



RANGE EXPANSION OF THE ALIEN POLYCHAETE *BRANCHIOMMA LUCTUOSUM* (GRUBE, 1870) (SABELLIDAE) IN MOROCCO (THE SOUTHWESTERN MEDITERRANEAN SEA)

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During a field survey of marine alien species along the Mediterranean coast of Morocco, the invasive sabellid polychaete *Branchiomma luctuosum* (Grube, 1870) was detected for the first time in the Ramsar site of Marchica lagoon. This finding represents the second record of this species in the country and the westernmost record in the southern Mediterranean, indicating its rapid expansion along the Moroccan coast.

Keywords: North Africa, Marchica lagoon, alien fan worm, rapid expansion

Mabrouki, Y. & Taybi, A.F.: Širenje strane vrste mnogočetinaša *Branchiomma luctuosum* (Grube, 1870) (Sabellidae) u Maroku (jugozapadno Sredozemno more). *Nat. Croat.*, Vol. 33, No. 1., 197-202, 2024, Zagreb.

Tijekom terenskog istraživanja morskih stranih vrsta duž sredozemne obale Maroka, po prvi puta je pronađena invazivna vrsta mnogočetinaša cjevaša *Branchiomma luctuosum* (Grube, 1870) na Ramsarskom lokalitetu u laguni Marchica. Taj nalaz je drugi za ovu vrstu u Maroku, i najzapadniji u južnom Sredozemlju, što pokazuje njeno brzo širenje duž marokanske obale.

Ključne riječi: sjeverna Afrika, laguna Marchica, strani cjevaš, brzo širenje

INTRODUCTION

The Alboran Sea, home to a rich biodiversity confirming its great ecological importance, is a biogeographical boundary, strongly affected by the dynamics of exchange between water masses from the Atlantic, through the Strait of Gibraltar, and those of the Mediterranean (ROBLES, 2010). Indeed, the Mediterranean Sea as a whole is considered a hotspot of marine biodiversity, with more than 17,000 reported marine species, of which about one fifth are considered endemic (LEJEUSNE *et al.*, 2010). Paradoxically, it is this high endemism that makes communities vulnerable to the arrival of new invasive species that lack the common evolutionary history (ELLENDER *et al.*, 2015).

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Today, the Mediterranean Sea has become one of the largest recipients of invasive species in the world (TSIAMIS *et al.*, 2020). Human activities, such as shipping, aquaculture and the opening of the Suez Canal, have led to the introduction of almost 1000 alien species into the Mediterranean, with almost 400 Lessepsian species becoming established (ZENETOS *et al.*, 2012; KATSANEVAKIS, 2014). These invasive species can drive native marine life towards extinction and alter the fragile Mediterranean ecosystem with potentially devastating consequences. Other risks associated with introduced species include the transport of foreign pathogens and other associated non-native organisms that can act as disease vectors (TARASCHEWSKI, 2006).

Sabellid polychaetes, commonly known as "fan worms" or "feather duster worms", are filter-feeding organisms with a radiolar crown together with a tube of sediment and mucus. *Branchiomma* Kölliker, 1859 is one of the genera of the family Sabellidae, with about 30 species found in sheltered waters worldwide, and is represented in the Mediterranean Sea by three alien species, including *B. luctuosum* (Grube, 1870) (TANDUO *et al.*, 2020). In this paper, we present the second record of the fan worm *Branchiomma luctuosum* in Morocco. This alien species was discovered in the Marchica lagoon, the westernmost site of the occurrence of this species in the southern Mediterranean.

MATERIAL AND METHODS

Several sampling and prospecting trips were carried out along the Eastern Mediterranean coast of Morocco from June 2019 (still ongoing) in order to follow the spread of alien species (part of a structured survey), from the western side of Al Hoceima to the eastern side of Saidia. The sampling was conducted either by examination of the brackish and marine waters near the shore, with the use of a hawk net at depths between 0.5 and 2 m, dragged randomly (when the water is cloudy) among the natural and artificial marine habitats or by the direct trapping of species on sight.

RESULTS

Several specimens of the non-indigenous polychaete *Branchiomma luctuosum* were detected in the Marchica lagoon (western Mediterranean, Morocco) on 15/03/2024, representing the westernmost record of this species on the Mediterranean coast of North Africa (Fig. 1a). Specimens of *B. luctuosum* have been observed all over the concrete walls of the small harbors for fishing and recreational boats located inside the Marchica lagoon (Fig. b) (35°11'07.3"N 2°55'27.5"W; 35°10'23.9"N 2°54'59.5"W). Specimen density ranges between 1–3 individuals/m² (Fig. 1c); three voucher specimens of *Branchiomma luctuosum* were deposited at Mohamed Premier University of Oujda, Morocco (UMP, TAF & MY, 150324).

DISCUSSION

Originally described from the Red Sea, the alien fan worm *B. luctuosum* is a possible Lessepsian migrant from the Red Sea (LICCIANO & GIANGRANDE, 2008). Since its first record in Italy, it has become established in many localities (Fig. 1a), showing variable invasion success in the western, central and eastern Mediterranean (MASTROTOTARO *et al.*, 2014; CROCCETTA *et al.*, 2021; LANGENECK *et al.*, 2022). In the southern Mediterranean or on the North African coast, it was first recorded in Morocco in the Marina of Saidia (MABROUKI *et al.*, 2021), then more recently in Tunisia (AYARI-KLITI *et al.*, 2021). Here

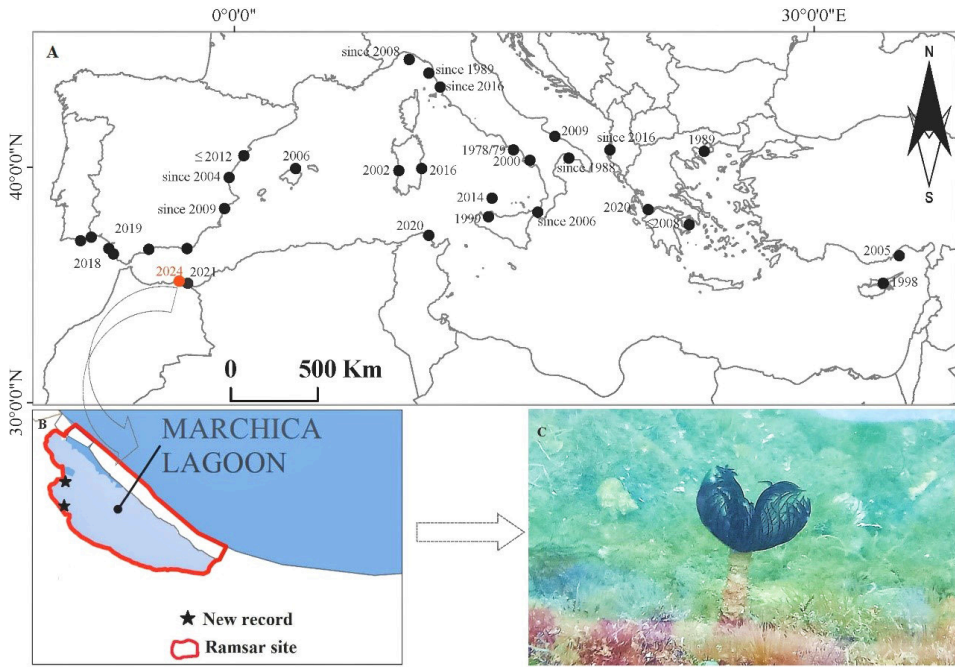


Fig. 1. *Branchiomma luctuosum* in the Mediterranean and Morocco. A: The updated distribution in the Mediterranean Sea (following MABROUKI *et al.*, 2021 and LANGENECK *et al.*, 2022) and the present paper (old records black, new record red). B: New records of *Branchiomma luctuosum* in Morocco. C: Specimen *in situ*.

we report for the first time its presence in the Marchica lagoon; this is currently the westernmost record of the species in the southern Mediterranean. This finding tends to indicate a rapid expansion along the Moroccan coast. The rapid expansion of its range means that the alien fan worm could soon reach the Atlantic coast of Morocco. Such a process is currently unfolding on the Spanish Mediterranean coast; *B. luctuosum* was first recorded in the port of Valencia, and since then the invasive species has spread throughout the southern part of the Iberian Peninsula, including the Atlantic coasts (EL HADDAD *et al.*, 2008; FERNÁNDEZ-ROMERO *et al.*, 2021).

In the newly invaded areas, the invasive worm has been detected inside small ports for fishing and recreational boats. As could be the case in the Marina of Saidia, *Branchiomma luctuosum* has expanded most of all within the Marchica lagoon, probably as a fouling species, thus confirming the rapid spread of this fan worm in confined areas (MABROUKI *et al.*, 2021). The abundance of *B. luctuosum* recorded in this first study is relatively low, and the invasive worm may be in the early stages of invasion in Marchica lagoon.

The Marchica lagoon is located in a key area for the conservation of marine areas in the Alboran Sea (IUCN, 2012). It is considered a very productive area and has an important socio-economic role in the region, with tourism and artisanal fishing being the main economic activities carried out in the lagoon (EL HAMOUTI *et al.*, 2023). Unfortunately, this Ramsar site has become an important container for invasive and exotic

species in recent years (MABROUKI *et al.*, 2019; SELFATI *et al.*, 2017; TAYBI & MABROUKI, 2020; TAYBI *et al.*, 2018, TAYBI *et al.*, 2020a, b; TAYBI *et al.*, 2024), forming one of the main 'hotspots' of biological invasion in Morocco (TAYBI *et al.*, 2023). Major efforts are needed to mitigate the spread of alien species in such a fragile ecosystem. A better understanding of how the new human-induced patterns of biodiversity will affect Mediterranean food webs and ecosystem functioning is needed. This is particularly relevant to areas of significant coastal development, which could destroy fish nurseries, reduce water quality and contribute to the spread of invasive species.

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