

# The case of *Holopyga gogorzae* Trautmann, 1926 and revision of the *H. miranda* group (Hymenoptera, Chrysididae)

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**Abstract** - The species treated as *Holopyga gogorzae* Trautmann, 1926 by Linsenmaier (1959) and subsequent authors was found to be misidentified. The first available name for this West Mediterranean species, thus the valid one, is *Holopyga calida* Linsenmaier, 1951, herewith raised to specific rank. Surprisingly enough, the true *H. gogorzae* Trautmann, whose female is still unknown, does not belong to the *H. miranda* group; it conversely belongs to the *H. fervida* group, and is most closely related to *H. rubra* Linsenmaier, 1999 according to genital capsule and tarsal claws. A key to the species of the *H. miranda* group, and relevant illustrations, are here provided. During this study, *Hedychridium planatum* Bischoff, 1910 and *H. planatum* var. *auratum* Bischoff, 1910 both proved *Holopyga*, not *Hedychridium*, most likely synonyms of *H. fervida* (Fabricius, 1781). The name *Holopyga amoenula* group is here proposed to replace the name *Holopyga gloriosa* group given by Linsenmaier (1959), because the name *gloriosa* Fabricius, 1793 has been suppressed by the ICZN - International Commission on Zoological Nomenclature (1998) and is therefore invalid.

**Key words:** cuckoo wasps, Elampini, species group, taxonomy.

**Riassunto** - Il caso di *Holopyga gogorzae* Trautmann, 1926 e revisione del gruppo *H. miranda* (Hymenoptera, Chrysididae).

La specie identificata come *Holopyga gogorzae* Trautmann, 1926 da Linsenmaier (1959) e dagli autori successivi è stata erroneamente interpretata. Il nome valido per questa specie a distribuzione mediterranea occidentale è *Holopyga calida* Linsenmaier, 1951, che viene qui elevata a rango specifico. Sorprendentemente, la vera *H. gogorzae* Trautmann, la cui femmina è ancora sconosciuta, non appartiene al gruppo di specie di *H. miranda*, bensì al gruppo di specie di *H. fervida*, ed è soprattutto affine a *H. rubra* Linsenmaier, 1999, per la forma della capsula genitale e degli unguicoli tarsali. Viene presentata una chiave dicotomica per le specie del gruppo *H. miranda* e illustrazioni per le specie ivi incluse. Durante lo studio è stato riscontrato che *Hedychridium planatum* Bischoff, 1910 e *H. planatum* var. *auratum* Bischoff, 1910 appartengono entrambi al genere *Holopyga*, non a *Hedychridium*, e sono con ogni probabilità sinonimi di *H. fervida*

(Fabricius, 1781). Viene qui proposto il nome “gruppo *H. amoenula*” in sostituzione del nome “gruppo *H. gloriosa*” dato da Linsenmaier (1959), in quanto il nome *gloriosa* Fabricius, 1793 è stato soppresso dalla Commissione Internazionale di Nomenclatura Zoologica (1998) ed è quindi invalido.

**Parole chiave:** Elampini, gruppo di specie, tassonomia, vespe cuculo.

## INTRODUCTION

The genus *Holopyga* Dahlbom, 1845 includes about 110 worldwide distributed species, predominantly in the Palaearctic region, where 89 species are listed (Rosa *et al.*, 2017; Rosa, 2018). Linsenmaier (1959, 1987, 1999) realized first that several alleged “varieties” actually were good species, and provided an essay of revision, with keys and illustrations, for most of the West Palaearctic species. Unfortunately, he did not always rely on relevant type materials, which resulted in several species misidentifications (Rosa & Xu, 2015), so that the whole genus needs revision, as for both systematics and nomenclature. We herewith begin the revision work, focusing on *H. miranda* species group, and on its relationships with the *H. fervida* group. We could examine primary or secondary types of all the species of the *H. miranda* group but *H. tussaci* Linsenmaier, 1999 (see below).

Linsenmaier (1959) divided the genus *Holopyga* into three species groups: *H. fervida*, *H. miranda* and *H. gloriosa* group. Linsenmaier (1999) added a fourth monospecific group, *H. deserticola* group, yet based on misidentification of *H. deserticola* du Buysson, 1898 (Rosa, unpubl. data). According to Linsenmaier (1959), the *H. fervida* group is characterised by the peculiar punctuation of mesoscutellum, with a finely, sparsely punctate (♂) or totally impunctate, smooth (♀), well-limited anteromedial area; the *H. miranda* group is characterised by the unmodified, even punctuation of mesoscutellum, ventrally non-metallic black (at most with weak bronze reflections) mesosoma, and dorsal fully red colouration; finally, the *H. gloriosa* group, including most of the Palaearctic species, is characterised by the unmodified punctuation of mesoscutellum as well, ventrally bright metallic mesosoma, and usually not entirely red dorsally. Linsenmaier (1959, 1999), however, failed to notice an important differential feature between *H. fervida* + *H. miranda* and *H. gloriosa* groups, namely the shape of tarsal claws (see below,

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under Discussion), which resulted in a partially incorrect characterization of the genus *Holopyga*.

We here revise the *Holopyga miranda* species group; we propose the new name *Holopyga amoenula* group for the former *Holopyga gloriosa* group established by Linsenmaier (1959) (see below, under *Holopyga amoenula* species group); finally, we tentatively propose two new synonymies.

## MATERIALS AND METHODS

The definitions of holotype, neotype, lectotype, etc. are given according to the International Code for Zoological Nomenclature, Fourth Edition (ICZN, 1999), below referred to as “the Code”. Linsenmaier’s allotypes, although indicated as such, are accordingly treated as paratypes.

Pictures were taken with a Nikon D-3400 connected to the stereomicroscope Togonal SCZ and stacked with the software Combine ZP.

Types and other specimens have been examined from the following institutions and private collections:

JSC – Jan Smit private collection, Duiven, The Netherlands.

MCZL – Musée Cantonal de Zoologie, Lausanne, Switzerland.

MfN – Museum für Naturkunde, Berlin, Germany.

MJC – Maarten Jacobs collection, Herentals, Belgium.

MNCN – Museo Nacional de Ciencias Naturales, Madrid, Spain (including Fresno collection).

MNHN – Muséum National d’Histoire Naturelle, Paris, France.

MNHNC – Museu Nacional de História Natural e da Ciência, Lisboa, Portugal.

MPC – Maurizio Pavesi private collection, Milano, Italy.

MSNV – Museo Civico di Storia Naturale, Verona, Italy.

NMLU – Natur-Museum, Luzern, Switzerland (including Linsenmaier, Naef and Perraudin collections).

PRC – Paolo Rosa private collection, Bernareggio, Italy.

ZISP – Zoological Institute, St. Petersburg, Russia.

## RESULTS

*Holopyga gogorzae* Trautmann, 1926 (Figs. 1A-F, 2C-D, 14E, 15C)

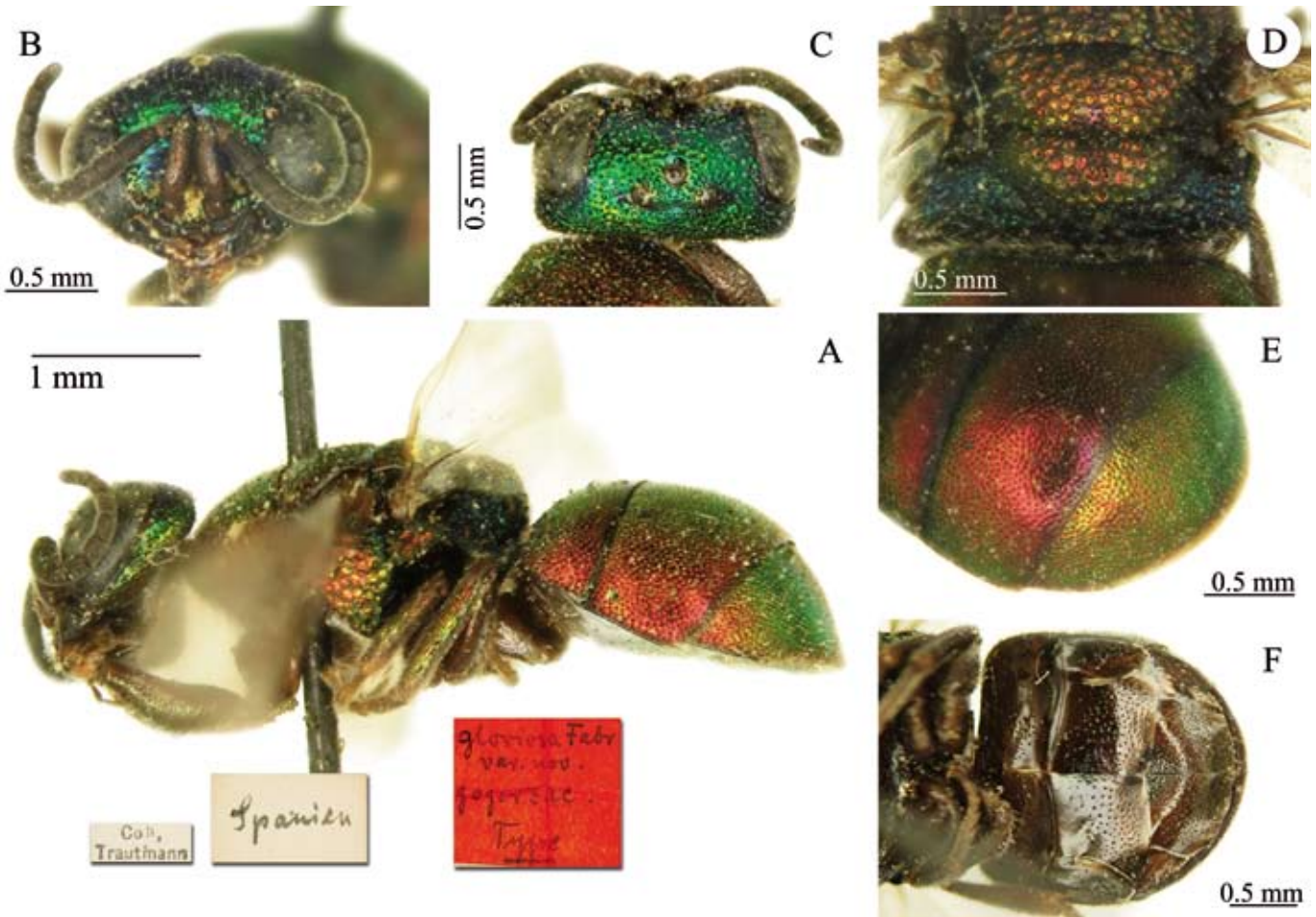


Fig. 1 - *Holopyga gloriosa* var. *gogorzae* Trautmann, 1926; ♂ lectotype / lectotypus. A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) head, dorsal view / capo, visione dorsale; D) scutellum, metanotum and propodeum, dorsal view / scutello, metanoto e propodeo, visione dorsale; E) metasoma, dorso-lateral view / metasoma, visione dorso-laterale; F) metasoma, ventral view / metasoma, visione ventrale.

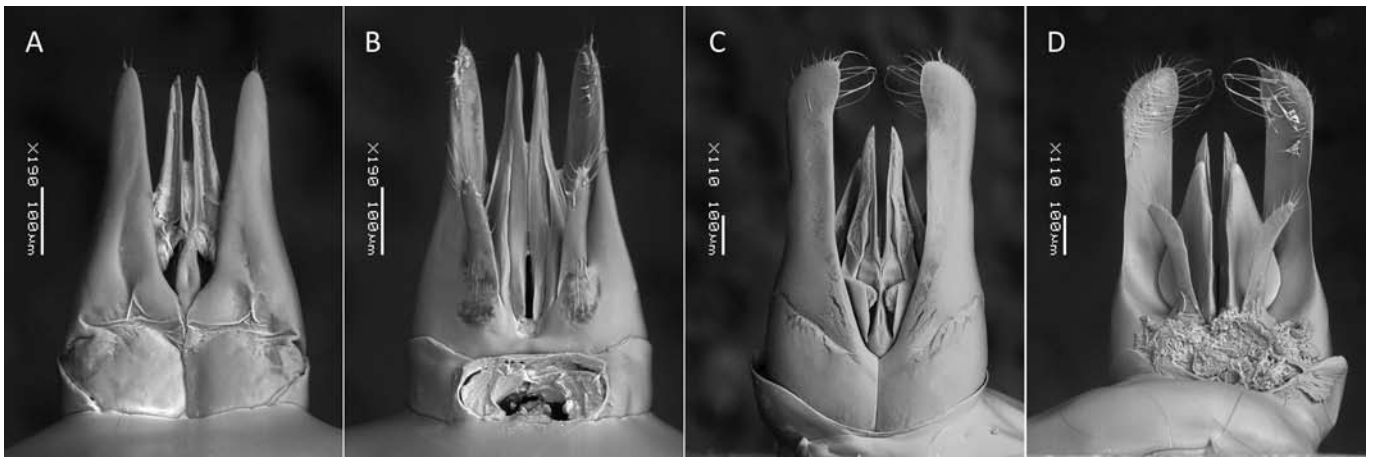


Fig. 2 - ♂ genital capsules / capsule genituali. *Holopyga calida* Linsenmaier, 1959. A) dorsal view / visione dorsale; B) ventral view / visione ventrale. *Holopyga gogorzae* Trautmann, 1926. C) dorsal view / visione dorsale; D) ventral view / visione ventrale.

*Holopyga gloriosa* var. *gogorzae* Trautmann, 1926: 5. Lectotype ♂; Spain: Castilia (MfN).  
*Holopyga gogorzae* sensu Linsenmaier, 1959: 26 (*H. miranda* group), nec Trautmann, 1926.  
*Holopyga gogorzae*: Tussac, 1994: 261. Incorrect subsequent spelling.

**Material examined. Spain.** ♂ lectotype (see below), Spanien, coll. Trautmann, *gloriosa* Fabr. var. nov. *gogorzae* Type [red label handwritten by Trautmann] (MfN). *Murcia*: 5♂♂, Lorca, 4.-6.v.1999, leg. F. Fresno (MNCN; PRC; MPC). *Madrid*: 1♂, Valdaracete, 28.v.2009, leg. F. Fresno (MNCN). *Alicante*: 2♂♂, Torremendo, 16.iv.1983 (MNCN; PRC). The following specimens are labelled as paratypes of *H. rubra* Linsenmaier, 1999: *Sevilla*: 1♂, W of Sevilla, 14.v.1964, leg. W. Linsenmaier (NMLU); 4♂♂, same locality, 24.iv.1965 (NMLU); 1♂, Jerez, 16.v.1964, leg. W. Linsenmaier (NMLU). **Portugal.** *Lisboa*: 1♂, Caparica, 22.v.1955, leg. N.F. de Andrade (NMLU).

**Remarks.** *Holopyga gogorzae* was described by Trautmann (1926) as follows: “*Holopyga gloriosa* Fabr. var. nov. *gogorzae* ist wie Nominatform gefärbt, besitzt aber golden Mesopleurae, vielleicht Uebergang zu miranda Ab. [= *Holopyga gloriosa* Fabr. var. nov. *gogorzae* is coloured like the nominate form, but has golden mesopleura, maybe transition to *miranda* Ab.]. Castilien, coll. Trautmann.”. The alleged “*H. gloriosa* nominate form” is to be intended as a *H. lucida*-like species. This colour description is short, yet detailed enough to exclude *H. gogorzae* from the *H. miranda* group, since none of the species like the “*H. gloriosa* nominate form” of the authors ever has wholly golden-red head as *H. miranda*. Trautmann (1927) provided a more detailed description: “Pronotum, auch die Seiten desselben, Mesonotum, Scutellum, Metanotum, Mesopleurae und Schenkel kupfern. Die Abdomentergite sind kupfern, der Kopf grün, die ganze Unterseite schwarz [= Pronotum, also the sides of the same, mesonotum, scutellum, metanotum, mesopleura and femora coppery. The abdominal segments are coppery, the head green, the whole underside black]. Castilien. Type in Coll. Trautmann (about the actual status of the “type”, see below).

Linsenmaier (1959) was the first author after Trautmann (1926, 1927) to deal with *H. gogorzae*. His interpretation however was incorrect, since he considered as *H. gogorzae* an entirely metallic golden-red species, in contrast with the original description, and included *H. gogorzae* in the newly established *H. miranda* group. Without type examination, Linsenmaier (1959) was likely misled by the statements: “maybe a transition to *H. miranda*” and “femora coppery [...] the whole underside black”. He based his description only upon female specimens; obviously more than one, since he gives as distribution “Spanien, Portugal” and no bibliographic references to *H. gogorzae* exist, subsequent to Trautmann (1926, 1927), in which only “Castilien” is reported. Linsenmaier (1959) explicitly states he does not know the male: “♂ mir nicht bekannt, die Type (♂) nach Trautmann mit mehr grünem K[opf]” [= ♂ unknown to me, the type (♂) according to Trautmann with more green head]. Trautmann (1926, 1927), however, never stated the type was a male; this was most likely inferred by Linsenmaier from having the type green head, in contrast with his females with red-golden head. A recent re-examination of Linsenmaier’s collection (Rosa, unpubl.) showed that Linsenmaier later received and collected several males and females of his “*H. gogorzae*”, from Spain and Portugal, which however did not lead him to change his opinion, despite of being males quite similar in colouring to females, thus not matching Trautmann’s (1926) description. All subsequent European authors (Mingo 1970, 1994; Tussac 1994; Rosa & Soon 2012) just accepted Linsenmaier’s (1959) interpretation.

As the Trautmann’s “type” is concerned, neither the original description of *H. gloriosa* var. *gogorzae* (1926), nor the subsequent large work, *Die Goldwespen Europas* (1927), do contain any statement that the description was based upon a single specimen, so that there is no evidence of monotypy. The “type” housed at MfN in Trautmann’s collection is not a holotype, since it was not cited as such in the original description; the Article 72.4.7. of the Code clearly states that “The mere citation of “Type” or equivalent expression, in a published work other than that in

which the nominal species-group taxon is established [...] is not necessarily evidence that a specimen is or is fixed as any of the kinds of types referred to in this Chapter". Thus, this specimen is to be regarded as a syntype. Because of the possible existence of unnoticed type series specimens, and of the taxonomic problems in which the species was involved, we herewith fix the Trautmann's specimen of *Holopyga gloriosa* var. *gogorzae* as the lectotype.

At first sight, the lectotype (Fig. 1) may appear related to *H. gloriosa* auctorum (rejected and invalid name, see below), because of body colouration. However, it can be easily separated from all *Holopyga* related to *H. "gloriosa"* (e.g. *H. inflammata*, *H. lucida*, *H. jurinei*) by bifid tarsal claws (Fig. 14E), with one small, stout subsidiary tooth, and a second, highly reduced denticle, the latter bearing a long, medial seta; red colour of mesopleura (Fig. 1A); shortened first flagellomere (Fig. 1B); and rounded temples in dorsal view (Fig. 1C). The bifid tarsal claws being a feature shared with both *H. fervida* and *H. miranda* groups, *H. gogorzae* actually appears somewhat intermediate between them, as pointed up by Trautmann (1926). On the other hand, besides the shared tarsal claws feature, females of the *fervida* group show clear similarities in habitus with those of the *H. miranda* group, mainly differing in mesoscutellum punctuation. Differences in colouring of mesosoma underside are not wholly consistent, since two Eastern species included in *miranda* group, namely the East Mediterranean *H. enslini* Linsenmaier, 1959, and the Central Asian *H. lucens* Rosa, 2018, have ventrally metallic mesosoma. In the next future, such similarities likely will lead to merge *H. fervida* and *H. miranda* groups into a single one, to be named *H. fervida* group for priority reasons, possibly including *H. fervida sensu stricto* and *H. miranda* subgroups. We prefer to wait until new molecular data, based on recently collected specimens of the *H. miranda* group, will be published (Rosa *et al.*, in prep.).

Linsenmaier (1999) also described two new species in the *Holopyga fervida* group: *H. meknesia*, from Morocco, and *H. rubra* from Morocco (type locality) and Iberian Peninsula. *Holopyga rubra* holotype (Fig. 15E) and paratypes (Fig. 15D) from Morocco actually belong to a separate species, closely related to *H. gogorzae* Trautmann. Iberian paratypes of *H. rubra*, from Spain (Sevilla and Jerez) and Portugal (Caparica), all males, upon examination, conversely proved *H. gogorzae*. Moroccan males of *H. rubra* (Fig. 15D) show a different body colouration, entirely green as typical males of *H. fervida*, and the typical punctuation of *H. fervida* males, with scutellum antero-medial polished; genitalia, however (Linsenmaier, 1999), are structurally very similar to *H. gogorzae*. The female of *H. rubra* (Fig. 15E) is easily recognisable from *H. fervida* by extended red body colouration, including mesopleuron and metanotum, and different shape of the head.

At our knowledge, only males of *H. gogorzae*, in fair numbers, are known. The female may be rare to very rare; moreover, it has possibly already been collected, yet overlooked, because of strong similarities with some other species, most likely *H. fervida*. This species appears to be endemic to Iberian Peninsula so far.

## HOLOPYGA MIRANDA SPECIES GROUP

**Diagnosis.** The *Holopyga miranda* group, including relatively small-sized species, is characterised by: tarsal claws apically bifid, with a very small submedian tooth, and a second, almost vestigial denticle, the latter bearing a long seta (Fig. 14F-H); body dorsally entirely metallic red, at most (*H. lucens*) with weak greenish reflections, yet never with well delimited green to blue areas; mesosoma ventrally non-metallic black, at most with weak bronze reflections, in West Mediterranean species, bright metallic only in the East Mediterranean *H. enslini* Linsenmaier, 1959 and the Central Asian *H. lucens* Rosa, 2018; punctuation on metasoma dense, with small punctures; male genitalia as usual in the genus, drop-like, basally rounded, and with sharply pointed gonocoxae, unlike those, unmodified (i.e. *Hedychridium*-like), of the otherwise similar *H. fervida* group (see e.g. *H. gogorzae*, Fig. 2C); wings darkened. The peculiar, apically bifid tarsal claws and the ventrally black mesosoma are features shared with *H. fervida* group; yet the mesoscutellar punctuation and the shape of genitalia for the moment allow a separation, possibly artificial, from each other.

The importance of tarsal claws in the systematics of Chrysididae has long been recognized, and emphasized by Kimsey & Bohart (1991). However, at least *H. fervida* was found not to genetically differ from other European *Holopyga* (Pauli *et al.*, 2019), therefore not to be included in a separate genus.

**Species included.** *Holopyga calida* Linsenmaier, 1951; *H. enslini* Linsenmaier, 1959; *H. lucens* Rosa, 2018; *H. mattheyi* Linsenmaier, 1959; *H. miranda* Abeille de Perrin, 1878; *H. naefi* Linsenmaier, 1959; *H. tussaci* Linsenmaier, 1999.

***Holopyga calida* Linsenmaier, 1951 bona sp.** (Figs. 2A-B, 3C-D, 4A-B, 5-7, 14G-H)

*Holopyga gloriosa* var. *calida* Linsenmaier, 1951: 15. Holotype ♀; Morocco (MCZL).

*Holopyga gogorzae* Linsenmaier, 1959: 26, nec Trautmann, 1926.

*Holopyga gogorzae calida*: Linsenmaier, 1959: 27.

*Holopyga gloriosa* var. *calida* Linsenmaier, 1951 synonymized with *Holopyga amoenua* Dahlbom, 1845: Kimsey & Bohart, 1991: 229.

*Holopyga gogorzae* ssp. *calida*: Linsenmaier, 1999: 33. Reinstated.

**Material examined. Morocco.** *Marrakech-Safi*: 1♀ paratype, Marrakech, Oued Tensif, 17.v.1947, leg. Naef (NMLU); 1♀ paratype, idem, 19.v.1947, leg. Naef (NMLU); 2♀♀ paratypes, idem, 14.-16.vi.1947, leg. Naef (NMLU); 1♀ paratype, Marrakech, jardin public, 14.vi.1947, leg. Naef (NMLU); *Souss-Massa*: 1♀, Agadir, 23.-26.v.1950, leg. P.M.F. Verhoeff (NMLU); 1♀, Aoulouz, 20 km S, 5.iv.1986, leg. M. Schwarz (NMLU); 2♂♂, Oued Sous, 29.iv.1980, leg. W. Perraudin (NMLU); *Casablanca-Settat*: 3♂♂, Mohammedia, 29.vi.1982, leg. Tussac (NMLU). **Spain.** *Alicante*: 1♂, La Romana, 11.vii.1993, leg. F.

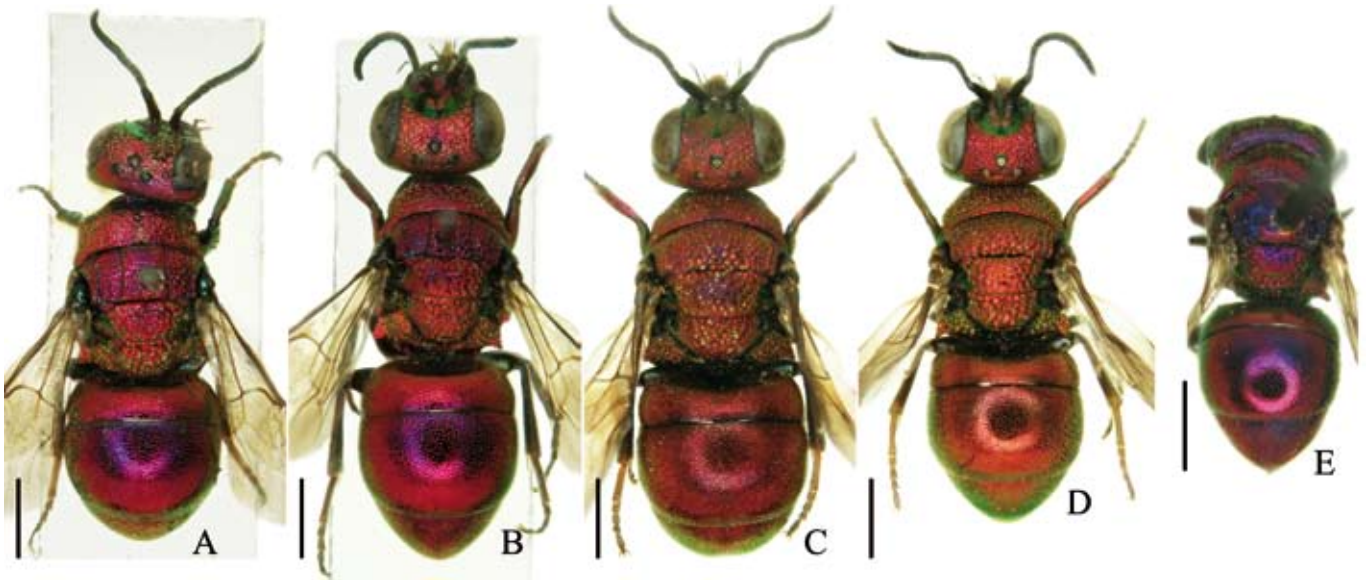


Fig. 3 - *Holopyga* species in dorsal view. / *Holopyga* spp., visione dorsale. A-B) *Holopyga miranda* Abeille de Perrin, 1878. A) ♂ from Ghisoni, Corse / ♂ di Ghisoni, Corsica; B) ♀ from Ghisoni, Corse / ♀ di Ghisoni, Corsica. C-D) *Holopyga calida* Linsenmaier, 1951. C) ♂ from Jerez, Spain / ♂ di Jerez, Spagna; D) ♀ from Jerez, Spain / ♀ di Jerez, Spagna. E) *Holopyga naefi* Linsenmaier, 1959; ♀ paratype (allotype) from Fedala, Morocco / ♀ paratypus (allotypus) di Fedala, Marocco. Scale bar = 1.0 mm.

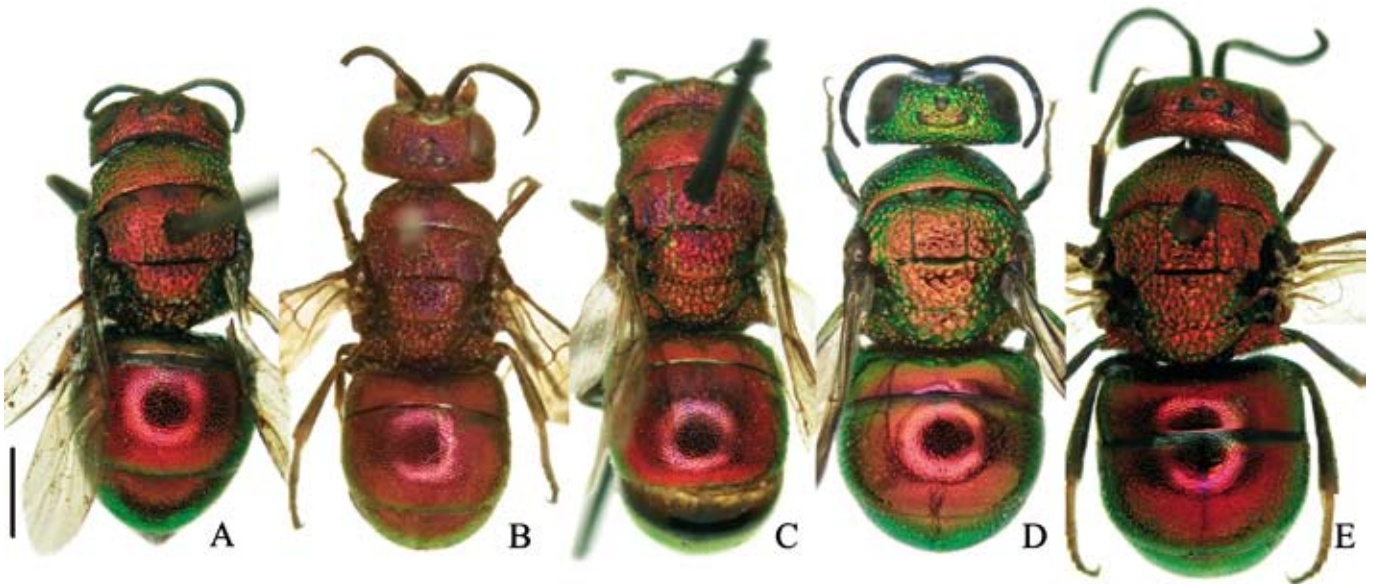


Fig. 4 - *Holopyga* species in dorsal view. / *Holopyga* spp., visione dorsale. A-B) *Holopyga calida* Linsenmaier, 1951. A) ♀ paratype from Marrakech, Morocco; / ♀ paratypus di Marrakech, Marocco; B) ♂ from Mohammedia, Morocco. / ♂ di Mohammedia, Marocco. C) *Holopyga mattheyi* Linsenmaier, 1959, ♂ paratype from Marrakech, Morocco. / ♂ paratypus di Marrakech, Marocco. D) *Holopyga lucens* Rosa, 2018, ♂ paratype from Karabata, Turkmenistan. / ♂ paratypus di Karabata, Turkmenistan. E) *Holopyga enslini* Linsenmaier, 1959, ♂ paratype from Beersheba, Israel. / ♂ paratypus di Beersheba, Israele. Scale bar = 1.0 mm.

Fresno (MNCN). *Ávila*: 1♂, Arévalo, 11.vi, 2005, leg. F. Fresno (MNCN); 1♂, Navalperal, vii.1989, leg. W. Linsenmaier (PRC). *Badajoz*: 1♀, Medellín, 5.vi.1998, leg. F. Fresno (MNCN). *Burgos*: 1♂, 1♀, Fuentespina, 22.vi.2002, leg. F. Fresno (MNCM, PRC). *Cádiz*: 1♂, 3♀♀, Jerez, 16.v.1964, leg. W. Linsenmaier (NMLU). *Cuenca*: 1♀, Tarancón, 4.vii.1968, leg. P.M.F. Verhoeff (NMLU). *Girona*: 1♂, 2♀♀, Estartit, B. Empurie, 16.-20.viii.2005, leg. P. Rosa (PRC). *Granada*: 1♀, Sierra d. Chaparral, 1100m, 24.vi.1997, leg. W. Linsenmaier (NMLU); 3♀♀, idem, 18.-

20.vi.1999, leg. W. Linsenmaier (NMLU); 1♂, Cerro de Chupa, 1250m, 28.v.2011, leg. P. Rosa (PRC). *Madrid*: 2♂♂, 1♀, El Escorial, 24.vi.1991, leg. W. Linsenmaier (NMLU); 1♀, Navacerrada, 16.vi.1983, leg. W. Linsenmaier (NMLU); 2♀♀, idem, 3.-6.vii.1987, leg. J. Schmidt (NMLU); 3♂♂, idem, 3.-4.vii.1987, leg. W. Linsenmaier (NMLU); 1♂, idem, 18.vi.1994, leg. W. Linsenmaier (NMLU); 2♀♀, El Pardo, 15.-22.vii.1984, leg. F. Fresno (MNCN); 4♂♂, Buitrago, 29.viii.1993, leg. F. Fresno (MNCN); 1♂, Miraflores, 31.viii.1985, leg. F. Fresno (MNCN); 1♂, Tielmes,

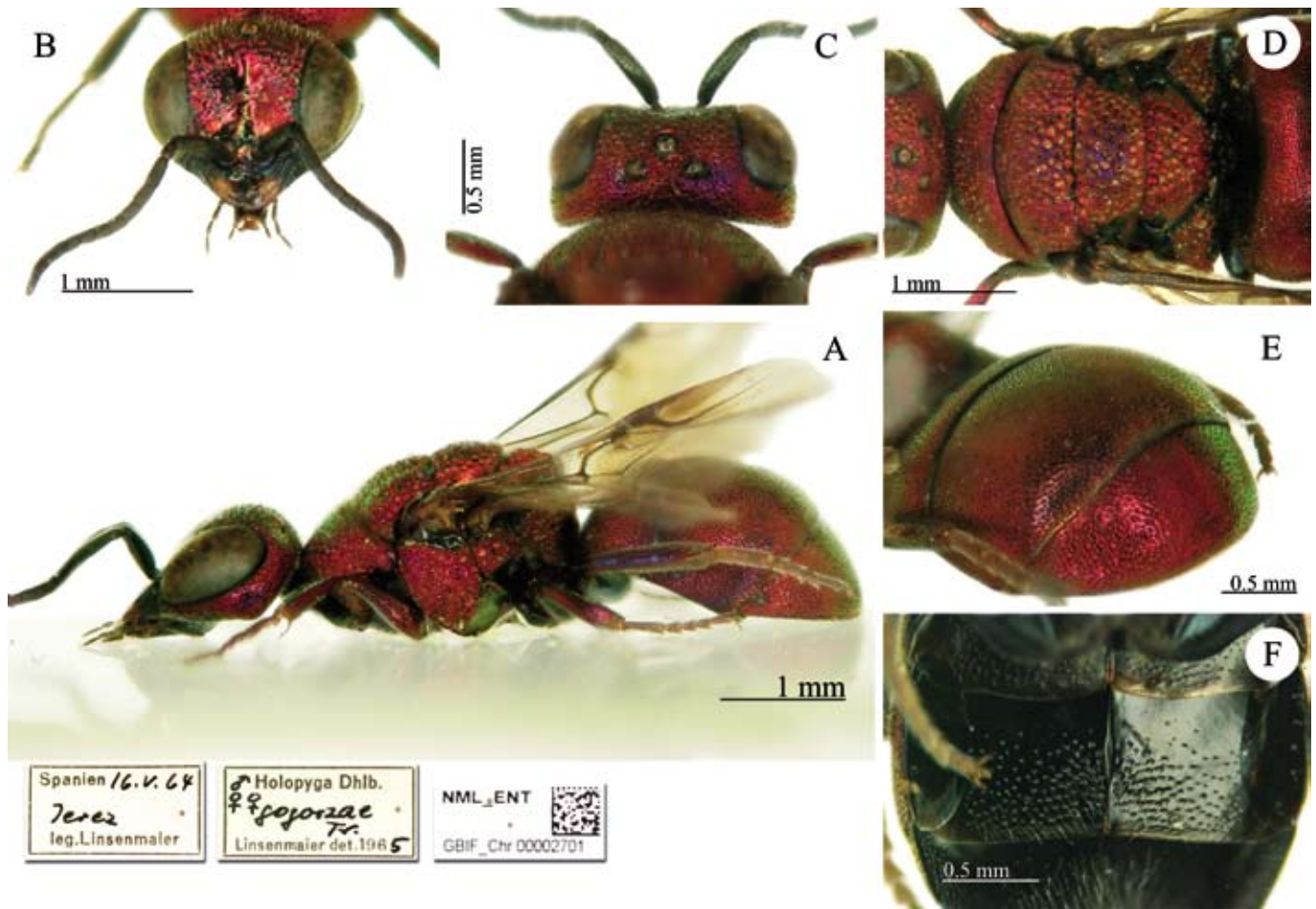


Fig. 5 - *Holopyga calida* Linsenmaier, 1951; ♂ from Jerez, Spain / ♂ di Jerez Spagna. A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) head, dorsal view / capo, visione dorsale; D) mesosoma, dorsal view / mesosoma, visione dorsale; E) metasoma, postero-lateral view / metasoma, visione postero-laterale; F) metasoma, ventral view / metasoma, visione ventrale.

28.vi.2003, leg. F. Fresno (MNCN); 1♂, idem, 12.vii.2003, leg. F. Fresno; 1♂, 2♀♀, Tres Cantos, 19.viii.1993, leg. F. Fresno (MNCN, PRC); 2♂♂, idem, 2.-6.viii.1993; 1♂, idem, 11.viii.1993; 1♂, idem, 29.vi.1996; 1♂, idem, 25.vi.1997; 1♂, idem, 14.vi.1999; 1♀, idem, 27.vi.1999; all leg. F. Fresno (MNCN); 1♀, Valdarachete, 4.vi.2009, leg. F. Fresno (PRC). *Segovia*: 1♂, Coca, vii.1981, leg. W. Schlaefle (NMLU); 1♀, idem, 30.vi.1991, leg. W. Linsenmaier (NMLU); 1♂, *Lastras de Cuéllar*, 11.vi.2006, leg. F. Fresno (MNCN). *Soria*: 2♂♂, Soria, 16.-19.vi.1964; 1♂, 2♀♀, idem, 15.-20.vii.1979; 2♂♂, idem, 8.vii.1991; 1♂, idem, 14.vi.1993; 1♀, idem, 24.vi.1996; 1♂, 1♀, idem, 28.vi.1999; 1♀, idem, 2.vii.1999; 1♂, idem, 29.vi.2000, all leg. W. Linsenmaier (NMLU). *Valencia*: 1♂, Alicante, Benidorm, 25.vii.1970, leg. W. Linsenmaier (NMLU); 1♀, Valencia, 30.vii.1957, leg. W. Schlaefle (NMLU). *Valladolid*: 1♂, Laguna de Duero, 28.vi.1984, leg. F. Fresno (MNCN). *Zamora*: 1♀, Mayalde, 8.vii.1984, leg. S.F. Gayubo, *Holopyga gogorzae* Tr. E. Mingo det. 1985. *Zaragoza*: 1♀, Sobradiel, 22.vi.1932, colección Dusmet, *Holopyga miranda* Ab. F. Bernard det., *Holopyga gogorzae* Tr. E. Mingo det. 1985. **Portugal**. *Lisboa*: 1♀, Lisboa, Av. Do Mexico, 31.vii.1947, leg. N.F. de Andrade. *Trás-os-*

*Montes*: 1♀, Chã, Montalegre, 16.vi.2019, 41°46'14"N 7°47'11"W, leg. M. Jacobs (MJC). *Beira Alta*: 2♂♂, Leomil, Almeida, 22.vi.2019, 40°38'45"N 6°57'27"W, leg. M. Jacobs (MJC). *Madeira*: 1♀, Arieiro, 29.vi.1944, leg. N.F. de Andrade (NMLU); 1♂, Afife, Minho W, 10 km N Viana do Castelo, 26.v.-7.vi.2001, leg. W. Fliervoet (JSC).

#### Redescription of *Holopyga calida* Linsenmaier, 1951

*Male*: body length 3.5-5.5 mm.

*Head*. Vertex and frons with round, dense, 0.1-0.5 PD apart, shallow punctures; postero-laterally to ocelli with small polished area and tiny punctures; on ocellar area and occiput with smaller, sparse punctures. Scapal basin deep, glabrous, from smooth to distinctly striate. Ocellar triangle isosceles, with postocellar line deeply impressed. Clypeal apical margin straight. Malar space short, less than 1.0 MOD. Subantennal space less than 1.0 MOD, shorter than antennal socket diameter. Genal carina hardly visible from lower edge of eye to mandible. Mandibles tridentate, brown, at mid-length lighter. Relative length of P:F1:F2:F3 = 1.0:1.4:0.8:0.7. In dorsal view, temples angulate, with slightly convergent sides.

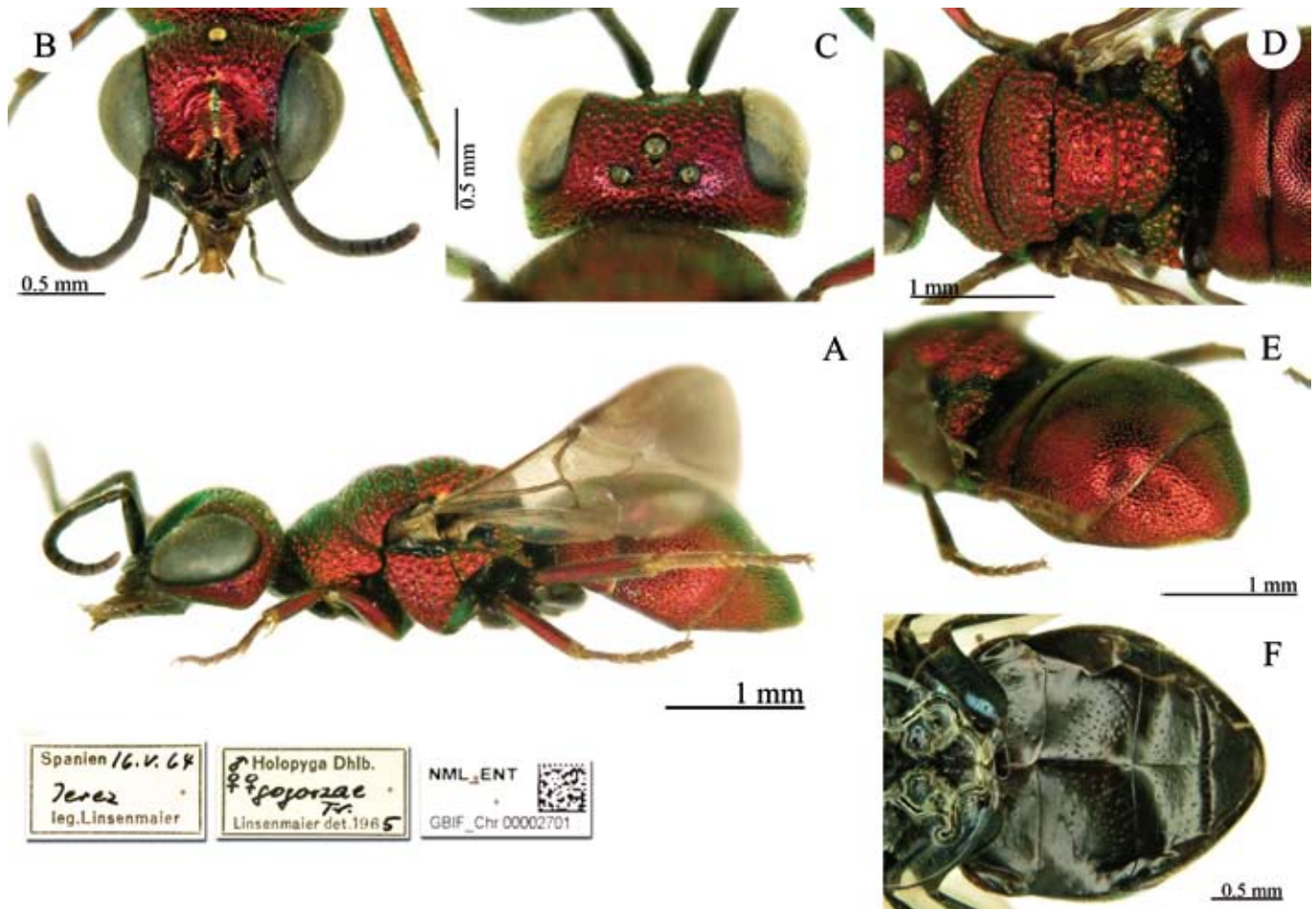


Fig. 6 - *Holopyga calida* Linsenmaier, 1951; ♀ from Jerez, Spain / ♀ di Jerez, Spagna. A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) head, dorsal view / capo, visione dorsale; D) mesosoma, dorsal view / mesosoma, visione dorsale; E) metasoma, postero-lateral view / metasoma, visione postero-laterale; F) metasoma, ventral view / metasoma, visione ventrale.

**Mesosoma.** Pronotum with double punctation and tiny punctures on intervals. Mesoscutum, between notauli, postero-medially with larger and denser punctures; notauli complete, visible as deep and fine lines, basally enlarged in a deep pit (1.0 MOD long); parapsidal furrows deep, as long as 2/3 of mesoscutal length. Suture between mesoscutum and mesoscutellum deep, broad (0.5 MOD), non-metallic black. Mesoscutellum with large, uneven punctures, with tiny dots on polished intervals. Metascutellum with large, considerably deep, polygonal, foveate-reticulate punctures, with sharp intervals among them. Mesopleuron angulate, with large, foveate-reticulate punctures. Posterior propodeal projections triangular, directed backwards. Forewing medial vein strongly arched in the middle. Forefemur ventrally expanded and slightly carinate.

**Metasoma.** Metasomal terga with small, even, and dense punctures, medially 0.5-1.0 PD apart, with polished intervals, laterally subcontiguous to subconfluent. Third tergum slightly swollen before apical margin, the latter with narrow, translucent rim, medially slightly emarginate. Second metasomal sternum postero-medially with small, scattered punctures. Genital capsule as in Fig. 2A and B.

**Colouration.** Dorsally metallic red; axillary trough, mesosomal sutures and dorsal area of the metapectal-propodeal complex black; femora, on anterior side, and tibiae metallic red; body ventrally black. Scape black, with faint metallic reflections, flagellum black. Tegulae brown.

**Vestiture.** Dorsally entirely covered with short (less than 1.0 MOD), sparse, erect, whitish setae; the latter ventrally longer (up to 1.5 MOD) on second and third metasomal sternum.

**Female:** similar to male, yet easily recognizable for the shape of the third metasomal tergum, subovoid instead of rounded.

**Distribution.** South-western Europe: Spain, Portugal, south of France. North Africa: Morocco.

**Remarks.** Linsenmaier (1951) described *calida* as a variety of *Holopyga gloriosa* (*sensu* Linsenmaier, *nec* Fabricius), giving as distribution "Armenien, Palästina, Ägypten, Marokko". Later Linsenmaier (1959), recognizing "*H. gloriosa*" as a complex of several distinct species, transferred *calida* as subspecies to *H. gogorzae* Trautmann, with distribution restricted to Morocco (type

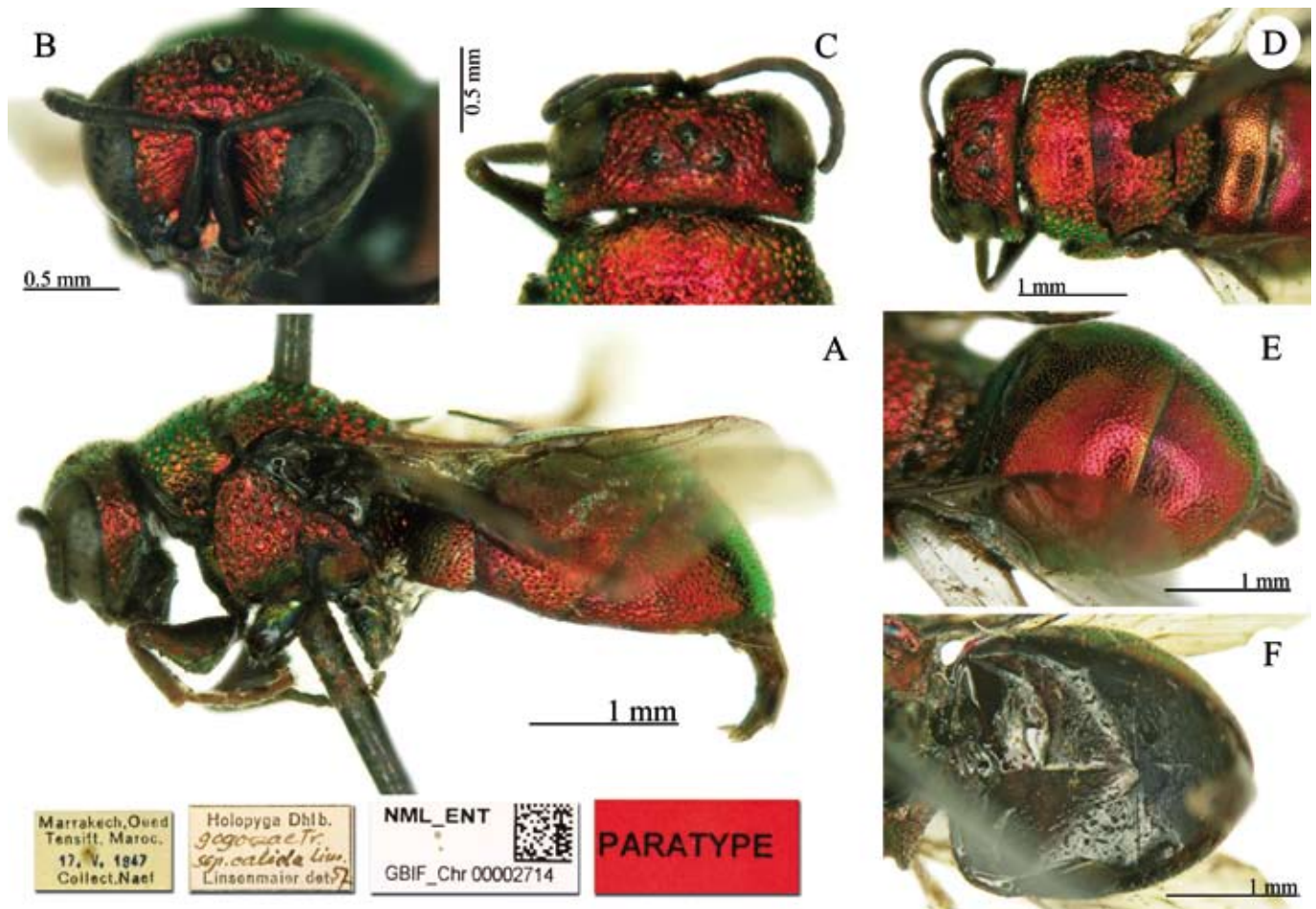


Fig. 7 - *Holopyga gloriosa* var. *calida* Linsenmaier, 1951; ♀ paratype, Morocco / ♀ paratypus, Morocco. A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) head, dorsal view / capo, visione dorsale; D) mesosoma, dorsal view / mesosoma, visione dorsale; E) metasoma, postero-lateral view / metasoma, visione postero-laterale; F) metasoma, ventral view / metasoma, visione ventrale.

locality), since specimens from Middle East were recognized to belong to different species; those from Palestine were described as *H. enslini* n. sp., while those from Armenia and Egypt were no longer dealt with. Incidentally, the original description of *H. gloriosa* var. *calida* is partly incorrect, where it says “dunkel bronzene Unterseite des Thorax” [= dark bronze underside of thorax], which indeed only applies to the true *H. calida* from Morocco, not to any of Eastern taxa, *H. enslini* included.

As discussed above, however, Linsenmaier’s *H. gogorzae* was misinterpreted. *Holopyga calida* in our opinion deserves good species rank, because well distinct from the true *H. gogorzae* Trautmann through entirely red (except for underside) body colouration, head in frontal view wider than high, and shape of genital capsule. The differences reported by Linsenmaier (1959, 1999) between the Moroccan *calida* (Figs. 4A, B and 7) and the alleged Spanish nominotypical subspecies (Figs. 5 and 6) are here considered not worthy of a subspecific distinction, although the finer and sparser metasomal punctation, which results in a brighter shine, appears to be consistent. The dimensions, said to be smaller in Moroccan populations, conversely proved overall variable.

#### *Holopyga enslini* Linsenmaier, 1959 (Figs. 4E, 8A-F)

*Holopyga enslini* Linsenmaier, 1959: 27. Holotype ♂; Turkey: Ulu Kizlar (NMLU).

**Specimens examined.** Turkey. *Niğde*: ♂ holotype, Ulu Kizlar [= Ulukışla], 5.vii.1952, leg. Seidenstücker. *Ağrı*: 1♂, Ağrı env., 27.vi.1993, leg. K. Deneš. **Israel.** *Southern District*: 1♂, Beersheba, 10.v., leg. Bytinski-Salz, paratype; 1♀, Nahal Nafha, 29.iv.1959, leg. J. Wahrman. All specimens housed at NMLU.

**Distribution.** Israel, Turkey (Linsenmaier, 1959).

**Remarks.** *Holopyga enslini* differs from the West Mediterranean species of the *H. miranda* group by the ventrally metallic red, instead of black or blackish, mesosoma. It is related to *H. lucens* Rosa, 2018, described from Central Asia, yet with blackish, almost without reflections, coxae, trochanters and femora (vs. shining metallic green in *H. lucens*). Moreover, it differs from *H. lucens* by the shape of the head in dorsal view, larger than pronotum, with posterior edge distinctly concave, and postero-lateral angles sharply projecting rearwards (vs. as large as pronotum, with posterior edge almost straight, and



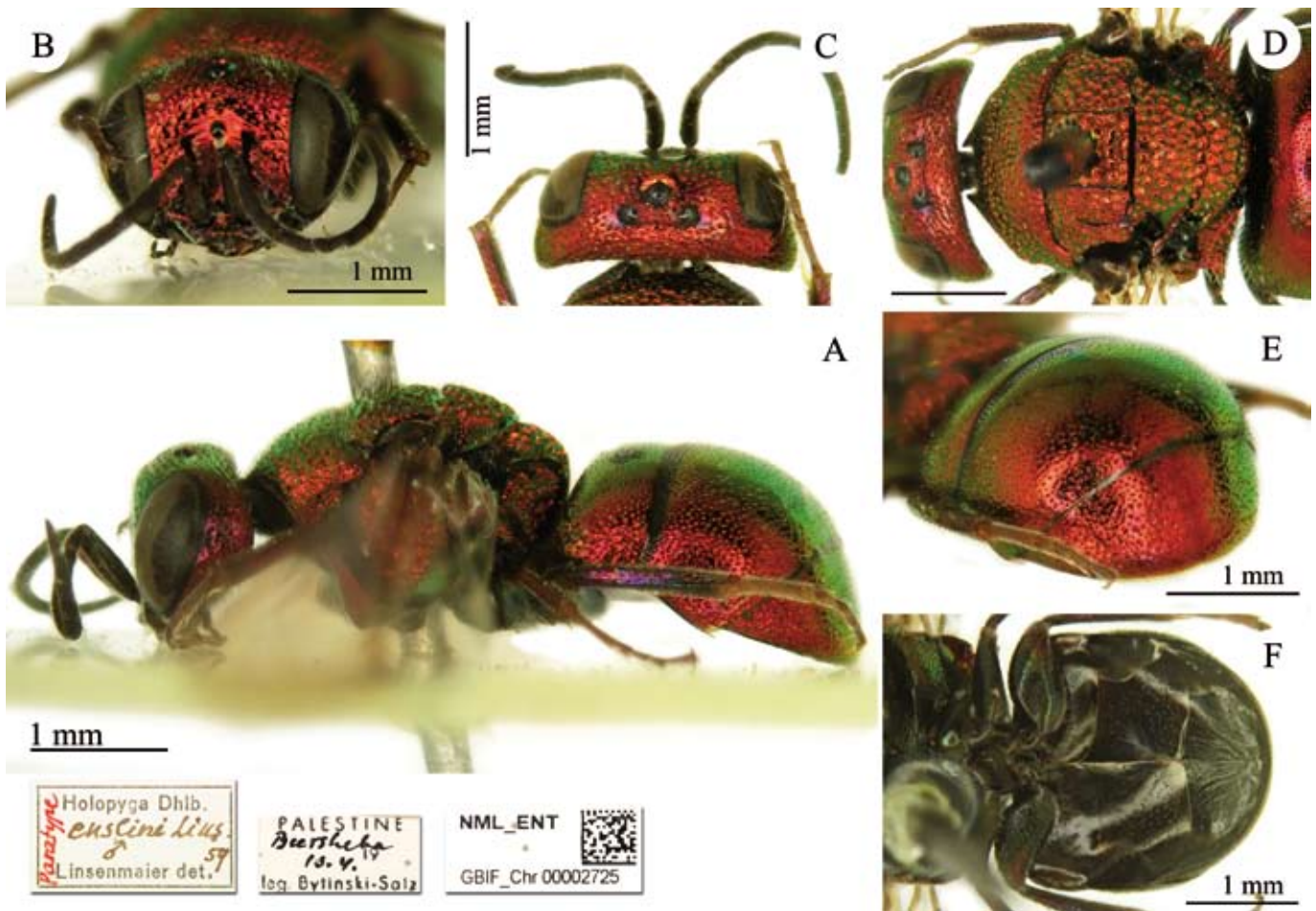


Fig. 8 - *Holopyga enslini* Linsenmaier, 1959; ♂ paratype / paratypus. A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) head, dorsal view / capo, visione dorsale; D) mesosoma, dorsal view / mesosoma, visione dorsale; E) metasoma, postero-lateral view / metasoma, visione postero-laterale; F) metasoma, ventral view / metasoma, visione ventrale.

posterolateral angles not projecting); head and mesosoma punctuation denser to confluent, without shining intervals (vs. scattered, with polished, shining intervals); and unmodified, fully micropunctate and ventrally angulate lower mesopleuron (vs. enlarged, carinate, ventrally polished and rounded).

#### *Holopyga lucens* Rosa, 2018 (Figs. 4D, 9A-F)

*Holopyga lucens* Rosa, 2018: 7. Holotype ♂; Uzbekistan: Kashkadarya, Muborak district, 5 km S of Muborak (ZISP).

**Specimens examined.** **Uzbekistan.** *Kashkadarya*: ♂ holotype, Muborak district, 5 km S of Muborak, 39°18'31"N 65°08'19"E, 15.v.2015, leg. Mokrousov, Proshalykin, Samartzev (ZISP). **Turkmenistan.** *Ashkhabad*: 1♂, Ashkhabad, 10.vi.1928, leg. V. Gussakowskij (ZISP); 1♂, Ashkhabad, 28.vi.1964, leg. W.J. Pulawski (NMLU). *Namangan*: 1♂, st. Akhcha-Kujma, 5.VII 1934, leg. V. Popov (ZISP). *Mary*: 2♂♂, Karabata, 7.vi.1932, leg. Kuziakini (ZISP).

**Distribution.** Turkmenistan, Uzbekistan (Rosa, 2018).

**Remarks.** *Holopyga lucens* is related to *H. enslini*, known from Palestine and Turkey (Linsenmaier, 1959). Apart from shining, metallic green (vs. blackish, almost without reflections) coxae, trochanters and femora, it differs by the shape of the head in dorsal view, as large as pronotum, with posterior edge almost straight, and posterolateral angles not projecting rearwards (vs. head larger than pronotum, with posterior edge distinctly concave, and posterolateral angles sharply projecting in *H. enslini*); punctuation of head and mesosoma scattered, with polished, shining intervals (vs. punctuation denser to confluent, without shining intervals); enlarged, carinate, rounded, ventrally polished mesopleuron (Figs. 9A, C) (vs. unmodified, typically angulate, fully micropunctate).

*Holopyga mattheyi* Linsenmaier, 1959 (Figs. 4C, 10A-F)

*Holopyga mattheyi* Linsenmaier, 1959: 27. Holotype ♀; Morocco (MCZL).

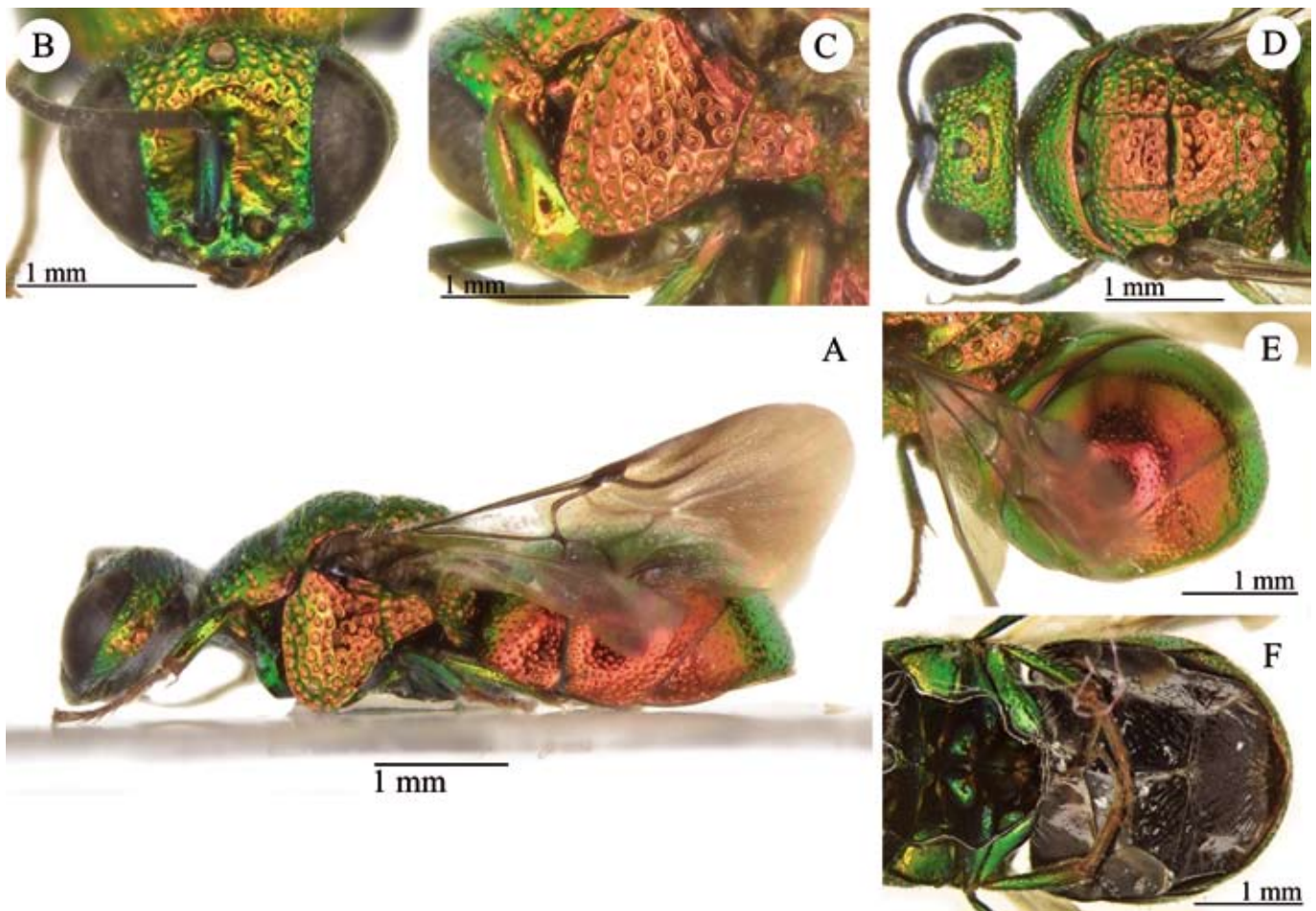


Fig. 9 - *Holopyga lucens* Rosa, 2018; ♂ paratype / paratypus. A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) mesopleuron and fore femur, postero-lateral view / mesopleura e femore anteriore, visione postero-laterale; D) head and mesosoma, dorsal view / capo e mesosoma, visione dorsale; E) metasoma, postero-lateral view / metasoma, visione postero-laterale; F) metasoma, ventral view / metasoma, visione ventrale.

**Specimens examined. Morocco.** *Grand Casablanca*: 2♀♀ paratypes, Fedala, 5.v.1937, leg. Naef. *Marrakech-Tensif*: 4♀♀ paratypes, Marrakech, Oued Tensif, 14.v.1947, leg. Naef; 1♂, Grand Atlas, Ijoukak, 9.v.1947, leg. J. de Beaumont. All specimens housed at NMLU.

**Distribution.** Morocco (Linsenmaier, 1999).

*Holopyga miranda* Abeille de Perrin, 1878 (Figs. 3A-B, 11A-F, 12A-C, 14F)

*Holopyga miranda* Abeille de Perrin, 1878: 2. Holotype ♀; France: Corse (MNHN).

*Holopyga miranda*: Kimsey, 1986: 109. Lectotype designation: ♀ [not ♂]; France: Corse (MNHN).

**Material examined. Corsica.** Holotype ♀ (see below), Corse (without further data), Lectotype, Muséum Paris EY11402, *Holopyga miranda* Lecto ♂ (!) Abeille, det. LS Kimsey; Lectotype is a female (♂) !! det. '98 O. Niehuis (MNHN). *Haute-Corse*: 2♂♂, 2♀♀, Ghisoni, 700 m, Chataigners forest, 21.vii.1972, leg. W. Per-

raudin (NMLU); 1♀, idem, 800 m, 13.vii.1972, leg. W. Perraudin (NMLU); 7♂♂, 7♀♀, Olivèse, 500 m, 13.-18.vii.1975, leg. W. Perraudin (NMLU). 2♀♀, St.-Florent, Casta, Campu Castingu, 350 m, 7.viii.1981, leg. A. Sette (MSNV, MPC). **France mainland.** *Pyrénées-Orientales*: 2♂♂, 1♀, Argelès-sur-Mer, Dün[en], 1.-4.vii.1980, leg. H. Wolf (NMLU). **Spain.** *Madrid*: 2♀♀, El Escorial, 2.-3.vii.1980; 4♂♂, 1♀, idem, 14.-17.vi.1983; 1♂, idem, 17.vi.1985; 16♂♂, 14♀♀, idem, 2.vi.1986; 2♂♂, 2♀♀, idem, 24.vi.1991; 1♂, 3♀♀, Navacerrada, 3.-7.vii.1987; 1♂, 2♀♀, idem, 22.vi.1991; 3♀♀, Tembleque, 2.-12.vii.1984, leg. Tussac; 1♂, 1♀, E Madrid, 22.vi.1991. *Teruel*: 1♀, P[uer]to El Cubillo, 1600 m, 3.-5.vii.1994. *Segovia*: 1♀, Coca, 26.vi.1991. *Soria*: 1♀, Soria, 22.-23.vi.1964; 1♂, idem, 26.v.1965; 1♂, 1♀, idem, 9.vii.1987; 2♂♂, 1♀, idem, 9.vii.1991; 1♂, 2♀♀, idem, 18.-20.vi.1994; 3♂♂, idem, 7.vii.1994; 1♂, 1♀, idem, 20.vii.1994; 2♂♂, idem, 17.vi.1995; 2♂♂, 2♀♀, idem, 23.vi.1995; 1♂, idem, 29.vi.2000. *Toledo*: 1♂, 1♀, Toledo, 25.-27.vii.1967, leg. P.M.F. Verhoeff. *Lleida*: 1♀, Almenar, 11.-13.vi.1957. All the above Spanish specimens housed at NMLU; all leg. W. Linsenmaier, unless otherwise stated. **Portugal.** *Lisboa*: 1♂, near Lisboa, 20-

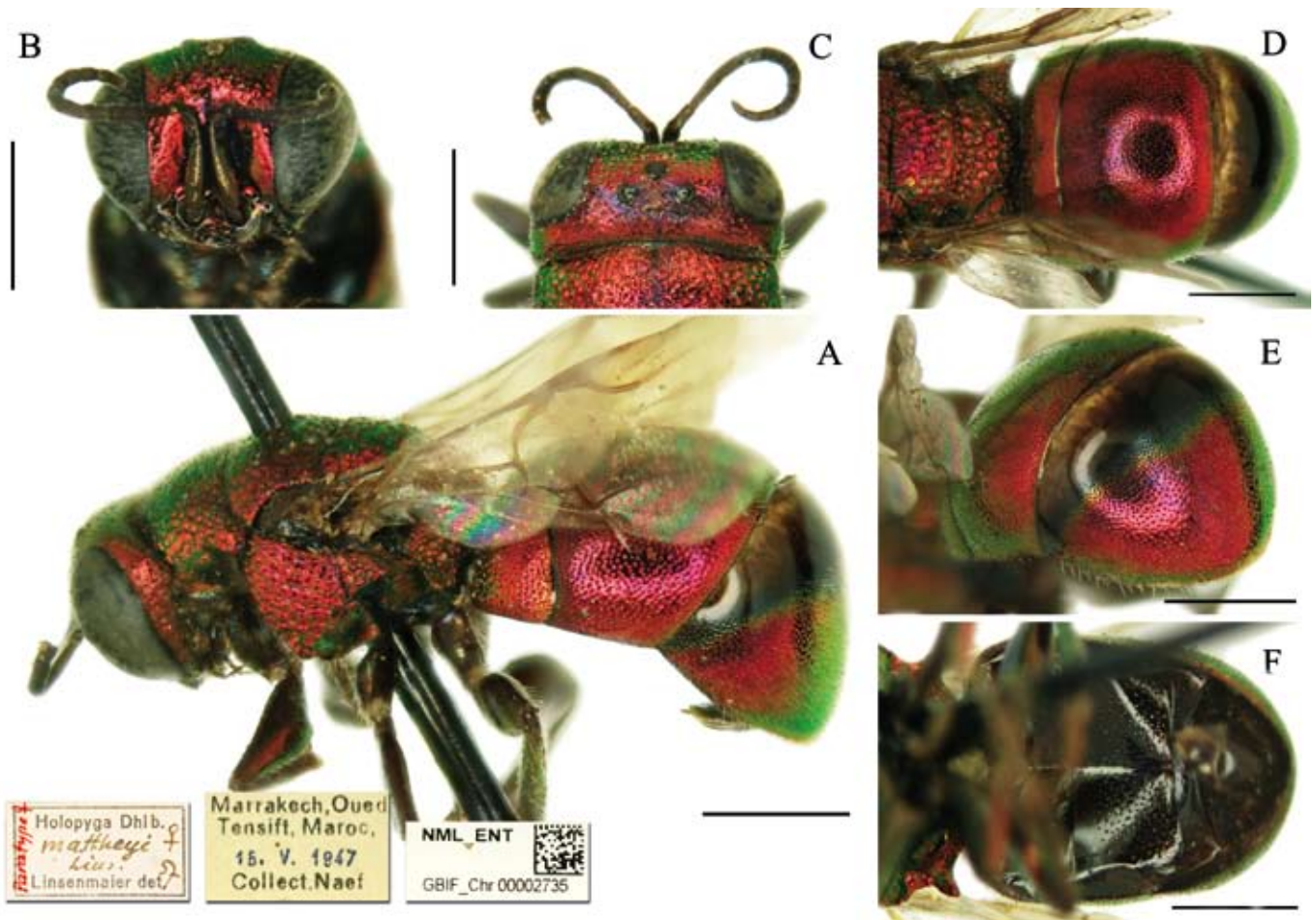


Fig. 10 - *Holopyga mattheyi* Linsenmaier, 1959; ♀ paratype / paratypus. A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) head, dorsal view / capo, visione dorsale; D) metasoma, dorsal view / mesosoma, visione dorsale; E) metasoma, postero-lateral view / metasoma, visione postero-laterale; F) metasoma, ventral view / metasoma, visione ventrale. Scale bar = 1.0 mm.

30.v.1949, leg. P.M.F. Verhoeff (NMLU). *Madeira*: 1♂, Arieiro, 2.vii.1941, leg. N.F. de Andrade (NMLU).

**Distribution.** South-western Europe (Corse, South of France, Portugal, Spain) (Linsenmaier, 1959). Note: Linsenmaier (1959), most likely because of a misprint, gives “? Korsika”.

**Remarks.** Abeille de Perrin (1878) described *Holopyga miranda* giving as unique locality “Corse”. Abeille de Perrin (1879) refined the description and added: “J’ai rapporté cette délicieuse espèce de Corse et j’en ai vu un second sujet venant de l’Escorial, dans la collection Puton”, which leads to conclude that the original description was based on a single specimen. Puton’s specimen cannot be considered as a syntype under Article 72.4.1.1. of the Code, since the Spanish locality is not mentioned in the original description, and no evidence exists that the Spanish specimen was known to Abeille de Perrin (1878), and recognized by him as *H. miranda*, when describing his new species. Abeille de Perrin’s specimen from Corsica is accordingly to be considered the holotype by monotypy, and Kimsey’s lectotype designation to be regarded as unnecessary.

### *Holopyga naefi* Linsenmaier, 1959 (Figs. 3E, 13A-F)

*Holopyga naefi* Linsenmaier, 1959: 26. Holotype ♂; Morocco: Fedala (Casablanca), 5.v.1937, leg. Naef (NMLU).

**Specimens examined. Morocco. Grand Casablanca:** ♂ holotype, Fedala, 5.v.1937, leg. Naef; 2♂♂, 1♀ paratypes (♀ allotype), idem. *Marrakech-Tensif*: 2♀♀, Marrakech, Oued Tensif, 14.-15.v.1947, leg. Naef. *Souss-Massa*: 1♂, Aoulouz, 20 km S, 5.iv.1986, leg. M. Schwarz; 1♀, Agadir, Oued Sousse, 29.iv.1980, leg. W. Perraudin; 1♀, Oued Sousse, 29.iv.1980, leg. W. Perraudin, sur *Daucus*. All specimens housed at NMLU.

**Distribution.** Morocco, Tunisia (Linsenmaier, 1999).

**Remarks.** The two specimens from Marrakech, not reported in the original description, are not to be considered paratypes under Article 72.4.1. of the Code. Although collected by Naef himself well before 1959, they bring a determination label “Linsenmaier det. 79”, presumably after the Naef collection was acquired by Linsenmaier. It is obvious that the above specimens were not known to Linsenmaier, and by him recognized as belonging to *H. naefi*, when describing the new species.



Fig. 11 - *Holopyga miranda* Abeille de Perrin, 1878; ♀, Corse / Corsica. A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) head, dorsal view / capo, visione dorsale; D) mesosoma, dorsal view / mesosoma, visione dorsale; E) metasoma, postero-lateral view / metasoma, visione postero-laterale; F) metasoma, ventral view / metasoma, visione ventrale.

### *Holopyga tussaci* Linsenmaier, 1999

*Holopyga tussaci* Linsenmaier, 1999: 33. Holotype ♂; Morocco: Mohammedia (Casablanca-Settat), 29.vi.1982, leg. Tussac (Tussac private coll.).

**Specimens examined.** None. Holotype and unique known specimen housed in the private collection of M. Tussac (France); not made available to us.

**Distribution.** Morocco (Linsenmaier, 1999).

**Remarks.** Linsenmaier (1999) provided some line drawings of *Holopyga tussaci* (figs. 39-42).

### KEY TO SPECIES OF THE *HOLOPYGA MIRANDA* GROUP

1. Posterolateral angles of the head in dorsal view rounded (Figs. 11C, 13C) ..... 2
- Posterolateral angles of the head in dorsal view sharp (Figs. 5C, 6C, 7C, 8C, 9D, 10C) ..... 4
2. Posterior propodeal projections large, broad at base, with sharp apex (Figs. 3A,B). South-West European species ..... *H. miranda*

- Posterior propodeal projections small, narrow at base (Fig. 13D). Iberian and/or North African species ..... 3
- 3. Posterior propodeal projections finger-shaped, distinctly projecting, with blunt apex (Fig. 13D) ..... *H. naefi*
- Posterior propodeal projections triangular, weakly projecting, with sharper apex ..... *H. tussaci* (\*)
- 4. Mesosoma ventrally black. West-Mediterranean species ..... 5
- Mesosoma ventrally with metallic red reflections. Middle East and Central Asian species ..... 6
- 5. Temples in dorsal view subparallel, hardly rearwards convergent. Posterior propodeal projections finger-shaped (Fig. 10C). North African species . *H. mattheyi*
- Temples in dorsal view distinctly rearwards divergent. Posterior propodeal projections triangular (Figs. 5D, 6D). Iberian and North African species ..... *H. calida*
- 6. Lower mesopleuron enlarged, carinate, ventrally rounded (Fig. 9A,C); head in dorsal view as wide as pronotum, posterior edge almost straight, posterolateral angles not projecting rearwards; head and mesosoma punctation scattered, with polished, shining intervals (Fig. 9D). Central Asia ..... *H. lucens*

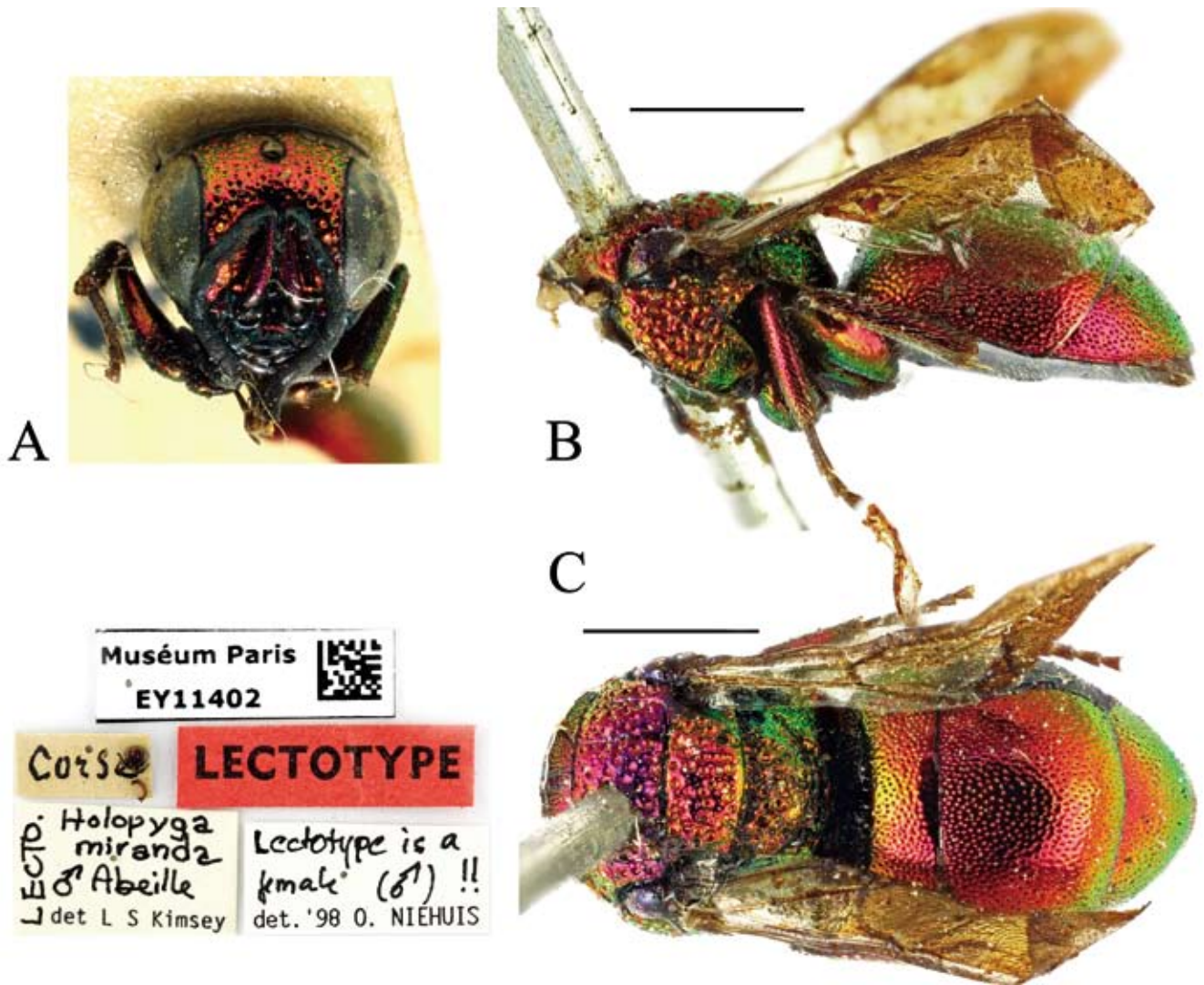


Fig. 12 - *Holopyga miranda* Abeille de Perrin, 1878, ♀ holotype (“lectotype”) / holotypus (“lectotypus”). A) head, frontal view / capo, visione frontale; B) habitus, lateral view / habitus, visione laterale; C) habitus, dorsal view / habitus, visione dorsale. Scale bar = 1.0 mm.

- Lower mesopleuron unmodified, ventrally angulate (Fig. 8A); head in dorsal view wider than pronotum, posterior edge distinctly concave, posterolateral angles projecting rearwards; head and mesosoma punctation denser to confluent, without shining intervals (Fig. 8D). Middle East ..... *H. enslini*

(\*) No specimen examined; description from Linsenmaier (1999).

#### SPECIES TO BE EXCLUDED FROM THE *HOLOPYGA MIRANDA* GROUP

##### *Holopyga bifrons* Abeille de Perrin, 1878

*Holopyga bifrons* Abeille de Perrin, 1878: 3. Holotype ♂, Algeria: Bône (MNHN).

**Material examined.** **Algeria.** *Annaba*: ♂ holotype, Bône [= Annaba] (MNHN); *Laghout*: 1♂, Tadjemout, 20.vi.1943, leg. Linsenmaier (NMLU). **Tunisia.** *Medenine*: 1♂, Djerba, 14 km SE Houmt Souk, 33°50'N, 11°00' E, 7.v.1992, leg. J. Gusenleitner (NMLU); 1♀, Djerba, Malboubine env., 7.iv.2002, leg. P. Rosa (PRC).

**Distribution.** Algeria, Tunisia (Linsenmaier, 1999).

**Remarks.** *Holopyga bifrons* was included by Linsenmaier (1999) in the *H. miranda* group; it conversely belongs to the *H. amoenula* group (see below). Apart from colouring features, namely blue face, contrasting with the red head in dorsal view, and mesosoma ventrally metallic, both unlike *H. miranda*, tarsal claws multidentate instead of bifid are a diagnostic feature of the *H. amoenula* group (tarsal claws examination based on non type specimen).

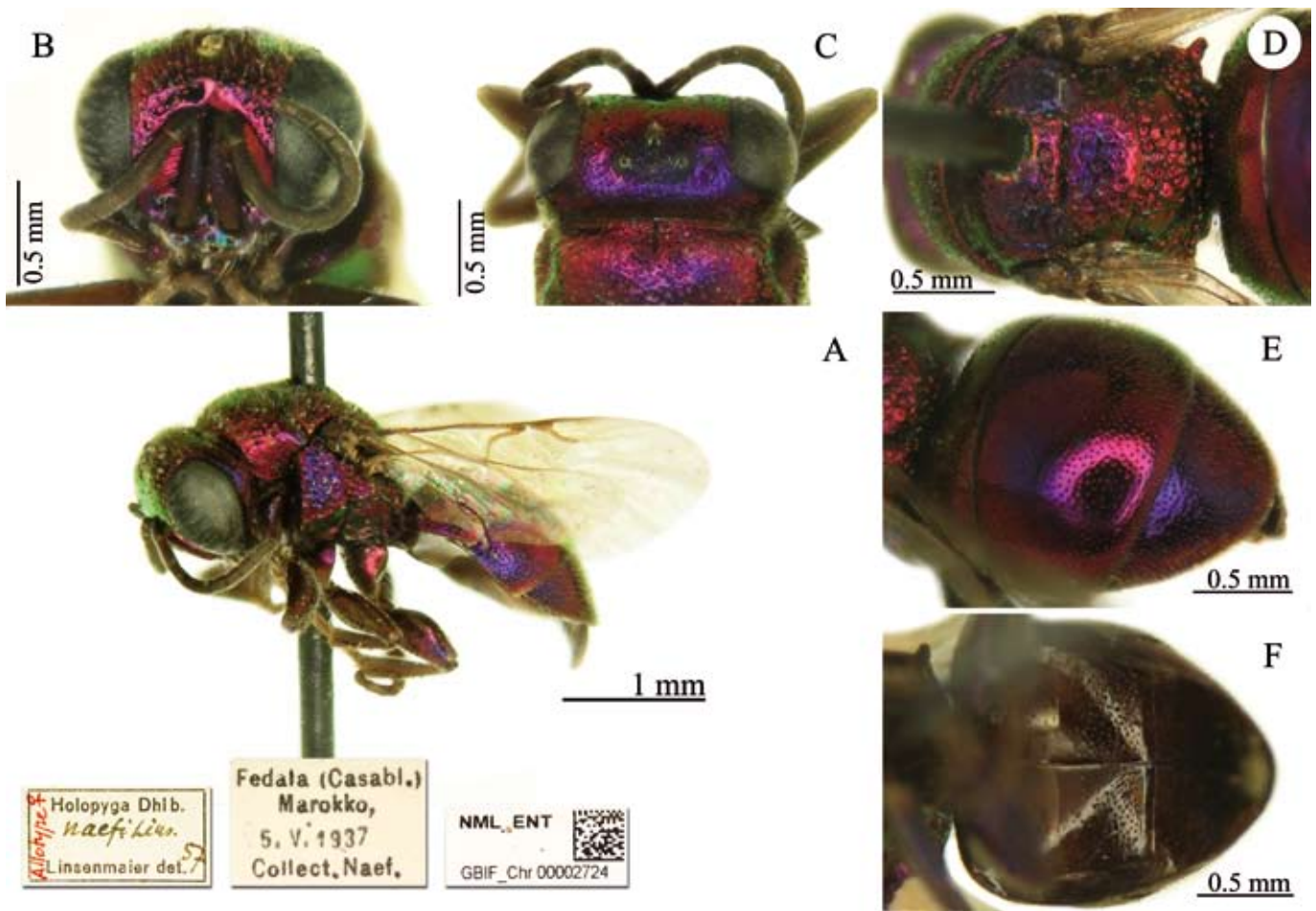


Fig. 13 - *Holopyga naefi* Linsenmaier, 1959, ♀ paratype (allotype) / paratypus (allotypus). A) habitus, lateral view / habitus, visione laterale; B) head, frontal view / capo, visione frontale; C) head, dorsal view / capo, visione dorsale; D) mesosoma, dorsal view / mesosoma, visione dorsale; E) metasoma, postero-lateral view / metasoma, visione postero-laterale; F) metasoma, ventral view / metasoma, visione ventrale.

### HOLOPYGA AMOENULA SPECIES GROUP

Linsenmaier (1959) introduced the name *Holopyga gloriosa* group for the largest species group within this genus. The name *Holopyga gloriosa* (Fabricius, 1793), originally described as *Chrysis gloriosa*, has long been used in European and Asian literature for a presumed highly variable *Holopyga* species, which later proved a heterogeneous species complex. Kimsey (1988) found a specimen labelled “*Chrysis gloriosa*” in Fabricius’ collection in Copenhagen [originally in Kiel (Zimsen 1964)], actually a *Pseudomalus auratus* (Linnaeus, 1758), and considered it as the holotype (in fact, selecting it as lectotype under Article 79b of the Code, see Pavesi & Strumia, 1997), despite of the striking differences with both original description, and Coquebert’s (1801) colour plate of a specimen identified as *C. gloriosa* by Fabricius himself in the Museum of Paris. Thus, *Chrysis gloriosa* was synonymised with *Omalus auratus* (Linnaeus, 1758), later transferred to the genus *Pseudomalus* (Kimsey & Bohart, 1991). Pavesi & Strumia (1997) found that both original Fabricius’ description, and Coquebert’s (1801) illustration of *C. gloriosa*, based on a specimen identified by Fabricius himself, cannot refer either to a *Pseudomalus auratus*, or

to a *Holopyga* whatsoever; conversely, they obviously refer to an unidentified species, of the tribe Chrysidini, not of Elampini. *Chrysis gloriosa* Fabricius, 1793, besides completely disagreeing with the prevailing usage of the name, was likely to prove a senior subjective synonym of a long-used name, thus the valid one, of some well-known species of Chrysidini. Stability of nomenclature would have been threatened. The authors therefore asked the International Commission on Zoological Nomenclature to place, under its Plenary Powers, the name *gloriosa* on the Official Index of Rejected and Invalid Specific Names in Zoology. The Commission (ICZN, 1998) accordingly suppressed the name *gloriosa*, as published in the binomen *Chrysis gloriosa* Fabricius, 1793, for the purposes of the Principle of Priority but not for those of the Principle of Homonymy.

Because of the suppression of the name *gloriosa*, the “*gloriosa* group” of Linsenmaier (1959) is to be renamed. The oldest available name is *H. lucida* (Lepelletier, 1806). However, since preliminary, partly unpublished molecular data (Pauli *et al.*, 2019; Rosa *et al.*, in prep.) suggest that *H. lucida* and related species may constitute a separate species group, or subgroup, not including *H. amoenula*

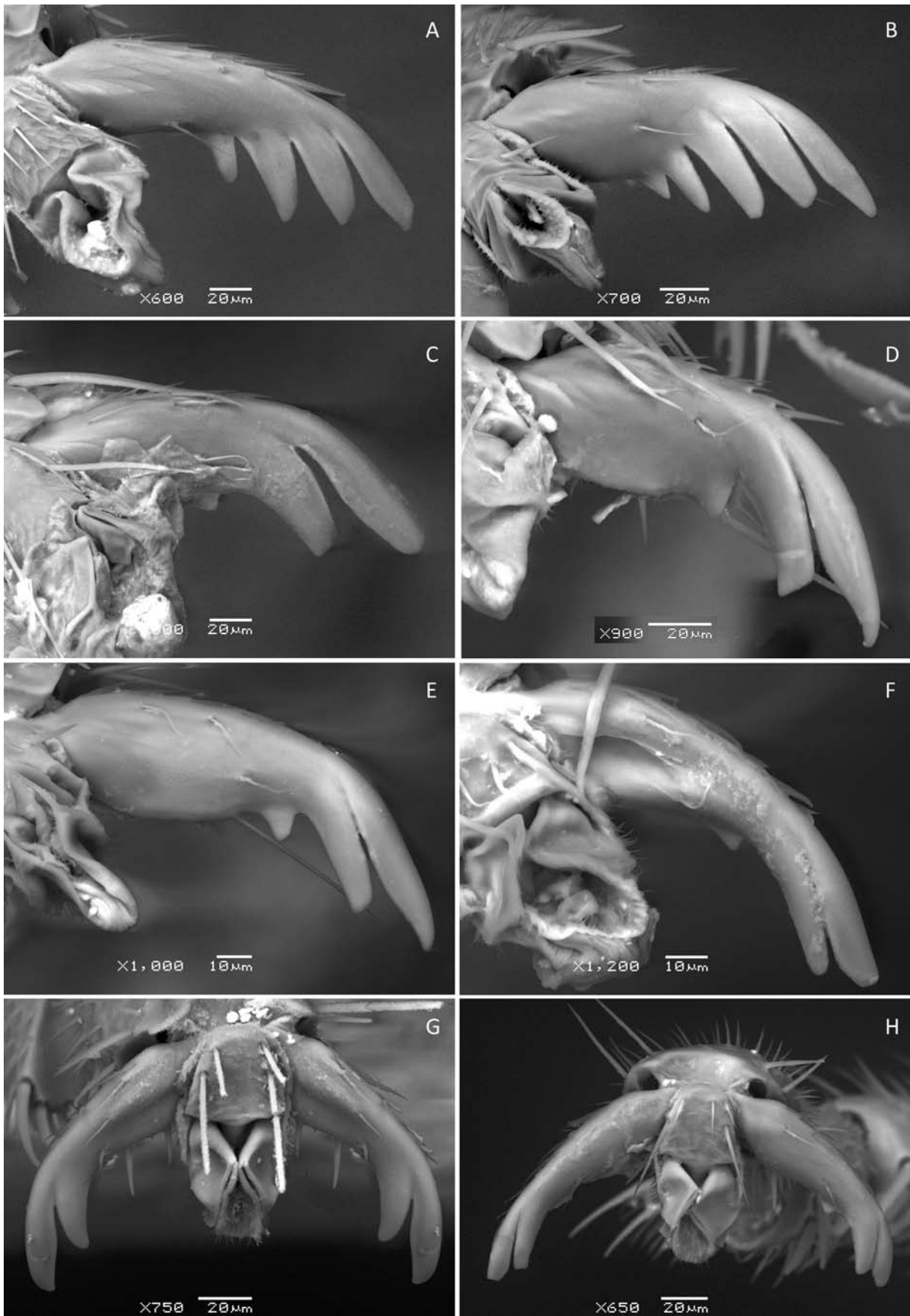


Fig. 14 – *Holopyga*, tarsal claws / unguitractori. A) *Holopyga amoenula* Dahlbom, 1845, ♂; B) idem, ♀; C) *H. fervida* (Fabricius, 1781), ♀; D) idem, ♂; E) *H. gogorzae* Trautmann, 1926, ♂; F) *H. miranda* Abeille de Perrin, 1878, ♂; G) *H. calida* Linsenmaier, 1951, ♀; H) idem, ♂.

Dahlbom, 1845, and being the latter the type species of the genus, we propose to rename the Linsenmaier's *H. gloriosa* group into *H. amoenula* group.

## ADDITIONAL NOTES

*Hedychridium planatum* Bischoff, 1910 and  
*Hedychridium planatum* var. *auratum* Bischoff, 1910  
(Fig. 15A,B)

*Hedychridium planatum* Bischoff, 1910: 439. Syntypes  
♂♂; Tunisia: Zaghuan (MfN).

*Hedychridium (Hedychridium) planatum sensu* Linsenmaier, 1999: 87 (*Hedychridium luteum* group), *neq* Bischoff, 1910.

*Holopyga planata* (Bischoff, 1910) **comb. nov.** = likely syn. of *Holopyga fervida* (Fabricius, 1781).

*Hedychridium planatum* var. *auratum* Bischoff, 1910: 439. Holotype ♂; Tunisia: Zaghuan (MfN).

*Holopyga planata* var. *aurata* (Bischoff, 1910) **comb. nov.** = likely syn. of *Holopyga fervida* (Fabricius, 1781).

Bischoff (1910) described *Hedychridium planatum* on two specimens, supposedly male and female, without designation of a holotype (Fig. 15A), and *H. planatum* var. *auratum* on a single male specimen, to be considered holotype by monotypy (Fig. 15B), all from Tunisia, Zaghuan [= Zaghouan]. After examination of the type material in Berlin collections, the two syntypes of *H. planatum* proved two males.

Both *H. planatum* and *H. planatum* var. *auratum* indeed are no doubt *Holopyga*, not *Hedychridium*. They appear most similar to the highly variable, as for colouring, *Holopyga fervida* (Fabricius, 1781), one of the commonest chrysidids also in Tunisia. They however differ from the latter in some punctuation features; par-

ticularly in the type of var. *auratum*, the mesoscutellar punctuation is unusual for *H. fervida* and its entire group. This difference was overlooked in the original description (“*formae typicae simillima, differt solum colore*”). It is most likely that the two taxa will prove conspecific, and *H. planatum* var. *auratum* not else than an anomalous specimen of *H. fervida*; yet the question will better be dealt with in our forthcoming revision of the whole *H. fervida* group.

Inclusion by Linsenmaier (1999) of *Hedychridium planatum* Bischoff, 1910 into his *H. luteum* species group most likely resulted from considering impossible a confusion, by Bischoff, between a *Holopyga* sp. *fervida*-like and a *Hedychridium*, and from a consequent attempt to assign *H. planatum*, according to described features, to one of his species groups. No *Hedychridium* species seems to have been positively recognized by Linsenmaier as *H. planatum*, since no specimen is to be found under that name in Linsenmaier's collection.

## DISCUSSION AND CONCLUSIONS

Surprisingly enough, Linsenmaier, even when subdividing the Palearctic *Holopyga* species into three species groups (Linsenmaier, 1959), totally overlooked the differences in tarsal claws between *H. fervida* + *H. miranda* (Fig. 14C-H) and *H. “gloriosa”* groups (Fig. 14A, B), despite of having this feature been noticed by prior authors. Dahlbom (1854), although recognizing the affinities of *fervida* and *chloroidea* (the latter subsequently recognized as the male of *fervida*) with *Holopyga*, based on tarsal claws shape placed both species in *Hedychrum*. Abeille (1879) also noticed the above differences, considering at first, and eventually discarding, the inclusion of *H. fervida* and other species in a new subgenus *Pseudhedychrum*, never validly described. Also Berland & Bernard (1938) provided good drawings of tarsal claws of *H. fervida* and of a not identifiable

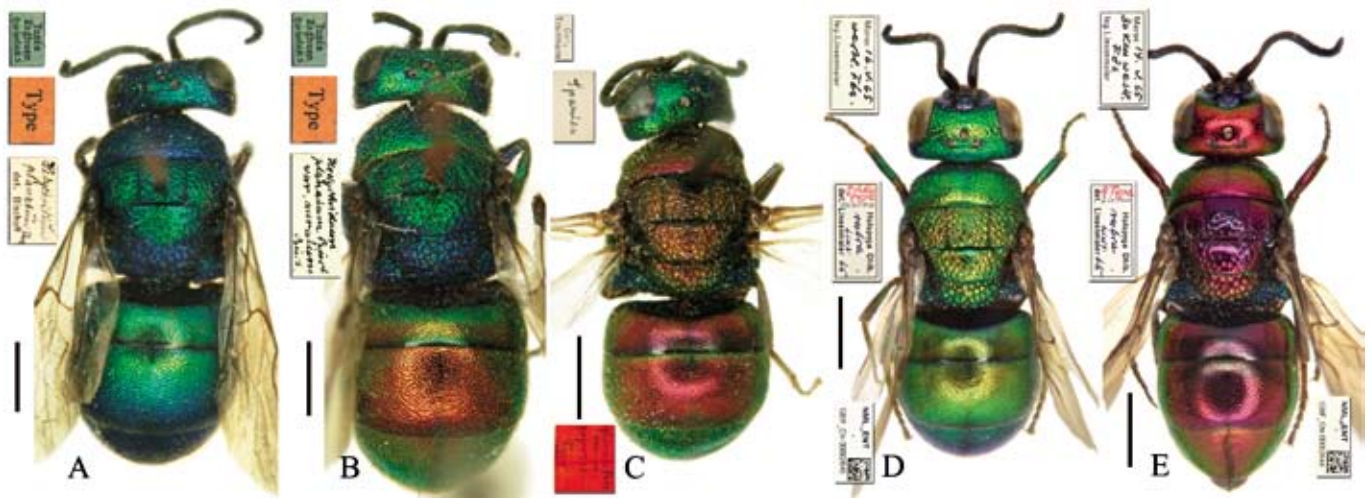


Fig. 15 - *Holopyga* habitus, dorsal view / habitus, visione dorsale. A) *Hedychridium planatum* Bischoff, 1910, ♂ syntype / syntypus. B) *Hedychridium planatum* var. *auratum* Bischoff, 1910, ♂ holotype / holotypus. C) *Holopyga gloriosa* var. *gogorzae* Trautmann, 1926, ♂ lectotype / lectotypus. D) *Holopyga rubra* Linsenmaier, 1999, ♂ paratype (allotype) / paratypus (allotypus). E) *Holopyga rubra* Linsenmaier, 1999, ♀ holotype / holotypus. Scale bar = 1.0 mm.



*H. "gloriosa"*. Linsenmaier (1951), in the key for genera, gives for *Holopyga* "Fusskrallen kammartig gezähnt" [= tarsal claws comb-like dentate]; later (1959) "Kral-len mit mehreren Zähnen" [= claws with several teeth]; finally (1999), in the diagnosis of the genus *Holopyga*, in which *Haba* and *Chamaeholopyga* were included as subgenera, again "Fußkrallen mit mehreren (nur bei *Haba* und *Chamaeholopyga* mit 1-2) Seitenzähnen" [= tarsal claws with several (only in *Haba* and *Chamaeholopyga* with 1-2) lateral teeth], again without noticing the differences between members of his "*gloriosa*" and *fervida* + *miranda* groups.

The genus *Holopyga* Dahlbom is certainly one of the most taxonomically difficult groups within the Palaearctic Chrysididae (Arens, 2004), together with the *Chrysis ignita* group (Soon *et al.*, 2014) and the *Chrysura dichroa* group (Arens, 2001). Identification and separation of *Holopyga* species are particularly complicated, because of the high variability of body sculpture and colouration on a large distributional area, and of still unresolved taxonomical and nomenclatural problems, such as those related to some of the commonest species, e.g. *H. chrysonota* (Förster, 1853), and *H. ignicollis* Dahlbom, 1854 (Rosa *et al.*, 2020). In particular, Arens (2004) observed that some species can be differentiated unexpectedly well in small regional contest (e.g. Peloponnese), whereas the same species may show different misleading characters in the same species outside the examined area, which results in confusion among taxonomists.

The whole genus *Holopyga*, as for both nomenclature and systematics, needs a major revision. Besides molecular studies, also morphometry-based taxonomical revisions proved an important tool, as they provide additional, easily verifiable, differential criteria between species (Arens, 2004). Moreover, according to recent, unpublished barcoding data, European fauna actually includes more *Holopyga* species than those currently recognized, and more researches about this topic are needed.

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