthocera var. *viridis* du Buysson, 1900:149. Holotype ♂; Iran: Tehran (Paris).
Chrysis xanthocera: Rosa et al., 2013:32 (Khorasan-e Razavi, Tehran).

Distribution. Iran (Khorasan-e Razavi, Tehran). Pakistan, Palestine, Central Asia; Northern Africa: Algeria, Egypt, Libya (Linsenmaier, 1959a, 1994, 1999).

Chrysis zobeida du Buysson, 1896

Chrysis zobeida du Buysson, 1896:474. Holotype ♀; Yemen: Aden (Paris) (*maculicornis* group).
Chrysis zobeida Rosa et al., 2013:32; Strumia & Fallahzadeh, 2015:24 (Fars); Farzaneh et al., 2017:499 (Fars); Iranmanesh et al., 2017:300 (Kerman); Falahatpisheh et al., 2021:31 (Fars).

Distribution. Iran (Fars, Kerman). Palestine, Türkiye, Saudi Arabia; Northern Africa: Egypt (Rosa et al., 2013); Iraq (Ebrahimi, 2015).

Chrysis zonata cypria du Buysson, 1898

Chrysis bidentata var. *cypria* du Buysson, 1898b:555. Holotype ♂; Cyprus (Paris) (*viridula* group).
Chrysis cypriana Enslin, 1950:668. Unnecessary replacement name for *cypria* du Buysson, 1898.
Chrysis pyrrhina cypria: Rosa et al., 2013:27 (East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). Cyprus, Lebanon, Palestine, and Türkiye (Linsenmaier, 1959a, 1968).

Chrysis zonata zonata Dahlbom, 1854

Chrysis serena Radoszkowski, 1891:194. Holotype ♂; Iran: Sarakhs (Krakow) (*viridula* group).
Chrysis pyrrhina serena: Rosa et al., 2013:28 (Khorasan-e Razavi); Ebrahimi, 2015:30 (Alborz).

Material examined. 1♂, Alborz, Karaj, 35°46'20''N, 50°56'4''E, 22.vi.2010, leg. M. Khayrandish (TMUC); 1♀, idem (TMUC).

Distribution. Iran (Alborz, Khorasan-e Razavi). Southern Russia, Palestine, Syria, Türkiye (Linsenmaier, 1968).

Remarks. *Chrysis serena* Radoszkowski was synonymised with *Chrysis zonata* Dahlbom by Rosa (2018b:170).

Genus *Chrysura* Dahlbom, 1845

Chrysura Dahlbom, 1845:6. Type species: *Chrysis austriaca* Fabricius, 1804, by subsequent designation of Bodenstein, 1939:125.

Olochrysis Lichtenstein, 1876:27. Type species: *Chrysis aerata* Dahlbom, 1854 [= *Chrysis trimaculata* Förster, 1853)], by subsequent designation of Ashmead, 1902:226. Junior subjective synonym of *Chrysura* Dahlbom, 1845 according to Kimsey & Bohart, 1991.

Chrysura baccha (Balthasar, 1953)

Chrysis baccha Balthasar, 1953:175. Holotype ♀; Palestine: Jerusalem (Prague) (*radians* group).
Chrysura baccha: Rosa et al., 2013:33 (Fars, Gilan).

Distribution. Iran (Fars, Gilan). Greece, Lebanon, Palestine, Türkiye (Linsenmaier, 1959a, 1968).

Chrysura baiocchii Rosa, 2013

Chrysura baiocchii Rosa in Rosa & Lotfalizadeh, 2013:26. Holotype ♀; Iran: Fars province, 2050 m, 7 km W Dasht-e-Arzhan, 29°38'00''N, 51°54'50''E, 12.v.2010, leg. D. Baiocchi (MSNM) (*radians* group).

Distribution. Iran (Fars).

Chrysura barbatula (Linsenmaier, 1968)

Chrysis (*Chrysogona*) *barbatula* Linsenmaier, 1968:131. Holotype ♂; Türkiye (Luzern) (*radians* group).
Chrysura barbatica Bohart in Kimsey & Bohart, 1991:486, unnecessary replacement name for *C. barbatula* Linsenmaier, 1968.
Chrysura barbatula Rosa et al., 2013:33 (East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). Türkiye (Linsenmaier, 1968).

Chrysura cuprea cuprea (Rossi, 1790)

Chrysis cuprea Rossi, 1790:78. Syntypes, sex unknown; Italy: Tuscany (Berlin) (*cuprea* group).
Chrysura cuprea cuprea: Rosa, 2020:467 (Mazandaran).

Distribution. Iran (Mazandaran). Euroasiatic, from Western Europe to Caucasus.

Chrysura cuprea demelti (Linsenmaier, 1987)

Chrysis (*Chrysogona*) *cuprea demelti* Linsenmaier, 1987:145. Holotype ♀; Türkiye: Konya, Sille (Luzern) (*cuprea* group).
Chrysura cuprea demelti: Rosa et al., 2013:33 (Zanjan).

Distribution. Iran (Zanjan). Türkiye (Linsenmaier, 1987).

Chrysura cyrenaica (Invrea, 1924)

Chrysis simplex var. *cyrenaica* Invrea [in Gribodo], 1924:268. Holotype ♂; Libya: Cyrenaica (Bologna) (*austriaca* group).
Chrysura cyrenaica: Strumia & Fallahzadeh, 2015:23 (Fars).

Distribution. Iran (Fars). Libya (Linsenmaier, 1999).

Chrysura darii (Mocsáry, 1914)

Chrysis (*Holochrysis*) *Darii* Mocsáry, 1914:20. Holotype ♀ Iran: "Persia merid.-occidentalis: R. Sefid" (London) (*candens* group).
Chrysura darii: Rosa et al., 2013:33; Strumia & Fallahzadeh, 2015:24 (Fars).

Distribution. Iran (Fars).

Chrysura desertorum (du Buysson, 1887)

Chrysis desertorum du Buysson, 1887:175. Lectotype ♂ designated by Bohart in Kimsey & Bohart, 1991:488; Palestine: Ramle (Paris) (*radians* group).
Chrysura desertorum: Strumia & Fallahzadeh, 2015:24 (Khorasan).

Distribution. Iran (Khorasan).

Chrysura desidiosa (du Buysson, 1891)

Chrysis desidiosa du Buysson, 1891:280. Holotype ♀; Caucasus (Paris) (*radians* group).
Chrysura desidiosa: Rosa et al., 2013 (Fars).

Distribution. Iran (Fars). Caucasus; Central Asia (Linsenmaier, 1959a).

Chrysura erigone (Mocsáry, 1889)

Chrysis erigone Mocsáry, 1889:239. Lectotype ♀ designated by Bohart in Bohart & French 1986:341; Caucasus (Budapest) (*radians* group).
Chrysura erigone: Rosa et al., 2013:33 (Fars); Strumia & Fallahzadeh, 2015:25 (Fars).

Distribution. Iran (Fars). Caucasus, Cyprus, Palestine, Türkiye (Linsenmaier, 1959a, 1968).

Chrysura filidichroa Rosa & Baiocchi, sp. nov. (Figs 16F, 16G, 36A–F, 37A–F)

https://zoobank.org/urn:lsid:zoobank.org:act:13DDCFC7-C85F-4B9D-A638-B7CB5F66EBFC

Material examined. **Holotype** ♂; IRAN, Kohgiluyeh and Buyer Ahmad province: Sisaht env., 2400m, Dena Nat. Reserve, 30°52'46''N, 51°25'12''E, 14.–16.v.2013, leg. D. Baiocchi (MSNM). **Paratypes**: 1♂, same locality and dates of holotype (PRC); 7♀♀, Kerman province: S of Deh Bakri, 29°01'08''N, 57°56'09''E, 26.–27.v.2012, leg. D. Baiocchi (DBC, PRC); 1♀, (Fārs) W Sarvestān, (40 Km NW Fasā) 1860m, Kūh-e Mian Jangal, 29°10'12''N, 53°22'50''E, 7.V.2016 D.Baiocchi leg. (DBC); 2♂♂, (SSE Yasuj) 2390m, (Būyer Ahmad-o-Kūhgīlūye), NE of Malashoreh pass, 30°29'24''N, 51°39'29''E, 10-13.V.2016 Baiocchi leg. (DBC); 9♂♂, Fars province: 20 km SE of Yasuj, 30°29'24''N, 51°39'28.8''E, 2390m, 4.v.2016, leg.M.Kafka (MHC); 1♂, 2♀♀, Fars province: S of Dasht Arjan, 29°33'7.2''N, 51°56'31.2''E, 2050m, 4.v.2016, leg. M. Kafka (MHC); 1♀, Fars province: 50km W of Shiraz, 12km S Dasht Arjan, 29°33'25.2''N, 51°56'45.6''E, 2250m, 15.v.2019, leg. O. Šauša (MHC).

Diagnosis. *Chrysura filidichroa* **sp. nov.** belongs to the *dichroa* group for: typical habitus, male antennae gibbous ventrally, and shape of genital capsule. The only species similar to *C. filidichroa* **sp. nov.** is *C. izadiae* Strumia & Fallahzadeh, 2016, but the male of *C. filidichroa* can be easily separated by the unique shape of genital capsule (Figs 16F, 16G), with upper part of gonocoxa with straight transverse margin and wide apex; this shape of the the genital capsule separates *C. filidichroa* also from other species in the group (compare images of genital capsules in Arens, 2001 and Strumia et al., 2016a); it is also separated from *C. izadiae* by the shape of propodeum with parallel sides (*vs*. concave laterally, with prominent humeral angles in *C. izadiae*); habitus narrow and elongate (*vs*. unmodified in *C. izadiae*); apical margin of third tergum continuous (*vs*. slightly concave). Comparison with the female of *C. izadiae* is not appropriate, because we consider the sex association proposed by Strumia et al. (2016a) unreliable, being the female closely related to other species of the *dichroa* group with body colour altered post mortem; moreover, the unmodified pronotum and the general habitus do not fit the description of the holotype male. *C. filidichroa* **sp. nov.** male and female can be separated from all the other species species of the *dichroa* group by body green colour, replacing the typical red one in members of this group; slender habitus (Figs 36A, 37A), and elongate malar spaces (2× MOD).

Description. — **Holotype** ♂ (Figs 16F, 16G, 36A–F). Body length 6.5 mm (paratypes 5.5-7.5 mm), anterior wing length 3.5 mm (Fig. 36A). Green, golden-green to golden-red.

Head. Brow, ocellar area and vertex with dense, contiguous and small punctures (0.2–0.4× MOD) continuing between scapal basin and eye and on malar space; punctures spaced between posterior ocelli and compound eye and on temples; posterior ocellus with lateral narrow fovea as long as ocellus; face typically flat; scapal basin with small, spaced punctures medially becoming denser and deeper laterally (Fig. 36B); genal carina sharp, from mid eye to mandibular insertion; subantennal space 1.0× MOD; apex of clypeus bordered by wide (0.6× MOD long) dark brown rim. Clypeus punctate, with punctures similar to those on scapal basin medially. Distance between anterior ocellus and clypeus = 5.7× MOD. OOL 1.6× MOD; POL 1.7× MOD; MS 2.0× MOD; relative length of P:F1:F2:F3 = 1.0:2.0:1.0:0.9.

Mesosoma. Medial pronotal furrow relatively wide and shallow (Fig. 36C), reaching half pronotal length; pronotum with small to medium sized punctures (0.2–0.5× MOD), irregularly shaped, contiguous and with dots in between; punctation on mesoscutum similar, without interspaces; on scutellum shallower, with some polished interspaces between punctures; notauli formed by relatively shallow, metallic, sub-rectangular foveae, narrow, as long as larger punctures on mesonotum, but as wide as the smallest; parapsidal signum deep and distinct; scutellar-metanotal suture formed by shallow, irregular punctures, with large, shallow median fovea; metanotum with deep and contiguous punctures; posterior propodeal projections slightly divergent and concave at sides; mesopleuron with episternal sulcus formed by relatively small, shallow, transversal foveae, larger than other punctures on segment (Fig. 36D).

Metasoma. First tergum with even, small sized punctures, equally spaced; smaller and denser dorsally, at sides of median line, which is formed by rows of small dots (Fig. 36E); punctures laterally with larger interspaces; on second tergum with similar punctures, denser antero-dorsally, and becoming smaller and sparser towards apical margin; longitudinal median carina faint; third tergum with small, even punctures; pits of pit row small, shallow, black, only slightly larger than other punctures on tergum; apical margin continuous, bordered by a thin hyaline rim; black spots on second sternum relatively large, subrectangular, covering less half of sternum length, medially separated by 2× MOD; spot margin straight (Fig. 36F).

Female (Paratype)**.** Body length 6.5–6.8 mm, anterior wing length 3.6 mm (Fig. 37A).

Head. Colour pattern, vestiture and sculpture as in male, less punctate on scapal basin; structure as in male for clypeus, mandibles, malar space (2× MOD), subantennal space, relative length of P:F1:F2:F3 = 1.0:2.0:1.0:0.8, and pilosity; however, female head is different for larger distance between anterior ocellus and clypeus (5.7× MOD), OOL 1.7× MOD, POL = 1.9× MOD, and general aspect narrower and elongate (Fig. 37A) with l/w = 0.85 vs. l/w = 0.77 in male.

Mesosoma and *metasoma* Colour pattern, vestiture and sculpture as in male.

Colouration. Male and female with body light green, green-blue to bluish on metanotum and metapostnotum; mandible basally, scape, pedicel, first and second flagellum metallic, the rest of flagellum blackish; tegulae green metallic; wings hyaline, with brown veins.

Vestiture. Head and mesosoma dorsally with short (1.0 to 1.5× MOD), whitish setae; on metasoma dorsally with shorter setae, laterally with longer (1.5 to 2.0× MOD), erect and white setae; legs with short (1× MOD), erect setae on outer side.

Etymology. The specific epithet *filidichroa* derives from Latin *filus* (thread) and *dichroa*, the species-group to which the taxon belongs to. It is related to the slender habitus of this species, similar to the slender body of *Chrysura filiformis* (Mocsáry, 1889), which is a species distinctly smaller (4–5 mm), with the typical body colour pattern of *C. dichroa*.

Distribution. *Iran (Fars, Kerman, Kohgiluyeh and Buyer Ahmad).

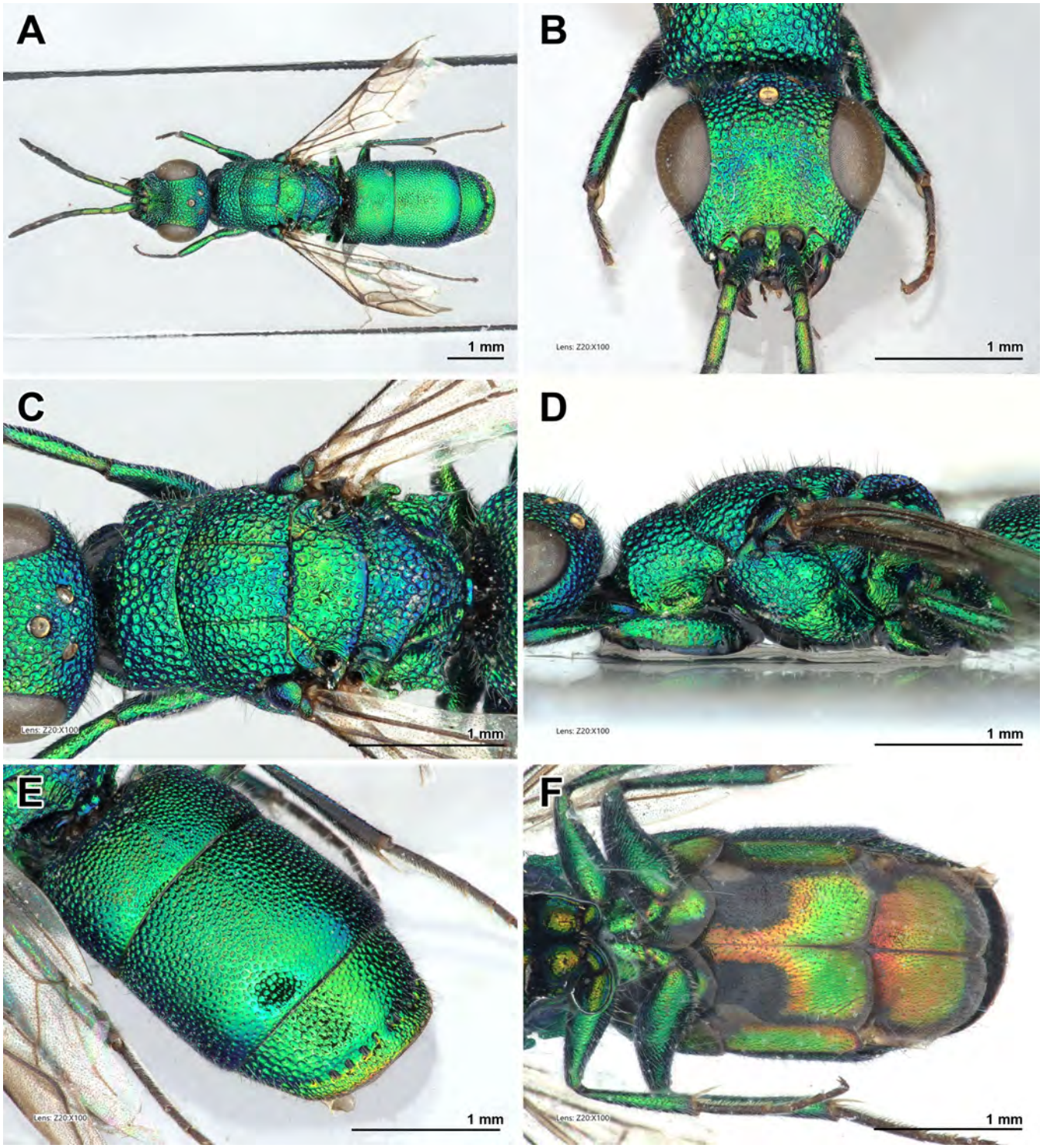

Figure 36. *Chrysura filidichroa* Rosa & Baiocchi, **sp. nov.**, male, holotype. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Head and mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Chrysura filiformis (Mocsáry, 1889)

Chrysis (*Olochrysis*) *filiformis* Mocsáry, 1889:266. Lectotype ♂ designated by Móczár, 1965:168; Croatia [not Hungary]: Fiume [currently Rijeka] (Budapest) (*dichroa* group).
Chrysura filiformis: Rosa et al., 2013:34 (Fars).

Distribution. Iran (Fars). Central and South-east Europe, Caucasus and Türkiye (Rosa et al., 2013).

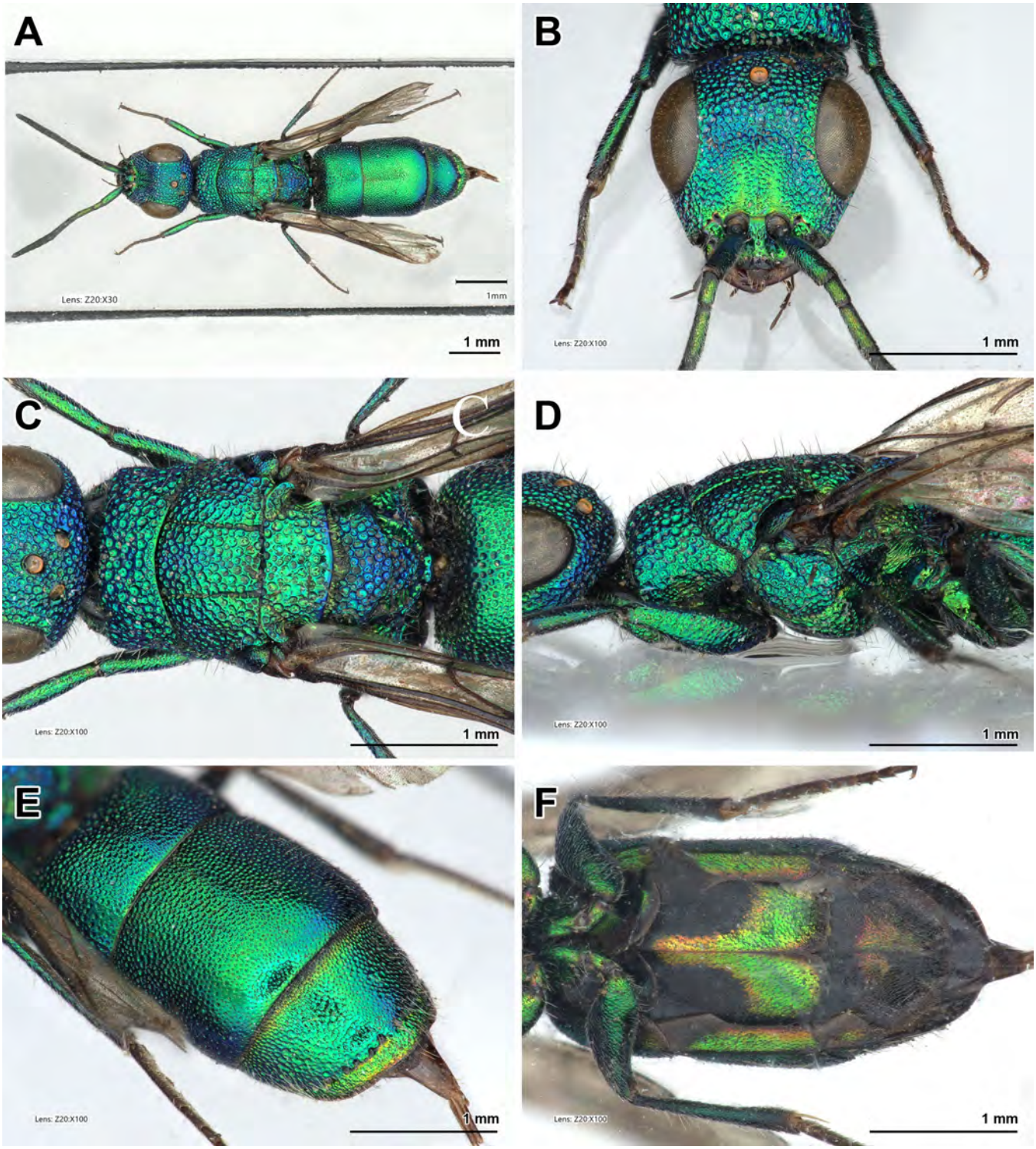

Figure 37. *Chrysura filidichroa* Rosa & Baiocchi, **sp. nov.**, female, paratype. **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Head and mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Chrysura foetiana (Semenov-Tian-Shanskij, 1967)

Chrysis (*Holochrysis*) *foetiana* Semenov-Tian-Shanskij, 1967:147. Holotype ♂; Turkmenistan: Ashkabad (St. Petersburg) (*radians* group).
Chrysura foetiana: Rosa et al., 2013:34 (Fars, Kordestan).

Distribution. Iran (Fars, Kordestan). Central Asia: Turkmenistan (Semenov-Tian-Shanskij, 1967).

Chrysura genalis (Mocsáry, 1887)

Chrysis foveata Radoszkowski, 1877:13, *nom. praeocc.*, *nec* Dahlbom, 1845. Syntypes ♂, ♀ [not holotype]; Uzbekistan: Zarafshan valley (Moscow, Kraków) (*radians* group).
Chrysis genalis Mocsáry, 1887:14. Replacement name for *Chrysis foveata* Radoszkowski, 1877, *nec* Dahlbom, 1845.
Chrysura genalis: Strumia & Fallahzadeh, 2015:25 (Fars).

Distribution. Iran (Fars). Türkiye; Central Asia (Radoszkowski, 1877, Linsenmaier, 1968).

Chrysura ignifrons (Brullé, 1833)

Chrysis ignifrons Brullé, 1833:375. Holotype ♂ [not ♀]; Greece: Peloponnese (Paris) (*austriaca* group).
Chrysura ignifrons: Rosa, 2020:467 (Khorasan-e Razavi), 473 (fig. 8).

Distribution. Iran (Khorasan-e Razavi). West-Paleartcic, from Southern Europe to the Caucasus and Middle East; Central Asia; Northern Africa (Rosa et al., 2013).

Remarks. *Chrysura ignifrons* (Brullé) was listed by Trautmann (1927) for Persia, yet later considered as a doubtful identification by Rosa et al. (2013), because the citation could be also referable both to *Chrysura smaragdina* (Trautmann, 1926) or *Chrysura anatolica* (Trautmann, 1926), both known from the Middle East.

Chrysura izadiae Strumia & Fallahzadeh, 2016

Chrysura izadiae Strumia & Fallahzadeh [in Strumia et al.], 2016a:282. Holotype ♂; Iran: Fars Province, Kherameh, 29º30'51"N, 53°18'40"E, 27.iv.2013; leg. E. Izadi (Pisa) (*dichroa* group).

Distribution. Iran (Fars).

Chrysura judith (Balthasar, 1953)

Chrysis judith Balthasar, 1953:192. Holotype ♂; Palestine: Jerusalem (Prague) (*radians* group).
Chrysura judith: Rosa et al., 2013:34 (Tehran).
Chrysura rhodia: Strumia & Fallahzadeh, 2015:25 (Kerman).

Distribution. Iran (Kerman, Tehran). Southern Europe, Palestine, Rhodes, Türkiye (Rosa et al., 2013).

Chrysura laconiae (Arens, 2001)

Chrysis laconiae Arens, 2001:1163. Holotype ♂; Greece: Peloponnese, Amyklai, Sparta, 4.iv.2000, leg. W. Arens (Arens' private collection) (*dichroa* group).
Chrysura laconiae: Rosa et al., 2013:34 (Kuhgiloye & Boyerahmad).

Distribution. Iran (Kuhgiloye & Boyerahmad). Greece, Türkiye (Arens, 2001, 2002).

Chrysura laevigata (Abeille de Perrin, 1879)

Chrysis laevigata Abeille de Perrin, 1879:81. Syntypes ♀♀; Russia, Caucasus (Paris) (*dichroa* group).
Chrysis loevigata auctorum. Incorrect subsequent spelling.
Chrysura laevigata: Rosa et al., 2013:35 (East-Azarbaijan, Golestan, Qazvin, Tehran); Samin et al., 2014:122 (Gilan); Ebrahimi, 2015:38 (Khorasan-e Razavi); Farzaneh et al., 2017:499 (Fars).

Distribution. Iran (East-Azarbaijan, Fars, Golestan, Gilan, Khorasan-e Razavi, Qazvin, Tehran). West-Palaearctic, from Europe to the Caucasus and the Middle East; Northern Africa (Rosa et al., 2013).

Chrysura laodamia laodamia (du Buysson, 1900) (Fig 38A–F)

Chrysis laodamia du Buysson, 1900:135. Lectotype ♀ designated by Bohart in Kimsey & Bohart, 1991:492; Lebanon: Brumana (Oxford) (*austriaca* group).

Material examined. 1♀, Fars province: 50km W of Shiraz, 12 km S of Dasht Arjan, 29°33'25.2"N, 51°56'45.6"E, 2250m, 15.v.2019, leg. O. Šauša (MHC); 1♀, Kuhgiluye and Buyer Ahmad: Sisahkt, Dena Nat. Reserve, 30°52'26"N, 51°25'12"E, 2400m, 14.–16.v.2013, leg. D. Baiocchi (PRC).

Distribution. *Iran (Fars, Kuhgiluye and Buyer Ahmad). Lebanon, Middle East (Kimsey & Bohart, 1991).

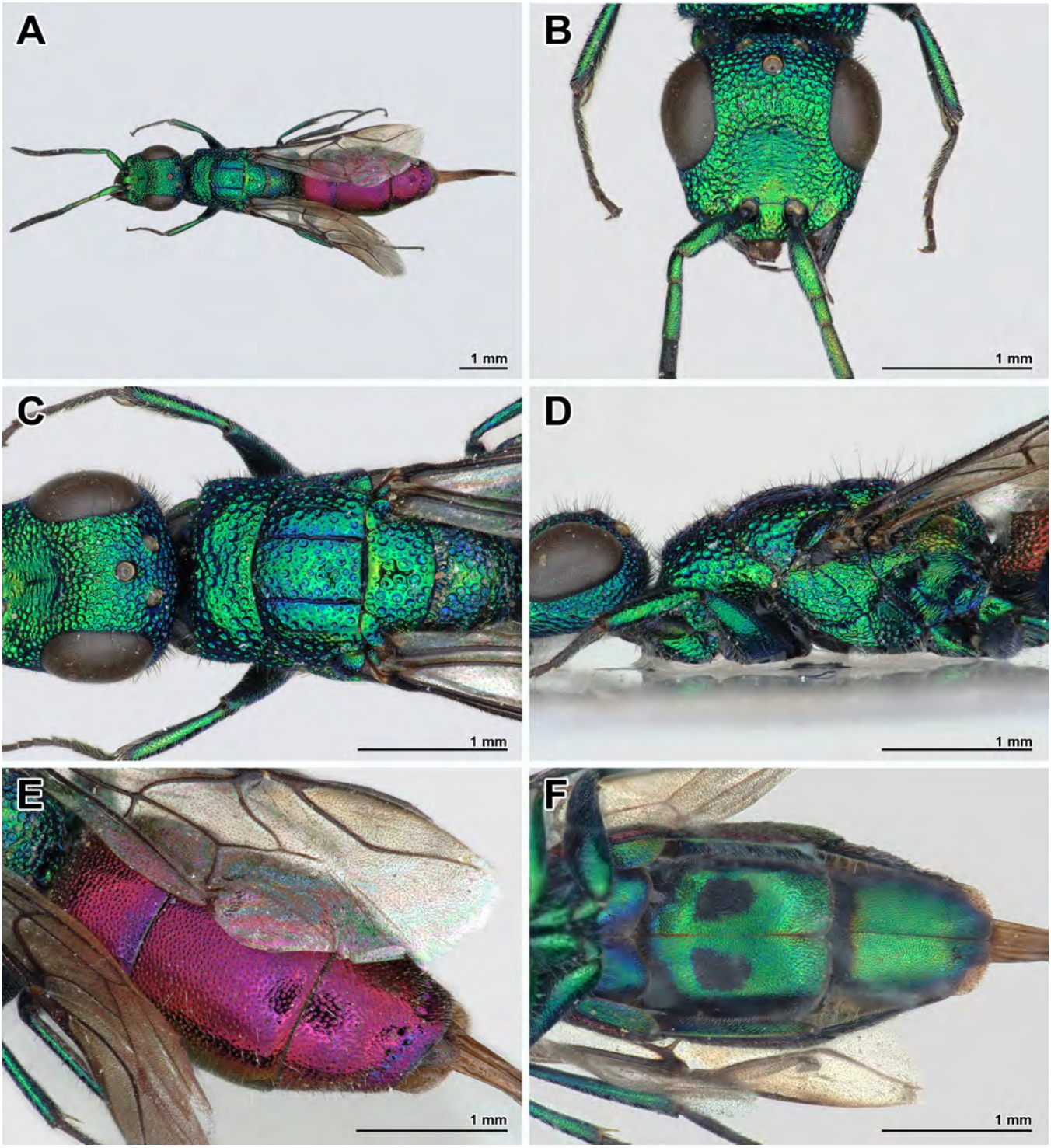

Figure 38. *Chrysura laodamia* (du Buysson, 1900). **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Chrysura leonidae (Semenov-Tian-Shanskij, 1967)

Chrysis (*Holochrysis*) *leonidae* Semenov-Tian-Shanskij, 1967:151. Holotype ♀; Iran: Gilan: Tash (St. Petersburg) (*radians* group [not *austriaca* group]).
Chrysura loenidae: Kimsey & Bohart, 1991:492. Incorrect subsequent spelling.
Chrysura leonidae: Rosa et al., 2013:35 (Gilan).

Distribution. Iran (Gilan).

Chrysura ludmila (Semenov-Tian-Shanskij, 1967)

Chrysis ludmila Semenov-Tian-Shanskij, 1967:155. Holotype ♀; Iran: Luristan, Kale-Tol (St. Petersburg) (*radians* group).
Chrysura ludmilla: Kimsey & Bohart, 1991:492. Incorrect subsequent spelling.
Chrysura ludmila: Rosa et al., 2013:35 (Lorestan).

Remarks. The type locality (Kale-Tol= Qal'eh-ye Tol) is now located in Khuzestan province.

Distribution. Iran (Khuzestan).

Chrysura lydiae (Mocsáry, 1889)

Chrysis (*Olochrysis*) *lydiae* Mocsáry, 1889:268. Holotype ♂; Türkiye: Bursa prov.: Brussa [= Bursa] (Budapest) (*dichroa* group).
Chrysura lydiae: Rosa et al., 2013:35 (Qazvin); Ebrahimi, 2015:39 (Khorasan-e Razavi).

Distribution. Iran (Khorasan-e Razavi, Qazvin). South-western Europe, Caucasus, Palestine, Türkiye (Rosa et al., 2013).

Chrysura nikolaji (Rosa, 2017)

Chrysis (*Holochrysis*) *medea* Semenov-Tian-Shanskij, 1967:148, *nom. praeocc.*, *nec* Balthasar, 1953. Holotype ♂; Georgia: Mt. Pitsunda (St. Petersburg) (*radians* group).
Chrysis nikolaji Rosa in Rosa et al., 2017a:38. Replacement name for *Chrysis medea* Semenov-Tian-Shanskij, 1967, *nec* Balthasar, 1953.
Chrysura nikolaji: Rosa, 2020:467 (Mazandaran), 474 (fig. 9).

Material examined. 1♀, Mazandaran province: 15 km S Alamdeh, 7.vi.2014, leg. J .Halada (MHC); 3♂♂, Golestan province: 60 km NEE Minudasht, 37°19'58.8"N, 56°01'1.2"E, 1280m, 26.v.2007, leg. O. Šauša (MHC).

Distribution. Iran (Golestan, Mazandaran). Caucasus (Rosa et al., 2013).

Chrysura pruna (Gribodo, 1879)

Chrysis pruna Gribodo, 1879:337. Lectotype ♂ designated by Bohart in Kimsey & Bohart, 1991:494; Algeria (Genoa) (*dichroa* group).
Chrysura pruna: Strumia & Fallahzadeh, 2015:26 (Kerman).

Distribution. Iran (Kerman). Palestine; Northern Africa: Algeria, Libya (Linsenmaier, 1999).

Chrysura pseudodichroa (Linsenmaier, 1959)

Chrysis (*Chrysogona*) *pseudodichroa* Linsenmaier, 1959a:86. Holotype ♂; Cyprus (Luzern) (*dichroa* group).
Chrysura pseudodichroa: Rosa et al., 2013:35 (Fars); Strumia & Fallahzadeh, 2015:26 (Fars).

Distribution. Iran (Fars). West-Palaearctic: Mediterranean countries, Türkiye, Middle East; Northern Africa (Rosa et al., 2013).

Chrysura pseudohybrida (Linsenmaier, 1999)

Chrysis (*Chrysis*) *pseudohybrida* Linsenmaier, 1999:124. Holotype ♀; Tunisia: Kairouan, 1.v.1978, leg. J. Gusenleitner (Luzern) (*austriaca* group).
Chrysura pseudohybrida: Strumia & Fallahzadeh, 2015:26 (Fars).

Distribution. Iran (Fars). Tunisia, Libya (Linsenmaier, 1999).

Chrysura purpureifrons (Abeille de Perrin, 1878)

Chrysis purpureifrons Abeille de Perrin, 1878:4. Syntypes ♂♂ [not holotype]; France (Paris) (*dichroa* group).
Chrysura purpureifrons: Rosa et al., 2013:36 (Atrek river).

Distribution. Iran (without precise locality, likely in the North Khorasan province). Palaearctic, from Southern Europe to Türkiye; Central Asia; Northern Africa (Rosa et al., 2013).

Chrysura pyrogaster pyrogaster (Brullé, 1833)

Chrysis pyrogaster Brullé, 1833:374. Lectotype ♀ designated by Bohart in Kimsey & Bohart, 1991:494; Greece: Peloponnese (Paris) (*austriaca* group).
Chrysura pyrogaster: Rosa et al., 2013:36 (East-Azarbaijan, West-Azarbaijan); Rosa, 2020:468 (Golestan).

Distribution. Iran (East-Azarbaijan, Golestan, West-Azarbaijan). South-eastern Europe, Caucasus, Türkiye, Middle East (Rosa et al., 2013).

Chrysura pyrogaster turca (Linsenmaier, 1997)

Chrysis (*Chrysogona*) *pyrogaster* ssp. *turca* Linsenmaier, 1997:272. Holotype ♂; Türkiye: Konya, Madensehir, 1300 m, 22.vi.1984, leg. Warncke (Luzern) (*austriaca* group).
Chrysura pyrogaster turca: Rosa et al., 2013:36 (Fars).

Distribution. Iran (Fars). Türkiye (Linsenmaier, 1997).

Chrysura radians (Harris, 1776)

Chrysis radians Harris, 1776:69. Neotype ♀ designated by Rosa et al., 2020b:112.; England: Kent, Halling, 8.vii.1971, leg. K.M. Guichard (London) (*radians* group).
Chrysura radians: Ebrahimi, 2015:40 (Qazvin).

Distribution. Iran (Qazvin). Palaearctic, from Western Europe to Siberia; Northern Africa (Rosa et al., 2013).

Chrysura simuldichroa (Linsenmaier, 1969)

Chrysis simuldichroa Linsenmaier, 1969:375. Holotype ♀; Türkiye: Urfa (Budapest); Linsenmaier, 1987:145 (*dichroa* group).
Chrysura simuldichroa: Rosa et al., 2013:36 (Iran, without locality); Rosa, 2020:468 (Tehran).

Distribution. Iran (Tehran). Cyprus, Palestine, Türkiye (Linsenmaier, 1969, 1987).

Chrysura smaragdina (Trautmann, 1926)

Holochrysis ignifrons var. *smaragdina* Trautmann, 1926:8. Lectotype ♀ designated by Bohart in Kimsey & Bohart, 1991:491; Syria (Berlin) (*austriaca* group).
Chrysura smaragdina: Rosa et al., 2013:36 (Fars).

Distribution. Iran (Fars). Syria, Türkiye (Linsenmaier, 1968).

Chrysura sulcata Dahlbom, 1845

Chrysura sulcata Dahlbom, 1845:7 [not *Chrysis*]. Lectotype ♀ designated by Rosa & Vårdal, 2015:112; Greece: Rhodes Is. (Stockholm) (*radians* group).
Chrysura sulcata: Rosa et al., 2013:37 (Fars); Farzaneh et al., 2017:500 (Fars). Rosa, 2020:468 (North Khorasan).

Distribution. Iran (Fars, North Khorasan). Southern Europe, Caucasus, Cyprus, Palestine, Rhodes, Türkiye (Rosa et al., 2013).

Chrysura varicornis (Spinola, 1838)

Chrysis varicornis Spinola, 1838:449. Holotype ♂; Egypt (Turin) (*radians* group).
Chrysura varicornis: Strumia & Fallahzadeh, 2015:26 (Fars, Khorasan); Farzaneh et al., 2017:500 (Fars); Rosa, 2020:468 (North Khorasan).

Distribution. Iran (Fars, North Khorasan). West-Palaearctic, from Southern Europe to Türkiye and the Middle East; Central Asia; Northern Africa (Rosa et al., 2013).

Genus *Euchroeus* Latreille, 1809

Euchroeus Latreille, 1809:49. Type species: *Chrysis purpurata* Fabricius, 1787 [= *Euchroeus purpuratus* (Fabricius, 1787)], by monotypy.

Euchroeus eous (Semenov-Tian-Shanskij, 1912)

Pseudochrysis eoa Semenov-Tian-Shanskij, 1912:186. Holotype ♀; Iran: Mekran [= Makran in Sistan & Baluchestan], Kutshe, Kambil, 8–9.iii.1891, N. Zarudny (St. Petersburg).
Euchroeus eous: Rosa et al., 2013:37 (Sistan & Baluchestan).

Distribution. Iran (Sistan & Baluchestan). Central Asia: Turkmenistan (Rosa et al., 2013); one subspecies in Saudi Arabia (Linsenmaier, 1994).

Euchroeus moricei zarudnianus (Semenov-Tian-Shansky, 1910)

Pseudochrysis (*Euchroeus*) *zarudniana* Semenov-Tian-Shansky, 1910:216. Holotype ♂; Iran: Khorasan: Atkul to lake Nemeksar, 22.iv.1898, leg. N. Zarudny (St. Petersburg).
Euchroeus zarudnianus: Rosa et al., 2013:37 (Khorasan).
Euchroeus moricei bytinskii Linsenmaier, 1969:374; Ebrahimi, 2015:42 (Sistan & Baluchestan).
Euchroeus moricei zarudnianus: Rosa et al., 2017a:62.

Distribution. Iran (Sistan & Baluchestan, South Khorasan). Palestine, United Arab Emirates; the typical form is distributed in Northern Africa from Algeria to Egypt (Linsenmaier, 1999; Rosa et al., 2020a).

Euchroeus pellucidus (Radoszkowski, 1877) (Fig. 39A–F)

Brugmoia pellucida Radoszkowski, 1877:26. Lectotype ♀ designated by Rosa et al., 2015d:5; Kazakhstan: Kyzyl-kum (Moscow).

Material examined. 1♂, 40 km NW of Paskuh, 29.iii.1973, Locality n°139, Exp. Nat. Mus. Praha (NHMP).

Distribution. *Iran (Sistan & Baluchestan). Egypt; Central Asia (Kimsey & Bohart, 1991).

Euchroeus rugulosus (Mocsáry, 1909)

Chrysis (*Euchroeus*) *rugulosa* Mocsáry, 1909:8. Lectotype ♂ designated by Kimsey, 1986:106; Kazakhstan: Djulek (Budapest).
Brugmoia rugulae Kimsey & Bohart, 1991:296. Unnecessary replacement name for *Chrysis* (*Euchroeus*) *rugulosa* Mocsáry, 1909.
Euchroeus rugulosus: Ebrahimi, 2015:43 (Sistan & Baluchestan).

Distribution. Iran (Sistan & Baluchestan). Russia; Central Asia: Kazakhstan, Kyrgyzstan, Uzbekistan (Rosa et al., 2013).

Euchroeus singularis (Spinola, 1838)

Chrysis singularis Spinola, 1838:452. Holotype ♀; Egypt (Turin).
Pseudochrysis virgo Semenow, 1891:441. Holotype ♂; Turkmenistan: Dort-Kuju oasis; Merv (St. Petersburg).
Euchroeus singularis: Rosa et al., 2013:37 (Kerman).

Distribution. Iran (Kerman). Palestine; Central Asia: Turkmenistan; Northern Africa: Egypt (Linsenmaier, 1959a).

Euchroeus vesperus (Semenov-Tian-Shansky, 1910)

Pseudochrysis vespera Semenov-Tian-Shansky, 1910:214. Lectotype ♀ designated by Kimsey, 1986:109; Iran: Khorasan province, Turbet-i-heidari and Feizabad, 8–11.iv.1898, N. Zarudny (St. Petersburg).
Euchroeus vesperus: Rosa et al., 2013:37 (Khorasan).

Distribution. Iran (Khorasan-e Razavi).

Genus *Morphochrysis* Rosa & Pavesi, 2023

Morphochrysis Rosa & Pavesi [Rosa et al.], 2023a:31. Type species: *Chrysis pulchella* Spinola, 1808 by original designation.

Morphochrysis gamberoonensis (Farhad, Rosa & Talebi, 2019)

Chrysis gamberoonensis Farhad, Rosa & Talebi in Farhad et al., 2019:1006 (key, fig. 1), 1007 (descr.). Holotype ♀; Iran: Hormozgan province, Bandar Abbas, Geno, 27°24'16''N, 56°08'51''E, 23.viii.2011, leg. A. Ameri (Tehran) (*pulchella* group).

Distribution. Iran (Hormozgan).

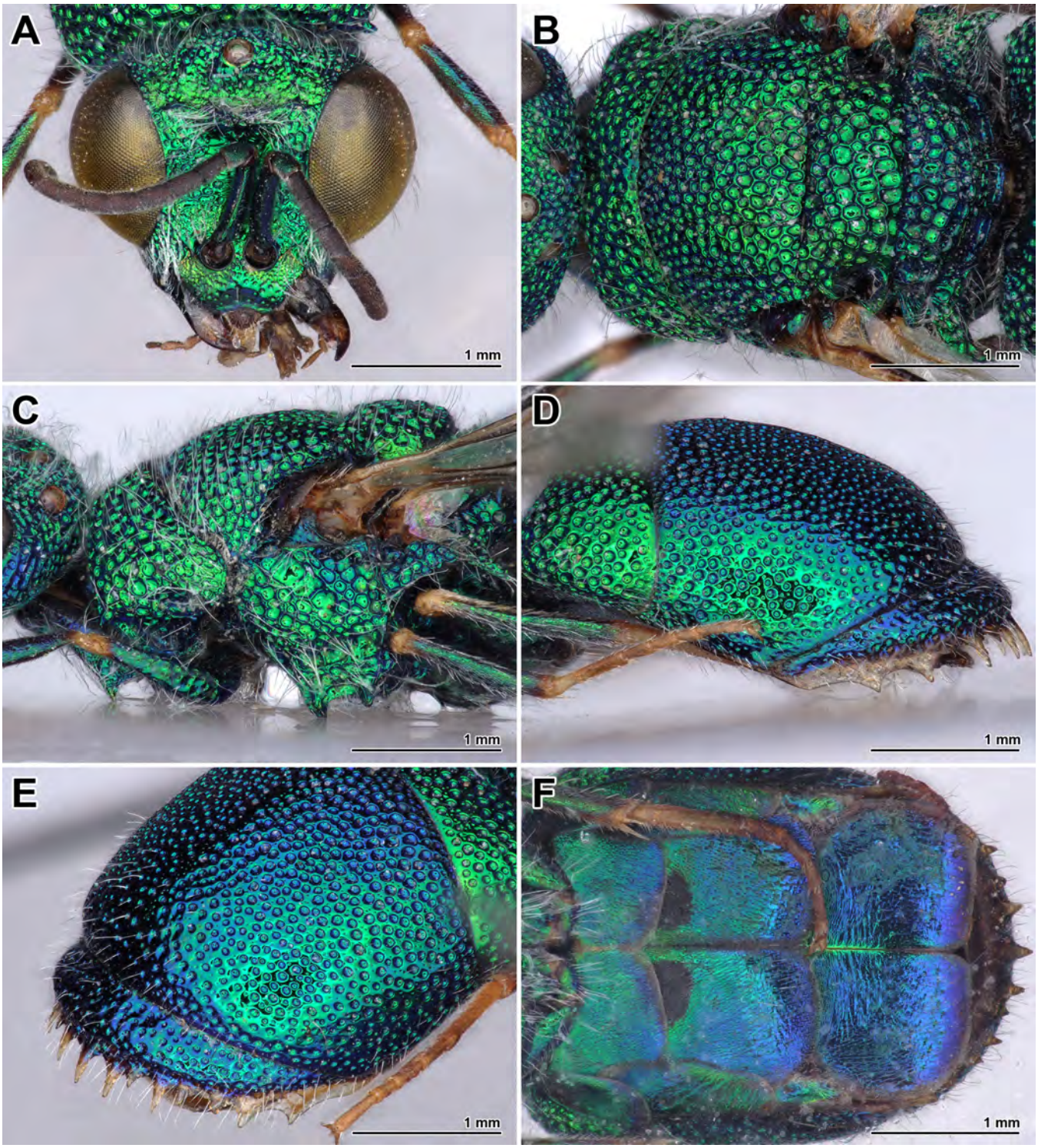

Figure 39. *Euchroeus pellucidus* (Radoszkowski, 1877). **A.** Head, frontal view; **B.** Mesosoma, dorsal view; **C.** Mesosoma, lateral view; **D.** Metasoma, lateral view; **E.** Metasoma, postero-lateral view; **F.** Metasoma, ventral view.

Morphochrysis personata (Semenov-Tian-Shanskij, 1967)

Chrysis (*Gonodontochrysis*) *pulchella* ssp. *personata* Semenov-Tian-Shanskij, 1967:158. Holotype ♂; Iran [not Iraq]: Rizaabad (St. Petersburg) (*pulchella* group).
Chrysis personata: Rosa et al., 2017a:46 (Qazvin - Rizaabad); Farhad et al., 2019:1007 (key, Qazvin).

Distribution. Iran (Qazvin). Central Asia (Rosa et al., 2017a).

Morphochrysis pulchella (Spinola, 1808)

Chrysis pulchella Spinola, 1808:28. Lectotype ♂ designated by Rosa & Xu, 2015:33; Italy: Liguria (Turin) (*pulchella* group).
Chrysis pulchella: Rosa et al., 2013:27 (Ardabil); Strumia & Fallahzadeh, 2015:22 (Fars); Farhad et al., 2019:1007 (key, Ardabil).

Distribution. Iran (Ardabil, Fars). Central and Southern Europe, Türkiye, Iraq; Central Asia: Kazakhstan (Rosa et al., 2013).

Genus *Pentachrysis* Lichtenstein, 1876

Pentachrysis Lichtenstein, 1876:227. Type species: *Chrysis amoena* Eversmann, 1857, by subsequent designation of Ashmead, 1902:226.

Pentachrysis amoena (Eversmann, 1858)

Chrysis amoena Eversmann, 1858:562. Holotype ♀; Russia: "*campis transuralensibus*" (Kraków) (*amoena* group).
Pentachrysis amoena: Torabipour et al., 2013b:86 (Sistan & Baluchestan); Ebrahimi, 2015:44 (Sistan & Baluchestan).

Distribution. Iran (Sistan & Baluchestan). From Eastern Europe to the Caucasus; Central Asia and Mongolia (Linsenmaier, 1959a). Cited for Siberia (Rosa et al., 2013).

Pentachrysis inaequalis (Dahlbom, 1845)

Chrysis inaequalis Dahlbom, 1845:8. Neotype ♂ designated by Rosa & Vårdal, 2015:124; Switzerland: Roveredo, 28.viii.1948, leg. W. Linsenmaier (Luzern) (*inaequalis* group).
Chrysis inaequalis: Rosa et al., 2013:22 (West-Azarbaijan, Tehran); Rosa, 2020:466 (Fars, Kerman, Tehran).

Distribution. Iran (West-Azarbaijan, Tehran). Euroasiatic, from Western Europe to Central Asia and China (Rosa et al., 2014).

Remarks. Linsenmaier (1959a) correctly placed the *inaequalis* group in the subgenus *Pentachrysis* Lichtenstein. Kimsey & Bohart (1991) elevated *Pentachrysis* to genus rank but included the *inaequalis* group in the genus *Chrysis* Linnaeus, 1761. Molecular analyses (Pauli et al., 2019) proved that members of the *inaequalis* group are related to *Pentachrysis*, thus confirming Linsenmaier (1959a) intuition.

Pentachrysis poetica (Semenov-Tian-Shanskij, 1954)

Chrysis inaequalis var. *caucasica* Mocsáry, 1889:484, *nom. praeocc.*, *nec* Radoszkowski, 1876. Holotype ♂; Azerbaijan: Helenendorf [= Goygol] (Berlin) (*inaequalis* group).
Chrysis inaequalis var. *poëtica* Semenov-Tian-Shanskij, 1954:131. Replacement name for *Chrysis inaequalis* var. *caucasica* Mocsáry, 1889, *nec* Radoszkowski, 1876.
Chrysis inaequalis Dahlbom, 1845:8 ; Farzaneh et al., 2017:498 (Fars); Iranmanesh et al., 2017:299 (Kerman).
Chrysis inaequalis sapphirina: Ebrahimi, 2015:28 (Ardabil); Farzaneh et al., 2017:498 (Fars).

Material examined. 1♀, Qazvin, Zereshk, 36°25'23''N, 50°06'37''E, 6.vii.2011, leg. M. Khayrandish (TMUC).

Distribution. Iran (Ardabil, Fars, Kerman, Qazvin, Tehran). Central and Southern Europe, Türkiye; Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan (Rosa, 2018a).

Remarks. *Chrysis poetica* Semenov-Tian-Shanskij was reinstated and upgraded to species rank by Rosa (2018a). In Farzaneh et al. (2017), the male was identified as *Chrysis inaequalis sapphirina* for the bluish color of the first tergum, and the female collected in the same locality as *Chrysis inaequalis inaequalis*; male and female of *Chrysis poetica* are known to be chromatically dimorphic (Rosa, 2018a).

Pentachrysis seminigra (Walker, 1871)

Chrysis seminigra Walker, 1871:71. Type series unknown. Egypt: Wadi Ferran [Sinai: Wadi Feiran] (depository unknown).
Pentachrysis seminigra: Torabipour et al., 2013b:86 (Alborz); Ebrahimi, 2015:45 (Alborz)

Distribution. Iran (Alborz). Middle East, Pakistan; Northern Africa (Linsenmaier, 1959a, 1968, 1994).

Genus *Pseudochrysis* Semenow, 1891

Pseudochrysis Semenow, 1891:444. Type species: *Chrysura humboldti* Dahlbom, 1845, by subsequent designation of Semenow, 1892b:485.
Pseudospinolia Linsenmaier, 1951:31. Type species: *Chrysis uniformis* Dahlbom, 1854, by original designation. Junior subjective synonym of *Pseudochrysis* Semenow, 1891 according to Rosa et al., 2017c.

Pseudochrysis aureicollis (Abeille de Perrin, 1879)

Chrysis aureicollis Abeille de Perrin, 1879:82. Syntypes ♀♀ [not holotype ♂]; Spain: Madrid (Paris).
Pseudospinolia aureicollis: Rosa et al., 2013:38 (Iran).

Distribution. Iran. West Palaearctic, from Southern Europe to Caucasus and Iran; Northern Africa (Rosa et al., 2013).

Pseudochrysis chamaleon (Semenov-Tian-Shanskij, 1967)

Spinolia chamaleon Semenov-Tian-Shanskij, 1967:181. Iran: Sistan & Baluchestan: Kulku, Sargad [given as North Khorasan in Rosa, 2020] (St. Petersburg).
Spinolia chamaeleon: Kimsey & Bohart, 1991:548. Incorrect subsequent spelling.
Pseudospinolia marqueti du Buysson, 1887:180; Rosa et al., 2013:38 (Sistan & Baluchestan).

Material examined. 1♀, Kerman province: 15 km SW of Kerman, 30°10'1.2"N, 56°58'58.8"E, 1780m, 5.vi.2010, leg. Mi. Halada (MHC).

Distribution. Iran (Kerman, Sistan & Baluchestan).

Remarks. *Pseudochrysis chamaleon* was synonymised by Kimsey & Bohart (1991) with *Pseudospinolia marqueti* (du Buysson) and was reinstated by Rosa et al. (2017a).

Pseudochrysis humboldti (Dahlbom, 1845)

Chrysura humboldti Dahlbom, 1845:6. Holotype ♂; Greece: Rhodes Is. (Stockholm).
Pseudospinolia humboldti: Rosa et al., 2013:38 (Qazvin). Rosa, 2020:468 (Hamadan).

Distribution. Iran (Hamadan, Qazvin). Euroasiatic, from Southern Europe to Caucasus, Türkiye; Central Asia and China (Rosa et al., 2013).

Pseudochrysis marqueti (du Buysson, 1887)

Chrysis marqueti du Buysson, 1887:180. Holotype ♂; Greece: Mt. Parnassus (type depository unknown).
Pseudochrysis marqueti: Rosa, 2020:468 (Fars).

Distribution. Iran (Fars). South-eastern Europe, Türkiye, Palestine (Linsenmaier, 1959a).

Pseudochrysis tumida (Mocsáry, 1911)

Chrysis (*Holochrysis*) *tumida* Mocsáry, 1911:464. Holotype ♂; Ethiopia (Budapest).
Pseudospinolia tumida: Ebrahimi, 2015:46 (Sistan & Baluchestan).

Distribution. Iran (Sistan & Baluchestan). Ethiopia (Mocsáry, 1911).

Pseudochrysis uniformis (Dahlbom, 1854)

Chrysis uniformis Dahlbom, 1854:149. Holotype ♀; Asia Minor (depository unknown).
Pseudospinolia uniformis: Rosa et al., 2013:38 (Fars, Esfahan, Qazvin, Tehran); Ebrahimi, 2015:46 (Golestan); Strumia & Fallahzadeh, 2015:26 (Khorasan-e Razavi); Rosa, 2020:469 (Kerman, Mazandaran, Qazvin).

Distribution. Iran (Fars, Esfahan, Golestan, Kerman, Khorasan-e Razavi, Mazandaran, Qazvin, Tehran). West-Palaearctic, from Southern Europe to Türkiye and Western Asia; Northern Africa (Rosa et al., 2013).

Genus *Spinolia* Dahlbom, 1854

Spinolia Dahlbom, 1854:363. Type species: *Spinolia magnifica* Dahlbom, 1854 [= *Spinolia lamprosoma* (Förster, 1853)], by monotypy.

Spinolia dallatorreana taurusiaca (Linsenmaier, 1987)

Euchroeus (*Spinolia*) *dallatorreanus taurusiacus* Linsenmaier, 1987:144. Holotype ♀; Türkiye: Konya (Luzern).
Spinolia dallatorreana taurusiaca: Rosa, 2020:469 (Iran, collecting place not located on the map), 474 (fig. 12).

Distribution. Iran (Golestan [Shahpasand = Azadshahr, explored by F. Ressl]). Türkiye (Linsenmaier, 1987).

Spinolia dournovii (Radoszkowski, 1866)

Chrysis dournovii Radoszkowski, 1866:303. Holotype ♀; Caucasus (Kraków).
Chrysis (*Olochrysis*) *dournovi*: Mocsáry, 1889:285. Incorrect subsequent spelling.
Chrysis dournowii: Dalla Torre, 1892:57. Incorrect subsequent spelling.
Pseudochrysis durnovi: Semenow, 1892b:491. Incorrect subsequent spelling.
Spinolia dournovi: du Buysson, 1893:246. Incorrect subsequent spelling.
Spinolia durnovi: Trautmann, 1927:88. Incorrect subsequent spelling.
Euchroeus (*Spinolia*) *durnovi*: Linsenmaier, 1959a:69. Incorrect subsequent spelling.
Spinolia dournovii: Rosa et al., 2013:39 (East-Azarbaijan).

Distribution. Iran (East-Azarbaijan). West-Palaearctic, from South-eastern Europe to the Caucasus and Middle East; Central Asia: Kazakhstan; Northern Africa (Rosa et al., 2013).

Spinolia morawitzii (Mocsáry, 1889)

Chrysis (*Spinolia*) *morawitzii* Mocsáry, 1889:607. Holotype ♂; Turkmenistan (Budapest).
Chrysis morawitzi: Bischoff, 1913:25. Incorrect subsequent spelling.
Spinolia morawitzi: Ebrahimi, 2015:48 (Markazi).

Material examined. 1♂, Fars province, Dasht Arjan, 29°56'27.6"N 51°54'46.8"E, 2040m, 6.v.2016, leg.: M.Kafka (MHC).

Distribution. Iran (Fars, Markazi). Central Asia: Turkmenistan (Rosa et al., 2017b).

Spinolia rogenhoferi (Mocsáry, 1889)

Chrysis (*Spinolia*) *rogenhoferi* Mocsáry, 1889:604. Holotype ♀; Greece [not Türkiye]: Attica (Budapest).
Spinolia chalcites Mocsáry, 1890:55; Rosa et al., 2013:38 (Qazvin).

Material examined. 1♀, env. Sisakht, 2400m, Kohgiluyeh and Buyer Ahmad, Dena Nat. Reserve, 30°52'46''N, 51°25'12''E, 14.–16.v.2013, leg. D. Baiocchi (PRC).

Distribution. Iran (Kohgiluyeh and Buyer Ahmad, Qazvin). Greece, Türkiye (Linsenmaier, 1959a).

Remarks. The species identified by Linsenmaier in his collection and in his keys (Linsenmaier, 1959a) is *Spinolia rogenhoferi* or an allied undescribed species, anyway does not match the type of *Spinolia chalcites* (Rosa & Greeff, 2020).

Spinolia stchurovskyi (Radoszkowski, 1877)

Polyodontus stchurovsky Radoszkowski, 1877:25. Holotype ♀; locality unknown ("*patria incognita*") [not Turkestan] (Moscow).
Chrysis (*Polyodontus*) *stschurovskyi*: Mocsáry, 1889:595. Emendation of *Polyodontus stchurovsky* Radoszkowski, 1877.

Material examined. 1♂, Kerman province: 20 km E Ghobeyra, 30°06'00"N, 56°35'24"E, 1780m, 5.vi.2010, leg. Mi. Halada (MHC).

Distribution. *Iran (Kerman). Central Asia (Amur Darya), Pakistan (Kimsey & Bohart, 1991).

Genus *Spintharina* Semenow, 1892

Spintharina Semenow, 1892b:485. Type species: *Chrysis vagans* Radoszkowski, 1877, by original designation.

Spintharina cassandra (Semenov-Tian-Shanskij, 1967)

Chrysis (*Holochrysis*) *cassandra* Semenov-Tian-Shanskij, 1967:149. Holotype ♂; Iran: Mekran [= Markan in Sistan & Baluchestan] (St. Petersburg).
Chrysis cassandra: Rosa et al., 2013:17 (Sistan & Baluchestan).
Spintharina cassandra: Rosa et al., 2017a:20.

Distribution. Iran (Sistan & Baluchestan).

Spintharina dubai (Bohart, 1987)

Spintharina dubai Bohart, 1987:96. Holotype ♂; United Arab Emirates: Dubai, Nakhali (Davis) (*vagans* group).
Spintharina dubai: Farhad et al., 2016b:8 (Hormozgan, fig. 7).

Distribution. Iran (Hormozgan). Arabian Peninsula: Saudi Arabia, United Arab Emirates (Rosa et al., 2020a).

Spintharina extrema (Semenov-Tian-Shanskij & Nikol'skaya, 1954) (Fig. 40A–F)

Chrysis (*Spintharina*) *extrema* Semenov-Tian-Shanskij & Nikol'skaya, 1954:121. Holotype ♀; Tadjikistan: Ayvadzh (St. Petersburg).
Chrysis extrema Semenov-Tian-Shanskij & Nikol'skaya, 1954 = *Spintharina vagans* (Radoszkowski, 1887): Kimsey & Bohart, 1991:558.
Spintharina extrema: Rosa et al., 2017a:24.

Material examined. 1♀, 30 km S of Tehran, 26.vi.1965, steppe, leg. Giordani Soika & Mavromoustakis, GBIF_Chr00041786 (NMLU).

Distribution. *Iran (Tehran). Tadjikistan and Turkmenistan (Rosa et al., 2017a).

Spintharina houskai (Balthasar, 1953)

Spintharis (*Acanthospintharis*) *houskai* Balthasar, 1953:155. Holotype ♂; Palestine: Jerusalem (Prague).
Chrysis (*Spintharina*) *houskai*: Linsenmaier, 1959a:172.
Spintharina houskai: Kimsey & Bohart, 1991:557.

Material examined. 2♂♂, 1♀, East-Azarbaijan province: 10 km E of Shabestar, Sis, 38°15'36"N, 45°51'36"E, 1540m, 19.vi.2010, leg. Mi. Halada (MHC).

Distribution. *Iran (East-Azarbaijan). Palestine.

Spintharina integerrima (Klug, 1845)

Chrysis integerrima Klug, 1845:tav. 45 fig. 14. Type [unknown]; Arabia (lost?) (*versicolor* group).
Spintharina integerrima: Farhad et al., 2016b:9 (Hormozgan, fig. 8).

Distribution. Iran (Hormozgan). Oman, Saudi Arabia, United Arab Emirates and Yemen (Rosa et al., 2020a), Palestine, Sudan.

Spintharina mocsaryi Radoszkowski, 1890

Spintharis mocsaryi Radoszkowski, 1890:508. Holotype [unknown]; Türkiye: Buyuk Agri Dagi (depository unknown).
Spintharina vagans Radoszkowski, 1887:11; Rosa et al., 2013:39 (East-Azarbaijan); Iranmanesh et al., 2017:300 (Kerman).

Distribution. Iran (East-Azarbaijan, Kerman). South-eastern Europe, Caucasus, Middle East (Rosa et al., 2013).

Remarks. In Rosa et al. (2013) the specimens were identified as *Spintharina vagans*, following Linsenmaier's identification of the species. Nevertheless, after examination of more material, it resulted that Linsenmaier's (1959a) identification of *S. vagans* is related to *S. mocsaryi* (or *alexandrii* du Buysson, replacement name). The occurrence of *S. vagans* is apparently restricted to Central Asia. The record from Kerman should be related to this *S. mocsaryi* as well since Iranmanesh et al. (2017) follow Linsenmaier's (1959a) keys.

Spintharina versicolor (Spinola, 1808)

Chrysis versicolor Spinola, 1808:241. Lectotype ♀ designated by Rosa & Xu, 2015:48; Italy: Liguria (Turin) (*versicolor* group).

Spintharina versicolor: Rosa et al., 2013:39 (Kordestan).

Distribution. Iran (Kordestan). Southern and Central Europe, from Spain to Greece, Lebanon (Linsenmaier, 1959a), Ukraine (Kimsey & Bohart, 1991), and Türkiye (Strumia & Yildirim, 2009).

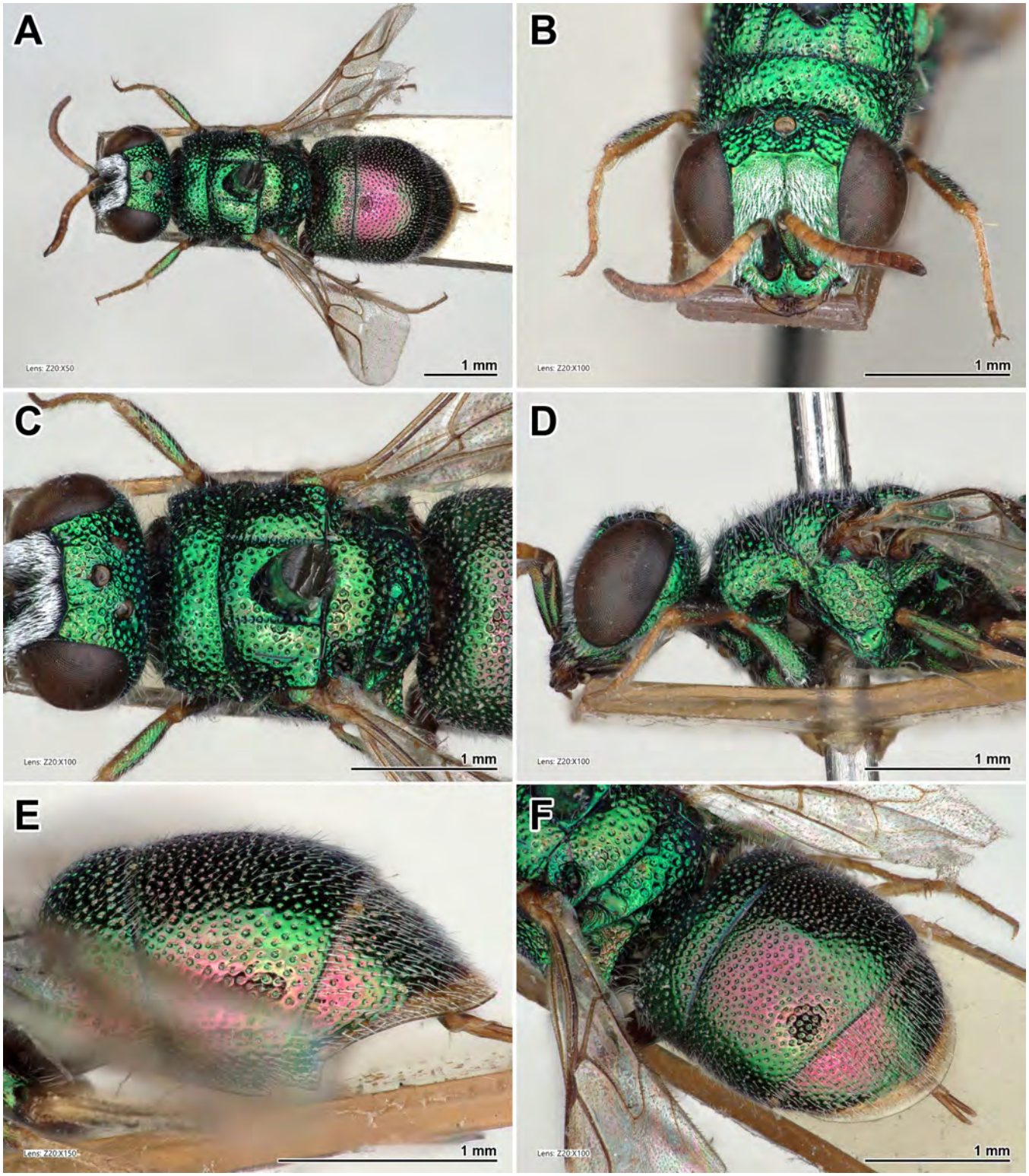

Figure 40. *Spintharina extrema* (Semenov-Tian-Shanskij & Nikol'skaya, 1954). **A.** Habitus, dorsal view; **B.** Head, frontal view; **C.** Mesosoma, dorsal view; **D.** Mesosoma, lateral view; **E.** Metasoma, lateral view; **F.** Metasoma, postero-lateral view.

Genus *Stilbum* Spinola, 1806

Stilbum Spinola, 1806:9. Type species: *Chrysis calens* Fabricius, 1781, by subsequent designation of Latreille, 1810:437.

Stilbum calens (Fabricius, 1781)

Chrysis calens Fabricius, 1781:455. Holotype ♀; Russia: Siberia (London).
Stilbum calens: Rosa et al., 2013:40 (Semnan, Tehran).
Stilbum calens westermanni Dahlbom, 1845:16; Boustani & Rosa, 2022:33 (Iran).

Distribution. Iran (Semnan, Tehran). Euroasiatic, from Europe to Siberia and China; Northern Africa (Rosa et al., 2013).

Remarks. The specimens recorded from Iran should be double-checked to be correctly identified. Recently Rosa et al. (2023b) elevated *Stilbum westermanni* to species rank, based on molecular analyses. However, molecular data and specimens for comparison were available from Europe, Russia and Central Asia, but not from Iran and the Middle East. For the moment, we still consider *S. calens* as the species distributed in Iran, but they both could be theoretically present in the country.

Stilbum cyanurum (Forster, 1771)

Chrysis cyanura Forster [not Förster], 1771:89. Holotype ♂; Spain (London).
Stilbum cyanurum: Rosa et al., 2013:39 (Qazvin); Ebrahimi, 2015:49 (Sistan & Baluchestan); Strumia & Fallahzadeh, 2015:26 (Fars); Farhad et al., 2016b:10 (Hormozgan); Farzaneh et al., 2017:500 (Fars); Iranmanesh et al., 2017:300 (Kerman).

Distribution. Iran (Fars, Hormozgan, Kerman, Qazvin, Sistan & Baluchestan). Worldwide distributed, excluded Neotropical and Nearctic Regions (Kimsey & Bohart, 1991).

Genus *Trichrysis* Lichtenstein, 1876

Trichrysis Lichtenstein, 1876:227. Type species: *Sphex cyanea* Linnaeus, 1758, by monotypy.

Trichrysis cyanea (Linnaeus, 1758)

Sphex cyanea Linnaeus, 1758:572. Lectotype ♂ designated by Morgan, 1984:10; Europe (London-Linnean Society).
Trichrysis cyanea: Rosa et al., 2013:40 (East-Azarbaijan); Ebrahimi, 2015:51 (East-Azarbaijan); Strumia & Fallahzadeh, 2015:27 (Alborz, Fars); Farzaneh et al., 2017:500 (Fars); Rosa, 2020:469 (Golestan, Mazandaran).

Distribution. Iran (Alborz, East-Azarbaijan, Fars, Golestan, Mazandaran, Semnan). Palaearctic, from Europe to China; Northern Africa (Linsenmaier, 1999, Rosa et al., 2014).

Trichrysis lacerta (Semenov-Tian-Shanskij, 1954)

Chrysis (*Trichrysis*) *lacerta* Semenov-Tian-Shanskij [in Semenov-Tian-Shanskij & Nikol'skaya], 1954:122. Holotype ♀; Kyrgyzstan: Kok-Janggak (St. Petersburg).
Trichrysis lacerta: Falahatpisheh et al., 2021:138 (Fars).

Distribution. Iran (Fars). Greece, Cyprus, Türkiye, Caucasus and Egypt (Kimsey & Bohart, 1991; Strumia & Yildirim, 2009).

Trichrysis longispina (Mocsáry, 1912)

Chrysis (*Trichrysis*) *longispina* Mocsáry, 1912a:377. Holotype ♀; Saudi Arabia: Lahej (Budapest).
Trichrysis longispina: Farhad et al., 2016b:11 (Hormozgan, fig. 10); Farzaneh et al., 2017:501 (Fars).

Distribution. Iran (Fars, Hormozgan). Oman, Saudi Arabia, United Arab Emirates, and Yemen (Rosa et al., 2020a).

Trichrysis scioensis (Gribodo, 1879)

Chrysis scioensis Gribodo, 1879:344. Holotype ♀; East Africa (Genoa).
Trichrysis scioensis: Farhad et al., 2016b:10 (Hormozgan, fig. 9).

Distribution. Iran (Hormozgan). Afrotropical (Madl & Rosa, 2012).

Tribe Parnopini Dahlbom, 1854

Genus *Cephaloparnops* Bischoff, 1910

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

Cephaloparnops denticulatus (Spinola, 1838)

Parnopes denticulatus Spinola, 1838:455. Holotype ♂; Egypt (Turin).
Cephaloparnops denticulatus: Kimsey & Bohart, 1991; Rosa et al., 2013:40 (Iran, without locality).

Distribution. Iran. Sudan, Egypt, Yemen (Rosa et al., 2020a).

Cephaloparnops vareillesi (du Buysson, 1900)

Parnopes vareillesi du Buysson, 1900:157. Lectotype ♀ designated by Kimsey, 1986:109; Algeria: Biskra (Paris).
Cephaloparnops abruptus Semenov-Tian-Shanskij, 1912:180. Holotype ♂; Iran: Kerman province, Sarhad district, Podagi (St. Petersburg).
Cephaloparnops medus Semenov-Tian-Shanskij, 1967:183. Holotype ♀; Iran: Semnan province, Shahrud, 26.v.1914, A. Kirichenko (St. Petersburg).
Cephaloparnops vareillesi: Rosa et al., 2013:40 (Semnan).

Distribution. Iran (Kerman, Semnan). Palestine, Saudi Arabia; Northern Africa: Algeria, Egypt (Linsenmaier, 1959a, 1994, 1999).

Remarks. A revision of the Palaearctic Parnopini is needed because more species were recently collected in desert areas and evaluation of all taxa through the morphological analysis is still missing.

Genus *Jsadelphus* Semenow, 1901

Jsadelphus Semenow, 1901:27. Type species: *Parnopes schmiedecknechtii* Mocsáry, 1899 [= *Jsadelphus schmiedecknechtii* (Mocsáry, 1899)], by monotypy.
Isadelphus: Semenow, 1902:353. Incorrect subsequent spelling of *Jsadelphus* Semenow, 1901.
Isadelphia Semenow, 1902:353. Unnecessary replacement name for *Isadelphus* in Semenow, 1902 *nec Isadelphus* Förster, 1868 (Hymenoptera Ichneumonidae).

Jsadelphus schmiedeknechtii (Mócsary, 1899)

Parnopes Schmiedecknechtii Mocsáry, 1899:493. Lectotype ♀ designated by Kimsey, 1987:90; Lebanon: Brumana (Budapest).
Isadelphia zarudnii Semenov-Tian-Shanskij, 1967:182. Holotype ♂; Iran: Esfahan env., 16–24.iv.1904, N. Zarudny (St. Petersburg)
Isadelphia schmiedecknechtii: Rosa et al., 2013:41 (Esfahan).

Distribution. Iran (Esfahan). Middle East; Northern Africa: Egypt (Rosa et al., 2013).

Genus *Parnopes* Latreille, 1797

Parnopes Latreille, 1797:126. Type species: *Chrysis carnea* Fabricius, 1775 [= *Parnopes grandior* (Pallas, 1771)], by monotypy.

Parnopes glasunowi Semenow, 1901

Parnopes glasunowi Semenow, 1901:25. Holotype ♂; Tadjikistan: Jagnob (St. Petersburg).
Parnopes glasunowi: Rosa et al., 2013:41 (Khorasan-e Razavi).

Distribution. Iran (Khorasan-e Razavi), Türkiye; Central Asia (Rosa et al., 2013).

Parnopes grandior (Pallas, 1771)

Chrysis grandior Pallas, 1771:474. Holotype ♂; Russia (Berlin).
Parnopes grandior: Rosa et al., 2013:42 (Golestan); Samin et al., 2014:123 (East-Azarbaijan).

Distribution. Iran (East-Azarbaijan, Golestan). Widespread in the Western Palaearctic Region (Kimsey & Bohart, 1991).

DISCUSSION

The new checklist of the Iranian cuckoo wasps is deeply different from the first one. This is due not only to the numerous species added in the last years and the new species described but also to a long list of changes made in the taxonomy, nomenclature and species concept of many species. In particular, twelve species have been synonymised: *Chrysis chrysochlora* Mocsáry, 1889 = *C. keriensis* Radoszkowski, 1887; *C. decora* Mocsáry, 1887 = *C. mesasiatica* Semenov-Tian-Shanskij, 1912; *C. elegans interrogata* Linsenmaier, 1959 = *C. confluens* (Dahlbom, 1845); *C. psittacina* du Buysson, 1887 = *C. regina* du Buysson, 1887; *C. pyrrha* Semenov-Tian-Shanskij, 1967 = *C. angustifrons* Abeille de Perrin, 1878; *C. pyrrhina* auct. = *C. zonata* Dahlbom, 1854; *C. splendidula chlorisans* du Buysson, 1895 = *C. splendidula* Rossi, 1790; *C. subcoerulea* Radoszkowski, 1891 = *C. chlorochrysa* Mocsáry, 1889; *Holopyga crassepuncta* Semenov-Tian-Shanskij, 1954 = *H. turkestanica* Mocsáry, 1909; *H. proviridis* Linsenmaier, 1959 = *H. generosa asiatica* Trautmann, 1926; *Pseudomalus masalskii* (Semenov-Tian-Shanskij, 1932) = *P. turkestanicus* (Mocsáry, 1889); *Cephaloparnops abruptus* Semenov-Tian-Shanskij, 1912 = *C. vareillesi* (du Buysson, 1900). Moreover, seven subspecies were upgraded to specific rank: *Chrysis dauriana* Linsenmaier, 1959; *Chrysis schwarzi* Linsenmaier, 1968; *Chrysis consobrina* Mocsáry, 1889; *Hedychridium davydovi* (Semenov-Tian-Shanskij, 1967); *Hedychrum caucasicum* Mocsáry, 1889; *Hedychrum persicum* Mocsáry, 1914; *Holopyga caucasica* Mocsáry, 1889, and one species downgraded to subspecific rank: *Euchroeus moricei zarudnianus* (Semenov-Tian-Shanksy, 1909).

Recent changes in the classification of genera also impacted the Iranian list. The following seven species were transferred to different genera: *Chrysis cassandra* Semenov-Tian-Shanskij, 1967 to the genus *Spintharina*; *Chrysis inaequalis* Dahlbom, 1845 to *Pentachrysis*; *Chrysis pulchella* Spinola, 1808 to *Morphochrysis*; *Hedychridium flavipes rugulosum* Linsenmaier, 1959 to *Colpopyga*; *Omalus hypocrita* (du Buysson, 1893) to *Philoctetes*; *Philoctetes medanae* (du Buysson, 1890) and *Philoctetes tatianae* (Semenov-Tian-Shanskij, 1967) to *Chrysellampus*.

The first checklist was largely based on Linsenmaier's (1959a, 1968, 1969, 1987) species concepts and material from his collection. However, the revision work on types deposited in Euroasian collections carried on by the first author, has shed light on some misinterpretations given by the Swiss author. In particular: *Chrysis ashabadensis* sensu Linsenmaier = *C. villosa* Rosa, 2022; *C. inaequalis sapphirina* sensu Linsenmaier = *Chrysis poetica* Semenov-Tian-Shanskij, 1954; *C. perrinii* sensu Linsenmaier = *C. caucasicola* Balthasar, 1953; *C. singula* sensu Linsenmaier = *C. grohmanni bolivari* García Mercet, 1904; *Holopyga chrysonota* sensu Linsenmaier = *H. similis* Mocsáry, 1889; *Spinolia chalcites* sensu Linsenmaier = *S. rogenhoferi* (Mocsáry, 1889); *Spintharina vagans* sensu Linsenmaier = *S. mocsaryi* (Radoszkowski, 1890). During the revision work mentioned above, other species were resurrected by previous synonymizations by Rosa et al. (2017a) and are now included in the new list, such as *Spinolia chamaleon* (Semenov-Tian-Shanskij, 1967), *Spintharina extrema* (Semenov-Tian-Shanskij & Nikol'skaja, 1954) and *Hedychridium erschovi* (Radoszkowski, 1877) in Rosa et al. (2013) listed as *H. chloropygum caputaureum*. Finally, to fully understand the relationships between similar species of some *Chrysis* groups, examination of more material is needed, possibly with the help of molecular analyses, like in the case of species in the *graelsii* group (see above).

The known Chrysidid fauna of Iran currently comprises 315 taxa which are categorized into four tribes and 25 genera (Fig. 41). The tribe Chrysidini, with 211 species includes more than two-thirds of the species, with the genus *Chrysis* represented by 137 species, followed by *Chrysura* with 35 species. *Hedychridium* and *Holopyga*, each with 25 recorded species, are documented as the most speciose genera of Elampini. The tribe Panopini and the subfamily Cleptinae, with 4 and 3 species respectively, represent a very small assembly of the Iranian chrysidids. Considering the development in the knowledge of Iranian fauna, a comprehensive key to species level for the country is still premature. In fact, the estimated number of chrysidid species should be at least 400, similar to the Türkish fauna (Rosa et al., 2013), if not more rich due to the presence of Afrotropical and Indian elements. Only a key including all Middle Eastern, Central Asian and Mediterranean species could assist in the identification of Iranian species. However, achieving this goal would require a dedicated project, including financing for research, travels to museums, and illustrations.

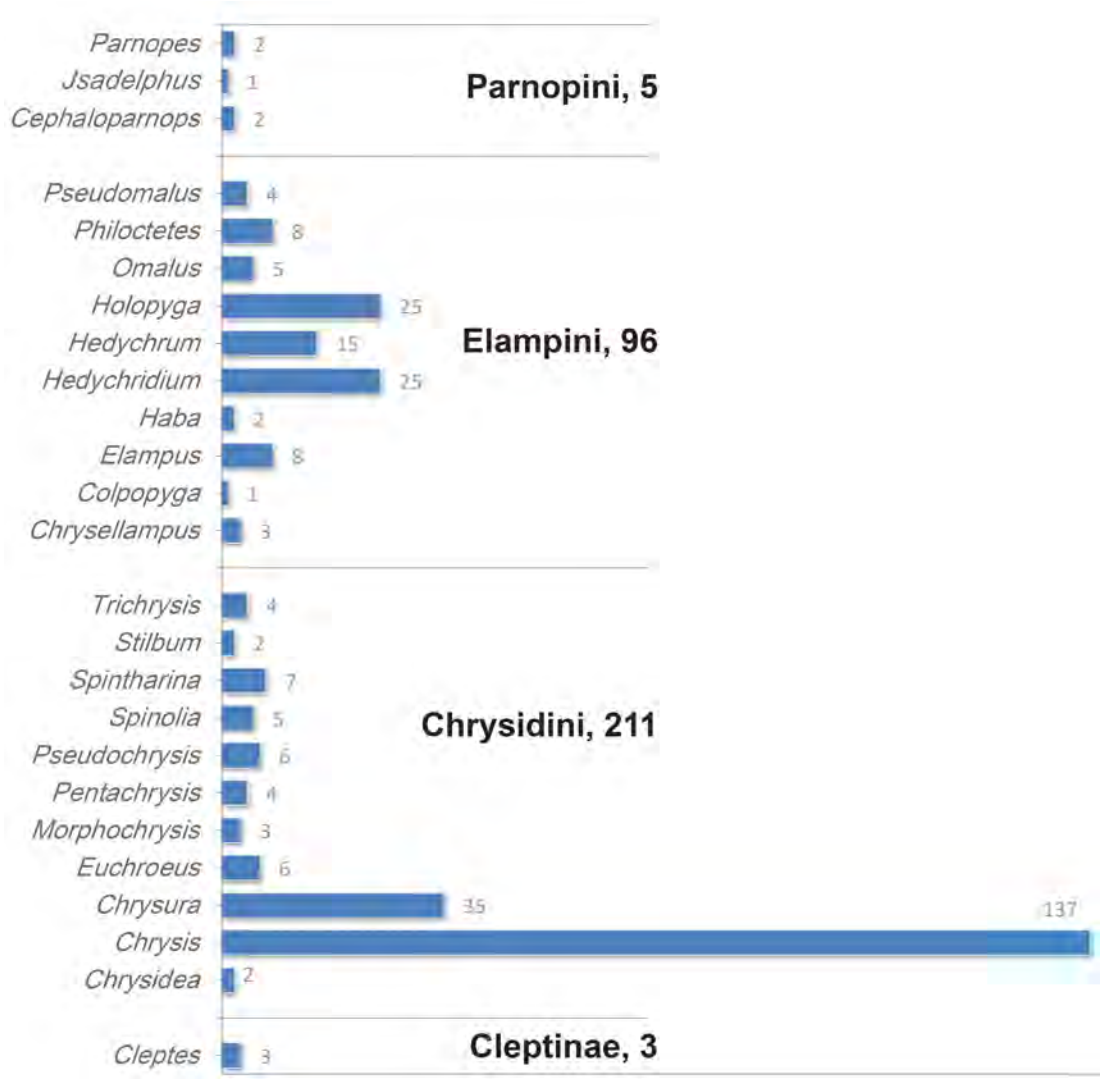

Figure 41. Number of recorded species within the genera of Chrysididae in Iran.

To facilitate the identification of species in the genus *Chrysis*, the most speciose one, we propose a synthetic list of the 137 species subdivided by species group. Species groups can be identified using the keys of Kimsey & Bohart (1991) and Linsenmaier (1959a):

***aestiva* group**
C. aestiva Dahlbom, 1854
C. interjecta hemichlora Linsenmaier, 1951
C. martinella du Buysson, 1900

***amneris* group**
C. amneris Balthasar, 1953

***bihamata* group**
C. capito Semenov-Tian-Shanskij, 1967
C. vachali du Buysson, 1900

***cerastes* group**
C. ambigua Radoszkowski, 1891
C. mutabilis du Buysson, 1887
C. regina du Buysson, 1887

***comparata* group**
C. altaica Mocsáry, 1912
C. apiata du Buysson, 1900
C. asiatica Radoszkowski, 1889
C. caucasicola Balthasar, 1953
C. comparata Lepeletier, 1806
C. imperatrix du Buysson, 1887
C. leuconoe Semenov-Tian-Shanskij, 1967
C. marginata marginata Mocsáry, 1889
C. subanalis Linsenmaier, 1968
C. verna Dahlbom, 1854
C. xanthocera Klug, 1845

***curta* group**
C. batyamensis Linsenmaier, 1969

***delicatula* group**
C. mandibularis du Buysson, 1901

***ear* group**
C. laetula Semenov-Tian-Shanskij & Nikol'skaya, 1954

***ehrenbergi* group**
C. erubescens Linsenmaier, 1997
C. turcomana Semenov-Tian-Shanskij & Nikol'skaya, 1954

***elegans* group**
C. angustifrons agitata Linsenmaier, 1959
C. angustifrons angustifrons Abeille de Perrin, 1878
C. confluens (Dahlbom, 1845)
C. lepida Mocsáry, 1889
C. transcaspica Mocsáry, 1889
C. villosa Rosa, in Boustani & Rosa, 2022

***exsecata* group**
C. mirifica Balthasar, 1953

***facialis* group**
C. gianassoi Strumia, 2015
C. mirabilis Radoszkowski, 1877
C. sefrensis du Buysson, 1900

***gracillima* group**
C. gracillima Förster, 1853

***graelsii* group**
C. remota Mocsáry, 1889
C. sybarita persis Semenov-Tian-Shanskij, 1967

***ignita* group**
C. clarinicollis Linsenmaier, 1951
C. comta Förster, 1853
C. corusca Valkeila, 1971
C. fulgida Linnaeus, 1761
C. ignita (Linnaeus, 1758)
C. impressa Schenck, 1856
C. indigotea Dufour & Perris, 1840
C. keriensis Radoszkowski, 1887
C. ruddii Shuckard, 1837
C. schencki Linsenmaier, 1968

***leachii* group**
C. infantula Semenov-Tian-Shanskij, 1967
C. leachii Shuckard, 1836
C. mediasignata Rosa, **sp. nov.**
C. santschii Linsenmaier, 1959

***maculicornis* group**
C. acceptabilis Radoszkowski, 1891
C. annulata du Buysson, 1887
C. distincta distincta Mocsáry, 1887
C. distincta exigua Mocsáry, 1889
C. heimi Rosa, **sp. nov.**
C. komarowi Radoszkowski, 1891
C. maculicornis Klug, 1845
C. sacrata du Buysson, 1898
C. saraksensis Radoszkowski, 1891
C. semenovi Radoszkowski, 1891
C. speciosa Radoszkowski, 1877
C. subdistincta Linsenmaier, 1968
C. zobeida du Buysson, 1896

***millenaris* group**
C. majidi Strumia, 2015
C. millenaris Mocsáry, 1897
C. serva du Buysson, 1898
C. unirubra Strumia, 2015

***oculata* group**
C. stilboides Spinola, 1838

***pallidicornis* group**
C. gorislava Semenov-Tian-Shanskij, 1967
C. manicata Dahlbom, 1854
C. pharaonum Mocsáry, 1882

***rubricata* group**
C. rubricata Mocsáry, 1902

***rufitarsis* group**
C. hafisi Semenov-Tian-Shanskij, 1967
C. herzensteini Semenow, 1892
C. parthorum Semenov-Tian-Shanskij, 1967
C. pseudoincisa Balthasar, 1953
C. rufitarsis rufitarsis Brullé, 1833
C. rufitarsis progressa Linsenmaier, 1959
C. subincisa Linsenmaier, 1959

***scutellaris* group**
C. araratica Radoszkowski, 1890
C. consobrina Mocsáry, 1889
C. maracandensis Radoszkowski, 1877
C. palliditarsis Spinola, 1838
C. soror Dahlbom, 1854

***smaragdula* group**
C. demavendae Radoszkowski, 1881
C. equestris Dahlbom, 1854
C. musa Semenov-Tian-Shanskij, 1954
C. sexdentata Christ, 1791

***splendidula* group**
C. mesasiatica Semenov-Tian-Shanskij, 1912
C. rutilans Olivier, 1791
C. splendidula Rossi, 1790

***subsinuata* group**
C. echidna Semenov-Tian-Shanskij, 1967
C. hydra Semenov-Tian-Shanskij, 1967
C. simurgh Rosa, **sp. nov.**
C. orienticola Linsenmaier, 1994

***succincta* group**
C. amerii Rosa & Farhad, **sp. nov.**
C. afghanica Linsenmaier, 1968
C. albanica alia Linsenmaier, 1959
C. coa Invrea, 1939

C. crenulata Rosa, **sp. nov.**
C. dauriana Linsenmaier, 1959
C. edentata Rosa & Baiocchi, **sp. nov.**
C. frivaldszkyi frivaldszkyi Mocsáry, 1882
C. frivaldszkyi sparsepunctata du Buysson, 1895
C. grohmanni bolivari Mercet, 1902
C. maidaquensis Strumia, 2014
C. marani Balthasar, 1953
C. minutissima Radoszkowski, 1876
C. mysta du Buysson, 1900
C. peri Rosa & Baiocchi, **sp. nov.**
C. prosuccincta Linsenmaier, 1968
C. robertsi Rosa, 2020
C. schousboei Dahlbom, 1854
C. singula Radoszkowski, 1891
C. titanica Rosa, **sp. nov.**
C. turcica (du Buysson, 1908)

***taczanovskii* group**
C. taczanovskii Radoszkowski, 1877
C. dentipes dentipes Radoszkowski, 1877

***varidens* group**
C. brunneamarginata Farhad, Rosa & Talebi, 2019
C. klio Balthasar, 1953
C. schwarzi Linsenmaier, 1968
C. diacantha diacantha Mocsáry, 1889
C. taurica Mocsáry, 1889

***viridissima* group**
C. chlorochrysa Mocsáry, 1889
C. viridissima Klug, 1845

Considering the discrete assemblage of the known Chrysididae of Iran, it is still challenging to analyse the faunal complex and the biogeographical history. The occurrence of the chrysidids is strictly dependent on the environments where their hosts nest (Pärn et al., 2014) and the availability of flowering plants for adult feeding (Rosa, 2004b). However, very little information is documented about their host (Pauli et al., 2019) which is one of the main factors determining the distribution of species in a wide or limited geographical range. Based on the current list, the Iranian chrysidid fauna is mostly (77.64%) represented by species distributed in the Western Palaearctic region (Fig. 42A). The rest comprises a small but meaningful assemblage shared with the Eastern Palaearctic (10.48%) and Afrotropical (8.89%) fauna. Excluding the widely distributed Afrotropical species, there are 10 species currently considered endemic to Iran, all found in southern provinces (Fars, Hormozgan, and Sistan & Baluchestan). However, this evaluation can be biased by undersampling in bordering provinces and neighbouring countries. Most of the species were found mainly in the southern provinces of Iran and, to some extent, outside the Afrotropical region. Similar findings have been clarified through the studies on other Hymenoptera of Iran (Rahmani et al., 2020; Barahoei et al., 2022). A very small overlap was found with the fauna of the Oriental (0.95% + 0.63 [E-Palaearctic]) region, represented by the occurrence of three species: *Hedychrum gerstaeckeri* as well as two widely distributed species *Chrysis stilboides*, and *Omalus aeneus*. The latter species was also found in the Nearctic region (0.32%), together with *Cleptes striatipleuris* and *Pseudomalus auratus*.

According to the current knowledge, out of 315 chrysidid species (and subspecies) in Iran, 52 species can be considered as "Endemic", since they were not still found elsewhere. These endemic species comprise 21% of the total Iran chrysidid species that can be restricted to the Western Palaearctic region (Fig. 42A). Up to 28% (69 species) are documented from the Central and Western Asian area (including the Caucasian region), and the rest (125 species, 51%) are distributed in Europe and North Africa.

The known provincial distribution of the Iranian Chrysididae (Fig. 43) represents an uneven exploration throughout the country, almost covering the whole territory except four provinces (Chaharmahal & Bakhtiari, Ilam, Qom and Yazd). The main species records achieved from the studies in the southern provinces (Strumia & Fallahzadeh, 2015; Farhad et al., 2016b; Strumia & Fallahzadeh 2016; Strumia et al., 2016b; Farhad et al., 2017; Farzaneh et al., 2017; Iranmanesh et al., 2017; Falahatpisheh et al., 2019), represented by Fars (108 species), Hormozgan (44 species) and Kerman (39 species) provinces occupying about one-fifth of the total area of the country. The North-western area of Iran encompasses a large and highly diverse environment, with high affinities to the Caucasia has been explored through the studies (Semenov-Tian-Shanskij, 1967; Rosa et al., 2013; Torabipour et al., 2013a) mainly centralized in the East-Azarbajian province (41 recorded species).

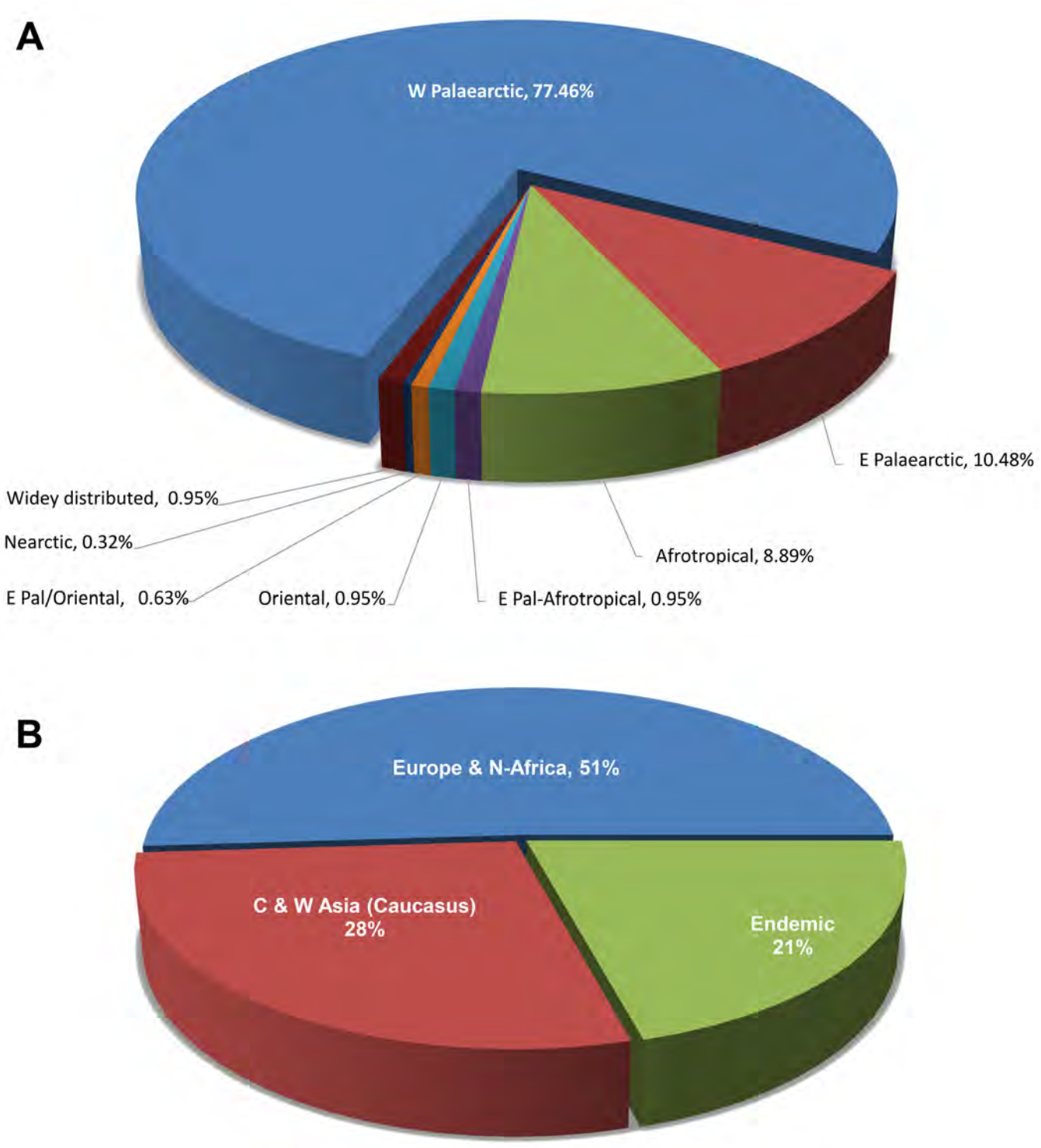

Figure 42. The plotted distribution of the known Chrysididae from Iran. **A.** Across the Zoogeographical regions. **B.** Inside the Western Palaearctic region.

The Eastern provinces (North Khorasan, Khorasan-e Razavi, South Khorasan, and Sistan & Baluchestan) have been assumed to harbour the unknown elements of the Eastern Palaearctic regions. This vast area occupies nearly one-third of the whole country, with extremely variable climate along, but very sporadically explored (Semenov-Tian-Shanskij, 1954, 1967; Rosa et al., 2013; Torabipour et al., 2013a; Ebrahimi, 2015; Strumia & Fallahzadeh, 2015; Farhad et al., 2018), as indicated by a few recorded species.

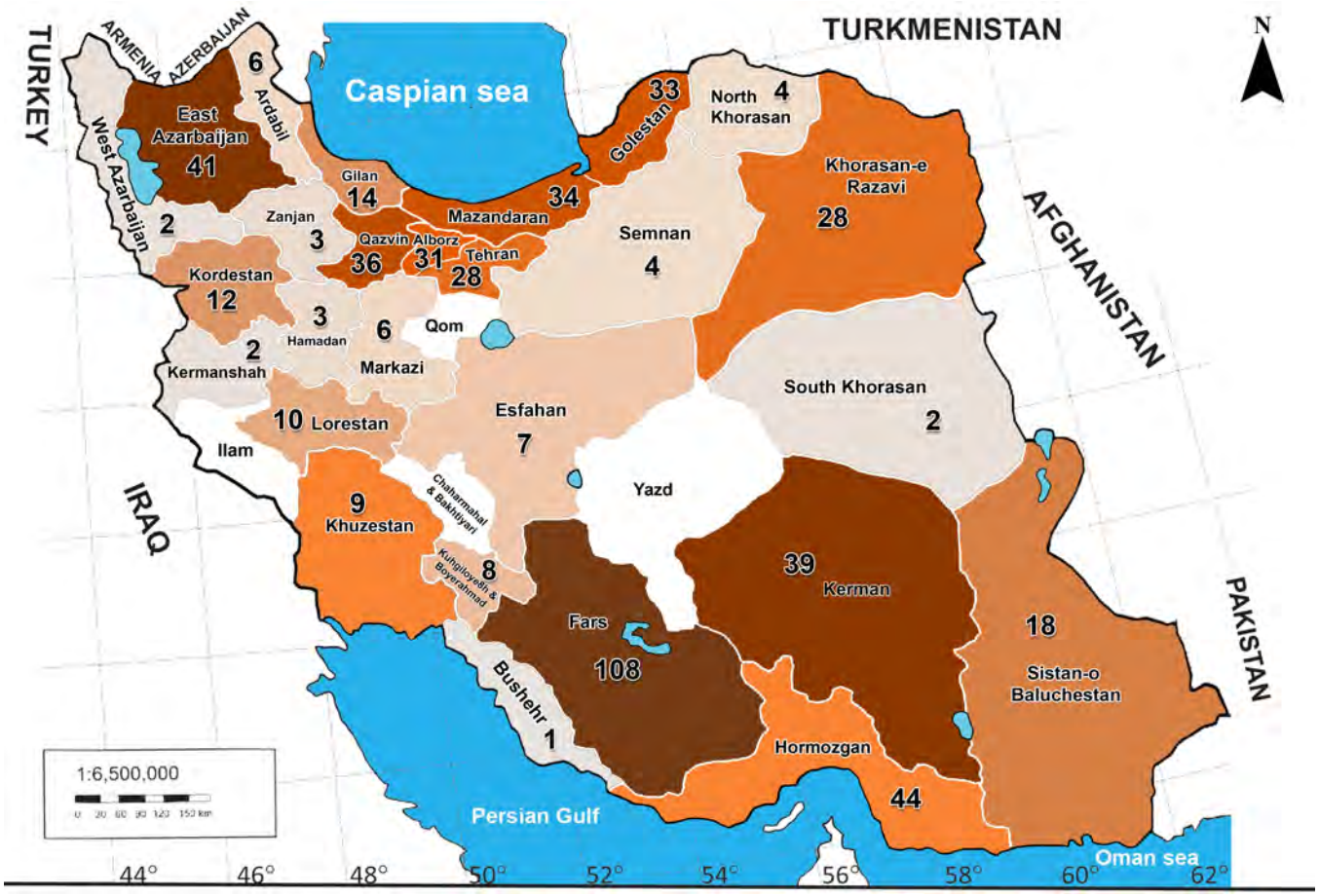

Figure 43. The Map of Iran with the number of the recorded chrysidid species of Iran, within the provincial framework. The intensity of shading colours represents the frequency of the species.

The cross-road for the faunal elements of three biogeographical regions (Afrotropical, Palaearctic, and Oriental) is perfectly coinciding within the area extending from the southern and south-eastern province of Iran deserves further explorations with emphasis through the highlands extended into the neighbouring countries.

There was not exact provincial records for 13 species (*Chrysis*: 7 sp., *Hedychridium*: 1 sp., *Hedychrum*: 2 sp., *Holopyga*, *Pseudochrysis* and *Cephaloparnops*: 1 sp.). Half of the species (56.64%) (Fig. 44) are recorded only from a single province. Three taxa (*Holopyga cypruscula detrita*, *Pseudomalus turkestanicus*, *Pseudochrysis uniformis* were found widely distributed in the country, their occurrences are documented in eight provinces, followed by *Chrysura laevigata* (in 7 provinces) and *Chrysis frivaldszkyi sparsepunctata*, *Chrysis marginata marginata*, *Trichrysis cyanea* (in 6 provinces).

Records need confirmation. (misidentifications, doubtful identifications, *nomina dubia* and *nomina nuda*)

With regards to the complicated taxonomy of Chrysididae, as well as their discrete history of the faunistic studies, records of some species are considered unreliable and doubtful (Table 1) Although the majority of these records were conservatively reported in Rosa et al. (2013), the current knowledge on the zoogeography and taxonomy of Chrysididae has shed light into many questions. A few species were recorded based on specimens that have never been examined by expert taxonomists, and in some cases, voucher specimens are unavailable (Samin et al., 2014; Ghahari, 2019). Major taxonomic or nomenclature changes have led to the exclusion of some taxa. Misidentifications could originate from the impossibility of examining type series, inadequate examination of specimens, absence of reference collections and robust taxonomic background, and finally by the biogeographical complexity within this family.

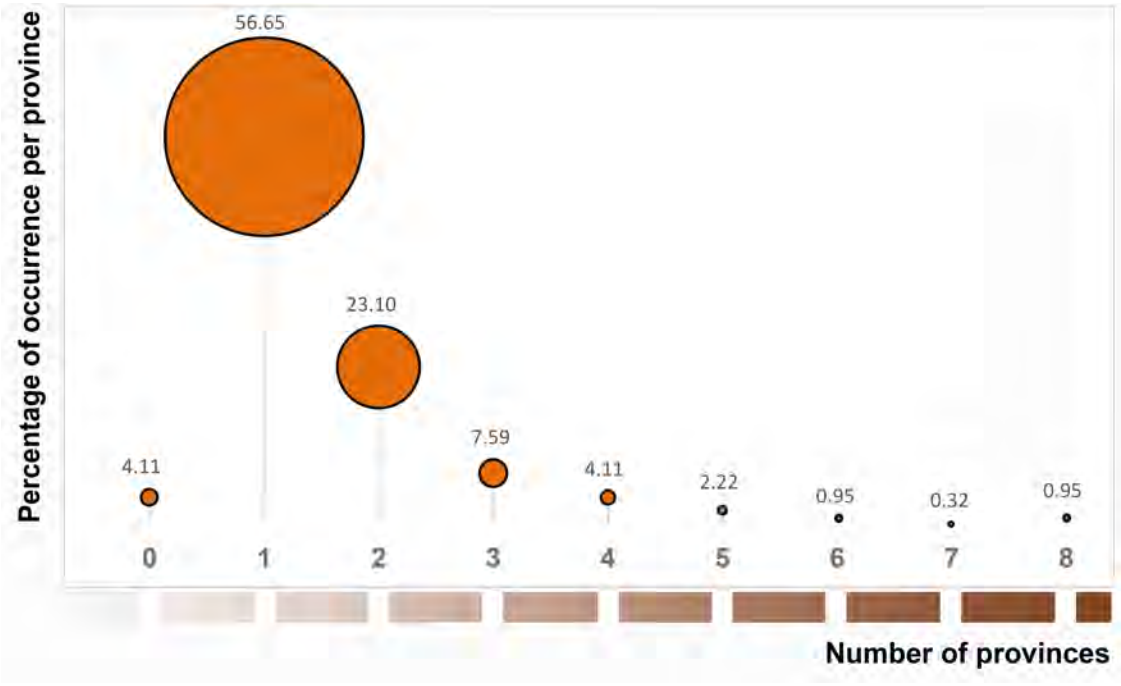

Figure 44. The rate of provincial occurrence (in percentage) of the known Iranian Chrysidiae. The Zero value indicating no locality was documented for these species; the maximum value of occurrence in the eight provinces is highlighted on the right.

The same situation can be partially applied to the late Strumia's papers on Iranian material (e.g. Farhad et al., 2017 on *Holopyga*), where the articles Semenov-Tian-Shanskij (1910, 1912, 1920, 1932, 1954, 1967) and Semenov-Tian-Shanskij & Nikol'skaya (1954) were mainly ignored. Emphasizing a single resource (Linsenmaier, 1999) for identification of the Iranian species led to an erroneous belief that the Iranian fauna is closely related to the Mediterranean one rather than an assemblage of taxa originating from various biogeographic areas, starting from Central Asia and the Turanic one.

Cleptes parnassicus Mocsáry, 1902 is endemic to Greece (Móczár, 2001). Japoshvili & Ljubomirov (2011) listed this species for Türkiye in a simple list of taxa, without further explanation. However, this species is hardly recognisable from other similar ones of the semiauratus group (e.g. *Cleptes anatolensis* Móczár, 2001), and without genitalia examination and experience in this group, it is hardly identifiable. So, the occurrence of this species both in Iran and Türkiye requires confirmation. The record of *Chrysis analis* Spinola, 1808 from Iran by Radoszkowsky (1877) is considered old and doubtful because more similar species were later described from Caucasus (e.g. *Chrysis caucasicola* Balthasar, 1953) and Central Asia (e.g. *C. altaica* Mocsáry, 1912) which are also known for Iran. According to Linsenmaier (1959a:146; 1968:93), *C. analis* occurs with certainty only in south- and Central Europe and records from Northern Africa, Palestine and Asia require confirmation, since they may refer to related species. The subsequent record by Samin et al. (2014) also needs to be confirmed. *Chrysis chrysophora* Semenow, 1892 is taxonomically an unknown species, not included in any species-group by Kimsey & Bohart (1991) and ignored by Linsenmaier (1959a and following publications). We could not find any type in the museum collections in St. Petersburg and Moscow (Rosa et al., 2017a). Since from the original description, it is not possible to assign this species to any species-group and have an unambiguous species concept, we consider this taxon as ***nomen dubium***. *Chrysis dawahi* Strumia, 2012 (listed by Falahatpisheh et al., 2020 for Iran) was synonymised with *C. mirifica* Balthasar by Rosa et al. (2020a). However, this action was unnecessary because in the original description of *C. dawahi*, the name and location of the collection housing the holotype are omitted, thereby not complying with Article 16.4.2 of the Zoological Code (ICZN, 1999). As a consequence, *Chrysis dawahi* results are not correctly described and must be considered as unavailable and ***nomen nudum***.

Table 1. Partial list of the Chrysididae species recorded from Iran pending confirmation.

Suspended species	Distribution	References
Cleptes nitidulus (Fabricius, 1793)	Mazandaran	Ghahari (2019:67)
Cleptes pallipes (Lepeletier, 1806)	Mazandaran	Ghahari (2019:67)
Cleptes parnassicus Mocsáry, 1902	West-Azarbaijan	Samin et al. (2014:123)
Chrysis analis Spinola, 1808	Mazandaran, Tehran	Samin et al. (2014:122)
Chrysis bicolor (Lepeletier, 1806)	Mazandaran	Ghahari (2019:67)
Chrysis chrysophora Semenow, 1892	Without locality	Semenow (1892a:81)
Chrysis simplonica Linsenmaier, 1951	Gilan	Samin et al. (2014:122)
Philoctetes hypocrita (du Buysson, 1893)	*"Perse, "mer Caspienne occidentale"*	Farhad et al. (2018:199)
Pseudomalus triangulifer (Abeille de Perrin, 1877)	Mazandaran	Ghahari (2019:67)
Spinolia unicolor (Dahlbom, 1831)	Sistan & Baluchestan	Samin et al. (2014:123)

Chrysis laeta was described by Dahlbom (1854) based on a series of specimens from sub-Saharan Africa belonging to different species. Bohart [in Kimsey & Bohart, 1991] designated the lectotype in Copenhagen, based on a typical African species, not yet found in the Palaearctic region. A paralectotype illustrated in Rosa & Xu (2015), from the Spinola collection, belongs to another African species, clearly different from the lectotype. As Rosa & Xu (2015) noted, Linsenmaier's interpretation of this species does not match the lectotype. Strumia (2014) and Falahatpisheh et al. (2021) followed Linsenmaier's keys, therefore we consider this taxon misidentified. Moreover, Strumia (2014, fig. 50) illustrated a species which is different from the lectotype and from Linsenmaier's interpretation. It probably refers to a species in the *delicatula* group and not from the *splendidula*-senegalensis group. Since the species concept of *Chrysis laeta* is unclear, with different interpretations between authors, we consider this record as doubtful, waiting for a future check of the specimens. *Chrysis simplonica* Linsenmaier, 1951 is considered a doubtful record because another similar and common species is known from the Caucasian area, *C. caucasicola* Balthasar, 1953 (Rosa et al., 2013), whereas *C. simplonica* is known on reliable records only from Western Europe.

Chrysis succincta Linnaeus, 1767 was listed for Iran by Strumia & Fallahzadeh (2015), nevertheless, the identification is based on females only. It is well known (e.g. Rosa & Makris, 2023) that females of *Chrysis succincta*, *C. tristicula*, *C. prosuccincta* and *C. frivaldszkyi* are impossible to identify based on morphological features. Since *C. succincta* is currently known with certainty only for northern and Central Europe and part of Russia, the occurrence in Iran is doubtful. On the other hand, several similar species are found in Iran, in particular, *Chrysis frivaldszkyi* seems to be very common. Strumia & Fallahzadeh (2015) postulated that the females from Fars could belong to *C. prosuccincta*; we also consider them as such species in the present list. We exclude *C. succincta* from the checklist until male specimens of are found.

Hedychrum cyaneum Brullé, 1846 is a South African species described on a type specimen originated from the Serville collection. Spinola bought Serville's collection but this type was lost since it was not located in Turin (Casolari & Casolari, 1978) and not even in Paris (du Buysson, 1899, pers. obs.). Kimsey & Bohart (1991) listed *cyaneum* in the genus *Hedychrum* Latreille, 1802, whereas Linsenmaier (1999:86) transferred *Hedychrum cyaneum* Brullé to the genus *Hedychridium* without type examination, and synonymized *H. flavipes cyanomaculatum* Trautmann, 1927 with *H. cyaneum*. This synonymy is clearly an error because *flavipes* belongs to the genus *Colpopyga* Semenov-Tian-Shanskij, 1954 (Rosa, 2017) and members of this genus are not yet recorded for Southern Africa, although it was recently found in

Central Africa (Rosa, 2023a). As the type of this species is apparently lost, its generic placement is uncertain and we consider this taxon as ***incertae sedis*** and ***nomen dubium***. *Hedychrum viridiauratum* Mocsáry, 1889 is a West Mediterranean taxon, known from the Iberian Peninsula, Southern France and Northern Africa (Linsenmaier, 1999). The Iranian records reported by Farzaneh et al. (2017) from Fars may be related to other similar taxa known from the Middle East or Western Asia, such as *H. persicum* Mocsáry, 1914, *Hedychrum rutilans perfidum* du Buysson, 1893, *H. rutilans veterrinum* Mocsáry, 1914, or *H. rutilans subparvulum* Linsenmaier, 1968. Under the name *Hedychrum rutilans* more sibling species are found and molecular data will clarify their real status.

Hedychridium incrassatum (Dahlbom, 1854) is a West Mediterranean species, known from the Iberian Peninsula and Morocco, with its easternmost record in Sicily. Linsenmaier (1968) recorded *Hedychridium incrassatum* in Türkiye, but this specimen was not found in his collection and Linsenmaier (1999) himself corrected the distribution in Morocco only. Eastern Mediterranean records were historically considered as subspecies of *Hedychridium incrassatum: H. incrassatum mavromoustakisi* Enslin, 1950 (endemic to Cyprus) and *H. incrassatum subaheneum* Linsenmaier, 1959 which are currently considered valid species. Moreover, other similar species known from the Eastern Mediterranean countries are *Hedychridium aheneum* (Dahlbom, 1854) and *Hedychridium feritatum* Linsenmaier, 1959, which is distributed in the Middle East and Iran (Rosa, 2020). Strumia et al. (2016b) did not report any subspecies or any other information to clarify the identity of their material, and these specimens should therefore be double-checked. *Hedychridium inusitatum* Linsenmaier, 1959 is considered a doubtful identification because it is known only on the type series from Morocco. In the Middle East three additional similar species, more or less common, can be found, namely *Hedychridium heliophilum* du Buysson, 1887, *Hedychridium insequosum* Linsenmaier, 1959, and *Hedychridium perpunctatum* Balthasar, 1953. Therefore, identification of the Iranian records requires confirmation. *Hedychridium tarnanii* Semenov-Tian-Shanskij, 1932 is an incorrect name. In fact, Semenov-Tian-Shanskij (1932) described *Ellampus tarnanii* which is currently considered as member of the genus *Philoctetes* Abeille de Perrin, 1879. The picture provided by Torabipour et al. (2013a:fig 1D) illustrates *Chrysis poetica* Semenov-Tian-Shanskij, 1912. This record must be deleted from the list of Iranian taxa.

Philoctetes hypocrita (du Buysson, 1893) was included in the check-list of the Iranian Chrysididae because of the type locality "*Perse: mer Caspienne occidentale*" which is currently in Azerbaijan and no longer Iran, after 1945. *Philoctetes hypocrita* was excluded from the Iranian fauna by Farhad et al. (2018) because no Iranian record is known, although it is expected for the country. *Spinolia unicolor* (Dahlbom, 1854) is a rare Euro-Sibiric species widely distributed from Central Europe to Mongolia, yet only occasionally collected, probably due to its unknown biology and ecology. In literature and museum collections there are numerous misidentifications of *Spinolia unicolor* (P.R. pers. observ.). Based on Samin et al. (2014) Iran is the most southern distributional limit for this species but we consider doubtful the occurrence of this species in the country. Examination of the specimen is needed prior to validation of the identification.

It should be noted that the current checklist is also not free from these kinds of problems, as we expect a large number of misidentifications to be checked and clarified by subsequent examination of the specimens that were unavailable for this study and directly taken from the literature.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution to the paper as follows: P. Rosa: Conceptualization, preparation, examination and identification of specimens, photographing, type designation and description of the new species, compiling the literature, drafting the manuscript, editing and proofreading; A. Farhad: Collecting, sorting the specimens, and photographing; A.A. Talebi: Supervising A. Farhad and A. Ameri, funding acquisition, organizing the collection, editing and proofreading; A. Ameri: Field trips, collecting and sorting the specimens; D. Baiocchi & M. Halada: Field trips, collecting, sorting and identification of some specimens; E. Rakhshani: Conceptualization, drafting, faunal analysis, editing and proofreading. All authors read and approved the final version of the manuscript.

FUNDING

Contribution of ER, was supported by grant No. IR-UOZ-GR-6230, the University of Zabol.

AVAILABILITY OF DATA AND MATERIAL

Not applicable.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included plants and 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 authors declare that there is no conflict of interest regarding the publication of this paper.

ACKNOWLEDGMENTS

P. Rosa is grateful to Marco Bernasconi (Natur Museum, Luzern, Switzerland) for the access to the Linsenmaier collection; Daniel Benda (Natur History Museum, Prague, Czech Republic) for loan of Iranian specimens; Esther Ockermüller (Biodiversitätszentrum, Linz, Austria) for access to the museum collection; Denis Michez (Umons, Belgium) for supervising his research. Special thanks to three anonymous reviewers, for their construction comments and suggestions that greatly improved the quality of the manuscript.

REFERENCES

Aaron, S.F. (1885) The North American Chrysididae. *Transactions of the American Entomological Society*, 12, 209–248. https://doi.org/10.2307/25076458

Abeille de Perrin, E. (1877) Diagnoses d'espèces nouvelles et remarques sur des espèces rares. *Feuille des Jeunes Naturalistes*, 7, 65–68.

Abeille de Perrin, E. (1878) Diagnoses de Chrysides nouvelles. Published by the author, Marseille. 6 p.

Abeille de Perrin, E. (1879) Synopsis critique et synonymique des Chrysides de France. *Annales de la Société Linnéenne de Lyon*, 26, 1–108. https://doi.org/10.3406/linly.1879.3979

Arens, W. (2001) Revision der Arten der *Chrysis dichroa* Gruppe auf der Peloponnes mit Beschreibung dreier neuer Arten (Hymenoptera; Chrysididae). *Linzer Biologische Beiträge*, 33 (2), 1157–1193.

Arens, W. (2002) Zum Status von *Chrysis smyrnensis* Mocsáry und Beschreibung einer neuen kleinasiatischen Art aus der *Chrysis dichroa*-Gruppe (Hymenoptera; Chrysididae). *Linzer Biologische Beiträge*, 34 (2), 935–952.

Arens, W. (2010) Revision der *Hedychridium roseum*-Gruppe in Kleinasien (Hymenoptera: Chrysididae), mit Neubewertung zahlreicher europaeischer Taxa und Beschreibung zweier neuer Arten. *Linzer Biologische Beiträge*, 42 (1), 401–458.

Arens, W. (2011) Weiterer Beitrag zur Taxonomie und Nomenklatur griechischer Goldwespen (Hymenoptera: Chrysididae). *Linzer Biologische Beiträge*, 43 (1), 311–321.

Arens, W. (2014) Die Goldwespen der Peloponnes (Hymenoptera: Chrysididae) 1. Teil: Die Gattungen *Cleptes*, *Omalus*, *Holopyga*, *Hedychrum*, *Hedychridium* und *Euchroeus*; mit Beschreibung einer neuen Cleptes-Art. *Linzer Biologische Beiträge*, 46 (1), 553–621.

Ashmead, W.H. (1902) Classification of the fossorial, predaceous and parasitic wasps, or the superfamily Vespoidea. *The Canadian Entomologist*, 34, 219–231. https://doi.org/10.4039/Ent34219-9

Balthasar, V. (1953) ["1951"] Monographie des Chrysidides de Palestine et des pays limitrophes. *Acta Entomologica Musei Nationalis Pragae*, Supplementum, 27 (2), 1–317.

Balthasar, V. (1957) ["1956"] Neue Chrysididen aus Afghanistan (Opuscula hymenopterologica XVII) (Hymenoptera, Chrysididae). *Acta Societatis Entomologicae Čechosloveniae*, 53, 143–153.

Barahoei, H., Khajeh N., Azevedo, C.O., Olmi, M. & Rakhshani, E. (2022) A review of Chrysidoidea (Hymenoptera, Aculeata), excluding Chrysididae of Iran. *Journal of Insect Biodiversity and Systematics*, 8 (4), 617–645. https://doi.org/10.52547/jibs.8.4.617

Bingham, C.T. (1903) *The Fauna of British India, including Ceylon and Burma. Hymenoptera*. Vol. II. Ants and Cuckoo-wasps. Taylor & Francis, London. 528 p. https://doi.org/10.5962/bhl.title.106780

Bingham, C.T. (1908) Notes on Aculeate Hymenoptera in the Indian Museum. Part 1. *Records of the Zoological Survey of India*, 2 (4/32), 347–349. https://doi.org/10.26515/rzsi/v2/i4/1908/163353

Bischoff, H. (1910) Die Chrysididen des Königlichen Zoologischen Museums zu Berlin. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 4, 426–493.

Bischoff, H. (1913) Hymenoptera. Fam. Chrysididae. In: Wytsman, P. (ed.) *Genera Insectorum*. Fascicule 151. Bruxelles, L. Desmet-Verteneuil, pp. 1–86 p. + 5 pls.

Bobrinskoi, N.A. (1940) [*Nikolai Alekseyevich Zarudny, Zoologist and Explorer (1859–1919)*]. Moskovskoe Obshchestvo Ispytatelej Prirody, Moscow. 72 p. + 1 map + 3 pls. [In Russian]

Bodenstein, W.G. (1939) The genotypes of the Chrysididae. *Transactions of the American Entomological Society*, 65, 123–133.

Bohart, R.M. (1987) A key to the species of *Spintharina* with descriptions of new species and indication of species groups (Hymenoptera, Chrysididae). *Psyche*, 94 (1–2), 93–101. https://doi.org/10.1155/1987/59023

Bohart, R.M. & French, L.D. (1986) Designation of Chrysidid Lectotypes in the Mocsáry Collection at the Hungarian National Museum, Budapest (Hymenoptera: Chrysididae). The *Pan-Pacific Entomologist*, 62 (4), 340–343.

Bohart, R.M. & Kimsey, L.S. (1982) A Synopsis of the Chrysididae in America North of Mexico. *Memoirs of the American Entomological Institute*, 33, 1–266.

Boustani, M. & Rosa, P. (2022) Survey of cuckoo wasps of Lebanon (Hymenoptera: Chrysididae) with description of four new species. *Zootaxa*, 5104 (1), 1–39. https://doi.org/10.11646/zootaxa.5104.1.1

Brullé, G.A. (1833) *Expédition scientifique de Morée. Section des sciences physiques*. Tome III. Zoologie et Botanique. 1re partie. Zoologie. Deuxième section. - Des animaux articulés. F.G. Levrault, Paris. 400 p. (1832) 1–288, (1833) 289– 400.

Brullé, A. (1846) Les Chrysidides. In: Lepeletier de Saint-Fargeau A. (ed.) *Histoire Naturelle des Insectes. Hyménoptères*. Librairie De Ruret Paris, vol. IV, pp. 1–680. https://doi.org/10.5962/bhl.title.9005

Casolari, C. & Casolari Moreno, R. (1978) Collezione imenotterologica di M. Spinola. *Cataloghi del Museo Regionale di Scienze Naturali di Torino*, 1, 1–164.

Chevrier, F. (1862) *Description des Chrysides du bassin du Léman*. Ramboz & Schuchardt, Genève. 134 p.

Chevrier, F. (1869) Description de deux Chrysides du bassin du Léman. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 3, 44–48.

Chevrier, F. (1870) Description de quelques Hyménoptères du Bassin du Léman. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 3 (6), 265–268.

Christ, J.L. (1791) *Naturgeschichte, Klassification und Nomenclatur der Insekten vom Bienen, Wespen und Ameisengeschlecht: als der fünften Klasse fünfte Ordnung des Linneischen Natursystems von den Insekten, Hymenoptera: mit häutigen Flügeln*. Hermannischer Buchhandlung, Frankfurt am Main. 535 p. + 60 pls. https://doi.org/10.5962/bhl.title.87724

Coquebert, A.J. (1801) *Illustratio iconographica insectorum Quae in Musaeis parisinis observavit et in lucem edidit Joh. Christ. Fabricius. Praemissis ejusdem descriptionibus; Accedunt Species plumariae, vel minus aut nondum cognitae*. Tabularum decas secunda. Petri Didot natu majors, Paris, 43 pp. [pp. 48–90 + pls. xi–xx] https://doi.org/10.5962/bhl.title.65970

Dalla Torre, C.G. (1892) Catalogus hymenopterorum hucusque descriptorum systematicus et synonymicus. Volumen VI Chrysididae du Buysson, R. (1887) Descriptions de Chrysidides nouvelles. *Revue d'Entomologie*, 6, 167–201. https://doi.org/10.5962/bhl.title.8794

Dahlbom, A.G. (1845) *Dispositio methodica specierum Hymenopterorum, secundum Familias Insectorum naturales*. Particula secunda. Dissert. Lund, Berling. 20 p. https://doi.org/10.5962/bhl.title.66977

Dahlbom, A.G. (1854) *Hymenoptera Europaea praecipue borealia; formis typicis nonnullis specierum generumve Exoticorum aut Extraneorum propter nexum systematicum associatis, per familias, genera, species et varietates disposita ae descripta. 2. Chrysis in sensu Linnaeano*. Friedrich Nicolai, Berlin XXIV + 412 p. + 12 pls.

Day, M.C. (1979) The species of Hymenoptera described by Linnaeus in the genera *Sphex*, *Chrysis*, *Vespa*, *Apis* and *Mutilla*. *Biological Journal of the Linnean Society*, 12, 45–84. https://doi.org/10.1111/j.1095-8312.1979.tb00049.x

du Buysson, R. (1887) Descriptions de Chrysidides nouvelles. *Revue d'Entomologie*, 6, 167–201.

du Buysson, R. (1888) Descriptions de Chrysidides nouvelles. *Revue d'Entomologie*, 7, 1–13.

du Buysson, R. (1891–1896) Les Chrysides. In: André, E. (ed.) *Species des Hyménoptères d'Europe & d'Algerie*. Tome Sixième. Vve Dubosclard, Paris, I–XII + 13–758 + 64 unnumbered pages + 32 pls. (1891) 1–88, (1892) 89–208, (1893) 209–272, (1894) 273–400, (1895) 401–624, (1896) 625–758. [Dating after Derksen & Scheiding 1963]

du Buysson, R. (1898a) Contribution aux Chrysidides du Globe. 3e Série. *Revue d'Entomologie*, 17 (5), 125–147.

du Buysson, R. (1898b) Étude des Chrysidides du Muséum de Paris. *Annales de la Société Entomologique de France*, 66 (4), 518–580 + 2 tavv.

du Buysson, R. (1899) Catalogue des insectes Hymenopteres de la famille des chrysidides du Museum de Paris. *Bulletin du Muséum National d'Histoire Naturelle*, 1899, 159–169.

du Buysson, R. (1900) Contribution aux Chrysidides du Globe (4e série). *Revue d'Entomologie*, 19, 125–158.

du Buysson, R. (1901) Sur quelques Chrysidides du Musée de Vienne. *Annalen des K.K. Naturhistorischen Hofmuseums in Wien*, 16 (1), 97–104.

du Buysson, R. (1904) Contribution aux Chrysidides du Globe (5e Série). *Revue d'Entomologie*, 23 (9–10), 253–275.

du Buysson, R. (1908a) Révision des Chrysidides de l'Égypte. *Mémoires de la Société Entomologique d'Égypte*, 1, 1–99.

du Buysson, R. (1908b) Hyménopères nouveux. Chrysidides. *Revue d'Entomologie*, 27, 207–219.

Dufour, L. & Perris, E. (1840) Mémoire sur les Insectes Hyménoptères qui nichent dans l'intérieur des tiges sèches de la Ronce. *Annales de la Société Entomologique de France*, 9, 5–53.

Ebrahimi, A. (2015) Faunistic study of Chrysididae family in Iran. *Bulletin of Research and Technology, Iranian Research Institute of Plant Protection*, 5 (5), 19–20. [In Farsi] + unpublished supplement, 124 p.

Enslin, E. (1950) On the Chrysididae (Hymenoptera) of Cyprus. *Annals and Magazine of Natural History*, (12) 3, 656–671. https://doi.org/10.1080/00222935008654092

Eversmann, E. (1858) ["1857"] Fauna Hymenopterologica Volgo-Uralensis. Continuatio. Familia Chrysidarum. *Bulletin de la Sociétè Imperiale des Naturalistes de Moscou*, 30, 544–567.

Fabricius, J.C. (1775) *Systema entomologiae, sistens Insectorum classes, ordines, genera, species, adiectis synonimis, locis, desriptionibus, observationibus*. Korti, Flensburgi et Lipsiae. 832 p. https://doi.org/10.5962/bhl.title.36510

Fabricius, J.C. (1781) *Species insectorum, exhibentes eorum differentias specificas, synonyma auctorum, loca natalia, metamorphosin, adjectis observationibus, descriptionibus*. Tomo I. C.E. Bohnii, Hamburgi et Kiloni. 522 p. + VIII. https://doi.org/10.5962/bhl.title.36509

Fabricius, J.C. (1787) *Mantissa Insectorum sistens eorum species nuper detectas adiectis characteribus genericis, differentiis, specificis, emendationibus, observationibus*. Tomo I. Impensis Christ. Gottl. Froft., Hafniae [= Copenhagen]. xx + 348 p. https://doi.org/10.5962/bhl.title.11657

Fabricius, J.C. (1794) *Entomologia systematica emendate et aucta secondum classes, ordines, genera, species adjectis synonimis, locis, observationibus, descriptionibus*. Tomo IV, C.G. Proft, Hafniae. VII + 472 p.

Fabricius, J.C. (1804) *Systema piezatorum secundum ordines, genera, species, adiectis synonymis, locis, observationibus, descriptionibus*. Apud Carolum Reichard, Brunsvigae [=Brunswick]. iii–xiv, 439 + 30 p. https://doi.org/10.5962/bhl.title.12548

Falahatpisheh, A., Fallahzadeh, M., Dousti, A.F., Strumia, F. & Saghaei, N. (2019) A further contribution to the fauna of Iranian Elampini (Hymenoptera: Chrysididae, Chrysidinae). *Journal of Entomological Research*, 11 (1), 1–9.

Falahatpisheh, A., Fallahzadeh, M., Dousti, A.F., Strumia, F. & Saghaei, N. (2020) A survey of the genus *Chrysis* (Hymenoptera: Chrysididae) in Fars province, with six new records for Iranian fauna. *Journal of Entomological Research*, 12 (4), 29–36.

Falahatpisheh, A., Fallahzadeh, M., Dousti, A.F., Strumia, F. & Saghaei, N. (2021) New records of two cuckoo wasp species (Hymenoptera: Chrysididae) from Iran. *Journal of Insect Biodiversity and Systematics*, 7 (2), 137–143. https://doi.org/10.52547/jibs.7.2.137

Farhad, A., Rosa, P., Talebi, A.A. & Ameri, A. (2015a) The genus *Chrysis* (Hymenoptera: Chrysididae) in Hormozgan province of Iran, with four new records for Iranian fauna. *Entomofauna*, 36 (2), 33–48.

Farhad, A., Talebi, A.A., Fathipour, Y. & Hajiqanbar, H. (2015b) First record of *Chrysis maidaquensis* Strumia, 2014 (Hymenoptera: Chrysididae) from Iran. In: Manzari S. (ed.) *1st Iranian International Congress of Entomology*,

29–31 August 2015. Iranian Institute of Plant Protection, Tehran, Iran, p. 97.

Farhad, A., Talebi, A.A., Fathipour, Y. & Hajiqanbar, H. (2016a) Record of *Omalus aeneus* (Fabricius, 1787) (Hymenoptera: Chrysididae) from Iran. *Proceedings of 22nd Iranian Plant Protection Congress*, 27–30 August 2016. College of Agriculture and Natural Resources, University of Tehran, Karaj, Iran, p. 460.

Farhad, A., Talebi, A.A., Rosa, P., Fathipour, Y. & Hajiqanbar, H. (2016b) Contribution to the knowledge of the Chrysididae (Hymenoptera, Aculeata) in the south of Iran, with nine new records. *Turkish Journal of Zoology*, 40, 1–13. https://doi.org/10.3906/zoo-1502-6

Farhad, A., Talebi, A.A., Fathipour, Y., Hajiqanbar, H. & Strumia, F. (2017) The genus *Holopyga* (Hymenoptera: Chrysididae) in Iran, with five new records. *Journal of Agricultural Sciences and Technology*, 19, 877–888.

Farhad, A., Rosa, P. & Talebi, A.A. (2018) Additions to the fauna of Iranian Elampini (Hymenoptera: Chrysididae, Chrysidinae), with key to species and taxonomic notes. *Journal of Crop Protection*, 7 (2), 191–206.

Farhad, A., Rosa, P., Fathipour, Y., Hajiqanbar, H. & Talebi, A.A. (2019) Two new species of *Chrysis* Linnaeus (Hymenoptera, Chrysididae) from Iran. *Journal of Asia-Pacific Entomology*, 22, 1005–1012. https://doi.org/10.1016/j.aspen.2019.08.011

Farzaneh, F.S., Saghaei, N. & Asadi, R. (2016) New records of two cuckoo wasps (Hymenoptera, Chrysididae) from Iran. *Proceedings of 22nd Iranian Plant Protection Congress*, 27–30 August 2016. College of Agriculture and Natural Resources, University of Tehran, Karaj, Iran, p. 439.

Farzaneh, F.S., Saghaei, N., Asadi, R. & Strumia, F. (2017) A contribution to the fauna of cuckoo wasps (Hymenoptera, Chrysididae) in Southern Iran. *Entomofauna*, 38 (23), 493–504.

Forster, J.R. (1771) *Novae Species Insectorum*. Centuria I. T. Davies & B. White, London. VIII + 100 p. https://doi.org/10.5962/bhl.title.152194

Förster, A. (1853) Eine Centurie neuer Hymenopteren. Beschreibungen neuer Arten aus der Familiae der Chrysididen. *Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande und Westphalens*, 10, 266–362.

Förster, A. (1868) Synopsis der Familien und Gattungen der Ichneumonen. *Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande und Westphalens*, 25, 135–221.

García Mercet, R. (1904) Especies nuevas de crisididos. *Bolétin de la Real Sociedad Española de Historia Natural*, 4, 83–89.

Ghahari, H. (2019) Faunistic survey of parasitoid wasps (Hymenoptera) in forest areas of Mazandaran province, northern Iran. *Iranian Journal of Forest*, 11 (1), 61–79.

Giebel, C.G. (1862) Wirbelthier und Insektenreste im Bernstein. *Halle, Zeitschrift für die Gesammten Naturwissenschaft*, 20, 311–21.

Guérin-Méneville, F.E. (1842) Description de quelques Chrysidides nouvelles. *Revue Zoologique*, 5 (5), 144–150.

Gribodo, G. (1879) Note Imenotterologiche. *Annali del Museo Civico di Storia Naturale di Genova*, 14, 325–347.

Gribodo, G. (1924) Imenotteri aculeati di Cirenaica raccolti dal Prof. Alessandro Ghigi durante l'escursione organizzata dal Touring Club Italiano 15–24 aprile 1920. *Atti della Società Italiana di Scienze Naturali e del Museo civico di Storia naturale di Milano*, 63 (3), 245–268.

Haldeman, S.S. (1844) Descriptions of insects presumed to be undescribed. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 2, 53–55.

Harris, M. (1776) ["1776–1780"] *An exposition of English Insects*. White and Robinson, London. 166 p.

ICZN (1999) *International Code of Zoological Nomenclature*. Fourth Edition. ITZN, London. i–xxx + 306 p.

Invrea, F. (1939) Secondo contributo per lo studio dei crisidi delle Isole italiane dell'Egeo. *Bollettino della Società Entomologica Italiana*, 71 (5), 107–109.

Iranmanesh, S., Strumia, F., Madjdzadeh, S.M., Purrezaali, M. & Lashkari, M.R. (2017) Fauna and species richness of chrysidid wasps (Hymenoptera: Chrysididae) in mountains of Kerman province, south-East Iran. *Journal of Insect Biodiversity and Systematics*, 3 (4), 293–307. https://doi.org/10.52547/jibs.3.4.293

Japoshvili, G. & Ljubomirov, T. (2011) New records of Chrysididae, Mutillidae, Crabronidae, and Sphecidae (Insecta: Hymenoptera) from Gölcük Natural Park, Isparta, Turkey. *Journal of Entomological Society of Iran*, 31 (1), 95–97.

Kawada, R., Lanes, G.O. & Azevedo, C.O. (2015) Evolution of metapostnotum in flat wasps (Hymenoptera, Bethylidae), implications for homology assessments in Chrysidoidea. *PLoS One*, 10 (10), e0140051. https://doi.org/10.1371/journal.pone.0140051

Kimsey, L.S. (1986) Designation of chrysidid lectotypes. *The Pan-Pacific Entomologist*, 62, 105–110.

Kimsey, L.S. (1987) Review of the Subfamily Parnopinae (Hymenoptera, Chrysididae). *Journal of the Kansas Entomological Society*, 60 (1), 83–91.

Kimsey, L.S. (1988) The identity of three Fabrician Chrysidid species (Hymenoptera). *Psyche*, 95 (3–4), 271–274. https://doi.org/10.1155/1987/43787

Kimsey, L. & Bohart R.M. (1991) ["1990"]. *The Chrysidid Wasps of the World*. Oxford Press, New York. 652 p. https://doi.org/10.1093/oso/9780198540106.001.0001

Klug, J.C.F. (1835) Des insectes d'Andalusie. In: Waltl, J. (ed.) *Reise durch Tyrol, Oberitalien und Piemont nach dem südlichen Spanien, nebst einem Anhange zoologischen Inhalts (Über die Thiere Andalusiens)*. Verlag der Pustet'schen Buchhandlung (J.F. Winkler), Passau (1. Aufl.), pp. 158–164.

Klug, F. (1845) *Symbolae Physicae seu Icones et Descriptiones Insectorum quae ex Itinere per Africam borealem et Asiam occidentalem Friderici Guilelmi Hemprich et Christiani Godofredi Ehrenberg Medicinae et Chirurgiae Doctorum studio novae aut illustratae redierunt*. Decas Quinta. Officina Academica, Berolini, 41 unnumbered pages + pls. 41–50.

Lanes, G.O., Kawada R., Azevedo C.O. & Brothers D.J. (2020) Revisited morphology applied for Systematics of flat wasps (Hymenoptera, Bethylidae). *Zootaxa*, 4752 (1), 1–127. https://doi.org/10.11646/zootaxa.4752.1.1

Latreille, P.A. (1797) *Précis des caractères génériques des Insectes, disposés dans un ordre naturel par le Citoyen Latreille*. 'An V'. Prévôt, Paris; F. Bourdeaux, Brive. I–XIV + 1–201 + 7 unnumbered pp. + 1 tab. [Dating after Evenhuis 1997]. https://doi.org/10.5962/bhl.title.58411

Latreille, P.A. (1802) *Histoire naturelle générale et particuliére des Crustacés et des Insectes. Ouvrage faisant suite à l'Histoire Naturelle générale et particulière, composée par Leclercq de Buffon, et rédigée par C.S. Sonnini, membre de plusiers Sociétés savantes. Familles naturelles des genres*. Tome troisième. F. Dufart, Paris. xii + 455 p. [13–467 pp.] https://doi.org/10.5962/bhl.title.15764

Latreille, P.A. (1809) *Genera Crustaceorum et Insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata*. Tomus quartus et ultimus. Amand Koenig, Parisiis et Argentorati [= Paris and Strasbourg]. 399 p.

Latreille, P.A. (1810) Considérations générales de l'ordre des animaux composant les classes des Crustacés, des Arachnides, et des Insectes. F. Schoell, Paris. 444 p. https://doi.org/10.5962/bhl.title.39620

Lepeletier [de Saint Fargeau], [A.L.M.] (1806) Mémoire sur quelques espéces nouvelles d'insectes de la section des Hyménoptères, appelés les Porte-tuyaux, et sur les caractères de cette famille et des genres qui la composent. *Annales du Muséum d'Histoire Naturelle*, 7, 115–129.

Lichtenstein, [J.] (1876) Note sur le genre *Chrysis*. *Petites Nouvelles Entomologiques*, 145, 27.

Linnaeus, C. (1758) *Systema Naturae per Regna tria Naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis*. Editio Decima, Refurmata, Tomus I. Laurenti Salvii, Holmiae. 824 p. + IV. https://doi.org/10.5962/bhl.title.542

Linnaeus, C. (1761) *Fauna Suecia sistens Animalia Sueciae Regni: Mammalia, Aves, Amphibia, Pisces, Insecta, Vermes. Distributa per Classes et Ordines, enera et Species, cum Differentiis, Specierum, Synonymis, Auctorum, Nominibus Incolarum, Locis natalium, Descriptionibus Insectorum*. Editio Altera, Auctior. Laurentius Salvius, Stockholm. 578 p. + 2 pl. https://doi.org/10.5962/bhl.title.46380

Linsenmaier, W. (1951) Die europäischen Chrysididen (Hymenoptera). Versuch einer natürlichen Ordnung mit Diagnosen. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 24 (1), 1–110.

Linsenmaier, W. (1959a) Revision der Familie Chrysididae (Hymenoptera) mit besonderer Berücksichtigung der europäischen Spezies. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 32 (1), 1–232.

Linsenmaier, W. (1959b) Revision der Familie Chrysididae (Hymenoptera). Nachtrag. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 32 (2–3), 233–240.

Linsenmaier, W. (1968) Revision der Familie Chrysididae (Hymenoptera). Zweiter Nachtrag. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 41 (1–4), 1–144.

Linsenmaier, W. (1969) The chrysidid wasps of Palestine (Hym., Chrysididae). A faunistic catalogue with descriptions of new species and forms. *Israel Journal of Entomology*, 4, 343–375.

Linsenmaier, W. (1987) Revision der Familie Chrysididae. (Hymenoptera). 4 Teil. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 60 (1–2), 133–158.

Linsenmaier, W. (1994) The Chrysididae (Insecta: Hymenoptera) of the Arabian Peninsula. *Fauna of Saudi Arabia*, 14, 145–206.

Linsenmaier, W. (1997) Altes und Neues von den Chrysididen. (Hymenoptera, Chrysididae). *Entomofauna*, 18 (19),

245–300.

Linsenmaier, W. (1999) Die Goldwespen Nordafrikas (Hymenoptera, Chrysididae). *Entomofauna*, Supplement, 10, 1–210.

Lucas, P.H. (1849) Hyménoptères. In: Deshayes, G.P., Guichenot, A., Loche, V. & Lucas, P.H. (eds) *Exploration scientifique de l'Algérie pendant les années 1840, 1841, 1842. Sciences physiques. Zoologie. III. Histoire naturelle des animaux articulés. Troisième partie. Insectes (Suite)*. Imprimerie Nationale, Paris, pp. 1–527.

Madl, M. & Rosa, P. (2012) A Catalogue of the Chrysididae (Hymenoptera: Chrysidoidea) of the Ethiopian Region excluding Malagasy Subregion. *Linzer Biologische Beiträge*, 44 (1), 5–169.

Magretti, P. (1890) Imenotteri di Siria raccolti dall'avvocato Augusto Medana, con descrizione di alcune specie nuove. *Annali del Museo Civico di Storia Naturale*, Genova, 9, 522–548.

Martynova, K.V. (2017) *Hedychridium monochroum* and *Chrysis lanceolata* (Hymenoptera: Chrysididae) - two species of cuckoo wasps reared from nests of *Solierella compedita* (Hymenoptera: Crabronidae) in southeastern Ukraine. *Turkish Journal of Zoology*, 41, 397–407. https://doi.org/10.3906/zoo-1603-43

Mercet, R.G. (1902) Nota sobre algunos Crisididos de Siria. *Bolétin de la Real Sociedad Española de Historia Natural*, 2, 221–223.

Mocsáry, A. (1882) *Chrysididae Faunae Hungaricae*. Vol. 3. Hungarian Academy of Science, Budapest. 94 p.

Mocsáry, A. (1883) Hymenoptera nova europaea et exotica. *Értekezések a Természettudományok Köréből*, 13 (11), 1–72.

Mocsáry, A. (1887) Studia Synonymica. *Természetrajzi Füzetek*, 11 (1), 12–20.

Mocsáry, A. (1889) *Monographia Chrysididarum Orbis Terrarum Universi*. Hungarian Academy of Science, Budapest. 643 p.

Mocsáry, A. (1890) Additamentum primum ad monographiam Chrysididarum Orbis Terrarum Universi. *Természetrajzi Füzetek*, 13 (2–3), 45–66.

Mocsáry, A. (1897) Hymenoptera nova e Fauna Hungarica. *Természetrajzi Füzetek*, 20, 644–647.

Mocsáry, A. (1899) Species Chrysididarum novae in collectione Musaei Nationalis Hungarici. *Természetrajzi Füzetek*, 22, 483–494.

Mocsáry, A. (1902) Species aliquot Chrysididarum novae. *Természetrajzi Füzetek*, 25, 334–349.

Mocsáry, A. (1909) Chrysididae in Territorio Syr-Dariae a Leone Wollmann collectae et ab Alexandro Mocsáry recensitae. *Archivum Zoologicum*, 1 (1), 1–9.

Mocsáry, A. (1911) Species Chrysididarum novae. I. *Annales Historico-Naturales Musei Nationalis Hungarici*, 9 (2), 443–474.

Mocsáry, A. (1912a) Species Chrysididarum novae. II. *Annales Historico-Naturales Musei Nationalis Hungarici*, 10 (2), 375–414.

Mocsáry, A. (1912b) Species Chrysididarum novae. III. *Annales Historico-Naturales Musei Nationalis Hungarici*, 10 (1), 549–592.

Mocsáry, A. (1914) Chrysididae plerumque exoticae novae. *Annales Historico-Naturales Musei Nationalis Hungarici*, 12, 1–74.

Móczár, L. (1964) Ergebnisse der Revision der Goldwespenfauna des Karpatenbeckens (Hymenoptera: Chrysididae). *Acta Zoologica Academiae Scientiarum Hungaricae*, 10, 433–450.

Móczár, L. (1965) Weitere Ergebnisse der Revision der Goldwespenfauna des Karpatenbeckens (Hymenoptera, Genus: Chrysis). *Acta Zoologica Academiae Scientiarum Hungaricae*, 11, 168–180.

Móczár, L. (1997) Revision of *Cleptes* (*Leiocleptes*) species of the world (Hymenoptera: Chrysididae, Cleptinae). *Folia Entomologica Hungarica*, 58, 89–100.

Móczár, L. (1998) Revision of the Cleptinae of world. Genus *Cleptes* subgenera and species groups (Hymenoptera, Chrysididae). *Entomofauna*, 30 (19), 501–516.

Móczár, L. (2001) World revision of the *Cleptes semiauratus* group (Hymenoptera, Chrysididae, Cleptinae). *Linzer Biologische Beiträge*, 33 (1), 905–931.

Morgan, D. (1984) *Cuckoo-Wasps Hymenoptera, Chrysididae*. Handbooks for the Identification of British insects, Vol 6 (5). Royal Entomological Society of London, London. 37 p.

Nurse, G.C. (1902) New species of Indian Chrysididae. *The Entomologist*, 35, 304–308.

Olivier, A.G. (1790) *Encyclopédie Méthodique*. Histoire Naturelle. Insectes, Tome 5. Paris, Panckoucke. 793 p.

Özbek, H. & Strumia, F. (2019) Research on the sub family Chrysidinae (Hymenoptera: Chrysididae) Fauna of

Turkey with distributional evaluation. *Acta Entomologica Serbica*, 23 (2), 75–104.

Pallas, P.S. (1771) *Reise durch verschiedene Provinzen des Russischen Reichs*. Erster Theil. Kayserlichen Akademie der Wissenschaften, St. Petersburg. [10] + 3–504 p. + pls. 1–11.

Panzer, G.W.F. (1792–1844) *Faunae Insectorum Germaniae initia oder Deutschlands Insecten, Nürnberg*. (1797) Hf. 39–48; (1798) Hf. 49–60; (1799) Hf. 61–72; (1800) Hf. 73–79; (1801) Hf. 80–85 (1805) Hf. 97–99; (1806–1809) Hf. 101–107. [Datind after Sherborn, 1923].

Pärn, M., Soon, V., Vallisoo, T., Hovi, K. & Luig, J. (2014) Host specificity of the tribe Chrysidini (Hymenoptera, Chrysididae) in Estonia ascertained with trap-nesting. *European Journal of Entomology*, 112, 91–99. https://doi.org/10.14411/eje.2015.012

Paukkunen, J., Berg, A., Soon, V., Ødegaard, F. & Rosa, P. (2015) An illustrated key to the cuckoo wasps (Hymenoptera, Chrysididae) of the Nordic and Baltic countries, with description of a new species. *ZooKeys*, 548, 1–116. https://doi.org/10.3897/zookeys.548.6164

Pauli, T., Castillo-Cajas, R.F., Rosa, P., Kukowka, S., Berg, A., van den Berghe, E., Fornoff, F., Hopfenmüller, S., Niehuis, M., Peters, R.S., Staab, M., Strumia F., Tischendorf, S., Schmitt, F. & Niehuis, O. (2019) Phylogenetic analysis of cuckoo wasps (Chrysididae) reveals the partially artificial nature of the current classification at the genus level in this family of Hymenoptera. *Systematic Entomology*, 44 (2), 322–335. https://doi.org/10.1111/syen.12323

Radoszkovsky, O. (1880) ["1879"]. Les Chrysides et Sphégides du Caucase. *Horae Societatis Entomologicae Rossicae*, 15, 140–156.

Radoszkowski, O. (1866) Enumération des espècies de Chrysides de Russie. *Horae Societatis Entomologicae Rossicae*, 3, 295–310.

Radoszkowski, O. (1876) Compte-rendu des Hyménoptères recueillis en Egypte et Abyssinie en 1873. *Horae Societatis Entomologicae Rossicae*, 12, 111–150.

Radoszkowski, O. (1877) Chrysidiformes, Mutillidae et Sphegidae. In: Fedtshenko, A.P. (ed) *Puteshestvie v Turkestan* [Voyage au Turkestan d'Alexis Fedtschenko], (14) 2 (5), Sankt-Petersburg, pp. 1–87 + 8 pls. [In Russian]

Radoszkowsky, O., 1877 ["1876"] Matériaux pour servir à une faune hyménoptérologique de la Russie. *Horae Societatis Entomologicae Rossicae*, 12 (1), 82–110.

Radoszkowski, O. (1881) Sitzung am 5 (17) Februar. *Horae Societatis Entomologicae Rossicae*, 16, iii–xxii.

Radoszkowski, O. (1887) Insecta in itinere Cl. N. Przewalskii in Asia Centrali novissime lecta. *Horae Societatis Entomologicae Rossicae*, 21, 41–51 + 2 pls.

Radoszkowski, O. (1889 ["1888"]) Révision des armures copulatrices des mâles de la tribu des Chrysides. *Horae Societatis Entomologicae Rossicae*, 23 (1–2), 3–40, pls 1–6.

Radoszkowski, O. (1890) Hyménoptères recoltés sur le Mont Ararat. *Horae Societatis Entomologicae Rossicae*, 24, 502–510.

Radoszkowski, O. (1891) Descriptions de Chrysides nouvelles. *Revue d'Entomologie*, 10, 183–198.

Radoszkowski, O. (1893) ["1892"] Faune hyménoptèrologique Transcaspienne. *Horae Societatis Entomologicae Rossicae*, 24, 38–81.

Rahmani, Z., Rakhshani, E. & Carpenter, J.M. (2020) Updated Checklist of Vespidae (Hymenoptera: Vespoidea) in Iran. *Journal of Insect Biodiversity and Systematics*, 6 (1), 27–86. https://doi.org/10.52547/jibs.6.1.27

Richards, O.W. (1935) Notes on the nomenclature of the aculeate Hymenoptera, with special reference to British genera and species. *Transactions of the Royal Entomological Society*, 83, 143-176. https://doi.org/10.1111/j.1365-2311.1935.tb00420.x

Rosa, P. (2004a) *Chrysis schmideggeri* n.sp., a new cuckoo-wasp of the *Chrysis rubricata*-group (Hymenoptera, Chrysididae). *Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano*, 145 (2), 307–319.

Rosa, P. (2004b) Alcune osservazioni sulle relazioni tra Vegetazione e Crisidi in Italia (Hymenoptera, Chrysididae). *Giornale Italiano di Entomologia*, 11 (52), 79–90.

Rosa, P. (2009) Catalogo dei tipi dei Crisidi (Hymenoptera, Chrysididae) del Museo Civico di Storia Naturale "G. Doria" di Genova. *Annali del Museo Civico di Storia Naturale "G. Doria"*, 100, 209–272.

Rosa P. (2017) Review of the Palaearctic species of the genus *Colpopyga* (Hymenoptera: Chrysididae) with description

of a new species. *Zoosystematica Rossica*, 26 (2), 294–306. https://doi.org/10.31610/zsr/2017.26.2.294

Rosa, P. (2018a) New records of cuckoo-wasps (Hymenoptera, Chrysididae) from Russia, with taxonomic notes. *Far Eastern Entomologist*, 360, 1–14. https://doi.org/10.25221/fee.360.1

Rosa, P. (2018b) *Chrysis serena* Radoszkowski, 1891 synonym of *Chrysis zonata* Dahlbom, 1854. *Zoosystematica Rossica*, 27 (1), 169–176. https://doi.org/10.31610/zsr/2018.27.1.169

Rosa, P. (2018c) On the status of the cuckoo wasp genus *Allochrysis*, with descriptions of the *Chrysis ear* and *C. slava* species groups (Hymenoptera: Chrysididae). *Zoosystematica Rossica*, 27 (2), 268–286. https://doi.org/10.31610/zsr/2018.27.2.268

Rosa, P. (2019) Two new species of *Hedychrum* Latreille from Middle East and Pakistan (Hymenoptera, Chrysididae). *Zoology in the Middle East*, 65 (1), 1–12. https://doi.org/10.1080/09397140.2019.1571742

Rosa, P. (2020) New records of Chrysididae from Iran (Hymenoptera). *Linzer Biologische Beiträge*, 52 (1), 461–474.

Rosa, P. (2023a) First record of the genus *Colpopyga* Semenov, 1954 from the Ethiopian Region, with description of a new species (Hymenoptera, Chrysididae). *Annalen des Naturhistorischen Museums in Wien* (Serie B), 125, 37–43.

Rosa, P. (2023b) New records for the Indian cuckoo wasp fauna (Hymenoptera: Chrysididae) with description of two new species and remarks on types of Smith and Cameron. *Journal of Natural History*, 57 (25–28), 1396–1433. https://doi.org/10.1080/00222933.2023.2250158

Rosa, P. (2024) *Chrysis fuscipennis* or *Chrysis angolensis*? An answer with new synonymies, a new combination and species resurrected (Hymenoptera, Chrysididae). *Journal of Entomological and Acarological Research*, 56, 12417. https://doi.org.10.4081/jear.2024.12417

Rosa, P. & Greeff, M. (2021) The types of Chrysididae (Insecta, Hymenoptera) deposited at the Institute of Entomology of the Swiss Federal Institute of Technology. *Zootaxa*, 4908 (2), 181–204. https://doi.org/10.11646/zootaxa.4908.2.2

Rosa, P. & Halada, M. (2021) New species and new records of cuckoo wasps (Hymenoptera: Chrysididae) from India and Sri Lanka. *Zoosystematica Rossica*, 30 (2), 190–212. https://doi.org/10.31610/zsr/2021.30.2.19

Rosa, P. & Lotfalizadeh, H. (2013) A new species-group of *Chrysura* Dahlbom, 1845 (Hymenoptera: Chrysididae), with description of *Ch. baiocchii* sp. nov. from Iran. *Zootaxa*, 3737 (1), 24–32. https://doi.org/10.11646/zootaxa.3737.1.2

Rosa, P. & Makris, C. (2023) A revision of the *Chrysis leachii* group from Cyprus, with a description of an outstanding species and a new synonymy (Hymenoptera, Chrysididae). *Taxonomy*, 3, 401–414. https://doi.org/10.3390/taxonomy3030023

Rosa, P. & Vårdal, H. (2015) An annotated catalogue of the types of Chrysididae (Hymenoptera) at the Swedish Museum of Natural History, Stockholm, with brief historical notes. *ZooKeys*, 495, 79–132. https://doi.org/10.3897/zookeys.495.9356

Rosa, P. & Xu, Z-f. (2015) Annotated type catalogue of the Chrysididae (Insecta, Hymenoptera) deposited in the collection of Maximilian Spinola (1780–1857), Turin. *ZooKeys*, 471, 1–96. https://doi.org/10.3897/zookeys.471.6558

Rosa, P., Lotfalizadeh H. & Pourrafei L. (2013) First checklist of the chrysidid wasps (Hymenoptera: Chrysididae) of Iran. *Zootaxa*, 3700 (1), 1–47. https://doi.org/10.11646/zootaxa.3700.1.1

Rosa, P., Wei, N-s. & Xu, Z-f. (2014) An annotated checklist of the chrysidid wasps (Hymenoptera, Chrysididae) from China. *ZooKeys*, 455: 1–128. https://doi.org/10.3897/zookeys.455.6557

Rosa, P., Antropov, A. & Xu, Z-f. (2015a) A catalogue of the Chrysididae (Insecta, Hymenoptera) types deposited in the Zoological Museum, Moscow Lomonosov State University, Russia. *Zootaxa*, 3990 (1), 1–31. https://doi.org/10.11646/zootaxa.3990.1.1

Rosa, P., Forshage, M., Paukkunen, J. & Soon, V. (2015b) *Cleptes pallipes* Lepeletier synonym of *Cleptes semiauratus* (Linnaeus) and description of *Cleptes striatipleuris* sp. nov. (Hymenoptera: Chrysididae, Cleptinae). *Zootaxa*, 4039 (4), 543–552. https://doi.org/10.11646/zootaxa.4039.4.4

Rosa, P., Wei, N-s. & Xu, Z-f. (2015c) Revalidation of genus *Chrysellampus* Semenov, 1932, with description of two new species from China (Hymenoptera, Chrysididae). *Zootaxa*, 4034 (1), 148–160. https://doi.org/10.11646/zootaxa.4034.1.7

Rosa, P., Wiśniowski, B. & Xu, Z-f. (2015d) Annotated type catalogue of the Chrysididae (Insecta, Hymenoptera) deposited in the collection of Radoszkowski in the Polish Academy of Sciences, Kraków. *ZooKeys*, 486, 1–100. https://doi.org/10.3897/zookeys.486.8753

Rosa, P., Belokobylskij S.A. & Zaytseva, L.A. (2017a) The Chrysididae types described by Semenov-Tian-Shanskij and deposited at the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg (Insecta, Hymenoptera). *Proceedings of the Zoological Institute RAS*, Supplement, 5, 1–266.

Rosa, P., Lelej A.S., Belokobylskij S.A., Loktionov V.M. & Zaytseva L.A. (2017b) Family Chrysididae. In: Lelej, A.S., Proshchalykin, M.Yu. & Loktionov, V.M. (eds) *Annotated Catalogue of the Hymenoptera of Russia. Volume 1. Symphyta and Apocrita: Aculeata*. Russkaya kollektsia SPb: St Petersburg. *Proceedings of the Zoological Institue RAS*, Supplement, 6, 126–144. https://doi.org/10.31610/trudyzin/2017.supl.6.5

Rosa, P., Pavesi M., Soon V. & Niehuis O. (2017c) Pseudochrysis Semenov, 1891 is the valid genus name for a group of cuckoo wasps frequently referred to as *Pseudospinolia* Linsenmaier, 1951 (Hymenoptera, Chrysididae). *Deutsche Entomologische Zeitschrift*, 64 (1), 69–75. https://doi.org/10.3897/dez.64.13005

Rosa, P., Proshchalykin M.Yu., Lelej A.S., Loktionov V.M. & Mokrousov M. (2017d) New records of Chrysididae (Hymenoptera) from Russia with description of five new species. *Far Eastern Entomologist*, 345, 1–33. https://doi.org/10.25221/fee.345.1

Rosa, P., Vas Z. & Xu Z-f. (2017e) The Palaearctic types of Chrysididae (Insecta, Hymenoptera) deposited in Hungarian Natural History Museum, Budapest. *Zootaxa*, 4252 (1), 1–130. https://doi.org/10.11646/zootaxa.4252.1.1

Rosa, P., Wei N-s. & Xu Z-f. (2017f) One new species and three new records of *Chrysis* Linnaeus from China (Hymenoptera, Chrysididae). *ZooKeys*, 669, 65–88. https://doi.10.3897/zookeys.669.12398

Rosa, P., Lelej A.S., Belokobylskij S.A., Vinokurov N.B. & Zaytseva L.A. (2019) Illustrated and annotated check-list of the Russian cuckoo wasps (Hymenoptera, Chrysididae). *Entomofauna*, supplement 23, 1–360.

Rosa, P., Gadallah, N.S. & Brothers, D.J. (2020a) Biodiversity of the aculeate wasps (Hymenoptera: Aculeata) of the Arabian Peninsula: Chrysidoidea, Chrysididae. *Zootaxa*, 4754 (1), 92–101. https://doi.org/10.11646/zootaxa.4754.1.10

Rosa, P., Madl M., Zettel H. & Zimmermann D. (2020b) Annotated catalogue of the Chrysididae (Insecta, Hymenoptera) types deposited at the Naturhistorisches Museum, Vienna. *Annalen des Naturhistorischen Museums in Wien*, Serie B, 17–140.

Rosa, P., Heim R. & Bernasconi M.V. (2022) The Palaearctic types of Chrysididae (Insecta, Hymenoptera) deposited in the Linsenmaier collection. Part 2. Elampini: genus *Hedychridium* Abeille de Perrin, 1878. *Zootaxa*, 5090, 1–94. https://doi.org/10.11646/zootaxa.5090.1.1

Rosa, P., Pavesi M. & Brothers D.J. (2023a) Solving nomenclatural problems of genus-group names of the cuckoo-wasps (Hymenoptera, Chrysididae): objectively invalid and unavailable names, new type-species designations, new names, a new genus and new synonymies. *Zootaxa*, 5301 (1), 1–50. https://doi.org/10.11646/zootaxa.5301.1.1

Rosa, P., Wood T.J., Silva T.L., Verissimo J., Mata V.A., Beja P., Michez D. & Ferreira S.A.F. (2023b) The InBIO Barcoding Initiative Database: contribution to the knowledge on DNA barcodes of cuckoo wasps, with description of new species (Hymenoptera, Chrysididae). *Biodiversity Data Journal*, 11, e98743. https://doi.org/10.3897/BDJ.11.e98743

Rossi, P. (1790) *Fauna etrusca sistens Insecta quae in provinciis Florentina et Pisana praesertim collegit*. Tomus secundus. Thomae Masi et Sociorum, Liburni [= Livorno]. 348 p. + 10 pl. https://doi.org/10.5962/bhl.title.15771

Rossi, P. (1792) *Mantissa Insectorum Exhibens Species Nuper in Etruria Collectas a Petro Rossio Adiectis Faunae Etruscae Illustrationibus, ac Emendationibus*. Polloni, Pisa. 150 p. https://doi.org/10.5962/bhl.title.49449

Samin, N., Ghahari, H. & Bagriacik, N. (2014) The species of Chrysididae and Megachilidae from Iran (Hymenoptera: Chrysidoidea, Apoidea). *Wuyi Science Journal*, 30 (10), 121–127.

Schenck, A.C.F. (1856) Beschreibung der in Nassau aufgafundenen Goldwespen (Chrysidida) nebst einer Einleitung über die Familie im Allgemeinen und einer kurzen Beschreibung der übrigen deutschen Arten. *Jahrbücher des Vereins für Naturkunde im Herzogthum Nassau*, 11, 13–89.

Scopoli, J.A. (1763) *Entomologia Carniolica exhibens Insecta Carnioliae indigena et distributa in ordines, genera, species, varietates. Methodo Linnaeano*. Typis Ioannis Thomae Trattner, Vindobonae [= Vienna], [1-36], 420, [4] pp. https://doi.org/10.5962/bhl.title.34434

Semenov-Tian-Shansky, A.P. (1910) ["1909"] Chrysididarum species novae vel parum cognitae (Hymenoptera). IV. *Russkoe Entomologicheckoe Obozrenie* [*Russian Entomological Review*], 9 (3), 213–226.

Semenov-Tian-Shanskij, A.P. (1912) Chrysididarum species novae vel parum cognitae (Hymenoptera). V. *Russkoe*

Entomologicheckoe Obozrenie [*Russian Entomological Review*], 12 (2), 177–201.

Semenov-Tian-Shanskij, A.P. (1920) Revisio synoptica Cleptidarum faunae rossicae (Hymenoptera Proctotrypodea). *Bulletin de l'Académie des Sciences de Russie*, 1920, 303–328.

Semenov-Tian-Shanskij, A.P. (1932) Supplementa ad Chrysididarum monographias ab A.G. Dahlbom (1854), A. Mocsáry (1889), R. du Buysson (1896) et H. Bishoff (1913) editas. I. *Horae Societatis Entomologicae Rossicae*, 42 (3), 1–48.

Semenov-Tian-Shanskij, A.P. (1954) [Classification of the tribe Hedychrini Mocs. (Hymenoptera, Chrysididae) and description of new species]. *Trudy Zoologicheskogo Instituta Akademii Nauk SSSR*, 15, 138–145. [In Russian]

Semenov-Tian-Shanskij, A.P. (1967) [New species of gold wasps (Hymenoptera, Chrysididae)]. *Trudy Zoologicheskogo Instituta Akademii Nauk SSSR*, 43, 118–184. [In Russian]

Semenov-Tian-Shanskij, A.P. & Nikol'skaya, M.N. (1954) [Cuckoo-wasps (Hymenoptera, Chrysididae) of Tadjikistan]. *Trudy Zoologicheskogo Instituta Akademii Nauk SSSR*, 15, 89–137. [In Russian]

Semenow, A. (1891) *Pseudochrysis* (*Spintharis*) *virgo*, sp. n. *Horae Societatis Entomologicae Rossicae*, 25, 441–444.

Semenow, A. (1892a) Chrysididarum species novae. Mélanges biologiques. *Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg*, 13, 241–265 [4 March 1892]. *Also published in: *Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg*, N.S. 3 (35), 71–95.

Semenow, A. (1892b) De genere Pseudochrysis m. *Horae Societatis Entomologicae Rossicae*, 26, 480–491.

Semenow, A. (1901) Chrysididarum species novae vel parum cognitae (Hymenoptera). I. *Russkoe Entomologicheckoe Obozrenie* [*Russian Entomological Review*], 1 (1–2), 23–27.

Semenow, A. (1902) Generica quaedam nomina mutanda vel emendata. *Revue Russe d'Entomologie*, 2, 353.

Shuckard, W.E. (1837) ["1836"] Description of the genera and species of the British Chrysididae. *Entomologist's Magazine*, 4, 156–177.

Spinola, M. (1806–1808) *Insectorum Liguriae Species Novae aut Rariores quas in Agro Ligustico Nuper Detexit, Descripsit et Iconibus Illustravit Maximilianus Spinola, Adjecto Catalogo Specierum Auctoribus jam Enumeratarum, quae in Eadem Regione Passim Cccurrunt*. Yves Gravier, Genuae. (1806) 1, xvii + 160 + 2 pls., (1808) 2, 83–262 + 5 pls.

Spinola, M. (1838) Compte rendu des hyménoptères recueillis par M. Fischer pendant son voyage en Égypte, et communiqués par M. le docteur Waltl a Maximilien Spinola. *Annales de la Société Entomologique de France*, 7, 437–457.

Spinola, M. (1843) Notes sur quelques Hyménoptères peu connus, recueillis en Espagne, pendant l'année 1842, par M. Victor Ghiliani, voyageur-naturaliste. *Annales de la Société Entomologique de France*, 1 (2), 111–129.

Strumia, F. (1994) Hedychidium mochii, new species from Burma and *H. monochroum* ssp. *lampunense* Tsuneki new synonimy. *Bollettino della Società Entomologica Italiana*, 126 (2), 155–159.

Strumia, F. (2004) Lectotype designation of *Hedychridium virescens* Buysson, 1908, male description of *Cleptes juengeri* Linsenmaier, 1994 and of the female of *C. triestensis* Moczar, 2000 (Hymenoptera, Chrysididae). *Bollettino del Museo regionale di Scienze naturali Torino*, 21 (2), 475–486.

Strumia, F. (2014) Order Hymenoptera, family Chrysididae. Upgraded checklist of the Chrysididae from the U.A.E. In: van Harten A. (ed) Arthropod fauna of the U.A.E., vol. 5, Dar Al Ummah Printing, Abu Dabi, pp. 471–504. https://doi.org/10.4001/003.017.0220

Strumia, F. & Dawah, H. (2012) New Hymenoptera Chrysididae from south Saudi Arabia. *Frustula Entomologica* (N.S.), 33, 171–179.

Strumia, F. & Fallahzadeh, M. (2015) New records and three new species of Chrysididae (Hymenoptera, Chrysidoidea) from Iran. *Journal of Insect Biodiversity*, 3 (15), 1–32. https://doi.org/10.12976/jib/2015.3.15

Strumia, F. & Fallahzadeh, M. (2016) A new species of the genus *Haba* Semenov, 1954 (Hymenoptera: Chrysididae) from Iran, with a key to species. *Zoology in the Middle East*, 62, (4), 358–362. https://doi.org/10.1080/09397140.2016.1250858

Strumia, F. & Yıldırım, E. (2009) ["2007"] Contribution to the knowledge of Chrysididae fauna of Turkey (Hymenoptera, Aculeata). *Frustula Entomologica*, 30 (43), 55–92.

Strumia, F., Fallahzadeh, M. & Izadi, E. (2016a) *Chrysura izadiae* sp.nov., a new cuckoo wasp (Hymenoptera, Chrysididae) from Southern Iran. *Zootaxa*, 4061 (3), 281–285. http://doi.org/10.11646/zootaxa.4061.3.7

Strumia, F., Fallahzadeh, M., Izadi, E. & Tavasoli, H. (2016b) Additions to the tribe Elampini (Hymenoptera, Chrysididae) of Southern Iran, with description of a new subspecies. *Trends in Entomology*, 12, 51–61.

Tarbinsky, Yu.S. (2002a) [Taxonomic review of the family Chrysididae (Hymenoptera) from Tian Shan fauna and

adjacent territories, with a key to genera, descriptions of new genera and new species. The golden wasp genus *Chrysis* L. (Hymenoptera, Chrysididae) in Tian Shan and adjacent territories. II. Species groups *succincta*, *leachii*, *cerastens* (sic), *taczanovskii*, *pallidicornis*, *smaragdula*, *elegans*, *subsinuata*, *serpentula*, *facialis*, *maculicornis*, *millenaris*]. *Entomological Investigations in Kyrgyzstan*, 22, 11–22. [In Russian]

Tarbinsky, Yu.S. (2002b) The golden wasp genus *Chrysis* L. (Hymenoptera, Chrysididae) in Tian Shan and adjacent territories. III. Species groups *zaravshanica*, *sogdiana*, *aestiva*, *rufitarsis*, *pulchella*, *inaequalis*. *Entomological Investigations in Kyrgyzstan*, 22, 23–30. [In Russian]

Tarbinsky, Yu.S. (2002c) The golden wasp genus *Chrysis* L. (Hymenoptera, Chrysididae) in Tien Shan and adjacent territories. IV. Species groups *graelsii*, *comparata*, *splendidula*, *viridula*, *scutellaris*. *Entomological Investigations in Kyrgyzstan*, 22, 31–44.

Tavasoli, H. & Fallahzadeh, M. (2015) A faunistic study of Chrysididae (Hymenoptera) in Fars province. In: Manzari S. (ed.) *1st Iranian International Congress of Entomology*, 29–31 August 2015. Iranian Institute of Plant Protection, Tehran, Iran, p. 301.

Torabipour, Sh., Ebrahimi, E., Lotfalizadeh, H. & Rosa, P. (2013a) [2012] Faunistic study of tribe Elampini (Hym.: Chrysididae) in Hayk Mirzayans Insect Museum (HMIM), Iran. *Journal of Field Crop Entomology*, 2 (1), 1–14 [in Farsi]

Torabipour, Sh., Ebrahimi, E., Lotfalizadeh, H. & Rosa, P. (2013b) New records of two species of the genus *Pentachrysis* Lichtenstein (Hym.: Chrysididae) in Iran. *Applied Entomology and Phytopathology*, 81 (1), 85–86 [in Farsi]

Trautmann, G. & Trautmann, W. (1919) Die Goldwespenfauna Frankens. *Zeitschrift für Wissenschaftliche Insektenbiologie*, 15, 30–36.

Trautmann, W. (1926) Untersuchungen an einigen Goldwespenformen. *Entomologische Zeitchrift*, 40, 4–12. http://doi.org/10.1002/mmnd.48019220216

Trautmann, W. (1927) *Die Goldwespen Europas*. Uschman, Weimar. 194 p.

Trautmann, W. (1929) Beitrag zur Kenntnis der Goldwespen Cyperns. *Konowia*, 8, 154–158.

Tournier, H. (1877) Addition aux Chrysides du bassin du Léman. *Petites Nouvelles Entomologiques*, 165, 105–106.

Tournier, H. (1879) Description d'Hyménoptères nouveaux appartenant à la famille des Chrysides. *Bulletin et Annales de la Société Royale Belge*, 22, 87–100.

Valkeila, E. (1971) Two new North European species of genus *Chrysis*. *Entomologisk Tidskrift*, 92 (1–2), 82–86.

Villers, de C.J. (1789) *Caroli Linnaei Entomologia, faunae Suecicae descriptionibus aucta: DD. Scopoli, Geoffroy, de Geer, Fabricii, Schrank, &c., speciebus vel in systemate non enumeratis, vel nuperrime detectis, vel speciebus Galli australis locupletata, generum specierumque rariorum iconibus ornata*. Piestre et Delamolliere, Lugduni [= Lyon]. vol. 3, 657 p.

Walker, F. (1871) List of Hymenoptera collected by J.K. Lord, Esq., in the neighborhood of the Red Sea and in Arabia. With descriptions of the new species. E.W. Janson, London. 59 p. https://doi.org/10.5962/bhl.title.8818

Wei, N-s., Rosa, P., Liu, J-x. & Xu, Z-f. (2014) The genus *Omalus* Panzer, 1801 (Hymenoptera, Chrysididae) from China, with descriptions of four new species. *ZooKeys*, 407, 29–54. https://doi.org/10.3897/zookeys.407.7531

Wiesbauer, H., Rosa, P. & Zettel, H. (2020) Die Goldwespen der Mitteleuropa. Biologie, Lebensräume, Artenporträts. Verlag Eugen Ulmer, Stuttgart, 248 pp.

زنبورهای فاخته‌ای ایران (Hymenoptera, Chrysididae)، آخرین دستاوردها، همراه با فهرست روزآمد گونه‌ها و توصیف یازده گونهٔ جدید

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| **تاریخ دریـافت:** ۳۰ تیر ۱۴۰۳ | **تاریخ پذیرش:** ۱۱ مرداد ۱۴۰۳ | **تاریخ انتشار:** ۲۴ مرداد ۱۴۰۳ |

چکیـده: مطالعات انجام شده روی زنبورهای فاخته‌ای در ایران، طی سال‌های اخیر بسیار قابل توجه و مدیون تلاش تیم‌های تحقیقاتی مختلف بوده است. پس از انتشار اولین فهرست توسط روزا و همکاران (۲۰۱۳)، بیش از یکصد گونه زنبور فاخته‌ای به فون ایران اضافه شدند که تعداد ۹ مورد از آنها شامل توصیف گونه‌های جدید برای دنیای علم بودند علاوه بر این، تغییرات عمده‌ای در تاکسونومی رخ داده، به طوری‌که دو جنس *Chrysellampus* Semenov-Tian-Shanskij, 1932 و *Colpopyga* Semenov-Tian-Shanskij, 1954 مورد بازنگری قرار گرفته؛ جنس *Pseudochrysis* Semenow, 1891 مجددا مبتنی بر آرایهٔ *Pseudospinolia* Linsenmaier, 1951 معرفی شده؛ جنس *Morphochrysis* Rosa & Pavesi, 2023 توصیف شده و تغییرات متعدد در سطح گونه منتشر شده، به نحوی که فهرست اولیه را به شدت تغییر داده‌اند. در پاسخ به این حجم تغییرات گسسته، ما یک فهرست جدید و به‌روز از گونه‌های ایران را ارایه کردیم که دربرگیرنده همهٔ یافته‌های جدید منتشر شده در سال‌های اخیر می‌باشد. ما یازده گونه جدید برای علم با گروه گونه‌ای جدید خود به شرح ذیل را توصیف کردیم: *Chrysis amerii* Rosa & Farhad, **sp. nov.**، *C. chamrosh* Rosa, **sp. nov.**، *C. crenulata* Rosa, **sp. nov.**، *C. edentata* Rosa & Baiocchi, **sp. nov.**، *C. peri* Rosa & Baiocchi, **sp. nov.**، *C. titanica* Rosa, **sp. nov.** (گروه *succincta*)، *C. mediasignata* Rosa, **sp. nov.** (گروه *leachii*)، *C. simurgh* Rosa, **sp. nov.** (گروه *subsinuata*)، *C. heimi* Rosa, **sp. nov.** (گروه *maculicornis*)، *Chrysura filidichroa* Rosa, **sp. nov.** (گروه *dichroa*) و *Hedychridium personatum* Rosa, **sp. nov.** همچنین بیست و شش رکورد جدید از زیرخانوادهٔ Chrysidinae برای ایران شامل: *Chrysidea disclusa* (Linsenmaier, 1959)؛ *Chrysis afghanica* Linsenmaier, 1968؛ *C. cylindrica* Eversmann, 1858؛ *C. echidna* Semenov-Tian-Shanskij, 1967؛ *C. grohmanni bolivari* Mercet, 1902؛ *C. klio* Balthasar, 1953؛ *C. laetula* Semenov-Tian-Shanskij & Nikol'skaya, 1954؛ *C. leuconoe* Semenov-Tian-Shanskij, 1967؛ *C. maracandensis* Radoszkowski, 1877؛ *C. mirabilis* Radoszkovsky, 1877؛ *C. mossulensis* Abeille de Perrin-du Buysson, 1887؛ *C. pseudobrevitarsis* Linsenmaier, 1951؛ *C. robertsi* Rosa, 2020؛ *C. rutilans* Olivier, 1791؛ *C. turcomana* Semenov-Tian-Shanskij & Nikol'skaya, 1954؛ *Chrysura laodamia laodamia* (du Buysson, 1900)؛ *Euchroeus pellucidus* (Radoszkowski, 1877)؛ *Hedychridium bytinskii* Linsenmaier, 1959؛ *H. mochii* Strumia, 1994؛ *H. plagiatum* (Mocsáry, 1883)؛ *Hedychrum concinnum* (Mocsáry, 1909)؛ *H. semicyaneum* Mocsáry, 1889؛ *Spinolia stchurovskyi* (Radoszkowski, 1877)؛ *Spintharina extrema* (Semenov-Tian-Shanskij & Nikol'skaya, 1954) و *S. houskai* (Balthasar, 1953). تعداد کنونی گونه‌های شناخته شده از ۱۸۵ (۱۷۹ گونه و ۶ زیرگونه) به ۳۱۵ (۳۰۶ گونه + ۹ زیرگونه) افزایش یافت. *Hedychrum persicum* Mocsáry, 1914 به سطح گونه ارتقا یافت. دو نام *Chrysis chrysophora* Semenow, 1892 و *Hedychrum cyaneum* Brullé, 1846 به ترتیب عنوان نام مشکوک و نام نامشخص در نظر گرفته شدند. *Chrysis dawahi* Strumia, 2012 نیز به عنوان نام نامعلوم نامعتبر مشخص شد.. بخش اعظم فون زنبورهای فاخته‌ای ایران (۷۷/۶۴٪) صرفاً در منطقه پالئارکتیک غربی انتشار دارند و از میان آنها، ۲۱٪ به همین منطقه محدود هستند. بحث کاملی نیز درباره گزارش گونه‌های مشکوک و غیرقابل اعتماد ارایه شد.

واژگـان کلیدی: Cleptinae، Chrysidini، زنبورهای فاخته‌ای، انتشار، Elampini، Paropini

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Expert on the taxonomy of Chrysididae, Paolo published more than 150 papers and authored more than 180 new species and genera of cuckoo wasps. He travelled around the world and made extensive research in Europe, Africa and Asia. Before returning to the University, he managed a private entomological company working with institutes setting up scientific exhibitions. The photograph on the left was taken on July 29, 2024 at Semenovka (Kyrgyzstan), a locality named after Petr Semenov-Tian-Shanskij, father of Andrey the outstanding pioneer in the study of Central Asian Chrysididae.

Read more at: *https://www.chrysis.net/about/paolo-rosa/*

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The second author has recently finished her PhD on the Taxonomy of the Iranian Chrysididae both in the northern and southern parts of the country. She published several papers from her Ph.D. thesis, and now working at Datis Agrochemicals Co., Iran.

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A well-known Iranian entomologist of the founder generation who is working on Taxonomy and application of biological control agents in pest management. He published around 500 papers in scientific journals and was recently recognized as one of the top 1% of highly cited scientists from 2021 to 2023. He currently serves as the president of the Entomological Society of Iran and is the founder of the Journal of Insect Biodiversity and Systematics and the Journal of Crop Protection. The photograph was taken during the celebration of the 50th Anniversary of the Entomological Society of Iran, which coincided with the 4th Iranian International Congress of Entomology, held in Kermanshah in 2023.

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An assistant professor, and a member of the Scientific board at the Iranian Research Institute of Plant Protection, who is mainly working on the systematics of parasitic wasps, Biological control, and quarantine, of the tropical and subtropical plant pests. He published nearly 50 papers in various scientific journals. He was awarded for his outstanding work on the biodiversity and conservation of natural resources in 2022. He did large-scale samplings of the hymenopterous insects throughout Iran, leading to the discovery of many new chrysid species awaiting description.

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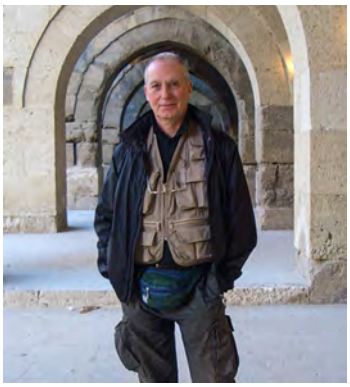

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Amateur entomologist and taxonomist, specialist of the genus *Anthaxia* of the Middle East (Coleoptera: Buprestidae). Has made numerous collecting trips to North Africa, the Mediterranean and the Middle East and has described several new species of *Anthaxia*. Passionate about Hymenoptera Chrysididae since several decades.

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Amateur entomologist and taxonomist, specialist of Chrysididae from the Palaearctic region. Marek made research trips all over the world in the last 36 years, spanning from South America to India, from North to South Africa, from Central Asia to Mongolia. Now he is focusing on Arabian fauna. He collected many new species of cuckoo wasps, later described with Paolo Rosa in various monographs.

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