

## Notas / Notes

### On the geographic distribution of the uncommon Iberian endemic *Armadillidium mateui* Vandel, 1953 (Crustacea, Isopoda, Armadillidiidae)

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#### ABSTRACT

*Armadillidium mateui* Vandel, 1953 is a little known, uncommon Iberian endemic terrestrial isopod. The species presents a strongly disjunct distribution, with only eight published records from three different regions in south-eastern, eastern and northern Spain. This strange pattern of distribution has led to question the identity of some of the published information. Here we present additional records from new Iberian regions and discuss the known and potential distribution of *A. mateui*, which seems to be much larger than previously expected.

**Keywords:** New records, Iberian Peninsula, sampling, chorology, terrestrial crustaceans, Oniscidea

#### RESUMEN

##### Distribución geográfica del raro endemismo ibérico *Armadillidium mateui* Vandel, 1953 (Crustacea, Isopoda, Armadillidiidae)

El isópodo terrestre *Armadillidium mateui* Vandel, 1953 constituye un endemismo de la Península Ibérica poco común y prácticamente desconocido. La especie presenta una distribución fuertemente disyunta, con solo ocho registros publicados de tres regiones diferentes en el sureste, este y norte de España. Viendo este extraño patrón de distribución, la identidad de parte de la información publicada ha sido cuestionada. En este trabajo presentamos nuevos registros en la península ibérica y discutimos sobre la distribución conocida y potencial del isópodo endémico *A. mateui*, aparentemente mayor de lo previamente esperado.

**Palabras clave:** Nuevos registros, península ibérica, muestreos, corología, crustáceos terrestres, Oniscidea

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The terrestrial Isopod fauna from the Iberian Peninsula is still largely understudied and, since the general works of Schmölzer (1971) and Cruz (1990), new species and distribution records have been slowly but continuously published from the Ibero-Balearic region. Even so, many species are poorly known, including basic biological aspects as geographical

distribution or habitat preferences, and even new species are being discovered and described (*e.g.* García, 2015; Reboleira *et al.*, 2015; Cifuentes, 2018).

The species diversity of *Armadillidium* Brandt, 1833, a mostly Mediterranean genus, presents a decreasing gradient from East to West (Vandel, 1962) and, of the almost 200 recognized species (Schmalzfuss, 2003), only 12 have

been reported from the Iberian Peninsula (Schmölzer, 1971; Cruz, 1993; Schmalfuss, 2003; Garcia, 2005). Most Iberian species in the genus were revised by Cruz (1993), but little has been added since then. Several of these species are widespread and probably synanthropic, but a few of them, such as *Armadillidium serratum* Budde-Lund, 1885; *A. galiciense* Schmölzer, 1955 or *A. mateui* Vandel, 1953 are Iberian endemics with more or less reduced distributions.

Among these endemic species, *Armadillidium mateui* Vandel, 1953 (Fig. 1a-b) has been reported from only 8 localities in the Iberian Peninsula (Fig. 1c). It was described from material collected in the Sierra Nevada mountains and Sierra de La Sagra in Granada Province, south-eastern Spain, and it was considered as a possible local endemic (Vandel, 1953). Several years later the species was reported from the Sierra de Lóquiz mountains in Navarra Province in northern Iberian Peninsula (Cifuentes, 1984), more than 500 km north of the closest known locality in an unconnected biogeographic area. Cruz (1993) provided additional records for the species from Granada Province, near the localities studied by Vandel (1953). More recently, the species was reported from the Sierra de Aitana mountains in Alicante Province (Jiménez-Valverde *et al.*, 2015). This later locality is almost 200 km northeast of the nearest locality, but is present in a biogeographically closer area. Given the apparently strong disjunct distribution of *Armadillidium mateui*, some authors doubt about the identity of the material from northern Iberian Peninsula (see Jiménez-Valverde *et al.*, 2015), but the observed distribution pattern could be also a result of insufficient data about the species. In recent years we have observed *Armadillidium mateui* from two Iberian regions where the species had not been previously reported (Fig. 1c), adding up to 10 known localities for the species and

narrowing the gap between northern, eastern and south-eastern populations (Fig. 1c).

#### MATERIAL EXAMINED OF *ARMADILLIDIUM MATEUI*

1♂, 1♀, Desierto de las Palmas, Benicassim, Castellón Province, Spain, 40°04'18" N, 0°01'02" E, 19-II-2017, 473 m, E. Recuero, P.C. Rodríguez, D. Osca leg.;

1♀, Saelices, Cuenca Province, Spain, 39°52'11" N, 2°47'09" W, 18-III-2019, 856 m, E. Recuero & P.C. Rodríguez leg. (Fig. 1a,b).

The species is present in the Desierto de las Palmas coastal mountains in Castellón. These small mountains, with a maximum elevation of 711 m, are geologically complex, with alternating siliceous and calcareous soils, including Palaeozoic slates, Triassic red sandstone and Mesozoic limestone (Sos Baynat, 1929; Vera, 2004). We found the species under a calcareous stone, in a small, young grove of *Pinus halepensis* Mill. with dense undergrowth formed by *Pistacia lentiscus* L., *Quercus coccifera* L. and *Chamaerops humilis* L. This population is about 160 km North of the Sierra de Aitana population in Alicante. Between these two localities there are many areas with suitable habitat for the species, so it is possible that its presence will be detected with more sampling effort.

More recently we have found the species to live in the Iberian Central Plateau. In this case it lives in a *Quercus ilex* L. forest on Jurassic and Cretaceous sandstones (Vera, 2004), and it was sampled in humid leaf litter. This locality is particularly interesting, as it is almost midway from every other known area occupied by *Armadillidium mateui*: about 200 km North of the nearest south-eastern population, 300 km South of the population from Navarra, and 250 km West of the Mediterranean localities.



Fig. 1.— a-b) Habitus *in vivo* of *Armadillidium mateui* from Saelices, Cuenca. c) Map of the Iberian Peninsula showing bibliographic (dots) and new (stars) localities of *A. mateui*.

Fig. 1.— a-b) Habitus *in vivo* de *Armadillidium mateui* de Saelices, Cuenca. c) Mapa de la Península Ibérica con las localidades bibliográficas (puntos) y nuevas (estrellas) de *A. mateui*.

The new localities increase considerably the known distribution of this Iberian endemic, and indicate a potential distribution much larger than previously expected over the eastern half of the Iberian Peninsula. Its presence in Sierra de Aitana, Desierto de las Palmas and Saelices, all of them part, or near, the Sistema Ibérico Mountain Range, suggests that the range of *Armadillidium mateui* could extend along these mountains into northern Spain, supporting the correct identification of the material from Navarra (Cifuentes, 1984).

The distribution of *Armadillidium mateui* as we know today seems largely disjunct, although the absence of records from large areas in the eastern Iberian Peninsula is probably a result of the scarcity of faunistic studies on terrestrial isopods. Alternatively, observed disjunct distribution could be real and consequence of range expansions and contractions following cyclic Pleistocene climatic changes as have been shown in many Iberian taxa (e.g. Sánchez-Montes *et al.*, 2019 and references therein). Also, it seems that the species could be locally uncommon. Our observations, and most published records, are based in isolated individuals, in our case collected superficially in the soil. However, Jiménez-Valverde *et al.* (2015), sampling the deep colluvial Mesovoid Shallow Substratum, found the species to be abundant in the Sierra de Aitana mountains. This could indicate that, more than rare, the species may be difficult to collect. Combining different sampling techniques would provide more records and a better knowledge on the species abundance.

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