



Types of Chrysididae (Insecta, Hymenoptera) deposited at the Eidgenössische Technische Hochschule in Zürich

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Abstract

A catalogue of the chrysidid type specimens housed at the Eidgenössische Technische Hochschule in Zürich with revision and discussion of their status is presented. Selected images of the primary types are given. The new replacement name *Chrysis robertsi* Rosa **nom. nov. pro** *Chrysis viridicyanea* Linsenmaier, 1959, *nec* Giebel, 1862 is given. *Ellampus subauratus* Mocsáry, 1890 **spec. resurr.** is restored from the previous synonymy with *Philoctetes sareptanus* (Mocsáry, 1889). The new synonymy *Ellampus schulthessi subauratus* Mocsáry, 1890 = *E. conifer* Semenov-Tian-Shanskij, 1932 **syn. nov.** is proposed.

Key words: Catalogue, cuckoo wasps, type depository, new synonymy, replacement name

Introduction

The Chrysididae collection housed at the Eidgenössische Technische Hochschule (Swiss Federal Institute of Technology), Zürich (ETHZ) is a large, historical collection including more than 9,200 specimens belonging to 446 species and subspecies. Specimens are currently subdivided into two separate collections: the collection of Anton von Schulthess-Rechberg and the general collection, which is mostly based on material collected by Adolf Nadig Senior and Adolf Nadig Junior. In addition, the latter includes noteworthy material collected by several collectors, such as A. Mavromoustakis (with material from Cyprus); A. Mochi (Egypt, Rhodes, Italy); A. Mader (Austria, Croatia); C.v. Demelt (Austria); W. Linsenmaier (Greece, Spain, Switzerland); W. Sauter and E. Enslin (Switzerland); J.M. Dusmet (Spain: Aranjuez); G. Mercet (Spain: Montarco); A. Vilarrubia (Spain: Catalonia); J. Giner Mari (Spain: Valencia); F. Santschi (Tunisia); A. Steck (Wallis); G.C. Krüger (Cyrenaica, Ticino); and few specimens collected by A. Mocsáry (Hungary), H. Brauns and H.A. Junod (South Africa). Other Swiss collectors contributed cuckoo wasps collected in Switzerland in recent times: S. Bieri, A. Breitenstein, E. Handschin, C. Meier, B. Merz, A. Müller, M. Herrmann, R. Neumeyer, S. Ungricht, and J.P. Wolf. Both collections were organized by following Linsenmaier's systematics (1959). The chrysidid collections of Peter and Ruth Hättenschwiler, P.W. Bühler-Zingg & M. Blum, as well the unidentified specimens from Schulthess' collection were integrated into the general collection.

Anton von Schulthess-Rechberg (also known as Anton von Schulthess-Schindler or simply Anton von Schulthess) was an eminent Swiss entomologist born in a Zürich family (14 January 1855–7 November 1941). He undergraduated in medicine at Universität Zürich in 1879 and became a medical doctor; from 1915 to 1938, he was the president of Société suisse d'utilité publique (Swiss Public Utilities Society), and from 1929 to 1939, he was the president of the Schweizerisches Rotes Kreuz (Swiss Red Cross). As an entomologist, he focused mainly on the African Hymenoptera and described a new species of Chrysididae from Madagascar (*Chrysis friederichsi* von Schulthess, 1918), too. In 1925, he was the president of the International Entomological Congress in Zürich. For his noteworthy contributions to the knowledge of Hymenoptera, many species were dedicated to him, included two chrysidid species, namely *Chrysis schulthessi* Mocsáry, 1889 and *Ellampus schulthessi* Mocsáry, 1890. The Schul-

thess Chrysididae collection includes more than 1,250 specimens and was studied by Mocsáry for the revision of the Chrysididae of the world (1889, 1890, 1912), by Trautmann (1927) for the revision of the European Chrysididae and finally by Linsenmaier (1959). In particular, this collection was revised by W. Linsenmaier in 1957. The Schulthess collection includes 26 type specimens belonging to 16 taxa (6 holotypes, 8 paratypes, 4 syntypes, 2 lectotypes, and 6 paralectotypes).

Adolf Nadig Sr. was born in München (Germany, 3 June 1877) and died in Chur (Switzerland, 15 May 1960). He was a politician and a keen Swiss naturalist, who also collected and published some articles on Hymenoptera (Formicidae and other families). He lived some years in Milan (Italy), where his son, Adolf Nadig Jr., was born (21 January 1910, died in Chur, 26 December 2003). The latter was a renowned amateur entomologist who followed in the footsteps of the father and was specialised on Orthoptera. Their Orthoptera collection is currently housed at the Muséum d'histoire naturelle de Genève and includes more than 100,000 Palaeartic specimens (Steinmann 2004). Nadig's Hymenoptera collection is a large, comprehensive collection of Symphyta and Aculeata deposited at ETHZ. It represents the majority of all specimens in ETHZ's Hymenoptera collection. Many Apoidea have been re-determined by A. Müller and most Apoidea data are recorded in the database of the Centre Suisse de Cartographie de la Faune (CSCF). Adolf Nadig Sr. and Jr. published several joint articles (e.g. Nadig & Nadig 1934, 1935). Bischoff dedicated one chrysidid to them, *Chrysis nadigorum* Bischoff in Nadig & Nadig (1935). The Nadig Chrysididae collection was revised by Linsenmaier in 1962–1963.

The main goal of this contribution is to provide a revision of the type material described by Mocsáry (1889, 1890, 1912), Trautmann (1927), Bischoff in Nadig & Nadig (1935) and Linsenmaier (1959, 1968) in the collections of Anton von Schulthess-Rechberg and Adolf Nadig Sr. and Jr.. In particular, this catalog complements other works on Mocsáry's types (Rosa *et al.* 2015d, 2017b, 2020) and implements previous works on the Palaeartic fauna (e.g. Linsenmaier 1959) in particular with respect to some taxa in which the identification has remained unclear so far.

Materials and methods

The collection housed at ETHZ includes 55 type specimens belonging to 25 taxa: eight holotypes, 35 paratypes, four syntypes, two lectotypes, and six paralectotypes described by A. Mocsáry (1889, 1890, 1912), A. von Schulthess-Rechberg (1918), W. Trautmann (1927), H. Bischoff (in Nadig & Nadig 1935), W. Linsenmaier (1959, 1968, 1999), Niehuis (2000). After the present revision, all types were placed together into a separate box. At the end of the 19th Century, a curator removed the original handwritten labels of the oldest authors (e. g. those of A. Mocsáry) and substituted them with semiprinted labels, as already noticed in the collection of HNHM and NHMW (Rosa *et al.* 2017b, 2020). These semi-printed labels have the handwritten species names of the types in red.

Selected primary types are illustrated, such as eight holotypes, two lectotypes and one syntype. Pictures of the types were taken with a Nikon D-3400 connected to the stereomicroscope Tegal SCZ and stacked with the software Combine ZS.

The type catalogue is arranged alphabetically according to the original combination. For each taxon the following information is given: type locality from original publication; category of the type; number and sex of the specimens; wording of all labels, in which handwritten text is given in italics and labels are separated from each other by double slash; remarks (where necessary) about the current systematic placement.

Terminology and classification of the genera follow Kimsey & Bohart (1991); classification of species and species-groups follows Fauna Europaea (Rosa & Soan 2012) and Linsenmaier (1959, 1968, 1997, 1999). The definitions of holotype, neotype, lectotype etc. are used according to the International Code of Zoological Nomenclature (ICZN 1999), fourth edition. The following abbreviations are used: cat. (catalogue), descr. (description), distr. (distribution), ecol. (ecology), fig. (figure), mis. (misidentification), pag. (page), *s.s.* (*sensu stricto*), tax. (taxonomical discussion).

Types and other specimens were examined in the following institutions: Forschungsinstitut Senckenberg, Frankfurt, Germany (SMF); Magyar Természettudományi Múzeum, Budapest, Hungary (HNHM); Instytut Systematyki i Ewolucji Zwierząt, Krakow, Poland (ISEA-PAS); Muséum d'Histoire Naturelle, Geneva, Switzerland (MHNG); Museum für Naturkunde Berlin, Germany (MfN); Národní Muzeum, Prague, Czech Republic (NHMP); Naturhistorisches Museum, Wien (NHMW); Natur Museum Luzern, Switzerland (NMLU).

Catalogue of types

Subfamily Chrysidinae

Tribe Chrysidini

Chrysis bidentata prominea Linsenmaier, 1959

Chrysis (*Chrysis*) *bidentata* ssp. *prominea* Linsenmaier, 1959: 131. Holotype ♀; Switzerland: Wallis (NMLU).
Chrysis (*Chrysis*) *consanguinea prominea*: Linsenmaier 1997: 277 (key).

Type locality. France, Italy, Switzerland: “Süd-Frankreich, Sizilien, Schweiz (Wallis). Selten. ♀ Type, ♂ Allotype (Wallis 500-900m, VII.) Coll. m., Paratypen Coll. Verhoeff und Coll. m.”.

Paratypes, 3 ♀♀: France Vaucl. Carpentras 30.v.59 Linsenmaier // Paratypen <handwritten in red> *Chrysis* L. *bidentata* Luc. *prominea* Lins. Linsenmaier det. 59 // PARATYPUS < red label>.

Remarks. Three paratype specimens are prepared and glued on the same plastic label, in Linsenmaier’s typical style (Rosa *et al.* 2015b). They were given in exchange by Linsenmaier, after examination of Nadig’s collection in 1963, together with other paratypes (see below) and interesting specimens.

Linsenmaier (1959, 1968, 1987) confused the name *Elampus bidentatus* Lucas, 1849 (a northern African species belonging to the tribe Elampini) with *Chrysis bidentata* Linnaeus, 1767 (described from Sweden and belonging to the tribe Chrysidini, *Chrysis viridula* group), which is a junior synonym of *Chrysis viridula* Linnaeus, 1761 (Paukkunen *et al.* 2014). *Chrysis bidentata* Lucas, 1849 *sensu* Linsenmaier (1959, 1968, 1987) is *Chrysis consanguinea* Mocsáry, 1889 (described from Algeria). Linsenmaier (1997, 1999) recognized his misinterpretation; however, this inaccuracy is still found in recent articles (e.g. Tarbinsky 2002).

Chrysis chalcites Mocsáry, 1890

(Fig. 1A–D)

Chrysis (*Gonochrysis*) *chalcites* Mocsáry, 1890: 55. Holotype ♀; Russia: Sarepta (ETHZ).

Chrysis chalcites: Dalla Torre 1892: 49 (cat., Russia).

Spinolia chalcites: du Buysson in André 1893: 249 (cat., descr., key, southern Russia, Sarepta); Bischoff 1913: 25 (cat., southern Russia); Trautmann 1927: 87 (key), 89 (cat., descr., distr., southern Russia); Balthasar 1953: 64 (key, southern Russia); Móczár 1964b: 447 (tax., Sarepta); Nikol’skaya 1978: 71 (key, southern European part of USSR); Rosa *et al.* 2019: 202 (cat., distr.), 329 (Fig. 99).

Pseudochrysis (*Spinolia*) *chalcites*: Semenov-Tian-Shanskij 1912: 183 (descr., distr., Volgograd Prov.: Sarepta).

Euchroeus (*Spinolia*) *chalcites*: Linsenmaier 1951: 28 (key), 29 (key), 30 (descr., southern Russia), 99 (cat.); Linsenmaier 1959: 69 (descr., distr., key, southern Russia, mis.), 188 (cat.), 201 (Fig. 221).

Type locality. Russia: “*Russia meridionalis* (Sarepta) (Coll. Schulthess-Rechbergi)”.

Holotype, ♀: Sarepta // *chalcites* <handwritten in red> det. Mosc. [!] // 711 // Holotypus *Chrysis chalcites* Mocsáry 1890 // 27.I.1989 Berra vidit // Schulthess Rechberg Collection.

Remarks. Although Mocsáry (1890) clearly reported Schulthess-Rechberg’s collection as the type depository, there was uncertainty on the real type depository and identification of this species. In fact, in the catalogue of the Chrysididae of the world (Kimsey & Bohart 1991) the given type depository is HMNH. The Mocsáry collection at HMNH was recently examined by the first author (Rosa *et al.* 2017b) and the only specimen found under the name *Chrysis chalcites* is not a type, but a male specimen belonging to an unidentified species, bearing the locality label “*Asia min. Adalia*” (Asia Minor, Adalia [= Antalya]). This specimen is bearing a handwritten label by Kimsey “*Not type: the type is ♀ from “Russia meridionalis” (Sarepta)*”. The specimen housed at ETHZ is undoubtedly the holotype examined by Mocsáry (1890), as confirmed by the red handwritten identification label and by morphological comparison, which is matching the original description.

Linsenmaier (1959: pag. 5) examined the type deposited at ETHZ and drew its face in the plates (Fig. 221). Nevertheless, the identification key and the description (pag. 69) are based on another specimen still deposited in his collection, which belongs to another species of *Spinolia* placed between *Spinolia rogenhoferi* (Mocsáry, 1889) and *Spinolia dournovii* (Radoszkovsky, 1866).

The type corresponds to the current interpretation of the species given by Rosa *et al.* (2019).

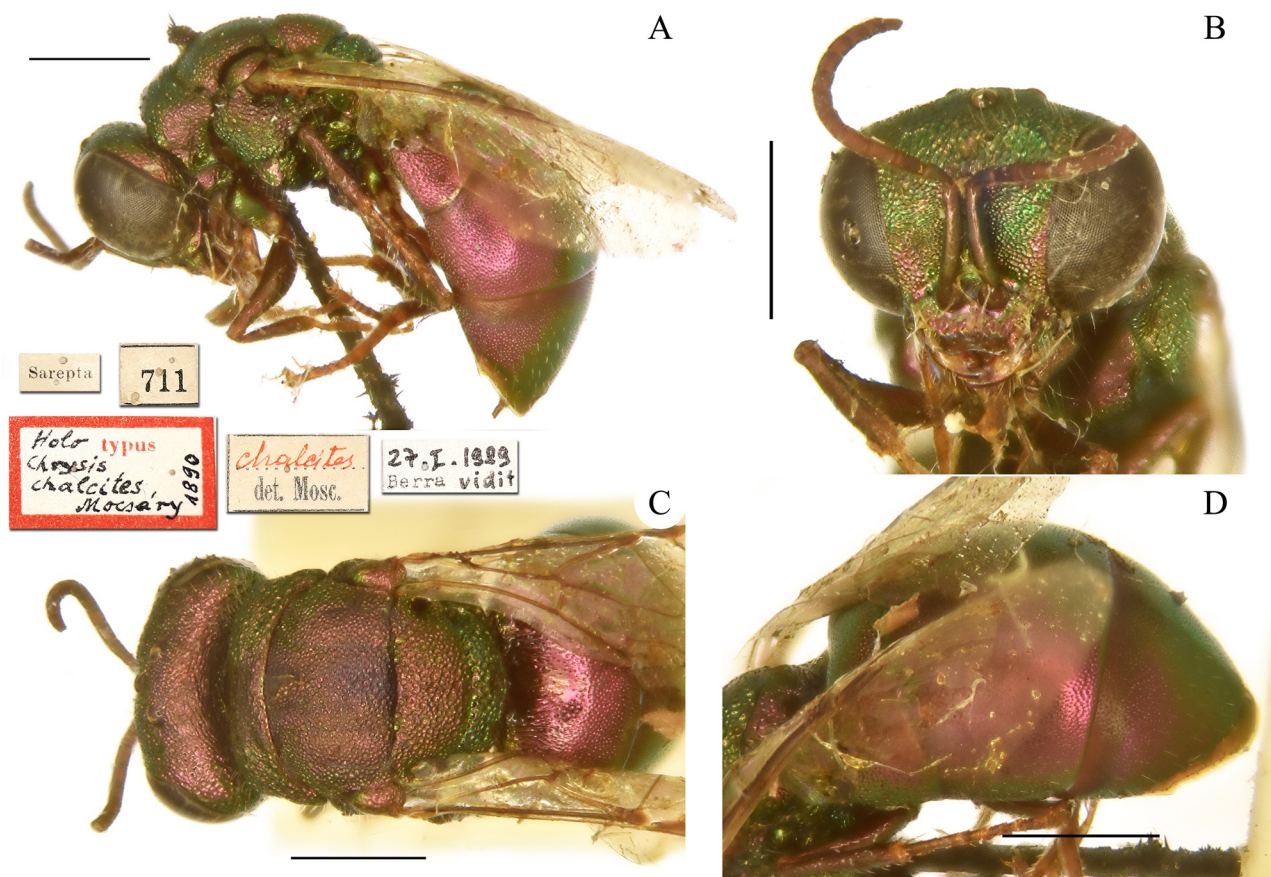


FIGURE 1. *Chrysis chalcites*, holotype ♀. A) Habitus, lateral view. B) Head, frontal view. C) Head, mesosoma and metasomal tergum I, dorsal view. D) Metasoma, dorso-lateral view. Scale bars: 1.0 mm.

Chrysis confinis Mocsáry, 1912

Chrysis (Tetrachrysis) confinis Mocsáry, 1912: 404. Lectotype ♀ designated by Bohart (in Bohart & French 1986: 341); South Africa: Limpopo Province: Shilouvane [= Shiluvane] (HMNH).

Chrysis confinis: Kimsey & Bohart 1991: 399 (cat., *maindroni* group).

Type locality. South Africa: “Transvaal: Shilouvane (Coll. Schulthess-Rechbergi et Mus. Hung.)”.

Paralectotype, ♀: Shilouvane N. Transvaal (Junod) // *confinis* Mocs. *typ.* <handwritten in red> det. Mocsáry. // TYPUS < red label > // Schulthess Rechberg Collection.

Remarks. The lectotype was designated by Bohart (in Bohart & French 1986) based on a female specimen deposited at Budapest, in Mocsáry’s collection. The paralectotype housed at ETHZ is conspecific with the lectotype. *Chrysis confinis* Mocsáry belongs to *Chrysis maindroni* species group (Madl & Rosa 2012).

Chrysis friederichsi von Schulthess, 1918

Chrysis (Dichrysis) friederichsi von Schulthess, 1918: 98. Syntype ♂; Madagascar: Diego Suarez, Antananarivo (ETHZ, MfN).

Chrysidea friederichsi: Kimsey & Bohart 1991: 313 (synonymous of *Chrysidea bellula* (Guérin-Méneville, 1842)).

Type locality. Madagascar: “Diegod, Suarez, Madagaskar borealis Kiesw, Antananarivo 2♂ (Dr. Friederichs captivus Gallorum leg. 1916 (c.m.)”.

Syntype, ♂: Antananarivo Madagascar // *Chrysis friederichsi* <handwritten in red> det. Schulthess 916 // Type <printed in red> // *Chrysis L. bellula* Guér. Linsenmaier det. // Schulthess Rechberg Collection.

Remarks. The second syntype is housed at MfN, in Trautmann's collection. *Chrysis friederichsi* was apparently synonymised with *Chrysidea bellula* (Guérin-Méneville, 1842) for the first time by Kimsey & Bohart (1991) (Azevedo *et al.* 2010).

***Chrysis grohmanni nadigorum* Bischoff in Nadig & Nadig, 1935**
(Figs 2A–D, 3A–D)

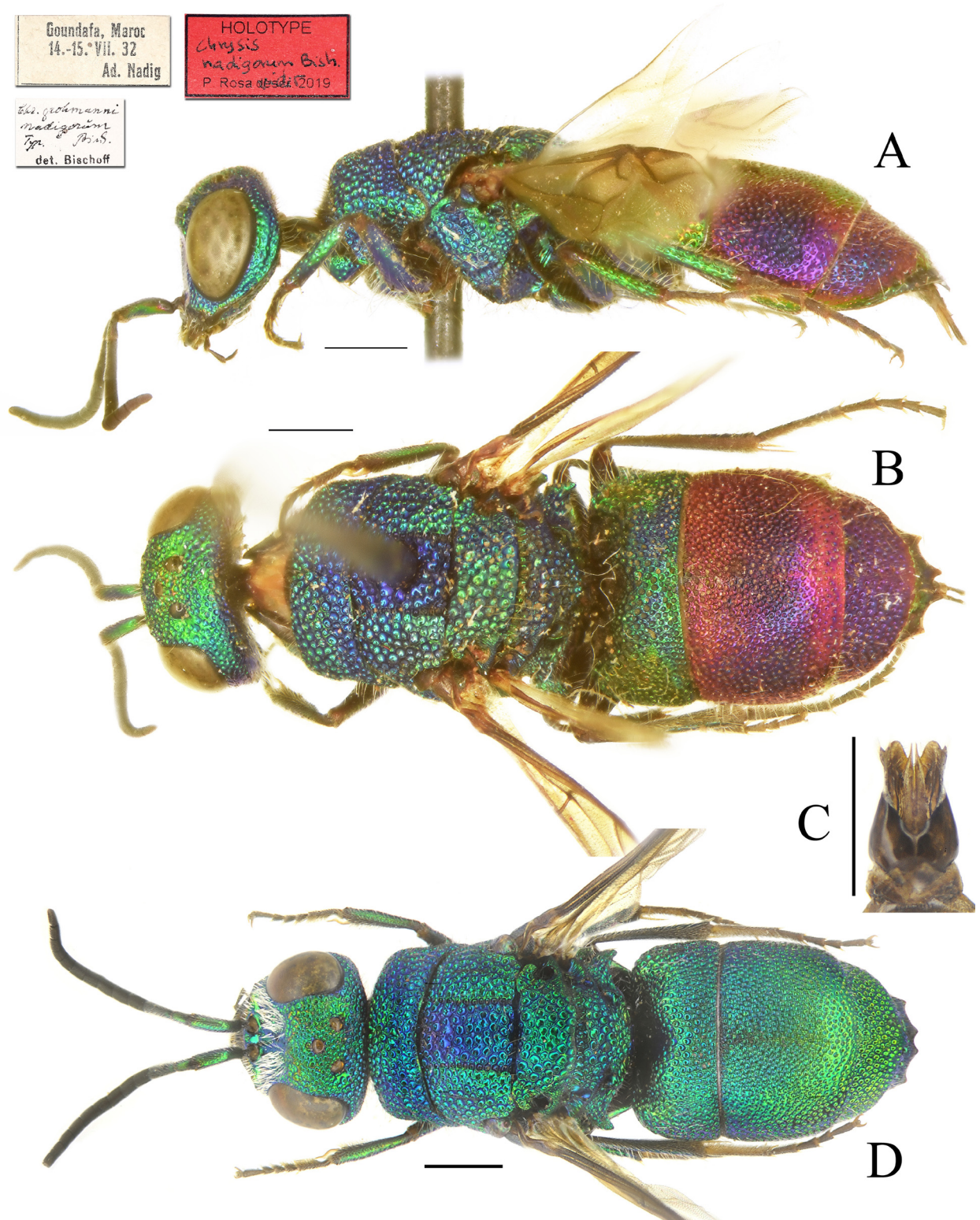


FIGURE 2. *Chrysis grohmanni nadigorum*, holotype ♀. A) Habitus, lateral view. B) Habitus, dorsal view. *Chrysis grohmanni nadigorum*, ♂ from Morocco. C) genital capsule. D) Habitus, dorsal view. Scale bars: 1.0 mm.

Chrysis grohmanni var. *nadigorum* Bischoff in Nadig & Nadig, 1935: 18. Holotype female [not syntype males]; Morocco: Goundafa (ETHZ).

Chrysis (*Chrysis*) *nadigorum*: Linsenmaier 1959: 108 (key, *succincta* group), 110 (descr.), 190 (cat.); Linsenmaier 1999: 150 (key), 154 (descr.).

Chrysis grohmanni var. *nadigorum*: Kimsey & Bohart 1991: 416 (synonymous of *Chrysis grohmanni* Dahlbom, 1854).

Type locality. Morocco: “Goundafa, 1♀”.

Holotype, ♀: Goundafa, Maroc 14.-15.VII.32 Ad. Nadig // *Chr. grohmanni nadigorum* Typ. Bis. Det. Bischoff.

Remarks. The description of *Chrysis grohmanni nadigorum* was based on a female, to be considered the holotype. Kimsey & Bohart (1991: 416) erroneously reported syntype males deposited in Berlin. Further specimens were eventually searched in Berlin by the first author (PR) without success. Linsenmaier (1968) designated in his collection a male specimen as the allotype. The latter has no type status because it is not part of the type series and it was collected in Morocco at Asni on 25 May 1964 by Linsenmaier himself, after the original description.

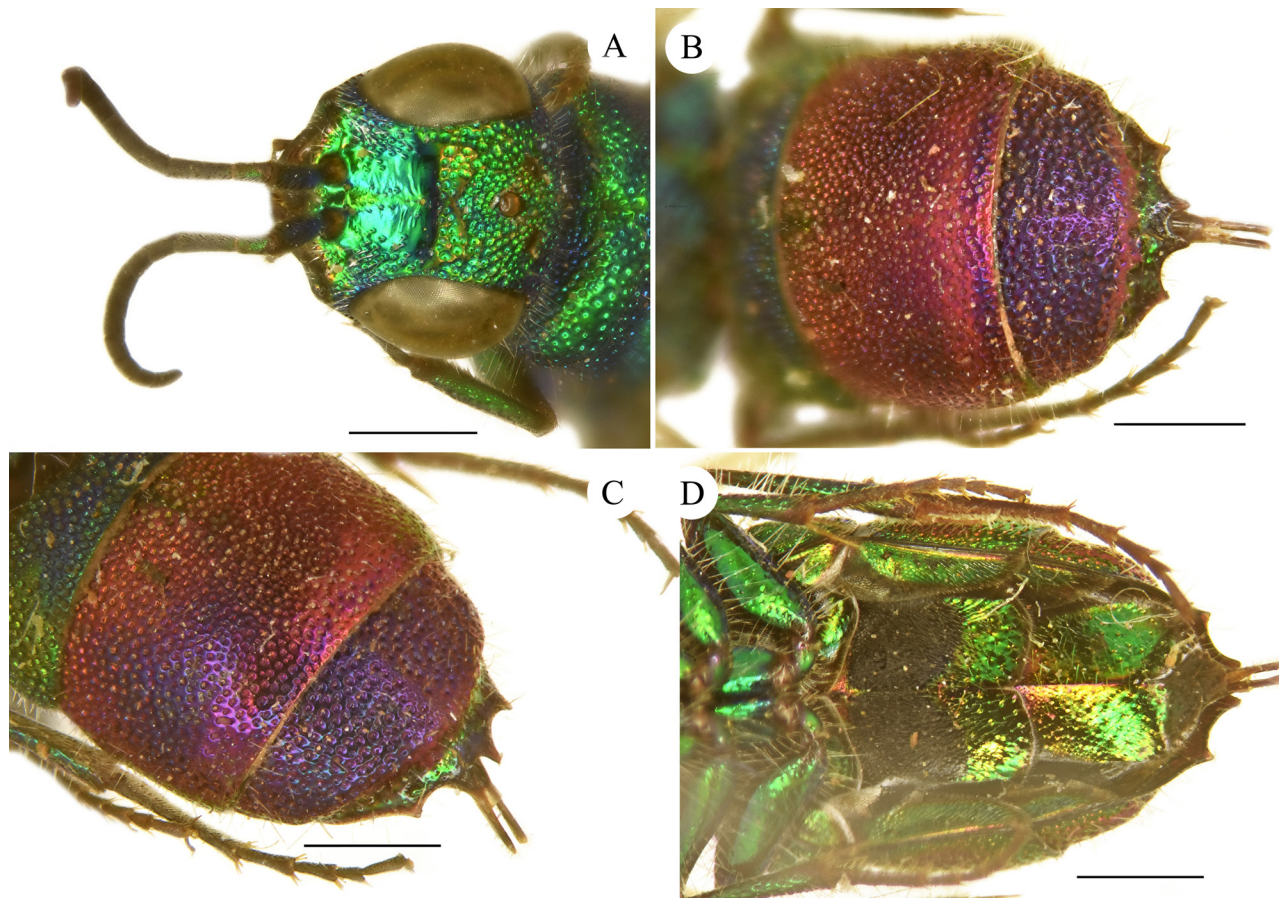


FIGURE 3. *Chrysis grohmanni nadigorum*, holotype ♀. A) Head, frontal view. B) Metasoma, posterior view. C) Metasoma, dorso-lateral view. D) Metasoma, ventral view. Scale bars: 1.0 mm.

Chrysis nadigorum was upgraded to species rank by Linsenmaier (1959), who later described the genital capsule (Linsenmaier 1968), which is similar to that of *Chrysis gribodoi* Abeille de Perrin, 1878 (Fig. 2C). It was synonymised with *Chrysis grohmanni* Dahlbom, 1854 by Kimsey & Bohart (1991), and finally revalidated by Linsenmaier (1999). It is a valid species with a distinct chromatic sexual dimorphism: the male is entirely blue-green (Fig. 2D), whereas the female has red metasomal terga II and III (Figs 2A–B). Linsenmaier (1968) recorded a chromatic variant of the female, in which the metasoma is entirely red. An assessment of the variability of this species is currently unfeasible because the species is very rarely collected (Linsenmaier 1968) and, as far as we know, only a few Moroccan specimens are deposited in ETHZ, NMLU, and in the private collections of the first author, Gian Luca Agnoli (Bologna, Italy) and Marek Halada (České Budějovice, Czech Republic).

Chrysis leachii mauritanica Trautmann, 1927

(Fig. 4A–D)

Chrysis leachii var. *mauritanica* Trautmann, 1927: 133 [not 153]. Syntypes ♂♂ and ♀♀; Tunisia (MfN, ETHZ).

Chrysis (Chrysis) mauritanica: Linsenmaier 1959: 118 (key), 120 (descr.), 190 (cat., *leachii* group), 204 (fig. 336), 207 (fig. 467), 208 (fig. 481).

Chrysis mauritanica: Kimsey & Bohart 1991: 437 (cat., *succincta-leachii* group).

Type locality. Tunisia: “Tunis, Coll. Trautmann, Coll. Schulthess”.

Syntypes, 1♂, 1♀: Tunisie Hammamet Santschi VII.16 // Collectio Reichensperger // *Chrysis leachii* Shuck. var. nov. *mauritanica* Tr. Cotype! u. Ubergang det. Trautmann <handwritten on red label> // Schulthess Rechberg Collection.

Remarks. Other syntypes are housed at MfN, in Trautmann’s collection. It was ranked as species by Linsenmaier (1959).

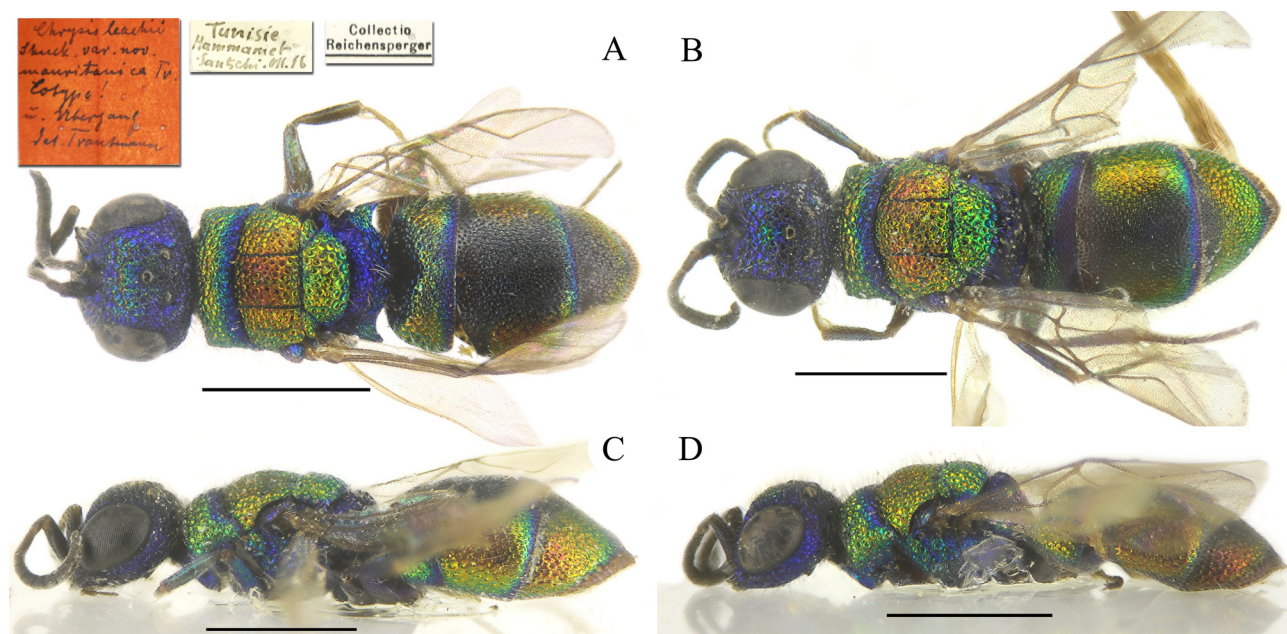


FIGURE 4. *Chrysis leachii mauritanica*, syntype ♂. A) Habitus, dorsal view. C) Habitus, lateral view. *Chrysis leachii mauritanica*, syntype ♀. B) Habitus, dorsal view. D) Habitus, lateral view. Scale bars: 1.0 mm.

Chrysis leptomandibularis Niehuis, 2000

Chrysis leptomandibularis Niehuis, 2000: 192. Holotype ♀; Germany: Rheinland-Pfalz, Monsheim (SMF) (*ignita* group).

Type locality. Austria, France, Germany, Italy, Netherlands, Poland, Switzerland, Turkey, Ukraine. Holotype: Germany: Rheinland-Pfalz, Monsheim, 49°38' N, 08°12' E, 28.v.1998, leg. G. Reder (Frankfurt).

Paratypes, 1♀: Halde Chur 20.VI.22 Dr. Ad. Nadig // *ignita* ♀ *brevidens*? Tourn. det. Ad. Nadig // *Chrysis* L. *angustula* Sch. Linsenmaier det. 62 // Paratype ♀ *Chrysis leptomandibularis* n. sp. det. '98 O. Niehuis <red label>; 1♀, Rügenacht 21.VI.1927 Steck // *Chrysis* L. *angustula* Sch. Linsenmaier det. 62 // Paratype ♀ *Chrysis leptomandibularis* n. sp. det. '98 O. Niehuis <red label>.

Chrysis monticola Linsenmaier, 1999

Chrysis (Chrysis) monticola Linsenmaier, 1999: 168. Holotype ♀; Morocco: H. Atlas, Tizi-n-Test, 1900 m (NMLU) (*aestiva* group).

Chrysis monticola: Rosa et al. 2015c: 89 (descr., distr.).

Type locality. Algeria, Morocco: “Marokko, Algerien.—Marokko: ♀ Type (Holotypus) H. Atlas Tizi-n-Test 1900m, 30.VI.1987 M. Schwarz, Coll. m., ♂ Allotype M-Atlas Timahdite 1800m, 9.VI.1964 leg. u. Coll. m.; Paratypen H. Atlas Ijoukak 1200m, VII.1932 leg. u. Coll. A. Nadig, Msenrir (NE) 2400m 3.VII.1987 leg. u. Coll. M. Schwarz; AntiAtlas Ait Saoun 1400m, 31.V.1990 und Agdz, 30.V.1990 leg. u. Coll. W. Schlaefle u. m.—Algerien: Hoggar, Tamnasset Guelta (25 km NE) 26.III.1989 leg. K. Warncke, ♂ Paratype Coll. m.”.

Paratype, 1♂: Goundafa, Maroc 14.–15.VII.32 Ad. Nadig // spec. ? ♂ det. Bischoff // ♂ Paratype <handwritten in red> *Chrysis L. monticola* Lins. Linsenmaier det. 65.

Remarks. Linsenmaier (1999) erroneously reported Ijoukak as the type locality for the specimen collected by Nadig in July 1932, which was conversely collected at Goundafa, on the Hight Atlas. This species is spreading in southern Europe and it was recently found in Portugal (Rosa *et al.* 2015c) and in Spain (P.R., unpublished data).

Chrysis purpureifrons helleniensis Linsenmaier, 1968

Chrysis (Chrysogona) purpureifrons ssp. *helleniensis* Linsenmaier, 1968: 48. Holotype ♀; Greece: Athen (NMLU) (*dichroa* group). *Chrysura purpureifrons* ssp. *helleniensis*: Kimsey & Bohart 1991: 494 (cat.).

Type locality. Greece, former Yugoslavia, Southern Russia: “Griechenland, Jugoslawien, Süd-Russland. ♀ Type von Athen, ♂ Allotype von Korinthos in Coll. m. Paratypen in Coll. de Beaumont, Verhoeff und m.”.

Paratypes, 2♀♀: Graecia, Pelop. Sparta 15.V.62 leg. Linsenmaier // Paratype <handwritten in red> *Chrysis L. purpureifrons helleniensis* Lins. Linsenmaier det. 63 // Paratypus <red label>.

Remarks. Taxon currently included in *Chrysura* Dahlbom, 1845.

Chrysis santschii Linsenmaier, 1959

(Fig. 5A–5D)

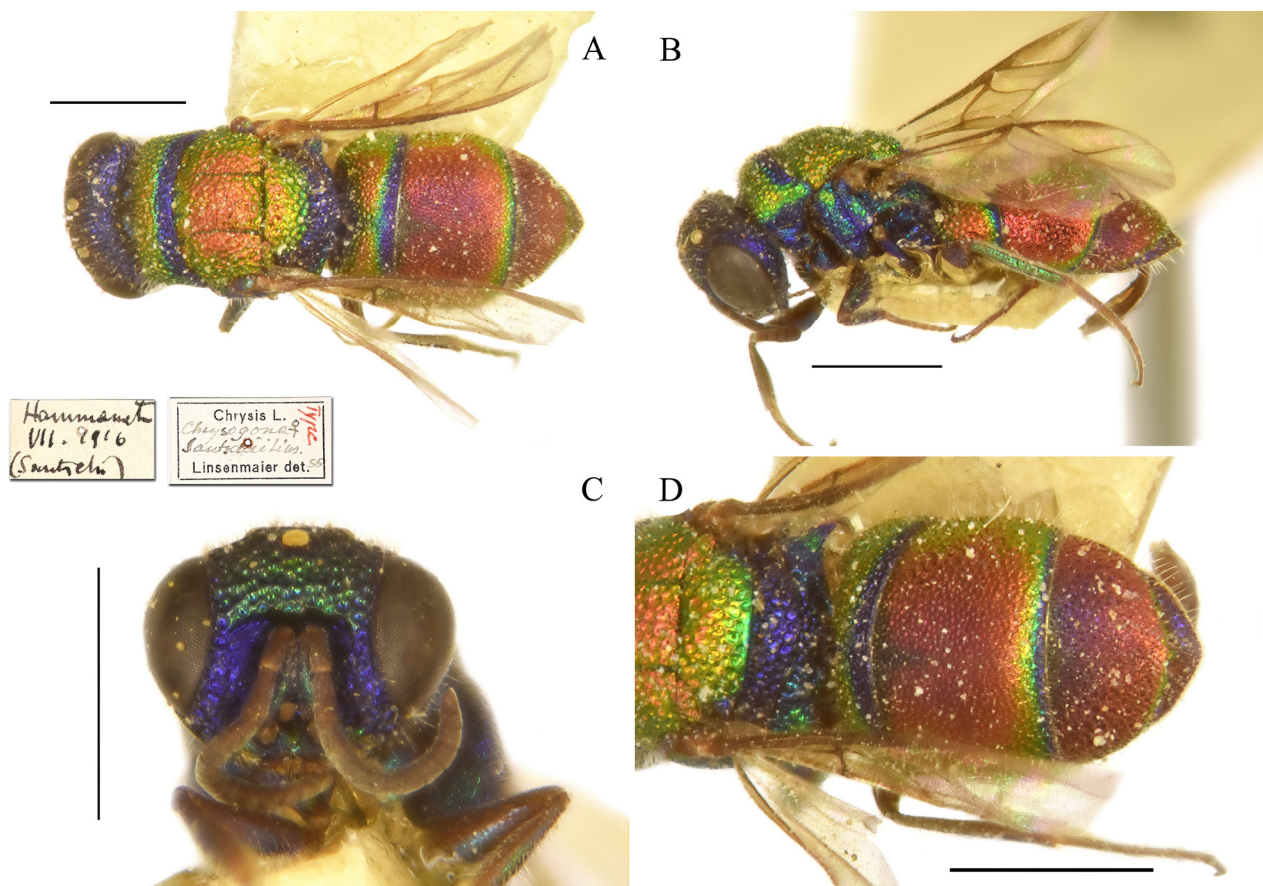


FIGURE 5. *Chrysis santschii*, holotype ♀. A) Habitus, dorsal view. B) Habitus, lateral view. C) Head, frontal view. D) Scutellum, metanotum, propodeum and metasoma, posterior view. Scale bars: 1.0 mm.

Chrysis (Chrysis) santschii Linsenmaier, 1959: 120. Holotype ♀; Tunisia: Hammamet (*leachii* group) (ETHZ).
Chrysis santschii: Kimsey & Bohart 1991: 459 (cat., *succincta-leachii* group).

Type locality. Tunisia: “Tunesien, ♀ Type Ent. Institut Zürich, ♀ Paratypen ebenda und Coll. m.”.

Holotype, ♀: Hammamet VII.1916 (*Santschi*) // Type <handwritten in red> *Chrysis* L. *Chrysogona* ♀ *Santschii* Lins. Linsenmaier det. 55 // Schulthess Rechberg Collection.

Paratypes, 2 ♀: Kairouan I.IV.1917 (*Santschi*) [handwritten] // Paratypen <handwritten in red> *Chrysis* L. *Chrysogona* ♀ *Santschii* Lins. Linsenmaier det. 55 // Schulthess Rechberg Collection; 3 ♀: Hammamet Tunisia VII.16 *Santschi* // Paratypen <handwritten in red> *Chrysis* L. *Chrysogona* ♀ *Santschii* Lins. Linsenmaier det. 55 // Schulthess Rechberg Collection.

Remarks. Linsenmaier (1959) did not report the accurate type locality and collecting date, which are Hammamet, July 1916, for the holotype, for three paratype specimens deposited at ETHZ and four paratypes deposited at NMLU; Kairouan is the other type locality for two female paratypes at ETHZ.

Linsenmaier (1959) designated a male specimen in his collection as the allotype. This specimen was collected by Santschi at Kairouan in June 1909, but it has no type status because it was not mentioned in the original type series and labelled as allotype in 1963, after the original description.

Chrysis tingitana Bischoff in Nadig & Nadig, 1935

(Figs 6A, B, 7A–D)

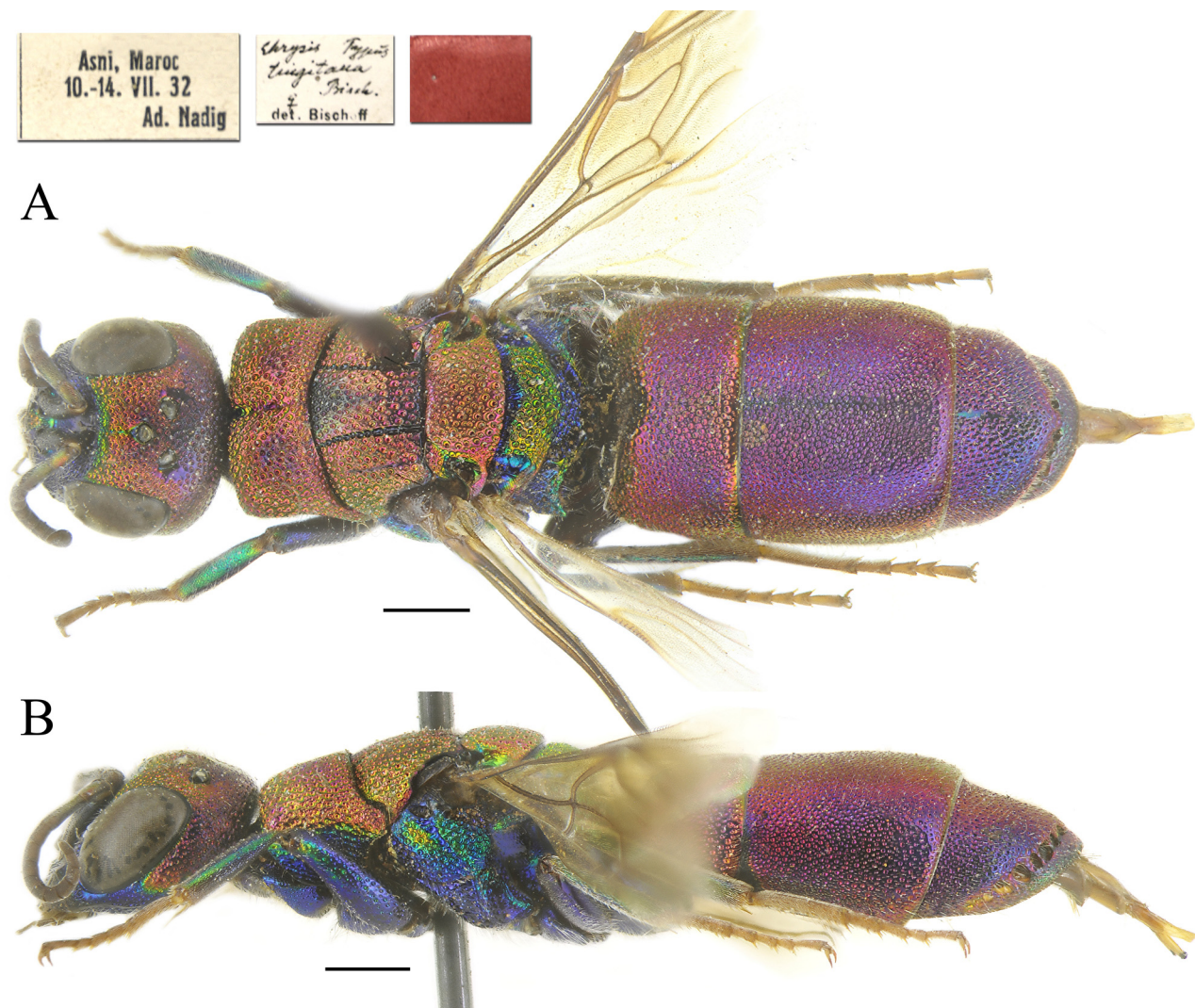


FIGURE 6. *Chrysis tingitana*, holotype ♀. A) Habitus, dorsal view. B) Habitus, lateral view. Scale bars: 1.0 mm.

Chrysis tingitana Bischoff in Nadig & Nadig, 1935: 15. Holotype ♀; Morocco: Asni (ETHZ).

Chrysis (Chrysis) tingitana: Linsenmaier 1959: 136 (descr., *emarginatula* group); Linsenmaier 1999: 186 (descr., *emarginatula* group), 193 (fig. 242).

Chrysis tingitana: Kimsey & Bohart 1991: 471 (cat., *elegans* group).

Type locality. Morocco: “Asni, 9 ♀, 3 ♂; Goundafa, 1 ♀” (pag. 16), “Ein ♀ und ♂ sind als Typus resp. Allotypus (Asni, in coll. Nadig) bezeichnet, die übrigen Stücke als Paratypen (in coll. Bischoff et Nadig)”.

Holotype, ♀: Asni, Maroc 10.–14.VII.32 Ad. Nadig // *Chrysis tingitana* Bisch ♀ typus det. Bischoff // red label.

Paratypes, 1 ♀: Goundafa, Maroc 14.–15.VII.32 Ad. Nadig // *Holo-Chrysis tingitana* Bisch n.sp. ♀ det. Ad. Nadig; 2 ♀♀: Asni, Maroc 10.–14.VII.32 Ad. Nadig // *Chrysis tingitana* Bisch ♀ Paratypus det. Bischoff // red label; 1 ♂: same collecting data // *Chrysis tingitana* Bisch ♀ Allotypus det. Bischoff // red label; 1 ♂: same collecting data // *Chrysis tingitana* Bisch ♀ Paratypus det. Bischoff // red label.

Remarks. In the original description, 12 type specimens from Asni and one from Goundafa are mentioned. In the ETHZ collection, there are 10 specimens from Asni and one from Goundafa. We consider only six specimens (two ♂, four ♀) from Asni and 1 ♀ from Goundafa to be types, because they bear an additional red label. Other specimens from Asni without red label are considered doubtful types, since the total number of known specimens is apparently higher than those given in the original description. In fact, in the Zimmermann collection (NHMW) there is another female specimen collected by Nadig at Asni, 10–14.VII.32, labelled *Holo-Chrysis tingitana* Bisch n.sp. det. Ad. Nadig (Rosa *et al.* 2020); 2 ♀, 1 ♂ with the same labels are deposited in the Linsenmaier collection at NMLU and others are deposited in Bischoff’s collection at MfN. Very likely, Nadig collected more specimens of *Chrysis tingitana* at Asni and sent only 13 selected specimens to Bischoff for the description. Kimsey & Bohart (1991) reported the depository of the holotype erroneously at MfN instead of ETHZ.

Chrysis tingitana was listed for the Italian fauna by Strumia (1995) as a species possibly accidentally introduced. In the following years, it was listed as an introduced species (e.g. Audisio *et al.* 2009) but we can confirm that the specimen cited by Strumia (1995) was collected in Morocco and later erroneously labelled as collected from a locality in Lazio (Italy), and for this reason it was excluded from the European fauna by Rosa & Soon (2012).

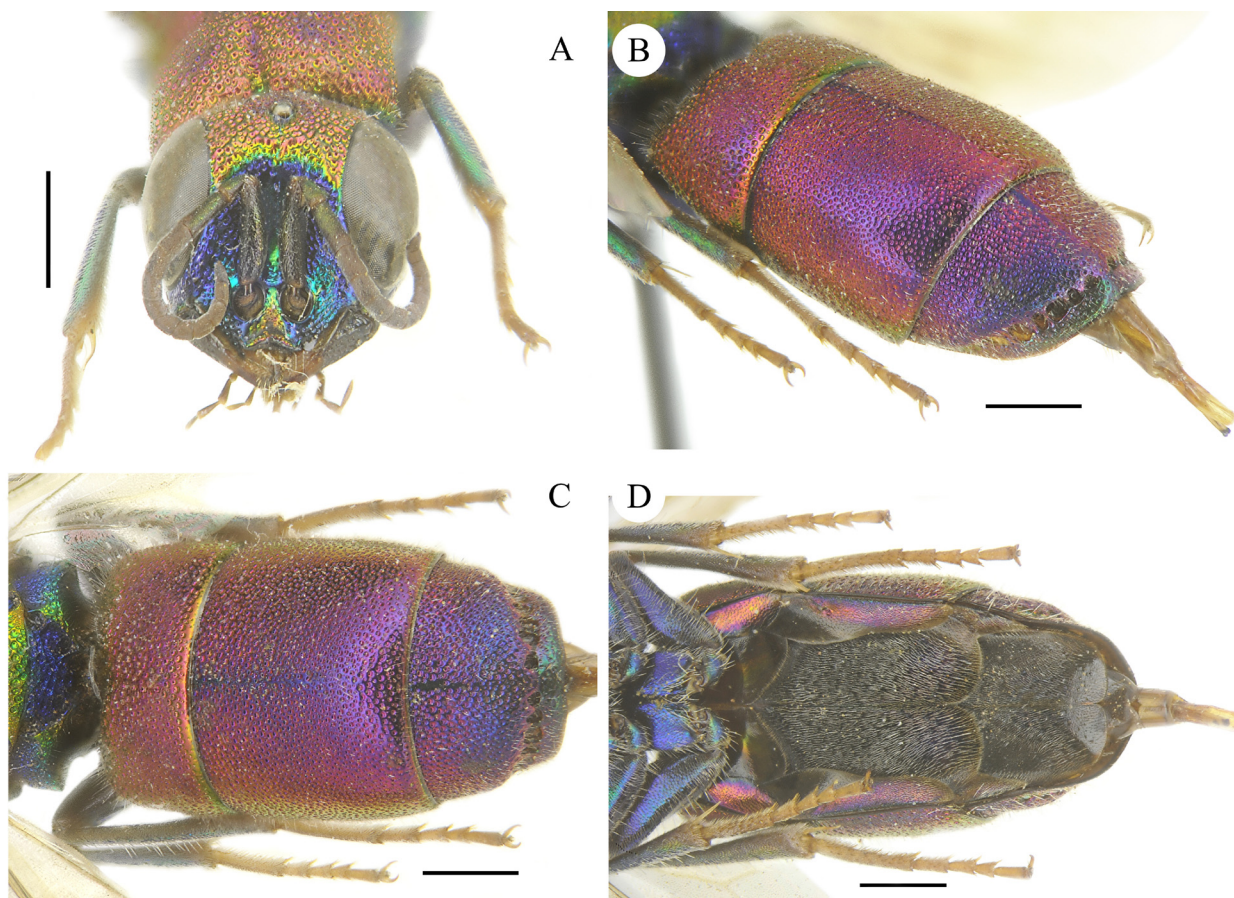


FIGURE 7. *Chrysis tingitana*, holotype ♀. A) Head, frontal view. B) Metasoma, postero-lateral view. C) Metasoma, posterior view. D) Metasoma, ventral view. Scale bars: 1.0 mm.

Chrysis viridicyanea Linsenmaier, 1968

Chrysis (Chrysis) viridicyanea Linsenmaier, 1968: 63, *nec* Giebel, 1862. Holotype ♀; Egypt: Cairo (*succincta* group) (NMLU).
Linsenmaier 1999: 150 (key), 155 (descr., distr.).

Chrysis viridicyanea: Kimsey & Bohart 1991: 477 (cat., *succincta* s.s. group).

Chrysis robertsi Rosa **nom. nov. pro** *Chrysis viridicyanea* Linsenmaier, 1959, *nec* Giebel, 1862.

Type locality. Egypt, Saudi Arabia: “Ägypten, Saudi-Arabien, ♀ Type von Kairo, X.57, leg. Pulawski, ♂ Allotype von Saudi-Arabien, El Riyadh, leg. Diehl, in Coll. m., Paratypen in Coll. Nadig und m.”.

Paratypes, 1♀: *Kairo III-V.35 Mochi* (Nadig) // ♀ Type <handwritten in red> *Chrysis L. grohmanni viridicyanea* Lins. Linsenmaier det. 62 // Holotypus <red label>; 1♂: *Kairo III-V.35 Mochi* (Nadig) // ♂ Allotype <handwritten in red> *Chrysis L. grohmanni viridicyanea* Lins. Linsenmaier det. 62 // Allotypus <red label>; 1♂: *Kairo III-V.35 Mochi* (Nadig) // ♂ Paratype <handwritten in red> *Chrysis L. grohmanni viridicyanea* Lins. Linsenmaier det. 62 // Paratypus <red label>; 1♂: *Coll. A. Mochi 30.V.33 Ezbeth el Nakhl Egitto // Chr. friesei d. Alfieri // 4 Ch.* [Tetrachrysis] *grohmanni cyanea* ♂ Trtm. det. Ad. Nadig // Paratype <handwritten in red> *Chrysis L. grohmanni viridicyanea* Lins. Linsenmaier det. 62 // Paratypus <red label>; 1♀: *Coll. A. Mochi 4.VI.33 Ezbeth el Nakhl Egitto // friesei* det. Alfieri // 4 Ch. [Tetrachrysis] *grohmanni cyanea* ♀ Trtm. det. Ad. Nadig // Paratype <handwritten in red> *Chrysis L. grohmanni viridicyanea* Lins. Linsenmaier det. 62 // Paratypus <red label>; 1♀: *Coll. A. Mochi 4.VI.33 Marg Egitto // Chr. quadrispina Buyss. d. Alfieri // 4 Ch.* [Tetrachrysis] *grohmanni cyanea* ♀ Trtm. det. Ad. Nadig // Paratype <handwritten in red> *Chrysis L. grohmanni viridicyanea* Lins. Linsenmaier det. 62 // Paratype <handwritten in red>.

Remarks. Linsenmaier in 1962 labelled 1 ♂ and 1 ♀ from Nadig’s collection as holotype and allotype of *Chrysis grohmanni viridicyanea*. Linsenmaier (1968) later described this taxon as *Chrysis viridicyanea* and selected as holotype and allotype two specimens from his collection, collected by Pulawski and Diehl, respectively. In the same description, he designated the specimens in Nadig’s collection as paratypes. Only three specimens were labelled as types by Linsenmaier in 1962, whereas three other specimens in the collection are labelled by someone else as paratypes, yet without the handwritten identification labels by Linsenmaier. We consider the latter specimens to be possible paratypes. Kimsey & Bohart (1991) reported the depository of the holotype erroneously at ETHZ instead of NMLU.

Chrysis viridicyanea Linsenmaier, 1968 is a junior homonym of *Chrysis viridicyanea* Giebel, 1862. Both taxa were listed in Kimsey & Bohart (1991: 477) as valid species names, without further information. *Chrysis viridicyanea* Giebel is a fossil species in African copal, originated from Tanzania, Holocene. We propose the new name *Chrysis robertsi* Rosa **nom. nov. pro** *Chrysis viridicyanea* Linsenmaier, 1959, *nec* Giebel, 1862. The specific epithet *robertsi* is dedicated to Huw Roberts (U.A.E.) for his precious help in the study of cuckoo wasps from the United Arab Emirates.

Subfamily Chrysidinae

Tribe Elampini

Ellampus albipennis Mocsáry, 1889

Ellampus (Notozus) albipennis Mocsáry, 1889: 80. Lectotype ♂ designated by Móczár (1964a: 447); Russia: Astrakhan (paratotypes from Sarepta) (HMNH).

Omalus (Notozus) albipennis: Linsenmaier 1959: 24 (cat., descr., distr.), 186 (cat.).

Notozus albipennis: Móczár 1964a: 447 (descr., lectotype designation).

Elampus albipennis: Kimsey & Bohart 1991: 166 (cat.).

Type locality: Russia: “*Patria: Russia meridionalis (Sarepta, Mus. Vindob.) et orientalis (Astrahan, Coll. Rad.! et Mus. Hung.)*”.

Paralectotype, ♂: Sarepta // 720 // *albipennis* <handwritten in red> det. Mocsary // Schulthess Rechberg Collection.

Remarks. No specimen is mentioned in the original description from the Schulthess’ collection. Nevertheless,

the labels and the type locality Sarepta match the original ones found at HMNH and NHMW and the specimen matches the original description. Since in the Schulthess collection there are specimens originated from NHMW and labelled by Kohl, very likely an exchange of specimens has occurred between von Schulthess and the Austrian Museum (as in other cases found in the collection, for example *Philoctetes truncatus*, collected by Megerle and identified by Kohl).

***Ellampus auratus virescens* Mocsáry, 1889**

(Fig. 8A–D)

Ellampus (Ellampus) auratus var. *virescens* Mocsáry, 1889: 91. Lectotype ♀ designated by Móczár (1964b: 436); Russia: Sarepta (ETHZ).

Omalus auratus var. *virescens*: Móczár 1964b: 436 (synonymous of *Omalus auratus* (Linnaeus, 1758)).

Pseudomalus auratus var. *virescens*: Kimsey & Bohart 1991: 266 (synonymous of *Pseudomalus auratus* (Linnaeus, 1758)).

Type locality. Hungary, Romania, Russia: “*Russia meridionalis (Sarepta, Coll. Schultess-Rechbergi! et Saussurei!) Romania (Dobrutscha, Mus. Hung.); Hungaria centralis (Mus. Hung.)*”.

Lectotype, ♀: Sarepta // 858 // *auratus virescens* <handwritten in red> det. Mocsary // *Omalus* Pz. *auratus* L. Linsenmaier det. // *Lecto-typus Ell. auratus* var. *virescens* Mocsáry <red label handwritten by Móczár> // *Omalus auratus* L. det. L. Móczár // Schulthess Rechberg Collection.

Paralectotype, ♀: Sarepta // *auratus virescens* <handwritten in red> det. Mocsary // *Omalus* Pz. *pusillus* F. Linsenmaier det. // Schulthess Rechberg Collection.

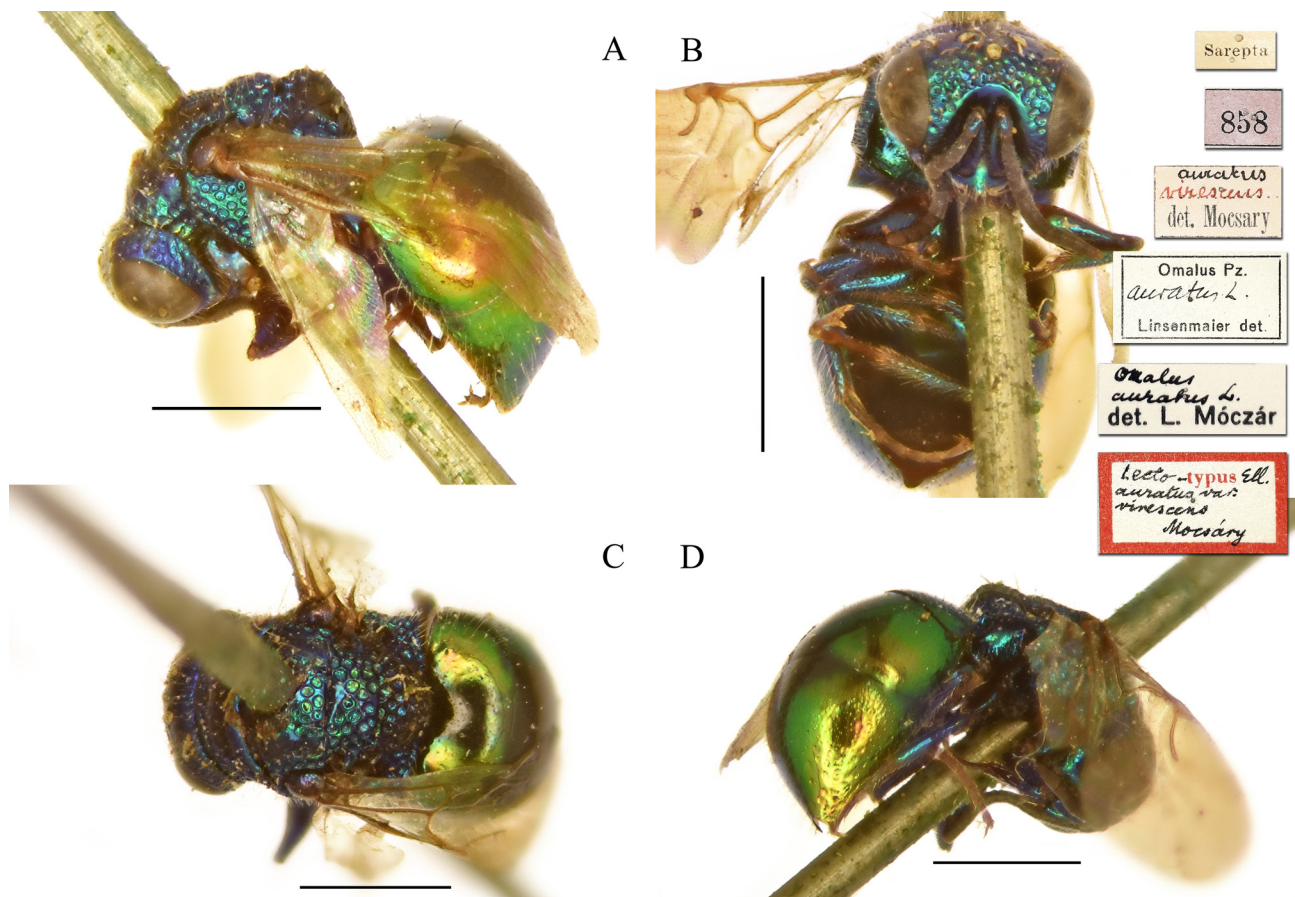


FIGURE 8. *Ellampus auratus virescens*, lectotype ♀. A) Habitus, lateral view. B) Habitus, frontal view. C) Habitus, dorsal view. D) Habitus, postero-lateral view. Scale bars: 1.0 mm.

Remarks. Móczár (1964b: 436) designated the lectotype at ETHZ and paralectotypes at HMNH and MHNG. The type series includes specimens belonging to different species: *Pseudomalus auratus* (Linnaeus, 1758), *Pseu-*

domalus pusillus (Fabricius, 1804) and *Omalus biaccinctus* (du Buysson in André, 1893). As already stated by Móczár (1964b), the lectotype is a female of *Pseudomalus auratus* (Linnaeus, 1758) (synonymised by Móczár 1964b, and transferred to *Pseudomalus* by Kimsey & Bohart 1991). In the catalogue of the Chrysididae of the world, Kimsey & Bohart (1991) listed syntypes housed only at HMNH and MHNG.

In Schulthess' collection there are three other specimens bearing the same collecting label "Sarepta". One female was identified as *Ellampus auratus* var. *maculatus* du Buysson by Mocsáry; 1 ♀ was identified as *Ellampus auratus* by Frey (identification confirmed by Linsenmaier) and finally 1 ♂ was identified as *Omalus auratus* by Linsenmaier. Although these specimens do not bear any type label or identification label handwritten by Mocsáry, they can be considered possible paralectotypes.

Ellampus auratus viridiventris Mocsáry, 1890

(Fig. 9A–D)

Ellampus (Ellampus) auratus var. *viridiventris* Mocsáry, 1890: 50. Lectotype ♀ designated by Móczár (1964b: 438); Russia: Sarepta (ETHZ).

Omalus auratus var. *viridiventris*: Trautman 1927: 39 (descr., distr., Caucasus).

Omalus auratus ab. *viridiventris*: Móczár 1964b: 438 (cat., descr., key, Caucasus).

Pseudomalus auratus viridiventris: Kimsey & Bohart 1991: 266 (cat., synonymous of *Pseudomalus auratus* (Linnaeus, 1758)).

Pseudomalus auratus viridiventris: Vinokurov 2012a: 1873 (cat., ecol., Karachayevo-Cherkess Rep.: Teberda Nature Reserve); Vinokurov 2012b: 40 (cat., ecol., Karachayevo-Cherkess Rep.: Teberda Nature Reserve); Vinokurov 2014a: 284 (cat., Karachayevo-Cherkess Rep.: Teberda Nature Reserve); 2014b: 92 (cat., Adygei Rep.: Maykop); Rosa *et al.* 2019: 88 (cat., distr.).

Type locality. Azerbaijan, Georgia, Russia: "Caucasus (Borschom [= Borzhomi, Georgia], Lenkoran, Daghestan) (Coll.Schultess-Rechberg)".

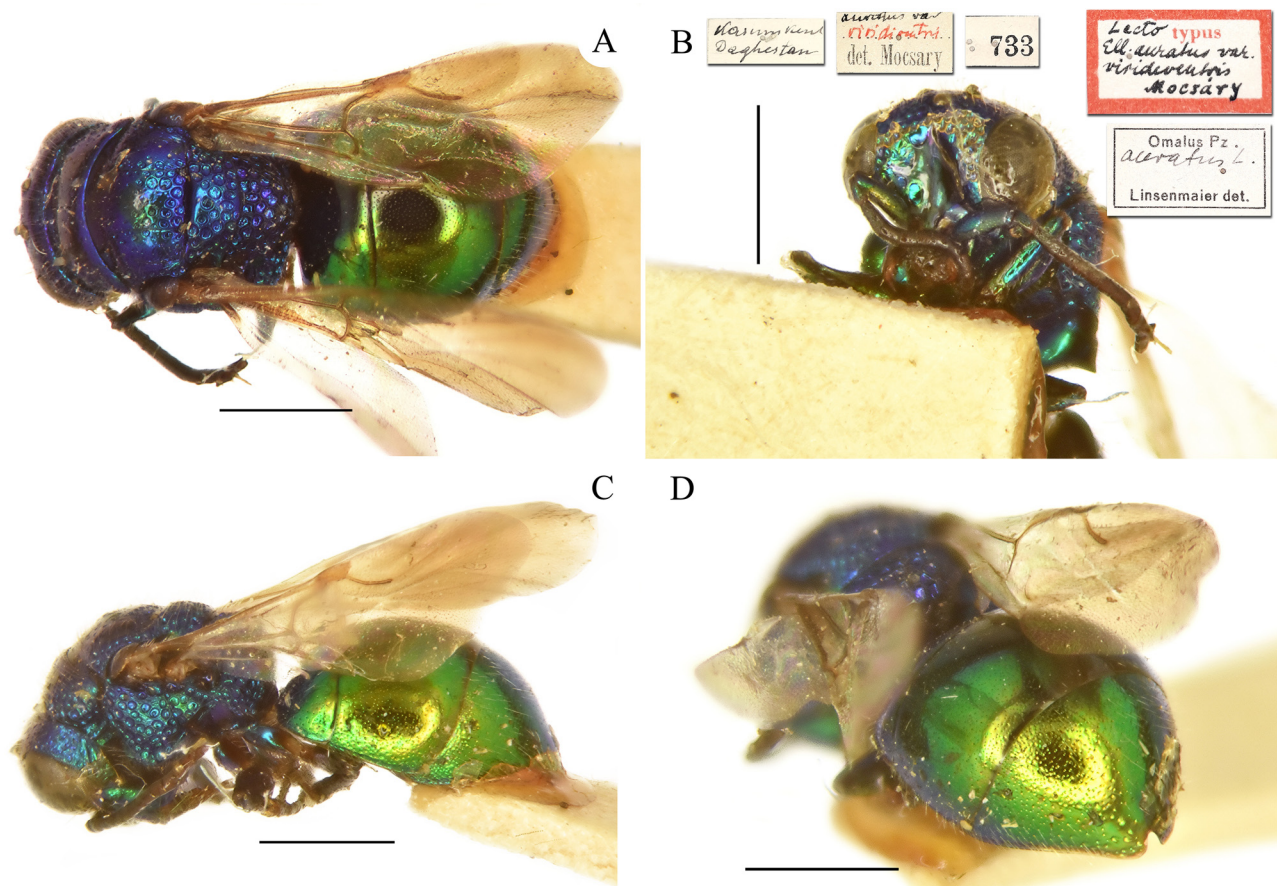


FIGURE 9. *Ellampus auratus viridiventris*, lectotype. A) Habitus, dorsal view. B) Head, frontal view. C) Habitus, lateral view. D) Habitus, postero-lateral view. Scale bars: 1.0 mm.

Lectotype, sex unknown: *Kasumkent Daghestan // auratus var. viridiventris* <handwritten in red> det. Mocsary // 733 // *Omalus* Pz. *auratus* L. Linsenmaier det. // *Lectotypus Ell. auratus var. viridiventris Mocsary* <red label handwritten by Móczár> // Schulthess Rechberg Collection.

Remarks. Móczár (1964b: 438) designated the lectotype at ETHZ and considered *viridiventris* to be an aberration of *Omalus auratus* (Linnaeus, 1758): “*Omalus auratus* ab. *viridiventris* stat. nov.”, according to ICZN (Art. 45.6.2.) m. (morph) and ab. (aberration) have no valid status because they are considered infrasubspecific. Vinokurov (2012a, 2012b, 2014a, 2014b) and Rosa *et al.* (2019) considered *viridiventris* to be a subspecies of *Pseudomalus auratus*. This taxon is largely distributed throughout the Caucasus (Rosa *et al.* 2019). Kimsey & Bohart (1991) reported syntypes instead of lectotype and transferred *viridiventris* to the genus *Pseudomalus* Ashmead, 1902.

***Ellampus horvathi* Mocsáry, 1889**

Ellampus Wesmaeli Mocsáry, 1882, *nom. praeocc., nec* Chevrier 1862.

Ellampus (Ellampus) Horváthi Mocsáry, 1889: 82, *nom. nov.* for *Ellampus Wesmaeli* Mocsáry, 1882. Lectotype ♀ designated by Móczár (1964b: 434); Serbia: Deliblat (HNHM).

Omalus (Omalus) horvathi: Linsenmaier 1959: 19 (cat., descr., distr.).

Omalus horvathi: Móczár 1964b: 434 (lectotype designation).

Philoctetes horvathi: Kimsey & Bohart 1991: 256 (cat.).

Type locality. Austria, Hungary, Russia, Serbia: “*Patria: Austria inferior (Coll. Handlirschi!); Hungaria centralis et meridionalis, mense Julio sat rarus (Mocs.); Russia meridionalis (Sarepta, Coll. Schulthess-Rechbergi!)*”.

Paralectotype, ♀: Sarepta // 862 // *Horvathi* <handwritten in red> det. Mocsary // Schulthess Rechberg Collection.

Remarks. Móczár (1964b) designated the lectotype at Budapest (HMNH).

***Ellampus sareptanus inflammatus* Mocsáry, 1890**

(Fig. 10A–D)

Ellampus sareptanus var. inflammatus Mocsáry, 1890: 50. Holotype ♀; Iran: Astrabad [= Gorgan] (ETHZ).

Omalus sareptanus var. inflammatus: Trautmann 1927: 35 (cat.), 36 (descr.).

Omalus (Omalus) horvathi ssp. inflammatus: Linsenmaier 1959: 20 (cat., descr., distr.).

Philoctetes sareptanus inflammatus: Kimsey & Bohart 1991: 257 (cat.).

Type locality: “*Patria: Astrabad in Persia (Coll. Schulthess-Rechbergi!)*”.

Holotype, ♀: Astrabad // *sareptanus v. inflammatus* <handwritten in red> det. Mocsary // 731 // *Omalus* Pz. *horvathi* [!] *Mocs. ssp. inflammatus Mocs.* Linsenmaier det. 57 // Schulthess Rechberg Collection.

Remarks. This taxon is closely related to *Philoctetes deflexus* (Abeille de Perrin, 1878) and should be one of its colour variations. The red colouration is variable in examined specimens (see Farhad *et al.* 2018 under *Ph. deflexus*).

***Ellampus schulthessi schulthessi* Mocsáry, 1890**

(Fig. 11A–D)

Ellampus schulthessi Mocsáry, 1890: 50. Holotype ♀; Russia: Sarepta (ETHZ).

Ellampus sareptanus var. schulthessi: Bischoff 1913: 9 (cat.).

Omalus sareptanus var. schulthessi: Trautmann 1927: 36 (cat., descr.).

Omalus (Omalus) Horvati (!) *var. schulthessi*: Linsenmaier 1951: 10 (descr.), 95 (cat.).

Omalus (Omalus) sareptanus var. schulthessi: Linsenmaier 1959: 20 (cat.).

Philoctetes schulthessi: Kimsey & Bohart 1991: 257 (synonymous of *Philoctetes sareptanus* (Mocsáry, 1889)).

Type locality: Russia: “*Patria: Russia meridionalis (Sarepta), a Clariss. Dom. Schulthess-Rechberg mecum benevole communicatus (Coll. Schulthess-Rechbergi)*”.

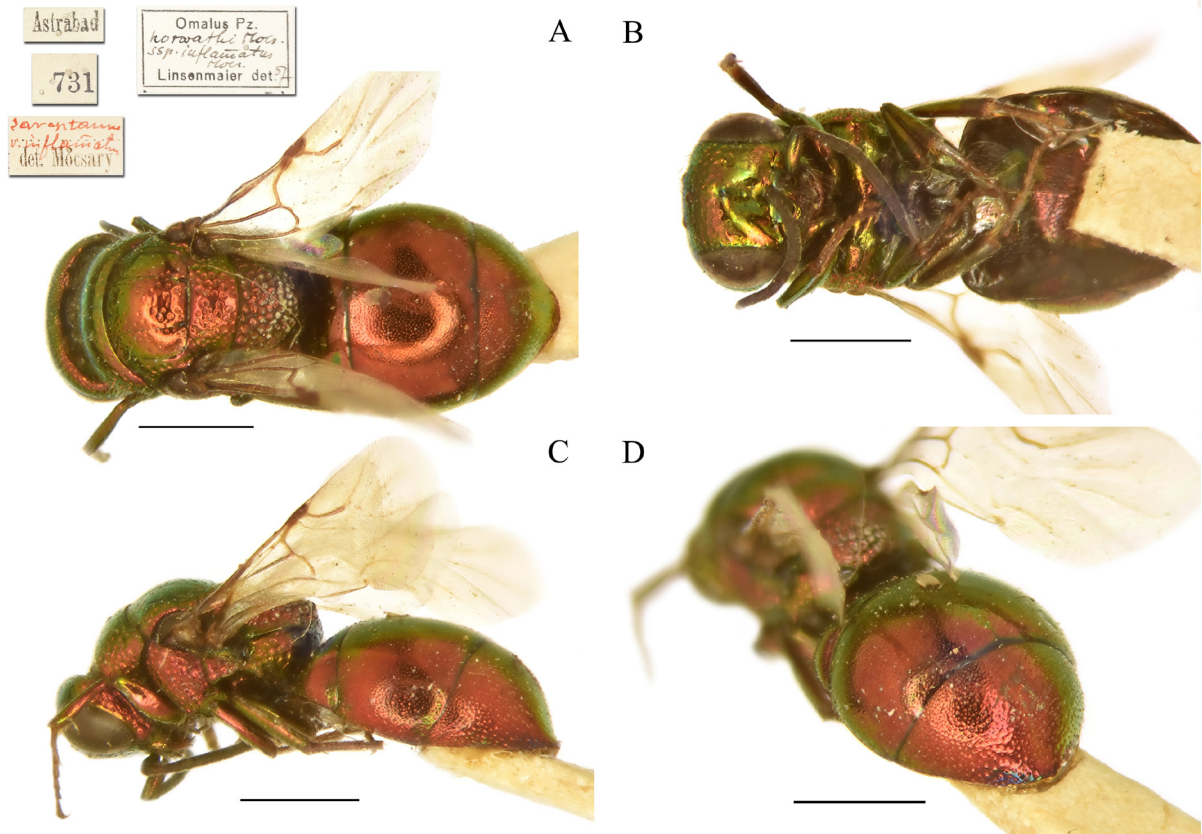


FIGURE 10. *Ellampus sareptanus inflammatus*, holotype ♀. A) Habitus, dorsal view. B) Habitus, ventral view. C) Habitus, lateral view. D) Habitus, postero-lateral view. Scale bars: 1.0 mm.

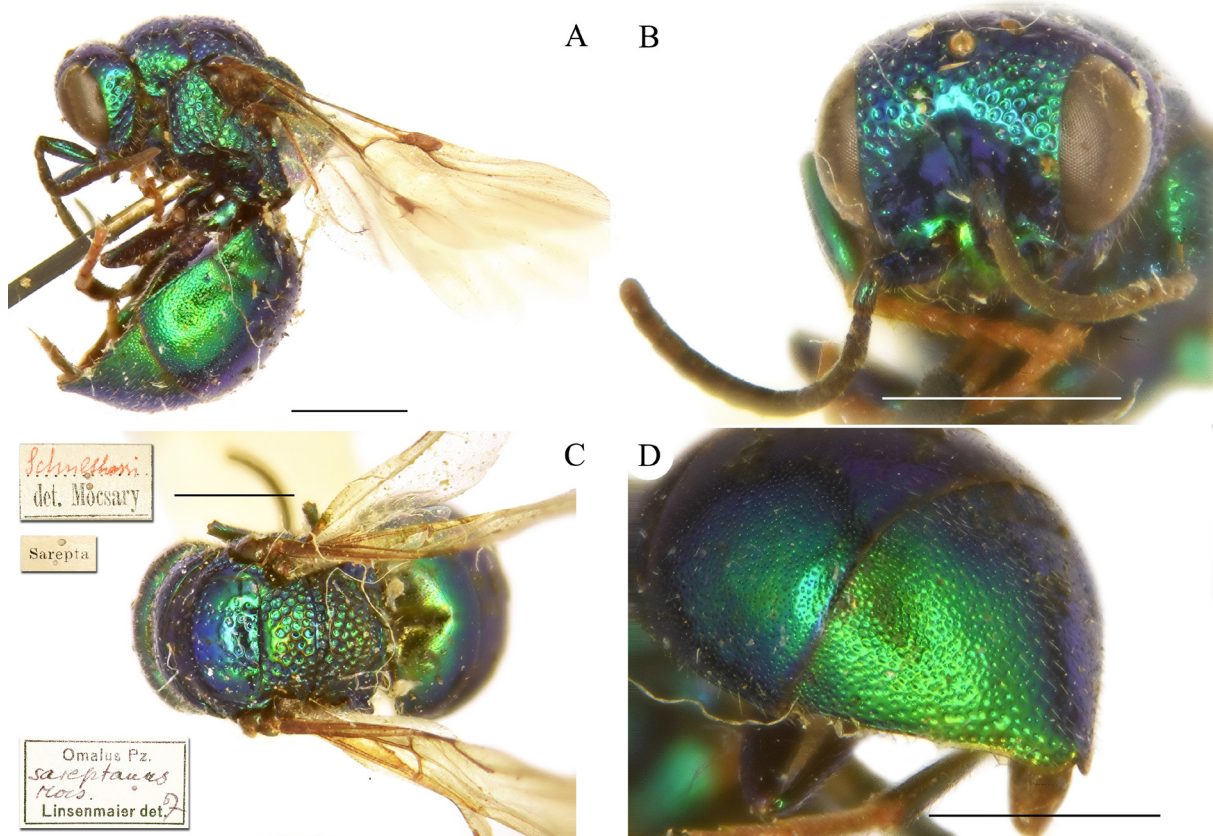


FIGURE 11. *Ellampus schulthessi schulthessi*, holotype ♀. A) Habitus, lateral view. B) Head, frontal view. C) Habitus, dorsal view. D) Metasoma, postero-lateral view. Scale bars: 1.0 mm.

Holotype, ♀: Sarepta // *Schulthessi* <handwritten in red> det. Mocsary // *Omalus* Pz. *sareptanus* Mocs. Linsenmaier det. 57 // Schulthess Rechberg Collection.

Remarks. *Ellampus schulthessi* Mocsáry, 1889 was synonymised with *Philoctetes sareptanus* (Mocsáry, 1889) and transferred to *Philoctetes* Abeille de Perrin, 1879 by Kimsey & Bohart (1991).

Ellampus schulthessi subauratus Mocsáry, 1890

(Fig. 12A–D)

Ellampus schulthessi var. *subauratus* Mocsáry, 1890: 51. Holotype ♂; Russia: Raddefka [= Evreyskaya autonomous Prov.: Radde] (ETHZ).

Ellampus sareptanus var. *subauratus*: Bischoff 1913: 9 (cat.).

Omalus sareptanus var. *subauratus*: Trautmann 1927: 36 (cat., descr.).

Omalus Horvathi [!] var. *subaurata*: Linsenmaier 1951: 96 (cat.).

Omalus (Omalus) sareptanus var. *subauratus*: Linsenmaier 1959: 20 (cat.).

Philoctetes schulthessi subauratus: Kimsey & Bohart 1991: 257 (synonymous of *Philoctetes sareptanus* (Mocsáry, 1889)).

Type locality: Russia: “Patria: Raddefka in territorio Amurensi Sibiriae (Coll. Schulthess-Rechbergi)”.

Holotype, ♂: Raddefka // *Schulthessi* v. *subauratus* <handwritten in red> det. Mocsary // *Omalus* Pz. *sareptanus* Mocs. Linsenmaier det. 57.

Remarks. *Ellampus subauratus* was described as a subspecies of *Ellampus schulthessi* Mocsáry, 1890 and synonymised with *Ellampus sareptanus* Mocsáry, 1889 (currently *Philoctetes sareptanus*) by Kimsey & Bohart (1991). However, it is separated from the latter by different punctuation on the last metasomal tergum, which is very fine and dense in *Ph. sareptanus*, but sparse and shallow in *Ph. subauratus*. For this reason, we consider *Philoctetes subauratus* (Mocsáry, 1890) **spec. resurr.** to be a separate species.

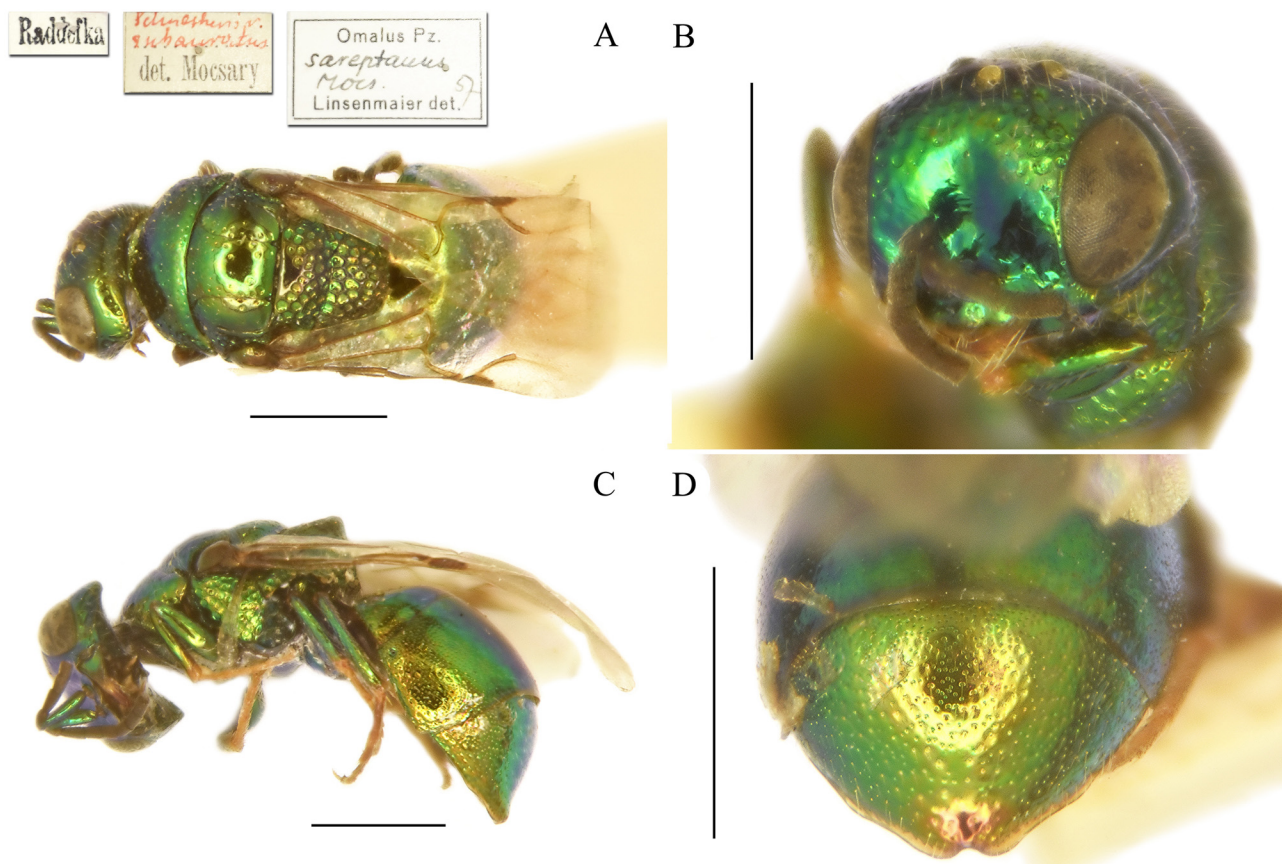


FIGURE 12. *Ellampus schulthessi subauratus*, holotype ♀. A) Habitus, dorsal view. B) Head, frontal view. C) Habitus, lateral view. D) Third metasomal tergum, posterior view. Scale bars: 1.0 mm.

After type examination of both types, we can state that *Philoctetes conifer* (Semenov-Tian-Shanskij, 1932) is conspecific with *Ph. subauratus*. Semenov-Tian-Shanskij (1932) followed Bischoff's (1913) classification of the species and wrote that he did not know *Ph. sareptanus* ("mihi in natura ignotae speciei") and consequently considered *Ph. schulthessi* and *Ph. subauratus* varieties of *Ph. sareptanus*. Here, we propose the synonymy *Ellampus schulthessi subauratus* Mocsáry, 1890 = *Ellampus (Dictenus) conifer* Semenov-Tian-Shanskij, 1932, **syn. nov.**

***Hedychridium elegantulum peloponnense* Linsenmaier, 1968**

Hedychridium (Hedychridium) elegantulum ssp. *peloponnense* Linsenmaier, 1968: 31. Holotype ♀; Greece: Olympia (NMLU).

Type locality. Greece, Italy: "Griechenland, Italien, Nieder-Österreich, ♀ Type, ♂ Allotype von Olympia, Paratypen diverser griechische Fundorte in Coll. m., ♀ Paratype von Italien (Marina Pisa) in Coll. Nadig, ♀ Paratype von Burgenland in Coll. Schmidt".

Paratype, 1♀: Marina Pisa VII.1920 // *H-dium* [= *Hedychridium*] *elongatum* [!] Buys. det. Ad. Nadig // ♀ Paratype <handwritten in red> *Hedychridium* Ab. *elegantulum peloponnense* Lins. Linsenmaier det. 62 // Paratypus <red label>.

***Hedychridium irregulare insulare* Linsenmaier, 1959**

Hedychridium irregulare ssp. *insulare* Linsenmaier, 1959: 62. Holotype ♂, Cyprus: Limassol (NMLU).

Type locality: Cyprus: "Cypern, Rhodos. ♂ Type (Cypern, Limassol, V.1949, leg. Mavromoustakis) und ♂♂ Paratypen Coll. m.".

Paratype, ♂: Cypern Limassol Mavromoustakis 14.5.49 // Paratype <handwritten in red> *Hedychridium* Ab. *irregulare* ssp. *insulare* Lins. Linsenmaier det. 57 // Schulthess Rechberg Collection.

Remarks. *Hedychridium irregulare insulare* Linsenmaier, 1959 is both homonymous and synonymous of *Hedychridium insulare* Balthasar, 1954 (Arens 2010).

***Hedychrum cyaneum* Mocsáry in Radoszkowski, 1889**

Hedychrum cyaneum Mocsáry in Radoszkowski, 1889: 10, *nom. praeocc. nec* Brullé, 1846. Syntypes ♂♀; Russia: Eastern Siberia (ISEA-PAS).

Hedychrum simile Mocsáry, 1889: 158. Replacement name for *Hedychrum cyaneum* Mocsáry in Radoszkowski 1889 *nec* Brullé, 1846.

Type locality: Russia: "Sibérie orientale".

Possible syntype, ♂: Raddefka [= Evreyskaya autonomous Prov.: Radde] // 716 // *simile* <handwritten in red> det. Mocs. [!]/ Schulthess Rechberg Collection.

Remarks. This male is labelled as type, it was collected in the Russian Far East (thus matching the original type locality), and it is morphologically similar to the male syntype housed in Radoszkowski's collection at ISEA-PAS. For these reasons, it is considered a syntype.

Mocsáry (in Radoszkowski 1889) described *Hedychrum cyaneum* (later replaced with the name *He. simile*) based on a type series [♂♀]. In the original description only the type locality Sibérie orientale [= East Siberia or Far East] is mentioned. Currently only one male from Siberia is housed in Radoszkowski's collection at ISEA-PAS (Rosa *et al.* 2015d). After the original description, Mocsáry (1889: 158), under the replacement name *He. simile*, extended the type locality: "Siberia orientalis (Coll. Rad.! et Mus. Hung.) and China borealis (Ta-tschian-sy, Mus. Hung.)". French (in Bohart & French 1986) designated the female specimen from China listed by Mocsáry (1889) as the lectotype, even if it was not mentioned in the original description (Radoszkowski 1889). For this reason, the lectotype designation was considered invalid (Rosa *et al.* 2017b).

***Omalus pusillus bulgariensis* Linsenmaier, 1959**

Omalus (Omalus) pusillus ssp. *bulgariensis* Linsenmaier, 1959: 19. Holotype ♂; Bulgaria: Bilo (ETHZ).
Pseudomalus pusillus ssp. *bulgariensis*: Kimsey & Bohart 1991: 269 (cat.).

Type locality: Bulgaria: “Bulgarien, (Bilo) ♂ *Type und Paratypen Coll. Schulthess (Zürich), Paratypen Coll. m.*”.

Holotype, ♂: *Bilo Bulgar. // Ell. pusillus* det. Mocsáry // Type <handwritten in red> *Omalus* Pz. ♂ *pusillus* F. ssp. *bulgariensis* Lins. Linsenmaier det. 57.

Paratypes, 1♂: *Bilo Bulgar. // Ell. pusillus* det. Mocsáry // Paratype <handwritten in red> *Omalus* Pz. *pusillus* F. ssp. *bulgariensis* Lins. Linsenmaier det. 57; 1♂: Aetoz Bulgarien // Paratype <handwritten in red> *Omalus* Pz. *pusillus* F. ssp. *bulgariensis* Lins. Linsenmaier det. 57 // Schulthess Rechberg Collection.

Subfamily Cleptinae

***Cleptes ignitus scutellaris* Mocsáry, 1889**

Cleptes ignitus var. *scutellaris* Mocsáry, 1889: 53. Lectotype ♀ designated by Móczár (1962: 121); Slovakia: Nyitra (HNHM).
Cleptes (Zimmermannia) scutellaris: Móczár 1962: 121 (descr., lectotype designation).

Type locality: Austria, Hungary [= Slovakia]: “*Patria: Hungaria septentrionali-occidentalis (Mus. Hung.); Austria ad Vindobonam [= Vienna] (Coll. Schultess-Rechbergi! Et Mus. Vindob.)*”.

Paralectotype, ♂: 2285 // 851 // *ignitus scutellaris* <handwritten in red> det. Mocsáry // Schulthess Rechberg Collection.

Remarks. Móczár (1962) designated the lectotype, which is deposited at Budapest (HMNH).

***Cleptes fallax* Mocsáry, 1889**

Cleptes fallax Mocsáry, 1889: 49. Lectotype ♂ designated by Móczár (1962: 119); Hungary: Budapest (HNHM).
Cleptes (Leiocleptes) fallax: Móczár 1962: 119 (lectotype designation, synonymised with *Cleptes nitidulus* (Fabricius, 1793)).

Type locality: Austria, Switzerland: “*Patria: Helvetia (Frey-Gessner); Austria ad Vindobonam [=Vienna] (Coll. Schultess-Rechbergi); Hungaria centralis, in unico solum specimen inventus (Mus. Hung.)*”.

Paralectotype, ♂: 2285 // 852 // *Fallax* <handwritten in red> det. Mocsáry // Schulthess Rechberg Collection.

Remarks. Móczár (1962) designated the lectotype, which is deposited at Budapest (HMNH). Rosa *et al.* (2017b) erroneously considered the lectotype invalid for an incorrect interpretation of the original type locality. Móczár’s (1962) lectotype designation was validly designated.

Missing types

***Ellampus marginellus* Mocsáry, 1890**

Ellampus (Holophris) marginellus Mocsáry, 1890: 51. Holotype ♀: Sumatra (ETHZ).
Ellampus marginellus: Dalla Torre 1892: 13 (cat.).
Holophris marginellus: Ashmead 1902: 229 (cat.); Bischoff 1913: 11 (cat.); Kimsey & Bohart 1991: 225 (cat.).
Ellampus (Holophris) marginellus: Mocsáry 1913: 287 (cat.).
Omalus (Holophris) marginellus: Linsenmaier 1959: 20 (cat.).
Omalus marginellus: Baltazar 1966: 188 (cat.).
Holophris marginella: Rosa *et al.* 2016: 205 (cat., distr.), 206 (descr., fig. 4).

Remarks. Despite intensive research in the ETHZ collection, we could not locate the type of *Ellampus marginellus* (currently *Holophris marginella*). The type was already unsuccessfully searched by the former curator of the ETHZ

collection, Rod Eastwood, for the revision of the Oriental *Holophris* Mocsáry, 1890 (Rosa *et al.* 2016). In fact, *Ellampus* (*Holophris*) *marginellus* Mocsáry, 1890 is the type species of the subgenus *Holophris*. This subgenus was upgraded to genus rank by du Buysson (1900) and it is still accepted as a valid genus (Kimsey & Bohart 1991; Rosa *et al.* 2016). Ashmead (1902) was the first author to provide a modern key to genera of Chrysididae, including *Holophris*, whereas Bischoff (1913) was the first author to produce a checklist of the species distributed from South America to Africa and Australia.

Specimens labelled as type but without type status

Chrysis propinquata Linsenmaier, 1968

Chrysis (*Chrysis*) *propinquata* Linsenmaier, 1968: 62. Holotype ♀; Egypt: Luzon (NMLU).

Type locality: “Ägypten, Palästina. ♀ Type, ♂ Allotype und Paratypen von Luxor, 11.58, leg. Pulawski, Paratypen von Palästina, in Coll. m.”.

Specimen, ♀: Coll. A. Mochi 13.V.34 Fayum Egitto// *bihamata* // ♀ Allotype <handwritten in red> *Chrysis* L. *propinquata* Lins. Linsenmaier det. 62 // Allotype <red red>.

Remarks. Linsenmaier in 1962 wrote allotype on the identification label of this specimen housed in ETHZ. However, he later designated another specimen as allotype in his collection (Linsenmaier 1968) and did not mention the specimen studied in Nadig’s collection anymore.

Chrysis fulvicornis graeciana Linsenmaier, 1968

Chrysis (*Cornuchrysis*) *fulvicornis* ssp. *graeciana* Linsenmaier, 1968: 111. Holotype ♀; Greece: Lidoriki (NMLU).

Original type locality: “Griechenland (auch Peloponnes), Rhodos. ♀ Type, ♂ Allotype von Lidorikion (Griechenland) in Coll. m., Paratypen im Museum Lausanne, in Coll. Verhoeff und Coll. m.”.

Specimen, ♂: Zakaki [Cyprus] VII.34 [leg. Mavromoustakis] // Paratype <handwritten in red> *Chrysis* L. *graeciana* Lins. ♂ Linsenmaier det. 62.

Remarks. The specimens labelled as paratype in the collection has no type status, because the locality Cyprus is not reported in the original description.

Ellampus schmiedeknechti Mocsáry, 1889

Ellampus (*Ellampus*) *Schmiedeknechti* Mocsáry, 1889: 83. Lectotype ♂ designated by Móczár (1964b: 436). Germany: Gumperda (MfN).

Ellampus pusillus var. *Schmiedeknechti*: du Buysson in André 1892: 126.

Omalus pusillus var. *Schmiedeknechti*: Trautmann 1927: 37 (cat.).

Omalus pusillus ab. *schmiedeknechti*: Móczár 1964b: 436 (cat., typ., aberration of *Omalus pusillus*).

Type locality: “Patria: Germania (Thuringia: Bibra penes Gumperda, mense Julio, Coll. Schmiedeknechti et Weisenfels, ab amico Friese inventus mihique donato, Mus. Hung.)”.

Specimen, ♀: Lenkoran // *Schmiedekn.* <handwritten in red> det. Mocsary // 739 // *Omalus* Pz. *pusillus* F. Linsenmaier det. 57.

Remarks. Although the identification label and the printed number match the other identification labels pinned with other type specimens examined by Mocsáry, the locality Lenkoran (Azerbaijan) was not reported in the original description and for this reason this specimen is not considered type. It was considered variation or aberration of *Pseudomalus pusillus* (du Buysson in André 1892; Trautmann 1927; Linsenmaier 1951; Móczár 1964b). It was synonymised by Móczár (1964b) with *Pseudomalus pusillus* (Fabricius, 1804) and transferred to *Pseudomalus* Ashmead by Kimsey & Bohart (1991).

***Ellampus violaceus virens* Mocsáry, 1889**

Ellampus (Ellampus) violaceus var. *virens* Mocsáry, 1889: 107. Lectotype ♂ designated by Móczár (1964b: 435); Germany: Blankenburg, Thuringia (HMNH).

Type locality: “*Patria: Germania (Thuringia, Coll. Schmiedeknechti!); Caucasus (Mus. Vindob.!)*”.

Specimens, 1 ♂: Siders // *violaceus* var. *virens* <handwritten in red> det. Mocsary // 787 // Omalus Pz. *violaceus* Sc. Linsenmaier det.

Remarks. As in the previous species, the specimen bears the same identification label and printed number observed with other specimens examined by Mocsáry. However, the locality Siders was not reported in the original description and for this reason this specimen is not considered type. It was synonymised by Linsenmaier (1951) with *Pseudomalus violaceus* (Scopoli, 1763) and transferred to *Pseudomalus* by Kimsey & Bohart (1991).

***Hedychridium lampadum limassolense* Linsenmaier, 1959**

Hedychridium roseum var. *cypricum* Balthasar, 1954: 54. Holotype ♀; Cyprus (NHMP).

Hedychridium lampadum ssp. *limassolense* Linsenmaier, 1959: 59. Unnecessary replacement name for *Hedychridium roseum* var. *cypricum* Balthasar, 1954.

Type locality: “*Cypern*”.

Specimen, ♀: Cypern Limassol Mavromoustakis 14.5.49 // *Hedychridium* Ab. *lampadum* ssp. *limassolensis* Lins. Linsenmaier det. 57 // *Paratype* <handwritten in red>.

Remarks. Linsenmaier (1959) labelled this specimen as type, as well as all the specimens of *Hedychridium lampadum limassolense* in his collection. However, they have no type status because this name was given by Linsenmaier (1959) as a new replacement name (nom. nov.) for *Hedychridium roseum* var. *cypricum* Balthasar, 1953. The name *limassolense* is an unnecessary replacement name because *H. roseum cypricum* was validly described and it is not homonymous. The only types of this taxon are those described by Balthasar (1953), which are deposited in his collection in Prague. *Hedychridium roseum* var. *cypricum* was synonymised with *Hedychridium insulare* Balthasar, 1953 by Arens (2010: 407).

***Hedychrum frivaldszkyi* Mocsáry, 1889**

Hedychrum Frivaldszkyi Mocsáry, 1889: 164. Holotype ♂; Turkmenistan: Krasnowodsk [= Türkmenbaşy] (HMNH).

Original type locality: “*Patria: territorium Maris Caspii (Krasnowodsk, a Clariss. Dom. Ferdinando Morawitz mihi donatum, Mus. Hung.)*”.

Specimen, ♂: Astrabad // *Frivaldszkyi* <handwritten in red> det. Mocsary // 717.

Remarks. As for the previous species, the specimen bears the same identification label and printed number observed with other specimens examined by Mocsáry. However, the locality Astrabad (Turkmenistan) was not reported in the original description and for this reason this specimen is not considered type.

Discussion

The ETHZ collection holds a small yet important collection of Palaearctic types of cuckoo wasps (Chrysididae). Inexplicably, some authors in the 20th Century did not examine the Schulthess collection, and for this reason, the correct identification of some species described by Mocsáry (1889, 1890) remained unclear and led to the description of a new synonym by Semenov-Tian-Shanskij (1932) (for *Ellampus conifer* Semenov-Tian-Shanskij, 1932) and to the misidentification of *Chrysis chalcites* (Linsenmaier 1959), perpetuated by later authors. Without type examination, the correct identification of some species remained unclear, in particular for *Ellampus auratus* var. *virescens* and var. *viridiventris* (currently *Pseudomalus*), *E. sareptanus* var. *inflammatus*, *E. schulthessi* and *E. schulthessi* var. *subauratus* (all these taxa are currently considered *Philoctetes*).

The importance of the examination of type material is fundamental in taxonomy, and particularly in the Chrysididae, one of the most taxonomically difficult families to study among the Aculeata. This article is part of a review of chrysidid types (mostly Palearctic) deposited in the European and Russian collections (Rosa & Vårdal 2015; Rosa & Xu 2015; Rosa *et al.* 2015a, b, d, 2017a, b, 2020) and it complements other works on Mocsáry's types (Rosa *et al.* 2015d, 2017b, 2020). One of the main goals of these articles is to take photographs that show the diagnostic features of the taxa as well as the original labels. This prevents valuable type specimens from being damaged or destroyed during shipment while still providing researchers with the information they need. Another goal is to clarify the taxonomic and nomenclatorial status of uncertain taxa and provide a foundation for future research.

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