ABSTRACT

Ria de Aveiro costal 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 Ría 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 criadero 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 Ría de Aveiro barriendo con redes la vegetación halófita 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, míridos, Ría de Aveiro, saltmarsh, wetlands, faunística, Península Ibérica.
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 km² of wetlands during high tide (Lillebø et al., 2015). Ria de Aveiro provides an 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.
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* is a rare marsh zoophytophagous insect, which can be found on Cyperaceae such as *Carex* sp. and *Scirpus* sp., Poaceae...
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.


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 Argelia), 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 do 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 Ephyridae 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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**References**


