Revision of the species Chalcidoidea (Insecta, Hymenoptera) deposited in the Museum of Natural History of the Scientific Institute in Rabat (Morocco)

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Abstract
Revision of the species Chalcidoidea (Insecta, Hymenoptera) deposited in the Museum of Natural History of the Scientific Institute in Rabat (Morocco). This work presents the revision of twelve species of the superfamily of Chalcidoidea (Insecta, Hymenoptera) deposited in the National Museum of Natural History, Scientific Institute, Rabat, Morocco. Data on biology and hosts of these species are given and a map of their distribution in the North Africa region is provided.

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Key words: Hymenoptera, Chalcidoidea, Revision, SI reference collection, Morocco

Resumen
Revisión de las especies de Chalcidoidea (Insecta, Hymenoptera) conservadas en el Museo de Historia Natural del Instituto Científico de Rabat (Marruecos). Este trabajo presenta la revisión de 12 especies de la superfamilia Chalcidoidea (Insecta, Hymenoptera) conservadas en el Museo de Historia Natural del Instituto Científico de Rabat (Marruecos). Se aportan datos referentes a la biología y huéspedes de dichas especies, así como un mapa de distribución de las mismas en el norte de África.

Datos publicados en GBIF (Doi: 10.15470/q0ya99)

Palabras clave: Hymenoptera, Chalcidoidea, Revisión, Colección de referencia del SI, Marruecos

Resum
Revisió de les espècies de Chalcidoidea (Insecta, Hymenoptera) conservades al Museu d’Història Natural de l’Institut Científic de Rabat (Marroc). Aquest treball presenta la revisió de 12 espècies de la superfamília Chalcidoidea (Insecta, Hymenoptera) conservades al Museu d’Història Natural de l’Institut Científic de Rabat (Marroc). S’aporten dades referents a la biologia i els hostes d’aquestes espècies, com també un mapa de distribució al nord d’Àfrica.
Introduction

The Chalcidoidea is a megadiverse superfamily of Apocrita (Hymenoptera) composed of 33 families. It includes around 25,000 known species and a total diversity estimated at more than 500,000 species, which means that most have not yet been discovered and described (Askew and Mifsud, 2016; Heraty et al., 2013). In addition, many species in this group of Hymenoptera are of great economic and agronomic importance because of their use as biological control agents.

Since 2012 in Morocco, we have been working on a research project focused on the inventory of Chalcidoidea, and have visited museums, including the National Museum of Natural History of the Scientific Institute (NMNH–SI), in Rabat. However, we found several specimens of the insect fauna recorded since the 1900s in the collection boxes had names that have not been updated and were even erroneous, never having been consulted or reviewed by specialists. This finding prompted us to revise all the species of this superfamily preserved in this former research institution.

The aim of this work therefore was to revise for the first time all the Chalcidoidea specimens from this old collection registered in the NMNH–SI in order to update and add to the diversity of the fauna of Morocco.

Material and methods

To review all the specimens deposited in the collection boxes belonging to the Chalcidoidea superfamily, each specimen was examined morphologically in detail with a Stereomicroscope Olympus SZX16 and identified by consulting specific and appropriate determination keys: Cresson (1972); Crawford (1910); Bouček (1952); Steffan (1950, 1959); Delvare (1992); Delvare and Bouček (1992); Baugnéé and Vago (2006); Delvare et al. (2011); Lotfalizadeh et al. (2012); Toheed et al. (2018); Bouček (1974); Rizzo and Mitroiu (2010); Doğanlar (2011); Delvare and Huchet (2017); Janšta et al. (2017); Cruaud et al. (2019); Cruaud et al. (2020).
Acronyms used in the text

- SI, Scientific Institute
- NMNH–SI, National Museum of Natural History, Scientific Institute, Mohammed V University of Rabat, Morocco
- NMNH, National Museum of Natural History, Paris, France

Results

After revising the specimens from the NMNH–SI collection we identified 12 species in 9 genera and 5 families: Chalcididae (5 species), Encyrtidae (1 species), Leucospidae (3 species), Megastigmidae (1 species) and Pteromalidae (2 species).

Annotated list of the species of the superfamily Chalcidoidea

The list below includes data on the species of Chalcidoidea from Morocco deposited at the NMNH–SI and classified by family, subfamily, tribe (where it exists), genus and species (see also the dataset published in GBIF, Doi: 10.15470/q0ya99).

Superfamily Chalcidoidea
Family Chalcididae
Subfamily Brachymeriinae

*Brachymeria minuta* (Linnaeus, 1767)

Examined material: 1♀, Morocco: Tangier, 1919, J. de Gaulle leg. [NMNH–SI, under the name *Chalcis minuta* (Linnaeus, 1767)].

Brief description: according to Delvare and Huchet (2017), the *Brachymeria minuta* species group has numerous characters that can be used to separate species. The Moroccan specimen of *Brachymeria minuta* is characterized by: a bright light yellow tegula; black scape with brown base and apex, brownish black pedicel; remaining antennal segments black; black coxae; black brownish trochanter; black femora with bright light yellow apices; brownish yellow anterior tibia with bright light yellow at the basal part and at the external apical part, and a long blackish spot at the median external part; shiny black mid–tibia with yellow base and apex; black posterior tibia with sub–basal spot and yellow apical part. Pubescence on grayish white body, hyaline wings with dark brown veins.

Comments: this species is distributed in the West Palearctic region and the U.S.A., and in Morocco (Kissayi et al., 2019) and Tunisia (Bouček, 1952) in the regions of North African. *Brachymeria minuta* is considered a parasitoid species of the primary type, hyperparasitoid or optional, pupae of Diptera (Calliphoridae, Sarcophagidae), Hymenoptera (Cimbicidae, Diprionidae), Lepidoptera (Arctiidae, Gelechiidae, Hesperiidae, Lasiocampidae, Erebidae, Pieridae, Tortricidae, Yponomeutidae) (Thompson, 1955; Askew, 1962; Herting, 1975, 1976, 1977, 1978; Filatova, 1982; Shanower et al., 1992; Delvare and Huchet, 2017). In Morocco, Jourdan and Rungs (1934) observed this species flying around inflorescences of *Euphorbia terracina* (Linnaeus) (Euphorbiaceae), and also noted it on Rosaceae aphids *Macrosiphum rosae* (Linnaeus) (Hemiptera, Aphididae) at Meknes (pers. obs.) (Kissayi et al., 2019).
Brachymeria tibialis (Walker, 1834)

*Chalcis tibialis* Walker, 1834: 29. Original description ♂. France, near Paris

= *Chalcis distinguenda* Walker, 1834: Bouček, 1992: 92

= *Chalcis intermedia* Nees, 1834: Bouček, 1992: 92

*Brachymeria intermedia* (Walker): Bouček, 1952: 18 (key), 22–23 (redescription, hosts); Steffan, 1959: 36 (key), 38 (hosts)

*Brachymeria tibialis* (Walker): Bouček, 1992: 92

Examined material: 1♀, Morocco: *Quercus suber*, (NMNH–SI, under *Chalcis intermedia* Nees, 1934); 5♀, 1♂, Maâmora forest, 1924, A. Théry leg., L. Berland det., 1♀, 18 VI 1925, (NMNH–SI, under *Chalcis flavipes* Panzer, 1801), 1♀, Maâmora [NMNH–SI, under *Chalcis minuta* (Linnaeus, 1767)].

Brief description: this species has frequently been reported using its junior synonym, *Brachymeria intermedia* (*Chalcis*); it has been described by Nees von Esenbeck (1834) and redescribed by Masi (1916) and Ruschka (1922). Crawford (1910) included it in a key, under the name of *Chalcis flavipes* Panzer, 1801. Ferrière (1927) mentions that several authors refer to *Brachymeria* under *Chalcis*. The revised specimens according to Crawford (1910) are characterized by their posterior femur and tibia showing yellow marks and the head presenting a keel in front of the malar space. Bouček (1952) provided a key to the genus with the description of *B. tibialis* characterized by right mandible with three teeth and left mandible with two teeth; posterior tarsi very robustly and compactly built, incisions between the segments weak. Steffan (1959) included the description of this species in a key to the *Brachymeria* species of France. *B. tibialis* is characterized by a third femur without internal basal tubercle, shiny disc, with a perfectly smooth integument between the setiger points; third femur black with large distal macule; third tibia yellow adorned with a black band along the outer ventral ridge.

Comments: *Brachymeria tibialis* is widespread in the Palearctic region. It is reported from three countries in the North African region (Algeria, Tunisia and Morocco). Commonly known to be polyphagous, the species is recognized as a primary or sometimes secondary parasitoid; solitary; endoparasitoid; hyperparasitoid or facultative; its larvae; nymphs or cocoons and even used in biological control. The primary hosts reported for this species are represented by Diptera (Cecidomyiidae, Tachinidae), Hymenoptera (Chalcididae, Cynipidae, Diprionidae), Lepidoptera (Arctiidae, Gelechiidae, Hesperiidae, Lasiocampidae, Erebidae, Noctuidae, Notodontidae, Nymphalidae, Oecophoridae, Papilionidae, Pieridae, Pyralidae, Saturniidae, Zygaenidae) (Bouček, 1952; Bouček and Sedivy, 1954; Steffan, 1959; Peck, 1963; Carl, 1968; OILB, 1971; Grimble, 1976; Herting, 1976, 1977; Fry, 1989; Drost and Cardé, 1992; Dindo, 1993; Dindo and Luciano, 1995; Askew and Shaw, 2001; Stojanova, 2006; Bărbuceanu and Andriescu, 2012; Lotfalizadeh et al., 2012; Tikader, 2012; Bărbuceanu et al., 2020). It is also capable of behaving as a pseudohyperparasitoid (Obregón et al., 2015). In Morocco, this species was found on *Tortrix viridana* (Linnaeus, 1758) and from *Acleris undulana* (Walsingham, 1900) (Lepidoptera, Tortricidae) (Mouna and Fabre, 2005). In addition, it was obtained from the biological community associated with *Lymnantria dispar* (Linnaeus, 1758) (Lepidoptera, Erebidae, Lymnantriinae) (De Lépiney, 1930).

Subfamily Chalcidinae

*Chalcis myrifex* (Sulzer, 1876) (fig. 1)

Examined material: 1♀, Morocco: Tangier, 1914, Ernest André leg., NMNH–SI [under *Smicra myriflex* (Sulzer, 1776)].

Brief description: *Chalcis myrifex* (Sulzer) is distinguished by its black color; head with
two yellow spots between the eyes; yellow tegula and petiole; black legs; yellow anterior femurs at ends; yellow posterior femur, upper base and black apex, with thirteen black teeth; fawn–colored anterior tibiae; posterior tibia yellow at extremities; tawny tarsi, with a dark point; dark wings.

Comments: *Chalcis myrifex* is a species that has been inventoried recently in the region of North Africa and specifically in Morocco and Tunisia (Bouček, 1952). Samples of this species from Morocco are deposited at the NMNH, Paris (pers. obs.). The species are endoparasites of larvae or pupae of Diptera, Stratiomyidae (Bouček, 1952, 1977; Erdős, 1955; Schremmer, 1960; Askew, 1962; Herting, 1978).

Subfamily Haltichellinae

**Neochalcis fertoni** (Kieffer, 1899)

*Euchalcis barbara* Benoist, 1921: 118–120.

Original description ♀♂. Morocco, Casablanca, ex nest *Anthidium lituratum* Panzer [now *Pseudoanthidium nanum* (Mocsáry, 1881)]. Holotype in NMHN, Paris.

= *Neochalcis fertoni* (Kieffer, 1899): Bouček, 1952: 43.

Examined material: 1♀, Morocco: Maâmora, IX 1919, R. Benoist leg. and det., NMNH–SI (under the name *Euchalcis barbara* Benoist, 1921 = *Neochalcis barbara* Benoist, 1921).

Comments: the result of a recent molecular phylogenetic study of the emblematic group Chalcididae using UCE showed that *Neochalcis fertoni* (described from Corsica) and *N. barbara* (described from Morocco) are different species (Cruaud et al., 2019, 2020). Furthermore, Bouček (1952) also reported this species from Algeria and Tunisia apart from the type from Morocco (Benoist, 1921).

In Morocco, this species was reared from *Anthidium lituratum* (Panzer, 1801) (Hymenoptera, Megachilidae) having established its nests in dried stems of *Thapsia garganica* Linnaeus, 1767 (Apiaceae) (Benoist, 1921).
**Chirocera pectinicornis** (Latreille, 1809) (fig. 2)

Examined material: 1♀, Algeria: Oran, 1914, Ernest André leg. (NMNH–SI).

Comments: identification is confirmed for this species. It was mentioned for the whole region of North Africa by Bouček (1952) in Algeria with a specimen deposited at the NMNH–SI, Rabat and Tunisia as well as in Morocco (Steffan, 1957). Its biology is still unknown.

**Family Encyrtidae**

**Subfamily Encyrtinae**

**Ooencyrtus kuvanae** (Howard, 1910)

Examined material: 2♀, 1♂, Morocco: Maâmora Forest, NMNH–SI (labelled *Schedius kuvanae* Howard, 1910).

Comments: *Ooencyrtus kuvanae* is well known as an egg–parasite of *Lymantria dispar* (L.) (Lepidoptera, Erebidae, Lymantriinae). The labels of specimens deposited in the NMNH–SI show that some specimens were sent to North America as indicated by gypsy moth eggs of the Lepidoptera. Trjapitzin (1989) mentioned it from Algeria and Tunisia. The hosts cataloged for this species are Hemiptera (Coreidae, Fulgoridae), Lepidoptera (Lasiocampidae, Erebididae, Saturniidae) and Neuroptera (Chrysopidae) (Herting, 1976; Hérad, 1978; Prinsloo, 1983; Matteson, 1981; Huang and Noyes, 1994; Noyes and Hayat, 1994; Fraval et al., 1995; Villemant and Luciano, 1995; Trjapitzin and Paik, 1996; Fallahzadeh and Japoshvili, 2010; Kissayi and Benhalima, 2016; Liu and Motton, 2017).

**Family Leucospidae**

**Leucospis brevicauda** Fabricius, 1804

Examined material: 1♀, Morocco: Tangier, 1914, Ernest André leg., NMNH–SI.

Comments: in North Africa this species was reported in Algeria (Fabricius, 1804), Tunisia, Egypt and Morocco (Baur and Amiet, 2000; Madl and Schwarz, 2014). In addition, its geographic distribution is cited in France (mainland), Italy (mainland, Sardinia, Sicily), Malta, Portugal, Spain (mainland, Baleares), Turkey (Spinola, 1838; Öncüer, 1991; Madl and Schwarz, 2014).
**Leucospis dorsigera** Fabricius, 1775

Material examined: 1♀, Morocco: Tangier, 1914, Ernest André leg., NMNH–SI.

Comments: This species, with palearctic distribution, is mentioned in North Africa in Algeria (Fabricius, 1804), Egypt (Spinola, 1838), Tunisia, Libya, and Morocco (Madl and Schwarz, 2014).

This species is quoted as a primary parasitoid or hyperparasitoid having primary hosts in Coleoptera (Bostrichidae, Cerambycidae), Hymenoptera (Megachilidae) (Herting, 1973; Fry, 1989; Baur and Amiet, 2000; Baur, 2005). The worldwide distribution is cited in Afghanistan, Albania, Austria, Azerbaijan, Belgium, Bulgaria, Croatia (mainland, Hvar, Krk, Losinj, Mljet, Rab, Susak), Cyprus, Czech Republic, France (mainland, Corsica), Georgia, Germany, Greece (mainland, Poros, Rhodes), Hungary, Iran, Iraq, Israel, Italy (mainland, Lampedusa, Sardinia, Sicily), Jordan, Kazakhstan, Lebanon, Luxembourg, Macedonia, Malta, Moldova, Montenegro, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain (mainland), Switzerland, Syria, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan (Hesami et al., 2005; Madl and Schwarz, 2014).

**Leucospis miniata** Klug, 1834

Examined material: 1♀, Morocco: Middle Atlas, Ras El Ksar, 900 m, 12, 13 VI 1929, F. Le Cerf leg.; 1♀, Aguelman Aberhane, VII 1954 (NMNH–SI).

Comments: This species has been cited by Bouček since 1959 in the North African region where it has a wide distribution and is mentioned from Egypt (Klug, 1934), Tunisia (Schmid–Egger, 2010), Algeria, Libya and Morocco (Bouček, 1974; Madl and Schwarz, 2014); and also from Italy (Lampedusa, Sicily) (Caleca et al., 1995); Malta (Casolari and Casolari Moreno, 1980) and Israel (Madl and Schwarz, 2014).

The identifications of the specimens at the NMNH–SI are correct. In addition, specimens of both these species of *Leucospis* from Morocco, Algeria and Tunisia are deposited at the NMNH, Paris (pers. obs.). Any hosts of this species are unknown (Bouček, 1974).

**Family Megastigmidae**

Megastigmidae were considered a subfamily of the Torymidae family until the work of Janšta et al. (2017) when the taxonomic level was raised to family status.

**Bootanomyia stigmatizans** (Fabricius, 1798) (fig. 3)

Examined material: 1♀, Morocco: Cap Spartel, 1904, G. Buchet leg., NMNH–SI [labelled *Megastigmus stigmatizans* (Fabricius, 1798)].

Comments: *Bootanomyia stigmatizans* currently has a limited geographic distribution in North Africa, being reported only in Morocco (Delucchi, 1962: 14).

This species is a primary parasitoid or associated with galls of Cynipidae (Hymenoptera) living on *Quercus* Linnaeus, 1753 (Fagaceae) (Askew, 1966).

**Family Pteromalidae**

**Subfamily Pteromalinae**

**Dibrachys microgastri** (Bouché, 1834)

Examined material: 3♀, Morocco: Maâmora forest, NMNH–SI [labelled as *Dibrachys boucheanus* (Ratzeburg, 1844)].

Comments: since *Dibrachys microgastri* (Bouché) was first described, several studies and revisions have been published and the identification of the specimens from the NMNH–SI is correct.
For the North African region, the species is reported in Algeria (Thompson, 1958), Tunisia, Egypt, and Morocco (Peters and Baur, 2011).

*Dibrachys microgastri* (Gordh) is recognized as a primary parasitoid, solitary or gregarious, or larvae, nymphs, or facultative hyperparasitoid, ectoparasitoid or endoparasitoid. The species is also used in biological control (Hu, 1964; Herting, 1975; Chu, 1978; Gülel, 1982, 1988; Fry, 1989; Knight et al., 1992; Vidal, 1993; Askew and Shaw, 1997; Myartseva et al., 1999; Mitroiu, 2001; Bărbuceanu and Andriescu, 2009). The primary hosts belong to Coleoptera, Diptera, Hemiptera, Hymenoptera, Lepidoptera and Neuroptera (Thompson, 1958; Peck, 1963; Herting, 1976, 1977, 1978; Burks, 1979; Peters and Baur, 2011). Other primary hosts reported for this species are the Araneae (Araneidae, Thomisidae) (Burks, 1979).

In Morocco, *D. microgastri* was collected from the *Thaumetopoea pityocampa* (Denis and Schiffermüller, 1775) caterpillar (Lepidoptera, Notodontidae) on *Cedrus atlantica* (Manetti ex Endlicher) Carrière, 1855 (Pinaceae) (Peters and Baur, 2011). It was collected from the biological complex of *Lymantria dispar* (Linnaeus, 1758) (De Lépiney, 1927).

**Norbanus guyoni** (Giraud, 1870) (fig. 4)

*Arthrolysis guyoni* Giraud, 1870: 484–485. Original description ♀♂. Algeria.

*Norbanus guyoni* (Giraud): Rizzo and Mitroiu: 239–241.

Examined material: 1♀, Algeria: Biskra, 1877, Giraud leg., NMNH–SI [under the name *Arthrolypis guyoni* (Giraud, 1870)].

Comments: Rizzo and Mitroiu (2010) revised the Palaearctic species of *Norbanus*, providing a key to identify the species; they redescribed *Arthrolypis guyoni* and transferred it to *Norbanus*. The specimen placed in the NMNH–SI agrees with this species. In addition to Algeria Rizzo and Mitroiu (2010) described it from Libya. It is recognized as a parasite of *Lepidoptera Gelechiidae* (Herting, 1975). The species was also described from *Oecocecis guynella* (Gueneé) (Lepidoptera, Gelechiidae) galling the twigs of *Limoniastrum guyonianum* Boiss. (Plumbaginaceae) (Giraud, 1870).
**Discussion**

The Hymenoptera collection of the NMHN–SI is especially interesting as it includes ancient data, some of them 150 years old. It also includes a specimen of a type series of *N. guyoni*. The other Hymenoptera housed there belonging to several taxa such as the Tenthredinidae, Ichneumonoidea, Apoidea, Chrysidoidea and Vespoidae, some of them not yet identified. This work allowed to check and correct, when necessary, the identifications, and to update the nomenclature, thus providing reliable data for the present and future databases. Further specimens are in the process of being added, following our project of studying the Chalcidoidea of the Maâmora forest.

This work in the NMHN–SI collection revealed the presence of 12 species of Chalcidoidea belonging to five families (table 1). Some of these samples have been deposited for more than century. The species names were often misspelled and, together with family names, descriptions were incorrect or outdated. Their spelling has now been corrected and updated and the nomenclature assigned to the species in the old collection has been revised and updated.

During this review, we found three specimens named *Chalcis flavipes* Panzer, *C. intermedia* Nees and *Brachymeria minuta* (Linnaeus). After examination, all three turned out to belong to a single species, *Brachymeria tibialis*, with *C. intermedia* being considered a junior synonym of *B. tibialis*. Concerning the encyrtid, it is an oophagous parasitoid that has been used for biological control of *Lymantria dispar* (Linnaeus) (Lepidoptera, Erebidae, Lymantriinae) since it was first introduced in Morocco in the 1920s (De Lépiney, 1927).

In summary, Leucospidae specimens of Morocco preserved at the NMNH–SI have now been correctly identified and labeled. Specimens of these species from the same period are also stored at NMNH, Paris, France (pers. obs.).

Megastigmidae is an updated family name and *Megastigmus stigmatizans* (Fabricius, 1798) is now named *Bootanomyia stigmatizans* (Fabricius, 1798). It is well identified as are the two Algerian species appearing in this collection represented by a Chalcididae and a Pteromalidace. All species (11), except *Norbanus guyoni* (Pteromalidae), have been mentioned from Morocco. Figure 5 illustrates the geographical distribution of the species examined during this study in North Africa: none have been recorded from Mauritania.
Table 1. Summary of the revision of Chalcidoidea from the NMNH–SI collection with the updated nomenclature and names of species and families as appearing of the labels of the collection.

| Species name                  | Family name                  | Updated                | In the collection | Updated                | In the collection |
|-------------------------------|------------------------------|------------------------|-------------------|------------------------|-------------------|
| Brachymeria tibialis (Walker, 1834) | Chalcis flavipes (Panzer, 1801) | Chalcididae Braconidae |                   |                        |                   |
| Brachymeria tibialis (Walker, 1834) | Chalcis intermedia (Nees, 1834) | Chalcididae Braconidae |                   |                        |                   |
| Brachymeria tibialis (Walker, 1834) | Brachymeria minuta (Linnaeus, 1767) | Chalcididae Braconidae |                   |                        |                   |
| Brachymeria minuta (Linnaeus, 1767) | Chalcis minuta (Linnaeus, 1767) | Chalcididae Braconidae |                   |                        |                   |
| Chalcis myrifex (Sulzer, 1876) | Smicra myrifex (Sulzer, 1876) | Chalcididae Braconidae |                   |                        |                   |
| Chirocera pectinicornis Latreille, 1809 | Chirocera pectinicornis Latreille, 1809 | Chalcididae Chalcididae |                   |                        |                   |
| Neochalcis fertoni (Kieffer, 1899) | Neochalcis barbara Benoist, 1921 | Chalcididae Braconidae |                   |                        |                   |
| Ooencyrtus kuvanae (Howard, 1910) | Schedius kuoanae Howard, 1910 | Encyrtidae Braconidae |                   |                        |                   |
| Leucospis brevicauda Fabricius, 1804 | Leucopis breicauda Fabricius, 1804 | Leucospidae Chalcididae |                   |                        |                   |
| Leucospis dorsigera Fabricius, 1775 | Leucopis dorsiaga Fabricius, 1775 | Leucospidae Chalcididae |                   |                        |                   |
| Leucospis miniata Klug, 1834 | Leucopis miniata Klug, 1834 | Leucospidae Chalcididae |                   |                        |                   |
| Bootanomyia stigmatizans (Fabricius, 1798) | Megastigmus stigmatys (Fabricius, 1798) | Megastigmidae Chalcididae |                   |                        |                   |
| Dibrachys microgastri (Bouché, 1834) | Dibraehys bouceanus (Ratzeburg, 1844) | Pteromalidae Chalcididae |                   |                        |                   |
| Norbanus guyoni (Giraud, 1899) | Arthrolypis guyoni (Giraud, 1870) | Pteromalidae Chalcididae |                   |                        |                   |
Fig. 5. Distribution map of the studied Chalcidoidea specimens deposited at the NMNH–SI.

Fig. 5. Mapa de distribución de los especímenes estudiados de Chalcidoidea conservados en el MNHN–SI.
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