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## A new alien crab for the Mediterranean Sea: *Xanthias lamarckii* (H. Milne Edwards, 1834) (Crustacea: Decapoda: Brachyura: Xanthidae)

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### Abstract

A single specimen of *Xanthias lamarckii* was collected on March 2013 from the shallow waters of Chtenia, a rocky islet near Rhodes Island, south-eastern Aegean Sea. The occurrence of this Indo-West Pacific species is reported for the first time in the Mediterranean waters and documents the ongoing process of biological invasion of the basin. The vector of introduction of *X. lamarckii* is unknown so far; future information on the establishment and spread of the species in its new environment is required.

**Keywords:** *Xanthias lamarckii*, Brachyura, aliens, Mediterranean Sea, Aegean Sea, Rhodes.

### Introduction

A number of 39 alien Brachyura species of Red Sea/Indo-Pacific origin, belonging to 19 families, have been recorded in the Mediterranean Sea (Galil, 2011; Zenetos *et al.*, 2012; Karhan *et al.*, 2013; Galil & Mendelson, 2013; Zaouali *et al.*, 2013). The families Portunidae, Pilumnidae and Leucosiidae show the highest number of Red Sea/Indo-Pacific aliens, with 11, 5 and 3 species respectively, while the remaining families are represented by only one or two species. Up to date, two alien Xanthidae were known in the basin, the earlier introduced *Atergatis roseus* (Rüppell, 1830) and the recently discovered *Actaea savignii* (H. Milne Edwards, 1834) (Karhan *et al.*, 2013).

This study presents the first record of the genus *Xanthias* Rathbun, 1897 from the Mediterranean Sea.

### Material and Methods

A single female specimen of *Xanthias lamarckii* (H. Milne Edwards, 1834) (Fig. 1 A, B) was captured on 15 March 2013, in Chtenia Islet (35°59'28"N, 27°42'26"E), approximately 3.4 km off the south-western coasts of Rhodes Island (SE Aegean Sea). The sample was found under a rock during snorkelling at 1 m of depth (seawater temperature 17.5 °C, salinity 39.1 ‰).

The specimen was identified following Serène (1984), while Barnard (1950) was consulted for its description. The sample is deposited at the Hydrobiological Station of Rhodes collection, preserved in ethanol (Catalogue number HSR100).

### Results

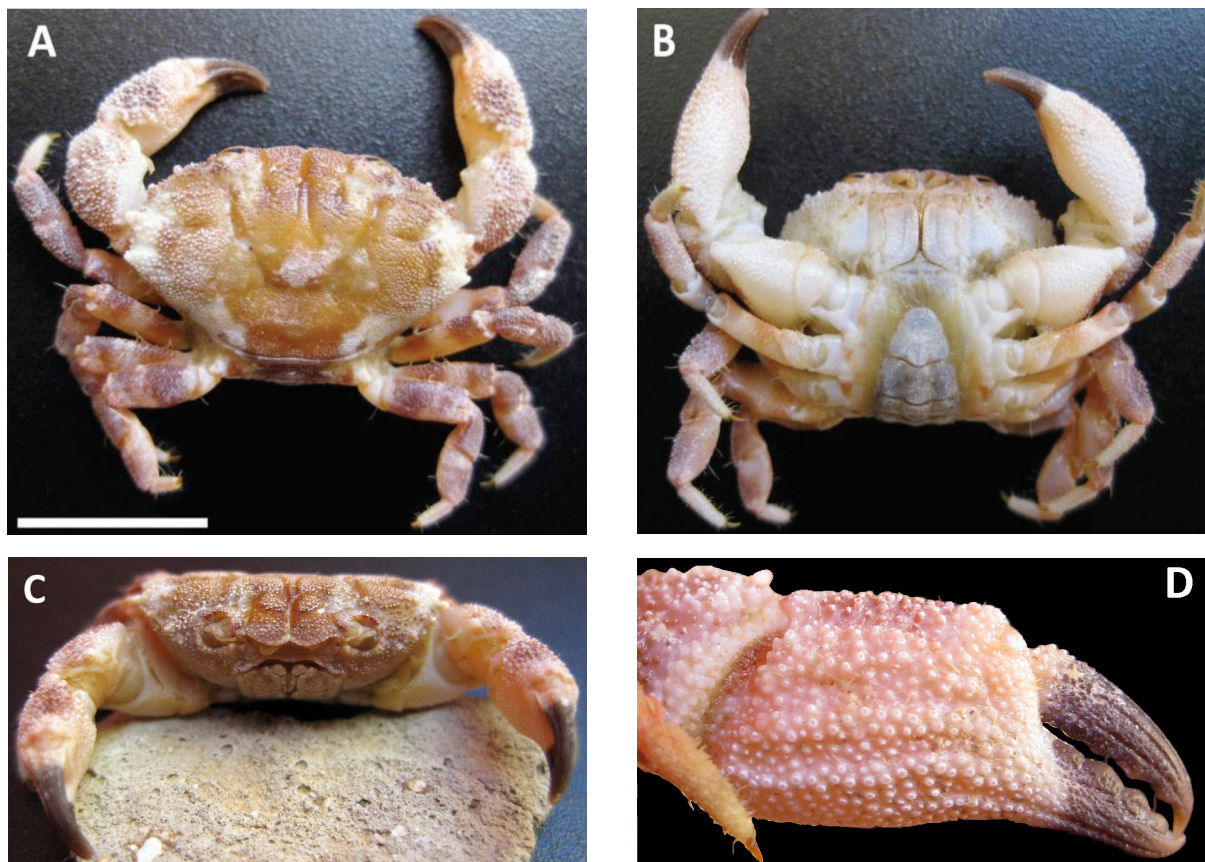
#### Description

The following measurements were obtained from the *X. lamarckii* specimen (Fig. 1A, B): carapace length 11.3 mm, carapace width 17.8 mm, length and height of both chelas 9.9 mm and 5.1 mm respectively, length of chelipeds 17.5 mm (left), 17.8 mm (right). The ratio between carapace width and length obtained from the present sample (1.58) agrees with those reported by Serène (1984) and Forest & Guinot (1961).

Carapace hexagonal, anterior and antero-lateral portions granulate, granules becoming smaller centrally and posteriorly; grooves evident, particularly the gastric-branchial one and the two grooves across the branchial region. Antero-lateral margins of the carapace, behind the exorbital angles, with four granulate obtuse teeth (Fig. 1A). Front not extending beyond the supra-orbital angles, nearly straight with a median fissure (Fig. 1C). Equal chelipeds, their supero-external surface granulate, smaller granules in the lower surface. External face of the cheliped's propodus bears three longitudinal furrows regularly granulate (Fig. 1D). Fingers of chelipeds pointed and hardly crossing each other when closed. Legs granulate, mainly on the upper surface.

#### Colour

Carapace yellow-brownish, laterally showing an irregular whitish area from the second lateral tooth up to the postero-lateral portion; whitish areas also behind the exorbital angles. Chelipeds and walking legs reddish-



**Fig. 1:** The female specimen of *Xanthias lamarckii* from Chtenia, Rhodes (carapace length 11.3 mm, carapace width 17.8 mm), just fixed in ethanol (A, dorsal view; B, ventral view, C, frontal view) and the external face of the right chela (length 9.9 mm), showing the three granular furrows (D). White bar 10 mm.

brown on upper surface. Fingers of chelas dark brown. Ventral surface: carapace and chelipeds whitish, walking legs orange-rose. The colour here described corresponds to the specimen just a few minutes after fixation in ethanol (Fig. 1 A, B), almost the same as the live specimen.

#### *Aquarium maintenance*

Before storing, the live specimen was kept for three weeks, fed on artificial fish food in flakes, in a 50 L tank, where it used to burrow under sand.

#### **Discussion**

*Xanthias lamarckii* is the most common species of the genus *Xanthias* (Serène, 1984), with a distribution extending in the Indo-West Pacific Ocean, from Eastern Africa (South Africa), Mauritius, Réunion, Madagascar, Europa Isl., Comoros (Anjouan, Mayotte) to Australia, Japan, Hawaii, and French Polynesia, including Wallis and Futuna Islands (Serène, 1984; Davie, 2002, 2012; Legall & Poupin, 2013). It is a shallow waters crab (0-100 m of depth), commonly observed in depths of 0 to 6 m, on hard bottom (rock and rubbles) (Legall & Poupin, 2013). According to the Interactive Marine Aquarium Encyclopedia Reeflex (2013), a sample of *X. lamarckii* from the South China Sea, hidden in a live stone hole of 3.2 cm in diam-

eter, was casually introduced in a tank and its presence was discovered thanks to the production of crumbed rock during its nocturnal activity. The crab was easily maintained in captivity feeding on algae, clam meat, small invertebrates, detritus and other. As assessed by Sewell (2007), while many species of xanthid crabs are kept by aquarists, most pose a threat to fish and other aquarium inhabitants, so many of the species that are found on live rocks are unwanted by aquarists. However, due to the geographic position of Chtenia islet, far from any town or village, it seems unlikely that the present finding could be attributed to discarded material by an aquarist.

Although *X. lamarckii* is common in shallow waters and widely distributed in the Indo-West Pacific, up to date no references regarding its occurrence in the Red Sea were obtained. The predation activity, prevalently nocturnal, observed in many xanthid species (Debelius, 1999) and the habit to hide in crevices under the rocks reported here, combined with the small size of this crab could probably contribute to eluding its observation in the field and/or samplings. Considering that the occurrence of *X. lamarckii* reported here is based on a single individual only, for the whole Mediterranean, and that data on establishment and spread of the species are not yet available, it is premature and highly hazardous to speculate its possible pathway of introduction to the area.



Up to date, most Indo-Pacific decapod species introduced to the Aegean waters (21 species) are concentrated along the coasts of the south-eastern corner of the basin, a marine environment particularly suitable for the establishment of warm-water alien species (Pancucci-Papadopoulou *et al.*, 2012). In particular, all Indo-Pacific alien Brachyura reported from the waters around Rhodes have been introduced via the Suez Canal (11 species) (Corsini-Foka & Pancucci-Papadopoulou, 2012). All of them are well established in the area and many, such as the xanthid *Atergatis roseus*, are regularly present in the public Aquarium displays of the Hydrobiological Station of Rhodes, because they are easily captured by nets in the shallow waters of the island.

Rhodes is very far from the Suez Canal, but the first finding of Indo-Pacific aliens new to the Mediterranean Sea, such as the actual *X. lamarckii*, is not a novelty, considering for example the cases of the tetraodontid *Tylerius spinosissimus* (Regan, 1908) (Corsini-Foka *et al.*, 2010a) and the portunid *Gonioinfradens paucidentatus* (A. Milne-Edwards, 1861) (Corsini-Foka *et al.*, 2010b). After successive findings along the Levantine coasts, both of the above species are now included among the Indo-Pacific aliens that have entered the basin via the Suez Canal, the so-called Lessepsian immigrants.

The record of *X. lamarckii* described here increases the number of alien Brachyura of Indo-Pacific origin introduced into the Mediterranean basin to 40. Furthermore the number of Indo-Pacific alien crabs recorded in the marine region of Rhodes increases to 12 (21 % of total brachyuran species locally recorded), documenting that the invasion of warm-water species in the area is an ongoing and accelerating process conducting to an alteration of native marine communities (Corsini-Foka M. & Pancucci-Papadopoulou, 2012).

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