



Research article

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New data on the occurrence and morphological abnormalities of aculeate wasps in Faro (Portugal) (Hymenoptera)

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Abstract

This paper reports 40 species of aculeate wasps collected at several localities in the Faro district, southern Portugal, during 2024. The material includes 13 species of Vespidae and 27 species of Spheciformes. Among them, two species of Eumeninae (Vespidae) and 16 species of Spheciformes are classified as scarce or rare in Portugal (Baldock et al. 2020; Cross et al. 2021), highlighting the faunistic importance of the study area. One species, *Ectemnius confinis* (Walker, 1871), is reported here for the first time from Portugal. Three specimens of *Euodynerus* (*Euodynerus*) *variegatus* (Fabricius, 1793) exhibited strong malformations of the mandibles, clypeus, and genae, tentatively referred to as “oplomerocephaly,” probably caused by parasitic nematodes. These abnormalities are discussed in the context of similar deformities known in other Hymenoptera.

Key words: Hymenoptera, aculeate wasps, Spheciformes, Vespidae, biodiversity, new records, Portugal.

Introduction

Aculeate wasps (Hymenoptera: Spheciformes, Vespidae, and others) constitute a diverse group of insects that includes both social and solitary species, playing important ecological roles as predators, pollinators (Gess & Gess 2014) and, in some cases, scavengers (Spradbery 1973). Eusocial species, such as those in the subfamilies Vespinae (hornets and yellowjackets) and Polistinae (paper wasps), exhibit complex colony structures with division of labor (Torres et al. 2009), while most solitary species, including many potter wasps and Spheciformes wasps, construct individual nests and provision their larvae with paralyzed prey, primarily Lepidoptera or Coleoptera larvae (Melo et al. 2011; Gess & Gess 2014). These solitary aculeates often nest in pre-existing cavities or build mud nests, and they play a key role in regulating insect populations in terrestrial ecosystems.

Studies on vespid wasps in Portugal are scarce and mostly limited to 19th- and 20th-century works by Saunders (1881), Dusmet (1921, 1932), and Diniz (1959–1989). The most recent summary by Baldock et al. (2020) presents a provisional list of records, both from literature

and from recent collections, of 279 species of vespiform wasps from Portugal. They note that there are remarkably few recent published records of Portuguese wasps.

Recent research on Spheciformes in Portugal has also been summarized by Cross et al. (2021), who provided a comprehensive list of 299 species based on both literature data and recent collections. Their work highlighted the scarcity of published studies on Portuguese wasps and emphasized the importance of recent collecting efforts, particularly in the Algarve region, which have considerably expanded the known fauna. Despite these advances, Cross et al. (2021) noted that additional recording is still needed, especially in central and northern Portugal.

The taxonomy and nomenclature used in the present paper follow Baldock et al. (2020) and Cross et al. (2021). For clarity in taxonomic treatment, Vespidae are listed at the subfamily level due to their well-resolved internal classification, whereas the former Crabronidae and Sphecidae are summarized under the term Spheciformes. Given the relatively limited number of recent records on the distribution of aculeate wasps in Portugal, this study contributes to a better understanding of their diversity and occurrence in the country.

Material and methods

Specimens of the genus *Oxybelus* Latreille, 1796 were collected under License No. 616/2024/CAPT issued by Conservação da Natureza e das Florestas (ICNF, Portugal) for the study of this genus. Sampling was conducted using an entomological net, a non-selective method that may result in the capture of additional taxa. Accordingly, specimens of other Crabronidae and Vespidae were also collected incidentally. The inclusion of these data is authorized by ICNF, although their collection was not covered by the original license.

Our material includes 42 specimens of Eumeninae (11 species), 2 specimens of Polistinae (1 species) and 3 specimens of Vespinae (1 species), 141 specimens of Spheciformes (27 species).

The material of digger wasps, including *Ectemnius confinis* (Walker, 1871), was identified using the keys in

Faune de France (Bitsch et al., 2020, 2021, 2022). The main diagnostic characters of *E. confinis* include, for males, a deeply emarginated sixth antennal segment, unmodified fore femur, extensively black hind femora, and weak punctuation on the metasomal tergites (especially tergite I), and for females, an unmodified fore femur with normal setae and weak punctuation on the metasomal tergites (especially tergite I) (Fig. 1).

The Eumeninae have been identified by Leopoldo Castro, while Spheciformes were identified by Christian Schmid-Egger, with the exception of *Astata* Latreille, 1796 and *Dryudella* Spinola, 1843 identified by Hans-Joachim Jacobs, and the genus *Sceliphron* Klug, 1801, identified by Piotr Olszewski.

The species are listed below in alphabetical order, with locality data provided first. The information on the distribution of the species in Portugal is mostly based on Bal-



Fig. 1. *Ectemnius confinis* (Walker, 1871): (A) female (Egypt); (B) male (Germany).

dock et al. (2020) and Cross et al. (2021). The details about the collecting locations, including latitude and longitude are mentioned in the species accounts. Coordinates for the type locality were determined via manual geolocation using Google Maps (<https://maps.google.com>; accessed 7 June 2025).

The images of the specimens were prepared using an M205C Leica stereomicroscope with an integrated high-resolution Leica DFC495 digital camera and associated software Leica Application Suite 4.4.0 (Leica Microsystems, Switzerland).

Results

Family Vespidae

Subfamily Eumeninae

Genus *Ancistrocerus* Wesmael, 1836

***Ancistrocerus gazella* (Panzer, 1798)**

Material examined. 1♀, Faro, 37.031747 N, 7.950918 W, 5 Jun 2024; 3♂♂, Faro, 37.015750 N, 7.915444 W, 6 Jun 2024. Collected on *Lantana camara* L. bushes and at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Baldock et al. 2020).

Genus *Antepipona* Saussure, 1855

***Antepipona deflenda* (Saunders, 1853)**

Material examined. 3♀♀, Faro, 37.031747 N, 7.950918 W, 5 and 8 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Central and southern Portugal, common (Baldock et al. 2020).

Genus *Eumenes* Latreille, 1802

***Eumenes coarctatus coarctatus* f. *barbatulus* Blüthgen, 1943**

Material examined. 1♂, Faro, 37.031747 N, 7.950918 W, 7 Jun 2024; 1♀ and 1♂, Faro, 37.015750 N, 7.915444 W, 6 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Unknown so far; probably common, as is the case in other parts of Iberia.

***Eumenes coarctatus coarctatus* f. *coarctatus* (Linnaeus, 1758)**

Material examined. 1♀ and 2♂♂, Faro, 37.031747 N, 7.950918 W, 5 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Baldock et al. 2020).

***Eumenes dubius dubius* Saussure, 1852**

Material examined. 1♀ and 1♂, Faro, 37.015750 N, 7.915444 W, 6 Jun 2024.

Collected on *Lantana camara* L. bushes.

Distribution in Portugal. Widespread, common (Baldock et al. 2020).

Genus *Euodynerus* Dalla Torre, 1904

***Euodynerus (Euodynerus) variegatus variegatus* (Fabricius, 1793)**

Material examined. 3♂♂, Faro, 37.015750 N, 7.915444 W, 6 Jun 2024; 3♀ and 9♂♂, Faro, 37.031747 N, 7.950918 W, 5 and 8 Jun 2024.

Collected on *Lantana camara* L. bushes and at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Baldock et al. 2020).

Remarks. Three of these specimens (1♀ and 2♂) are noteworthy because they show malformations affecting their mandibles, clypeus and genae (Figs 2, 3): both the mandibles and the clypeus have deep emarginations, the genae are thicker than usual and the clypeus is also somewhat wider than in normal specimens. Blüthgen (1958) described this kind of abnormality as “oplomerocephaly”. Oplomerocephaly is a developmental disorder characterized by deformation of the head capsule, often accompanied by alterations in the shape of the thoracic section of the body. Blüthgen (1966) associated this phenomenon with the activity of nematodes from the family Mermithidae (Nematoda). Oplomerocephaly occurs predominantly in males. Due to the symmetrical nature of the body modifications (e.g., evenly deep incisions in the clypeus), this condition has led to the erroneous designation of new species. For instance, a deformed *Ancistrocerus parietinus* Linnaeus, 1761 was mistakenly described as *Odynerus (Ancistrocerus) thuringiacus* Blüthgen, 1937, while *Ancistrocerus nigricornis* (Curtis, 1826) was misidentified as *Odynerus excisus* Thomson, 1870. In addition to these species, this anomaly has also been recorded in *Ancistrocerus oviventris* (Wesmael, 1836), *Euodynerus dantici* (Rossi, 1790), *Euodynerus notatus* (Jurine, 1807), *Euodynerus posticus* (Herrich-Schaeffer, 1841), *Euodynerus variegatus* (Fabricius, 1793), and *Alastor mocsaryi* (André, 1884) (cited as *Alastor biegelebeni* Giordani Soika, 1942) (Blüthgen 1944, 1966).

Genus *Eustenancistrocerus* Blüthgen, 1938

***Eustenancistrocerus (Parastenancistrocerus) amadanensis amadanensis* (Saussure, 1855)**

Material examined. 2♀♀, Faro, 37.031747 N, 7.950918 W, 5 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Central and southern Portugal (Baldock et al. 2020).

Genus *Leptochilus* Saussure, 1853

***Leptochilus (Euleptochilus) duplicatus duplicatus* (Klug in Walzl et al., 1835)**

Material examined. 2♀♀, Faro, 37.031747 N, 7.950918 W, 4-5 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Central and southern Portugal, common (Baldock et al. 2020).

Leptochilus (Neoleptochilus) regulus (Saussure, 1855)

Material examined. 1♂, Faro, 37.031747 N, 7.950918 W, 5 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Central and southern Portugal (Baldock et al. 2020)

Genus *Rhynchium* Spinola, 1806

Rhynchium oculatum oculatum f. oculatum (Fabricius, 1781)

Material examined. 2♂♂, Faro, 37.015750 N, 7.915444 W, 6 Jun 2024.

Collected on *Lantana camara* L. bushes.

Distribution in Portugal. Southern Portugal, scarce (Baldock et al. 2020).

Genus *Stenodynerus* Saussure, 1863

Stenodynerus fastidiosissimus (Saussure, 1855)

Material examined. 1♀ and 1♂, Faro, 37.031747 N, 7.950918W, 5 Jun 2024;

1♂, Faro, 37.015750 N, 7.915444 W, 6 Jun 2024,.

Collected on *Lantana camara* L. bushes and at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Baldock et al. 2020).

Genus *Tropidodynerus* Blüthgen, 1939

Tropidodynerus (Tropidodynerus) fertoni (Dusmet, 1925)

Material examined. 2♀♀, Faro, 37.015750 N, 7.915444 W, 6 Jun 2024.

Collected on *Lantana camara* L. bushes

Distribution in Portugal. Central and southern Portugal, scarce (Baldock et al. 2020).

Subfamily Polistinae

Genus *Polistes* Latreille, 1802

Polistes (Polistes) gallicus (Linnaeus, 1767)

Material examined. 2♀♀, Faro, 37.031747 N, 7.950918 W, 5 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Baldock et al. 2020).

Subfamily Vespinae

Genus *Vespula* Thomson, 1869

Vespula germanica (Fabricius, 1793)

Material examined. 2♀♀ and 1♂, Faro, 37.031747 N, 7.950918 W, 8 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Baldock et al. 2020).

Spheciformes

Genus *Astata* Latreille, 1796

Astata boops (Schrank, 1781)

Material examined. 1♀, Faro, 37.031747 N, 7.950918 W, 9 Jun 2024.

Collected on roadside herbaceous vegetation.

Distribution in Portugal. Widespread but locally scarce (Cross et al. 2021).

Astata costae A. Costa, 1867

Material examined. 1♀ and 2♂♂, Faro, 37.031747 N, 7.950918 W, 6-8 Jun 2024.

Collected on roadside herbaceous vegetation.

Distribution in Portugal. Widespread but locally scarce (Cross et al. 2021).

Astata cobosi Giner Marí, 1946

Material examined. 5♂♂, Faro, 37.031747 N, 7.950918 W, 4, 6, 8 and 9 Jun 2024.

Collected on roadside herbaceous vegetation.

Distribution in Portugal. Widespread but locally scarce (Cross et al. 2021).

Astata apostata Mercet, 1910

Material examined. 3♂♂, Faro, 37.031747 N, 7.950918 W, 5 and 9 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Scarce (Cross et al. 2021).

Genus *Bembix* Fabricius, 1775

Bembix oculata (Panzer, 1801)

Material examined. 3♀♀ and 1♂, Faro, 37.031747 N, 7.950918 W, 5-6 and 8 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Cross et al. 2021).

Bembix sinuata Panzer, 1804

Material examined. 2♀♀ and 4♂♂, Faro, 37.031747 N, 7.950918 W, 5 and 7-8 Jun 2024. Collected at roadside herbaceous plants.

Distribution in Portugal. Scarce (Cross et al. 2021).

Genus *Cerceris* Latreille, 1802

Cerceris sabulosa (Panzer, 1799)

Material examined. 7♀♀ and 3♂♂, Faro, 37.031747 N, 7.950918 W, 4, 6-7, 9 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Cross et al. 2021).

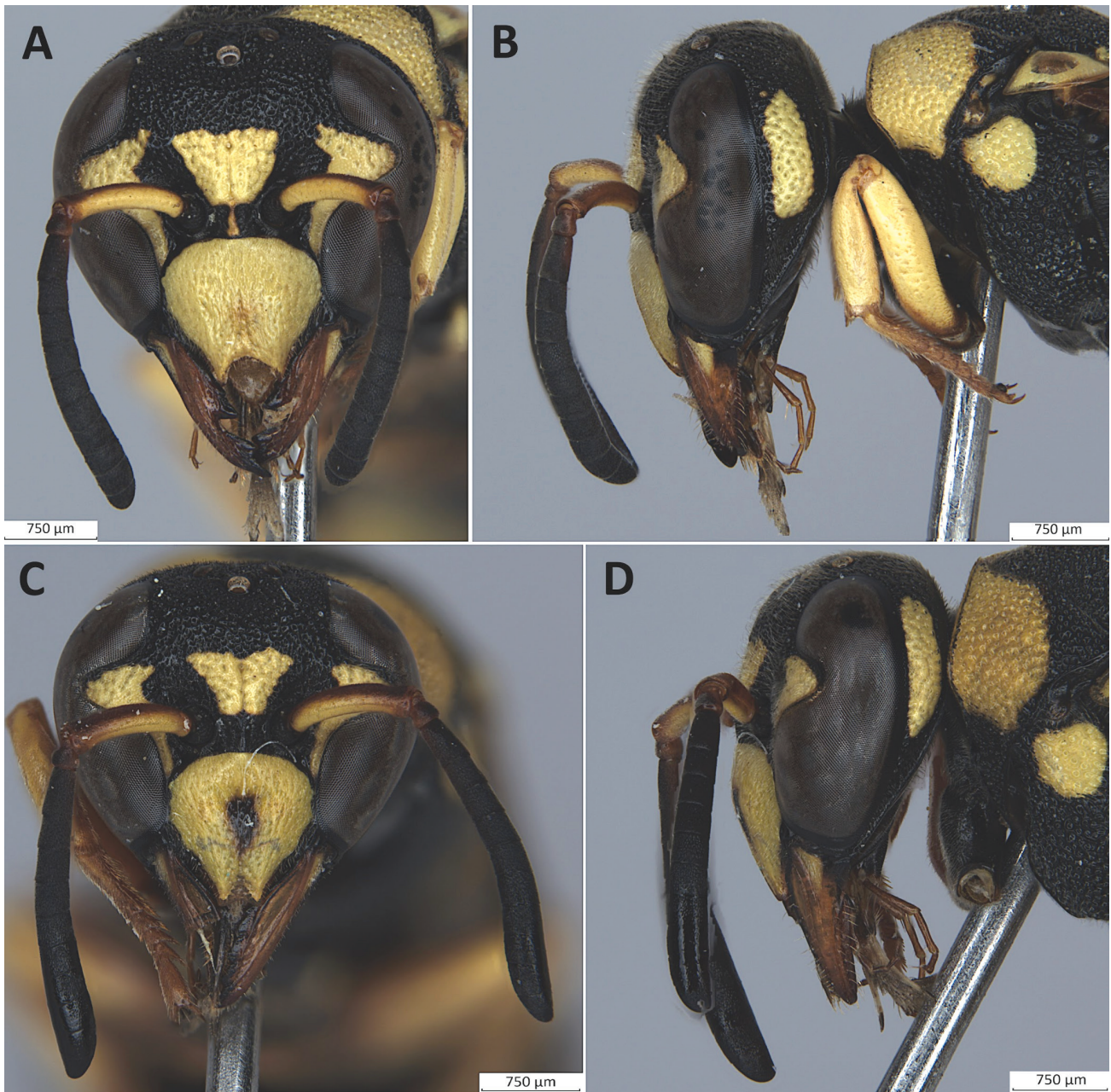


Fig. 2. *Euodynerus (Euodynerus) variegatus variegatus* (Fabricius, 1793) females: (A) deformed (oplomerocephalic) head in frontal view; (B) deformed head in lateral view; (C) normal head in frontal view; (D) normal head in lateral view.

Genus *Diodontus* Curtis, 1834

***Diodontus insidiosus* Spooner, 1938**

Material examined. 8♀♀, Faro, 37.031747 N, 7.950918 W, 4, 6-7 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Widespread, frequent (Cross et al. 2021).

Genus *Dryudella* Spinola, 1843

***Dryudella tricolor* (Vander Linden, 1829)**

Material examined. 6♂♂, Faro, 37.031747 N, 7.950918 W, 4-5 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Scarce (Cross et al. 2021).

Genus *Ectemnius* Dahlbom, 1845

***Ectemnius confinis* (Walker, 1871)**

(Fig. 1)

Material examined. 1♂, Faro, 37.015750 N, 7.915444 W, 7 Jun 2024.

Collected on *Lantana camara* L. bushes.

Distribution in Portugal. First record from Portugal.

***Ectemnius continuus* (Fabricius, 1804)**

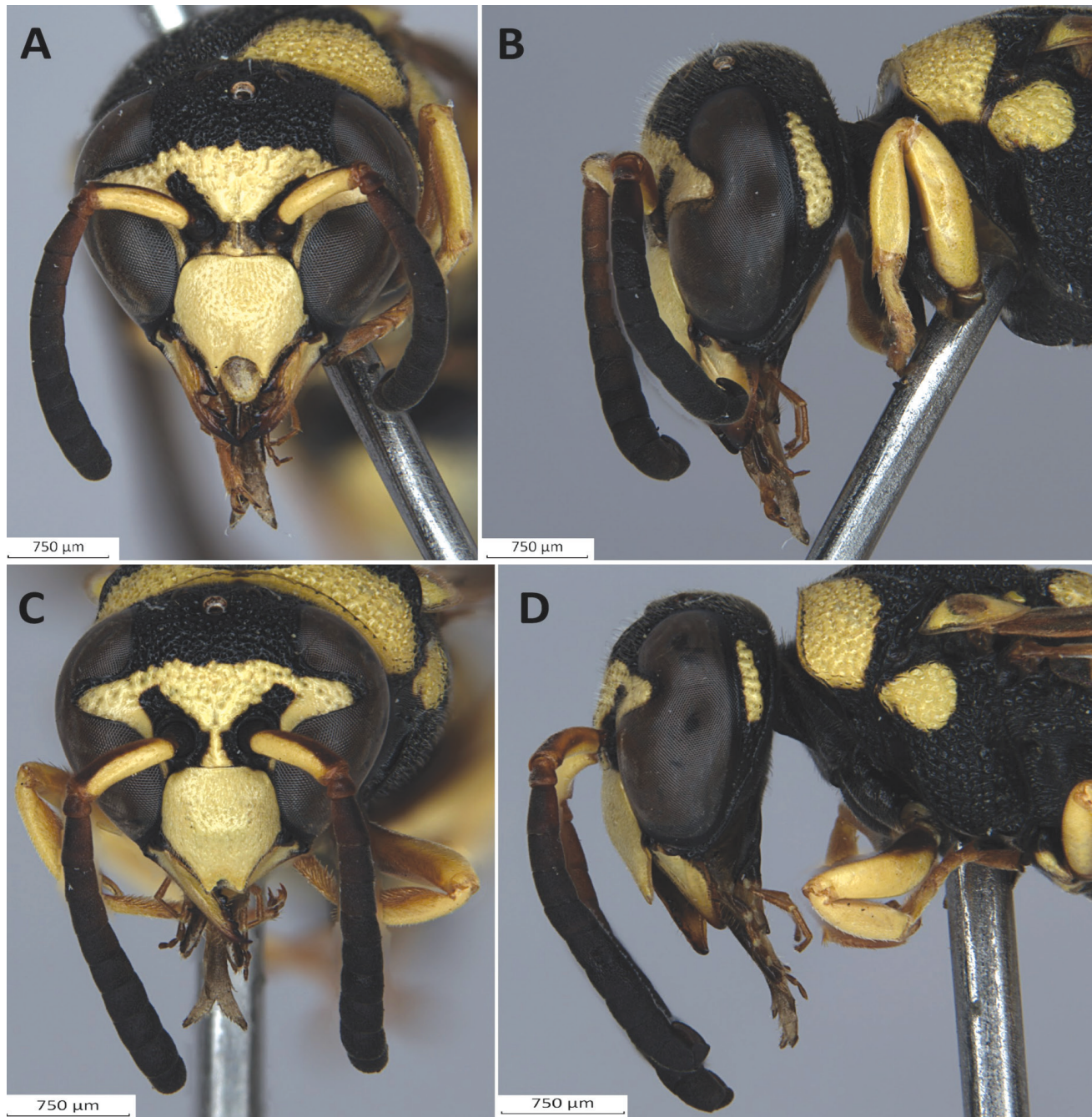


Fig. 3. *Euodynerus (Euodynerus) variegatus variegatus* (Fabricius, 1793) males: (A) deformed (oplomerocephalic) head in frontal view; (B) deformed head in lateral view; (C) normal head in frontal view; (D) normal head in lateral view.

Material examined. 9♀♀ and 12♂♂, Faro, 37.015750 N, 7.915444 W, 8-9 Jun 2024.

Collected on *Lantana camara* L. bushes.

Distribution in Portugal. Widespread, frequent (Cross et al. 2021).

Genus *Gorytes* Latreille, 1805

***Gorytes sulcifrons* (A. Costa, 1867)**

Material examined. 1♂, Faro, 37.015750 N, 7.915444 W, 6 Jun 2024.

Collected on *Lantana camara* L. bushes.

Distribution in Portugal. Widespread, common (Cross et al. 2021).

Genus *Lindenius* Lepeletier & Brulle, 1835

***Lindenius ibericus* (Kohl, 1905)**

Material examined. 1♂, Faro, 8 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Widespread, scarce (Cross et al. 2021).

***Lindenius mesopleuralis* (F.Morawitz, 1890)**

Material examined. 1♀, Faro, 8 Jun 2024, 37.031747 N, 7.950918 W.

Collected at roadside herbaceous plants.

Distribution in Portugal. Rare (Cross et al. 2021).

Genus *Miscophus* Jurine, 1807

***Miscophus merceti* de Andrade, 1952**

Material examined. 11♀♀ and 2♂♂, Faro, 37.031747 N, 7.950918 W, 5-8 Jun 2024. Collected at roadside herbaceous plants.

Distribution in Portugal. Rare (Cross et al. 2021).

Genus *Oxybelus* Latreille, 1797

***Oxybelus haemorrhoidalis* Olivier, 1812**

Material examined. 6♂♂, Faro, 37.031747 N, 7.950918 W, 6-7 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Frequent (Cross et al. 2021).

***Oxybelus quatuordecimnotatus* Jurine, 1807**

Material examined. 6♂♂, Faro, 37.031747 N, 7.950918 W, 4-6 and 8 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Frequent (Cross et al. 2021).

***Oxybelus subspinosus* Klug, 1835**

Material examined. 1♀ and 4♂♂, Faro, 37.031747 N, 7.950918 W, 5 and 8 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Rare (Cross et al. 2021).

Genus *Philanthus* Fabricius, 1790

***Philanthus pulchellus* Spinola, 1843**

Material examined. 1♀, Faro, 37.031747 N, 7.950918 W, 4 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Common (Cross et al. 2021).

Genus *Podalonia* Fernald, 1927

***Podalonia tydei* (Le Guillou, 1841)**

Material examined. 2♂♂, Faro, 37.031747 N, 7.950918 W, 9 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Widespread, common (Cross et al. 2021).

Genus *Prosopigastra* A. Costa, 1867

***Prosopigastra punctatissima* A.Costa, 1867**

Material examined. 2♂♂, Faro, 37.031747 N, 7.950918 W, 7-8 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Scarce (Cross et al. 2021).

***Prosopigastra zalinda* de Beaumont, 1955**

Material examined. 2♀♀ and 1♂, Faro 37.031747 N, 7.950918 W, 7-8 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Rare (Cross et al. 2021).

Genus *Sceliphron* Klug, 1801

***Sceliphron caementarium* (Drury, 1773)**

Material examined. 2♀♀ and 8♂♂, Faro, 37.031747 N, 7.950918 W, 5 and 7-9 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Scarce (Cross et al. 2021).

***Sceliphron destillatorium* (Illiger, 1807)**

Material examined. 1♂, Faro, 37.031747 N, 7.950918 W, 9 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Frequent (Cross et al. 2021).

***Sceliphron madraspatanum tubifex* (Latreille, 1809)**

Material examined. 4♂♂, Faro, 37.031747 N, 7.950918 W, 9 Jun 2024.

Collected at roadside herbaceous plants.

Distribution in Portugal. Scarce (Cross et al. 2021).

Genus *Trypoxylon* Latreille, 1796

***Trypoxylon attenuatum* Smith, 1851**

Material examined. 12♀♀, Faro, 37.015750 N, 7.915444 W, 5-6 Jun 2024.

Collected on *Lantana camara* L. bushes.

Distribution in Portugal. Widespread, scarce (Cross et al. 2021).

***Trypoxylon scutatum* Chevrier, 1867**

Material examined. 1♀, Faro, 37.015750 N, 7.915444 W, 5 Jun 2024.

Collected on *Lantana camara* L. bushes.

Distribution in Portugal. Widespread, scarce (Cross et al. 2021).

Discussion

The present material represents a noteworthy contribution to the knowledge of the Vespidae fauna of southern Portugal, particularly in the Faro district. All the species recorded during this short survey are already known from the country and most are generally considered widespread or common (Baldock et al. 2020), with the exception of *Rhynchium oculatum* and *Tropidodynerus fertoni*, both of which are regarded as scarce and have more localized distributions.

The majority of specimens were collected from flowering herbaceous vegetation and *Lantana camara* shrubs along roadsides. This highlights the importance of disturbed, ruderal habitats as foraging sites for adult solitary wasps. The dominance of eumenine wasps (subfamily

Eumeninae) in the material, particularly species of *Euodynerus*, *Eumenes*, and *Ancistrocerus*, is consistent with their known flower-visiting behavior and general ecological flexibility.

One particularly remarkable observation concerns morphological malformations recorded in *Euodynerus variegatus*, including deformations of the mandibles, clypeus, and genae, a condition described by Blüthgen (1958, 1966) as “oplomerocephaly.” These abnormalities, found in three specimens (1♀ and 2♂♂), are likely induced by parasitic nematodes (Mermithidae), as stated above. Such findings emphasize the potential of even small-scale sampling to reveal biologically significant anomalies and reinforce the importance of carefully examining morphological variation in field-collected specimens.

Such environments are often associated with increased environmental stress, including pollution, habitat fragmentation and altered ecological interactions (McIntyre 2000). Entomopathogenic nematodes and other insect parasites commonly interact with their hosts in ways that can disrupt normal development (Poinar 1979; Hajek 2004).

The presence of multiple color forms (*formae*) within species, such as *Eumenes coarctatus coarctatus*, demonstrates intraspecific variation that may warrant further morphological and molecular investigation (see, for example, the comments on *E. coarctatus* in van Achterberg et al. 2023). In addition, the identification of relatively poorly known or underreported taxa, such as *Eustenancistrocerus amadanensis* and *Leptochilus regulus*, underscores the need for continued surveys in the region.

Finally, the incidental collection of social wasps (*Polistes gallicus* and *Vespula germanica*) complements the solitary taxa and reflects the diversity of the Vespidae assemblage in anthropogenically influenced habitats in southern Portugal.

The Spheciformes wasps constitute 27 species documented during the survey. A considerable number of these taxa are regarded as scarce or rare in Portugal, including 16 species (Cross et al. 2021). This highlights the high faunistic value of the surveyed sites, despite their largely anthropogenically disturbed character. The discovery of *Ectemnius confinis* as new to the Portuguese fauna emphasizes the still incomplete knowledge of Spheciformes wasps in southern Portugal. Most specimens were collected on flowering roadside vegetation, indicating that ruderal habitats provide important foraging resources for these predominantly predatory wasps. The frequent occurrence of genera such as *Astata*, *Oxybelus*, *Trypoxylon*, and *Sceliphron* reflects their ecological versatility and ability to exploit fragmented, human-modified landscapes. These findings support growing evidence that semi-natural and disturbed habitats can play a crucial role in conserving aculeate wasp diversity in Mediterranean ecosystems.

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