



Research article

urn:lsid:zoobank.org:pub:D187046C-F9C9-4FB9-8192-A80D06CD0E47

Revision of the tribe Pogonini (Coleoptera, Carabidae, Trechinae) from the Ibero-Balearic region

José MUÑOZ-SANTIAGO ^{1,*} & Vicente M. ORTUÑO ²

^{1,2}Research Team on Soil Biology and Subterranean Ecosystems, Department of Life Sciences,
Faculty of Sciences, University of Alcalá (UAH), A.P. 20, Campus Universitario,
E-28805, Alcalá de Henares, Madrid, Spain.

* Corresponding author: jose_munoz.s@hotmail.com

² Email: vicente.ortuno@uah.es

¹ urn:lsid:zoobank.org:author:1025DDEB-ADDC-46EB-8527-353DCC89A5C1

² urn:lsid:zoobank.org:author:37C97660-C26E-439B-B582-5DAC0F293B8C

Abstract. In the Iberian Peninsula and the Balearic Islands, Pogonini (Coleoptera, Carabidae) is the least species-rich tribe of Trechinae. Nevertheless, the taxon is relatively poorly studied in this territory, and the available records are mostly published in old and/or faunistic works. The present study provides a taxonomic revision of the 3 genera and 11 species of Pogonini occurring in the Ibero-Balearic region, with an identification key, diagnoses and illustrations of their external morphology and aedeagus. The chorology of the species was also studied, and was assessed by obtaining precise records from published papers and the collection localities of the examined material. These data were used to make updated distribution maps (with several new occurrence points) that reveal a strong regionalization of the tribe in the Ibero-Balearic territory. The species occur in humid and saline environments, especially along the meridional and Mediterranean coasts of the Iberian Peninsula and in inner arid localities of eastern Spain. This result agrees with the widely accepted halobiont condition of the group. However, sampling bias must be considered, and new records are expected to be provided from future revisions of collections and new samplings.

Keywords. *Pogonus*, *Pogonistes*, *Sirdenus*, distribution, diagnoses, halobiont, key.

Muñoz-Santiago J. & Ortuño V.M. 2022. Revision of the tribe Pogonini (Coleoptera, Carabidae, Trechinae) from the Ibero-Balearic region. *European Journal of Taxonomy* 846: 75–109. <https://doi.org/10.5852/ejt.2022.846.1967>

Introduction

Trechinae Bonelli, 1810 (Coleoptera, Carabidae) is the most species-rich subfamily of ground beetles in the Iberian Peninsula and Balearic Islands, with 5 tribes and nearly 450 species currently recognised (Serrano 2020). Of these tribes, Pogonini Laporte, 1834 is the least diverse, with only 12 species (none of which is endemic) listed for the entire Ibero-Balearic region.

Pogonini is a worldwide tribe that currently includes more than 80 described species, of which 60 are found in the Palaearctic Region (Bousquet 2012, 2017). The taxon was established by Laporte (1834), and its internal taxonomy and systematics were principally developed by French authors (Chaudoir 1872; Carret 1903). In the Iberian Peninsula and the Balearic Islands, Pogonini is represented by 3 genera: *Pogonus* Dejean, 1821 (8 spp.); *Pogonistes* Chaudoir, 1872 (2 spp.) and *Sirdenus* Dejean, 1828 (1 sp. confirmed, and 1 sp. doubtful). The first key to Iberian Pogonini (together with many other groups) was published by Fuente (1927), but he considered species that are now synonyms, or are not Ibero-Balearic representatives, such as *Pogonus iridipennis* Nicolai, 1822 and *Pogonus reticulatus* Schaum, 1857. Other relevant and useful works for the recognition of the Ibero-Balearic Pogonini include the later studies of French and Moroccan ground beetles published, respectively, by Jeannel (1941) and Antoine (1961), as they include some taxa also present in the Iberian Peninsula and Balearic Islands.

Since these publications, and apart from faunistic works (Vives & Vives 1976, 1978a, 1999; Baehr 1986; Ortiz *et al.* 1989; Serrano *et al.* 1990; Vives 1998; among others), no further relevant contributions to the knowledge of the group in the Ibero-Balearic region have been made. On the contrary, more diverse Trechinae tribes in the territory have been widely studied in the last decades (for Anillini Jeannel, 1937, see Zaballos & Banda 2001; Ortuño & Sendra 2010, 2011; Ortuño & Gilgado 2011; Serrano & Aguiar 2014; Pérez-González *et al.* 2017; Pérez-González & Zaballos 2019; among others; for Bembidiini Stephens, 1827, see Ortuño & Toribio 2005; for Trechini Bonelli, 1810, see Faille *et al.* 2011; Ortuño & Jiménez-Valverde 2011; Ortuño & Barranco 2015; Ortuño *et al.* 2017; among others). Meanwhile, studies and revisions of Pogonini fauna have been published from the New Word (Bousquet & Laplante 1997), Korea (Choi *et al.* 2015) and Iran (Azadbakhsh 2019).

The aim of the present work is to provide a revision of the tribe Pogonini in the Iberian Peninsula and Balearic Islands. A key to the taxa from this territory is included, together with diagnoses and redescriptions. In addition to the taxonomic information, the species chorology was studied, and precise distribution maps in the study area, with several new occurrence points, are included for all of them. The implications of the updated chorology are discussed, and comments on the species biology are also provided. The present revision is expected to be a useful tool for future research, including applied works.

Material and methods

Criteria of the work

The taxonomic classification and nomenclature here presented (including the synonymy for all taxa) are those proposed by Bousquet (2017) in the last version of the Catalogue of Palaearctic Coleoptera (Löbl & Löbl 2017). For this reason, the subgenus *Raptor* Lutshnik, 1927 is treated as synonymous of *Pogonus*, although it is considered valid in the last Catalogue of Iberian Carabidae (Serrano 2020).

When a genus or subgenus is represented by only one species in the study area, a unique diagnoses and redescription is provided both for the supra-specific and specific taxa.

The species *Sirdenus filiformis* (Dejean, 1828) is not included in this study, although its presence in the Ibero-Balearic region had been suggested, with a need for confirmation, in several Iberian catalogues of the family Carabidae (Zaballos & Jeanne 1994; Serrano 2003, 2013, 2020). While it is well-known in other Mediterranean regions (Aliquò & Castelli 1991; Vigna Taglianti & Bonavita 1994; Vigna Taglianti & Fattorini 2002), *S. filiformis* has not been observed or collected in the Iberian Peninsula since it was listed from the territory, with no precise details, by Fuente (1927). Thus, we decided not to recognise *S. filiformis* as an Ibero-Balearic representative of the tribe Pogonini.

Identification key

A key to the imagoes of the Ibero-Balearic Pogonini is provided. It is based on personal observations on the examined material combined with the information contained in the keys published by Reitter (1923), Fuente (1927), Jeannel (1941) and Trautner & Geigenmüller (1987).

Taxonomic study

Diagnoses of the imaginal external morphology and the male genitalia are presented for the studied taxa, together with the habitus in dorsal view and illustrations of the median lobe of all species. The information provided for the higher taxonomic categories is not repeated in the lower ones, unless necessary. Although the study of Ibero-Balearic samples was always preferred, when there was no available material from this territory the work was completed with samples from other regions of Europe.

The external morphology and the male genitalia were studied, respectively, with a NIKON SMZ 1000 stereo microscope and a LEICA DM 2500 LED microscope, both equipped with a drawing tube. For the study of the aedeagus, the median lobe was prepared in left lateral view, and the parameres were prepared in lateral external view, both on a transparent acetate strip using the water-soluble resin dimethyl hydantoin formaldehyde (DMHF). In some cases, the inner sclerotised parts of the median lobe were made visible after a treatment of this structure with lactic acid. The internal sac of the median lobe was studied in resting state in all cases.

The study of Pogonini larvae is out of the scope of the present work. We just indicate that the most complete descriptive study of Pogonini larvae to date has been provided by Grebennikov & Bousquet (1999).

Chorology

Comments about the world distribution are included for all taxa. The distribution of Ibero-Balearic species was assessed by obtaining precise records from published papers and the examined material. Updated distribution maps were then prepared for all species using QGIS (Quantum Gis Development Team 2018). Occurrence points included in the maps correspond to the UTM 10 × 10 coordinates system. If the UTM coordinates were not provided by the examined bibliography or the collection labels, Google Earth (2015) was used to obtain them.

References of works containing precise records of the species are listed at the end of the results section dedicated for each one of them. Ambiguous and imprecise records are not included in the distribution maps, as it was not possible to associate them with a unique UTM. However, these data are discussed.

Material examined

A total of 768 samples was examined. The material list of each species is indicated before their diagnoses. The institutions and private collections where the material is deposited are referred with the following acronyms:

JMS	=	José Muñoz-Santiago, Alcalá de Henares, Madrid, Spain
MNCN	=	Museo Nacional de Ciencias Naturales, Madrid, Spain
PN	=	Paolo Neri, Forlì, Italy
VMO	=	Vicente M. Ortuño, UAH, Alcalá de Henares, Madrid, Spain
WAM	=	Werner A. Marggi, Bern, Switzerland

Results

Checklist of Ibero-Balearic Pogonini

Genus *Sirdenus* Dejean, 1828

Subgenus *Syrdenopsis* Lutshnik 1933

Sirdenus (*Syrdenopsis*) *grayii* (Wollaston, 1862)

Genus *Pogonistes* Chaudoir, 1872

Pogonistes gracilis (Dejean, 1828)

Pogonistes testaceus testaceus (Dejean, 1828)

Genus *Pogonus* Dejean, 1821

Subgenus *Pogonoidius* Carret, 1903

Pogonus (*Pogonoidius*) *meridionalis* Dejean, 1828

Subgenus *Pogonus* Dejean, 1821

Pogonus (*Pogonus*) *chalceus viridanus* Dejean, 1828

Pogonus (*Pogonus*) *gilvipes* Dejean, 1828

Pogonus (*Pogonus*) *littoralis* (Duftschmid, 1812)

Pogonus (*Pogonus*) *luridipennis* (Germar, 1822)

Pogonus (*Pogonus*) *pallidipennis* Dejean, 1828

Pogonus (*Pogonus*) *riparius* Dejean, 1828

Pogonus (*Pogonus*) *smaragdinus* Walzl, 1835

Class Insecta Linnaeus, 1758

Order Coleoptera Linnaeus, 1758

Family Carabidae Latreille, 1802

Subfamily Trechinae Bonelli, 1810

Tribe **Pogonini** Laporte, 1834

Diagnoses

Imagoes of Pogonini can be differentiated from the rest of Trechinae by the following characters: umbilical series complete, formed by approximately 12 setae disposed from the humeri to the apical region. Basal elytra border complete. Last labial and maxillary palpomeres fusiform. Tarsi glabrous and with a longitudinal dorsal sulcus.

Description

Length between 4.0 and 8.0 mm from the anterior margin of the labrum to the apex of the elytra. Tegument glabrous; metallic in most species, although in some it is totally or partially depigmented. Microsculpture polygonal. Head with eyes protruding, medium- or large-sized and in general convex. Neck absent or poorly marked. Front wide, with two supraocular sulci more or less long and deep depending on the genus (very poorly marked in *Sirdenus grayii*). Two supraocular setae. Antennae long and filiform, pilose from the anterior half of the second antennomere; last antennomeres slightly wider than the first ones. A pair of clypeal setae; 6 dorsal setae in the anterior margin of the labrum (the external ones are longer than the inner ones). Mandibles with a small and thin seta inserted in the mandibular sulcus. Last labial and maxillary palpomeres fusiform, with small setae (except in the apical ones). Ligula with a pair of setae. Labium not fused with the prebasilar, with a central and conspicuous bifid-tooth provided with a pair of fine setae in the base. Pronotum clearly wider than the head (except in *S. grayii*), convex and of variable morphology: cordiform or sub-cordiform and more or less transverse; the lateral sinuosity and the posterior narrowing are more marked in some species

than in others. Hind and posterior angles of the pronotum in general protruding; the lateral sulcus is narrow, slightly more explanate in some species. The pronotum has two pairs of setae, one inserted at its widest region and another inserted near the hind angles. Basal foveae in general large and limited by a carinula which presents different grades of development between the species (absent in *S. grayii*). Base of pronotum depressed, punctured (punctuation is more marked in some species than in others) and almost rectilinear, always coincident to the basal elytra border. Elytra, in general, convex and parallel or sub-parallel. Shoulders not or hardly protruding; functional wings. Basal and lateral elytra border complete. Scutellum present. 8th elytral striae punctured and well-marked until the apical region, where they are frequently very tenuous or obliterated; punctuation more or less deep depending on the species. Basal striole punctured, present between the elytral suture and the first stria. Umbilical series complete from the humeral to the apical region, formed by approximately 12 setae; the first 3–4 setae are inserted in the lateral sulcus while the rest are inserted along the 8th stria. The 1st stria presents a setigerous pore in its base. Up to 5 setigerous pores disposed along the 3rd stria in all species (commonly 3); setigerous pores present also in the 5th and/or 7th striae in *Pogonus* (*Pogonoidius*) *meridionalis*. Fine preapical setae present at the end of the 2nd and 5th striae. Legs, in general, slender; of a different colour from the body in some cases. Tarsus with a longitudinal dorsal sulcus; protarsus of the males with the first and second tarsomeres dilated, pilose and provided with adhesive phanerae. Prosternum glabrous in *Pogonus* and *Pogonoidius*, pilose in *Sirdenus*. Metepimerum visible. Last abdominal sternite with 2 setigerous pores in the males and 4 in the females. Aedeagus with median lobe asymmetrical, and the basal orifice located on its right side. Form and length of the median lobe variable between species, with the apex, in general, rounded and directed down. The internal sac of the median lobe is covered by small squamae, visible under the microscope; in the resting state it is possible to observe folds and sclerotised pieces which are variable on its form and extension between the species and groups. Left and right parameres unequal, both of them with at least one seta inserted in the distal region (the number could vary between individuals and species). Left paramere well-developed, with a triangular or sub-triangular form. Right paramere reduced, narrow and more or less elongated; in some cases, it is elbowed or curved.

Distribution

The tribe Pogonini has a worldwide distribution; it is present in all zoogeographical regions, with the main diversity of species in the Palearctic (Grebennikov & Bousquet 1999; Choi *et al.* 2015; Bousquet 2017).

Remarks

The tribe Pogonini is a very well supported monophyletic group within the subfamily Trechinae, closely related to Tachyini Motschulsky, 1862, Bembidiini, Anillini and other tribes than with Trechini (Maddison & Ober 2011; Maddison 2012; Maddison *et al.* 2019). The species of Pogonini show, in general, predaceous, thermophilous and diurnal behaviours (Rueda & Montes 1987), although it is also possible to find them developing a sublapidicolous life (Mateu 1947). Detailed phenology and larval instars are unknown for most Pogonini (Matalin & Makarov 2008), but some data are available for a small number of species (Jeannel 1941; see Grebennikov & Bousquet 1999).

Maybe the best-documented feature of the species of Pogonini is their strict relationship with saline environments. This trait, combined with the extended hygrophilous character of all Trechinae (Ortuño & Toribio 2005: 17–18), implies that the most common habitats of Pogonini are the coastal regions, salt marshes and saline continental waters. For this reason, pogonines have been widely considered as halobiont elements (Bousquet & Laplante 1997). It was suggested that this specialised lifestyle derived from the basal hygrophilous condition of the subfamily, and it was originated as a response to intense interspecific competition with other riparian relatives (Rueda & Montes 1987). The results of breeding Pogonini species in laboratory obtained by Grebennikov & Bousquet (1999) suggested that the halobiont condition of these ground beetles is shared both for the pre-imaginal and the imaginal stages.

With respect to the study area, although the term “halobiont” has been applied with different criteria by Iberian entomologists (Vives & Vives 1978a; Ortiz *et al.* 1989), a high grade of specialization and adaptation to the life in saline habitats (sometimes extreme saline) have been recognised for the local species (Vives & Vives 1981, 1986; Rueda & Montes 1987; Serrano *et al.* 1990; Novoa *et al.* 1998; Andújar *et al.* 2001, 2002; Pardo *et al.* 2008; among others).

Key to Ibero-Balearic Pogonini

1. Pronotum more or less transverse, always clearly wider than the head 2
 - Pronotum longitudinal, as wide as or barely wider than the head. Tegument partially depigmented; elytra parallel and almost cylindrical body. Small species, 4.0–5.0 mm *Sirdenus* Dejean, 1828: *Sirdenus (Syrdenopsis) grayii* Wollaston, 1862
2. Supraocular sulcus deep and long, surpassing the level of the anterior supraocular seta and ending close to the posterior supraocular seta. 8th and 9th interstriae of the same width *Pogonus* Dejean, 1821
 - Supraocular sulcus little deep and short, ending at the level of the anterior supraocular seta or barely surpassing it. 9th interstriae wider than the 8th *Pogonistes* Chaudoir, 1872

Genus *Pogonistes* Chaudoir, 1872

1. Pronotum sub-cordiform, scarcely narrowed in its posterior region (smooth sinuosity). Anterior angles of the pronotum glabrous. Larger size (5.5–6.0 mm). Tegument testaceous *Pogonistes testaceus testaceus* (Dejean, 1828)
- Pronotum cordiform, clearly narrowed in its posterior region (marked sinuosity). Anterior angles of the pronotum with 1–3 short and fine setae. Smaller size (4.0–5.0 mm). Tegument brown with bronze sheen *Pogonistes gracilis* (Dejean, 1828)

Genus *Pogonus* Dejean, 1821

1. Variable number of setigerous pores present only in the 3rd interstria. Anterior angles of the pronotum glabrous subgen. *Pogonus* Dejean, 1821
- Setigerous pores present in the 5th, 7th interstriae, or both, in addition to the ones present in the 3rd interstria. Anterior angles of the pronotum provided with small setae. Pronotum wide and convex, with a short lateral sinuosity and the base clearly wider than the anterior margin. Length: 5.5–7.0 mm subgen. *Pogonoidius* Carret, 1903: *Pogonus (Pogonoidius) meridionalis* Dejean, 1828

Subgenus *Pogonus* Dejean, 1821

1. Body coloration uniform: head, pronotum and elytra concolorous 2
 - Body bicolored: head and pronotum metallic green, elytra orange-testaceous (similar to the appendices) 6
2. 3rd interstria with fewer than 5 setigerous pores 3
 - 3rd interstria with 5 setigerous pores. Tegument dark brown, with bronze sheen. Pronotum cordiform, transverse or sub-transverse. Length: 5.5–6.0 mm *Pogonus (Pogonus) gilvipes* Dejean, 1828
3. Pronotum almost quadrangular, with the posterior region weakly narrowed and the base markedly wider than the anterior margin. Length: 6.0–8.0 mm *Pogonus (Pogonus) riparius* Dejean, 1828
 - Pronotum cordiform, with the posterior region clearly narrowed and the base barely wider than the anterior margin 4

4. Tegument bluish green or emerald. Legs yellowish, paler. Pronotal disc smooth, very shiny. Length: 6.5–8.0 mm *Pogonus (Pogonus) smaragdinus* Waltl, 1835
 - Tegument darker, in general bronze. Legs testaceous or brown, darker. Pronotal disk with a fine reticulation that makes it less shiny. Length: 5.5–7.0 mm 5
5. Anterior region of the pronotum markedly punctured. Elytra in general sub-oval, clearly wider than the pronotum. First antennomere brown. Length: 5.0–7.0 mm
 - *Pogonus (Pogonus) chalceus viridanus* Dejean, 1828
 - Anterior region of the pronotum with a tenuous punctuation, barely visible. Elytra parallel or sub-parallel, barely wider than the pronotum. In general, first antennomere bronze, similar to the tegument of the body. Length: 5.5–6.5 mm *Pogonus (Pogonus) littoralis* (Duftschmid, 1812)
6. Elytra narrow, parallel, slightly wider than the pronotum and markedly convex. Pronotum slightly or not transverse, with the lateral sinuosity less marked. Length: 7.0–8.0 mm
 - *Pogonus (Pogonus) pallidipennis* Dejean, 1828
 - Elytra sub-parallel, clearly wider than the pronotum and less convex. Pronotum transverse, with the lateral sinuosity more marked. Length: 6.0–7.0 mm
 - *Pogonus (Pogonus) luridipennis* (Germar, 1822)

Pogonini from the Ibero-Balearic region

Genus *Sirdenus* Dejean, 1828

Sirdenus Dejean, 1828: 21.

Type species

Pogonus filiformis Dejean, 1828.

Subgenus *Syrdenopsis* Lutshnik, 1933

Syrdenopsis Lutshnik, 1933: 690.

Type species

Pogonus grayii Wollaston, 1862.

Sirdenus (Syrdenopsis) grayii (Wollaston, 1862)

Figs 1A, 3A, 4A

Pogonus grayii Wollaston, 1862: 438.

Pogonus dilutus Fairmaire, 1873: 333.

Pogonus fulvus Baudi di Selve, 1864: 206.

Diagnoses

Tegument partially depigmented, testaceous. Pronotum longitudinal, as wide as or barely wider than the head. Elytra parallel and body almost cylindrical. Up to 4 setigerous pores with short setae along the 3rd interstria. Legs shorter, in relation to the body, than in the rest of species.

Material examined

PORTUGAL • 5 specs; Ribatejo, Herdade do Pinheiro; C. de Barros leg.; MNCN.

SPAIN • 22 specs; Alicante, Albufera de Elche; Apr. 1934; C. Bolívar leg.; MNCN • 138 specs; same collection data as for preceding; no date; MNCN • 1 spec.; Alicante, Calpe; 7 Apr. 1918; Moroder leg.; MNCN • 3 ♂♂, 2 ♀♀; Alicante, Urbanova; 17 Apr. 1988; V.M. Ortuño leg.; VMO • 2 ♂♂, 1 ♀; same collection data as for preceding; 21 Apr. 1988; VMO • 2 ♂♂, 3 ♀♀; same collection data as for preceding; 28 Apr. 1988; VMO • 2 ♂♂, 1 ♀; same collection data as for preceding; 25 May 2001; VMO • 3 specs; Almería, Salinas de Cabo de Gata; 2 May 1842; E. Zarco leg.; MNCN • 1 spec.; Cádiz, San Fernando; 2 Jul. 1976; J. Ramírez leg.; MNCN • 2 specs; same collection data as for preceding; 13 Jul. 1976; J. Ramírez leg.; MNCN • 4 ♂♂, 8 ♀♀; Guadalajara, Santamera; 10 Aug. 2021; J. Muñoz-Santiago, V.M. Ortuño and E. Andrés Gómez leg.; JMS • 1 ♂, 2 ♀♀; same collection data as for preceding; 19 Aug. 2021; J. Muñoz-Santiago leg.; JMS.

Description

Habitus (Fig. 1A). Length: 4.0–5.0 mm. Head as wide as, or barely wider than the pronotum; supraocular sulcus short. Pronotum longitudinal, scarcely narrowed in its posterior region and with a long and smooth lateral sinuosity; hind angles obtuse, little or nothing protruding. Base of the pronotum without punctation; foveae little deep, no limited by a carinula but a longitudinal cleft. Elytra slightly wider than the pronotum. Striae with superficial punctation. The 9th interstria is wider than the rest. Legs with a similar colour to the tegument. Prosternum covered by fine setae. Median lobe of the aedeagus rather short, with a straight base and the apex scarcely directed down (Fig. 3A).

Chorology

The genus, subgenus and species *S. grayii* are distributed principally in the Palaearctic Region (Europe, Asia and North Africa) but also in the Afrotropical Region (Bousquet 2017). *Sirdenus grayii* also occurs in the Canary Islands and Cyprus (Putzeys 1874; Jeanne 1986).

Ibero-Balearic distribution (Fig. 4A): in the Iberian Peninsula, the species is principally represented along the Mediterranean coast, but it is also present at some meridional Atlantic coastal localities. The interior records correspond to saline lagoons and saltmarshes from the Ebro valley (NE Spain) and the Southern Sub-plateau (SE Spain). It is known, with no precise records, from Los Monegros Desert (NE Spain) and other saline environments of Aragon (NE Spain; Vives & Vives 1978a, 1981, 1999; Vives 1998), Toledo (SE Spain; Vives & Vives 1981) and Alicante (E Spain; Vives & Vives 1978a). We also examined collection material labelled as coming from “Herdade do Pinheiro // Ribatejo”, an inland locality from Portugal crossed by the Tagus River. In the Balearic Islands, *Sirdenus grayii* is present in Mallorca.

Biology

Sirdenus grayii is present both in interior and coastal regions (Bolívar 1919; see Vives & Vives 1978a, 1981). This species is frequently associated with plants of the Salicornioideae and Arthrocnemetea groups (Sauleda 1985). The maximum activity period principally occurs in spring, but it has been found from March to July (Sauleda 1985; Andújar *et al.* 2002). *Sirdenus grayii* develops a sub-lapidicolous to endogean life (Machado 1992): it occupies abandoned galleries excavated by some species of the genus *Bledius* Leach, 1819 (Coleoptera, Staphylinidae). Its morphological appearance –tegument partially depigmented, cylindrical and stylised body, relatively short legs– could be interpreted as adaptations of a gallery-dweller (Sauleda 1985).

Bibliographic Ibero-Balearic records

Aistleitner & Lencina 2018; Andújar *et al.* 2002; Baehr 1988; Bolívar 1919; Español 1964; Jeanne 1968; Putzeys 1874; Sauleda 1985; Serrano *et al.* 2015, 2021; Vives & Vives 1978a; Zaballos & Jeanne 1994.

Genus *Pogonistes* Chaudoir, 1872

Pogonistes Chaudoir, 1872: 22.

Eupogonistes Carret, 1903: 151; type species *Pogonus gracilis* Dejean, 1828.

Type species

Pogonus testaceus Dejean, 1828.

Diagnoses

Supraocular sulcus short and shallow, ending at the level of the anterior supraocular seta or barely surpassing it. Pronotum cordiform or sub-cordiform; elytra parallel or sub-parallel. Up to 3 setigerous pores along the 3rd interstria; 9th interstria wider than the 8th.

Description

Length: 4.0–6.0 mm. Tegument testaceous or brown (in the last case, with bronze sheen). Palps yellow, lighter than the testaceous legs and antennae. Pronotum little or nothing transverse; the anterior angles may be protruding or not, and occasionally have with tiny setae. Lateral sulcus of the pronotum narrow; hind angles hardly conspicuous. Base of the pronotum as wide as or less wide than the base of the elytra. Elytra generally convex. Legs testaceous, never darker than the body tegument. Prosternum covered by fine setae. Median lobe of the aedeagus slightly arcuate and clearly directed down.

Chorology

The genus is represented over the whole Palaearctic Region (Bousquet 2017).

The Ibero-Balearic representatives of *Pogonistes* are distributed along the Mediterranean coast of the peninsula, in the saline environments of the Ebro valley and the Southern Sub-plateau and in the Balearic Islands.

Pogonistes gracilis (Dejean, 1828)

Figs 1B, 3B, 4B

Pogonus gracilis Dejean, 1828: 18.

Diagnoses

Tegument brown with bronze sheen; legs and antennae testaceous, contrasting with the rest of the body. Pronotum cordiform, with a marked sinuosity; anterior angles with 1–3 short and fine setae. Elytra sub-parallel slightly convex.

Material examined

SPAIN • 2 ♂♂, 2 ♀♀; Álava, Laguna de Carravalseca; 23 Mar. 1995; J.M. Marcos leg.; VMO • 1 ♂; Alicante, Calpe; 10 Apr. 1989; J.M. Beltrán leg.; VMO • 1 ♂; Alicante, Elche, El Hondo; 6 Mar. 1988; J.M. Beltrán leg.; VMO • 1 ♂; Alicante, Salinas de Calpe; 19 Apr. 1934; C. Bolívar leg.; MNCN • 9 ♂♂, 2 ♀♀; Alicante, Urbanova; 21 Apr. 1988; VMO • 1 ♀; same collection data as for preceding; 28 Apr. 1988; VMO • 2 ♂♂, 1 ♀; same collection data as for preceding; 2 Jun. 1995; V.M. Ortuño leg.; VMO • 1 ♀; same collection data as for preceding; 16 May 1996; VMO • 1 ♂; same collection data as for

preceding; 25 May 2001; VMO • 1 ♂; Alicante, Santa Pola; 2 Mar. 1983; T.G. Sempere leg.; VMO • 1 ♂; Cádiz, Conil de la Frontera, El Palmar; 29 Aug. 2001; J. Navarro leg.; VMO • 1 ♂, 1 ♀; Huelva; Cardiel leg.; MNCN • 2 ♂♂, 1 ♀; Málaga, Fuente de Piedra; 3 Jun. 1987; J. Barandica leg.; VMO • 25 ♂♂, 34 ♀♀; Toledo, Villacañas; 22 May 1934; C. Bolívar leg.; MNCN.

Description

Habitus (Fig. 1B). Length: 4.0–5.0 mm. Head with a similar colour to the body tegument. Anterior angles of the pronotum obtuse and barely protruding. Base of the pronotum clearly narrower than the anterior margin of the elytra; the punctuation of the base is hidden by longitudinal clefts, so the surface

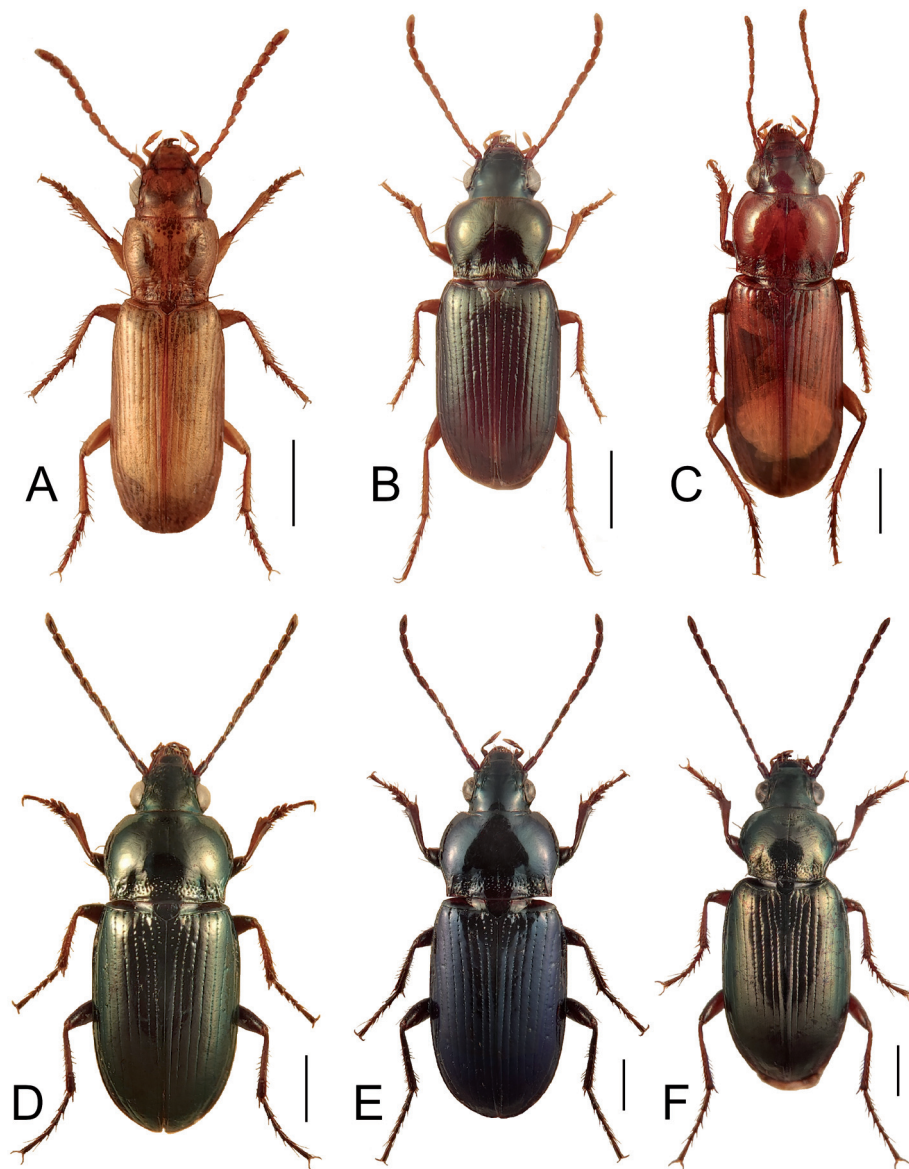


Fig. 1. Habitus. **A.** *Sirdenus (Syndenopsis) grayii* (Wollaston, 1862). **B.** *Pogonistes gracilis* (Dejean, 1828). **C.** *Pogonistes testaceus testaceus* (Dejean, 1828). **D–E.** *Pogonus (Pogonoidius) meridionalis* Dejean, 1828. **F.** *Pogonus (Pogonus) chalceus viridanus* Dejean, 1828. Scale bars = 1.0 mm.

of this region presents a striated appearance. Elytra punctuation deep. Median lobe of the aedeagus (Fig. 3B) narrower and with the apex more developed than in *P. testaceus*.

Chorology

Mediterranean coast of South Europe, from Spain to Greece (including Malta) and North Africa (Compte Sart 1968; Magrini & Schembri 1997; Bousquet 2017).

Ibero-Balearic distribution (Fig. 4B): in the Iberian Peninsula, the species is present discontinuously along the Mediterranean coast, from Cádiz to Tarragona (Spain), and in saline localities of the Ebro valley

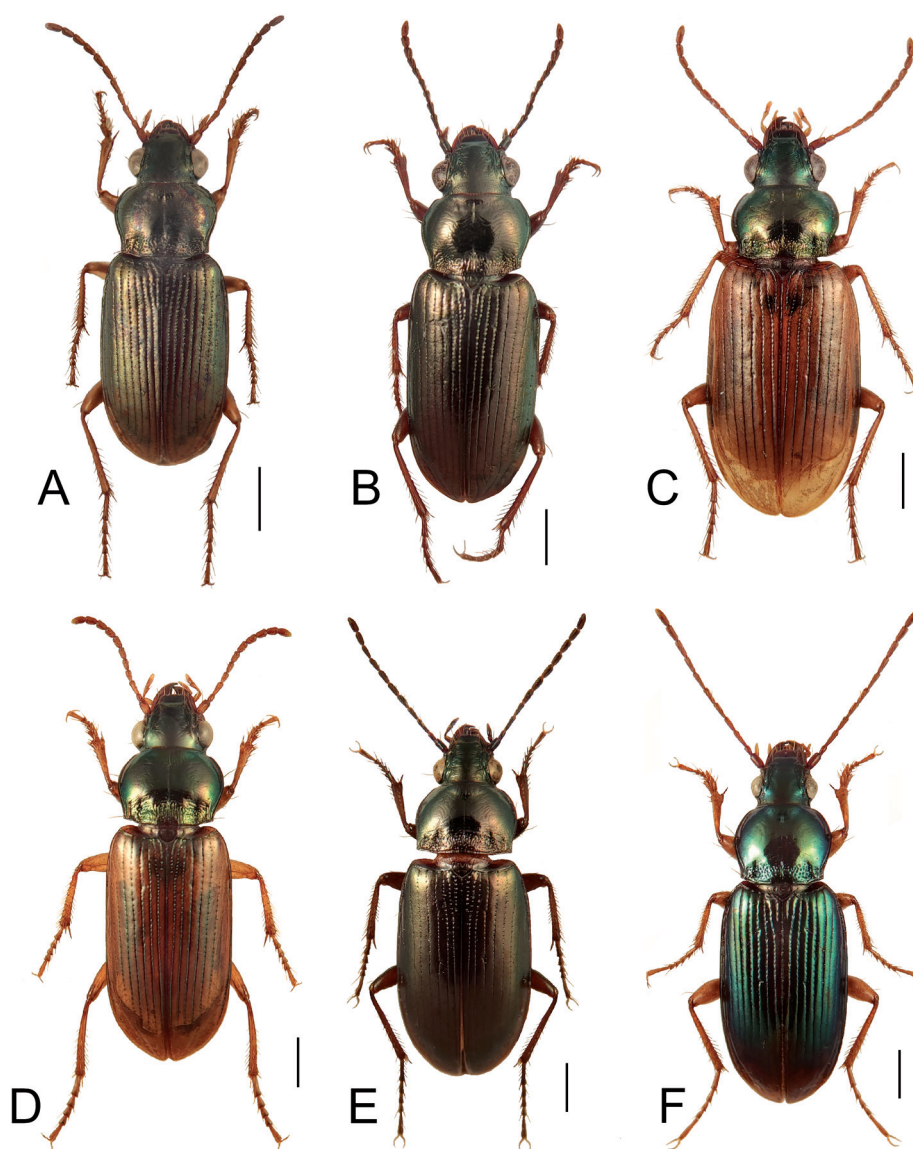


Fig. 2. Habitus. **A.** *Pogonus (Pogonus) gilvipes* Dejean, 1828. **B.** *Pogonus (Pogonus) littoralis* (Duftschmid, 1812). **C.** *Pogonus (Pogonus) luridipennis* (Germar, 1822). **D.** *Pogonus (Pogonus) pallidipennis* Dejean, 1828. **E.** *Pogonus (Pogonus) riparius* Dejean, 1828. **F.** *Pogonus (Pogonus) smaragdinus* Waltl, 1835. Scale bars = 1.0 mm.

(NE Spain) and the Southern Sub-plateau (SE Spain). The species has been reported, with no precision, from Algarve (SW Portugal; Zaballos & Jeanne 1994), Los Monegros Desert (NE Spain; Vives & Vives 1978a, 1981, 1999), saltmarshes of Alicante (E Spain; Vives & Vives 1978a) and a saltmarsh in Toledo (SE Spain) (Vives & Vives 1981). We examined collection material from Huelva (SW Spain, with no precise locality), a territory from which *P. gracilis* has never previously been reported. In the Balearic Islands, *Pogonistes gracilis* is present in Mallorca, Menorca and Ibiza.

Biology

The species inhabits coastal and interior regions equally (Bolívar 1919; see Vives & Vives 1978a, 1978b, 1981). Imagoes are active during spring, principally from March to July, but some records are dated from other months such as November (Andújar *et al.* 2002). *Pogonistes gracilis* can be found in direct contact with water when it takes refuge under the rocks on the shores, in damp and saline environments where it occurs (Ortuño & Marcos 2003).

Bibliographic Ibero-Balearic records

Aistleitner & Lencina 2018; Andújar *et al.* 2002; Baehr 1988; Compte Sart 1968; Jeanne 1968, 1978; Ortiz *et al.* 1989; Ortuño & Marcos 2003; Serrano *et al.* 1990, 2015, 2021; Vives & Vives 1986, 1978a, 1978b.

Pogonistes testaceus testaceus (Dejean, 1828) Figs 1C, 3C, 4C

Pogonistes testaceus testaceus Dejean, 1828: 20.

Diagnoses

Tegument testaceous. Pronotum sub-cordiform, scarcely narrowed in its posterior region (smooth sinuosity); anterior angles protruding. Elytra parallel and convex, sub-cylindrical, with the posterior half slightly depigmented.

Material examined

SPAIN • 1 ♂; Vuillefroy leg.; Pérez Arcas coll., MNCN • 1 ♂, 2 ♀♀; Alicante, Albufera de Elche; Apr. 1934; C. Bolívar leg.; MNCN • 3 ♂♂, 1 ♀; Alicante, Santa Pola; 29 Apr. 1985; T.G. Sempere leg.; VMO • 2 ♀♀; 17 Jan. 1983; VMO • 3 ♂♂; Valencia, Los Valles; Morote leg.; MNCN.

Description

Habitus (Fig. 1C). Length: 5.5–6.0 mm. Tegument with some regions more pigmented than others. Head brown, slightly darker than the rest of the body. Pronotum with the base as, or almost as, wide as the anterior margin of the elytra and with well-visible punctuation. Elytral striae with almost superficial punctuation, considerably more tenuous than in other species of the tribe. Legs slightly lighter than the rest of the body. Median lobe of the aedeagus (Fig. 3C) wider than in *P. gracilis* and with the apex less developed.

Chorology

Species distributed along the West Mediterranean: the subspecies *P. testaceus testaceus* is present in North Africa (records from Argelia), the Iberian Peninsula and along the French coast (Español 1964; Bousquet 2017); the subspecies *P. testaceus graecus* (Apfelbeck, 1904) is known from Bulgaria and Greece (Bousquet 2017).

Ibero-Balearic distribution (Fig. 4C): in the Iberian Peninsula, the species is present along the Mediterranean coast ranging from Tarragona to Alicante (Spain). On the Balearic Islands, it is present in Menorca and Ibiza.

Biology

It was suggested that this species prefers the most high-saline environments (Sauleda 1985), which could explain why its distribution in the Iberian Peninsula is restricted to the Mediterranean coast, where it can be a common element (Español 1964). Imagoes present all year, with a peak of activity in spring (Sauleda 1985).

Bibliographic Ibero-Balearic records

Aistleitner & Lencina 2018; Compte Sart 1968; Español 1964; Jeanne 1968, 1978; Sauleda 1985; Serrano *et al.* 2015, 2021; Zaballos & Jeanne 1994.

Genus *Pogonus* Dejean, 1821

Pogonus Dejean, 1821: 9.

Type species

Carabus littoralis Duftschmid, 1812.

Diagnoses

Tegument with metallic sheen, at least in the head and pronotum. Supraocular sulcus deep and long, surpassing the level of the anterior supraocular seta and ending close to the posterior one. Pronotum always wider than the head, with different shape among species. Up to 5 setigerous pores along the 3rd interstria (commonly 3). 8th and 9th interstriae of the same width.

Description

Length: 5.0–8.0 mm. Tegument with variable coloration from green to bronze (not always uniform between the parts of the body). Antennae and palps yellow, testaceous or brown. Pronotum cordiform or sub-cordiform, in general convex and more transverse in some species than in others. Anterior angles of the pronotum glabrous or with fine setae. Base as, or almost as, wide as the anterior margin of the elytra, with a marked and deep punctuation that is limited by a well-developed carinula. Except in *P. riparius* and *P. meridionalis*, the base is oblique near the hind angles, so they are obtuse and more or less protruding. Elytra parallel, sub-parallel or sub-oval, convex and wider than the pronotum. In all the species, the punctuation of the elytral striae is deep, except in the apical region. Interstriae other than the 3rd glabrous, except in *P. meridionalis*, which also has setigerous pores in the 5th and 7th interstriae. Legs yellow, testaceous or brown. Median lobe of the aedeagus curved or arcuate, with the apex clearly directed down, except in *P. littoralis*. Sclerotised pieces of the internal sac rather massive in some species.

Chorology

Genus widely distributed in all geographic regions except the Neotropical; the Palaearctic Region is where it is best-represented (Bousquet & Laplante 1997; Bousquet 2017).

Species of *Pogonus* are present both along the Atlantic and Mediterranean coasts of the Iberian Peninsula, the saline environments of its continental interior and in the Balearic Islands.

Subgenus *Pogonoidius* Carret, 1903

Pogonoidius Carret, 1903: 133.

Pogonulus Lutshnik, 1927: 89; type species *Pogonus punctatulus* Dejean, 1828.

Type species

Pogonus meridionalis Dejean, 1828.

***Pogonus (Pogonoidius) meridionalis* Dejean, 1828**

Figs 1D–E, 3D, 4D

Pogonus (Pogonoidius) meridionalis Dejean, 1828: 17.

Pogonus salinus Motschulsky, 1844: 89.

Amara interstitialis Fairmaire, 1856: 523.

Pogonus atrocyaneus Dieck, 1870: 60.

Pogonus barthei Puel, 1923: 89.

Diagnoses

Tegument bronze in most Ibero-Balearic individuals, but blue with metallic sheen in the southern populations of the peninsula. Pronotum markedly convex, with the base clearly wider than the anterior margin and small setae inserted in the anterior angles. Elytra sub-oval and slightly convex. Setigerous pores present in the 5th, 7th or both interstriae, in addition to those present in the 3rd interstria.

Material examined

SPAIN • 1 ♂, 1 ♀, 2 specs; Pozuelo; MNCN • 2 ♂♂, 1 ♀; Alicante, Elche, El Hondo; 6 Mar. 1988; J.M. Beltrán leg.; VMO • 1 ♂, 1 ♀; same collection data as for preceding; 9 Mar. 1991; VMO • 3 ♂♂, 2 ♀♀; Alicante, ctra. [road] La Marina-Elche (km 8); 23 Mar. 1996; J.M. Beltrán leg.; VMO • 3 ♂♂, 5 ♀♀; Alicante, Salinas, Laguna de Salinas; 20 Feb. 1993; J.M. Beltrán leg.; VMO • 5 ♂♂, 5 ♀♀; same collection data as for preceding; 14 May 1993; VMO • 1 ♀; Alicante, Santa Pola; 2 Mar. 1983; T.G. Sempere leg.; VMO • 2 ♂♂; Cádiz, El Palmar, Conil de la Frontera; 29 Aug. 2001; J. Navarro leg.; VMO • 2 ♂♂, 2 ♀♀; Cádiz, Jerez; Lauffer leg.; MNCN • 1 ♂; same collection data as for preceding; L. Cepero leg.; MNCN • 1 ♂; Cádiz, Puerto de Santa María; Dieck leg.; MNCN • 1 ♂, 1 ♀; Lauffer leg.; MNCN • 3 ♂♂, 1 ♀; Ciudad Real, Pozuelo de Calatrava; La Fuente leg.; MNCN • 1 ♂, 1 ♀; same collection data as for preceding; no leg.; MNCN • 1 ♂; Cuenca, Uclés; Pantiel leg.; MNCN • 1 ♀; Huelva; May 1911; Cendrero leg.; MNCN • 2 ♂♂; Madrid, Colmenar de Oreja, Laguna de las Esteras; 8 Jul 2020; J. Muñoz-Santiago leg.; JMS • 1 ♀; Murcia, Cartagena; 5 Jan. 1924; Escalera leg.; MNCN • 2 ♂♂, 4 ♀♀; 7 Jan. 1925; MNCN • 2 ♂♂, 1 ♀; same collection data as for preceding; 22 Jan. 1905; G. Schramm leg.; MNCN • 2 ♂♂; same collection data as for preceding; Dec., no year; MNCN • 1 ♂, 2 ♀♀; same collection data as for preceding; Lauffer leg.; MNCN • 1 ♀; same collection data as for preceding; Ehlers leg.; MNCN • 1 ♀; same collection data as for preceding; Bolívar leg.; MNCN • 2 ♀♀; Toledo, Quero; 22 May 1929; Escalera leg.; MNCN • 1 ♂; 15 May 1999, Lauffer leg.; MNCN • 1 ♀; same collection data as for preceding; no date; MNCN • 3 ♂♂, 2 ♀♀; same collection data as for preceding; 22 May 1934; C. Bolívar leg.; MNCN • 1 ♂, 1 ♀; same collection data as for preceding; no date; no leg.; MNCN • 6 ♂♂, 5 ♀♀; Toledo, Quero, Laguna Grande; 9 Apr. 1993; V.M. Ortuño leg.; VMO • 1 ♂; Toledo, Quero, Laguna de Peña Hueca; 10 Jun. 1986; J.P. Zaballós leg.; VMO • 1 ♂, 2 ♀♀; Toledo, Villacañas, Salinas de Peña Hueca; 25 Apr. 1997; J.M. Beltrán leg.; VMO • 1 ♂; Toledo, Villacañas; 20 May 1934; C. Bolívar leg.; MNCN • 1 ♀; same collection data as for preceding; no date; C. Bolívar leg.; MNCN.

Description

Habitus (Fig. 1D–E). Length: 5.5–7.0 mm. Antennae and palps dark brown, lighter at the base of antennomeres (from the second to the last) and at the apex of the last palpomeres. Pronotum with short lateral sinuosity and the base sub-rectilinear; lateral sulcus narrow; hind angles well marked and straight or slightly sharp. Legs brown, with the femora darkened (in southern populations, almost the entire legs darkened). Median lobe of the aedeagus arcuate, with the apex rounded and not narrowed (Fig. 3D).

Chorology

The subgenus *Pogonoidius* is well represented in the Palaearctic Region (Bousquet 2017). The species *P. meridionalis* is a Palaearctic element with a wide distribution from the Iberian Peninsula to Siberia (Bousquet 2017).

Ibero-Balearic distribution (Fig. 4D): in the Iberian Peninsula, the species is present in the meridional extreme, in the Segura basin (SE Spain), some localities of the Catalanian coast and in lagoons and saltmarshes of the Southern Sub-plateau (SE Spain) and Central Spain. It has been reported from Portugal, with no precise locality, by Serrano (2002).

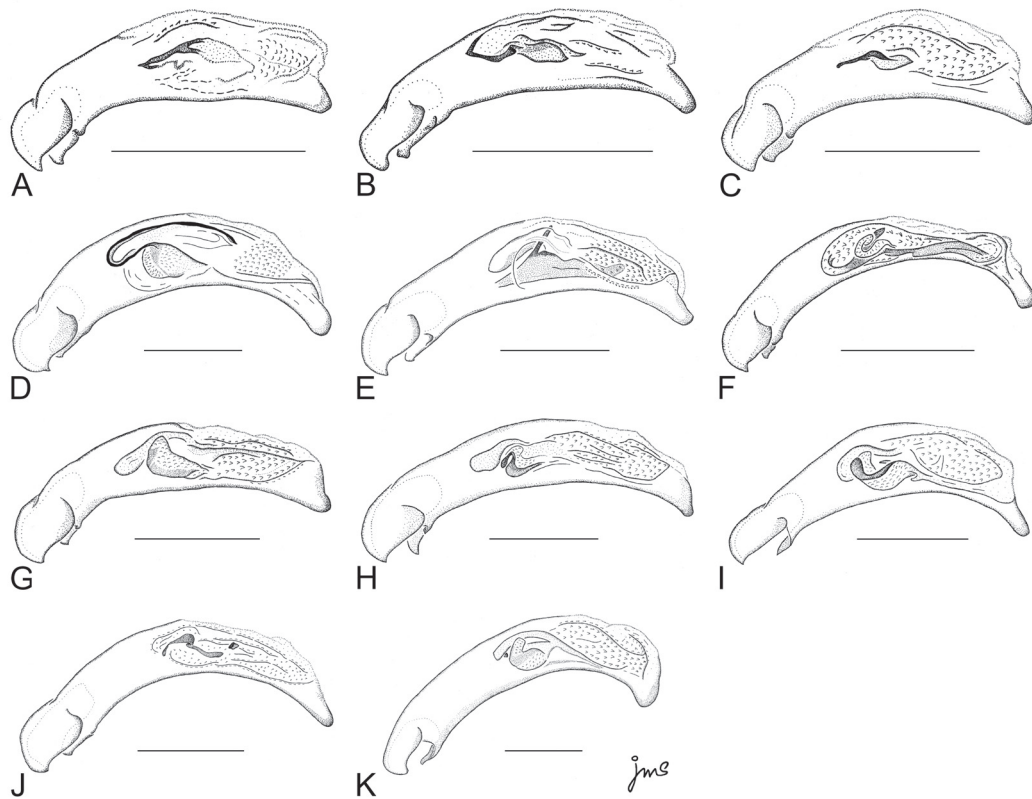


Fig. 3. Median lobe in left lateral view. **A.** *Sirdenus (Syrdenopsis) grayii* (Wollaston, 1862). **B.** *Pogonistes gracilis* (Dejean, 1828). **C.** *Pogonistes testaceus testaceus* (Dejean, 1828). **D.** *Pogonus (Pogonoidius) meridionalis* Dejean, 1828. **E.** *Pogonus (Pogonus) chalceus viridanus* Dejean, 1828. **F.** *Pogonus (Pogonus) gilvipes* Dejean, 1828. **G.** *Pogonus (Pogonus) littoralis* (Duftschmid, 1812). **H.** *Pogonus (Pogonus) luridipennis* (Germar, 1822). **I.** *Pogonus (Pogonus) pallidipennis* Dejean, 1828. **J.** *Pogonus (Pogonus) riparius* Dejean, 1828. **K.** *Pogonus (Pogonus) smaragdinus* Walth, 1835. Scale bars = 0.5 mm.

Biology

The species can be found in saline areas colonised by plants of the Arthrocnemetea group and the genus *Salicornia* L. (Sauleda 1985; Vigna Taglianti & Bonavita 1994; J. Muñoz-Santiago pers. obs.) but also in non-saline environments, as it is less halobiont than other species of the genus (Sauleda 1985). This suggestion is supported by the presence of the species in the Embalse de Valmayor (Madrid, Spain; Ortuño & Toribio 1996), a freshwater body. The phenology of a population of *P. meridionalis* in Elton lake (Volgograd, Russia) was studied by Matalin & Makarov (2008): it had a peak of imaginal activity on spring (April–May), and the imagoes which emerged on one year coexisted with imagoes from the previous year, so it is not an annual species. The large number of imagoes in spring was also observed by Sauleda (1985).

Bibliographic Ibero-Balearic records

Aistleitner & Lencina 2018; Andújar *et al.* 2002; Baehr 1986; Cuní 1885; Jeanne 1968; López-Pérez *et al.* 2014; Mateu 1947; Ortuño & Toribio 1996; Prieto 2018; Sauleda 1985; Serrano *et al.* 2021; Vives & Vives 1976; Zaballos & Jeanne 1994.

Subgenus *Pogonus* Dejean, 1821

Pogonus Dejean, 1821: 9.

Calopogonus Lutshnik, 1927: 89; type species *Pogonus smaragdinus* Waltl, 1835.

Nogopus Lutshnik, 1927: 89; type species *Pogonus reticulatus* Schaum, 1857.

Raptor Lutshnik, 1927: 89; type species *Pogonus riparius* Dejean, 1828.

Type species

Carabus littoralis Duftschmid, 1812.

Diagnoses

Tegument with metallic sheen (at least in the head and pronotum). Up to 5 setigerous pores in the 3rd interstria (commonly 3); the rest of interstriae are glabrous.

Description

Length: 5.0–8.0 mm. Tegument generally green or bronze, uniform in most of the species; in *P. luridipennis* and *P. pallidipennis* the elytra are a testaceous. Anterior angles of the pronotum glabrous. Base of the pronotum slightly curvilinear.

Distribution

The distribution range of the subgenus is similar to that of the genus.

Pogonus (Pogonus) chalceus viridanus Dejean, 1828 Figs 1F, 3E, 4E

Pogonus (Pogonus) chalceus viridanus Dejean, 1828: 14.

Diagnoses

Tegument bronze or blue with metallic sheen. Pronotum cordiform; anterior region clearly punctured. Elytra generally wide and sub-oval. Up to 3 setigerous pores in the 3rd interstria.

Material examined

PORTUGAL • 1 ♂; P. d'Oliveira leg.; Pérez Arcas coll.; MNCN • 4 ♀♀; Algarve, Faro; Paulino leg.; MNCN.

SPAIN • 1 ♂; [A] Coruña; Bolívar leg.; MNCN • 1 ♂, 1 ♀; A Coruña, Boiro, Playa Mañons; 25 Jul. 1992; V.M. Ortuño leg.; VMO • 2 ♂♂; Albacete, Laguna de Pétrola; 18 Jul. 1989; J.M. Beltrán leg.; VMO • 2 ♂♂, 2 ♀♀; Albacete, Laguna del Salobrelejo; 15 May 1999; J.M. Beltrán leg.; VMO • 1 ♂; Alicante, Calpe; 30 Dec. 1984; J.M. Beltrán leg.; VMO • 1 ♀; same collection data as for preceding; 21 Dec. 1985; VMO • 1 ♂; Alicante, Elche, El Hondo; 3 May 1986; J.M. Beltrán leg.; VMO • 1 ♂; same collection data as for preceding; 9 Mar. 1991; VMO • 2 ♂♂, 1 ♀; Alicante, Salinas, Laguna de Salinas; 14 May 1993; J.M. Beltrán leg.; VMO • 3 ♀♀; same collection data as for preceding; 26 Mar. 1994; VMO • 3 ♂♂, 2 ♀♀; Alicante, Salinas de Calpe; 22 Apr. 1934; C. Bolívar leg.; MNCN • 2 ♂♂; Alicante, Urbanova; 21 Apr. 1988; V.M. Ortuño leg.; VMO • 1 ♀; same collection data as for preceding; 23 Apr. 1988; VMO • 1 ♀; same collection data as for preceding; 28 Apr. 2002; VMO • 1 ♀; Alicante, Santa Pola; 17 Jan. 1983; T.G. Sempere leg.; VMO • 2 ♂♂; Alicante, Salinas de Santa Pola; 11 Feb. 1980; T.G. Sempere leg.; VMO • 1 ♀; Alicante, Santa Pola, srra. [mountain range]; 6 Mar. 1994; J.M. Beltrán leg.; VMO • 1 ♀; same collection data as for preceding; 24 Dec. 1994; VMO • 1 ♀; Alicante, Guardamar del Segura, Segura River; 30 Mar. 1996; J.M. Beltrán leg.; VMO • 1 ♂, 1 ♀; Barcelona, Faro de Llobregat; Oct. 1987; Bolívar leg.; MNCN • 1 ♂, 1 ♀; Cádiz; 1918; Smith leg.; MNCN • 1 ♂, 1 ♀; Cádiz, Conil de la Frontera, El Palmar; 29 Aug. 2001; J. Navarro leg.; VMO • 72 specs; Cádiz, Jerez, Laguna de Medina; 8 May 1982; Ramírez leg.; Ferrer coll.; MNCN • 2 specs; Cádiz, Palmones; 29 Apr. 1976; J. Ramírez leg.; MNCN • 1 spec.; same collection data as for preceding; 6 Jul. 1976; J. Ramírez leg.; MNCN • 4 specs; Cádiz, Tarifa, Punta Paloma; 6 Jun. 1998; Ferrer coll.; MNCN • 2 specs; Cádiz, San Fernando; 13 Jun. 1976; J. Ramírez leg.; MNCN • 1 spec.; same collection data as for preceding; 15 Apr. 1976; J. Ramírez leg.; MNCN • 1 spec.; Cádiz, San Roque; 20 Jul 1974; J. Ramírez leg.; MNCN • 1 spec.; Cádiz, Zahara de los Atunes; 24 Apr. 1976; J. Ramírez leg.; MNCN • 4 ♂♂; Ciudad Real; Pozuelo de Calatrava; MNCN • 5 ♂♂, 1 ♀; Cuenca, Uclés; Pantel leg.; MNCN • 2 ♂♂; same collection data as for preceding; Lauffer leg.; MNCN • 1 ♀; same collection data as for preceding; no leg.; MNCN • 1 ♂; same collection data as for preceding; Var. leg.; MNCN • 1 ♂; Girona, Aiguamolls del Emporda; 25 Apr. 1990; V.M. Ortuño leg.; VMO • 1 ♀; Guadalajara, Imón, Salinas de Imón; 10 Aug. 2021; J. Muñoz-Santiago, V.M. Ortuño and E. Andrés Gómez leg.; JMS • 1 ♀; Guadalajara, Paredes de Sigüenza; 8 Mar. 1985; V.M. Ortuño leg.; VMO • 1 ♂, 1 ♀; Guadalajara, Santamera; 10 Aug. 2021; J. Muñoz-Santiago, V.M. Ortuño & E. Andrés Gómez leg.; JMS • 1 ♂, 1 ♀; same collection data as for preceding; 19 Aug. 2021; J. Muñoz-Santiago leg.; JMS • 1 spec.; Málaga, Sierra de las Nieves; 22 Jun. 1966; Ferrer coll.; MNCN • 1 ♀; Mallorca; Mas de Xaxars leg.; MNCN • 1 ♂, 1 ♀; Mallorca, Palma; Lauffer leg.; MNCN • 2 ♂♂; same collection data as for preceding; Moraguer leg.; MNCN • 2 ♂♂; Mallorca, Pollensa; H.J. Jorda leg.; MNCN • 1 ♂; Sevilla; Marvier leg.; MNCN • 1 ♀; Soria; Pérez Arcas coll.; MNCN • 1 spec.; Toledo, Quero; 12 May 1899; Lauffer leg.; MNCN • 2 ♂♂, 1 ♀; same collection data as for preceding; Jun. 1909; MNCN • 2 ♂♂, Toledo, Quero, Laguna Grande; 9 Apr. 1993; V.M. Ortuño leg.; VMO • 2 ♂♂; Toledo, Villacañas, Laguna de Peña Hueca; 9 Apr. 1993; V.M. Ortuño leg.; VMO • 6 ♂♂, 5 ♀♀; Toledo, Villacañas; 24 May 1999; Lauffer leg.; MNCN • 1 ♂, 3 ♀♀; same collection data as for preceding; 20 May 1934; C. Bolívar leg.; MNCN • 9 ♂♂, 7 ♀♀; same collection data as for preceding; no date; MNCN • 1 spec.; same collection data as for preceding; MNCN • 1 ♂, 2 ♀♀; Madrid, Aranjuez; F. Moróder leg.; MNCN • 1 ♀; same collection data as for preceding; Sanz leg.; MNCN • 1 ♂, 1 ♀; same collection data as for preceding; Bolívar leg.; MNCN • 1 ♀; same collection data as for preceding; Lauffer leg.; MNCN • 1 ♂; same collection data as for preceding; no leg.; MNCN • 1 ♂; Madrid, Aranjuez, Laguna de Ontígola; 1 Jan. 1973; J. Serrano leg.; MNCN • 2 ♂♂; same collection data as for preceding; 2 Apr. 1975; J. Serrano leg.; MNCN • 1 ♂; Murcia, Cartagena; Dec., no year; G. Schramm leg.; MNCN • 1 ♂, 1 ♀; same collection data as for preceding; no date; no leg.; MNCN • 1 ♀; Valencia, El Puig; 11 Apr. 1987; J.M. Beltrán leg.; VMO • 1 ♂, 1 ♀; Valladolid; 29 Sep. 1921; Lezcane leg.;

MNCN • 1 ♂; same collection data as for preceding; no date; Chevrolat leg.; Pérez Arcas coll.; MNCN • 2 ♂♂; Bolívar leg.; Pérez Arcas coll.; MNCN • 2 ♂♂, 3 ♀♀; Zamora, Lagunas de Villafáfila; 6 Feb. 1987; V.M. Ortuño leg.; VMO • 3 ♂♂; Zaragoza, Laguna de Gallocanta; 17 Jul 1981; J. Serrano leg.; MNCN.

Description

Habitus (Fig. 1F). Length: 5.0–7.0 mm. Antennae testaceous, with the distal half of the antennomere 2 and the base of the rest of antennomeres lighter (sometimes the last antennomeres are entirely lightened). Palps yellow, with the base of the last palpomere darkened. Anterior angles of the pronotum more marked than in other species. Lateral sulcus of the pronotum slightly widened. Legs testaceous, sometimes slightly yellow. Median lobe of the aedeagus arcuate; the internal sac presents a characteristic thorn-shaped sclerotised piece whose apex is directed to the dorsum, among others (Fig. 3E).

Chorology

The species is distributed along the Mediterranean and Atlantic coasts from the Iberian Peninsula and North Africa to the North Sea and the Black Sea (Magrini & Schembri 1997; Tamadouni & Arahou 2016; Bousquet 2017). The subspecies *P. c. viridanus* occurs in the Iberian Peninsula and, with *P. c. alticola* Antoine, 1955, in North Africa (Bousquet 2017). The populations of the rest of Europe correspond to the subspecies *P. c. chalceus* (Marsham, 1802).

Ibero-Balearic distribution (Fig. 4E): in the Iberian Peninsula, *P. c. viridanus* is present at several localities of the Atlantic and Mediterranean coasts and in many interior saline lagoons and saltmarshes. The species is known from Los Monegros Desert (NE Spain), with no precise records (Vives & Vives 1978a). We could examine collection material from unpublished but imprecise localities: Sierra de las Nieves Natural Park (Málaga, SE Spain), Coruña (NW Spain), Soria (NE Spain) and Valladolid (NW Spain). In the Balearic Islands, it is present in Mallorca, Menorca and Ibiza.

Biology

Species that inhabits both coastal and interior regions, as long as it finds the conditions that it requires (see Vives & Vives 1978a), where it is very common (Andújar *et al.* 2002). It has been typically considered as a spring/summer-reproductive species, both in the Iberian Peninsula (Cárdenas *et al.* 1999) and other Palaearctic regions (Matalin & Makarov 2008). Following the information provided by some authors, the imagoes are present during all or most of the year, with a peak of activity between March and August (Sauleda 1985; Andújar *et al.* 2002). In addition, Ortuño & Marcos (2003) remark the scarcity –not absence– of individuals during the driest months. The phenotypical variability of this species had resulted in the descriptions of several subspecies and ‘forms’ along the geographic regions where it is present (Carret 1903; Bousquet 2017; see Machado 1992). The dispersal ability of *P. chalceus* depends on its wing-polymorphism status (Desender 1989; Desender *et al.* 1998), with flightless individuals more frequent in Atlantic than in Mediterranean populations (Desender *et al.* 2000). This genetic difference could be related, according to Desender *et al.* (2000), with the stability of the environment: the Atlantic habitats, in general, are subject to fewer alterations than the Mediterranean ones, resulting in a smaller need for colonisation of new territories and, therefore, the existence of a higher proportion of flightless individuals. The genetic features of *P. chalceus* and their implications in the phenotype were widely studied and discussed by Van Belleghem (2014).

Bibliographic Ibero-Balearic records

Aistleitner & Lencina 2018; Andújar *et al.* 2001, 2002; Baehr 1986; Campos Gómez & Novoa 2006; Champion 1898; Chapman & Champion 1907; Compte Sart 1968; Desender *et al.* 2000; Eiroa *et al.* 1988; Herrera & Arricibita 1990; Jeanne 1968, 1978; López-Pérez *et al.* 2014; Mateu 1947; Novoa *et al.*

1998; Ortiz *et al.* 1989; Ortuño *et al.* 1997; Ortuño & Marcos 2003; Ortuño & Toribio 1996; Prieto 2018; Prieto Piloña & Valcárcel 1996; Putzeys 1874; Ramos-Abuín 1990; Ruiz-Tapiador & Zaballos 2001; Sauleda 1985; Santos *et al.* 1985; Serrano 1983; Serrano *et al.* 1990, 2015, 2021; Viñolas *et al.* 2019; Vives & Vives 1978a, 1986; Zaballos 1986b.

***Pogonus (Pogonus) gilvipes* Dejean, 1828**

Figs 2A, 3F, 4F

Pogonus (Pogonus) gilvipes Dejean, 1828: 14.

Pogonus apicalis Küster, 1852: no. 37.

Pogonus parallelus Chaudoir, 1872: 27.

Pogonus fallax Carret, 1903: 138.

Diagnoses

Tegument dark brown, with a bronze sheen. Pronotum cordiform, transverse or sub-transverse, with the disc smooth. Elytra parallel or sub-parallel; up to 5 setigerous pores in the 3rd interstria.

Material examined

SPAIN • 3 ♂♂, 1 ♀; Alicante, Albufera de Elche; C. Bolívar leg., MNCN • 2 ♂♂, 2 ♀♀; Alicante, Elche; MNCN • 1 ♂; Alicante, Salinas de Bonmatí; 16 Aug. 1985; V.M. Ortuño leg.; VMO • 1 ♀; same collection data as for preceding; 21 Aug. 1985; V.M. Ortuño leg.; VMO • 3 ♂♂, 1 ♀; same collection data as for preceding; 21 Jul. 1986; V.M. Ortuño leg.; VMO • 6 ♂♂, 2 ♀♀; Alicante, Salinas de Calpe; 22 Apr. 1934; C. Bolívar leg.; MNCN • 3 ♂♂, Alicante, Urbanova; 21 Apr. 1988; V.M. Ortuño leg.; VMO • 1 ♂; 23 Apr. 2002; V.M. Ortuño leg.; VMO • 1 ♂; Cádiz; F. Fernando leg.; Pérez Arcas coll.; MNCN • 2 specs; Cádiz, Jerez; Laguna de Medina, 8 May 1982; Ramírez leg.; MNCN • 1 spec.; Cádiz, Palmones; 29 Apr. 1976; J. Ramírez leg.; MNCN • 1 spec.; same collection data as for preceding; 3 May 1976; J. Ramírez leg.; MNCN • 1 spec.; same collection data as for preceding; 5 May 1976; J. Ramírez leg.; MNCN • 1 spec.; same collection data as for preceding; 6 Jul. 1976; MNCN • 1 spec., Cádiz, Tarifa, Río del Valle; 18 Jul. 1977; J. Ramírez leg.; MNCN • 3 spec.; Cádiz, San Fernando; 13 Jul. 1976; J. Ramírez leg.; MNCN • 6 spec.; same collection data as for preceding; 15 Apr. 1976; MNCN • 2 spec.; Cádiz, Zahara de los Atunes; 24 Apr. 1976; J. Ramírez leg.; MNCN • 1 ♂, 1 ♀; Huelva; Cardiel leg.; MNCN • 2 ♂♂; same collection data as for preceding; Lauffer leg.; MNCN.

Description

Habitus (Fig. 2A). Length: 5.5–6.0 mm. Antennae and palps almost entirely testaceous or yellow (base of the first antennomere and insertion points of the palpomeres slightly darkened). Anterior angles of the pronotum not or hardly protruding; lateral sulcus widened. Legs entirely testaceous. Median lobe of the aedeagus arcuate and narrowed progressively until the apex, which is well developed and spatula-shaped (Fig. 3F). Among the sclerotised pieces that are found in the internal sac, the presence of a thick thorn directed to the dorsum should be noted, on which a helical scaly structure is superimposed.

Chorology

Species with a wide Palaearctic distribution, also present in the Afrotropical Region (Ratti 1983; Sauleda 1985; Bousquet 2017) and in the Canary Islands (Machado 1992).

Ibero-Balearic distribution (Fig. 4F): in the Iberian Peninsula, the species is widely present along the Atlantic coast of the meridional extreme, but also at some localities of the Mediterranean coast. Jeanne (1968) published a record from Las Hurdes (Cáceres, W Spain) that probably is incorrect as, according

to the current chorological knowledge, it would represent a very isolated population. In the Balearic Islands *P. gilvipes* is present in Mallorca, Menorca and Ibiza.

Biology

Sauleda (1985) indicates that this is an uncommon species which can be found in areas colonised by plants of *Arthrocnemetea* all year except winter. Some comments on the larvae of this species have been published: Machado (1992) suggested that, at coastal localities, the preimaginal stages of *P. gilvipes* could develop under the remains of marine algae deposited by the sea on rocky shorelines.

Bibliographic Ibero-Balearic records

Baehr 1986; Jeanne 1968, 1978; López-Pérez *et al.* 2014; Palmer & Vives 1993; Putzeys 1874; Sauleda 1985; Serrano *et al.* 1986, 2015, 2021; Vives & Vives 1978a; Zaballos & Jeanne 1994.

Pogonus (Pogonus) littoralis (Duftschmid, 1812)

Figs 2B, 3G, 5A

Carabus littoralis Duftschmid, 1812: 183.

Pogonus pilipes Germar, 1817: 193.

Pogonus aeruginosus Stephens, 1828: 107.

Pogonus provincialis Carret, 1903: 135.

Diagnoses

Body tegument, and commonly first antennomere, bronze. Pronotum cordiform and sub-transverse; anterior region with tenuous punctuation. Elytra parallel or sub-parallel; up to 3 setigerous pores in the 3rd interstria.

Material examined

SPAIN • 1 ♀; Alicante, Elche, El Hondo; 21 Nov. 1988; J.M. Beltrán leg.; VMO • 2 ♂♂; Alicante, Salinas de Bonmatí; 21 Jul. 1986; V.M. Ortuño leg.; VMO • 1 spec.; Cádiz, Palmones; 29 Apr. 1976; J. Ramírez leg.; MNCN • 1 spec.; same collection data as for preceding; 6 Jul. 1976; J. Ramírez leg.; MNCN • 1 ♀; Cádiz, Conil de la Frontera; 29 Aug. 1998; J. Navarro leg.; VMO • 1 ♂, 1 ♀; Cádiz, Playa de Sancti Petri; 1 Apr. 1987; V.M. Ortuño leg.; VMO • 2 specs; Cádiz, San Roque • 20 Jul. 1974; J. Ramírez leg.; MNCN • 4 specs; Cádiz, Zahara de los Atunes; 24 Apr. 1976; J. Ramírez leg.; MNCN • 1 ♀; Huelva; Cardiel leg.; MNCN • 1 spec.; Málaga, Sierra de las Nieves; 22 Jun. 1966; Ferrer leg.; MNCN • 2 ♂♂; Mallorca; Mas de Xaxars leg.; MNCN • 1 ♂, 1 ♀; Mallorca, Pollensa; H.J. Jorda leg.; MNCN.

Description

Habitus (Fig. 2B). Length: 5.5–6.5 mm. Antennae brown except the first antennomere. Palps testaceous, with the basal half of the last palpomere darkened. Lateral sulcus of the pronotum slightly widened. Legs testaceous. Median lobe of the aedeagus scarcely curved, with the apex little developed (Fig. 3G).

Chorology

Species widely distributed along the Palaearctic Region (Compte Sart 1968, Ratti 1983; Tamadouni & Arahou 2016; Bousquet 2017).

Ibero-Balearic distribution (Fig. 5A): in the Iberian Peninsula, it is present along the southern Atlantic coast, in the meridional extreme, at some localities of the Mediterranean coast and in saline interior environments of Albacete (SE Spain). We examined collection material from the Sierra de las Nieves

National Park (Málaga, SE Spain), a new record that could not been represented in the distribution map. In the Balearic Islands, it is known from Mallorca and Menorca.

Biology

There is few published information about the biology of this species. As in the case of *P. riparius*, Ratti (1994) suggested that, in some populations along the Adriatic coast, the different life phases of *P. littoralis* can overlap in the same year, so it cannot be exclusively considered an annual species.

Bibliographic Ibero-Balearic records

Andújar *et al.* 2002; Baehr 1986; Champion 1898; Jeanne 1968, 1978; López-Pérez *et al.* 2014; Putzeys 1874; Serrano *et al.* 2015, 2021; Zaballos & Jeanne 1994.

Pogonus (Pogonus) luridipennis (Germar, 1822)

Figs 2C, 3H, 5B

Harpalus luridipennis Germar, 1822: 2.

Pogonus burrellii Curtis, 1824: 47.

Pogonus flavipennis Dejean, 1828: 8.

Diagnoses

Tegument bicolored: head and pronotum with metallic sheen, bluish green or bronze, while the elytra and appendices have a testaceous colour. Pronotum markedly cordiform and transverse. Elytra wide, sub-parallel and less convex than in other species. Up to 3 setigerous pores in the 3rd interstria.

Material examined

GERMANY • 1 ♂, 1 ♀; Hamburg-Altona, Mittelbe Sülldorf (near Magdeburg); 4 Jun. 1993; Wrase leg.; VMO.

SPAIN • 1 ♂; Huelva; Cardiel leg.; MNCN • 1 ♂; Toledo, Quero; 22 May 1929; Escalera leg.; MNCN.

Description

Habitus (Fig. 2C). Length: 6.0–7.0 mm. First antennomere slightly darker than the rest, that are uniformly testaceous. Palps yellow. Lateral sinuosity of the pronotum well-marked; anterior and hind angles in general protruding; lateral sulcus mildly widened. Surface of the anterior region of the pronotum slightly striated. Legs entirely testaceous. Median lobe of the aedeagus narrow and slightly arcuate, with the apex scarcely developed but clearly directed down (Fig. 3H).

Chorology

Wide Palaearctic distribution from the Iberian Peninsula to Siberia, in Mediterranean, Atlantic coastal and interior localities; coast of the North Sea, Black Sea and Caspian Sea (Ratti 1983; Bousquet 2017).

Ibero-Balearic distribution (Fig. 5B): in the Iberian Peninsula, the species is known with precision from coastal localities of the meridional extreme and from saline environments of the Southern Sub-plateau (SE Spain) and the Ebro valley (NE Spain). Imprecise records of *P. luridipennis* exist from Los Monegros Desert (NE Spain; Vives & Vives 1981, 1999), a saltmarsh of Toledo (SE Spain; Vives & Vives 1981), Alicante and Barcelona (E Spain; Zaballos & Jeanne 1994). The species is not known from the Balearic Islands.

Biology

Species associated with saline environments where plants of the genus *Salicornia* grow (Vigna Taglianti & Bonavita 1994). The preimaginal stages of *P. luridipennis* are known, unusually for Pogonini (see Jeannel 1941).

Bibliographic Ibero-Balearic records

Andújar *et al.* 2002; Jeanne 1978; Serrano 1983; Vives & Vives 1978a, 1986; Zaballos & Jeanne 1994.

Pogonus (Pogonus) pallidipennis Dejean, 1828 Figs 2D, 3I, 5C

Pogonus (Pogonus) pallidipennis Dejean, 1828: 7.

Pogonus rappi Hubenthal, 1915: 107.

Diagnoses

Tegument similar than in *P. luridipennis*. Pronotum weakly or not transverse, sub-cordiform. Elytra narrow, parallel and convex. Up to 3 setigerous pores in the 3rd interstria.

Material examined

No Ibero-Balearic material was available for study.

FRANCE • 4 ♂♂, 7 ♀♀; Provence-Alpes-Côte d’Azur, Saintes-Maries-de-la-Mer; 28 Mar. 1974; G. Dubault leg.; VMO.

Description

Habitus (Fig. 2D). Length: 7.0–8.0 mm. Antennomeres testaceous, but the 2nd and 3rd are slightly lighter than the rest. Palps yellow. Lateral sinuosity of the pronotum relatively long and smooth; lateral sulcus slightly widened. Anterior region of the pronotum slightly punctured; punctuation of the base deep, combined with marked longitudinal clefts that give the surface a striated appearance. Legs entirely testaceous. Median lobe of the aedeagus wide in its median region, clearly arcuate and with the apex narrow and relatively sharp (Fig. 3I).

Chorology

Species present along the Mediterranean coast of the Iberian Peninsula, France and Italy (Bousquet 2017).

Ibero-Balearic distribution (Fig. 5C): in the Iberian Peninsula, the only precise records of this species come from some localities of the Catalan coast (NE Spain), but it has also been reported, with no precision, from the coast of Valencia (E Spain; Zaballos & Jeanne 1994).

Biology

The few published comments about its biology remark that, as in other Pogonini, *P. pallidipennis* has a sub-lapidicolous life close to wet and saline zones (it can also be collected under other solid objects that act as refuges) (Español 1964).

Bibliographic Ibero-Balearic records

Español 1964; Vives & Vives 1978a; Zaballos & Jeanne 1994.

***Pogonus (Pogonus) riparius* Dejean, 1828**

Figs 2E, 3J, 5D

Pogonus (Pogonus) riparius Dejean, 1828: 16.

Diagnoses

Body tegument and first antennomere with metallic sheen, bronze or blue. Pronotum sub-cordiform, convex and almost quadrangular, with the posterior region poorly narrowed and the base sub-rectilinear and markedly wider than the anterior margin. Elytra sub-parallel and convex. Up to 3 setigerous pores in the 3rd interstria.

Material examined

No Ibero-Balearic material was available for study.

GREECE • 2 ♂♂; Corfu, Korission Lagoon; 15 May 1992; Gudenzi leg.; PN • 3 ♀♀; Lefkada; 4 Jun. 2004; P. Neri leg.; PN • 1 ♂; Peloponnesus; Akra Arakos, Limno, Kalogria/Limanaki; 28 Apr. 1996; W.A. Marggi leg.; WAM • 1 ♂; Phthiotis, Lamia; 30 May 1999; W.A. Marggi leg.; WAM • 1 ♂, 1 ♀; Thessaly, Fanari, Limni Ptelia; 28 May 1999; W.A. Marggi leg.; WAM • 2 ♀♀; Thrace, Kavalla, Agiasma; 28 May 1999; W.A. Marggi leg.; WAM.

ITALY • 3 ♂♂, 2 ♀♀; Basilicata, mouth of the River Sinni; 25 Apr. 1988; Gudenzi leg.; PN • 1 ♂, 1 ♀; Emilia-Romagna, Ravenna, Cervia; 7 Aug. 1983; Pavanello leg.; PN • 2 ♀♀; same collection data as for preceding; Jul. 1982; Pavanello leg.; PN • 1 ♂; Emilia-Romagna, Ravenna; 28 Apr. 1979; Gudenzi leg.; PN • 1 ♀; Emilia-Romagna, Ravenna, mouth of the River Savio; 11 May 2008; Gudenzi leg.; PN • 2 ♀♀; Emilia-Romagna, Ravenna, Pineta di San Vitale; 5 Jan. 1975; Gudenzi leg.; J. Salvigni coll.; PN • 1 ♂, 2 ♀♀; Puglia, Foggia, Lake Lesina; 11 Jul. 1986; Gudenzi leg.; PN • 2 ♀♀; Toscana, Grosseto, Marina di Alberesse; 28 Apr. 2017; P. Neri leg., PN.

Description

Habitus (Fig. 2E). Length: 6.0–8.0 mm. Antennae dark, with the base of the antennomeres (especially the 2–5) slightly lighter. Palps dark, but lighter in the base and/or apex. Anterior angles of the pronotum protruding; hind angles straight. Lateral sulcus of the pronotum marked and narrow. Surface of the pronotal disc slightly rugose. Legs brown, but femora the base and apex of the tibiae or the dorsal surface of the tarsi can be darkened (in this last case, sometimes with a slight metallic sheen). Median lobe of the aedeagus narrow, regularly arcuate from the base to the apex (Fig. 3J).

Chorology

Species distributed along the Mediterranean coast of South Europe from Spain to Albania (Bousquet 2017), also present in Cyprus (Jeanne 1986). In Bulgaria, it is associated with the coast of the Black Sea (Gueorguiev & Gueorguiev 1995).

Ibero-Balearic distribution (Fig. 5D): in the Iberian Peninsula, the species is known from some coastal and saline environments of Alicante (E Spain) and Catalonia (NE Spain). Eiroa *et al.* (1988) reported one record from the Playa de Barra (Pontevedra, Galicia, NW Spain), but it was based on incorrect identification of *P. chaldeus* (Campos Gómez & Novoa 2006). The species has been reported, with no precise locality, from the Balearic Islands (Menorca; Compte Sart 1968; Zaballos & Jeanne 1994).

Biology

The species occupies environments where plants of *Arthrocnemetea* grow (Sauleda 1985). The only comments about its phenology come from Ratti (1994), who suggested that, in some populations along

the Adriatic coast, the different life phases of this species can overlap in the same year, so it cannot be exclusively considered an annual species.

Bibliographic Ibero-Balearic records

Baehr 1986; Cuní 1885; Prieto Piloña & Valcárcel 1996; Sauleda 1985; Serrano *et al.* 2021; Toribio 2022.

Pogonus (Pogonus) smaragdinus Walth, 1835

Figs 2F, 3K, 5E

Pogonus (Pogonus) smaragdinus Walth, 1835: 53.

Pogonus viridimicans Fairmaire, 1852: 69.

Diagnoses

Tegument shiny, bluish or emerald green. Pronotum sub-cordiform and markedly convex; surface of the central disc smooth. Elytra sub-parallel and convex. Up to 3 setigerous pores in the 3rd interstria.

Material examined

SPAIN • 2 ♂♂, 2 ♀♀; Cádiz, San Fernando, Campo Soto; 11 Nov. 1993; P. Coello leg.; VMO • 2 ♂♂; Cádiz, Chiclana; 29 Mar. 1991; J.M. Beltrán leg.; VMO • 1 ♂; Cádiz, La Janda; 18 Oct. 1980; J. de Ferrer leg.; VMO • 1 spec.; Cádiz, Laguna de La Janda; 15 Jun. 1976; J. Ramírez leg.; MNCN • 1 ♀; Cádiz, Los Barrios; 27 Apr. 1976; J. de Ferrer leg.; VMO • 2 specs; Cádiz, Palmones; 27 Apr. 1976; J. Ramírez leg.; MNCN • 2 specs; same collection data as for preceding; 3 May 1976; J. Ramírez leg.; MNCN • 3 specs; same collection data as for preceding; 29 Apr. 1976; MNCN • 3 specs; Cádiz, San Fernando; 15 Apr. 1976; J. Ramírez leg.; MNCN • 1 spec.; Cádiz, Zahara de los Atunes; 24 Apr. 1976; J. Ramírez leg.; MNCN • 1 spec.; same collection data as for preceding; 22 May 1976; MNCN • 1 ♂, 1 ♀; Sevilla, Los Palacios y Fillafranca, Caño de la Vera; 30 Nov. 2002; J. Navarro leg.; VMO.

Description

Habitus (Fig. 2F). Length: 6.5–8.0 mm. Palps yellow; antennae entirely testaceous. Anterior angles of the pronotum rounded and not protruding; lateral sulcus narrow. Base of the pronotum punctured. Legs pallid testaceous or yellow. Median lobe of the aedeagus narrow, arcuate near the distal extreme and with claw-appearance since the apex is abruptly directed down (Fig. 3K).

Chorology

Species with a narrow distribution: it is present only at coastal and saline interior localities of the meridional extreme of the Iberian Peninsula (Fig. 5E) and in North Africa (Vives 1965; Bousquet 2017).

Biology

There is no published information about the biology of this Pogonini. The first record of *P. smaragdinus* in an interior locality of the Iberian Peninsula corresponds to the Laguna de Herrera, a saline lagoon in Antequera (Málaga, Spain) (Zaballos, 1986a).

Bibliographic Ibero-Balearic records

Champion 1898; Zaballos 1986a; Zaballos & Jeanne 1994.

Discussion

The Ibero-Balearic species of Pogonini can be divided in two main groups according to their global distribution:

- 1) Mediterranean elements, more or less present along the Mediterranean coast of SW Europe and North Africa, including *Pogonistes testaceus testaceus*, *Pogonistes gracilis*, *Pogonus chalceus viridanus*, *Pogonus pallidipennis*, *Pogonus riparius* and *Pogonus smaragdinus*.
- 2) Widespread Palearctic elements, present in several regions from S Europe to Asia, including *Sirdenus grayii*, *Pogonus meridionalis*, *Pogonus gilvipes*, *Pogonus littoralis* and *Pogonus luridipennis*.

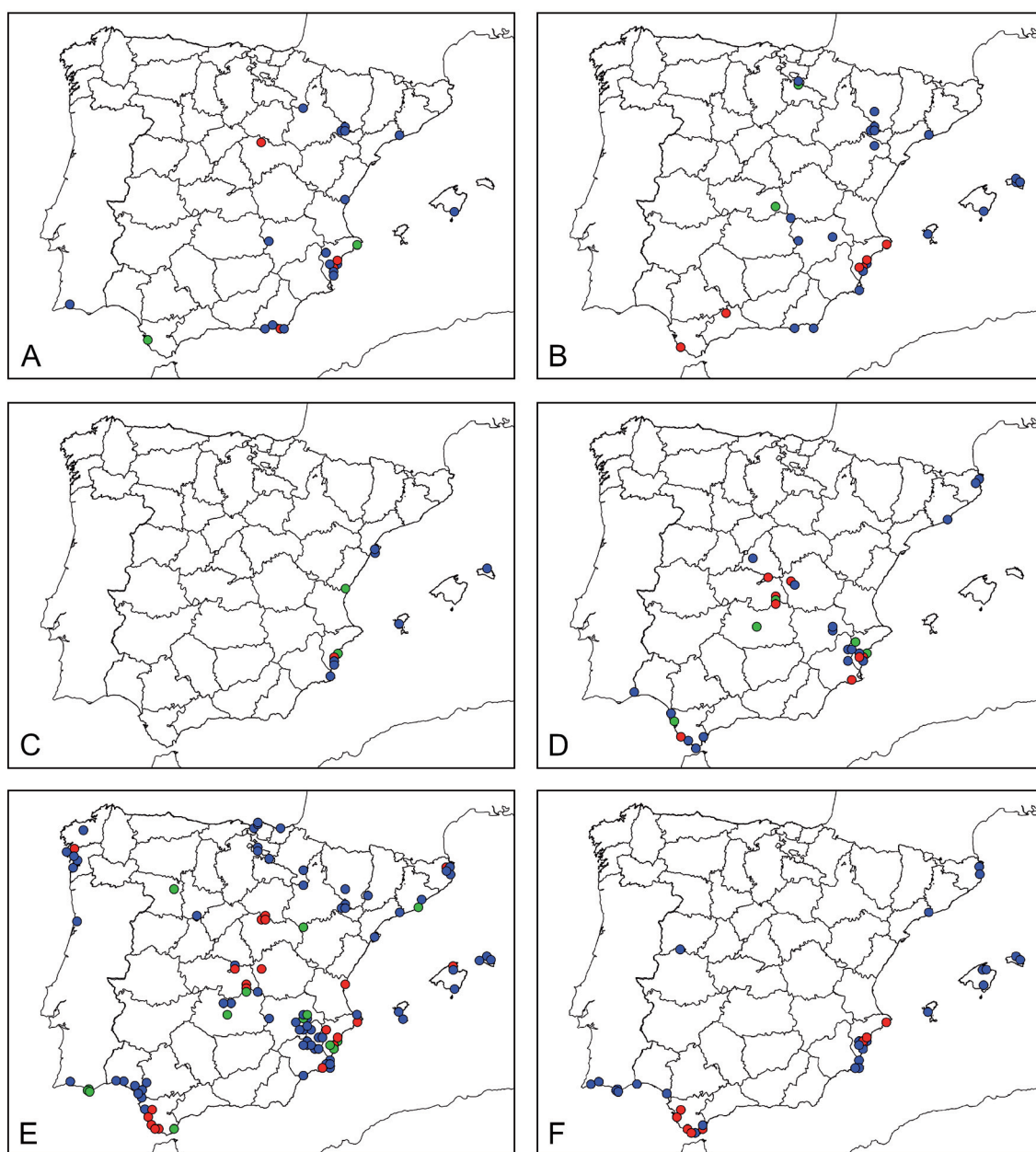


Fig. 4. Distribution map in the Ibero-Balearic region. **A.** *Sirdenus (Syrdenopsis) grayii* (Wollaston, 1862). **B.** *Pogonistes gracilis* (Dejean, 1828). **C.** *Pogonistes testaceus testaceus* (Dejean, 1828). **D.** *Pogonus (Pogonoidius) meridionalis* Dejean, 1828. **E.** *Pogonus (Pogonus) chalceus viridanus* Dejean, 1828. **F.** *Pogonus (Pogonus) gilvipes* Dejean, 1828. Occurrence points: bibliographic records (blue dots), bibliographic records confirmed with examined material (green dots), new records (red dots).

The halobiont condition of Pogonini suggests that their presence is closely related to the existence of saline and humid environments. Our results support this assumption, as the vast majority of the records comes from localities with these two requirements, such as the coast and inner saline lakes and lagoons. In particular, we want to note the occurrence of Pogonini in salt pans [‘salinas’ or ‘saladares’ in Spanish]. Salt pans represent an anthropogenic habitat that results from salt exploitation, a common and important economic activity in Mediterranean coastal villages of Spain (Walmsley 2000). The importance of the management and protection of salt pans for the conservation of specialised organisms has previously

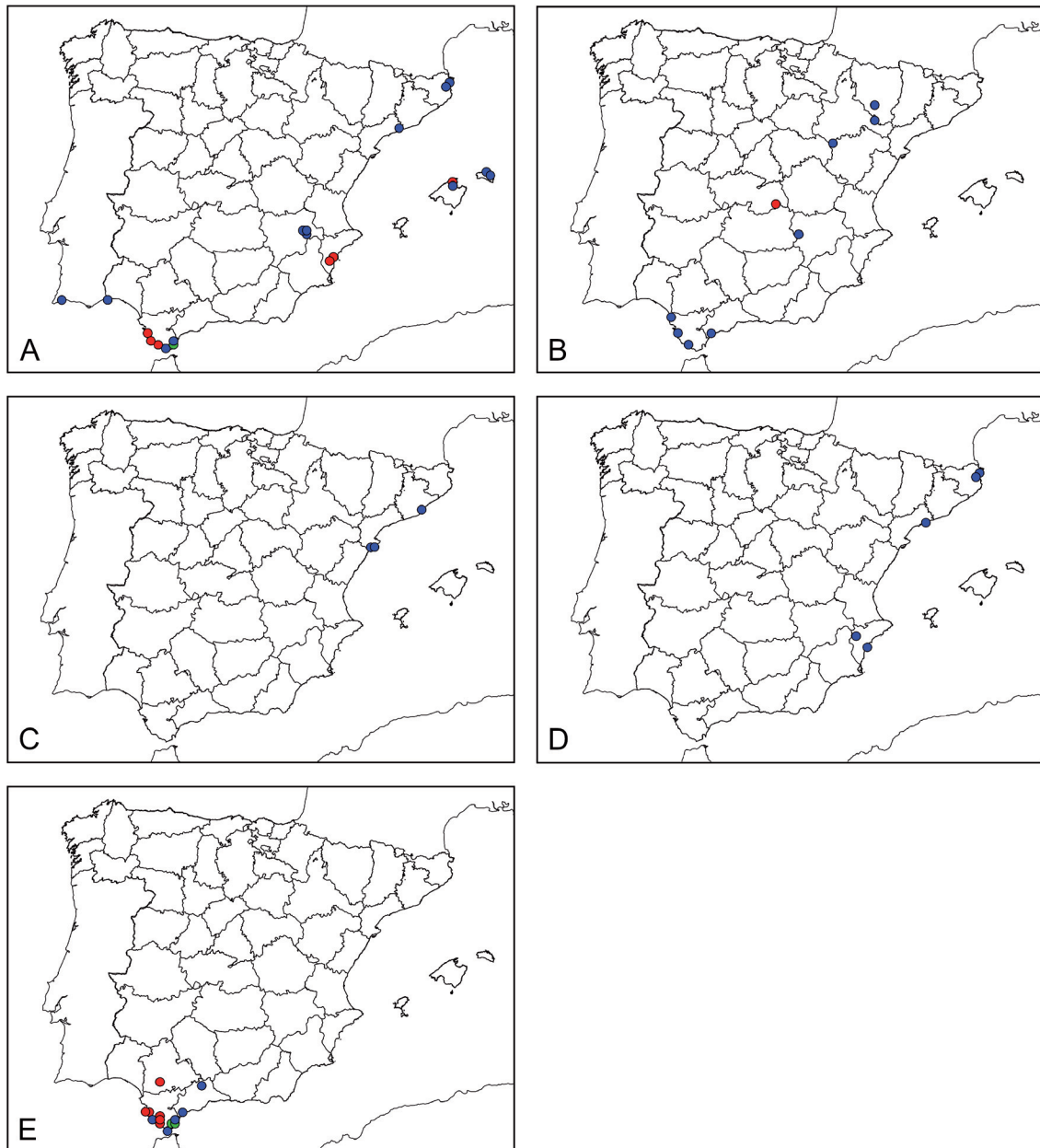


Fig. 5. Distribution map in the Ibero-Balearic region. A. *Pogonius (Pogonius) littoralis* (Duftschmid, 1812). B. *Pogonius (Pogonius) luridipennis* (Germar, 1822). C. *Pogonius (Pogonius) pallidipennis* Dejean, 1828. D. *Pogonius (Pogonius) riparius* Dejean, 1828. E. *Pogonius (Pogonius) smaragdinus* Waltl, 1835. Occurrence points: bibliographic records (blue dots), bibliographic records confirmed with examined material (green dots), new records (red dots).

been suggested (López *et al.* 2010), and we found that Pogonini species are well established in this environment. Some salt pans with protection status and records of Pogonini are: Salinas de la Mata (Natural Park of Las Lagunas de La Mata y Torrevieja, Alicante), Salinas de Bonmatí (Natural Park of Las Salinas de Santa Pola, Alicante), Salinas del Rasall (Regional Park of Calblanque, Monte de las Cenizas y Peña del Águila, Murcia), Salinas de Ibiza (Natural Park of Las Salinas de Ibiza y Formentera, Balearic Islands) and Salinas de l'Albufera (Natural Park of La Albufera de Mallorca, Balearic Islands).

Our results reveal a strong regionalisation of the tribe Pogonini in the Ibero-Balearic territory, as most of the records are concentrated in some zones: the Catalanian coast, the Ebro basin, the Southern Sub-plateau, the Segura Basin, the Southwestern coast and the Balearic Islands. All these regions present a dry climate, a temperate climate (with warm, dry summers) or a mixture of both (AEMET & IMP 2011). It is relevant that, from these regions, the continental inner ones correspond to the zones with the lowest mean average annual precipitation of the peninsula (300–500 mm; AEMET & IMP 2011). In these arid areas, evaporation exceeds precipitation, resulting in saline water marshes when endorheic lakes and lagoons are formed (Yechieli & Wood 2002). With respect to the coastal localities, species of Pogonini are represented more on the Mediterranean coast than on the Atlantic coast. This unequal distribution between the Iberian coasts may again be related to abiotic factors, as the Mediterranean is a high-salinity sea (Emery & Camps 2017: 695) and, presumably, more suitable for the establishment of Pogonini. Outside these areas, the tribe Pogonini seems to be less represented, but not absent. This is especially true for *Pogonus chalceus viridanus*, as its wide distribution (Fig. 4E) suggests that it is the most eurytopic species of the Ibero-Balearic fauna.

At this point, we must note that the absence of data should not be always interpreted as true absence. The scarcity of records along the west coast of Portugal may represent a sampling bias in the current chorological knowledge of the tribe Pogonini. Thus, we suggest considering the possible and non-reported distribution of species of Pogonini along the Western coast of Portugal, especially those known from the northwestern and southwestern coasts of the Peninsula. Another potentially poorly-studied region is the Northern Sub-plateau, from which only *Pogonus chalceus viridanus* has been reported (Fig. 4E). Future sampling and examination of collection material are expected to provide new chorological data in the study area.

Conclusions

The tribe Pogonini is represented in the Ibero-Balearic region by 3 genera and 11 species, all of them well characterised taxa that could be recognised by studying their external morphology and aedeagus. None of these species is endemic, but more or less widespread Palearctic elements (some of them are only present in the Mediterranean basin). Ibero-Balearic Pogonini are halobiont carabids that colonise saline and humid environments such as the coast, salt marshes, salt pans and saline lagoons and lakes. In the study area, the group is principally known from the meridional and Mediterranean coasts (including the Balearic Islands) and the inner arid regions of eastern Spain.

Acknowledgments

We want to express our gratitude to Paolo Neri and Werner A. Marggi for the loan of the material of *Pogonus riparius* here studied. We would like to thank the curator Mercedes París for granting us access to the collection of Pogonini deposited in the Museo Nacional de Ciencias Naturales (MNCN). We also thank our colleagues Enrique Ledesma and Elena Andrés Gómez for their collaboration in several samplings. Finally, we thank the referees, one of them Arnaud Faille, and the editor Max Barclay for corrections and suggestions improving the manuscript.

References

- AEMET & IMP 2011. *Atlas Climático Ibérico*. Agencia Estatal de Meteorología. Ministerio de Medio Ambiente y Medio Rural y Marino e Instituto de Meteorología de Portugal, Madrid.
- Aistleitner E. & Lencina J.L. 2018. Fragmenta entomofaunistica XXV. Zur Laufkäferfauna der Iberischen Halbinsel (Coleoptera, Carabidae). *Entomofauna* 39 (2): 623–669.
- Aliquò V. & Castelli V. 1991. Nuovi dati sui coleotteri Cicindelidi e Carabidi del Trapanese. *Libera Università Trapani* 10 (29): 5–66.
- Andújar C., Andújar A., Lencina J.L., Ruano L. & Serrano J. 2001. Los Carabidae (Insecta, Coleoptera) del Saladar de Cordovilla (Albacete). *Sabuco, Revista de Estudios Albacetenses* 2: 121–166.
- Andújar C., Andújar A., Lencina J.L., Ruano L. & Serrano J. 2002. Los Carabidae (Insecta, Coleoptera) de lagunas y embalses de Albacete. *Sabuco, Revista de Estudios Albacetenses* 3: 23–76.
- Antoine M. 1961. Coléoptères Carabiques du Maroc (quatrième partie). *Mémoires de la Société des Sciences naturelles et physiques du Maroc (Zoologie, N.S.)* 8: 466–539.
- Azadbakhsh S. 2019. Contribution to the tribe Pogonini Laporte, 1834 (Coleoptera: Carabidae, Trechinae) with descriptions of a new genus and a new species from southern Iran. *Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen* 71: 141–152.
- Baehr M. 1986. On the carabid fauna of the province of Girona, northeastern Spain (Insecta, Coleoptera). *Miscel·lània Zoològica* 10: 161–171.
- Baehr M. 1988. Über seltene und weing bekannte Laufkäfer aus Spanien (Coleoptera, Cicindelidae und Carabidae). 1. Teil: Cicindelidae; Carabidae: Carabinae bis Pogoninae. *Sonderabdruck aus dem Nachrichtenblatt der Bayerischen Entomologen Jahrgang* 37 (1): 18–26.
- Baudi di Selve F. 1864. Coleopterorum messis in insula Cypro et Asia minore ab Eugenio Truqui congregatae recensitio: de Europaeis notis quibusdam additis. Pars prima. *Berliner Entomologische Zeitschrift* 8: 195–233. <https://doi.org/10.1002/mmnd.18640080304>
- Bolívar C. 1919. Notas sobre Carábidos españoles (1). *Boletín de la Real Sociedad Española de Historia Natural* 19: 73–79.
- Bousquet Y. 2012. Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. *ZooKeys* 245: 1–1722. <https://doi.org/10.3897/zookeys.245.3416>
- Bousquet Y. 2017. Tribe Pogonini Laporte, 1834. In: Löbl I. & Löbl D. (eds) *Catalogue of Palaearctic Coleoptera. Revised and Updated Edition. Vol. 1. Archostemata-Myxophaga-Adephaga*: 354–357. Koninklijke Brill NV, Leiden.
- Bousquet Y. & Laplante S. 1997. Taxonomic review of the New World Pogonini (Coleoptera: Carabidae). *The Canadian Entomologist* 129: 699–731. <https://doi.org/10.4039/Ent129699-4>
- Cárdenas A.M., Gallardo P., González R. & Hidalgo J.M. 1999. Biología de reproducción de *Chlaenius velutinus* (Duftschmid, 1812) (Coleoptera, Carabidae) en el sur de la Península Ibérica. *Zoologica baetica* 10: 113–122.
- Carret A. 1903. Notes relatives à l'étude de quelques pogonides. Création d'un sous-genre. Description d'espèce et variétés nouvelles. *L'Échange, Revue Linnéenne* 19: 150–152.
- Campos Gómez A.M. & Novoa F. 2006. *Los Carabidae (orden Coleoptera) de Galicia (N.O. de España). Catálogo, distribución y ecología*. Monografías de Nova Acta Científica Compostelana - Serie Biología, Universidad de Santiago de Compostela.

- Champion G.C. 1898. A list of the Cicindelidae, Carabidae and Staphylinidae collected by Mr. J.J. Walker, R.N., F.L.S., in the region of the Strait of Gibraltar. *Transactions of the Entomological Society of London, part I* 5: 65–103.
- Chapman T.A. & Champion G.C. 1907. Entomology in N.W. Spain (Galicia and León). *Transactions of the Entomological Society of London, part I*: 147–171.
<https://doi.org/10.1111/j.1365-2311.1907.tb03068.x>
- Chaudoir M. 1872. Essai monographique sur le groupe des pogonides. *Annales de la Société entomologique de Belgique* 14: 21–61.
- Choi I.J., Lim J., Park J. & Park J.K. 2015. Taxonomic revision of the tribe Pogonini (Coleoptera: Carabidae) from Korea. *Journal of Asia-Pacific Entomology* 18: 831–835.
<https://doi.org/10.1016/j.aspen.2015.10.013>
- Compte Sart A. 1968. *La Fauna de Menorca y su Origen (Síntesis de la Fauna de Menorca, su Naturaleza y un Ensayo acerca de su Origen)*. Ateneo Científico, Literario y Artístico, Mahón.
- Cuní M. 1885. Excursión entomológica a varias localidades de la provincia de Gerona (Catalonia). *Anales de la Sociedad española de Historia Natural* 14 (1): 51–73.
- Curtis J. 1824. *British Entomology; Being Illustrations and Descriptions of the Genera of Insects Found in Great Britain and Ireland: Containing Coloured Figures from Nature of the Most Rare and Beautiful Species, and in Many Instances of the Plants upon which they are Found. Vol. I*. J. Curtis, London.
<https://doi.org/10.5962/bhl.title.8148>
- Dejean P.F.M.A. 1821. *Catalogue de la Collection de Coléoptères de M. le Baron Dejean*. Crevot, Paris.
<https://doi.org/10.5962/bhl.title.11259>
- Dejean P.F.M.A. 1828. *Species Général des Coléoptères de la Collection de M. le Comte Dejean. Tome troisième*. Méquignon-Marvis, Paris.
- Desender K. 1989. Heritability of wing development and body size in a carabid beetle, *Pogonus chalceus* Marsham, and its evolutionary significance. *Oecologia* 78: 513–520. <https://doi.org/10.1007/BF00378743>
- Desender K., Backeljau T., Delahaye K. & De Meester L. 1998. Age and size of European saltmarshes and the population genetic consequences for ground beetles. *Oecologia* 114: 503–513.
<https://doi.org/10.1007/s004420050474>
- Desender K., Serrano J. & Verdyck P. 2000. Genetic diversity and wing polymorphism in the saltmarsh beetle *Pogonus chalceus*: an Atlantic-Mediterranean comparison. In: Brandmayr P., Lövei G.L., Zetto Brandmayr T., Casale A. & Vigna Taglianti A. (eds) *Natural History and Applied Ecology of Carabid Beetles*: 35–43. Pensoft, Sofia.
- Dieck G. 1870. [New species]. In: Heyden L. von (ed.) *Entomologische Reise nach dem südlichen Spanien, der Sierra Guadarrama und Sierra Morena, Portugal und den Cantabrischen Gebirgen. Mit Beschreibungen der neuen Arten*: 60. G. Kraatz & Nicolai, Berlin; Friedrich Fleischer, Leipzig; L. Buquet, Paris.
- Duftschild C.E. 1812. *Fauna Austriae, oder Beschreibung der österreichischen Insekten für angehende Freunde der Entomologie. Zweyter Theil*. Akademie Buchhandlung, Linz & Leipzig.
- Eiroa E., Novoa F. & González J. 1988. La entomofauna de las dunas de la Playa de Barra (Cangas-Pontevedra). III. *Coleoptera*. *Boletín de la Asociación española de Entomología* 12: 301–317.
- Emery W. & Camps A. 2017. Ocean applications. In: Emery W. & Camps A. (eds) *Introduction to Satellite Remote Sensing. Atmosphere, Ocean, Cryosphere and Land Applications*: 637–699. Elsevier.
<https://doi.org/10.1016/B978-0-12-809254-5.00009-9>

- Español F. 1964. Algunos carábidos interesantes del Levante Español (Coleoptera). *Graellsia* 20 (4–6): 277–280.
- Faille A., Casale A. & Ribera I. 2011. Phylogenetic relationships of Western Mediterranean subterranean Trechini groundbeetles (Coleoptera: Carabidae). *Zoologica Scripta* 40 (3): 282–295.
<https://doi.org/10.1111/j.1463-6409.2010.00467.x>
- Fairmaire L. 1852. Quelques coléoptères nouveaux du midi de l'Europe et du nord de l'Afrique. *Annales de la Société entomologique de France* (2) 10: 69–93.
- Fairmaire L. 1856. Miscellanea entomologica. Première partie. *Annales de la Société entomologique de France* (3) 4: 517–548.
- Fairmaire L. 1873. [New species]. In: Fairmaire L. & Raffray A. Coléoptères du nord de l'Afrique. *Revue et Magasin de Zoologie pure et appliquée* (3) 1: 331–385.
- Fuente J.M. de la. 1927. *Tablas Analíticas para la Clasificación de los Coleópteros de la Península Ibérica. I. Cicindelidae, II. Carabidae*. Altés, Barcelona.
- Germar E.F. 1817. *Reise nach Dalmatien und in das Gebiet von Ragusa. Mit 9 illum. Kupfern und 2 Charten*. F.A. Brockhaus, Leipzig & Altenburg.
- Germar E.F. 1822. *Fauna Insectorum Europae. VII. C.A. Kummel, Halae*.
- Google Earth 2015. Google Inc. [Software]. Version 7.1.2.2041. Available from <http://www.google.com/earth/index.html> [accessed Apr. 2018].
- Grebennikov V. & Bousquet Y. 1999. Larvae of Pogonini (Coleoptera: Carabidae): genera *Pogonus*, *Pogonistes*, *Cardiaderus*, and *Thalassotrechus*. *Acta Societatis Zoologicae Bohemicae* 63: 427–441.
- Gueorguiev V.B. & Gueorguiev B.V. 1995. *Catalogue of the Ground Beetles of Bulgaria (Coleoptera: Carabidae)*. Pensoft Publishers, Sofia-Moscow.
- Herrera L. & Arricibita F.J. 1990. *Los Carábidos de Navarra, España (Coleoptera, Carabidae). Descripción, Binomía, Distribución, Geografía y Clasificación*. Entomograph vol. 12., E.J. Brill/Scandinavian Science Press.
- Hubenthal W. 1915. Eine neue Art der Coleopterengattung *Pogonus* Dej. aus Süd-Frankreich. *Entomologische Blätter* 11: 107–108.
- Jeanne C. 1968. Carabiques de la Péninsule Ibérique (7^e note). *Actes de la Société linnéenne de Bordeaux* 105 (S.A, 1): 1–25.
- Jeanne C. 1978. Carabiques de la Péninsule Ibérique (3^e supplément). *Bulletin de la Société linnéenne de Bordeaux* 8: 21–47.
- Jeanne C. 1986. Contribution à l'histoire naturelle de l'île de Chypre. Les Coléoptères Carabiques. *Biocosme mésogéen* 3 (1): 1–33.
- Jeannel R. 1941. Coléoptères Carabiques, première partie. *Faune de France* 39: 1–571.
- Küster H.C. 1852. *Die Käfer Europas. Nach der Natur beschrieben. Mit Beiträgen mehrerer Entomologen*. Fünfundzwanzigstes Heft., Bauer & Raspe, Nürnberg.
- Laporte F.L. de. 1834. *Études entomologiques, ou description d'insectes nouveaux et observations sur leur synonymie*. Méquignon-Marvis, Paris.
- Löbl I. & Löbl D. 2017. *Catalogue of Palaearctic Coleoptera. Revised and Updated Edition. Vol. 1. Archostemata-Myxophaga-Adephaga*. Koninklijke Brill NV, Leiden.

- López E., Aguilera P.A., Schmotz M.F., Castro H. & Pineda F.D. 2010. Selection of ecological indicators for the conservation, management and monitoring of Mediterranean coastal salinas. *Environmental Monitoring and Assessment* 166: 241–256. <https://doi.org/10.1007/s10661-009-0998-2>
- López-Pérez J.J., Sánchez Gea J.F., Cárdenas Talaverón A. & Serrano J. 2014. Catálogo de los Carabidae (Coleoptera) de la provincia de Huelva (suroeste de Andalucía, España). *Boletín de la Sociedad Entomológica Aragonesa* 54: 263–292.
- Lutshnik V.N. 1927. Klíč nového rozdělení podrodů v rodu *Pogonus* Nic. (Col., Carabidae). *Časopis Československé Společnosti Entomologické* 23: 89–90.
- Lutshnik V.N. 1933. A note on the subgenus *Syrdenus* Chaud. (Coleoptera, Carabidae). *The Annals and Magazine of Natural History* 10 (11): 689–690. <https://doi.org/10.1080/00222933308673745>
- Machado A. 1992. *Monografía de los Carábidos de las Islas Canarias (Insecta, Coleoptera)*. Instituto de Estudios Canarios, La Laguna, Tenerife.
- Maddison D.R. 2012. Phylogeny of *Bembidion* and related ground beetles (Coleoptera: Carabidae: Trechinae: Bembidiini: Bembidiina). *Molecular Phylogenetics and Evolution* 63: 533–576. <https://doi.org/10.1016/j.ympev.2012.01.015>
- Maddison D.R. & Ober K.A. 2011. Phylogeny of minute carabid beetles and their relatives based upon DNA sequence data (Coleoptera, Carabidae, Trechitae). *ZooKeys* 147: 229–260. <https://doi.org/10.3897/zookeys.147.1871>
- Maddison D.R., Kanda K., Boyd O.F., Faille A., Porch N., Erwin T.L. & Roig-Juñent S. 2019. Phylogeny of the beetle supertribe Trechitae (Coleoptera: Carabidae): Unexpected clades, isolated lineages, and morphological convergence. *Molecular Phylogenetics and Evolution* 132: 151–176. <https://doi.org/10.1016/j.ympev.2018.11.006>
- Magrini P. & Schembri S. 1997. A topographic catalogue of the Carabidae of the Maltese Islands (Coleoptera). *Bolletino della Società entomologica italiana* 129 (3): 213–234.
- Matalin A.V. & Makarov K.V. 2008. Life cycles in the ground-beetle tribe Pogonini (Coleoptera, Carabidae) from the Lake Elton region, Russia. In: Penev L., Erwin T. & Assmann T. (eds) *Back to the Roots and Back to the Future. Towards a New Synthesis amongst Taxonomic, Ecological and Biogeographical Approaches in Carabidology. Proceedings of the XIII European Carabidologists Meeting, Blagoevgrad, August 20–24, 2007*: 305–323. Pensoft Publishers, Sofia-Moscow.
- Mateu J. 1947. Los carábidos de la delta del río Llobregat. *Graellsia* 5 (1): 1-19.
- Motschulsky V. 1844. Insectes de la Sibérie rapportés d'un voyage fait en 1839 et 1840. *Mémoires présentés à l'Académie impériale des Sciences de St.-Petersbourg par divers Savans et lus dans ses Assemblées* 5: 1–274, i–xv, 10 pls. <https://doi.org/10.5962/bhl.title.16349>
- Novoa F., Baselga A. & Campos A. 1998. Inventario de coleópteros (Carabidae, Staphylinidae y Chrysomelidae) de los sistemas dunares y lagunares del Parque Natural de Corrubedo (Galicia, noroeste de la Península Ibérica). *Nova Acta Científica Compostelana (Biología)* 8: 281–295.
- Ortiz A.S., Galián J., Andújar A. & Serrano J. 1989. Estudio comparativo de la fauna de carábidos de algunas lagunas de la región manchego-levantina (España). (Coleoptera: Adephaga). *Anales de Biología*, 15 (*Biología Animal* 4): 49–57.
- Ortuño V.M. & Barranco P. 2015. Un nuevo *Trechus* (Coleoptera, Carabidae, Trechini) hipogeo de la Sierra de Parapanda (Andalucía, España): taxonomía, sistemática y biología. *Animal Biodiversity and Conservation* 38 (2): 191–206. <https://doi.org/10.32800/abc.2015.38.0191>

- Ortuño V.M. & Gilgado J.D. 2011. Historical perspective, new contributions and enlightening dispersal mechanism for the endogean genus *Typhlocharis* Dieck 1869 (Coleoptera: Carabidae: Trechinae). *Journal of Natural History* 45 (19–20): 1233–1256. <https://doi.org/10.1080/00222933.2011.566944>
- Ortuño V.M. & Jiménez-Valverde A. 2011. Taxonomic notes on Trechini and description of a new hypogean species from the Iberian Peninsula (Coleoptera: Carabidae: Trechinae). *Annales de la Société entomologique de France* 47 (1–2): 21–32. <https://doi.org/10.1080/00379271.2011.10697693>
- Ortuño V.M. & Marcos J.M. 2003. *Los Caraboidea (Insecta, Coleoptera) de la Comunidad Autónoma del País Vasco*. Eusko Jaurlaritzaren Argitalpen Zerbitzu Nagusia (Servicio Central de Publicaciones del Gobierno Vasco), Vitoria-Gasteiz.
- Ortuño V.M. & Sendra A. 2010. Description of *Microtyphlus (Speleotyphlus) infernalis* n. sp. from Valencia (eastern Iberian Peninsula), and review of the present state of knowledge of this hypogean subgenus (Coleoptera: Carabidae: Anillini). *Revue suisse de Zoologie* 117 (1): 169–183. <https://doi.org/10.5962/bhl.part.117598>
- Ortuño V.M. & Sendra A. 2011. A new hypogean species of Iberian *Microtyphlus* and a review of the taxonomic position of *Speleotyphlus* and *Aphaenotyphlus* (Carabidae: Trechinae: Anillini). *Zootaxa* 2862 (1): 56–68. <https://doi.org/10.11646/zootaxa.2862.1.3>
- Ortuño V.M. & Toribio M. 1996. *Los Coleópteros Carábidos. Morfología, Biología y Sistemática*. Fauna de la Comunidad de Madrid. Organismo Autónomo Parques Nacionales (Ministerio de Medio Ambiente), Madrid.
- Ortuño V.M. & Toribio M. 2005. *Carabidae de la Península Ibérica y Baleares. Vol. I. Trechinae, Bembidiini*. Argania Editio, Barcelona.
- Ortuño V.M., Zabalegui I. & Marcos J.M. 1997. Nuevos datos de *Pseudolimnaeum inustum* (Duval, 1857) en la Península Ibérica y descripción de la genitalia femenina (Coleoptera, Caraboidea: Trechidae). *Boletín de la Asociación española de Entomología* 21 (3–4): 185–193.
- Ortuño V.M., Sendra A., Reboleira A.S.P.S., Fadrique F. & Faille A. 2017. The Iberian genus *Paraphaenops* Jeannel, 1916 (Coleoptera: Carabidae: Trechini): Morphology, phylogeny and geographical distribution. *Zoologischer Anzeiger* 266: 71–88. <https://doi.org/10.1016/j.jcz.2016.10.009>
- Pardo M.T., Esteve-Selma M.A., Giménez A., Martínez-Fernández J., Carreño M.F., Serrano J. & Miñano J. 2008. Assessment of hydrological alterations on wandering beetle assemblages (Coleoptera: Carabidae and Tenebrionidae) in coastal wetlands of arid Mediterranean systems. *Journal of Arid Environments* 72: 1803–1810. <https://doi.org/10.1016/j.jaridenv.2008.05.005>
- Palmer M. & Vives J. 1993. Carabidae i Tenebrionidae (Coleoptera) de s'Albufera de Mallorca: Dades preliminars. *Bolletí de la Societat d'Història Natural de les Balears* 36: 65–76.
- Pérez-González S. & Zaballos J.P. 2019. Structure of male genitalia in a lineage of minute endogean ground beetles: how four new species of *Microcharidius* Coiffait, 1969 (Coleoptera: Carabidae: Anillini) reveal gradual change and convergent evolution. *Arthropod Systematics & Phylogeny* 77 (1): 57–86.
- Pérez-González S., Andújar C. & Zaballos J.P. 2017. Hidden biodiversity: total evidence phylogenetics and evolution of morphological traits in a highly diverse lineage of endogean ground beetles, *Typhlocharis* Dieck, 1869 (Carabidae, Trechinae, Anillini). *Cladistics* 34: 359–383. <https://doi.org/10.1111/cla.12208>
- Prieto M. 2018. Els coleòpters del delta del Llobregat. Aproximació històrica i noves aportacions. In: Germain i Otzet J. & Pino i Vilalta J. (eds) *Els sistemes naturals del delta del Llobregat*: 408–482. Treballs de la Institució Catalana d'Història Natural (19), Barcelona.
- Prieto Piloña F. & Valcárcel J.P. 1996. Catálogo bibliográfico de los Caraboidea (Coleoptera) de Galicia (N.O. de la Península Ibérica). *Suplemento del Boletín de la Sociedad Entomológica Aragonesa* 1: 1–17.

- Puel L. 1923. Quelques variétés nouvelles du genre *Pogonus* Dej. (Col.). *Miscellanea Entomologica* 26: 89–91.
- Putzeys M.J. 1874. Relevé des Cicindélides et Carabiques recueillis en Portugal par M. Camille van Volxem en mai et juin 1871. *Annales de la Société entomologique de Belgique* 17: 47–60.
- Quantum Gis Development Team 2018. Quantum GIS Geographic Information System. Ver 2.18. Open Source Geospatial Foundation Project. Available from <https://qgis.org/es/site/> [accessed Jul. 2018].
- Ratti E. 1983. Ecologia e geonemia dei carabidi alofili delle coste adriatiche. *Atti del Museo civico di Storia naturale di Trieste* 35: 121–140.
- Ratti E. 1994. Alcuni aspetti, dell'attività di volo dei coleotteri carabidi sul delta del Po. *Quaderni della Stazione di Ecologia del civico Museo di Storia naturale di Ferrara* 6: 275–291.
- Ramos-Abuín J.A. 1990. Carábidos (Coleoptera: Carabidae) del complejo dunar-marismeno de Baldayo (La Coruña, Galicia). *Actas del IV Congreso Ibérico de Entomología, Sant Feliu de Guixols*: 103–104.
- Reitter E. 1923. Tableaux de détermination des Coléoptères d'Europe. Carabidae. Tribu: Pogonini. *Miscellanea Entomologica* 27 (6–7): 1–11.
- Rueda F. & Montes C. 1987. Riparian Carabids of saline aquatic ecosystems. *Acta Phytopathologica et Entomologica Hungarica* 22 (1–4): 247–263.
- Ruiz-Tapiador I. & Zaballos J.P. 2001. Los Caraboidea (Coleoptera) de los Montes de Toledo (España Central). *Boletín de la Sociedad Entomológica Aragonesa* 29: 11–31.
- Santos A., Montes C. & Ramírez-Díaz L. 1985. Ciclos de vida de algunas poblaciones de Carábidos (Col. Carabidae) de dos ecosistemas del bajo Guadalquivir (SO España) con especial referencia a *Steropus globosus ebenus* Quens, 1806. *Revue d'Écologie et de Biologie du Sol* 22 (1): 75–95.
- Sauleda N. 1985. Caraboidea amofilos y halofitos de la provincia de Alicante. *Anales de la Universidad de Alicante. Escuela de Magisterio* 2: 241–264.
- Serrano A.R.M. 2002. Os coleópteros carabóides endémicos da Península Ibérica em Portugal (Coleoptera: Caraboidea): Padrões de distribuição e tentativa de ordenação das áreas protegidas. In: Costa C., Vanin S.A., Lobo J.M. & Melic A. (eds) *Proyecto de Red Iberoamericana de Biogeografía y Entomología Sistemática PRIBES 2002. IV. Escenarios biogeográficos del Proyecto PRIBES*: 277–293. Monografías Tercer Milenio (m3m), vol. 2, Sociedad Entomológica Aragonesa, Zaragoza.
- Serrano A.R.M. & Aguiar A.S. 2014. The genus *Typhlocharis* Dieck 1869 (Coleoptera: Carabidae): description of a new species from Portugal and remarks on the external microsculpture of the last abdominal sternum “belt”. *Annales de la Société entomologique de France* 50 (2): 202–212. <https://doi.org/10.1080/00379271.2014.937106>
- Serrano J. 1983. Contribución al conocimiento de los Carábidos (Col.) de la Laguna de Gallocanta. *Boletín de la Asociación española de Entomología* 6 (2): 369–379.
- Serrano J. 2003. *Catálogo de los Carabidae (Coleoptera) de la Península Ibérica*. Monografías de la Sociedad Entomológica Aragonesa, vol. 9, Zaragoza.
- Serrano J. 2013. *New catalogue of the Family Carabidae of the Iberian Peninsula (Coleoptera)*. Universidad de Murcia, Murcia.
- Serrano J. 2020. *Catálogo electrónico de los Cicindelidae y Carabidae de la Península Ibérica (Coleoptera, Caraboidea)*. 2ª parte. [Versión 12.2020]. Monografías electrónicas SEA 9, Zaragoza. Available from <http://sea-entomologia.org/monoelec.html> [accessed 26 Dec. 2020].

- Serrano J., Galián J. & Ortiz A. 1986. A chromosome study of thirteen species of Spanish Carabidae (Coleoptera, Adephaga). *Folia Biologica* 34 (3): 319–328.
- Serrano J., Ortiz A.S. & Galán J. 1990. Los Carabidae de lagunas y ríos de la Submeseta Sur, España (Coleoptera, Adephaga). *Boletín de la Asociación española de Entomología* 14: 199–210.
- Serrano J., Fernández J.J., Fernández B., Ruiz C. & Petitpierre E. 2015. Los coleópteros carábidos de las islas Baleares (Coleoptera: Carabidae). *Boletín de la Asociación española de Entomología* 39 (1–2): 39–97.
- Serrano J., Lencina J.L. & Miñano J. 2021. *Catálogo de los Caraboidea (Coleoptera: Cicindelidae y Carabidae) de la Región de Murcia*. Editum. Ediciones de la Universidad de Murcia.
<https://doi.org/10.6018/editum.2874>
- Stephens J.F. 1828. *Illustrations of British Entomology; or, a Synopsis of Indigenous Insects: Containing their Generic and Specific Distinctions; with an Account of their Metamorphoses, Times of Appearance, Localities, Food, and Economy, as far as Practicable. Embellished with Coloured Figures of the Rarer and More Interesting Species. Mandibulata. Vol. I.* Baldwin & Cradock, London.
<https://doi.org/10.5962/bhl.title.8133>
- Tamadouni I. & Arahou M. 2016. Settlement of beetles of the Wetland of Sidi Moussa-Oualidia. *Journal of Entomology* 14 (1): 33–43. <https://doi.org/10.3923/je.2017.33.43>
- Toribio M. 2022. Datos interesantes de Carabidae (Coleoptera) para la península ibérica. *Archivos Entomológicos* 25: 85–94.
- Trautner J. & Geigenmüller K. 1987. *Tiger Beetles, Ground Beetles. Illustrated Key to the Cicindelidae and Carabidae of Europe*. J. Margaf, Aichtal.
- Van Belleghem S.M. 2014. *Genomic and behavioral aspects of recurrent ecotypic divergence in the wing polymorphic beetle Pogonus chalceus*. PhD thesis, Ghent University, Belgium.
- Vigna Taglianti A. & Bonavita P. 1994. Nuovi dati genomici su carabidi italiani (Coleoptera, Carabidae). *Bolletino dell'Associazione Romana di Entomologia* 49 (3–4): 137–149.
- Vigna Taglianti A. & Fattorini S. 2002. Aspetti biogeografici delle comunità di Carabidi (Coleoptera, Carabidae) dei sistema costieri italiani. *Biogeographia - The Journal of Integrative Biogeography* 23: 127–138. <https://doi.org/10.21426/B6110100>
- Viñolas A., Piera E. & Muñoz-Batet J. 2019. Noves aportacions al coneixement de la fauna coleopterològica de Catalunya i Illes Balears. Nota 6^a. (Coleoptera). *Bulletí de la Institució Catalana d'Historia Natural. Gea, Flora et Fauna* 83: 61–69.
- Vives E. & Vives J. 1999. Singularidad de los coleópteros de Los Monegros. In: Melic A. & Blasco-Zumeta J. (eds) Manifiesto científico por los Monegros: 165. *Volumen Monográfico, Boletín de la Sociedad Entomológica Aragonesa* 24.
- Vives J. 1965. Caraboidea de la provincia de Cádiz. *Miscellanea Zoologica* 2 (1): 63–77.
- Vives J. 1998. Catálogo de los Carabidae de Aragón (Insecta: Coleoptera). *Catalogus de la Entomofauna Aragonesa* 19 (Insecta: Coleoptera): 3–14.
- Vives J. & Vives E. 1976. Caraboidea de la provincia de Cádiz (2^a nota). *Miscellanea Zoologica* 3: 109–119.
- Vives J. & Vives E. 1978a Coleópteros halófilos de Los Monegros. *Boletín de la Asociación española de Entomología* 2: 205–214.

- Vives J. & Vives E. 1978b. Carábidos nuevos o interesantes para la Península Ibérica. *Miscel·lània Zoològica* 4 (2): 165–176.
- Vives J. & Vives E. 1981. A propòsit d'alguns coleòpters caràbids de les zones salades espanyoles. *II Sessió conjunta d'entomologia*: 49–55.
- Vives J. & Vives E. 1986. Carábidos (Ins. Coleoptera) de la Laguna de Sariñena. In: Instituto de Estudios Altoaragoneses (ed.) *Estudio Multidisciplinar de La Laguna, Sariñena (Huesca)*: 127–136. Colección de Estudios Altoaragoneses (6), Huesca.
- Walmsley J.G. 1999. The ecological importance of Mediterranean salinas. In: Korovessis N.A. & Lekkas T.D. (eds) *Proceedings of the Post Conference Symposium SALTWORKS: Preserving Saline Coastal Ecosystem (6th Conference on Environmental Science & Technology)*: 81–95. Pythagorion, Samos, 30 August–1 September 1999. Global Nest, Athens.
- Waltl J. 1835. *Reise durch Tyrol, Oberitalien und Piemont nach dem südlichen Spanien, nebst einem Anhang zoologischen Inhalts*. Pustet, Passau.
- Wollaston T.V. 1862. Brief diagnostic characters of new Canarian Coleoptera. *The Annals and Magazine of Natural History (3 Ser.)* 9: 437–442. <https://doi.org/10.1080/00222936208681259>
- Yechieli Y. & Wood W.W. 2002. Hydrogeologic processes in saline systems: playas, sabkhas, and saline lakes. *Earth-Science Reviews* 58: 343–365. [https://doi.org/10.1016/S0012-8252\(02\)00067-3](https://doi.org/10.1016/S0012-8252(02)00067-3)
- Zaballos J.P. 1986a. Adiciones al catálogo de los carábidos (Coleoptera) de la Península Ibérica. *Actas de las VIII Jornadas de la Asociación española de Entomología*: 710–719.
- Zaballos J.P. 1986b. Primera contribución al conocimiento de los carábidos (Coleoptera) de las lagunas salinas y subsalinas de la Meseta Norte. *Actas de las VIII Jornadas de la Asociación española de Entomología*: 700–709.
- Zaballos J.P. & Banda E. 2001. Sistemática del género *Typhlocharis*. Las especies del grupo *T. baetica* (Coleoptera: Carabidae). *Fragmenta Entomologica* 33: 51–79.
- Zaballos J.P. & Jeanne C. 1994. Nuevo catálogo de los carábidos (Coleoptera) de la Península Ibérica. *Monografías de la Sociedad Entomológica Aragonesa* 1: 66–67.

Manuscript received: 1 February 2022

Manuscript accepted: 2 September 2022

Published on: 3 November 2022

Topic editor: Tony Robillard

Section editor: Max Barclay

Desk editor: Pepe Fernández

Printed versions of all papers are also deposited in the libraries of the institutes that are members of the EJT consortium: Muséum national d'histoire naturelle, Paris, France; Meise Botanic Garden, Belgium; Royal Museum for Central Africa, Tervuren, Belgium; Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Natural History Museum of Denmark, Copenhagen, Denmark; Naturalis Biodiversity Center, Leiden, the Netherlands; Museo Nacional de Ciencias Naturales-CSIC, Madrid, Spain; Leibniz Institute for the Analysis of Biodiversity Change, Bonn – Hamburg, Germany; National Museum, Prague, Czech Republic.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [European Journal of Taxonomy](#)

Jahr/Year: 2022

Band/Volume: [0846](#)

Autor(en)/Author(s): Munoz-Santiago Jose, Ortuno Vicente M.

Artikel/Article: [Revision of the tribe Pogonini \(Coleoptera, Carabidae, Trechinae\) from the Ibero-Balearic region 75-109](#)