

First report of two parasitic copepods of *Pampus argenteus* (Stromateidae) in west of Persian Gulf, Iran

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A survey on parasitic copepods was carried out on *Pampus argenteus* Euphrasen, 1788 in Hormozgan province. Totally, 62 specimens were caught by bottom trawl from northwest of Qeshm Island in summer 2010 and winter 2011. These were immediately frozen in on-board deep freezer of fishing vessel. All samples were transferred to laboratory and after measuring fish weight and length, parasitological survey implemented by stereo-and light microscopes on body surface and gill cavities of the host. Individuals belong to two species of parasitic copepods were removed from the inner surface of the operculum and gill filaments of the host. The collected parasites were *Notbobomolochus tricerus* (Basset-Smith, 1898) and *Paralebion aliuncus* (Rangnekar, 1955). The prevalence, mean intensity and abundance of parasites were as follows: *N. tricerus* (6.45%, 0.8 ± 0.71 and 0.06) and *P. aliuncus* (1.61%, 0.2 ± 0.17 and 0.01), respectively. Both species of copepod parasites are reported, for the first time, from Iran.

Key words: Crustacean parasites, Copepod, Qeshm Island, Silver pomfret.

INTRODUCTION

Crustaceans are the most various and ubiquitous in all the metazoan groups. Among them, the copepods are dominant. Many copepods have great economic importance as agents of disease in wild and cultured fish populations (Rohde, 2005). The silver pomfret, *Pampus argenteus* is commercially an important fish in the Asia. It has a wide distribution in the waters of the Indo-West Pacific, ranging from the Persian Gulf in the west to Indonesia and northward to Hokkaido, Japan (Ho & Lin, 2003). Studies on ectoparasites, mainly parasitic copepods on marine fish, are scarce in Iran.

Previously recorded copepod parasites of *Pampus argenteus* include: *Notbobomolochus tricerus* from the gill cavity of the host was noted by Pillai (1969) in the collection of the British Museum, London. *N. tricerus* was reported from the gills of the host in Yosu Bay, Korea (Choi et al., 1994). Also this species was first reported in marine fishes of Kuwait Bay, Persian Gulf (Ho et al., 2000). *N. tricerus* and *Paralebion aliuncus* from the gills and the branchiuran parasites *Argulus* sp. from body surface of the host were reported from Karachi waters by Ghani and Mohammad Ali (2003). *Naricolax insolitus* Ho & Lin, 2003 in the nasal cavities of the silver pomfret *P. argenteus* was described from Taiwan by Ho and Lin (2003). *N. tricerus* was also reported by Lin and Ho (2004) from the host in Taiwan. The purpose of this study was identification of crustacean parasites on *P. argenteus* in northwest of Qeshm Island.

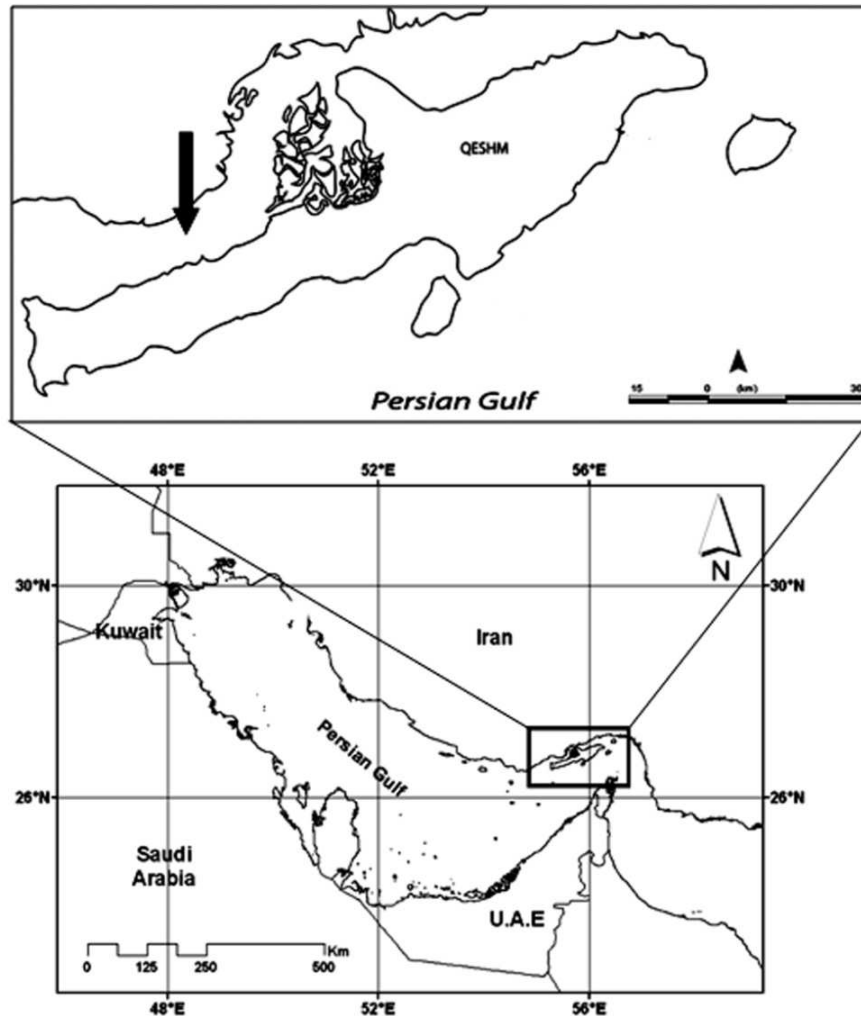


FIGURE 1. Sampling location in Persian Gulf, northwest of Qeshm Island (Chahoo Sharghi).

MATERIALS AND METHODS

A total of 62 specimens of *Pampus argenteus* were caught by bottom trawl in northwest of Qeshm Island (Chahoo Sharghi), in the Persian Gulf, Iran. The specimens were obtained in summer 2010 and winter 2011 (warm and cold seasons). These were collected from $26^{\circ} 42'$ to $26^{\circ} 44'$ N and $55^{\circ} 30'$ to $55^{\circ} 25'$ E (Figure. 1) and were immediately deep frozen.

All samples were transferred to laboratory of Shahid Beheshti University and examined for the presence of parasites based on parasitology methods. After measuring weight and length of the host, body surface and gill cavities were carefully examined for copepod parasites. The samples were studied using stereo microscopes NSZ-606 and light microscopes Nikon YS 100. The copepod Parasites were removed from the inner surface of the operculum and gill arches of the host and preserved in 10% formalin. The specimens were cleared in 85% lactic acid for 1-2 hours. The illustrations were made with the aid of camera lucida. Measurements given in the description are in millimeters. Copepods identification carried out based on morphological features according to Rangnekar (1955) and Pillai (1969, 1985).

Statistical analysis

Because data were not normally distributed, significant differences between parasites abundance and gender of fish (male, female and immature) were compared using Kruskal wallis test. Non-parametric Spearman correlation coefficient was used to investigate the relationship between parasites abundance and total length of fish. The significant differences between summer and winter seasons with copepods abundance was determined using Non- parametric Mann- Whitney test. All data were analyzed using SPSS version 16.0.

RESULTS

Sixty-two specimens of *P. argenteus* from Persian Gulf were investigated and five specimen or 8.06% of fish were found to be infested with copepod parasites. In total, two different parasites were observed in the fish including *Notbobomolochus tricerus* and *Paralebion aliuncus*. The prevalence, mean intensity and abundance of *N. tricerus* were 6.45%, 0.8 ± 0.71 and 0.06 also for *P. aliuncus* were 1.61%, 0.2 ± 0.17 and 0.01, respectively.

N. tricerus (Figure. 2a, 2b) is the most common copepod parasite of *P. argenteus* and female specimens were collected from gill filaments and inner surface of the operculum. The body length was 2.90 - 3.52 mm, excluding setae on caudal rami with a mean length (\pm SE) of 3.21 ± 0.17 mm. Greatest width 1.28 – 1.41 mm (measured at widest part of cephalon), egg sacs length was 0.9 – 1.06 mm and width 0.30 – 0.32 mm.

P. aliuncus (Figure. 3a, 3b) was observed on gill filaments. It has a large size and can be easily seen by the naked eye. The body length was 5.21 mm long, excluding setae on caudal rami. Morphological measurement was made on 1 specimen (only one specimen was found on the host). Greatest width 1.95 mm (measured at widest part of cephalon excluding marginal membrane), egg sacs length was 2.70 mm and width 0.28 mm.

The result of Kruskal-Wallis test showed no significant difference among the copepods analyzed with respect to the sex of the host (Chi-Square = 0.261; df = 2; $P = 0.878$). The result of non-parametric Mann- Whitney test showed no significant difference between copepods abundance in summer and winter (warm and cold weather) seasons ($Z = -538$; df = 1; $P = 0.591$). No significant correlation was found between parasites abundance and total length of fish ($P > 0.05$).

DISCUSSION

All discovered parasites were female. According to Heckmann (2003) identification of parasitic copepods (Entomostraca) is usually based on females. Males of these parasites disappear after copulation in pre-adult stages.

The gills are a favorite site for the attachment of copepod parasites, as these feed on tissue of the gills and blood of the lamellae, causing to loss of respiratory surface area (Purivirojkul & Areechon, 2008). However, when present in small numbers, usually cause only minor harm to their hosts (Heckmann, 2003). *N. tricerus* from *P. argenteus* was reported in several studies (Pillai, 1969; Choi et al., 1994; Ho et al., 2000; Lin & Ho, 2004). *Naricolax insolitus* a new species of bomolochid copepod was reported by Ho and Lin (2003) in the nasal cavities of the silver pomfret *P. argenteus* from Taiwan. *P. aliuncus* was first recorded by Rangnekar (1955) from *P. argenteus* in Bombay. Ghani and Mohammad Ali (2003) reported three species of crustacean parasites of *P. argenteus* from Karachi waters, two copepods parasites *N. tricerus* and *P. aliuncus* also branchiopod *Argulus* sp.

This study had the same parasites as found in Karachi waters (Ghani & Mohammad Ali, 2003) except for the branchiopod *Argulus* sp. Likewise, no copepod parasites were observed in the body surface and nasal cavities of fish.

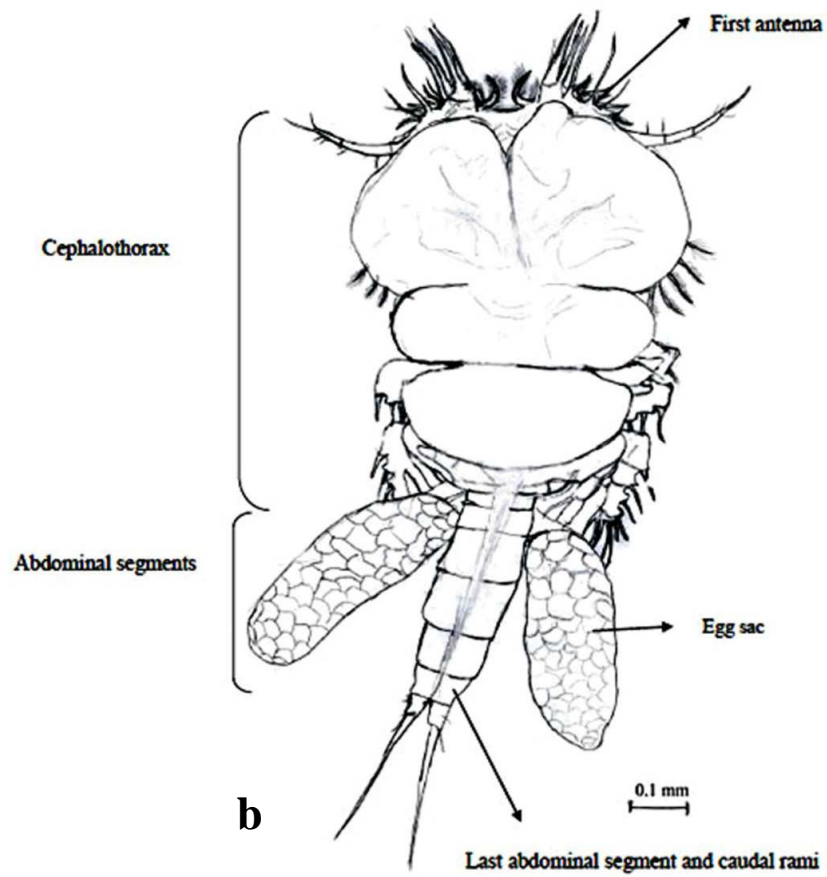
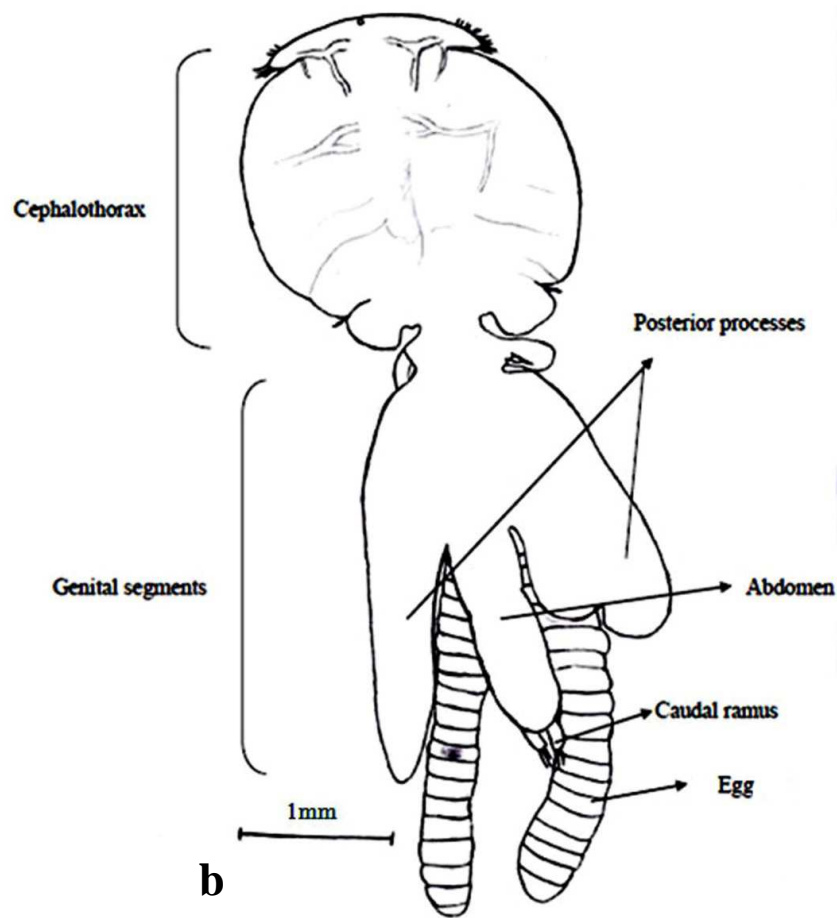
**a****b**

FIGURE 2 (a, b). *Nothobomolochus tricerus* (Basset- Smith, 1898) dorsal view, female



a



b

FIGURE 3(A, B). *Paralebion aliuncus* (Rangnekar, 1955) dorsal view, female.

Copepods are the largest and most diversified group of crustaceans. Due to their feeding activities on the host are economically important parasites and should not be neglected. Although there are a few studies on copepod parasites in Iran, but more researches are needed to study their importance as disease agents.

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