

Rapid Communication

New records of the invasive crabs *Callinectes sapidus* Rathbun, 1896 and *Percnon gibbesi* (H. Milne Edwards, 1853) along the Italian coasts

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Abstract

Callinectes sapidus (Crustacea, Decapoda, Portunidae) and *Percnon gibbesi* (Crustacea, Decapoda, Percnidae) are respectively reported from two Italian localities: Basento river (Basilicata, Ionian Sea) and Montecristo Island, Tuscan Archipelago (Northern Tyrrhenian Sea). Data on collection sites and discussion regarding their present distribution are provided.

Key words: American blue crab, Sally lightfoot crab, Montecristo Island, Basilicata, Apulia

Introduction

The Italian Peninsula, with over 7,000 km of coastline, has a critical position in the Mediterranean Sea, being in the middle of different basins. Recent studies have detected > 275 alien and cryptogenic species in marine and brackish alien waters of Italy (Occhipinti-Ambrogi et al. 2011; Katsanevakis et al. 2013). Several of these species are well established along the Italian coasts and some seem to be expanding their range. Here we report the occurrence of: 1. a portunid crab, *Callinectes sapidus* Rathbun, 1896, recently found at the mouth of two rivers that flow into the Ionian Sea; and 2. a grapsoid crab, *Percnon gibbesi* (H. Milne Edwards, 1853), that was recently collected from the Tuscan Archipelago (Italy) in the Northern Tyrrhenian Sea, Central Mediterranean Sea.

The Portunid crab *C. sapidus* (American blue crab) is a commercially important species and a dominant invertebrate in estuaries along much of the east coast of North and South America, including the Gulf of Mexico. Since 1900, the blue crab has extended its distribution to many European coastal waters; transport in ballast

water is considered the most probable vector (Nehring 2011). In Italy, *C. sapidus* was first recorded in the Northern Adriatic Sea where two specimens from Venice lagoon were misidentified as *Neptunus pelagicus* (A. Milne-Edwards 1861) (Giordani Soika 1951). Later, Mizzan (1993) identified two additional specimens of *C. sapidus* labelled as *N. pelagicus* found in the zoological collections of the Natural History Museum of Venice, preserved together with those originally recorded by Giordani Soika. However, sampling sites were diverse and for one specimen the collecting date was antecedent to those of Giordani Soika: specifically, a female crab was collected near Marina di Grado on 4th October 1949. Since it was collected earlier than the one cited by Giordani Soika, it seems that the first confirmed record in the Mediterranean Sea should be ascribed to Mizzan (1993), though there are claims of its presence in the Aegean Sea as early as 1935 (Nehring 2011). From the end of the 1950s, additional specimens were collected along the Adriatic coast both in brackish and coastal waters (Mizzan 1993; Scaravelli and Mordenti 2007; Florio et al. 2008; Giansante 2012; Castriota et al. 2012). Several were found in the Gulf of



Figure 1. *Callinectes sapidus*, male. The specimen is presently preserved in the Natural History Museum of the University of Florence, Zoology Section (MZUF 4260) (photo by G. Stasolla).



Figure 2. *Percnon gibbesi*, female. The specimen is presently preserved in the Natural History Museum of the University of Florence, Zoology Section (MZUF 3931) (photo by S. Bambi).

Genova (Tortonese 1965), in Sicily (Cavaliere and Berdar 1975), in Tuscany (Bisconti and Silvi 2005) and eventually in the Ionian Sea, near Ugento (Gennaio et al. 2006). The species is euryhaline and lives in estuaries and marine embayments from the water edge to approximately 90 m depth (mainly at depths <35 m) on muddy and sandy bottoms (Hill et al. 1989). In its native habitats, *C. sapidus* crabs perform a variety of ecosystem functions and can play a major role in energy transfer within estuaries and lagoons. They are omnivores and, if food is in short supply, they can be also cannibals (Hill et al. 1989; Douglas et al. 2011).

Percnon gibbesi (Sally lightfoot crab) is one of the most widespread non-native species found in Mediterranean waters (Cannicci et al. 2006; Katsanevakis et al. 2011). This crab, belonging to the Percnidae family, shows a subtropical distribution (Manning et al. 1981). The species likely was through shipping (Galil et al. 2002) or by larval drift through the Strait of Gibraltar (Pipitone et al. 2001; Abelló et al. 2003). A third possible vector is releases from the aquarium trade (Padilla and Williams 2004; Chucholl 2013). *P. gibbesi* was first recorded in the Mediterranean Sea in 1999 at Linosa, Strait of Sicily (Relini et al. 2000). After the first record in 1999, *P. gibbesi* expanded its range across several areas (Katsanevakis et al. 2011). It has been recorded in various spots along the Italian Tyrrhenian coast (Cannicci et al. 2006). While the species has established populations south of the Gulf of Naples (Gravili et al. 2010), northwards it has only been reported in limited numbers around islands (Russo and Villani 2005), such as on the Island of Giglio where one single specimen was found (Galil et al. 2002) and on Elba Island (M. Weber, locality quoted in http://www.mpi-bremen.de/en/Research_Projects_92.html; Katsanevakis et al. 2010). The species is absent from the Ligurian Sea, Corsica and the Adriatic Sea (except from its southern limit in the Albanian part of Otranto channel) and northern Aegean Sea (Katsanevakis et al. 2011). *P. gibbesi* usually occurs in shallow, subtidal, rocky shore habitat, 0–4 m deep (Deudero et al. 2005) with occasional incidence at 11 m (Raineri and Savini 2010). It has, however, been recorded down to a depth of 20 m along the West Africa coast (Fransen 1991). Like the blue crab, *P. gibbesi* is an omnivore (Cannicci et al. 2004; Deudero et al. 2005; Puccio et al. 2006).

Results and discussion

In August 2013, about 50 specimens (Figure 1) of *C. sapidus* were collected by local fishermen at the mouth of Basento river and about 20 were sampled from Bradano river near Metaponto (Matera) (at the border of the Basilicata and Apulia regions, Ionian Sea) (Figure 3). Both sites are characterized by brackish water and sandy bottoms. According to Galil et al. (2002), one specimen was collected in 1999 in Lido di Policoro (Matera), 25 km south of Metaponto, but none after that specimen (*C. Frogliã*, pers. comm.).

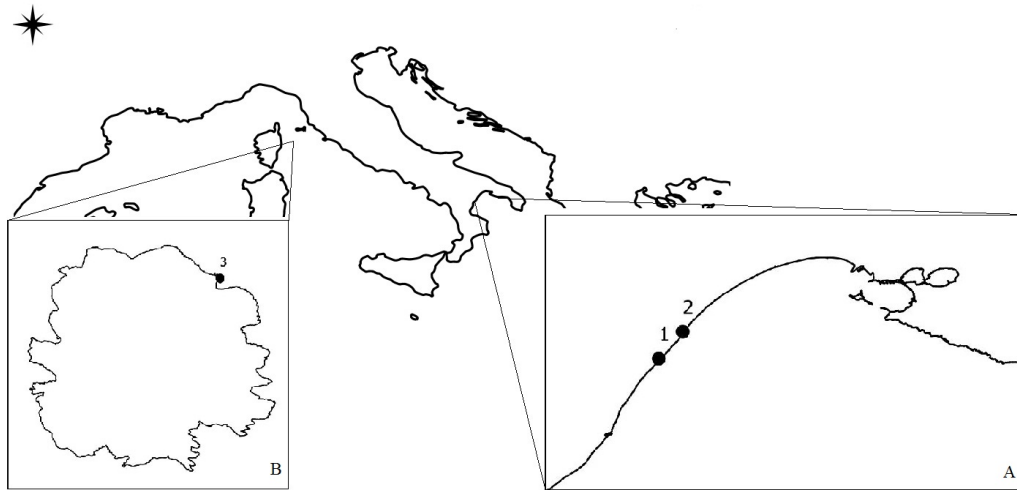


Figure 3. Collecting sites of *Callinectes sapidus* (A) and *Percnon gibbesi* (B). For localities see Appendix 1.

The blue crab's high tolerance to extreme variations in water conditions, a high fecundity, large body size, and its aggressive behaviour are considered ecological and biological determinants of its invasive success (Nehring 2011). Being aggressive towards, and a predator of, other species, they can compete with other crabs for food and space (Gennaio et al. 2006; Nehring et al. 2008). *C. sapidus* is also a host to several parasites and diseases, some with a high potential to cause mass mortalities (Messick and Sindermann 1992). Thus the introduction of blue crabs can have significant consequences to the ecology of the invaded environments. Most of the reports of the species in Italy refer to episodic catches, limited in terms of number of the number of specimens collected and periodic captures (Nehring 2011 and references therein). Nevertheless, these reports confirm the evidence of fully established populations of *C. sapidus* at least in the Adriatic Sea and the Ionian Sea, as suggested by Mancinelli et al. (2013).

On 6 June 2012, an ovigerous female of *P. gibbesi* (carapace width 29.7 mm; carapace length 33.6 mm; Figure 2) was collected at a depth of 1 m in the Integral Natural Reserve of Montecristo Island in the Tuscan Archipelago (Figure 3). This individual was captured while it was feeding on an algae-covered boulder.

The present distribution of *P. gibbesi* in the Mediterranean Sea, like that of many warm water species, seems to depend upon natural

dispersions of larvae by currents (Bianchi et al. 2012; Katsanevakis et al. 2011). The present, ongoing, period of global warming has been shown to favour both the entry and the dispersal of tropical species in the Mediterranean Sea, not only by the direct influence of increased temperature, but also by modifications to the strength of currents and the pattern of water circulation; this mechanism may play a major role for species with prolonged larval phase (Katsanevakis et al. 2011). Bianchi (2007) suggested that the February surface isotherms of 15°C and 14°C in the Mediterranean Sea are barriers between warm and cold water biota within the basin. Moreover, both the 15°C and the 14°C isotherms recently have shifted northward (Coll et al. 2010). The effects of warming may also significantly affect native communities (Garrabou et al. 2009), resulting in empty niches for new colonisers. There is, however, no evidence that *P. gibbesi* competes with native crabs (Sciberras and Schembri 2008) or with Mediterranean grazers such as the sea urchins *Paracentrotus lividus* (Lamarck, 1816) and *Arbacia lixula* (Linnaeus, 1758) (Puccio et al. 2006). However the colonization of the shallow, rocky infralittoral zone of the Mediterranean Sea may add further stress to the already altered ecosystems (Lejeune et al. 2009).

Our record together with those scattered from Giglio and Elba islands (Galil et al. 2002; quoted in Katsanevakis et al. 2011) suggest that breeding

populations have yet to establish along the Tuscan coastline. On the other hand, the presence of an ovigerous female of *P. gibbesi* in the Integral Natural Reserve of Montecristo Island, far from other Mediterranean populations, could represent a stage in the on-going spread of this successful invader.

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Appendix 1. Records *Callinectes sapidus* and *Percnon gibbesi* from Italy. Numbers refer to sites shown in Figure 3.

Record No (map ref.)	Location	Record coordinates		Record date	Reference
		Latitude	Longitude		
1	Ionian Sea, Basento river, Metaponto	40.339398	16.816424	August 2013	Present study
2	Ionian Sea, Bradano river, Metaponto	40.387528	16.857313	August 2013	Present study
3	Tyrrhenian Sea, Montecristo island	42.345467	10.321783	6 June 2012	Present study