New record of Attulus saltator for Spain, with further 16 new regional spider records for Catalonia and Galicia (Araneae)

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New record of *Attulus saltator* for Spain, with further 16 new regional spider records for Catalonia and Galicia (Araneae)

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Abstract. We present the first record of *Attulus saltator* (O. Pickard-Cambridge, 1868) for Spain. The single male was collected in Blanes, Catalonia. Additionally, we offer nine new records for the Spanish region of Galicia (province of Lugo) and seven for Catalonia (province of Girona), one of which is *Cepheia longiseta* (Simon, 1881), which represents the first record of the family Synaphridae in the region of Catalonia. Furthermore, a redescription of the male of *Amaurobius occidentalis* Simon, 1893 is provided.

Keywords: biodiversity, distribution, Iberian Peninsula

Zusammenfassung. Erstnachweis von *Attulus saltator* für Spanien, mit 16 weiteren regionalen Neunachweisen der Spinnen für Katalonien und Galicien (Araneae). Wir erbringen den ersten Nachweis von *Attulus saltator* (O. Pickard-Cambridge, 1868) für Spanien. Ein einzelnes Männchen wurde in Blanes, Katalonien, gesammelt. Zusätzlich werden neun Neunachweise für die spanische Region Galicien (Provinz Lugo) und sieben für Katalonien (Provinz Girona) präsentiert. Mit *Cepheia longiseta* (Simon, 1881) wird die Familie Synaphridae erstmals in Katalonien nachgewiesen. Weiterhin wird das Männchen von *Amaurobius occidentalis* Simon, 1893 wiederbeschrieben.

Human activity in the last century has accelerated the rate of species extinction (Ceballos et al. 2015, Chapin III et al. 2000), which compromises the stability and functioning of ecosystems. At the same time, the invasion rate of exotic species has increased (Hulme 2009), which adds yet another threat to biological communities. Hence, it is very important to have exhaustive knowledge on the distribution of species, even at the regional scale, before effective conservation plans can be established. However, this information is still incomplete especially for megadiverse and poorly studied animal groups, such as spiders. This lack of information, known as the "Wallacean shortfall" (Lomolino 2004), highlights the importance of studies improving and updating our knowledge on the distribution and habitat of species.

Over the last decades, numerous and extensive projects have been established or conducted to unravel and compile the spider species richness on the European continent, such as the "araneae – Spiders of Europe" initiative (Nentwig et al. 2021) or large-scale surveys (e.g. Kostanjšek & Kuntner 2015, Mammola et al. 2018, Pantini & Isaia 2019). However, new studies on the arachnological fauna keep being done and, as a result, new species and new regional records keep being published over the years (e.g. Domènech et al. 2020, Henriques et al. 2018, Isaia et al. 2017, Morano & Bonal 2018), which suggests that those checklists are still far from complete.

The Iberian Peninsula, located at the southwest of Europe, has also been the subject of large-scale spider inventories and their fauna was summarized in the catalogues, both for Spain (Bosselaers 2018, Crespo et al. 2018) and for Portugal (e.g. Cardoso et al. 2008a, 2008b). To this day, 1379 species of spiders have been recorded for continental Spain and 850 for continental Portugal (Nentwig et al. 2021). The Iberian spider catalogue, which was recently updated (Branco et al. 2019), combines data from both countries and offers information at the province level.

In this work we combine the new spider species records obtained from two projects in different regions of Spain (Galicia and Catalonia). These new records increase the knowledge on spider fauna of both regions, and at the same time provide a new addition for the Spanish spider species catalogue.

Material and methods

All the records presented here come from two different projects conducted in two regions of Spain: one in Blanes, Girona, Catalonia and the other in O Incio, Lugo, Galicia (Fig. 1). The sampling conducted in Catalonia was part of a project focused on biodiversity recovery after three post fire management treatments (no intervention, sustainable logging criteria and conventional logging practices) (Pons et al. 2020). Pitfall traps were distributed among ten experimental plots in a burned mixed forest of stone pine *Pinus pinea* L. and cork oak *Quercus suber* L. in Blanes (41.7097°N, 2.7772°E, 95 m a.s.l.), in the province of Girona (see Pons et al. 2020 for more details on the study area). This location has a Mediterranean climate. A severe wildfire of 31 ha took place in July 2016 and sampling was performed in May and October 2017, May and November 2018 and May 2019. Pitfall traps had an opening diameter of 37 mm and were half-filled with 50% propylene glycol. Each sampling session lasted for 12 days and all invertebrates collected were separated in the laboratory of the University of Girona. Spiders were then sent to the University of Barcelona for species identification by AB, MD and LC.

The sampling conducted in Galicia was part of an ongoing monitoring project of arthropods for ecological studies, with the aim of assessing the importance of streams as promoters of non-riparian forest diversity. Samplings were performed in the locality of O Incio (42.6545°N, 7.3517°W, 700 m a.s.l.), in the province of Lugo (see details in Albacete et al. 2020 and Matas et al. 2021). This location has a temperate oceanic sub-Mediterranean climate (Rivas-Martínez 2004), and it is dominated by chestnut forests, followed by oak forests and open shrubland. Sampling started in 2017 and has been performed every year between the 2nd and 19th of August. Spiders, together with other epigean arthropods, were collected

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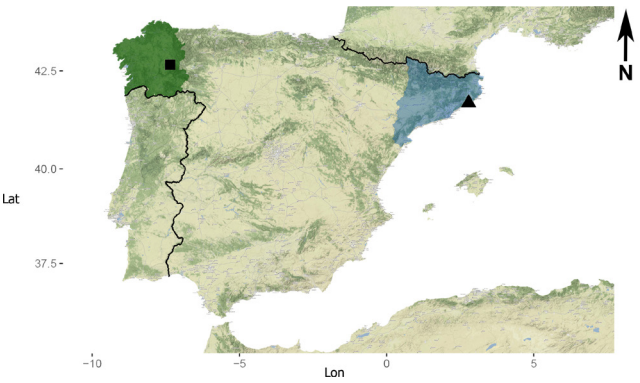

Fig. 1: Location of the two sampling sites. Black triangle: Blanes (Catalonia); black square: O Incio (Galicia). The two regions to which each sampled locality belongs are highlighted. Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under ODbL

using pitfall traps consisting of a 500-ml container filled with concentrated sea salt solution. Additionally, in 2019 some extra spiders were collected directly from the leaf litter by hand.

Specimens were examined using a LEICA MZ16A stereoscopic microscope with a camera lucida and a ZEISS Axio LAB.A1 microscope. Digital images were taken with a high-resolution digital camera LEICA DFC 450 and the software Leica Application Suite v4.4, as well as with a FLIR digital camera with a THORLABS C-mount CML15 lens attached to the microscope. Images were stacked with the Helicon Focus software (Helicon Soft, Ltd.). The illustrated epigyne was prepared in pancreatin, following the protocol of Álvarez-Padilla & Hormiga (2008) for digestion of internal soft tissues modified after Dingerkus & Uhler (1977).

Information on the distribution of species was obtained from the World Spider Catalog (2021), and information on records at the regional scale is given based on the Iberian spider catalogue (Branco et al. 2019) and Arachnomap (Biurrun et al. 2021). All specimens reported here were captured using pitfall traps unless a different method is specified. If not specified otherwise, Nentwig et al. (2021) was used to identify species. The map with the location of the surveys was performed using the ggmap package (Kahle and Wickham 2013) in R software (R Core Team 2019).

Results

New record for Spain

Salticidae

***Attulus saltator* (O. Pickard-Cambridge, 1868)** (Fig. 2)

Material examined. SPAIN, Catalonia, Blanes: 22. Oct.–3. Nov. 2017, 1 ♂.

Distribution. Europe, Turkey, Russia (Europe to South Siberia), Kazakhstan. First record for Spain.

Remarks. The distribution of *Attulus saltator* encompasses most of Europe, including France and Portugal. Given the already known distribution range of the species, the new record in Spain fills a geographical gap. Although the existing records from Portugal correspond to coastal localities (Bacelar 1940, Carvalho et al. 2011), which matches the habitat where the new specimens from Catalonia were found, *Attulus saltator* has also been recorded in central European countries far from the coast (Nentwig et al. 2021).

New records for Galicia

Agelenidae

***Tegenaria ramblae* Barrientos, 1978**

Identification. Barrientos (1978).

Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2018, 1 ♀; 2.–19. Aug. 2019, 3 ♀♀.

Distribution. Portugal, Spain. First record for Galicia (Spain).

Remarks. In the case of *Tegenaria ramblae,* this Galician population appears to be the second Spanish record of this Iberian endemic, of which the most records are from Portugal (Biurrun et al. 2021, Barrientos 1978).

Amaurobiidae

***Amaurobius occidentalis* Simon, 1893** (Fig. 3)

Identification. Bacelar (1929).

Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2018, 5 ♂♂; 2.–19. Aug. 2019, 4 ♂♂; 2.–19. Aug. 2020, 11 ♂♂. Coll. University of Barcelona (Gal24_G4PDB2).

Description.

Carapace light brown with central darker striae, eye region light brown. All eyes of similar size. Chelicerae brown with lighter central part with five anterior and three posterior teeth. Gnathocoxae light brown-yellow, labium light brown, yellowish distally, brown basally. Sternum light brown with

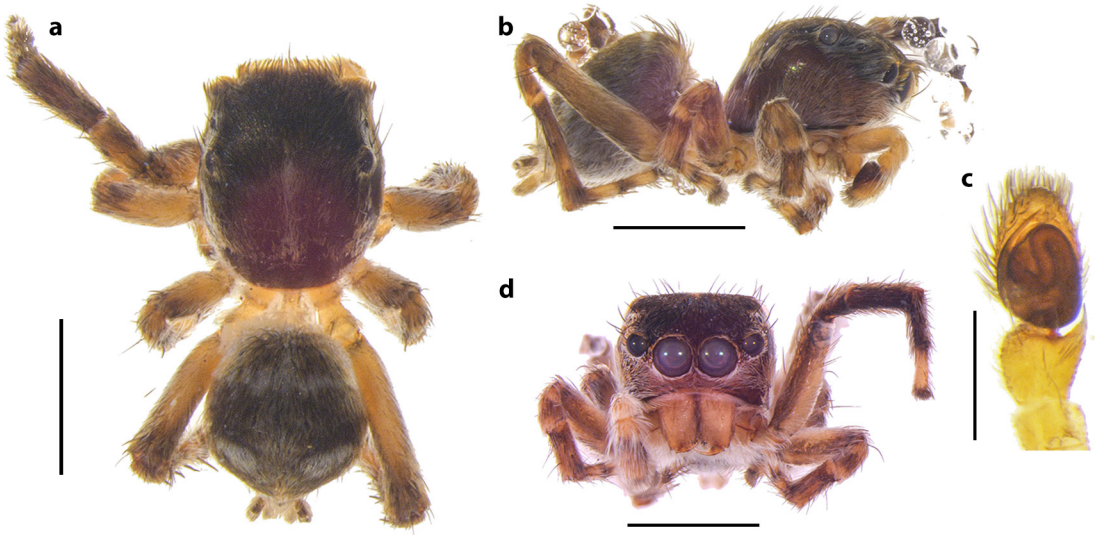

Fig. 2: Male *Attulus saltator* (O. Pickard-Cambridge, 1868). **a.** habitus, dorsal view; **b.** habitus, lateral view; **c.** pedipalp, ventral view; **d.** frontal view; scale bars 1 mm (a, b, d), 0.5 mm (c)

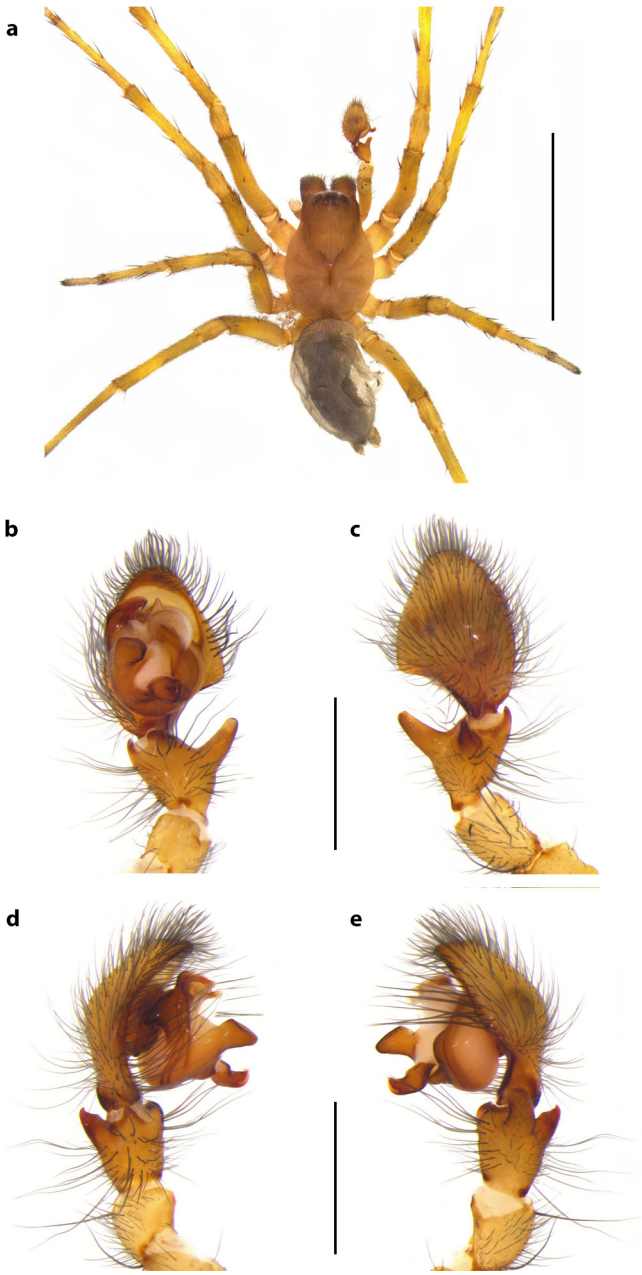

Fig. 3: *Amaurobius occidentalis* Simon, 1893. **a.** habitus of male, dorsal view; **b-e.** male pedipalp. **b.** ventral view; **c.** dorsal view; **d.** prolateral view; **e.** retrolateral view; scale bars 5 mm (a), 1 mm (b–e)

darker margins without pattern. Dorsal and ventral side of opisthosoma grey without any visible pattern. Legs uniformly light brown. Leg length (in mm): I 14.5 (3.9, 1.3, 3.7, 3.8, 1.8), II 11.7 (3.3, 1.2, 2.9, 2.8, 1.5), III 9.3 (2.7, 1.1, 2.1, 2.2, 1.2), IV 11.6 (3.3, 1.1, 2.9, 2.9, 1.4). Leg formula: I, II, IV, III. Palpal retrolateral tibial apophysis extremely elongated and slightly curved. Dorsal tibial apophysis distally projected and pointed, triangular. Tegulum globular. Median apophysis wide basally, narrowing in the central part and elongated and distally curved by 90 degrees. Tegular apophysis massive, wider than long. Embolus with a small tooth shaped apophysis in the basal part, distally widened.

Distribution. Portugal, Spain, France. First record for Galicia (Spain).

Remarks. Simon (1914) claimed that *Amaurobius occidentalis* is found in "mountains in north-western Spain and Portugal" without more specific locality data. To this date, that constitutes the only reference of *A. occidentalis* in Spain (Bosmans 2021). Therefore, the specimens of *A. occidentalis* reported in this work represent the first documented record of this species in the region of Galicia and the first record from Spain with reference to the collection locality.

Dysderidae

***Dysdera fuscipes* Simon, 1882**

Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2018, 2 ♂♂, 3 ♀♀; 2.–19. Aug. 2019, 6 ♀♀; 2. Aug. 2019, 1 ♀ (hand capture in leaf litter).

Distribution. Portugal, Spain, France. First record for Galicia (Spain).

Remarks. With records in the west and north of the Iberian Peninsula up into France (Iorio 2017, Biurrun et al. 2021), the new findings of *Dysdera fuscipes* in Galicia fit perfectly into the already known distribution of this species, mostly areas with Atlantic influence.

Gnaphosidae

***Zelotes manius* (Simon, 1878)**

Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2019, 1 ♂; 2.–19. Aug. 2020, 6 ♂♂.

Distribution. Southern Europe. First record for Galicia (Spain).

Remarks. *Zelotes manius* is a widespread species in southwestern Europe, with numerous records in Portugal and Spain (Biurrun et al. 2021) as well as in France (Le Peru, 2007). Interestingly, outside of this region, *Z. manius* has also been recorded in North Macedonia (Deltshev 2013). It inhabits forest areas (Jerardino et al. 1991), which matches the habitat where the new records have been found. These specimens constitute the first record of *Z. manius* for the Spanish region of Galicia.

Hahniidae

***Chorizomma subterraneum* Simon, 1872**

Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2018, 2 ♂♂, 1 ♀.

Distribution. Spain, France. First record for Galicia (Spain).

Remarks. The individuals of *Chorizomma subterraneum* reported here represent the first explicit records for this species in the region of Galicia. Simon (1898: p. 268) mentioned that the range of this species includes northern Spain, but without more precise data or specific records it is impossible to know if it included what today is the region of Galicia. This species has a distribution mainly restricted to leaf litter in mountainous areas from northern Portugal to southern France, where it is usually common (Biurrun et al. 2021). However, this species presents a scattered distribution, as it has also been found in Croatia (leg. A. Schönhofer, det. P. Jäger, stored in the Senckenberg-Museum, Ref: SMF 62378) (Nentwig et al. 2021). In the Iberian Peninsula, it has been reported from Asturias, Spain (Vargas et al. 2016) and Braga, Portugal (Machado 1937), two neighbouring provinces of Galicia.

Linyphiidae

***Sintula iberica* Bosmans, 2010**

Identification. Bosmans et al. (2010).

Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2019, 1 ♂.

Distribution. Portugal, Spain. First record for Galicia (Spain).
Remarks. *Sintula iberica* is an Iberian endemic, although its records expand from north to south (Biurrun et al. 2021). It has been found only in closed-canopy forests (Bosmans et al. 2010), which matches the record in the sampling from Galicia. This population in Galicia increases the number of Spanish regions where *S. iberica* has been found to five, after being recorded in Andalusia, the Valencian Community, Cantabria (all: Bosmans et al. 2010) and possibly Castile and León (identified as *Sintula* cf. *iberica* in Ledesma et al. 2019).

Lycosidae
***Pardosa tenuipes* L. Koch, 1882**
Identification. Isaia et al. (2018).
Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2020, 1 ♂, 2 ♀♀.
Distribution. Portugal, Spain, Italy, France, Great Britain, Belgium, Netherlands, Germany, Czechia, Austria, Hungary. First record for Galicia (Spain).
Remarks. It is widely distributed in western Europe. However, in the Iberian Peninsula it has only been recorded in the south-west (Isaia et al. 2018) and in the Pyrenees (Polchaninova et al. 2018), so this new record in Galicia expands its known Iberian distribution. *Pardosa tenuipes* seems to be associated with areas close to water bodies or with high humidity, such as wet meadows, swampy areas or the edge of ponds and lakes (Isaia et al. 2018), and our records in riparian forests confirm this affinity.

Mimetidae
***Ero furcata* (Villers, 1789)**
Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2017, 1 ♀.
Distribution. Europe, Turkey, Caucasus, Russia (Europe to Far East), Turkmenistan, Japan. First record for Galicia (Spain).
Remarks. This species is relatively abundant and largely widespread in most of the Palaearctic region (World Spider Catalog 2021), so this new record for the region of Galicia adds to numerous other records in Spain (Biurrun et al. 2021) and constitutes a logical addition.

Philodromidae
***Thanatus atratus* Simon, 1875**
Material examined. SPAIN, Galicia, O Incio: 2.–19. Aug. 2020, 2 ♀♀.
Distribution. Europe, Turkey, Caucasus, Russia (Europe to South Siberia), Kazakhstan, Iran, Korea, Japan. First record for Galicia (Spain).
Remarks. *Thanatus atratus* has a wide distribution encompassing most of the Palaearctic region (World Spider Catalog 2021). Although numerous Spanish records exist (Biurrun et al. 2021), no localities were previously known for north-western Spain.

New records for Catalonia
Gnaphosidae
***Haplodrassus typhon* (Simon, 1878)**
Identification. Bosmans et al. (2018).
Material examined. SPAIN, Catalonia, Blanes: 14.–26. May 2018, 4 ♂♂, 4 ♀♀; 12.–24. May 2018, 3 ♂♂, 1 ♀.
Distribution. Algeria, Tunisia, Portugal, Spain, France, Italy (Sardinia). First record for Catalonia (Spain).
Remarks. *Haplodrassus typhon* was declared a valid species following the revision of the genus *Haplodrassus* from the Mediterranean and the Maghreb region by Bosmans et al. (2018), when it was removed from the synonymy of *H. macellinus*. Although several European species closely resemble *H. typhon*, the pointed tibial apophysis and the female genital structures (Bosmans et al. 2018) support our identification representing the first record for Catalonia. As a consequence of the recent revalidation of this species, its known distribution is still patchy. It is usefully complemented by this new location as a continuation of the French Mediterranean populations (Bosmans et al. 2018).

***Setaphis parvula* (Lucas, 1846)**
Material examined. SPAIN, Catalonia, Blanes: 11.–23. May 2017, 4 ♂♂; 14.–26. May 2018, 9 ♂♂, 1 ♀; 12.–24. May 2019, 7 ♂♂, 1 ♀.
Distribution. Mediterranean. First record for Catalonia (Spain).
Remarks. *Setaphis parvula* is a species with a Mediterranean distribution (World Spider Catalog 2021) and the specimens reported here for Catalonia add to numerous records in other regions of the Iberian Peninsula, including the neighbouring region of Aragon (Biurrun et al. 2021).

Lycosidae
***Pardosa paludicola* (Clerck, 1757)**
Material examined. SPAIN, Catalonia, Blanes: 14.–26. May 2018, 2 ♀♀; 12.–24. May 2019, 2 ♀♀.
Distribution. Europe, Turkey, Caucasus, Russia (Europe to Far East), Kazakhstan, Iran, China. First record for Catalonia (Spain).
Remarks. Only two records of *P. paludicola* exist for the Iberian Peninsula, one in the Portuguese region of Guarda and another one in the Spanish region of Andalusia (Biurrun et al. 2021), both around 800 km away from Catalonia.

Salticidae
***Euophrys rufibarbis* (Simon, 1868)**
Identification. Metzner (1999).
Material examined. SPAIN, Catalonia, Blanes: 12.–24. May 2019, 1 ♂.
Distribution. Southern Europe, North Africa, Turkey, China. First record for Catalonia (Spain).
Remarks. Although numerous records of this species exist in Portugal, this represents the second Spanish region from which it has been recorded after Madrid (San Román & Zárate 1947).

Synaphridae
***Cepheia longiseta* (Simon, 1881)** (Fig. 4)
Material examined. SPAIN, Catalonia, Blanes: 12.–24. May 2019, 5 ♂♂, 2 ♀♀.
Distribution. Southern Europe. First record of the family for Catalonia (Spain).
Remarks. Synaphridae is a rarely recorded family with only five species in Europe, four in the genus *Synaphris* and *Cepheia longiseta*, which is found only in southern Europe (Nentwig et al. 2021). *Cepheia longiseta* is usually found in coastal dry

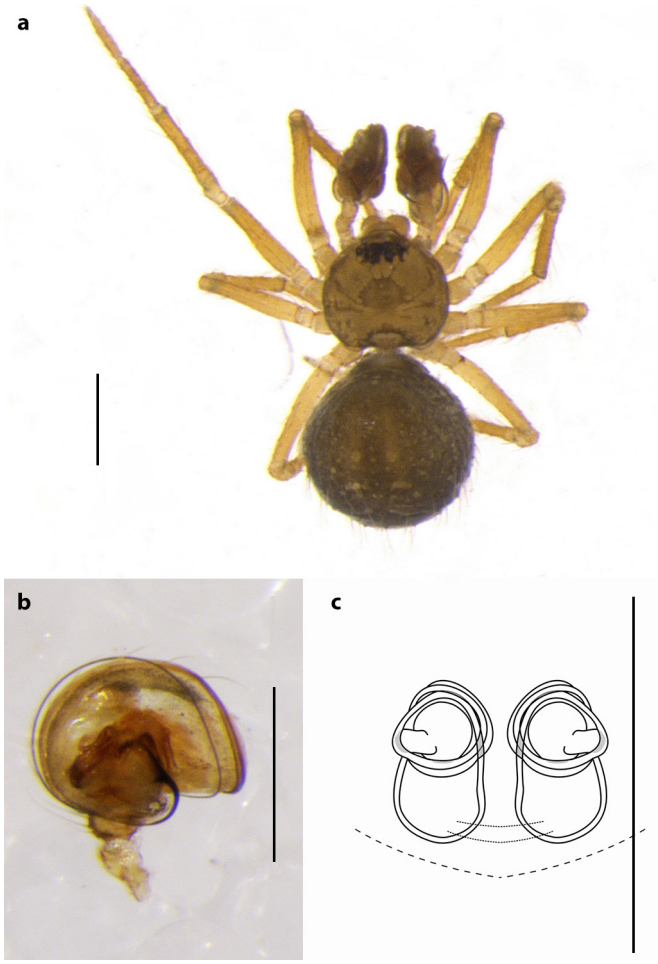

Fig. 4: *Cepheia longiseta* (Simon, 1881). **a.** habitus of male, dorsal view; **b.** male pedipalp, prolateral view; **c.** female vulva, ventral view; scale bars 0.25 mm

regions near the shore (Lopardo & Hormiga 2007), similar to the environment found in Blanes. The specimens reported here represent the first record of this family for Catalonia. Previously it was only known from the southern Iberian Peninsula (Biurrun et al. 2021).

Theridiidae

***Lasaeola testaceomarginata* Simon, 1881**

Identification. Wunderlich (2011, 2021).

Material examined. SPAIN, Catalonia, Blanes: 22. Oct. – 3. Nov. 2017, 1 ♂.

Distribution. Mediterranean. First record for Catalonia (Spain).

Remarks. *Lasaeola testaceomarginata* has a western Mediterranean distribution, both in Europe and North Africa (Nentwig et al. 2021). Although five records of this species are known from Portugal, this new record for Catalonia only represents the second locality where it has been found in Spain, after it was reported from Andalusia (Sánchez & Bosmans 2017).

Thomisidae

***Xysticus tortuosus* Simon, 1932**

Identification. Pesarini (2000), Jantscher (2001).

Material examined. SPAIN, Catalonia, Blanes: 12.–24. May 2019, 1 ♂.

Distribution. Portugal to Austria, Morocco, Algeria. First record for Catalonia (Spain).

Remarks. *Xysticus tortuosus* is a rare species with a discontinuous distribution. It has been reported from Portugal, Spain, France, Austria, the island of Sicily (Italy) and the Urals (Russia) (Mikhailov 2013: p. 200, Nentwig et al. 2021), as well as North Africa (Morocco and Algeria) (World Spider Catalog 2021). However, some authors suspect that the records from central and eastern Europe may be misidentifications (Jantscher 2001), and that the species may be restricted to the western Mediterranean region. The specimen reported here represents the first Spanish record with specific locality data, after it was reported for the country of Spain in general by Simon (1932).

Conclusion

With the present work we contribute 17 remarkable records, increasing the knowledge on spider distribution of the Iberian Peninsula at the national and local scales. The record of *Attulus saltator* presented here increases the known spider species number for continental Spain to 1380. Although some of the species presented here were already recorded in Spain, their scattered and poorly known distribution makes them noteworthy findings. This is the case of *Pardosa tenuipes*, only recorded from two distant localities in Spain (Isaia et al. 2018, Biurrun et al. 2021) and *Euophrys rufibarbis*, *Laseola testaceomarginata*, *Pardosa paludicola* and *Tegenaria ramblae* (Barrientos 1978, Sánchez & Bosmans 2017, Biurrun et al. 2021) constituting second records.

The male of *Amaurobius occidentalis* was described by Bacelar (1929) and never presented since. Here, we provided a redescription and new pictures of these species (Fig. 3) to facilitate identification of this poorly known south-western European species.

Despite the extremely diverse terrain, habitat and climate, but also the sheer size because of different mountain ranges, Spain (without Balearic and Canary islands) is still the third country in terms of spider species number in Europe behind continental France (1607 species) and continental Italy (1582 species) (Nentwig et al. 2021).

In summary, the records presented in this study increase the knowledge of the Spanish spider fauna at the national and regional scale. The new records suggest that, despite the extensive work already conducted, the Iberian spider fauna is still not satisfactorily known and more exhaustive sampling needs to be performed in order to reach completeness of the national and local spider checklists.

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