

— SHORT COMMUNICATION —

## Closing the gap: *Cerithium scabridum* Philippi, 1848 found in the South Aegean (Greece, Mediterranean Sea)

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A living population of the alien species *Cerithium scabridum* Philippi, 1848 was found in East Rhodes, Greece. This record extends the known distribution of the species in the Aegean Sea and raises questions concerning its mode of introduction into the Western Mediterranean.

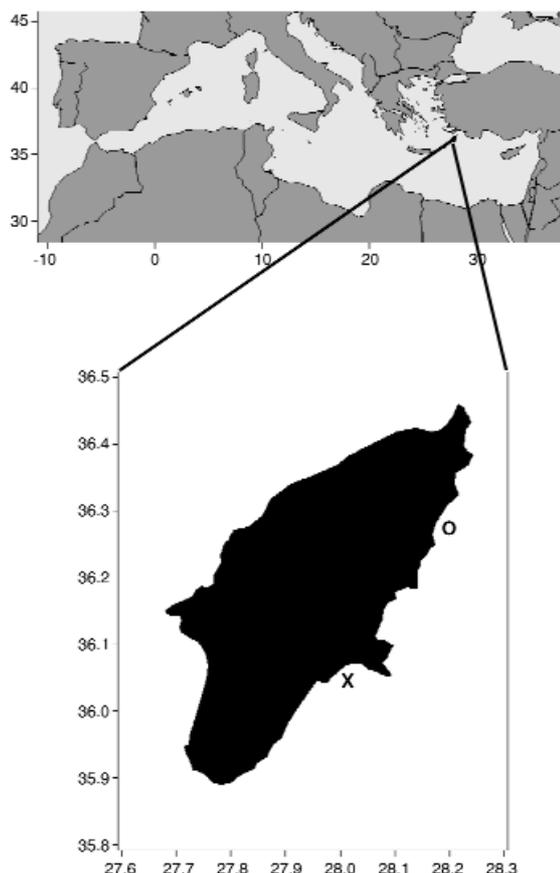
**Key words:** alien mollusca, Greece, *Cerithium scabridum*.

### INTRODUCTION

The SE Aegean Sea is perceived as a continuation of the Levantine Sea, the nursery of Indo-Pacific immigrants in the Mediterranean Sea. In particular, Rhodes, being the largest island of Dodecanese, lies in the straddle between the Levantine Sea and the Aegean Sea. Rhodes island (Fig. 1) is influenced by the AMC (Asia Minor Current) running along the Anatolian coasts, bringing warm and salt water from the Levantine Sea into the Aegean Sea through the Cretan Arc straits (mainly, Rhodes and Karpathos straits). From here, some alien species such as the bluespotted cornetfish *Fistularia commersonii* (Rüppell, 1835) and the mollusca *Bursatella leachii* De Blainville, 1817 are known to spread into the North Aegean Sea (Karachle *et al.*, 2004; Zenetos *et al.*, 2007), Adriatic Sea (Jaklin & Vio, 1989; Dulčić *et al.*, 2008) and even reach the Western Mediterranean Sea (Terrasa & Oliver, 2004; Sánchez-Tocino *et al.*, 2007).

FIG. 1. Map of Rhodes Island. Sites where specimens were found are shown; Afandou (O) and Lardos (X).

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*Cerithium scabridum* Philippi, 1848 is a proso-branch gastropod originating from the Indo-Pacific (Houbrick, 1992). It is among the first molluscan species recorded from the Suez Canal (Keller, 1883) and then in the Mediterranean Sea from regions in Egypt, Israel, Lebanon, Syria, South Turkey and Cyprus, where it is very common and considered as an invasive species (Gofas & Zenetos, 2003). More recently it was found in Tunisia (Enzenross & Enzenross, 2001; Ben Souissi *et al.*, 2005; Cecalupo *et al.*, 2008) and Malta (Mifsud & Sammut, 2006) while it became established in Italy in the vicinity of or inside touristic harbours (Albano & Trono, 2008; Crocetta *et al.*, 2009). Its actual distribution in the Italian Seas is critically discussed in Crocetta *et al.* (2008). Surprisingly enough, the species was never recorded from the Greek coast of the South Aegean (Delamotte & Vardala-Theodorou, 2007) although one specimen was reported at Imbros Island, in the northern Aegean (Albayrak, 2001).

#### MATERIALS AND METHODS

In May 2007, thirty live specimens of *Cerithium scabridum* were collected while free diving at the Gulf Afandou, NE Rhodes (Fig. 2). They were found lying on stones at 4 m depth. In March 2009, empty shells beached in the same area were spotted. During a sampling survey in early April 2009, live specimens were found southern, in Lardos area, on stones covered by vegetation at 0.5 m depth (Table 1).

#### RESULTS

All specimens exhibit the same general morphology as described and figured in the literature (Houbrick, 1992). However, the live specimens from the Gulf of Afandou measured from 10 to 12 mm in height, being significantly smaller than the average 12-20 mm (Zenetos *et al.*, 2004). The empty shell height ranged



FIG. 2. *Cerithium scabridum* from Afandou Gulf, NE Rhodes, Greece. Height: 11 mm.

from 7 to 16 mm, suggesting a newly introduced population which appears to be established. Voucher specimens (GMNH 39192) are deposited in the Goulandris Museum mollusca collection.

#### DISCUSSION

On the basis of data available in the literature, the recent establishment of *C. scabridum* in the central and western Mediterranean as opposed to its long widespread distribution in the Levantine Sea, has been attributed to a different mechanism of dispersion. The presence of *C. scabridum* in Italy is likely due to shipping from the Eastern Mediterranean (Garilli & Caruso, 2004). This dispersal mechanism from Eastern to Western Mediterranean is well documented for other species that are successful colonizers (Chemello & Oliverio, 1995). In contrast, distribution along the Levantine Sea can be due to progressive penetration via the Suez Canal, the so called Lessepsian migration. *Cerithium scabridum* from the Egyptian coast colonized Syria and successively Lebanon, Israel, South Turkey and Cyprus with a pattern known for

TABLE 1. Details on samples and sites (where *Cerithium scabridum* has been collected)

Location	Geographic coordinates		Date of record	Number of specimens	Collector
	Latitude, N	Longitude, E			
NE Rhodes: Afandou	36° 15' 32"	28° 10' 00"	5/2007	30 live	P. Ovalis
NE Rhodes: Afandou	36° 15' 32"	28° 10' 00"	3/2009	15 shells	A. Zenetos S. Kalogirou
SE Rhodes: Lardos	36° 04' 08"	28° 00' 17"	4/2009	10 live	S. Kalogirou

other Indo-Pacific species. Consequently a double dispersal mechanism has been assumed to explain the distribution pattern of *C. scabridum*. A similar distribution pattern was already described for other molluscs, such as *Brachidontes pharaonis* (Gianguzza et al., 1998).

The presence of an established population of *C. scabridum* in East Rhodes is a new piece of evidence that its spread follows the “island-jumping” introduction mode (Chemello & Oliverio, 1995) or else the Lessepsian way pattern. At the same time it raises questions about the vector of its introduction in Italy. The Greek localities are not in the vicinity of a harbour or aquaculture activities, as opposed to the peninsular Italian populations that were recorded in harbour areas such as the harbour of Otranto (Albano & Trono, 2008; Crocetta et al., 2008, 2009) which strongly confirm the secondary spread hypothesis (via shipping). An alternative explanation could be that the species is unreported from South Crete and therefore its presence in Malta, Sicily and the west Mediterranean is due to natural spread and not to secondary introduction (via shipping). An unverified record of the species from the island of Cefallonia, western Greece (De Smit & Baba, 2001) in an area unaffected from shipping activities, points towards the latter assumption.

The occurrence of *C. scabridum* in Rhodes island increases the number of alien mollusca reported in Greece from 38 (Zenetos et al., 2008; ELNAIS website) to 39 species.

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#### REFERENCES

- Albano PG, Trono D, 2008. Record of the alien species *Cerithium scabridum* Philippi, 1848 (Gastropoda: Cerithiidae) from Otranto, southern Adriatic Sea. *Bollettino malacologico*, 44: 1-4.
- Albayrak S, 2001. Prosobranch gastropods of the Imbros Island (NE Aegean Sea). *Acta adriatica*, 42: 35-42.
- Ben Souissi J, Trigui El Menif N, Mahjoub MS, Méjri H, Zaouali J, Capapé C, 2005. On the recent occurrence of marine exotic species in the Tunisian waters. *Coastal environment*, 3: 529-540.
- Cecalupo A, Buzzurro G, Mariani M, 2008. Contributo alla conoscenza della malacofauna del Golfo di Gabes (Tunisia). *Quaderni della civica stazione idrobiologica di milano*, 31: 1-268.
- Chemello R, Oliverio M, 1995. Lessepsian migrations: a theoretical “island-jumping” model. *Biologia marina mediterranea*, 3: 444-446.
- Crocetta F, Renda W, Colamonaco G, 2008. New distributional and ecological data of some marine alien molluscs along the southern Italian coasts. *JMBA2 Biodiversity records*, 6199.
- Crocetta F, Renda W, Vazzana A, 2009. Alien Mollusca along the Calabrian shores of the Messina Strait area and a review of their distribution in the Italian seas. *Bollettino malacologico*, 45: 15-30.
- Delamotte M, Vardala-Theodorou E, 2007. *Shells from Greek Seas*. Goulandris Natural History Museum, Athens, Greece.
- De Smit E, Baba K., 2001. Data to the malacofauna of Kavatohres (Kefalinia, Greece). *Malacological newsletter*, 19: 95-101.
- Dulčić J, Scordella G, Guidetti P, 2008. On the record of the Lessepsian migrant *Fistularia commersonii* (Rüppell, 1835) from the Adriatic Sea. *Journal of applied ichthyology*, 24: 101-102.
- ELNAIS. Ellenic Network on Aquatic Invasive Species: <http://www.elnais.ath.hcmr.gr>
- Enzenross L, Enzenross R, 2001. Untersuchungen über das Vorkommen mariner Mollusken in tunesischen Gewässern. *Schriften für malakozoologie*, 17: 45-62.
- Garilli V, Caruso T, 2004. Records of *Cerithium scabridum* Philippi, 1848 (Caenogastropoda, Cerithiidae) from Northwestern Sicily. *Bollettino malacologico*, 39: 157-160.
- Gianguzza P, Chemello R, Riggio S, 1998. Segnalazione di *Brachidontes pharaonis* (P. Fischer, 1870) (Bivalvia, Mytilidae) nella salina di Marsala e considerazioni sulla distribuzione della specie in Mediterraneo. *Bollettino malacologico*, 33: 169-172.
- Gofas S, Zenetos A, 2003. Exotic molluscs in the Mediterranean basin: current status and perspectives. *Oceanography and marine biology: an annual review*, 41: 237-277.
- Houbrick RS, 1992. Monograph of the genus *Cerithium* Bruguière in the Indo-Pacific (Cerithiidae: Prosobranchia). *Smithsonian contribution to zoology*, 510: 1-211.
- Jaklin A, Vio E, 1989. *Bursatella leachii* (Gastropoda, Opisthobranchia) in the Adriatic Sea. *Journal of molluscan studies*, 55: 419-420.
- Karachle PK, Triantaphyllidis C, Stergiou KI, 2004. Blue-spotted cornetfish, *Fistularia commersonii* Ruppell, 1838: a Lessepsian sprinter. *Acta ichthyologica et piscicultura*, 34: 103-108.
- Keller C, 1883. Die Fauna im Suez Kanal und die Diffusion der mediterranen und erythraischen Thierwelt. Eine thiergeographische Untersuchung. *Neue denkschriften der allgemeinen schweizerischen gesellschaft für die*

- gesamnten naturwissenschaften*, 28: 1-39.
- Mifsud C, Sammut P, 2006. *Cerithium scabridum* Philippi, 1848 (Gastropoda: Cerithiidae), a new invader to the Maltese Islands. *Novapex*, 7: 115-116.
- Terrasa J, Oliver JA, 2004. Primera cita de *Bursatella leachii* (de Blainville, 1817) (Mollusca, Opisthobranchia) a Mallorca. *Bolleti de la societat d'història natural de les balears*, 47: 37-42.
- Sánchez-Tocino L, Hidalgo Puertas F, Pontes M, 2007. First record of *Fistularia commersonii* Ruppell, 1838 (Osteichthyes, Fistulariidae) in Mediterranean waters of the Iberian Peninsula. *Zoologia baetica*, 18: 79-84.
- Zenetos A, Gofas S, Russo G, Templado J, 2004. *CIESM Atlas of exotic species in the Mediterranean. Vol. 3. Molluscs*. CIESM Publishers, Monaco.
- Zenetos A, Vassilopoulou V, Salomidi M, Poursanidis D, 2007. Additions to the marine alien fauna of Greek Waters (2007 update). *JMBA2 Biodiversity records*, 5928.
- Zenetos A, Ovalis P, Houart R, 2008. Eastward spread of *Ergalatax junionae* Houart, 2008 (Gastropoda, Mollusca) a recent alien in the Mediterranean. *Journal of biological research-Thessaloniki*, 10: 221-223.