

## SHORT COMMUNICATION

## A sea urchin (*Diadema africanum* Rodriguez et al., 2013) and a pipe fish (*Syngnathus phlegon* Risso, 1827) – two new records for the Azores

ROBERT MINDERLEIN &amp; PETER WIRTZ



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R. Minderlein (e-mail: robert@lechtaucher.de), Leonard-Hausmann Str. 36, DE-86157 Augsburg, Germany; Peter Wirtz, Centro de Ciências do Mar, University of Algarve, Campus de Gambelas, PT-8005-139 Faro, Portugal.

## INTRODUCTION

Maciel & Costa (2010) reported the presence of 17 species of coastal sea urchins (Echinoidea) in the Azores, while Porteiro et al. (2010) reported six species of pipefishes (Syngnathidae) for the area. During SCUBA diving at Santa Maria Island, the first author detected a sea urchin and a pipe fish which are new to the marine fauna of the Azores.

## MATERIAL &amp; METHODS

The animals were observed SCUBA diving and photographed *in situ*. The pictures were sent to the second author for identification. A *Diadema* cf. *africanum* specimen was preserved in alcohol and sent to the Department of Oceanography and Fisheries of the University of the Azores at Horta, Faial Island for verification of the provisional identification. It was deposited in the local collection (COLETA) with the number DOP – 9281.

## RESULTS



Fig. 1 (left). *Diadema africanum* at Santa Maria Island, Azores.

Fig. 2 (right). *Syngnathus phlegon* swimming below *Rhincodon typus* near Santa Maria Island.

**1) *Diadema africanum*** Rodríguez et al., 2013

As noted by Marques (1983) and by Wirtz & Martins (1993), a black colour form of *Centrostephanus longispinnis* (Philippi, 1845), at first glance similar to *Diadema antillarum*, is common in the Azores. *D. antillarum*, however, has never been recorded from the archipelago of the Azores but occurs and has been recorded under that name in Madeira and Canary Islands. Recently, however, the eastern Atlantic *Diadema* has been described as a separate species, *D. africanum* (Rodríguez et al. 2013). A single individual of *Diadema* (Figure 1) was recorded by the first author in 2007 at Santa Maria Island (36°56'N; 25°10'W). The animal was in a depression in the rock at a depth of about 8 m at a moderately exposed site. Since then, this lone individual has been observed repeatedly at exactly the same place. It was collected in 2010. Measurements of the characteristics of this specimen confirmed that it indeed was *Diadema africanum* (Table 1 gives the main measurements and ratios). In May 2010, a second, solitary individual of *Diadema africanum* was detected at N36°55', W25°01',

about 12 km from the first individual. This animal was also observed in a depression of the rock, at a depth of about 8 m. The site is moderately exposed and the same sea urchin has since been seen repeatedly.

**2) *Syngnathus phlegon*** Risso, 1827

Whale sharks (*Rhincodon typus* Smith, 1828) have become more common at Santa Maria Island in recent years (Afonso et al. 2014). The first author observed and photographed a pipe fish, approximately 15 cm in length, that was swimming in the open water near a whale shark at 37°12'N, 24°45'W (28 September 2010; Figure 2). This apparently is *Syngnathus phlegon*, which can be recognized by its unique colour pattern, the dark and light pattern on the body. Open-sea swimming behaviour is typical for this species. *S. phlegon* is known from the Mediterranean Sea and adjacent Atlantic coasts (Dawson 1986) but has not been recorded in Azorean waters previously. The momentary “association” of the pipe fish with a whale shark was short-lived and encountered entirely by chance.

Table 1. Main measurements and ratios of *Diadema africanum* specimen (in mm).

Measurements (mm)			
Test:		Long spines*:	
Diameter	78.5	Length	66.5
Height	39.2	Diameter	
Apical disc diameter	16.6	At the base	1.32
Periproct diameter	8.9	At middle	1.05
Peristome diameter	31.3	At tip	0.63
Ratios (%)			
Height to width ratio genital plate	71.5	Diameter of gonopore %	35.4
Ambulacra % at ambitus	29.9	Apical system	21.1

\*average 6 spines

**DISCUSSION**

There are many marine species at the Azores that appear to have been introduced by man (Cardigos et al. 2006)). The appearance of *Diadema*

*africanum* at Santa Maria Island, however, seems to be due to natural settlement and not to human introduction. While the first site is about 3 km away from the harbour, the second site is more than 12 km away from the harbour. A similar case

is the appearance of a sea anemone, *Telmactis cricoides*, which previously had its northern limit at Madeira, but has recently been recorded from the Azores (Wirtz 2009). Both of these records could be a result of global warming, allowing these warm-water species to survive at the Azores. Santa Maria is at the south-eastern limit of the archipelago and has the warmest climate. Species originally from warmer waters might be expected to settle at Santa Maria Island first. While the sea anemone can reproduce clonally, the presence of two solitary individuals of a sea urchin species more than 12 km apart does not constitute a reproductively viable population. Only the detection of additional individuals in the future might confirm the presence of a reproductive population of *Diadema* sea urchins in the Azores. At Madeira and the Canary Islands, *Diadema* sea urchins have a key role in controlling macroalgal populations (e.g. Hernández et al. 2008 and references therein); a reproductive population of *Diadema* in the Azores could alter the marine habitats in the archipelago.

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