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Timoides agassizii* Bigelow, 1904, little-known hydromedusa (Cnidaria), appears briefly in large numbers off Oman, March 2011, with additional notes about species of the genus *Timoides

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Abstract

A bloom of the hydromedusan jellyfish, *Timoides agassizii*, occurred in February 2011 off the coast of Sohar, Al Batinah, Sultanate of Oman, in the Gulf of Oman. This species was first observed in 1902 in great numbers off Haddummati Atoll in the Maldivian Islands in the Indian Ocean and has rarely been seen since. The species appeared briefly in large numbers off Oman in 2011 and subsequent observation of our 2009 samples of zooplankton from Sohar revealed that it was also present in low numbers (two collected) in one sample in 2009; these are the first records in the Indian Ocean north of the Maldives. Medusae collected off Oman were almost identical to those recorded previously from the Maldivian Islands, Papua New Guinea, the Marshall Islands, Guam, the South China Sea, and Okinawa. *T. agassizii* is a species that likely lives for several months. It was present in our plankton samples together with large numbers of the oceanic siphonophore *Physalia physalis* only during a single month's samples, suggesting that the temporary bloom off Oman was likely due to the arrival of mature, open ocean medusae into nearshore waters. We see no evidence that *T. agassizii* has established a new population along Oman, since if so, it would likely have been present in more than one sample period. We are unable to deduce further details of the life cycle of this species from blooms of many mature individuals nearshore, about a century apart. Examination of a single damaged *T. agassizii* medusa from Guam, calls into question the existence of its congener, *T. latistyla*, known only from a single specimen.

Key words: Cnidaria, Hydrozoa, *Timoides agassizii*, *Timoides latistyla*, *Physalia physalis*, Arabian Sea, Gulf of Oman, Sea of Oman, Indian Ocean, Western Pacific, Sohar, Okinawa, Guam, zooplankton, jellyfish blooms, medusa, Hydromedusae

Introduction

Jellyfish blooms occur naturally in many estuarine and coastal regions and may be increasing in their magnitude and extent worldwide, but we lack data from many parts of the world's oceans (Mills 2001; Condon *et al.* 2012). Changes in the magnitude of blooms of native jellyfish species have been reported from boreal regions such as the Bering Sea (Brodeur *et al.* 1999) (which later returned to normal levels, Brodeur *et al.* 2008) to the warm temperate Sea of Japan (Uye & Ueta 2004). Invasive jellyfish species arriving from other ecosystems have also formed new blooms; invasive species cause increasingly troublesome blooms in the Eastern Mediterranean Sea (Lotan *et al.* 1994), have made extensive changes to the ecology of the Black Sea (Shiganova 1998), and also occur on coastlines and especially estuaries worldwide (Millard 1959; Mills 2001; Xian *et al.* 2005; Miglietta & Lessios 2009; Wintzer *et al.* 2011). A recent analysis of all available long-term data sets suggests that the perceived global increase in jellyfish abundance may be a consequence of a natural worldwide oscillation in jellyfish populations, with an approximately 20-year periodicity (Condon *et al.* 2013).

species in the region, since no younger life history stages were observed prior to this brief influx of adult medusae. The purpose of this paper has been to describe the appearance of this interesting little medusa, which has been observed in numbers that call attention to its sudden presence in a little-known ocean ecosystem. Improved sampling in the Indian Ocean or Arabian Sea will be required in order to identify correlations between *Timoides agassizii* abundance and climatic or oceanographic indices. This study again emphasizes the importance of jellyfish study in coastal waters of Oman in helping to provide background to better understand jellyfish blooms in a global context. There is no reason to assume that the brief presence of large numbers of *T. agassizii* in the Gulf of Oman should be interpreted as part of a global trend towards increases in jellyfish blooms over time.

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