

First record of *Cassiopea andromeda* (Scyphozoa: Rhizostomeae: Cassiopeidae) from the central Mediterranean Sea

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The occurrence of the scyphozoan Cassiopea andromeda is reported from the Maltese Islands, where a sizable aggregation was found in Marsamxett harbour. This is the first record of this circumtropical species from the central Mediterranean Sea, hitherto known from the Levantine and Aegean basins. It is suggested that the most likely vector responsible for transporting this species to the Maltese Islands is shipping.

Keywords: Cnidaria, scyphomedusa, Malta, alien species, lessepsian invasion, range extension

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INTRODUCTION

The so called ‘upside-down jellyfish’, *Cassiopea andromeda* (Forsskål, 1775), is not native to the Mediterranean, but was one of the first wave of lessepsian immigrants that entered the eastern Mediterranean through the Suez Canal. Galil *et al.* (1990) traced the history of its invasion of the Mediterranean to its presence in the Suez Canal in 1886, and the first record, off Cyprus (Maas, 1903). *Cassiopea andromeda* is well established in the Levantine and Aegean Seas, but was hitherto unknown west of the south–central Aegean (Galil *et al.*, 1990; Çevik *et al.*, 2006; Özgür & Öztürk, 2008; Bayram Öztürk, personal communication, 2009).

RESULTS AND DISCUSSION

An aggregation of scyphomedusae of *Cassiopea andromeda* (Figure 1) was observed by one of us (P.J.V.) on 20 March 2009 close to the mouth of Marsamxett Harbour (35°53′54.61″N 14°30′21.13″E), on the north-east coast of Malta, at depths of 3.5 – 6 m, on a muddy-sand bottom. The aggregation, consisting of about 50 individuals 3–11 cm in diameter, was observed again in the same location a month later, and a few individuals were still present at the end of May. The precise number of individuals could not be ascertained due to the very poor visibility. Although underwater photographs of the aggregation were taken, the results were not very satisfactory due to the amount of suspended particles in the water. Specimens were identified using the key in Galil *et al.* (1990). *Cassiopea andromeda* seems to prefer warm, well-lit, shallow and sheltered waters with muddy or fine sand

bottoms, to permit exposure of the photosymbionts disposed in its oral arms (Verde & McCloskey, 1998). The area in Marsamxett Harbour where the aggregation occurred conforms to this habitat type. It is worth noting that practically the only localities with shallow, sheltered, muddy habitats in the Maltese Islands are the main harbours, so there are few places where species such as *Cassiopea* can establish. No similar jellyfish, either in coloration or in behaviour, occur in the Maltese Islands. Local divers and fishermen, alert to the presence of jellyfish due to recurring ‘blooms’ (mostly of *Pelagia noctiluca*), have not reported aggregations of unusual species to local news media.

The genus *Cassiopea* has a wide circumtropical distribution in the western Atlantic and Indo-Pacific, including the Red Sea. Noting the taxonomic confusion in the genus, Holland *et al.* (2004) examined the global phylogeography and molecular systematics of the three currently recognized species: *Cassiopea andromeda*, *C. frondosa*, and *C. xamachana*. Their molecular phylogenetic results support identification of the Red Sea populations as *C. andromeda*. Although no specimens from the Mediterranean were studied by Holland *et al.* (2004), given the history of the introduction and spread of *Cassiopea* in the Mediterranean, it is reasonable to assume that the Mediterranean populations, including those reported here from the Maltese Islands, belong to *C. andromeda sensu* Holland *et al.* (2004). However, only molecular analysis of Mediterranean specimens will ascertain this, since Holland *et al.* (2004) found that in Hawaii there have been two independent introductions of different yet morphologically similar cryptic species from separate source populations.

At present one can only speculate as to how *Cassiopea* has arrived in the Maltese Islands. Although *Cassiopea* possesses pelagic larvae, surface currents in the region of Malta travel west to east. Potentially, larvae may reach the Maltese Islands from Sicily under certain conditions, but this species is not known from Italian waters (Anna Occhipinti Ambrogi, personal communication, 2009). Under the

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Fig. 1. Aboral view of a specimen of *Cassiopea andromeda* collected from Marsamxett Harbour, Malta on 20 March 2009, from a depth of 5 m. (Image by P.J. Vella.)

circumstances, shipping seems to be the most likely vector either through the transport of larvae in ballast water, or of scyphistomae on hulls.

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