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First record of *Charinus ioanniticus* (Arachnida, Amblypygi: Charinidae) from continental Europe

Georgios Agapakis & Gustavo Silva de Miranda

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Abstract. Amblypygids, commonly known as whip spiders, are one of the small orders of Arachnida with a global distribution in the tropical and subtropical regions. Amblypygids are essentially absent from temperate areas, with only three species known from the Western Palaearctic. Here, we expand the known distribution of *Charinus ioanniticus* (Kritscher, 1959) with a new record from Athens, Greece, which is the first time the species has been found in continental Europe. The new record could either be the result of accidental human transportation or the actual species distribution that is wider than previously expected. An updated map with the records of *C. oanniticus* is also provided.

Keywords: Distribution, expansion, Greece, whip spiders

Zusammenfassung. Erstnachweis von *Charinus ioanniticus* (Arachnida, Amblypygi: Charinidae) aus dem kontinentalen Europa. Amblypygi (Geißelspinnen) gehören zu den kleinen Ordnungen der Arachnida mit einer globalen Verbreitung in den Tropen und Subtropen. Geißelspinnen fehlen in den gemäßigten Regionen und sind nur mit drei Arten in der Westpaläarktis vertreten. Wie erweitern hiermit die bekannte Verbreitung der Art *Charinus ioanniticus* (Kritscher, 1959) durch neue Nachweise aus Athen, Griechenland, weisen die Art damit erstmals für das kontinentale Europa nach. Der Neunachweis kann entweder ein Resultat menschlicher (Waren)Transporte sein oder die Art ist weiter verbreitet als bisher erwartet. Eine aktualisierte Karte der Nachweise von *C. ioanniticus* wird präsentiert.

Amblypygi is a relatively small arachnid order with five families and more than 220 living species (Harvey 2003, Miranda & Zamani 2018). Amblypygids are commonly called whip spiders, but they differ from true spiders (Araneae) by their extremely flattened bodies, elongate first pair of legs and lengthened and spiny pedipalps; amblypygids also lack venom glands in the chelicerae, secondary copulatory organs on the male palps and spinnerets on the opisthosoma, structures only found in spiders (Dunlop 2010). They also differ from other 'whipped' orders of arachnids, like whip scorpions (Uropygi) and Palpigradi, by the absence of a flagellum at the end of the opisthosoma (Weygoldt 2000, Harvey 2003).

Whip spiders have a wide geographical distribution covering most tropical and subtropical parts of the world, but are essentially absent from more temperate areas (Harvey 2003). However, three species have been recorded from the Western Palaearctic region (Blick & Seiter 2016, Miranda et al. 2016, El-Hennawy 2019). One of them, *Charinus ioanniticus* (Kritscher, 1959), has even been recorded in the European territory from the Greek islands of Rhodes and Kos in the Aegean Sea (Blick & Seiter 2016, Miranda et al. 2016). These two islands are (geopolitically) considered part of Greece, but they are located near the coast of Turkey. Those islands were thus mostly colonized by fauna from the Anatolian peninsula (Fattorini 2002).

Material and methods

The material was studied with a stereomicroscope and photographed with a phone camera. Identification followed Miranda et al. (2016). The distribution map was produced and edited using ArcGis 10.2 (ESRI 2014). The coordinates (in the Geodetic System WGS 84) were obtained from Google Earth. A voucher specimen is deposited in the Goulandris National History Museum of Athens (GNHM), curator Dr. Maria Dimaki. The Western Palearctic region is here defined as the area between the West Sahara to the border between Israel and Syria.

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Results

Charinus ioanniticus (Kritscher, 1959)

New records. GREECE, Athens, Agia Varvara, 37.99042°N, 23.65830°E, 71 m a.s.l., on the walls of a bathroom, 19. Mar. 2018, G. Agapakis leg. (juvenile specimen kept alive); on the floor of a bathroom, 8. May 2018, G. Agapakis leg. (1 ♀ GNHM2191); on the walls of a kitchen, 1. Aug. 2018, G. Agapakis leg. (juvenile specimen kept alive).

Post-collection maintenance of specimens. The first specimen found was kept alive and placed into an empty plastic container filled with about 4 cm of soil for potted plants and topped with some patches of moss and liverwort (Fig. 1a, c). Some garden pebbles and a biodegradable flower pot were also added to cover the bottom of the container. After some time, dead leaves and some pieces of tree bark were added for extra covering. A type of small, grey, relatively elongated springtail (Entomobryomorpha, *Orchesella* sp.) was provided as a regular food source along with tiny fungus gnats (Sciaridae and Mycetophilidae) which naturally colonized the container. Later, during the summer, when the springtails and gnats became scarce or absent, a second type of springtail (Entomobryomorpha, *Tomocerus* sp.) was provided as food, along with ants (Formicidae) and even some mint moth caterpillars (*Pirausta* sp., Crambidae). The individual was never directly observed eating prey except once during the night. The specimen also moulted once, sometime between 10. and 11. Sep.; the exoskeleton was kept for study. The second and largest specimen was placed into the same container as the first one, but died after two days; the specimen was then preserved in ethanol and deposited in the Goulandris National History Museum of Athens (GNHM2191) (Fig. 1b). A third specimen was found and was smaller than the others. It was placed in the same container as the other two and kept alive.

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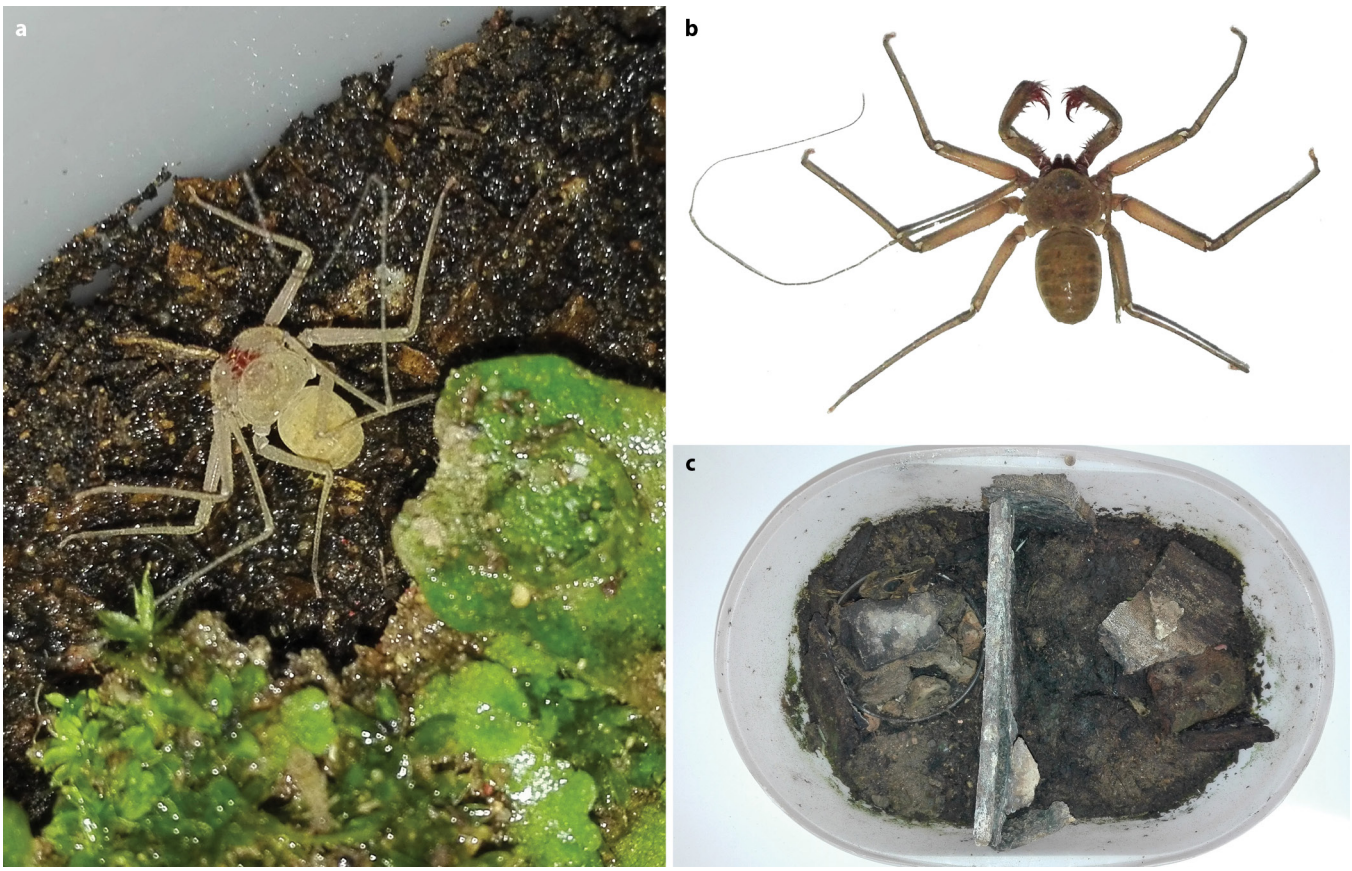


Fig. 1: *Charinus ioanniticus*. **a.** Ex-situ photo of the first juvenile specimen collected; **b.** Image of the ethanol-preserved female; **c.** The container where the specimens were kept alive (photos by G. Agapakis)

Geographical distribution and discussion

The three specimens were found in the same place, the town of Agia Varvara, which is a suburb in the western part of the city of Athens (Fig. 2). This region is around 340 km away from the closest Greek island where *C. ioanniticus* was found (island of Kos, east Aegean Sea). This is in fact the westernmost record for the species in the whole eastern Mediterranean region. The occurrence of the species in continental Greece may be the result of accidental transportation (however, none of the inhabitants of the flat where the animals were found went to areas where *C. ioanniticus* occurs) or the fact that the species has a wider distribution than previously expected. *Charinus ioanniticus* has a synanthropic nature and is known to be parthenogenetic (Weygoldt 2007, Blick & Seiter 2016, Miranda et al. 2016), thus growth of its populations and the ability to adapt to new localities with the proper environmental conditions may be facilitated by those characters. Further investigation should be carried out on the many islands of the Aegean Sea and their caves, as it has been shown that the area has high levels of endemism (Fattorini 2002) and there is a general lack of knowledge about these islands' diversity (Legakis & Maragkou 2009). A broader investigation of the existence of new populations in the Mediterranean could reveal the stepping stone links between the widely separated specimens. The discovery of new populations of *C. ioanniticus* could also add new information about the biology and ecology of the species.

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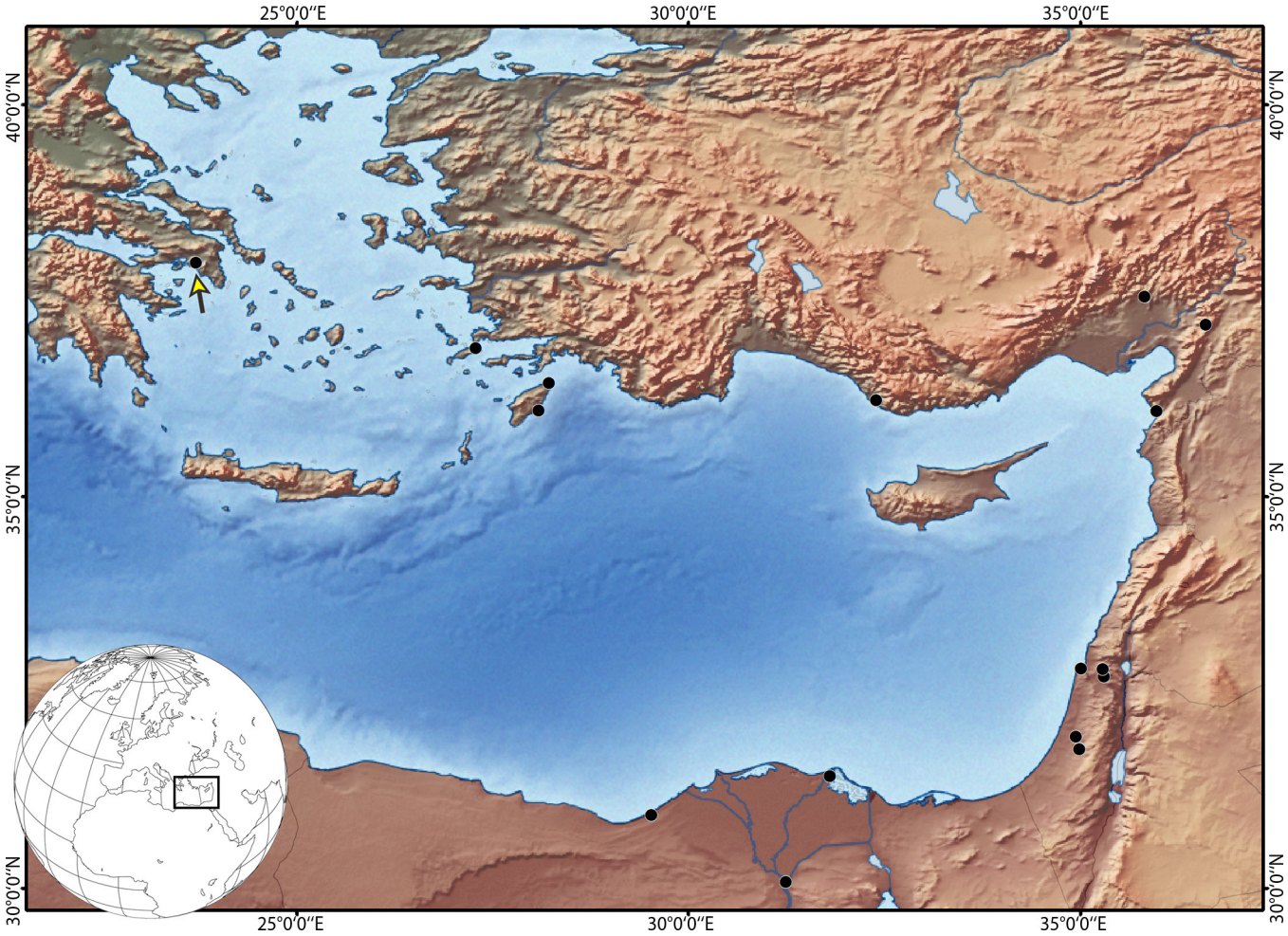


Fig. 2: Known records of *Charinus ioanniticus* (black dots, after Blick & Seiter 2016, Miranda et al. 2016 and El-Hennawy 2019) and the new one from continental Greece (yellow arrow)

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