


Article

A Revision of the *Chrysis leachii* Group from Cyprus, with a Description of an Outstanding Species and a New Synonymy (Hymenoptera, Chrysididae) [†]

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urn:lsid:zoobank.org:act:29E9A918-5E8B-4B3F-8C75-A5CFB6079F67.

Abstract: A new species in the *Chrysis leachii* group from Cyprus, *Chrysis kalliroi* Rosa & Makris, sp. Nov., is described. Distribution, illustrations, and a key to the Cypriot members of this species group are provided. *Chrysis lanceolata* Linsenmaier, 1959 is recorded from Cyprus for the first time. *Chrysis pumilio* Balthasar, 1953 stat. nov. is raised to species rank. *Chrysis cypruscula* Linsenmaier, 1959 (repl. Name for *Chrysis leachii cypriana* Linsenmaier, 1951 nec Enslin, 1950) is synonymised with *Chrysis pumilio* Balthasar, 1953.

Keywords: cuckoo wasps; Chrysidini; Fauna Europea; East Mediterranean

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1. Introduction

The cuckoo wasp fauna of Cyprus is undoubtedly one of the most interesting in the Mediterranean basin because it includes numerous endemic taxa (Linsenmaier 1959) and some of the most colourful species in the Mediterranean. Several authors [1–8] listed and described new species from Cyprus, mostly basing the descriptions on specimens collected by the renowned entomologist George A. Mavromoustakis (1898–1968), a bee taxonomist native to the island. His material was studied by his contemporary colleagues: Trautmann [1], Invrea [2], Enslin [3,4], Balthasar [5], and Linsenmaier [6–8]. The second author's dedicated efforts in recent years have resulted in the discovery of several species new to science and for Cyprus, which also led to the initiation of a comprehensive revision of the Cypriot fauna.

This paper serves a dual purpose. Firstly, it describes the newly discovered species *Chrysis kalliroi*. Secondly, it provides illustrations and a key for the identification of the Cypriot species of the *leachii* group.

2. Materials and Methods

The holotype of the newly described species has been deposited in the Linsenmaier collection at the Natur-Museum (Luzern, Switzerland, NMLU). Paratypes were deposited in the private collections of the authors (CMC and PRC). Other specimens studied in this paper are deposited in the Natur-Museum (Luzern, Switzerland, NMLU) and in the Natural History Museum, Prague (Prague, Czech Republic, NHMP), and in the private collections of G. Georgiou (Cyprus, GGC) and G. Pischilis (Cyprus, GPC).

The abbreviations used in these descriptions are as follows: F1, F2, F3, etc., = flagellomeres 1, 2, 3, etc., respectively; l/w = length/width ratio; MOD = median ocellus diameter (measured in frontal view); MS = malar space, the shortest distance between the base of the mandible and the lowest margin of the compound eye; OOL = oculo-ocellar line, the shortest distance between the posterior ocellus and compound eye; P = pedicel; PD = puncture

diameter; POL = posterior ocellar line, the shortest distance between posterior ocelli; T1, T2, T3, etc. = terga 1, 2, 3, etc.

The specimens were photographed by C. Makris, using a Camera Canon EOS 5D Mark III (Canon Inc., Ōta, Tokyo, Japan) with a Canon MP-E 65 mm f/2.8 1–5× Macro Photo lens; the images were stacked using software. Zerene Stacker, T2020-05-22-1330 (Zerene Systems LLC, Richland, WA, USA) then enhanced them using Adobe Photoshop (Adobe Inc., San Jose, CA, USA). Other images were obtained by P. Rosa using a Camera Olympus (Olympus Corporation, Shinjuku, Tokyo, Japan) E-M1 Mark II with an Olympus Zuiko 60 mm (Olympus Corporation, Shinjuku, Tokyo, Japan) and a Mitutoyo 5× lens (Mitutoyo Corporation, Kanagawa, Japan); the images were stacked using Helicon software v. 8.2 (Helicon Soft Ltd., Oakland, CA, USA) and then enhanced using Adobe Photoshop v. 13.0 (Adobe Inc., San Jose, CA, USA).

3. Results

3.1. Taxonomy

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

leachii species group

Chrysis (*Chrysis*) *leachii* group: Linsenmaier 1959: 92 (key to species group); 117–118 (diagnosis, keys), 190 (catalogue of the species); 1999: 161 (diagnosis),

Chrysis succincta-leachii subgroup: Kimsey & Bohart 1991: 364 (diagnosis, host, discussion).

Diagnosis of the *leachii* group. The *leachii* group includes very small to small species (2.5–5.0 mm) with apex of T3 edentate or with median tooth short to spiny or lanceolate; scapal basin broadly microridged in both sexes; malar space short and strongly convergent; transverse frontal carina faint; black spots on second sternum medium-sized (covering about half segment length) to large (covering two-thirds of segment length), subsquare to subrectangular, separated by narrow metallic line.

Discussion. The *leachii* group is closely related to the *succincta* group: females are distinguished by the microridged scapal basin (medially polished and laterally micropunctate in the *succincta* group), males can be separated by habitus, shape and coloration.

In contrast to some species groups, such as the *ignita* group or the *comparata* group, members of the *leachii* species group can be easily identified based on their colour pattern and the shape of genital capsule, as illustrated by Linsenmaier [7]. The following key for the identification of species in this group is partially based on these diagnostic features to allow for easy identification by final users with or without taxonomic experience in this family.

Haris [9] synonymised *Chrysis leachii* Shuckard, 1837 with *C. hungarica* Scopoli, 1772 against the opinion of experts and without following the recommendations of the International Code on Zoological Nomenclature [10]. For these reasons, subsequent authors continued to consider the name *C. leachii* to be valid, and *C. hungarica* a synonym of *C. succincta* Linnaeus, 1767 as proposed by Mocsáry [11], thus ignoring Haris' [7] opinion (e.g., [12–23]). An article dealing with nomenclatorial cases will be submitted to the Commission on Zoological Nomenclature, and the case of *Chrysis hungarica* will be reported, asking for an action. Meanwhile, the use of the name *Chrysis leachii* is maintained herein.

Hosts. The hosts are Crabronidae in the genera *Diodontus*, *Miscophus*, and *Tracheliodes* [7,24–26]. Some of these records require confirmation.

3.2. New Species Description

Chrysis kalliroi Rosa & Makris, sp. nov.

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Figure 1A,B, Figure 2A–E, Figure 8C,H and Figure 9C.

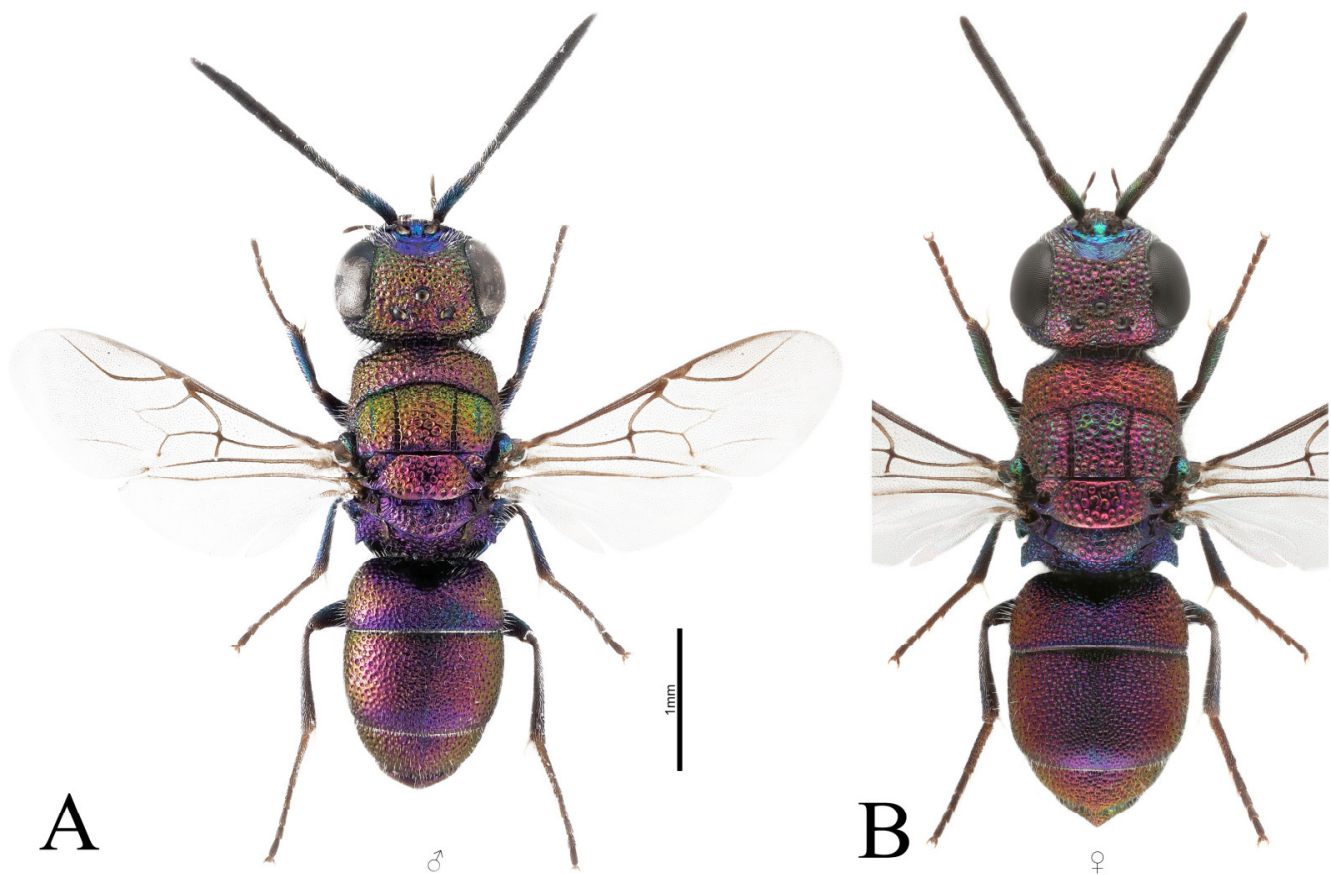


Figure 1. *Chrysis kalliroi* sp. nov., habitus, dorsal view. (A) Male holotype; (B) female paratype.

Type Material

Holotype: ♂, Troodos (Kannoures), 5.VII.2020, leg. C. Makris (NMLU). **Paratypes:** 1♂, Kourio, 06.VI.2006, leg. C. Makris (CMC); 1♀, Troodos (Kannoures), 5.VII.2020, leg. C. Makris (PRC).

Diagnosis: *Chrysis kalliroi* sp. n. is easily distinguished from other Cypriot species via its unique colouration (Figures 1 and 2); sculpture with large punctures on mesonotum and T2, on the latter with small punctures on interstices; shape of the genital capsule (Figure 9C) with elongate gonostylus and inner margin of gonocoxa oblique and medially gently waved. Only one other species in the *leachii* group shares a similar colouration, *C. alcudiae* Reder & Arens, 2012, which is endemic to the island of Mallorca (Spain), in the western Mediterranean (Figure 3). However, *C. alcudiae* is entirely red to golden red, including the scapal basin, scape, pedicel, tegula, and legs. In addition, *C. kalliroi* sp. nov. has a different sculpture pattern, with large, deep, and spaced punctures on the mesosoma and metasoma (Figure 2B), whereas in both sexes of *C. alcudiae*, the punctation is characterised by dense and small punctures (Figure 3C). The male genital capsule of *C. kalliroi* sp. n. is differently shaped (Figure 9C), with an unmodified inner margin of the gonocoxae, similar to *C. leachii*, leaving the aedeagus visible in dorsal view, whereas the gonocoxae of *C. alcudiae* are fully developed and apically curved to protect the aedeagus (Figure 9C).

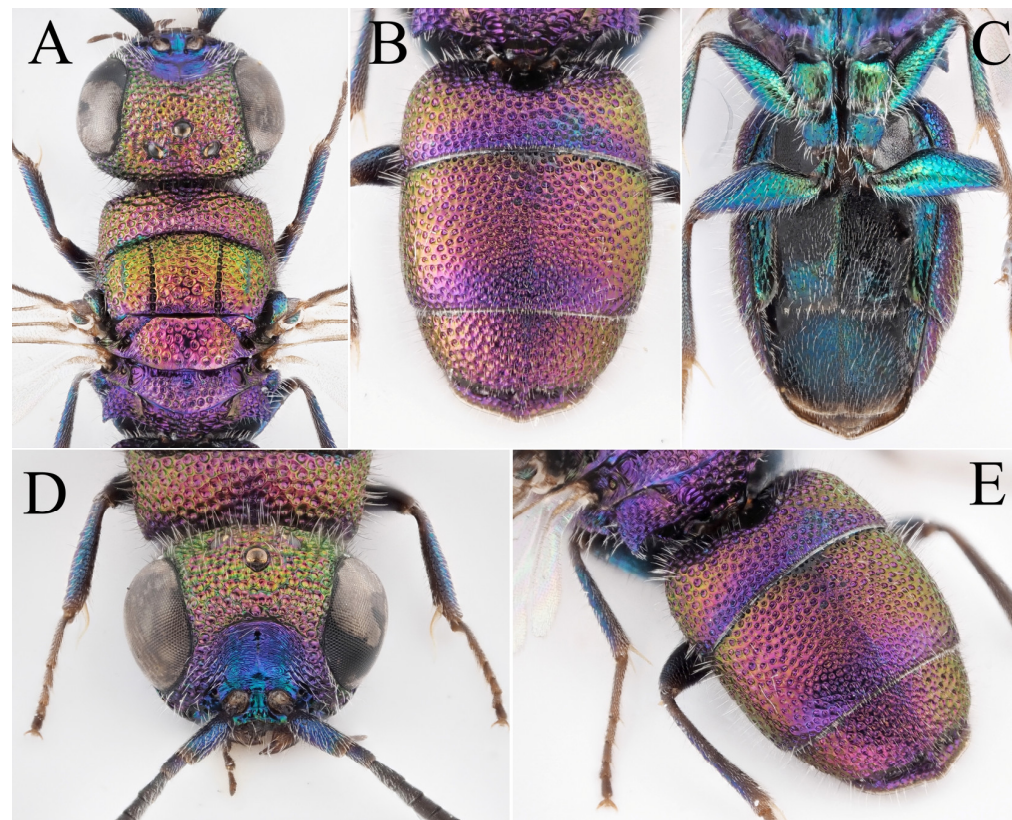


Figure 2. *Chrysis kalliroi* sp. nov., holotype, male. (A) Head and mesosoma, dorsal view; (B) metasoma, dorsal view; (C) metasoma, ventral view; (D) head, frontal view; (E) metasoma, postero-lateral view.

Description. *Male.* Body length 4.0–4.2 mm (holotype 4.2 mm, Figure 1A).

Head. Brow between scapal basin and anterior ocellus with dense, polygonal to irregular and somewhere confluent punctures, medium to large (about $0.4\text{--}0.6 \times \text{MOD}$), without interspaces (Figure 2D); similar sculpture between scapal basin and eye, with row of small punctures aligned along eye; head posterior to ocelli with smaller punctures and narrow, polished interspaces, rugose around posterior ocelli; transverse frontal carina faint; scapal basin deep, with sharp transverse ridges, shallower on longitudinal midline and medially weak on lower scapal basin; genal carina straight, sharp, fully developed from mid-eye to mandibular insertion; subantennal space short, $0.6 \times \text{MOD}$; apex of clypeus with dark brown rim. OOL $1.5 \times \text{MOD}$; POL $2.0 \times \text{MOD}$; MS $1.1 \times \text{MOD}$; relative length of P:F1:F2:F3 = 1.0:1.4:0.9:0.9.

Mesosoma. Medial pronotal line shallow and elongate, reaching two-thirds of pronotal length (Figure 2A); pronotum as long as mesoscutellum, with deep punctures, irregularly sized antero-medially and with narrow, sharp interspaces; shallower punctation on mesoscutum; postero-medially with large, irregular punctures; somewhere on interspaces with weak transverse wrinkles; notauli formed by deep, black, sub-rectangular foveae, parapsidal signum distinct; mesoscutellum with irregular sized punctures, medially weak; mesoscutellar-metanotal suture deep, formed by longitudinally elongate punctures; metanotum antero-medially with enlarged, impunctate area, irregularly sculptured; posteriorly and laterally with small, round punctures and polished interspaces; posterior propodeal projections divergent, covered by deep and dense small punctures; mesopleuron with episternal sulcus formed by small foveae.

Metasoma. T1 with deep, large punctures, dorsally with small, shallow punctures on interspaces (Figure 2B), laterally with widely spaced with polished interspaces, without small punctures; largest punctures of T1 half as wide as basal mesonotal punctures; T2 dorsally with sculpture similar to T1, punctures smaller toward posterior margin; weak

median longitudinal carina on T2-T3; T3 without pre-pit swelling; pits of pit row deep, irregular and partially confluent (Figure 2E); apical margin bordered by hyaline rim and with weak median indentation (Figure 2B); black spots on S2 subrectangular, as long as two-thirds of segment length, medially separated by narrow line (Figure 2C); genital capsule (Figure 9C) with elongate gonostylus, longer than in other species, and inner margin of gonocoxa oblique, gently waved medially.

Coloration. Body dorsally violet to purple, ventrally blue; scapal basin, scape, pedicel, tegula and legs blue. Vertex and mesoscutum with golden reflections, probably post-mortem. Wings hyaline with light brown nervures.

Female. Body length 4.5 mm. Similar to the male, with strong, triangular apical median tooth of T3.

Distribution: Cyprus. The species was collected on the highest peak of Troodos mountains, at Kannoures at the beginning of July, and close to the sea at Kourio at the beginning of June.

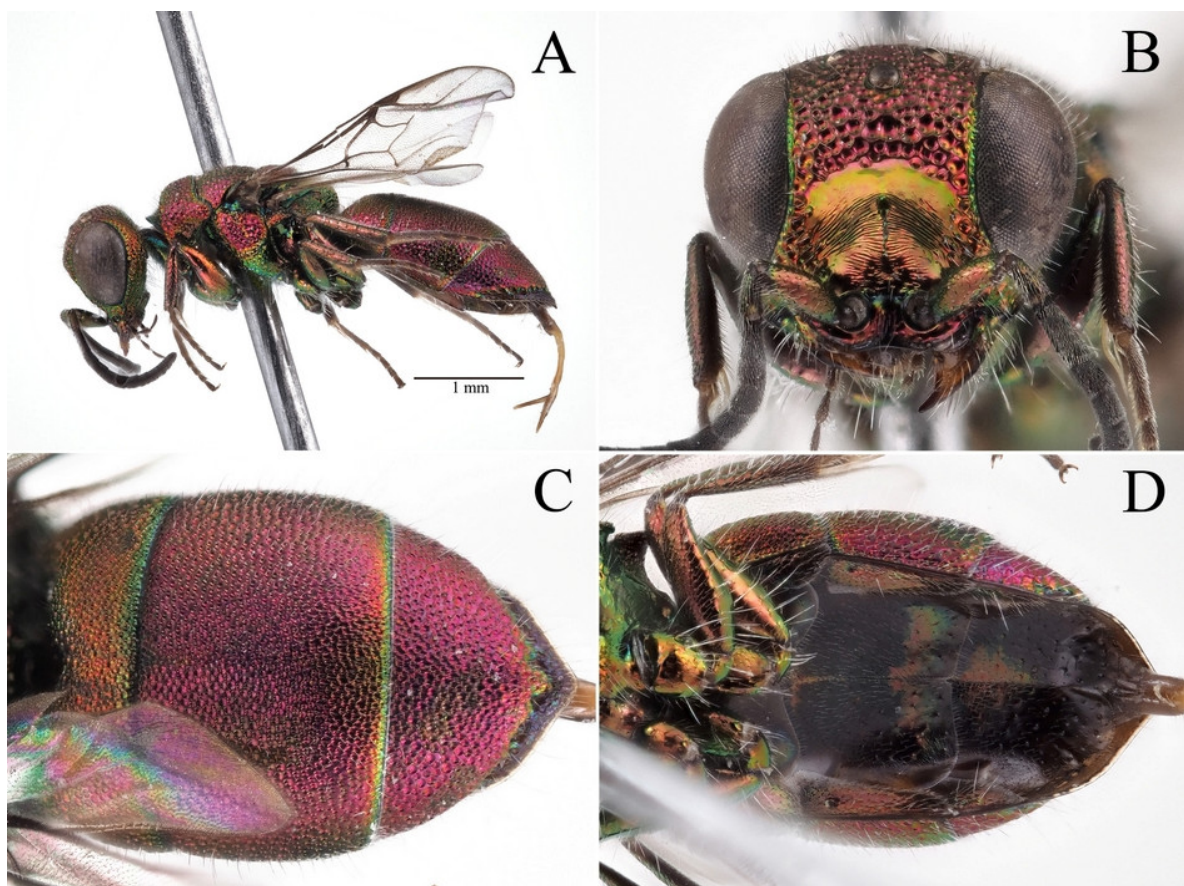


Figure 3. *Chrysis alcudiae* Reder & Arens, 2012, paratype, female (PRC). (A) Habitus, lateral view; (B) head, frontal view; (C) metasoma, dorsal view; (D) metasoma, ventral view.

Etymology. The name *kalliroi* (καλλιρροή) means “beautiful flow” in Greek, deriving from the words *kallos* (κάλλος, meaning beauty) and *roi* (ροή, meaning flow); therefore, *kalliroi* refers to the species’ beautiful body coloration, which changes from violet to purple. In Greek mythology, the nymph Kalliroi was one of the Oceanids, daughters of the titan Oceanus. From this mythological name derives the name Roi, name of the wife of the second author, to whom the species is dedicated.

Discussion. The outstanding colour of *Chrysis kalliroi* is rare in cuckoo wasps and thus far, is known only for a few species, including another member of the *leachii* group, *Chrysis alcudiae* Reder & Arens, 2012 (Figure 3), the female of *Chrysis episcopalix*

rubrafeminae Linsenmaier, 1968 (*viridissima* group), and *Chrysis hemipyrrha* Mocsáry, 1889 (*smaragdula* group).

3.3. Other Cypriot Species of the *leachii* Group

Chrysis ignescoa Linsenmaier, 1959

Chrysis (Chrysis) ignescoa Linsenmaier, 1959: 118 (key), 120 (descr.), 190 (cat., *leachii* group), 204 (Fig. 334), 207 (Fig. 470), 208 (Figs. 472, 473). Holotype ♂; Cyprus, without locality [actually Limassol, VII.1932, leg Mavromoustakis] (NMLU).

Figure 4A,B, Figure 8A,F and Figure 9A

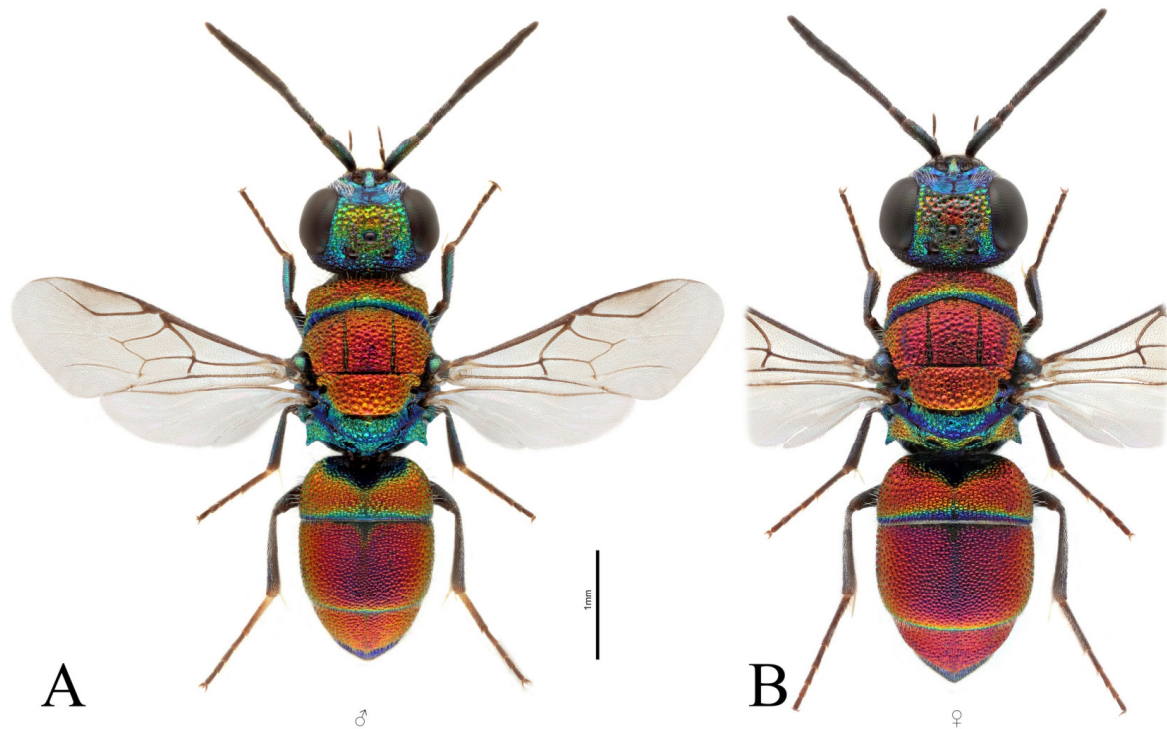


Figure 4. *Chrysis ignescoa* Linsenmaier, 1959, habitus in dorsal view. (A) Male; (B) female.

Material examined: The following specimens were collected by A. Mavromoustakis and deposited at NMLU: 1♂, Limassol, IX.1922, holotype; 1♀, Kathikas, 22.IX.1949, allotype; 1♂, Limassol, VII.1932; 1♀, id., V.1937; 2♂♂, id., IX.1951; 1♀, id., 4.IV.1958; 1♀, near Limassol 21.XI.1957; 1♂, Erimi, 21.VII.1950; 1♂, near Zakaki, 3.VI.1950; other specimens without type status from the same collection: 1♀, near Limassol, 19.X.1961; 1♂, Limassol, 18.IV.1959. All the following specimens were collected by the second author and deposited in his private collection: 3♂♂, Troodos, 30.VII.2005, leg. C. Makris; 1♂, 2♀♀, id., 15.VII.2007, leg. C. Makris; 1♂, 7♀♀, id., 29.VII.2007, leg. C. Makris; 2♀♀, id., 11.VIII.2007, leg. C. Makris; 1♂, id., 17.VI.2019, leg. C. Makris; 1♀, id., 25.VII.2020, leg. C. Makris; 1♀, Troodos (Kannoures), 6.VII.2008, leg. C. Makris; 1♀, id., 12.VII.2008, leg. C. Makris; 1♀, Troodos (Chionistra), 19.VII.2020, leg. C. Makris; 1♀, Kantou, 22.VIII.2006, leg. C. Makris; 1♀, Oreites, 27.VI.2008, leg. C. Makris; 1♂, Agia Varvara, 11.IV.2006, leg. C. Makris; 1♂, Ypsonas, 25.IV.2006, leg. C. Makris; 1♂, id., 26.IV.2006, leg. C. Makris; 1♂, Moni, 26.VIII.2022, leg. P. Rosa (PRC); 2♀♀, Agios Sozomenos, 9.IV.2007, leg. C. Makris; 1♀, id., 22.X.2022, leg. C. Makris.

Diagnosis: *Chrysis ignescoa* can be separated from other Cypriot species based on its colour pattern and the shape of the male genital capsule. It is the only species with a blue line on the posterior margin of the pronotum and T1, contrasting the red colour of these segments. The female is largely red on propodeum and posterior propodeal projections. The genital capsule has an oblique inner margin, similar to *C. kalliroi* sp. nov., but the

gonostylus is short and stout (Figure 9A), whereas it is elongated and slender in *C. kalliroi* sp. nov. (Figure 9C).

Distribution: Cyprus endemic.

Chrysis ignigena Linsenmaier, 1959

Chrysis (Chrysis) ignigena Linsenmaier, 1959: 118 (key), 120 (descr., holotype ♂; Cyprus, without locality), 190 (cat., *leachii* group), 204 (Fig. 338), 207 (Fig. 469), 208 (Fig. 482) (NMLU).

Figure 5A,B, Figure 8B,G and Figure 9B

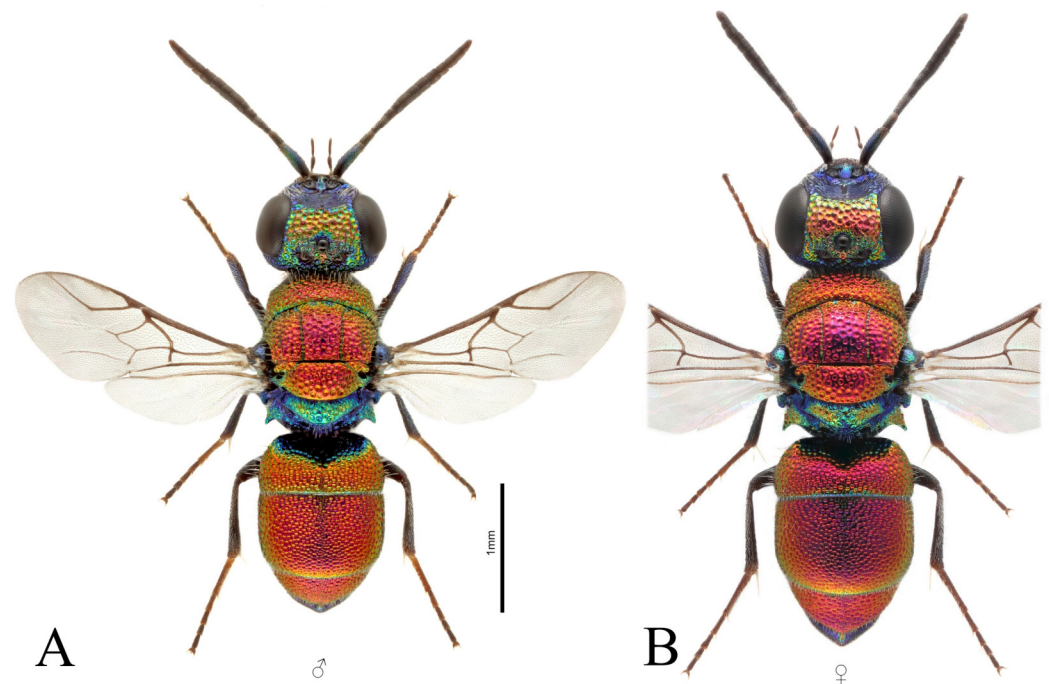


Figure 5. *Chrysis ignigena* Linsenmaier, 1959, habitus in dorsal view. (A) Male; (B) female.

Material examined: 2♂♂, Yermasoyia River, IX.1951, leg. G. Mavromoustakis, holotype and paratype (NMLU); 1♀, Achna dam, 19.VI.2005, leg. C. Makris (CMC); 1♂, Akrotiri, 8.IX.2019, leg. C. Makris (CMC); 1♂, Potamia, 2.VII.2019, leg. C. Makris (CMC); 1♂, Polemidia, 3.VII.2020, leg. C. Makris (CMC); 1♂, id., 23.VIII.2020, leg. C. Makris (CMC); 1♀, Agios Sozomenos, 29. X. 2022, leg. C. Makris (CMC); 1♀, id., 5.IX.2022, leg. P. Rosa (PRC).

Diagnosis: *Chrysis ignigena* can be separated from other Cypriot species via its colour pattern and the shape of the male genital capsule. It is the only species with pronotum and T1 entirely red, without distinct blue posterior margin; the vertex is almost entirely red in both sexes. The female has extended red colour on posterior propodeal projections and propodeum. The genital capsule has a unique shape, with inner margins of gonocoxae parallel and apically pointed (Figure 9B).

Distribution: Cyprus endemic.

Chrysis lanceolata Linsenmaier, 1959

Chrysis (Chrysis) lanceolata Linsenmaier, 1959: 118 (key), 121 (descr., holotype ♀; Russia, without locality [type examined, locality: Rostov Prov.: Taganrog, 24.VIII.1925, leg. C. Ahnger]), 190 (cat., *leachii* group), 204 (Fig. 338), 207 (Fig. 471) (NMLU).

Figure 6A,B, Figure 8D,I and Figure 9D

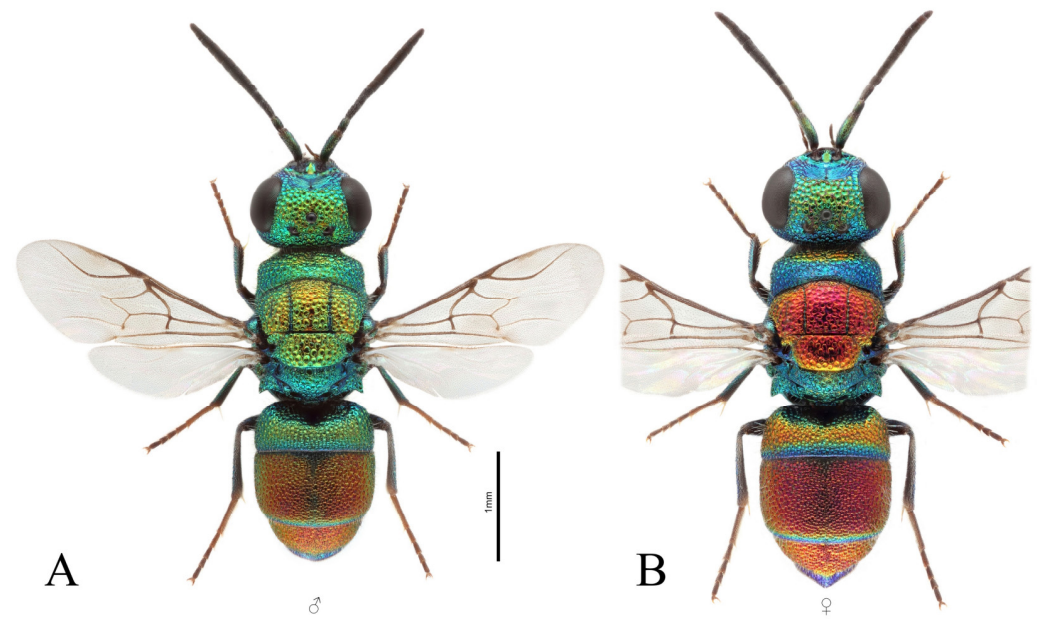


Figure 6. *Chrysis lanceolata* Linsenmaier, 1959, habitus in dorsal view. (A) Male, (B) female.

Material examined: 1♀, Geri, 28.X.2005, leg. C. Makris (CMC); 1♂, Troodos (Kannoures), 5.VII.2020, leg. C. Makris (CMC); 1♂, 1♀, Agios Sozomenos, 8.X.2022, leg. C. Makris (CMC); 2♂♂, id., 9.X.1922, leg. C. Makris (CMC); 1♀, id., 22.X.2022, leg. C. Makris (CMC); 1♂, Moni, 14.VIII.2021, leg. G. Pischilis (GPC).

Diagnosis: *Chrysis lanceolata* is the only Cypriot species with sexually dimorphic colouration. The male is recognisable by the green colour on its head, mesosoma, and T1, with some golden reflections (Figure 6). The female has the typical colour pattern of *Chrysis leachii*, with a blue head, pronotum posteriorly, metanotum, propodeum and T1-T2 posteriorly. The male can be recognised from similarly coloured species in the East Mediterranean by the shape of the genital capsule (Figure 9D), with parallel inner margins of the gonocoxae, which are gently curved apically. The female can be recognised from similarly coloured species in the East Mediterranean by the strong and lanceolate median tooth on T3.

Distribution: First record for Cyprus. The species is known from France (Corsica), Greece (mainland, Crete), Crimea, Croatia, Hungary, Italy (mainland and Sardinia), Romania, Russia (South and Ural), Slovakia [27], and possibly Spain [28].

Chrysis pumilio Balthasar, 1953 stat. nov.

Chrysis succincta f. *pumilio* Balthasar, 1953: 288 (descr., holotype ♀; Israel: Yarkon Petach Tikvah), 290 (key) (NHMP).

Chrysis (Chrysogona) leachii var. *cypriana* Linsenmaier, 1951: 50 (descr., syntypes ♂, ♀; Cyprus, without locality), *nom. praeocc., nec* Enslin 1950 (NMLU). Syn. nov.

Chrysis (Chrysis) cypruscula Linsenmaier, 1959a: 120 (replacement name for *Chrysis leachii* var. *cypriana* Linsenmaier 1951, *nec* Enslin, 1950). Syn. nov.

Chrysis cypruscula: Rosa & Soon 2012. Reinstated.

Figure 7A,B, Figure 8E,J and Figure 9E

Material examined: 2♀♀, Geri, 21.X.2005, leg. C. Makris (CMC); 1♂, Fasouri, 28.X.2005, leg. G. Georgiou (GGC); 1♀, id., 9.XI.2005, leg. C. Makris (CMC); 1♀, id., 18.X.2006, leg. G. Georgiou (GGC); 1♂, Timi, 1.IV.2006, leg. C. Makris (CMC); 1♂, Ladys Mile, 4.VI.2006, leg. C. Makris (CMC); 2♀♀, id., 18.VIII.2019, leg. C. Makris (CMC); 1♂, Agia Varvara, 22.V.2008, leg. C. Makris (CMC); 1♀, Potamia, 24.X.2020, leg. C. Makris (CMC); 1♀, Anarita, 5.VI.2021, leg. C. Makris (CMC); 1♀, Agios Sozomenos, 8.X.2022, leg. C. Makris (CMC); 1♀, id., 22.X.2022, leg. C. Makris (CMC); 1♀, id., 29.X.2022, leg. C. Makris (CMC); 2♀♀,

id., 6.XI.2022, leg. C. Makris (CMC). All the following specimens were collected by A. Mavromoustakis, identified by W. Linsenmaier and are deposited at NMLU: 1♂, near Zazaki, 3.VI.1950, syntype of *Chrysis leachii* var. *cypriana* [labelled as type]; 1♀, Moni, 3.X.1941, syntype of *Chrysis leachii* var. *cypriana* [labelled as allotype]; 3♂♂ near Zakaki, 1.VI.1950; 2♂♂ Erimi, 21.VII.1950; 1♂, Cherkas, 27.VII.1941, Coll. Dr. Enslin; 1♀, Limassol, 1.X.1952; 2♀♀, near Limassol, 5.IX.1957; 1♂, id., 19.X.1961; 2♂♂, 2♀♀, Yermasoyia Hills, IX.1951; 1♀, id., 24.IX.1951; 2♂♂, id., 25.IX.1951.

Diagnosis: *Chrysis pumilio* is the most easily identifiable species in East Mediterranean countries via its unique colour pattern: head blue, pronotum and mesonotum entirely red, metanotum and propodeum blue, T1 largely blue medially and red laterally, T2 red, T3 red with apical margin green to blue (Figure 7). Genital capsule with parallel inner margins of gonocoxae and apical apically straight (Figure 9E).

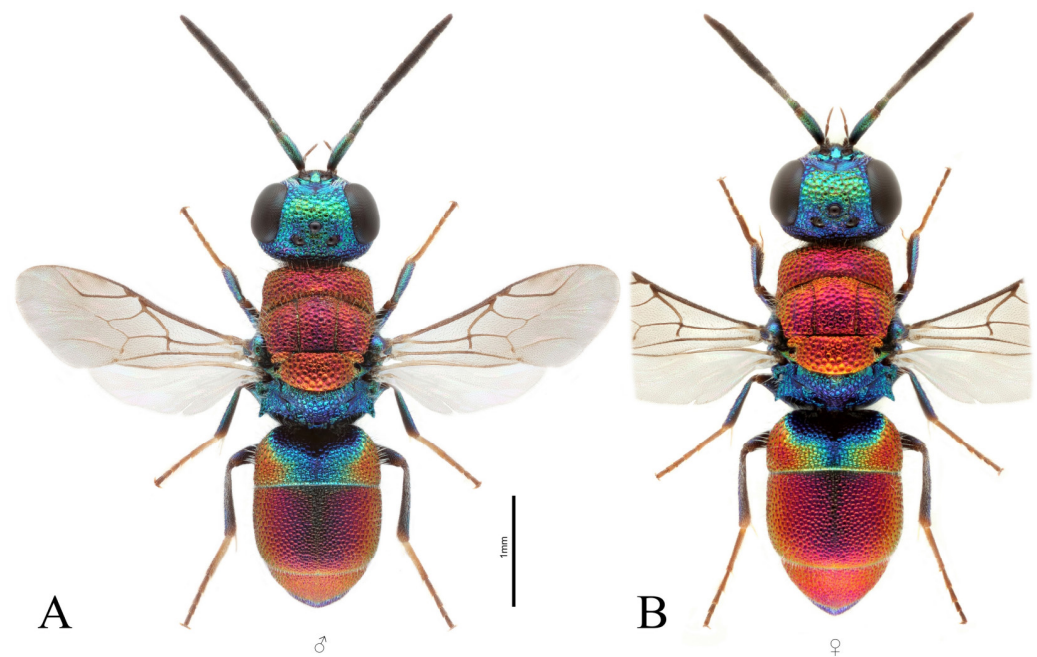


Figure 7. *Chrysis pumilio* Balthasar, 1953, habitus in dorsal view. (A) Male; (B) female.

Distribution: Cyprus. Greece (Rhodes), Palestine, and Turkey (Balthasar 1953; Linsenmaier 1968).

Remarks: Linsenmaier [7] replaced the name *Chrysis leachii* var. *cypriana* Linsenmaier, 1951 nec Enslin, 1950 with *Chrysis cypruscula* Linsenmaier, 1959. *Chrysis leachii* var. *cypriana* and *C. cypruscula* were synonymised by Kimsey and Bohart [29] with *Chrysis succincta* Linnaeus, 1761, whereas *C. succincta* f. *pumilio* Balthasar, 1953 was not mentioned in the catalogue, like many other forms described by Balthasar [30]. Linsenmaier (1959) recognised that *Chrysis leachii* var. *cypriana* and *Chrysis succincta* f. *pumilio* Balthasar, 1953 are conspecific; nevertheless, he considered the latter to be an invalid name. According to the International Code of Zoological Nomenclature [10], taxa described as form (f.) before 1961 are considered subspecific and not infrasubspecific unless the author expressly gave them an infrasubspecific rank (Article 45.6.4). Therefore, the taxa described as forms by Balthasar [30] must be considered available, as in the case of *pumilio* Balthasar, 1953 which has priority over the name *cypruscula* Linsenmaier, 1959. The types of *Chrysis pumilio* and *Chrysis leachii* var. *cypriana* Linsenmaier were examined to confirm the synonymy.

3.4. Species to Be Excluded from the Cypriot Fauna

Chrysis leachii Shuckard, 1837

Chrysis (*Monochrysis*) *leachii*: Invrea 1935: 103 (cat., Cyprus: Limassol, June, August, September).

Chrysis leachi [!]: Enslin 1950: 663 (cat., Fassouri, 30.IX.1941; Moni, 3.X.1941).

Remarks: Invrea [2] and Enslin [4] listed *Chrysis leachii* from Cyprus. Nevertheless, all the species listed in the present article were described after these two references; the examination of these old specimens is needed to correctly identify them.

3.5. Key to the Species of the *leachii* Group from Cyprus

1. Body dorsally fully violet to purple (Figure 8C,H), ventrally blue; scapal basin, scape, pedicel, tegula and legs blue; male genital capsule as in Figure 9C, with oblique inner margin of gonocoxa and gonostylus slender and elongate *C. kalliroi* sp. nov.

- Body with different colour pattern (Figure 8A,B, 8D–G, 8I,J), with green to blue head, metanotum and propodeum, red mesoscutum and large part of metasoma dorsally; genital capsule differently shaped, with fully developed inner margin of gonocoxa (Figure 9B,D–F), covering the aedeagus, or with gonostylus broad and short (Figure 9A,D) 2

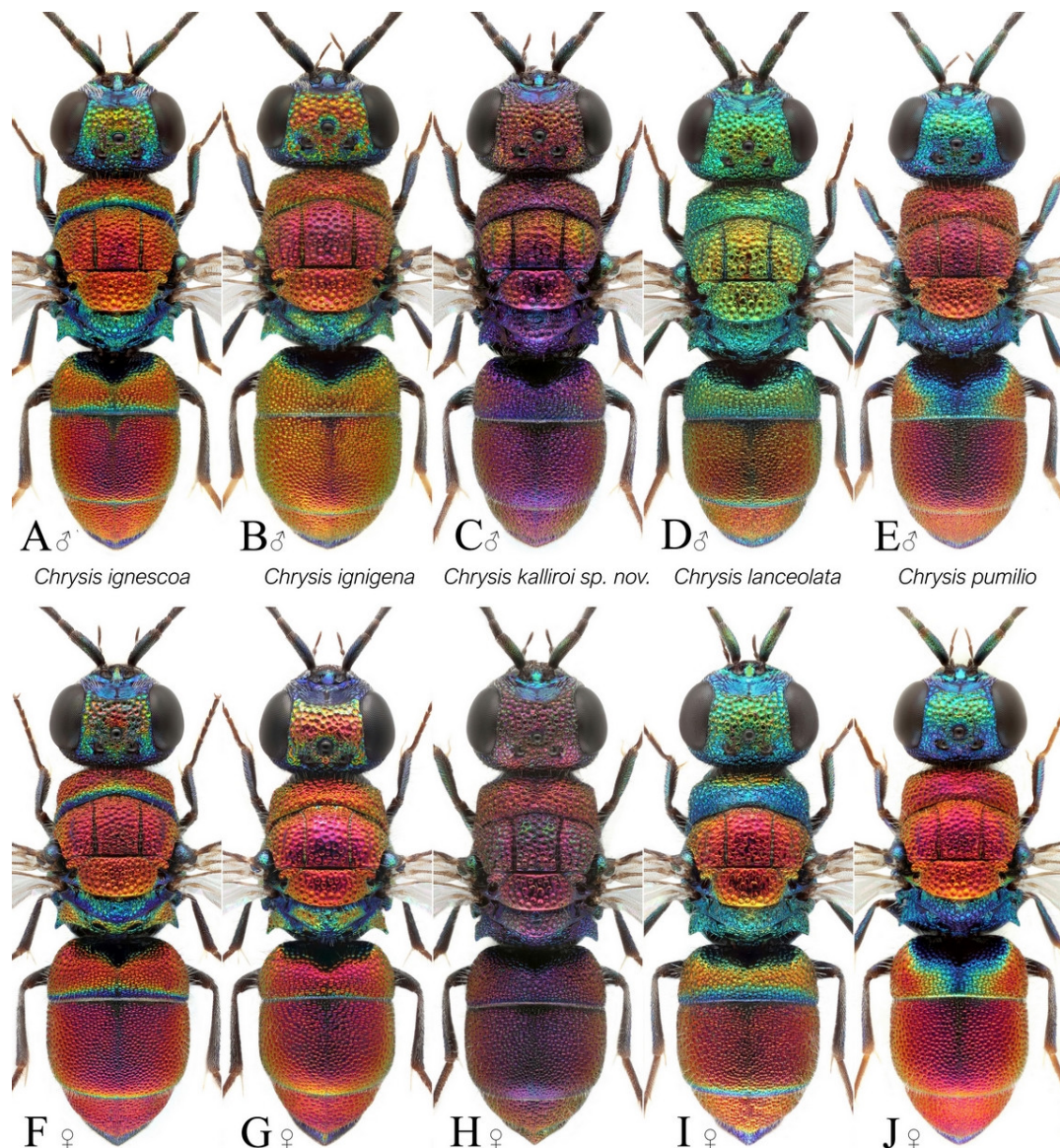


Figure 8. Cypriot species of the *leachii* group, habitus in dorsal view. Males (A–E) and females (F–J).



Figure 9. Genital capsules of Cyprid species, dorsal view. (A) *Chrysis ignescoa*, (B) *C. ignigena*, (C) *C. kalliroi* sp. nov., holotype, (D) *C. lanceolata*, (E) *C. pumilio*, and (F) *C. alcudiae* paratype from Mallorca. Scale bar: 0.5 mm.

- 2. Body with head, mesosoma and T1 green, with golden reflections; T2 and T3 red with green posterior margin; genital capsule as in Figure 9D, with very short gonostylus and round, slightly declivitous inner margin of gonocoxa *C. lanceolata* ♂
- Body with different colour pattern, red on pronotum, mesonotum and large part of T1 and shape of genital capsule with inner margin of gonocoxae distinctly obliquous (Figure 9A,C), convex (Figure 9B), or straight apically (Figure 9E,F) 3
- 3. Head entirely blue, T1 with large blue band on posterior margin 4
- Head blue with red or golden-green reflections on vertex, T1 largely or entirely red 6
- 4. Pronotum entirely red; T1 medially blue, laterally red; T2 entirely red; male genital capsule as in Figure 9E, with straight apical margin of gonocoxa *C. pumilio*
- Pronotum anteriorly red, posteriorly blue; T1 anteriorly and posteriorly blue, medially red; T2 red, with narrow blue posterior line; genital capsule with oblique apical margin of gonocoxa 5
- 5. Pronotum with narrow anterior golden stripe; apical margin of T3 with lanceolate median tooth; male with head, mesosoma and T1 green, with golden reflections; T2

- and T3 red with green posterior margin; male with head, mesosoma and T1 green, with golden reflections (see couplet 2); genital capsule as in Figure 9D, with slightly divergent inner margin of gonocoxa and with oblique apical margin; short and stout gonostylus *C. lanceolata* ♀
- Pronotum with anterior golden stripe covering more than half the pronotal length; apical margin of T3 slightly projecting medially; male usually darker dorsally on metasoma and coloured similarly as the female; genital capsule with highly divergent inner and apical margining of gonocoxa, leaving the capsule wide open medially *C. leachii*
6. Pronotum posteriorly with a narrow blue stripe; T1 without posterior blue stripe; genital capsule as in Figure 9A *C. ignigena*
- Pronotum entirely red; T1 posteriorly bordered by narrow blue stripe; genital capsule as in Figure 9B *C. ignescoa*

4. Discussion

With five species, the *leachii* species group is currently the most speciose group of *Chrysis* Linnaeus, 1761 in Cyprus. It was established by Linsenmaier [7], based on West Palaearctic species, and Kimsey and Bohart [29] considered *leachii* a subgroup of the *C. succincta* group. The *leachii* group is still poorly known, and in recent years, the number of known species has almost doubled [31–36]. Moreover, its distributional range has been recently revised with the discovery of species in the Afrotropical realm [21]. For this reason, a wider revision of this species group is needed, including molecular analyses.

Three of the five species known for the Cypriot fauna are endemic: *C. ignigena*, *C. ignescoa* and *C. kalliroi* sp. nov. (the collecting site is shown in Figure 10; the distribution map of species of the *leachii* group is shown in Figure 11). The reason for this high rate of endemism should be further investigated, beginning research on their hosts. Of the other two species, *C. pumilio* is known from other eastern Mediterranean localities, such as Rhodes, Turkey [8], and Palestine [30], whereas *C. lanceolata* was originally described from southern Russia and is apparently spreading its distributional range from Eastern into Western Europe [37].



Figure 10. Type locality of *Chrysis kalliroi* sp. nov. in the Troodos Mountains (Ph.: P. Rosa).

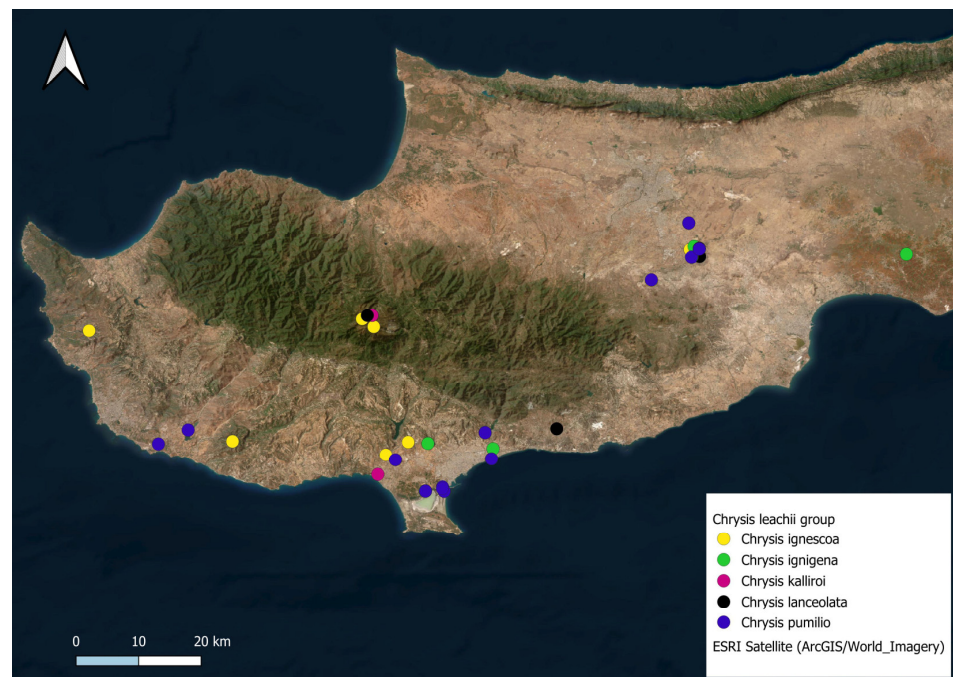


Figure 11. Distribution of species of the *leachii* group in Cyprus.

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