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PENSOFT

Xysticus grallator Simon, 1932 new to mainland Italy (Araneae, Thomisidae)

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Abstract. *Xysticus grallator* Simon, 1932 is a little-known species of crab spider distributed in the western Mediterranean region. We present new records of this species from mainland Italy, together with images of living and preserved specimens, the copulatory organs, and the habitat. A map of literature records provides insights into the known distribution of this species. Additionally, we show that a historical record of *Xysticus pavesii* O. Pickard-Cambridge, 1873 by L. di Caporiacco is misidentified and in fact the first record of *X. grallator* on the Italian Peninsula.

Keywords. Check list, crab spider, Iberian Peninsula, monitoring, Sardinia, Spain, rare species

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Introduction

The thomisid genus *Xysticus* C.L. Koch, 1835 belongs to the mainly Holarctic Coriarachnini sensu Ono (1988). While this clade is morphologically and genetically relatively well defined, its internal structure, especially at the genus level, is far from being fully resolved (Breitling 2019). At the moment, *Xysticus* contains around 80 species in the Western Palearctic region (Nentwig et al. 2023). Most of these species occur in grassland and other open habitats, ranging from lowland to alpine areas (Jantscher 2001), while some others, like *Xysticus lanio* C.L. Koch, 1835 and *Xysticus audax* (Schrank 1803), are frequently found on branches of trees and shrubs (Roberts 1985, 1995). The distribution of many species, especially in the Mediterranean Basin, is still unclear, and collection efforts frequently yield new regional or country records (e.g. Logunov and Demir 2006; Demir et al. 2009; IJland and van Helsdingen 2016; Bauer et al. 2020; Domènech et al. 2021).

Xysticus grallator Simon, 1932 is a little-known species of crab spider that has been infrequently recorded from Portugal, Spain, Corsica (the type locality), and Sardinia (e.g. Simon 1932; Kraus 1955; Urones et al. 1983; Trotta 2011; Carrillo et al. 2016). Although mainland Italy is known for its diverse crab-spider fauna that includes alpine endemics and other species with restricted distribution (Pantini and Isaia 2019), no records of *X. grallator* are listed from here. Given the distribution in the literature, the species appears to be restricted to the European part of the Western Mediterranean Basin. Our records of this species, made in South Italy in 2004 and 2021/2022, now show that this species also occurs on the Italian mainland and might be more widespread than previously thought. We also found a misidentified historical record of *X. grallator* in the Italian spider literature, which is clarified and discussed here as well. In addition, we present images of the copulatory organs and of living and preserved specimens of both sexes and describe and illustrate the habitat of the species near Gorgoglione (Basilicata).

Methods

Specimens from Gorgoglione were hand collected. Known distribution records of the species, available

from the Iberian Spider catalogue (de Biurrun et al. 2019), the Italian spider catalog (Pantini and Isaia 2019), and the World Spider Catalog (2023) were collated and then plotted by using Simplemappr (Short-house 2010). Additionally, we plotted an additional new record from Málaga from the iNaturalist platform (iNaturalist 2023). Given the unique leg morphology of the male, usage of male records without examination of the copulatory organs seems justified. A female specimen was collected as a subadult and raised to adulthood in captivity. It was fed House Crickets (*Acheta domestica* (Linnaeus, 1758)) of adequate size. It molted to adulthood approximately 4 weeks after it was collected.

For determination and image taking, the epigyne of the female collected at Gorgoglione was removed with needles and tweezers and put in lactic acid for 1 hour. Images of the preserved specimens and copulatory organs were taken with Automontage® software (Syncroscopy, Cambridge, UK) and a Leica DFC 495 digital camera, connected to a Leica Z6 APO microscope (Leica Microsystems, Wetzlar, Germany). Images were stacked with Helicon Focus stacking software (HeliconSoft, Kharkiv, Ukraine). Additionally, we also examined material deposited at the Museo di Storia Naturale of Verona (MCSV) that was determined and published by di Caporiacco (1951) as *Xysticus pavesii* (O. Pickard-Cambridge, 1873). The material from Basilicata is deposited at the State Museum of Natural History Karlsruhe (SMNK), the specimens from Apulia at the Museo Civico di Scienze Naturali "E. Caffi" of Bergamo (MSNB).

Results

***Xysticus grallator* (Simon, 1932)**

Figures 1–3

Xysticus pavesii—di Caporiacco 1951: 91, fig. 9; misidentification, non *X. pavesii* O. Pickard-Cambridge, 1873.

For further taxonomic resources, see World Spider Catalog (2023).

New records. ITALY – **Puglia** • Bari, Andria, Castel del Monte, 41.08°N, 016.27°E, 3.IX.2004, leg. R. Addante, 1 ♂, MSNB • idem, 7.X.2004, leg R. Addante, 1 ♀, MSNB • Lecce, Alessano, 24–26.IX.1948, leg. Ruffo S. and Conci C., 1 ♂, 1 subadult ♂, 3 subadult ♀ (all sub. *Xysticus pavesii*), MCSV • Lecce, Leuca, Punta Ristola, 28.IX.1948, leg. Ruffo S. and Conci C., 2 ♂, 1 ♀ (all sub.

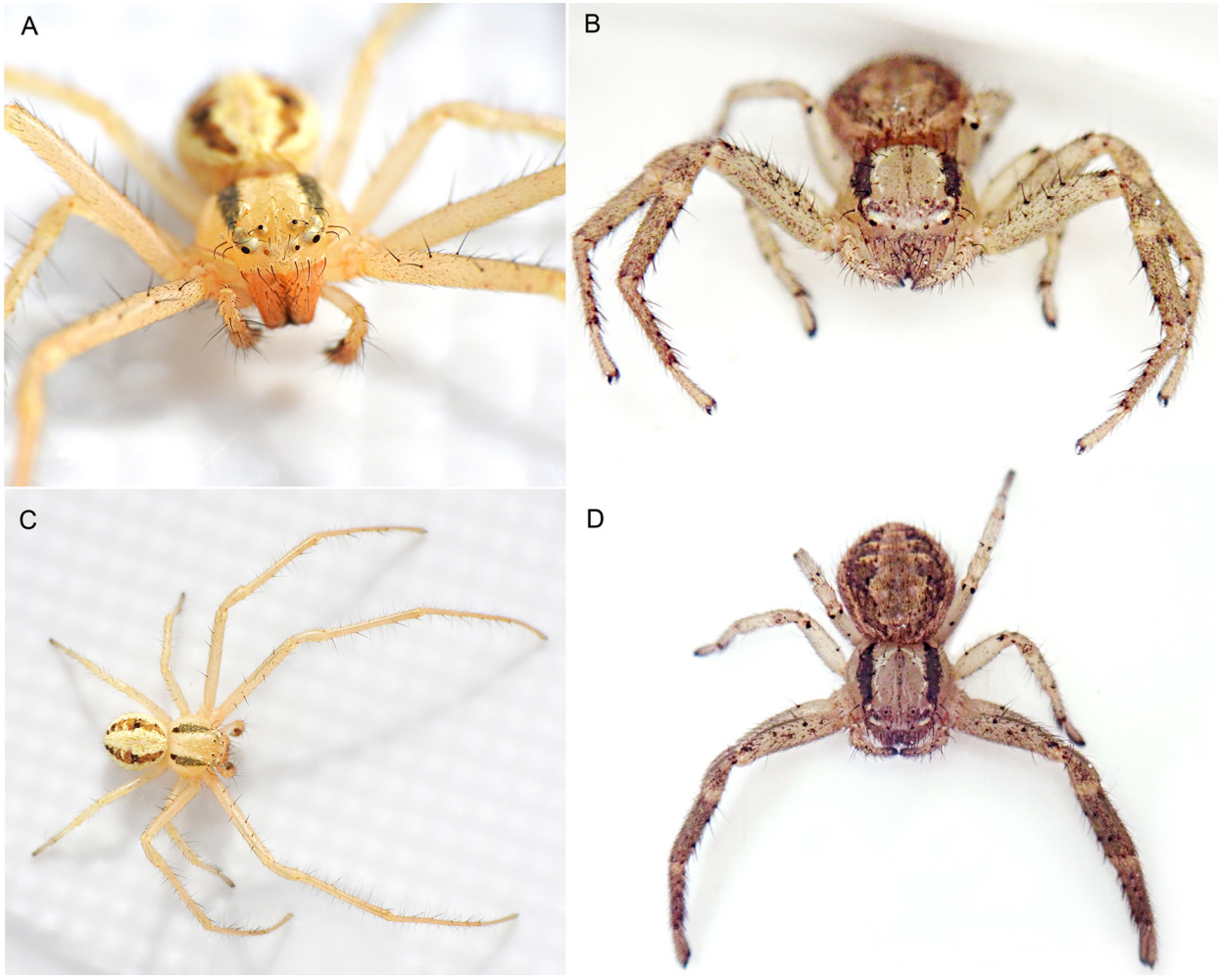

Figure 1. *Xysticus grallator* Simon, 1932. Living specimens from Gorgoglione (Basilicata), Italy. **A.** Male in frontal view. **B.** Female in frontal view. **C.** Male in dorsal view. **D.** Female in dorsal view.

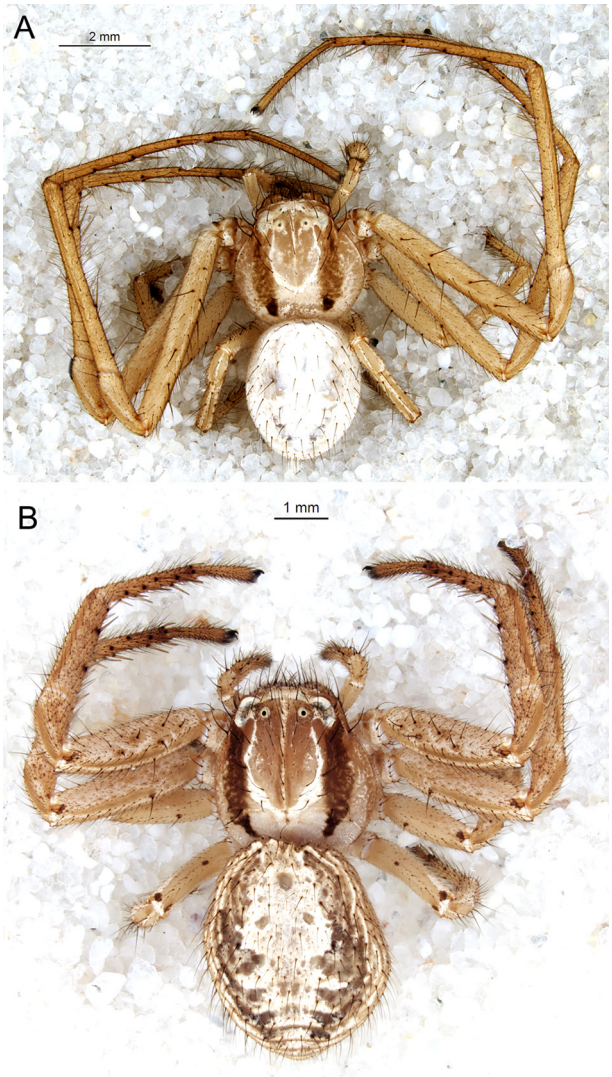

Figure 2. *Xysticus grallator* Simon, 1932. Preserved specimens from Gorgoglione (Basilicata), Italy**. A.** Male. **B.** Female.

Xysticus pavesii), MCSV – **Basilicata** • Matera, Gorgoglione, 40.3523°N, 016.1897°E, 7.IX.2021, leg. R. Falato, 1 ♂, SMNK-ARA 19657 • idem, 40.3575°N, 016.1852°E, 16.IX.2021, leg. R. Falato, 1 subadult ♀ (adult in captivity), SMNK-ARA 19656

The first record of this species in mainland Italy was illustrated by di Caporiacco (1951: fig. 9) but was misidentified as *X. pavesii*, which is treated today as a junior synonym of *Ebrechtella tricuspidata* (Fabricius, 1775). All material available and examined at the MCSV clearly belongs to *X. grallator*. Our records from Castel del Monte near Bari and Gorgoglione (Matera), as well as di Caporiacco's material, show that the species is, at least, widespread in an area ranging from Bari to the easternmost point of Italy (Fig. 4). Both specimens from Gorgoglione were found on two different slopes covered by dry grassland in an unprotected area (Fig. 5). Exactly one year later (September 2022), an adult male was again observed by RF at the first location in Gorgoglione, Matera. The habitat is in a traditionally managed agricultural landscape of South Italy, consisting of wheat fields, olive orchards (for oil production), patches of fallow land, and hedges. The wheat fields are tilled annually and grazed afterward by livestock. Fallow land is frequently cleared of shrubs by rural workers.

Measurements. Male (from Gorgoglione) total length 5.7 mm, prosoma length 2.8 mm, prosoma width 2.7 mm. Female (from Gorgoglione) total length 6.8 mm, prosoma length 3.1 mm, prosoma width 2.9 mm.

Identification. Males of *Xysticus grallator* are easily recognized by the very long legs and the massive tegular apophysis with a very large and massive, hook-like basal apophysis and a small median apophysis (Kraus 1955; Urones et al. 1983; Fig. 3b). The females are somatically similar to species of the *X. cristatus* group (Jantscher 2001), but they can be differentiated by their epigyne and vulva. The vulva consists of two intertwined loops and becomes more darkened and sclerotized towards the fertilization ducts (Kraus 1955; Urones et al. 1983, Fig. 3c, d).

Discussion

Although the arachnofauna of mainland Italy is comparatively well known, newly recorded species or even newly described species are frequently published (e.g. IJland and van Helsdingen 2016; Ballarin and Pantini 2022a, b; Lenzini et al. 2022). This might be explained by the relief of the country and its diverse climate, as well as apparent research gaps in the southern parts. *Xysticus grallator* is now the 27th species of the genus *Xysticus* known from the Italian mainland (Pantini and Isaia 2019). The misidentified and now clarified record by di Caporiacco (1951) shows that the species is very probably native to the region and has not been recently introduced. In addition, the illustrations of *X. diversus* (Blackwall, 1870) from Sicily closely resemble *X. grallator* (Blackwall 1870). If the examination of potentially available type material reveals that *X. diversus* and *X. grallator* are synonyms, *X. diversus* should, if possible, be treated as a *nomen oblitum* according to Article 23.9 of the International Code on Zoological Nomenclature. *Xysticus grallator* is a well-established name and should be preserved.

The ventral illustration of the palp in Kraus (1955: fig. 25) differs slightly from the original description (Simon 1932: fig. 1245), Urones et al. (1983), and ours (Fig. 3b). The apical part of the basal apophysis points towards the palpal tibia, while it points more towards the tip of the palp in the other illustrations. This is probably due to a slightly different angle of the palp during the drawing process. In addition, Urones et al. (1983) detected morphological differences between the holotype and the specimens studied, attributable to the angle of observation and its lesser sclerotization (Urones et al. 1983: 789). However, when possible, the material should be re-examined to clarify this problem.

Following the literature and record schemes (e.g. de Biurrun et al. 2019), it seems that *X. grallator* is a rarely recorded species with a restricted distribution

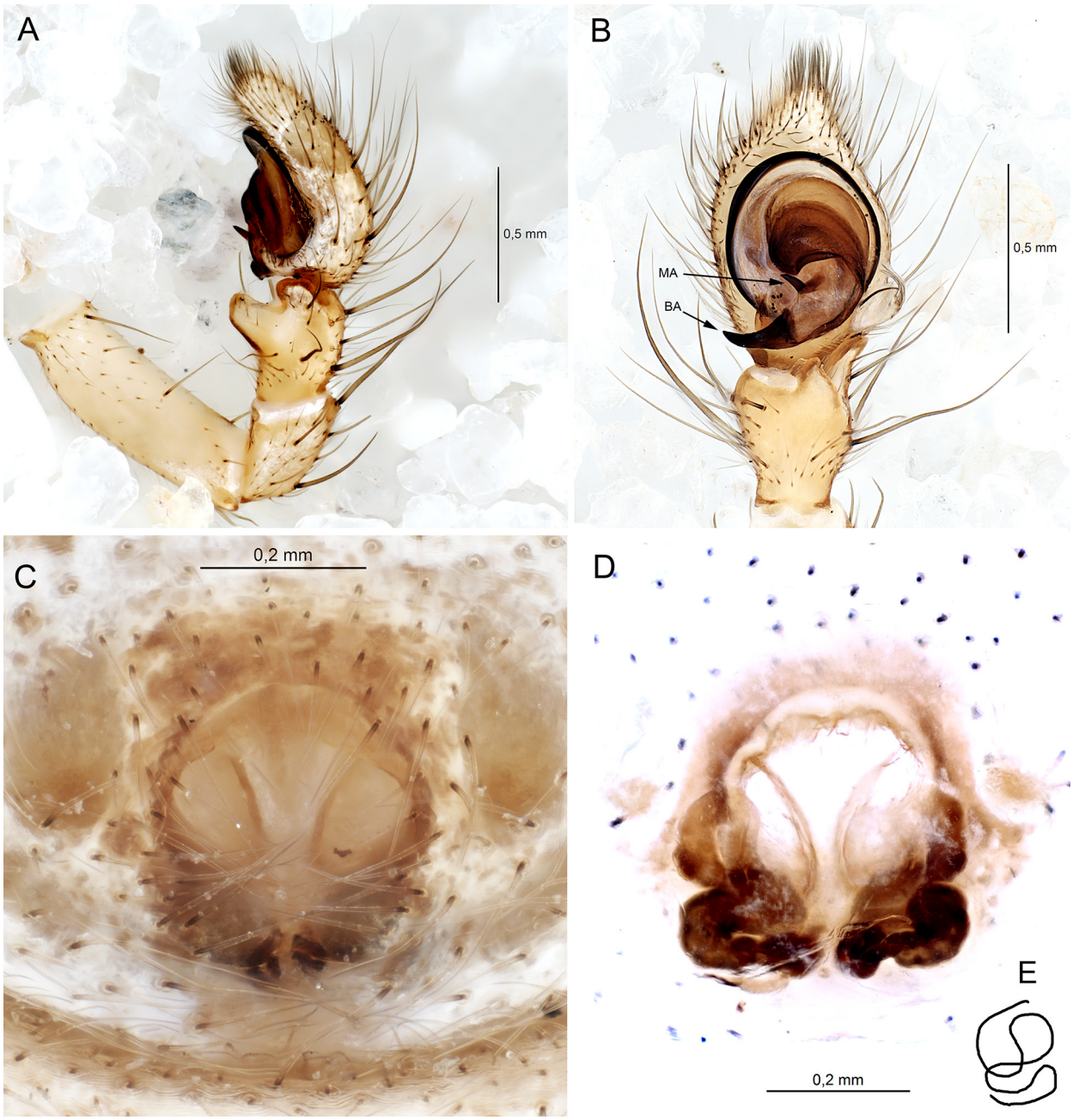

Figure 3. *Xysticus grallator* Simon, 1932 from Gorgoglione (Basilicata), Italy. Copulatory organs. **A.** Male pedipalp, retrolateral view. **B.** Male pedipalp, ventral view. Abbreviations: MA = median apophysis, BA = Basal apophysis. **C.** Epigyne *in situ*. **D.** Vulva. **E.** Schematic course of internal duct system of the vulva.

in the European part of the Western Mediterranean Basin and South Italy. No records are available from northern Spain at the moment, which might indicate a climatic limitation of the distribution to the southern Iberian Peninsula and possibly parts of North Africa. The species' habitat in Gorgoglione suggests that the conservation of the species in Italy may depend on small-scale, extensive agriculture and the presence of dry, extensively managed grassland.

Our records represent a considerable expansion of the known distribution for this species. The next known records from Sardinia and Corsica are separated by the Mediterranean Sea and by a linear distance of over 600 km. Future records on Sicily and other parts of southern Italy are to be expected.

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Figure 4. Map of the known records of *Xysticus grallator* Simon, 1932. Black dots = records in the literature, white square = record from iNaturalist.org, red squares = recent records in Italy, yellow hexagon = previously misidentified records in di Caporiacco (1951).

Figure 5. Habitat of *Xysticus grallator* Simon, 1932 near Gorgoglione (Matera, Basilicata, southern Italy). **A.** Collection locality of the male near Gorgoglione **B.** Surrounding landscape of the locality in Gorgoglione.

Author Contributions

Conceptualization: TB. Data curation: TB. Investigation: RF, PP. Visualization: TB. Writing – original draft: TB. Writing – review and editing: RF, PP.

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