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On the distribution of *Percnon gibbesi* (H. Milne Edwards, 1853) (Crustacea, Decapoda, Plagusiidae) along the Tunisian coast

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Abstract

The subtropical crab, *Percnon gibbesi* is established along the Tunisian coasts. This crab was recorded by underwater observation from Malloula, Tabarka, El-Haouaria, Yasmine Hammamet, Monastir marina and the Kuriat Islands. These new observations increase the known distribution of *P. gibbesi* in the south Mediterranean basin.

Keywords: *Percnon gibbesi*; Plagusiidae; Invasive species; Distribution; Tunisia; South Mediterranean.

Introduction

Biological invasions are a widespread and significant component of human-caused global environmental change (VITOUSEK *et al.*, 1997). Marine bio-invasions represent a serious threat to ecosystems and native biodiversity and may cause profound economic impacts (STREFTARIS & ZENETOS, 2006).

The Mediterranean Sea is one of the regions most severely affected by marine species invasions, fostered by the opening of the Suez Canal, heavy shipping traffic (resulting in the transportation of species by fouling and ballast waters), aquaculture,

the warming of the Mediterranean (resulting in entry of thermophilic Atlantic species), and the aquarium trade (STREFTARIS *et al.*, 2005; GALIL, 2009). By the end of 2009, approximately 947 species were listed as introduced in the Mediterranean Sea (ZENETOS *et al.*, 2009).

A recent case of introduction of an alien invasive species in the South Mediterranean is *Percnon gibbesi* (H. Milne-Edwards, 1853). This small crab is one of the most widely distributed grapsids in the world, with a range extending from California to Chile, from Florida to Brazil, and from Madeira to the Gulf of Guinea (MANNING & HOLTHUIS, 1981). It was first recorded

in the Mediterranean Sea in 1999 from the island of Linosa (Strait of Sicily) (RELINI *et al.*, 2000), and almost simultaneously from the Balearic Islands and the northern Spanish coast (GARCIA & REVIRIEGO, 2000; MÜLLER, 2001; DEUDERO *et al.*, 2005), Sardinia, the Tyrrhenian Sea, Sicily and Malta (PIPITONE *et al.*, 2001; MORI & VACCHI, 2002; SCIBERRAS & SCHEMBRI, 2007). Since 2004, it has invaded the eastern Mediterranean (THESSALOU-LEGAKI *et al.*, 2006), and recently it was reported from Libya (ELKRWE *et al.*, 2008) and from the Italian Ionian Sea (CROCETTA & COLAMONACO, 2008). Its presence in Tunisian waters was reported in 2004 (MEDMPA, 2004) but with no follow up. The distribution of the species in the Mediterranean and its spread in the Greek Aegean and Ionian Seas was reviewed by KATSANEVAKIS *et al.* (2010).

In this paper, we report the occurrence of *P. gibbesi* along the Tunisian coast enlarging its known distribution in the South Mediterranean Sea.

Materials and Methods

All observations were made in July–August 2010, at 0.5–3 m depth. Presence/absence surveys were conducted at ten coastal sites along the Tunisian coastline (Table 1). In all sites, standardized one-hour transects of various lengths along the coastline were surveyed by snorkeling.

Results and Discussion

Percnon gibbesi was found in six sites along the Tunisian coastline (Table 1). The species seemed to be very well established. It was highly abundant, widely spread in most studied areas, and represented by a noticeable number of ovigerous females and juveniles.

Percnon gibbesi was observed in many different types of rocky substrate, varying from straight cliffs on the sea side to gentle sloped pebble coasts. In the Kuriat Islands (Fig. 1) and Malloula, the crab occurred on shallow sub-tidal rock (0.5–2 m), exposed to strong wave action, among shade-tolerant

Table 1
Surveyed localities and abundance of *P. gibbesi* along the Tunisian coast.

Site	Depth (m)	GPS location		Substrate	Abundance**
		N	E		
Malloula*	0.5-2	36° 57' 47"	08° 42' 51"	Rock	3
Tabarka*	0.5-3	36° 57' 48"	08° 45' 43"	Rocky seawall	35
El-Haouaria*	0.5-3	37° 02' 28"	11° 03' 58"	Rocky seawall	40
Yasmine Hammamet*	0.5-3	36° 22' 24"	10° 32' 57"	Rocky seawall	25
Monastir marina*	0.5-3	35° 46' 46"	10° 50' 08"	Rocky seawall	50
Monastir Karaia	0.5-3	35° 46' 28"	10° 50' 18"	Rock	-
Kuriat Islands*	0.5-2	35° 48' 11"	11° 01' 44"	Rock	2
Kerkennah Charguia	0.5-1	35° 46' 28"	10° 50' 18"	Sand	-
Kerkennah Gharbia	0.5-1	34° 40' 13"	11° 01' 14"	Rock	-
Zarzis	1-3	33° 29' 19"	11° 07' 24"	Rocky seawall	-

(* presence of *P. gibbesi* ** i.e. recorded individuals during standardized one-hour transects)



Fig. 1: *Percnon gibbesi* observed at the Kuriat Islands at 1m depth, July 2010. Photo of Y.R. Sghaier.

algae including *Flabellia petiolata*, *Halimeda tuna*, *Cladophora pellucida* and *Peyssonnelia* spp. The highest abundances were observed in areas with artificial boulders near marinas (Tabarka, El-Haouaria, Yasmine Hammamet and Monastir marina).

One female and three additional males were collected in Monastir marina at a depth of 1-1.5 m. The carapace length was 2.5, 2.7, 3.5, and 3.9 cm respectively. The specimens were fixed in 4% formaldehyde and deposited at the Animal Biology and Evolutionary Systematic Unit, Biology Department of Faculty of Sciences, University of Tunis ElManar.

Contrary to some reports (PIPITONE *et al.*, 2001; DEUDERO *et al.*, 2005), *P. gibbesi* was observed to coexist with the xanthid *Eriphia verrucosa*, which is one of the native species occurring in the Kuriat Islands. Several authors suggest that the alien species is a potential competitor for resources, mainly space, with the native syntopic grapsid (DEUDERO *et al.*, 2005).

PUCCIO *et al.* (2006) suggest that the feeding behaviour of *P. gibbesi* could give it an advantage over other Decapoda species, by allowing the invasive species to explore a broader feeding niche.

According to WILLIAMS (1984), *P. gibbesi* is very difficult to catch because of its propensity for rapid concealment under rocks. This could explain the delays in recording *P. gibbesi* along the Tunisian coast. Larval transport by surface currents and transport due to shipping may hypothetically be the ways *P. gibbesi* was introduced in Tunisia. In fact, a large population was found in Sicily and circum-Sicilian Islands and in Malta (PUCCIO *et al.*, 2006; SCIBERRAS & SCHEMBRI, 2007).

This new record of *P. gibbesi* raises the total number of alien decapod crustaceans off the Tunisian coast to three, the others being *Grapsus granulatus* H. Milne-Edwards, 1853 and *Pachygrapsus transversus* (Gibbes, 1850) (ZAOUALI *et al.*, 2007) collected at Zarzis. The increase in the

number of alien species recorded along the Tunisian coasts over the last few decades is probably caused by the increase in maritime traffic, and climate change (ZAOUALI *et al.*, 2007).

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