Journal of Animal and Veterinary Advances 7 (11): 1430-1433, 2008
ISSN: 1680-5593

Serrasentis Sagittifer (Acanthocephala: Rhadinorhynchidae) from the Japanese Thread Fin Bream, *Nemipterus japonicus*, in Bushehr Waters of Persian Gulf

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Abstract: This research evaluated, Acanthocephala infections in *Nemipterus japonicus* caught between December 2006 and January 2007 in the coast of Bushehr. Of 50 fishes examined 3 were infected, they were female and had light (4-8 worms) to heavily (168 worm) infection. This investigated Acanthocephala was turned out to be from Rhadinorhynchidae, Serrasentinae and Serrasentis sagittifer. This Acanthocephalan is one of most important pathogens parasite, which attach to the digestive system, especially intestine.

Key words: Acanthocephala, serrasentis sagittifer, *Nemipterus japonicus*, infection, persian gulf, Iran

INTRODUCTION

The thread fin breams of the genus Nemipterus, are widespread throughout the tropical and subtropical Indo-West Pacific region. They are small to moderate-sized, brightly colored fishes. Most inhabit shallow sand or mud bottoms, but a few species occur to depths as great as 300 m. The threadfin breams are valued food fishes in many parts of the world and are taken commercially by hook and line and bottom trawl (Puentes Granada *et al*., 2004).

More than 50 nominal species of Nemipterus have been described. Species of Nemipterus of the Indo-Pacific and Indo-Australian, Thailand, the Western Indian Ocean and Taiwan have been reviewed. Much of this previous research is summarized in an illustrated catalogue of Nemipterid fishes (Russell, 1993).

Nemipterus japonicus is a species of Nemipterus with pectoral fin 2, 15-16, gill rakers 14-17, body moderately deep, depth 2.7-3.5 in SL, head length about equal to body depth, diameter of eye about equal to (small specimens) or less than (large specimens) snout length, 0.9-1.5 in snout, lower edge of eye above a line from tip of snout to upper pectoral-fin base; suborbital moderately deep, its lower edge slightly emarginated, least depth 1.0-1.9 in eye diameter, imaginary line extended upward from posterior edge of suborbital reaching dorsal profile about 2-4 scale rows before dorsal fin origin; pectoral fins very long, reaching to or just beyond level of anal fin origin; pelvic fins moderately long, reaching to or just beyond level of vent, upper lobe of caudal fin with short or moderately long, trailing filament. Color of body pinkish, silvery below, 11-12 pale golden-yellow stripes along body from behind head to base of caudal fin; prominent red-suffused, yellow blotch below origin of lateral line, dorsal fin suffused pale whitish, margin of fin yellow, edged with red; pale lemon stripe extending along dorsal fin near base, this stripe narrow anteriorly and widening on posterior part of fin, anal fin suffused pale whitish with pale lemon scribblings or broken lines over most of fin, pectoral fins translucent pinkish, pelvic fins whitish with yellow axillary scales, caudal fin pink, upper tip and filament yellow. *N. japonicus* is widespread in the Indo-West Pacific ranging from East Africa, including the Persian Gulf and Red Sea, to the Indo-Malay Archipelago. It occurs in depths of 5-80 m. This species is important economically and is trawled in commercial quantities in the South China Sea as well as the Andaman Sea and western Bay of Bengal (Russell, 1993; Puentes Granada *et al*., 2004).

Acanthocephala is a small group of obligate parasites that utilize arthropods and vertebrates in a conserved 2-host life cycle. The name of the phylum refers to the thorny retractable proboscis that anchors the adult worm to the intestine of the vertebrate host. In addition to the thorny proboscis, Acanthocephalans are distinguished morphologically as cylindrical and unsegmented worms. The trunk is a hollow structure that

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contains the excretory, reproductive and nervous systems and is filled with psuedocoelomic fluid (Martins *et al*., 2001; Santos *et al*., 2005). An interesting feature of Acanthocephalans is the absence of an alimentary tract. The absorption of nutrients occurs entirely through the body wall and is facilitated by a syncytial epidermis and a lacunar system of circulatory channels. Other unique morphological features of Acanthocephalans include a proboscis receptacle at the anterior end of the trunk and the paired lemnisci that extend into the trunk, from an attachment on the neck. Acanthocephalans are gonochoristic and invariably utilize arthropods as intermediate hosts and vertebrates as definitive hosts. Occasionally, vertebrates serve as paratenic hosts harboring larval Acanthocephalans that do not develop to adults unless ingested by the appropriate vertebrate definitive hosts (Yang and Liau, 2001). As in many helminth parasites, Acanthocephalan life cycles exploit trophic interactions between arthropods and vertebrates, with the initial stages of the life cycle involving ingestion of viable shelled embryos by the arthropod intermediate host. Completion of the life cycle, including reproduction, occurs when an appropriate vertebrate definitive host ingests an infected arthropod intermediate host. For some species, transport or paratenic hosts are required to complete the life cycle (Amin *et al*., 1984; Nikishi, 2001; Santos *et al*., 2005).

Different species of Acanthocephalans are known to occur in Persian Gulf and Red Sea; Sclerocollum rubrimaris, (Amin *et al*., 1984), Neoechinorhynchus qatanesis (Amin *et al*., 2002), Neoechinorhynchus dimorphospinus (Amin *et al*., 2002), Serrasentis sagittifer, Van Cleave (Amin *et al*., 1984). This research studied the infection of Japanese thread fin bream by Acanthocephalan in coasts of Bushehr, Bushehr province, Iran.

MATERIALS AND METHODS

Freshly caught fish (50 pieces) were obtained from local commercial fishermen, dissected and examined for parasites immediately thereafter. Fish were collected in December, 2006 and January 2007 off the coast of Bushehr (Fig. 1). Acanthocephalans were carefully collected on petridishes with distilled water, refrigerated and fixed in AFA for 24 h to posterior storage in 70% ethanol. Worms were stained in Mayer's acid carmine, dehydrated in ascending concentrations of ethanol, cleared in graduated concentrations of terpineol in 100% ethanol and whole mounted in Canada balsam. Measurements are in micrometers unless otherwise stated. Body length does not include neck, proboscis, or bursa. Species of Acanthocephala were identified according to Amin (1984).

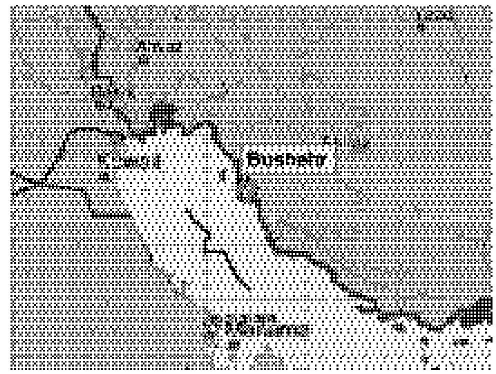

Fig. 1: Position of sampling site

RESULTS

Three of 50 Japanese thread fin bream examined were infected with Acanthocephalans belonging to the new species, they were female and 2 had light infections of 4-8 worms each. Another one fish were especially heavily infected with 168 worms. The investigated Acanthocephalan has distinctive rows of spines (combs) on the ventral surface of its body in adult and encysted stages (Fig. 2). The proboscis is short, bulbous and expanded on the anterior end and covered with numerous, uniform spines (16-24 longitudinal rows of 14-18 hooks each). Female are 6.0-130.0 mm in length (as long as finger), male 8.6-75.0 mm, juvenile female 4.0-6.4 mm, juvenile male 2.6-4.2 mm, was turned out to be from class Palaeacanthocephala, order Echinorhynchida, family Rhadinorhynchidae, sub family Serrasentinae, genus Serrasentis and species of sagittifer.

Location in host was intestine and pyloric ceca, body cavity, mesenteries and external surfaces of internal organs (encysted forms). Encysted forms damage the tissues of their intermediate fish hosts and should produce significant injury if they occur in heavy infections. Although, this parasite did not deeply penetrate the intestinal tissues enough to even cause discontinuity of the mucosa, it caused considerable histopathological alterations including connective tissue hyperplasia, epithelial metaplasia, muscle hypertrophy, mucus epithelium necrosis and degeneration and extensive destruction of intestinal villi. Host responses included mobilization of lymphocytes and macrophages and excessive production of mucus in the sight of infection.

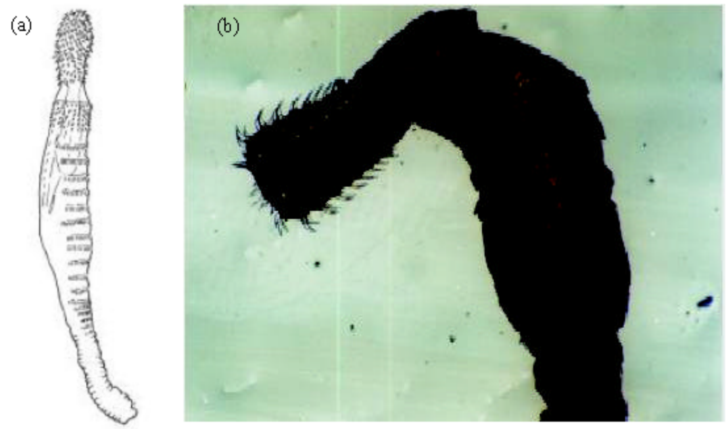

Fig. 2: Serrasentis sagittifer

DISCUSSION

Diseases and parasites cause major problems in mariculture facilities. A better understanding of the biology of marine fish parasites and pathogens can help to prevent future disease outbreaks in mariculture facilities.

Acanthocephalan is one of most important pathogens parasite, which attach to the digestive system, especially intestine. The diversity of Acanthocephalans is limited to approximately 1150 described species. Most species and genus of this family are recognized by their relatively large size and morphology of trunk. In recent years, some studies have been made on sea fish from the point of view of infection with different Acanthacephala.

Acanthocephalans exhibit wide variation of vertebrate definitive hosts at the species level, as well as when comparing the major lineages. Many Acanthocephalan species use a wide variety of vertebrate definitive host species, but some major lineages are confined to specific groups of vertebrate hosts. Physiologically, the relationship between early life stage Acanthocephalans and their arthropod intermediate hosts are much more invasive than that of later life stages of Acanthocephalans and their vertebrate definitive hosts. Early life, stages of Acanthocephalans actually penetrate the intestinal wall of the arthropod intermediate host and continue development in the body cavity of the intermediate host (Near *et al*., 2002), while the later life stages are found in the intestinal lumen of vertebrate definitive hosts and normally do not enter the body cavity. Because of the more intimate relationship between Acanthocephalans and their arthropod intermediate hosts, early life stages may be more constrained to the physiological environment of arthropod hosts than later life stages are to the environment of vertebrate hosts. This constraint may limit Acanthocephalan lineages to particular arthropod hosts, whereas the use of particular vertebrate hosts may be freer to vary. The type of arthropod intermediate hosts used by each Acanthocephalan class is conservative and hence diagnostic: Palaeacanthocephala utilize Malacostracans. There have been at least 2 independent radiation of Acanthocephala in to mammals and birds in Archiacanthocephala and Palaeacanthocephala, with an unambiguous ancestral state of fishes as definitive hosts in Palaeacanthocephala (Yang and Liau, 2001; Near *et al*., 2002).

In spite, of the fact that the amount of infection to Acanthocephala was not very much in Japanese thread fin bream but for preventing from spreading out of this diseases and controlling parasite infection its necessary to informing about the life cycles, intermediate and final hosts.

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