



INFECTION BY PLEROCERCIDS OF THE ATLANTIC TRYPANORHYNCH *PTEROBOTHRIUM SENEGALENSE* IN THE LABRID *XYRICHTYS NOVACULA* FROM THE CENTRAL MEDITERRANEAN

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Abstract: Plerocerci of the trypanorhynch *Pterobothrium* cf. *senegalense* in the pearly razorfish *Xyrichtys novacula* from Lampedusa Island (African continental shelf) are described. Fish analysed monthly were found infected throughout the year. The frequency of parasitosis was 95.6 %, estimated from a sample of 204 fish ranging from 97 to 199 mm TL. All fish under 124 mm TL were found non infected. Most fish presented 1 or 2 blastocysts in their body cavity; anyway increasing number of blastocysts with increasing fish size was noticed. The absence of this parasitosis in pearly razorfish sampled on the European platform suggests that it is restricted to the African continental shelf.

Key words: Mediterranean Sea, plerocercoid, *Pterobothrium senegalense*, Trypanorhyncha, *Xyrichtys novacula*

Introduction

The pearly razorfish *Xyrichtys novacula* (Linnaeus, 1758) is a widespread benthic fish, living on shallow sandy and muddy bottoms, sometimes on *Zostera* meadows, usually between 1 and 50 m of depth (Fischer et al., 1987). It is distributed in the Mediterranean; in the eastern Atlantic, from the coast of Spain to the Gulf of Guinea, in the tropical western Atlantic, northward to North Carolina and Bermudas southward to Brazil (Fischer 1978; Fischer et al. 1981, 1987). The pearly razorfish is frequently found in fishermen's catches and is a much appreciated fish in many areas of the Mediterranean Sea, like Morocco, Cyprus and Italy (Fischer et al. 1987; Candi et al. 2004). During a study about its biology in the central Mediterranean Sea, an endoparasite infection has been observed in specimens of *X. novacula* caught along the coasts of Lampedusa Island (Straits of Sicily). The parasites have been identified as

trypanorhynch plerocercoids of the genus *Pterobothrium* and described (Marcer et al. 2004). In this paper we add information on this parasitosis related to the biology of its intermediate host.

Materials and methods

From 2000 to 2004, numerous specimens of *X. novacula* were caught by hand-line on the African continental shelf of Lampedusa Island (Straits of Sicily) and on the European continental shelf of Capo d'Orlando (southern Tyrrhenian Sea) (Figure 1). Monthly samples were collected from June 2000 to October 2001 for the study of the pearly razorfish biology. Each fish was measured to the nearest mm of total length and dissected to examine its abdominal cavity. The frequency of occurrence (%F) of the parasitosis was estimated on a total of 204 individuals caught in Lampedusa Island. In October 2002 and in August 2004, 64 razorfish were sampled with the aim to

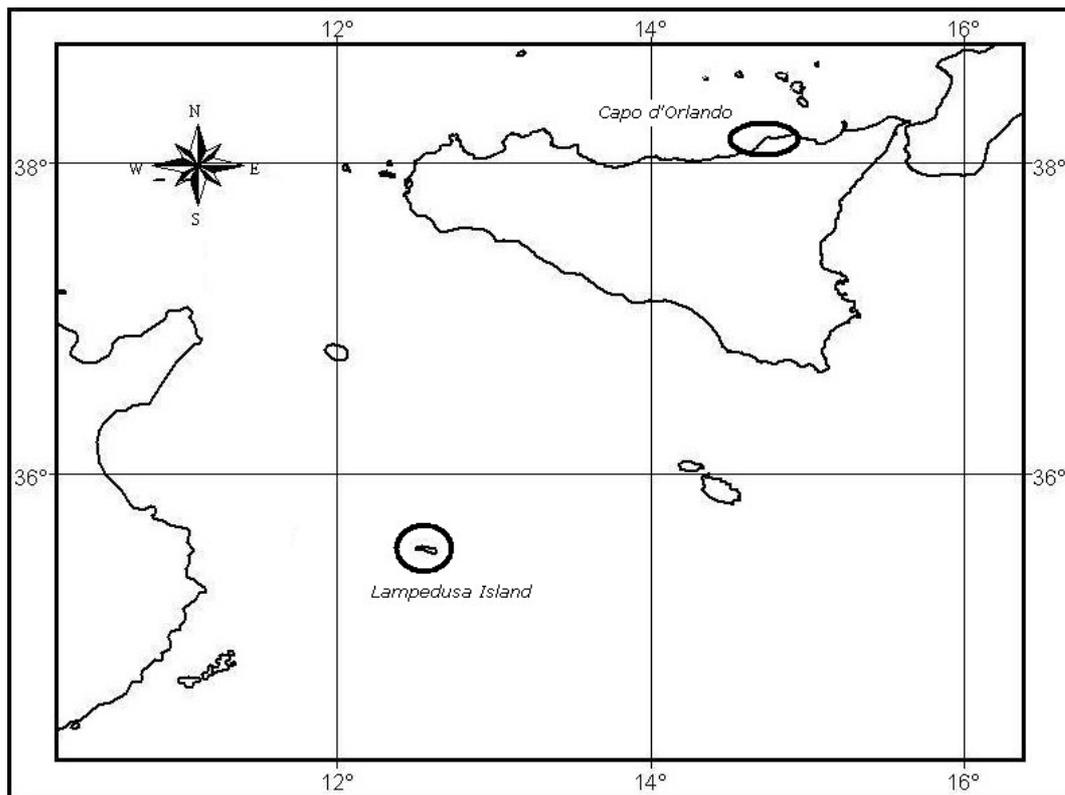


Figure 1. Map of the study area showing the sampling sites.

identify the parasite and to estimate the number of parasites per fish. Pearson's coefficient was calculated to investigate the relationship between fish size and parasite number per fish. Cysts-like structures were isolated, measured and washed in saline solution for further observation by stereomicroscope. The cysts were dissected in order to extract the parasite. The parasites were fixed in alcohol 70° and then clarified by Amman's lactophenol, for observation of their morphological features by light microscope. A few parasites were dehydrated in alcohol and included in hexamethyldisilazane for Scanning Electron Microscopy (SEM) examination.

Results

The inspection of 482 pearly razorfish specimens caught off Capo d'Orlando, southern Tyrrhenian Sea, ranging from 50 to 200 mm TL, did not reveal any presence of this parasitosis.

Fish sampled at Lampedusa Island presented parasites in their body cavity

throughout the study period. On a total of 204 specimens of *X. novacula* ranging from 97 to 199 mm total length, 195 (95.6 %) were infected by endoparasites. Parasitized fish ranged from 124 to 199 mm TL; the incidence of the parasitosis in fish size classes of 10 mm TL is shown in Figure 2.

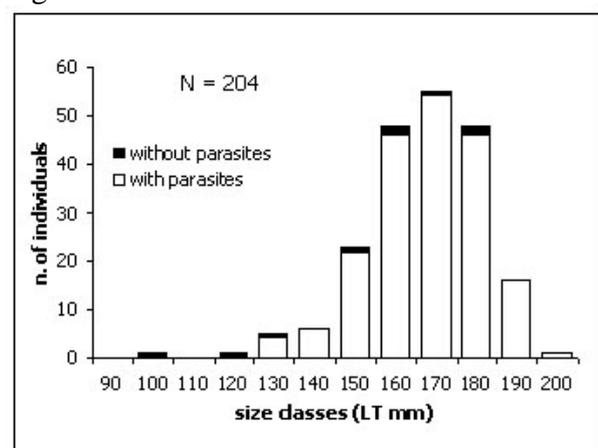


Figure 2. Incidence of parasitosis in pearly razorfish size classes of 10 mm TL.

Pearson's coefficient was $r = 0.4$; the relationship between number of blastocysts per fish and fish size is shown in Figure 3.

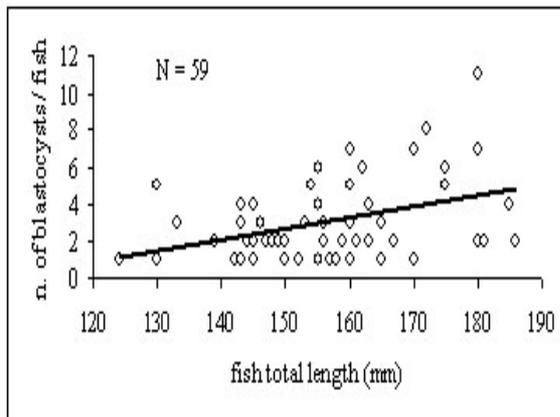


Figure 3. Relationship between number of blastocysts per fish and fish size.

59 specimens out of 64 sampled in October 2002 and August 2004, presented parasitic cysts always localized in the body cavity and strongly attached to the peritoneum. The average number of blastocysts was $2.1 (\pm 1.2)$ in 21 fish ranging from 124 to 150 mm TL and $3.5 (\pm 2.4)$ in 38 fish larger than 150 mm TL. The frequency distribution of blastocysts is shown in Figure 4.

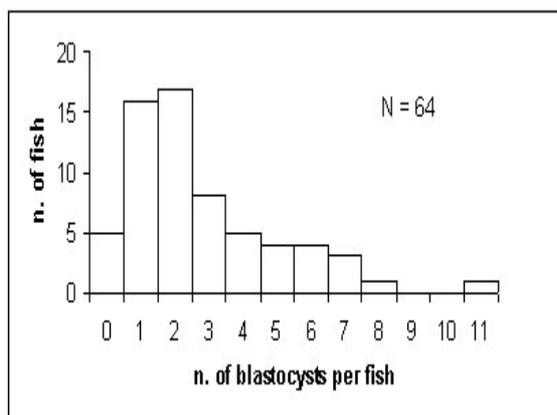


Figure 4. Frequency distribution of parasites in 64 fish examined.

All the parasites were identified as larval stages of Trypanorhyncha cestodes. The larvae were composed of a whitish vesicular blastocyst, measuring 7-13 x 4 mm, and a ribbon-like larval tail up to 20 mm long. The blastocyst contained the

scolex, 5-9 mm long, which showed: a *pars post-bulbosa* showing an orifice with possible excretory function; a *pars bulbosa* with 4 strong muscular retractor bulbs; a *pars vaginalis* composed of tentacle sheaths; a *pars bothridialis* with 4 pedicellate bothridia projecting in a cruciform arrangement and 4 long armed tentacles.

SEM examination allowed to observe several rows of 5 principal heteromorphous hooks, 4 of which falcate and the fifth spine-like, on the external and internal surfaces of each tentacle. 3-4 rows of smaller intercalary hooks were also present between two rows of principal hooks. The external face presented many groups of small spines, alternated on the medial and lateral side. All these morphological features allowed to ascribe the parasite to the family Pterobothriidae Pintner, 1931, genus *Pterobothrium* Diesing, 1850 (Campbell and Beveridge, 1996). According to the hooks and spines arrangement on the external face of each tentacle, the parasite would be classified as plerocercus of *Pterobothrium senegalense* Campbell and Beveridge, 1996.

Discussion

The morphological features of the parasite found in *X. novacula* corresponded as well as those reported by Campbell and Beveridge (1996) for the adult stage of *Pterobothrium senegalense*, which was found in *Dasyatis centroura* (Mitchill, 1815) and *Taeniura grabata* (Geoffroy Saint-Hilaire, 1817) from the coasts of Senegal, western Africa. Although these two elasmobranch dasyatids occur in the Mediterranean waters, *P. senegalense* has never been recorded in this area and to date its larval stages were unknown.

The high frequency of occurrence of plerocercoids of *P. senegalense* in *X. novacula* would ascribe this fish as an intermediate host of this parasite. Actually, trypanorhynch cestodes are known to use teleost fishes as intermediate or transport hosts and to mature in elasmobranchs

(Palm 1997). The monthly observations carried out for the study of pearly razorfish biology allowed us to state that this parasitosis occurs at Lampedusa Island throughout the year. Most parasitized fish showed a small number of blastocysts in their abdominal cavity and their number increased with increasing fish size. In the range of fish sizes examined, the blastocysts were always present in fish larger than 180 mm TL, very frequent in specimens from 120 to 180 mm TL and never present in those under 120 mm TL. Therefore, we hypothesize a relationship between both parasite occurrence and increasing degree of infestation with increasing fish size.

The absence of blastocysts in all the specimens of *X. novacula* sampled on the European platform, suggests that this parasitosis is restricted to the African continental shelf.

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