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Myripristis murdjan (Beryciformes: Holocentridae) a new host record for *Cymothoa indica* (Crustacea, Isopoda, Cymothoidae)

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Cymothoa indica*, a cymothoid isopod, is reported for the first time parasitizing* Myripristis murdjan *(Pinecone soldierfish), a reef-associated Indo-pacific fish, collected from the Red Sea, Egypt. The specimens observed are mature females and males. It is distinguishable from the other members in the genus principally by having a poorly developed amphicephalic process, oblong body, pyriform cephalon and presence of well-developed lobe on ischium of pereopod VII. Parasites were found in greater numbers in the buccal cavity (62.5%) than in the branchial cavity (18.75%) of* Myripristis murdjan *with a total prevalence of 81.3%. In addition to the infection prevalence, mean intensity and site specificity are discussed.*

Key words: *Cymothoa indica*, Egypt, *Myripristis murdjan,* prevalence, Red Sea

INTRODUCTION

Myripristis murdjan, the Pinecone soldierfish, is a common coral-reef species usually found in shallow lagoons and seaward reefs, is nocturnal, and feeds mainly on larger animals of the zooplankton. It is widely distributed from the Red Sea, including the gulf of Oman and east of Africa, to Oceania, being one of the important commercial species in Egyptian markets.

In aquatic systems parasites play an important role in the ecology of coastal and marine ecosystems as well as in mariculture. Isopods are one of the most diverse orders of crustaceans and live in a wide variety of environments, from terrestrial habitats to marine and fresh waters, though are most commonly found in shallow marine waters. The suborder Flabellifera contains almost exclusively parasitic families such as Cymothoidae. The Cymothoid isopods inhabit freshwater, brackish water and the sea environment as ectoparasites of various fish species with a short free-living planktonic phase. Adults are exclusively parasitic and the presence of a few individuals can cause damage to hosts (PAPAPANAGIOTOU *et al.*, 1999). They are observed on the body, in the buccal cavity and/or gill cavity of the hosts. They feed on host blood and tissue, as well as inducing tissue damage due to the mechanical pressure of the parasites body (TRILLES, 1969; ROMESTAND, 1978, 1979).

Several recent studies have focused on Cymothoidae, one of them reporting thirteen cymothoid species belonging to six genera (*Anilocra*, *Nerocila*, *Ceratothoa*, *Emetha*, *Livoneca* and *Mothocya*) in Turkey (ÖKTENER & TRILLES, 2004). In the coastal waters at Ponta Negara, Natal, Brazil, THATCHER *et al.* (2007) described a new species C*ymothoa spinipalpa* from the mouth of *Oligoplites saurus.* ALAS *et al.* (2008)

stated *Parablennius sanguinolentus* as a new host record for *Nerocila bivittata* in the Black Sea, Turkey. Species of genus Cymothoa Fabricius 1793 are widely distributed and mostly found in marine fish; from the Mediterranean Sea and other areas of the world, e.g. French Polynesia (TRILLES & GALZIN, 1969); Australia (AVDEEV, 1979); eastern Pacific (BRUSCA, 1981); Kuwait (BOWMAN & TAREEN, 1983); northwest Africa (ROKICKI, 1986); Puerto Rico (WILLIAMS & WILLIAMS, 1994); Parangipettai coast, India (VEERAPAN & RAVICHANDRAN, 2000) and recently Lebanon (TRILLES & BARCHIE, 2006). Despite that, there are still several parts of the world where cymothoid fauna is poorly known or even completely unknown. Therefore, the objective of the present study was to identify the isopod parasite, which has been recorded from *M. murdjan* (Pinecone soldierfish) from the Red Sea, with reference to its prevalence, location on the host, abundance and the intensity of the infection.

MATERIAL AND METHODS

A total of 240 (150 females and 90 males) specimens of *Myripristis murdjan,* the Pinecone soldierfish (commercially named murjan), weighing 180g ± 10.5 (150-190 g) with total length of 20cm ± 2.4 (18-22 cm) each were obtained from El-Obour fish market, Cairo, Egypt. The fish were transported to the laboratories of the Departments of Parasitology of Kafrelsheikh and South Valley Universities of Egypt, preserved in cold icebox and individually inspected for the presence of isopod parasite.

The recovered parasitic isopods were removed from the mouths and gill chambers of the infected fish. Their sizes were measured after being washed in physiological saline solution and fixed in 70% ethyl alcohol. Parasites were cleared and mounted according to the method described by THATCHER (1991). Parasites appendages were dissected with a needle in pure phenol for the study of temporary mount.

The recovered parasites were morphologically identified according to available literature; SCHIOEDTE & MEINERT (1884), PILLAI (1954), TRILLES (1975), VEERAPAN & RAVICHANDRAN (2000) and RAJKUMAR *et al.* (2004, 2005). The prevalence was calculated according to BUSH *et al.* (1997) and abundance and mean intensity according to MARGOLIS *et al.* (1982).

Statistical Analysis

Tests of independence, Chi Squares (χ^2), were used for the analytical assessment for host gender and site differences according to SNEDICOR & COCHRAN (1980).

RESULTS

The recovered isopod from *Myripristis murdjan* was identified as *Cymothoa indica* (SCHIOEDTE & MEINERT, 1884).

Host: *Myripristis murdjan*

Locality: Red Sea, Egypt

Prevalence: 81.3% (195/240)

C. indica is mainly found in the buccal and the branchial cavities of the examined host. Of 240 *M. murdjan*, 195 specimens were found to carry 205 parasites, equivalent to an overall prevalence of 81.3%. The prevalence of the parasite with respect to the host gender was 54.2% and 27.1% in females and males respectively. Although females generally had a higher infection rate than males, it was not statistically significant ($\chi^2 = 0.8144$, $P>0.05$).

Site of infection: Buccal cavity (62.5%) branchial cavity (18.75%). This difference was found to be highly significant ($\chi^2 = 44.024$, $P<0.01$). Moreover, the percentage occurrence of the parasite in relation to the branchial position for the right and left branchial chambers was found to be highly significant ($\chi^2 = 22.27$, $P<0.01$).

A total of 150 parasites were found in the buccal cavity and 45 parasites were found in the right branchial cavity and 10 in the left branchial cavity of the host. In 77.1% cases one pair of adult parasites was found, and 10 (4.2%) were found to carry 2 parasites, one in each branchial cavity. The parasite in the host buccal cavity occupied the bottom, attached firmly to the tongue with cephalic part directed towards to the mouth opening. In the branchial cavity,

the parasite was found attached to the anterior-ventral portion of the host's gill chambers. Parasites cephalon were always directed towards the host ventral side. The parasite body was bent to the right when it occupied the right branchial cavity or to the left when it occupied the left branchial cavity. In most cases, the parasite was located between the second and third branchial arches. The percentage of occurrence of female parasites with respect to gender and site is shown in

Abundance: 0.85

Intensity: 1.08 parasites/fish

Distribution: Previous reliable records are entirely from the Indian Ocean; Bangkok, Thailand (SCHIOEDTE & MEINERT, 1884) and India, Chilka Lake (CHILTON, 1924), Madras (PANIKKAR & AIYAR, 1937), Parangipettai (VEERAPAN & RAVICHANDRAN, 2000; RAJKUMAR *et al*., 2004, 2005a, b) and recently from Lebanon (TRILLES & BARCHIE, 2006).

				Parasite location					
				Buccal cavity		Right branchial cavity		Left branchial cavity	
Host	N.	+Ve	%	Female	Male	Female	Male	Female	Male
Female	150	130	54.2	70	40	22	8	4	3
Male	90	65	27.1	28	12	9	6	2	1
Total	240	195	81.3	98	52	31	14	6	4

Table 1. Prevalence of C. indica *in relation to the host sex and their location on the host fish*

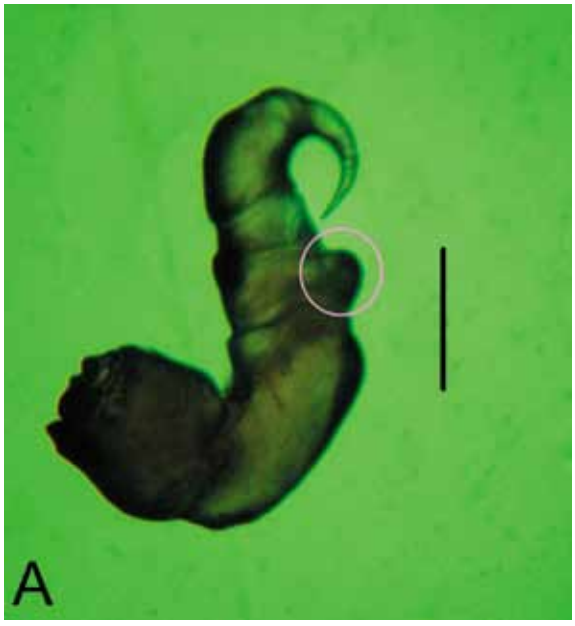

Fig. 1. Cymothoa indica *(A) and (B) Pereopod VII, showing the characteristic lobe on the postero-angle of ischium (fresh specimen) (circle). (Scale bar 8mm)*

DISCUSSION

Marine isopods are poorly studied animals in many regions of the world and some groups remain completely undescribed. This was the situation in the Red Sea, particularly in Egypt, as there is a paucity of information on fish associated isopods (HIEKAL & EL-SOKKARY, 1990).

In this study *Cymothoa indica* was recorded for the first time from the Red Sea, Egypt and *Myripristis murdjan*, the Pinecone soldierfish, is a new host recorded for this parasite. Previously it was reported from several fish species such as Cichlidae: *Etroplus maculatus*, *E. suratensis* (PANIKKAR & AIYAR, 1937); Gobiidae: *Glossogobius giuris* (CHILTON, 1924; PANIKKAR & AIYAR, 1937); Sphyraenidae: *Sphyraena obtusata* and Synodontidae: *Trachinocephalus myops* (VEERAPAN & RAVICHANDRAN, 2000); Belonidae: *Strongylura strongylura* (MISRA & NANDI, 1986; RAJKUMAR *et al.,* 2004); cultured *Mystus gulio* (Bagridae) and *Lates calcarifer* (Latidae) (RAJKUMAR *et al*., 2005a, b) and recently from *Sphyraena chrysotaenia* (TRILLES & BARICHE, 2006).

The high prevalence of *C. indica* (81.3%) in this study might be a secondary result of the migration of exotic fish species from the Mediterranean Sea to the Red Sea through the Suez Canal, in addition to the environmental condition and spatial structure of the host population (GROSHOLZ & RUIZ, 1995; CARVALHO *et al.,* 2003). Moreover, the high level of infection suggests that *M. murdjan* might under certain conditions be a suitable host for *C. indica*. PANIKKAR & AIYAR (1937) recorded similar observations from *Etrophus maculates, Etrophus suratensis* (77.7%) and *Glossogobius giuris* (50%), respectively.

In this study, females were more frequently infected than males, which is in agreement with the results of LEONARDOS & TRILLES (2003) in a study of *Mothocya epimerica* on the sand smelt *Atherina boyeri* in the Mesolongi and Etolikon Lagoons (western Greece). The main reason for the differences in parasitic load with respect to host gender is thought to be physiological.

The parasites seem to prefer to infect the buccal cavity and the right branchial cavity compared to the left branchial cavity. This difference was statistically significant. Similar results were reported previously for *C. catarinensis* isolated from the mouth of *Menticirrhus litoralis* in Brazil (THATCHER *et al.,* 2003). RAJKUMAR *et al.* (2004) observed severe infection by *C. indica* in the buccal cavity of the spot-tail needlefish *Strongylura strongylura*. In the study of *C. indica* populations from the eastern Mediterranean Sea the parasites were mainly found in the mouth, occasionally in the branchial cavities and more rarely on the body of *Sphyraena chrysotaenia* (TRILLES & BARICHE, 2006). This preference might be attributed to genetic or environmental differences (BELLO *et al.*, 1997).

In general, species of genus Cymothoa can be divided into two groups according to the size and shape of antero-lateral angles of the first pereon segment. The first group includes about 27 species, which possess moderate to strongly wide amphicephalic processes of pereonite I. Furthermore, the remaining species, referred to as a second group, are characterized by poorly developed or undeveloped amphicephalic processes of pereonite I. The Egyptian specimens undoubtedly belong to the second group of Cymothoa since they possess poorly developed amphicephalic processes of pereonite I. Egyptian Cymothoa can be readily distinguished from *C. curta* observed on the gills *of Anablepis tetrophthalmi* (SCHIOEDTE & MEINERT, 1884) due to a less stocky body (1.8 times as long as wide for *C. curta*), presence of a pyriform cephalon and the posterior margin of pleonite V being unsinuate (trisinuate) while the posterior margin of pleotelson is broadly rounded. *C. slusarskii* is also distinct, with a body clearly more elongated (2.38 times more long than wide), with poorly developed processes of pereonite 1 being distinctly acute and the cephalon being abruptly narrowed at the level of the antennae. The posterior margin of pleonite V is bisinuate, pleotelson possesses a notch at the distal margin and the pereopod VII does not possess a lobe on postero-distal angle of ischium. *C. frontalis* differs mainly due to the possession of a less stocky body (2.66 times more long than wide) and the pleon is distinctly narrower than the pereon.

The pleotelson is fairly less wide (1.5 times as wide as long) and possesses a notch at the distal margin and pereopod VII does not possess a lobe on ischium. On the other hand, *C. indica* from Egypt is similar to those species described by TRILLES & BARICHE (2006) found parasitizing mainly barracudas (Sphyraenidae) from Lebanon, from which it differs in being longer and more protracted.

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Myripristis murdjan, (Beryciformes: Holocentridae) crvena vojnikinja kao novi domaćin parazita *Cymothoa indica* (Crustacea, Isopoda, Cymothoidae)

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SAŽETAK

Cymothoa indica, račić jednakonožac je pronađen po prvi put na domaćinu, crvenoj vojnikinji *Myripristis murdjan*, Indo-pacifičkoj grebenskoj ribi ulovjenoj u Crvenom moru, u Egiptu. Istraživani primjerci su bili zrele ženke i mužjaci. Razlikuje se od ostalih pripadnika roda po slabo razvijenom amficefalnom procesu, duguljastom tijelu, piriformnom obliku glave i dobro razvijenoj resici na ischiumu pereopoda VII. Veći broj parazita je pronađen u usnoj šupljini (62.5%) nego u škržnom otvoru (18.75%) crvene vojnikinje, *Myripristis murdjan,* s ukupnom zastupljenošću od 81.3%.

U radu se raspravljavlja o zastupljenosti, jačini i posebnostima infekcije.

Ključne riječi: *Cymothoa indica*, Egipt, *Myripristis murdjan,* pretežito, Crveno more