

BREVI NOTE / SHORT NOTES

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WHERE PEN SHELL LIVES? SHIPWRECKS GENERATE OPTIMUM ENVIRONMENTS
FOR THE ENDANGERED MEDITERRANEAN *PINNA NOBILIS* (L. 1758)
(*Mollusca Bivalvia*)

Relitti sommersi come habitat per Pinna nobilis (L. 1758)

Pinna nobilis Linnaeus, 1758, is a bivalve occurring in the soft bottoms of inner shelf (0.5-60m) and in estuarine areas of coastal salt-marshes of the Mediterranean Sea (KATSANEVAKIS, 2005; BASSO *et al.*, 2015). Commonly named Pen shell (among other names; Nacchera in Italian), it is a long lived (up to 38 years and likely more) bivalve, reaching up to 120 cm of shell length (ZAVODNIK *et al.*, 1991); it was traditionally used for byssus-derived sea silk for clothes (even nowadays in Sardinia) and as souvenir, mainly to decorate restaurants with the mother-of-pearl appearance of the shells (RICHARDSON *et al.*, 1999; BASSO *et al.*, 2015).

With the diffusion of scuba diving, both sighting and collection of Pen shell has become quite easy since it prefers burrowing inside soft bottoms, especially nearby rocky outcrops or seagrass meadows (BASSO *et al.*, 2015). The vertical position is considered the main Achilles' heel of this species, although it can tolerate slight inclination and shows, if displaced, some capability to survive (DE GAULEJAC & VICENTE, 1990; BASSO *et al.*, 2015).

The species is quite sensible to different anthropogenic effects such boat anchoring, fishing gear entanglements, displacement due to flipper knocks by inexperienced diver, water pollution or high sediments deposition (BASSO *et al.*, 2015). The multiple threats, along with Pen shell slow growth (ca. 1-2 cm by year after the onset of sexual maturity: RICHARDSON *et al.* 1999; KATSANEVAKIS, 2005; BASSO *et al.*, 2015), have raised concerns about the status of Mediterranean populations (KATSANEVAKIS, 2005; BASSO *et al.*, 2015).

Consequently, although historical data are quite limited, Mediterranean Pen shell is currently considered an endangered species to be protected mainly by forbidding the handling, capture and selling. On the other side, many studies have been implemented in the last decade (GARCÍA-MARCH *et al.*, 2006; BASSO *et al.*, 2015) in order to increase the knowledge about the species and figuring out the proper management tools for the safeguard of the Mediterranean populations. Usually projects deal with the Pen shell in its "natural" environments (marine protected areas included), although occurrence of Pen shell in artificial habitat (such wrecks) was already recognised (GARCÍA-MARCH *et al.*, 2006).

In 2009, a project was proposed for studying Pen shell occurrence in the peculiar "artificial" environment formed by wrecks involuntary sunken along the NW coasts of Sicily (BIANCHINI &

RAGONESE, 2009). The aim of the study was to investigate the suitability for Pen shell of the meanders of iron plates, cabins and locals; in other words, “Can the wrecks be considered an environment for Pen shell?”

Four iron wrecks, located off the NW coasts of Sicily, were explored: Elpis, sunken in 1978 next to Formica Island (MPA of Egadi islands); Capua, sunken in 1943, NW Gulf of Castellammare (Trapani); Pavlos, sunken in 1978 off Trapani; Kent, sunken in 1978, E San Vito lo Capo (Trapani). All the wrecks are in sailing trim position and entire, but Pavlos, which was broken in two sections after an explosion before sinking (it was an oil tanker). Elpis is next to a seagrass meadow, whereas the other wrecks are located on soft bottoms.

The wrecks and nearby surroundings were occasionally explored by the Authors of the present note by open circuit scuba diving between 2011 and 2015. Overall, 68 immersions were carried out: 6, 5, 32 and 25 in Elpis, Capua, Kent and Pavlos, respectively. Detected Pen shell were sorted in 2 arbitrary classes according the location: a) wreck’s strictly related, i.e. above, inside and close (<10 m) to the hull or other wreck structure, such as the anchor chain; herein coded with IW; b) outside the wreck, i.e. from 10 to 30 m from the hull, herein coded with OW.

The results (Tab. 1) strongly support the conjecture that sunken shipwrecks do represent a suitable environment for Pen shell as already suggested by records in GARCÍA-MARCH *et al.* (2006). Live and dead specimens were found almost exclusively in the IW zone (even in places where light penetration is almost null) and many specimens were seen among the intricate complex of iron plates or in the holds; hence, it is likely that standing population might be more numerous than observed. Another impressive finding was a weird oriented live Pen shell inserted in a crevice inside the machine hall of Elpis (Fig. 1; a complete photo gallery is available upon request) indicating the vertical *habitus* is not a 100% vital constraint; unfortunately, this specimen was found detached and dead in 2015.

Table 1

Results of the Pen shell visual census on the wrecks. WN (L): wreck name and length; MD: maximum depth; N: total number considering both alive and death specimen, the latter number in brackets; IW: specimens above, inside and close (<10 m) the wreck; OW: specimens outside the wreck (10 - 30 m from the hull). Lengths and depths are in meter (m).

WN (L)	MD	N IW	N OW	Remarks
Elpis (40)	15	5 (2)	0	High accessibility. Seagrass also on the wreck
Capua (45)	38	3 (1)	1	Medium accessibility
Pavlos (180)	36	50 (20)	0	Medium accessibility; interiors not safe for divers. Rests of Pen shell scattered along and inside the wreck
Kent (76)	50	17 (3)	3 (1)	Low accessibility especially the internal locals

Present results also suggest that deeper (Kent) and quite complex structured (Pavlos) wrecks seem more suitable to Pen shell than lower and less complex Elpis and Capua, even considering the different wreck lengths. It is worth highlighting, however, some main drawbacks: 1) given the low amount of sediments, most Pen shell were inclined; 2) this feature makes them more vulnerable to diver movements; 3) reaching and measuring Pen shell with precision is difficult and almost impossible in some situations; and 4) mortality seems quite high, since many specimens were found dead.

Notwithstanding the limits of the present experience, the results encourage the implementation of intensive studies in order to verify the “wrecks as Pen shell habitat” conjecture, i.e. wrecks may contribute by offering shelter from hydrodynamic and fishing gear to an effective “reserve positive effect” already evidenced by other studies.



Fig. 1 — The weird oriented Pen shell found inside the Elphis.

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