

# THE RARE SALTMARSH BUG *TERATOCORIS ANTENNATUS* (BOHEMAN, 1852) (HEMIPTERA, MIRIDAE), NEW SPECIES FOR PORTUGAL

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## ABSTRACT

Ria de Aveiro coastal lagoon is a socio-ecological system framed between the land and the sea. The lagoon is embedded in a biodiversity rich landscape mosaic comprising beaches, dunes, sandflats, mudflats, seagrasses, and small water channels, and is one of the largest saltmarsh areas in Portugal and in Europe, supporting coastal food webs and providing nursery areas for several species. Despite being a Long-Term Ecological Research (LTER) site and integrating the Natura 2000 network, few systematic studies have been carried on its entomofauna. In this work, field collections were carried in seven locations along Ria de Aveiro saltmarsh areas by sweep-netting the dominating halophyte vegetation in September 2020. From these collections, *Teratocoris antennatus* (Boheman, 1852), a rare marsh bug, is reported for the first time for Portugal.

**Keywords:** Plant bugs, capsid bugs, Ria de Aveiro, saltmarsh, wetlands, faunistics, Iberian Peninsula.

## Resumen

**El raro chinche de las marismas *Teratocoris antennatus* (Boheman, 1852) (Hemiptera, Miridae), nueva especie para Portugal**

La laguna costera Ria de Aveiro es un sistema socioecológico enmarcado entre la tierra y el mar. La laguna se encuadra en un mosaico paisajístico biodiverso compuesto por playas, dunas, marismas, pastos marinos, y pequeños canales de agua, y es una de las zonas de marismas más grandes de Portugal y de Europa, sustentando redes tróficas costeras y proporcionando zonas de cría para varias especies. A pesar de ser un sitio de Investigación Ecológica a Largo Plazo (LTER) y de integrar la red Natura 2000, se han realizado pocos estudios sistemáticos sobre su entomofauna. En este trabajo se realizaron muestreos de campo en siete localidades a lo largo de las marismas de la Ria de Aveiro barriando con redes la vegetación halófila dominante en septiembre de 2020. De estas colecciones se reporta por primera vez para Portugal *Teratocoris antennatus* (Boheman, 1852), un raro insecto de las marismas.

**Palabras clave:** Chinchas de las plantas, miridos, Ria de Aveiro, marismas, humedales, faunística, Península Ibérica.

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## Introduction

Ria de Aveiro is a coastal lagoon located in the north-west coast of Portugal. The lagoon is connected to the Atlantic Ocean through a single inlet and is approximately 45 km long by 10 km wide, covering an area up to 83 km<sup>2</sup> of wetlands during high tide (Lillebø *et al.*, 2015). Ria de Aveiro provides a heterogeneous network of habitats with a high biological diversity, encompassing one of the largest contiguous saltmarsh areas in Portugal and Europe. Ria de Aveiro is a LTSER - Long Term Socio-economic & Ecosystem Research platform- and part of Natura 2000 Network with two Special Protection Areas (the lagoon area and the adjacent marine area). Despite Ria de Aveiro being considered a living laboratory and target of several research studies, insects have been mostly overlooked.

The family Miridae, commonly known as plant bugs or capsid bugs, has more than 1300 genera and 11300 described species (Schuh, 2013; Schuh & Weirauch, 2020), representing the largest and most diverse Heteroptera family (Ferreira *et al.*, 2015). Mirids can be found worldwide, except in the Antarctic continent, with diversity hotspots in tropical and Mediterranean ecosystems (Wheeler, 2001; Cassis & Schuh, 2012; Schuh, 2013).

In the Iberian Peninsula, the most recent checklist (Goula *et al.*, 2018) shows that there are approximately 550 Miridae species, belonging to roughly 190 genera and 7 subfamilies. From these, about one third of the species, corresponding to 35 genera, belongs to the subfamily Mirinae.

The aim of this manuscript is to report the occurrence of *Teratocoris antennatus* (Boheman, 1852) for the first time in Portugal. In the Iberian Peninsula, the species is only known from a single record of a female in 2017 in Almería, Spain, registered in Global Biodiversity Information Facility based on an iNaturalist observation (iNaturalist, 2022).

## Material and methods

The specimens were caught in a saltmarsh area of Ria de Aveiro, Portugal. The insect collections were carried out in September 2020, in selected locations along Ria de Aveiro coastal lagoon (Fig. 1). Insect specimens were collected on halophyte vegetation, using sweeping nets (300 sweeps per plant species) in each site, and then transferred with an insect aspirator to small flasks. Specimens were then stored into flasks containing 70% ethanol solution

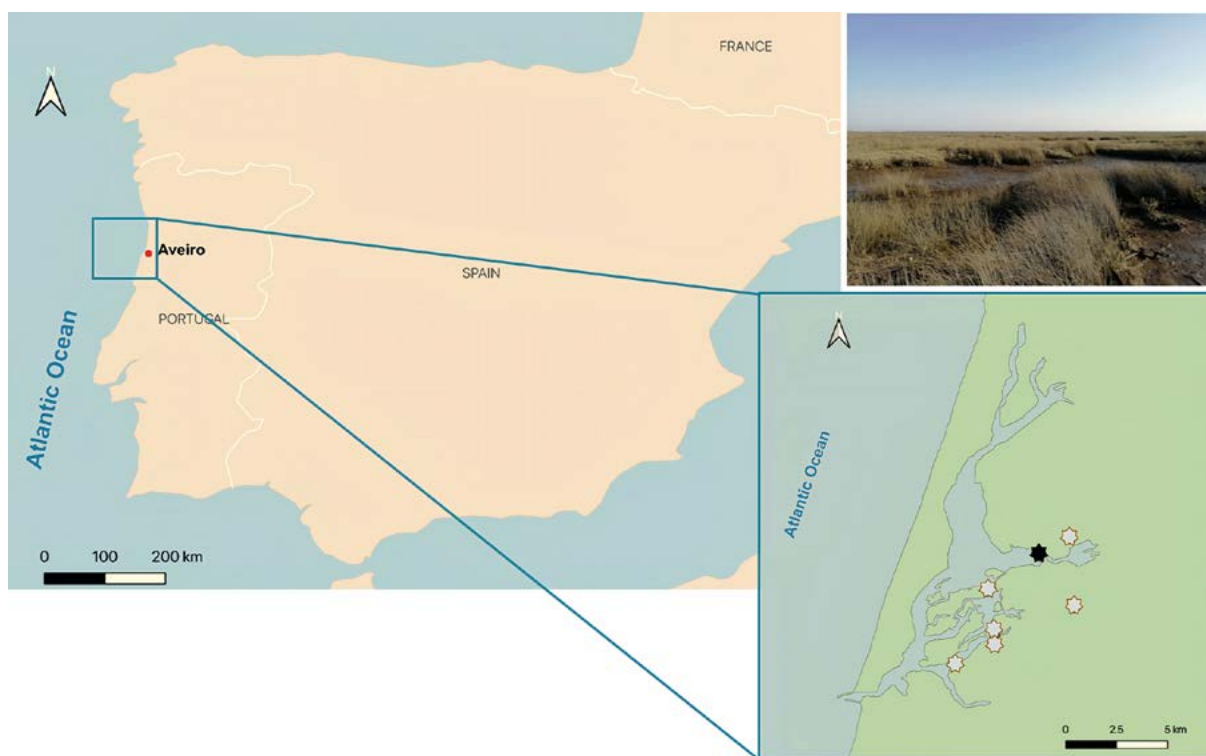


Fig. 1.– Ria de Aveiro location and sampling sites named according to local fishermen as: 1. Bico; 2. Cambeia; 3. Monte Farinha; 4. Cacia; 5. Rio Novo; 6. Salinas; 7. Rebocho. Site Bico (40°43'33.0" N, 8°38'46.3" W) was the site where *Teratocoris antennatus* (Boheman, 1852) was collected.

Fig. 1.– Ubicación de la Ría de Aveiro y lugares de muestreo denominados según los pescadores locales. 1. Bico; 2. Cambeia; 3. Monte Fariña; 4. Cacia; 5. Río Novo; 6. Salinas; 7. Rebocho. Bico (40°43'33.0" N, 8°38'46.3" W) fue el lugar donde se recolectó *Teratocoris antennatus* (Boheman, 1852).

and kept in the Department of Biology of the Aveiro University. Identification was done using Wagner's (1974) keys.

## Results and discussion

### MATERIAL EXAMINED

Portugal, Ria de Aveiro, Bico (40°43'33.0" N, 8°38'46.3" W), 9.IX.2020, 2 ♀♀. On a saltmarsh area, in *Juncus maritimus*. Sweep-nets. Vasco Santos and Olga Ameixa leg., Paride Dioli det. Photo of one of the collected females is presented in Figure 2. For comparison, photos from individuals (male and female), collected in Pian di Spagna, Lombardia, Italy by Paride Dioli & Martino Salvetti, are shown on Figure 3.

### COMMENTS

*Teratocoris antennatus* belongs to the Hemiptera order, in the Miridae family and tribe Stenodemiini. *Teratocoris* includes eleven described species, five of which occur in the Palearctic region (*T. antennatus* Boheman, 1852, *T. coriaceus* Vinokurov, 1995, *T. depressus* Kerzhner, 1979, *T. tagoi* Yasunaga & Schwartz, 2012 and *T. ussuriensis* Kerzhner, 1988), another four in the Holarctic region (*T. caricis* Kirkaldy, 1909, *T. paludum* J. Sahlberg, 1870, *T. saundersi* Doublas & Scott, 1869 and *T. viridis* Doublas & Scott, 1867), and the remaining two species in the Nearctic region (*T. borealis* Kelton, 1966 and *T. discolour* Uhler, 1887) (Henry & Froeschner, 1998; Kerzhner & Josifov, 1999; Yasunaga *et al.*, 2012; Aukema *et al.*, 2013).

*Teratocoris antennatus* is a rare marsh zoophytophagous insect, which can be found on Cyperaceae such as *Carex* sp. and *Scirpus* sp., Poaceae



Fig. 2.– *Teratocoris antennatus* (Boheman, 1852) female specimen collected in Ria de Aveiro, Portugal. A. Dorsal view. B. Ventral view. Photos taken by Olga Ameixa.

Fig. 2.– Espécimen hembra de *Teratocoris antennatus* (Boheman, 1852) recolectado en Ría de Aveiro, Portugal. A. Vista dorsal. B. Vista ventral. Fotos tomada por Olga Ameixa.



Fig. 3.— *Teratocoris antennatus* (Boheman, 1852). A. Male. B. Female. Samples from Pian di Spagna, Lombardia, Italy, Paride Dioli & Martino Salvetti coll., preserved in P. Dioli collection. Photo taken by Paride Dioli.

Fig. 3.— *Teratocoris antennatus* (A - macho; B - hembra) (Boheman, 1852). Ejemplares de Pian di Spagna, Lombardia, Italia, colección Paride Dioli & Martino Salvetti, conservados en la colección P. Dioli. Foto tomada por Paride Dioli.

such as *Glyceria* sp. and *Phragmites* sp., and Juncaceae such as *Juncus* sp. (Kelton, 1966). This species is more predominant in central and northern Europe, but it was recently found in Italy (Dioli & Salvetti, 2016) and is now reported for the first time in Portugal, which together with the Almería report in GBIF (via iNaturalist), represent the first records for the Iberian Peninsula.

This species has previously received several names, due to variability in its coloration, resulting in several synonyms: *Teratocoris bohemani* Stichel, 1930, *Teratocoris dahli* Wagner, 1952, *Teratocoris dorsalis* Fieber, 1864, *Teratocoris feberi* Stichel, 1930, *Teratocoris hueberi* Stichel, 1930, *Teratocoris reuteri* Stichel, 1930, and *Teratocoris notatus* Baerensprung, 1859 (Kerzhner & Josifov, 1999, Schwartz, 2008; Dioli & Salvetti, 2016).

Morphological differences can be found among Palaearctic individuals of *T. antennatus*, mainly in the antennae. Its first antennal segment may present a red or orange-brown coloration, covered with scattered, very short, barely visible bristles with a size of less than

a third of the segment diameter. Otherwise, antennae are brownish, with the second article 1.8 times longer than the first article and slightly shorter than the third and fourth segments united. In the head, the vertex is wider than the eye, 1.5 times in the male, and 1.5-1.7 times in the female. In the proximal part, the pronotum has a shallow but distinct transverse groove, and its margin has an almost angular indentation. The distal part is slightly wider than the head, including the eyes. The general colouration is pale green, especially in the females, or ochre-yellow in the males, often with reddish or brown spots in the hemelytra. The female (5.2-5.5 mm) is considerably longer than the male (3.2-3.5 mm). Both macropterous and brachypterous specimens can be found (Wagner, 1974; Dioli & Salvetti, 2016).

#### DISTRIBUTION

Its distribution includes all European territory, North Africa (Morocco and Algeria), and central and northern Asia (Turkey, Iran, Russia up to Siberia, Turkmenistan, and Tajikistan) (Kerzhner & Josifov, 1999).

## FINAL REMARKS

*Teratocoris antennatus* is well adapted to the harsh saltmarsh conditions, under the influence of tides, with inundation periods of brackish to saline water. According to Wachmann *et al.* (2004) this species can live in dense reed beds and sedge beds near fresh and brackish waters and in marshy areas with a mixture of plants belonging to Poaceae, Cyperaceae and Juncaceae, but it can also be found on *Phragmites australis* and *Phalaris arundinacea* (Dioli & Salvetti, 2016).

This species mostly feeds on the vegetative part and reproductive organs from its host plants, but since it is zoophytophagous, there are also records of this species feeding on aphids, young cicadas, small caterpillars of butterflies and other insects (Dioli & Salvetti, 2016). Regarding its behaviour, it is not a gregarious species, only occasionally it is possible to find both juveniles and adults together (Dioli & Salvetti, 2016).

Lagoons are vulnerable wetlands, and climate change projections for this century highlight the increased risk of floods, already responsible for saline intrusion in adjacent areas. This can induce important changes in plant cover composition and all dependent life forms. For this reason, rare species such as *T. antennatus* may be at risk in these threatened environments. Ria the Aveiro lacks important entomological research, so sampling often results in new records, for instance, Lourenço *et al.* (2020) reported the first record of *Fucellia maritima* (Haliday, 1838) for Portugal, and Prado e Castro *et al.* (2022) presented several new records from Ephydriidae family. For this reason, it is important to conduct additional surveys.

Insects play important ecological roles in the ecosystems due to their diversity, abundance, and wide range of feeding habitats, and even have potential biotechnological uses (Duarte *et al.* 2021). Since they are vulnerable to habitat disturbances they can be used as indicators of ecological changes (Ameixa *et al.*, 2018), which can contribute to monitor ongoing environmental changes.

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