

Study on Some Helminth Parasites Larvae Common in Arabian Gulf Fish: A Comparison Between West and East Coasts of U.A.E

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ABSTRACT. A total of 610 fish belonging to 4 species collected from both west and east coasts of UAE during the period from September 1991 to May 1992 were investigated for the presence of helminth parasites larvae. The fish were *Argyrops spinifer*, *Lethrinus miniatus*, *Lutjanus fulviflamma* and *Nemipterus japonicus*. Two common types of larvae were detected, the nematode *Anisakis* sp. type I larvae and the cestode plerocercoid *Floriceps* sp. When a comparison was made between the west and east coasts the total prevalence of helminth infection in the fish species, found on the east coast (42.7 %), was markedly higher than that noted on the west coast (29.4%).

The *Anisakis* sp. larvae are of potential risk to consumers as they may cause a disease commonly known as anisakidosis (Smith and Wootten 1978, Möller 1991). Since Thiel *et al.* (1960) first reported the pathogenic characteristics of these larvae in the Netherlands, many research workers, notably in Japan, have carried out detailed clinical and epidemiological studies on it (Asaishi *et al.* 1989, Ishikura 1989, Ishikura and Namiki 1989). *Anisakis* larvae have also been reported to be present in the marine fish caught from the neighbouring areas, like the coast of Pakistan (Rasheed 1965, Khan and Begum 1971, Bilqees and Rashid 1982, Fatima 1985), the western coast of India (Nammalwar 1980) and the Indian Ocean (Kalyankar 1971, 1972, Gavriluk 1978, Soota 1983). These studies have indicated differences in the frequency and type of helminth parasites occurrence in the fish from different regions suggesting the possible role of marine environmental conditions such as pollution and quality of water in fish helminthiasis. Extensive studies undertaken by Al-Ghais

(1993) have led to unravel various aspects of biology of the fish found in the Gulf region and their relationship with seasonal and marine environment variations.

The plerocercoids of trypanorhynchids including *Floriceps* sp. are prominent cestodes found in tropical marine fish. Their ultimate hosts, sharks and rays, which survive on small fish, are widely distributed (Palm 1992). Recently, it has been reported that the most commonly occurring helminth larvae in Arabian Gulf fish are of *Anisakis* sp. type (I), *Hysterothylacium* type (MB) and *Floriceps saccatus* (Cuvier 1817) (Kardousha 1991, El Naffar *et al.* 1992).

In the current study an attempt has been made to investigate the prevalence of helminthiasis in the fish from UAE region and compare it in four different species collected from Arabian Gulf and Gulf of Oman which are represented by the west and east coasts of UAE respectively.

Materials and Methods

During the period from September 1991 to May 1992, four fish species namely *Argyrops spinifer*, *Lethrinus miniatus*, *Lutjanus fulviflamma* and *Nemipterus japonicus* were obtained monthly from commercial fishermen. The fish were collected from 2 localities: Dubai, which represents the west coast (Arabian Gulf side) and Khor Fakkan, representing the east coast (Gulf of Oman) (Fig.1).

A total of 610 fish were investigated for the occurrence of helminth parasite larvae on the muscle surface lining the body cavity. Unfortunately, some species were missed completely in some months, especially from the east coast. Standard procedures as reported earlier (Fatima 1985, Kardousha 1991) were followed to identify and characterize the helminth parasite larvae microscopically. The collected larvae were washed several times with normal saline solution, fixed in alcohol-formalin-acetic acid (AFA) mixture and stored in glycerin-alcohol solution for microscopic examination. Nematode larvae were cleaned in lactophenol just before examination and larval cestodes were processed normally, stained with aceto-carmin and mounted as reported earlier. The parasites and their larvae were identified and characterized using stereomicroscope and light microscope respectively. The magnification applied is given in the legend to the figure.

Results

Two types of helminth parasites larvae, namely *Anisakis* sp. type I and *Floriceps* sp., were detected on the muscle surface lining the body cavity of the 4 species of fish viz *Argyrops spinifer*, *Lethrinus miniatus*, *Lutjanus fulviflamma* and *Nemipterus japonicus* collected from the west and east coasts of UAE. Identification and characterization of the larvae revealed that the characteristic diagnostic features of *Anisakis* sp. type I larvae are a prominent boring tooth, long muscular oesophagus,

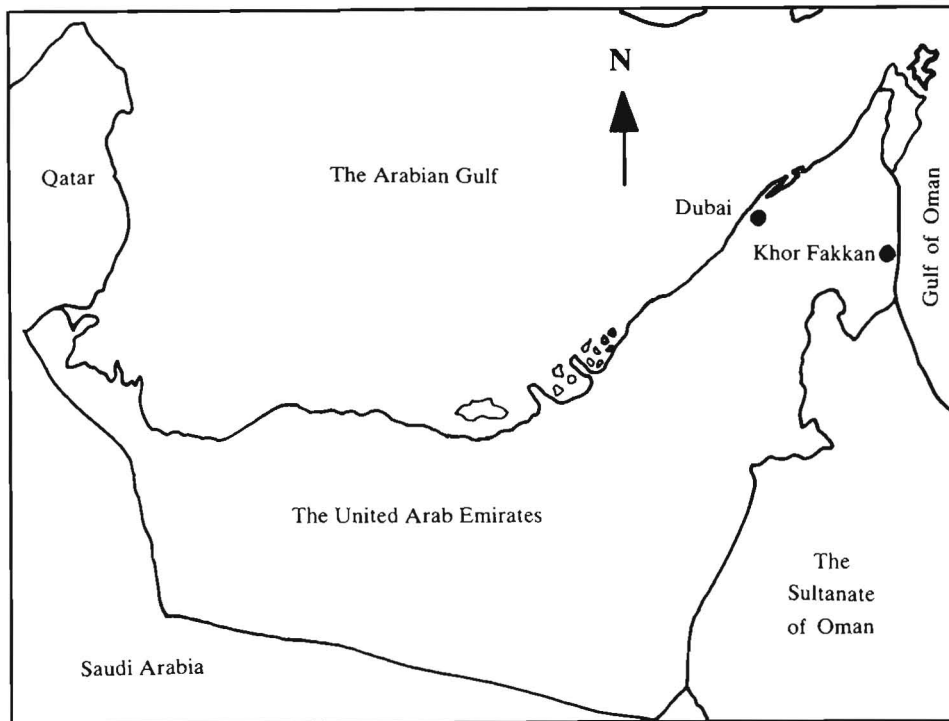


Fig. 1. A map of UAE showing the two localities of fish collection along the west and east coasts.

elongated glandular ventriculus attached to the intestine obliquely and the obvious mucron (Fig. 2, 3).

The plerocercoid of *Floriceps* sp. (Cuvier 1817) forms an elongated blunt cyst with broad anterior head and tapering posterior tail (Fig. 4). The old cyst has an appendage resembling a long tail, attaining a length of 2-3 cm. It is milky-white in colour but in many cases it is surrounded by a thick dark brownish envelop. The anterior portion of the blastocyst contains the well differentiated scolex and strobila of the future worm (Fig. 5).

The study was conducted in two groups of fish belonging to four species described above, each comprising 350 and 260 fish collected monthly from the west and east coasts of UAE respectively during the period from September 1991 to May 1992. The total prevalence of helminthiasis, as determined by the number of hosts infected with the larvae of *Anisakis* sp. type I and *Floriceps* sp. was 29.4 and 42.7% on the west and east coasts respectively (Table 1). The degree of total prevalence of parasites was maximum in *Lutjanus fulvivlamma* which also had the highest mean intensity of *Floriceps* sp. plerocercoids infection. The mean intensity of *Anisakis* sp. type I infection was highest in *Argyrops spinifer*.

Table 1. Prevalence of the most common helminth larva, *Anisakis* sp. type (A) and *Floriceps* sp. (F) in the fish from west (W) and east (E) coasts of U.A.E.

Hosts (Fish species)	Fish Examined		Prevalence (%)		Mean Intensity*				Number of Larvae**			
	W	E	W	E	W		E		W		E	
<i>Argyrops spinifer</i>	90	80	26.7	43.7	A 3.9	F 1.8	A 6.1	F 1.8	A 95	F 44	A 214	F 64
<i>Lethrinus miniatus</i>	90	40	32.2	25	2.8	3.2	3.2	2.5	82	94	32	25
<i>Lutjanus fulviflamma</i>	90	70	36.7	51.4	1.6	5.1	2	5.8	56	170	66	210
<i>Nemipterus Japonicus</i>	80	70	21.2	42.8	3.6	4.4	3.8	3.1	62	75	115	94
Total	350	260	29.4	42.7	2.9	3.7	3.8	3.5	305	383	427	393

*Mean intensity is the mean of larvae of a particular parasite species per infected host.

**Total number of larvae collected from each species of fish.

Fig. 2. The anterior end of the *Anisakis* sp. type I larva showing an obviously prominent boring tooth (X 100).

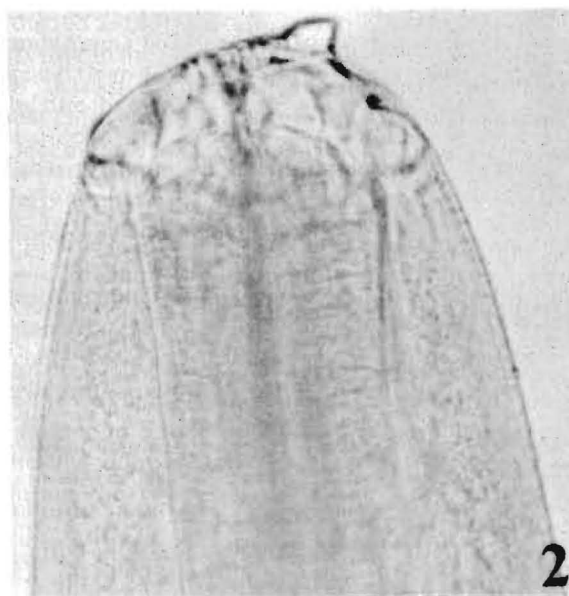


Fig. 3. An *Anisakis* sp. type I larva showing a blunt rounded tail with mucron (X 100).

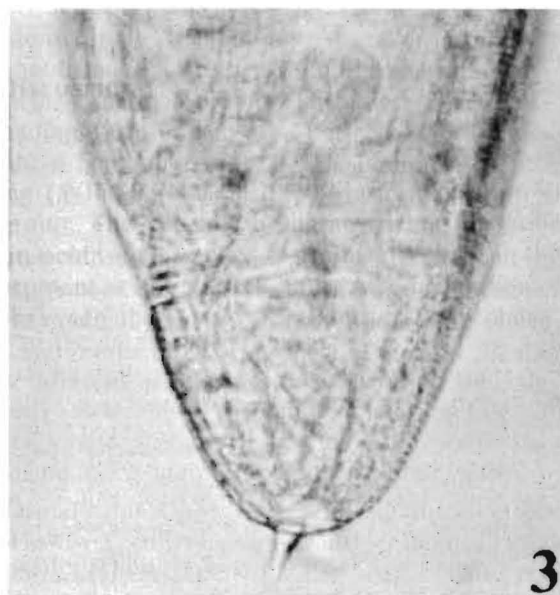


Fig. 4. Many plerocercoids of *Floriceps* sp. larvae collected in Petri dish, with some scolices excysted from the cysts (X 1.6).

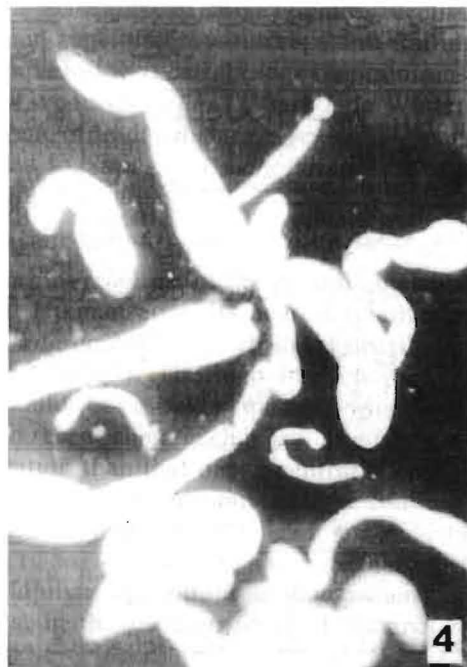


Fig. 5. *Floriceps* sp. larvae stained with aceto-carmin, note the blastocyst containing the scolex (X 10).



The prevalence of parasite (A and F) occurrence in different months in the fish collected from the west and east coasts are given in Figure 6A and 6B respectively. Although no clear cut consistent trend in the seasonal parasite occurrence on the west coast was observed, there appears to be relatively greater frequency of the parasite larvae occurrence in the months of November, February-March and May. However, there was a conspicuous higher incidence of parasite infection in November, February-March and May on the east coast of UAE.

Maximum Values of Prevalence
of (A + F) larvae from west coast

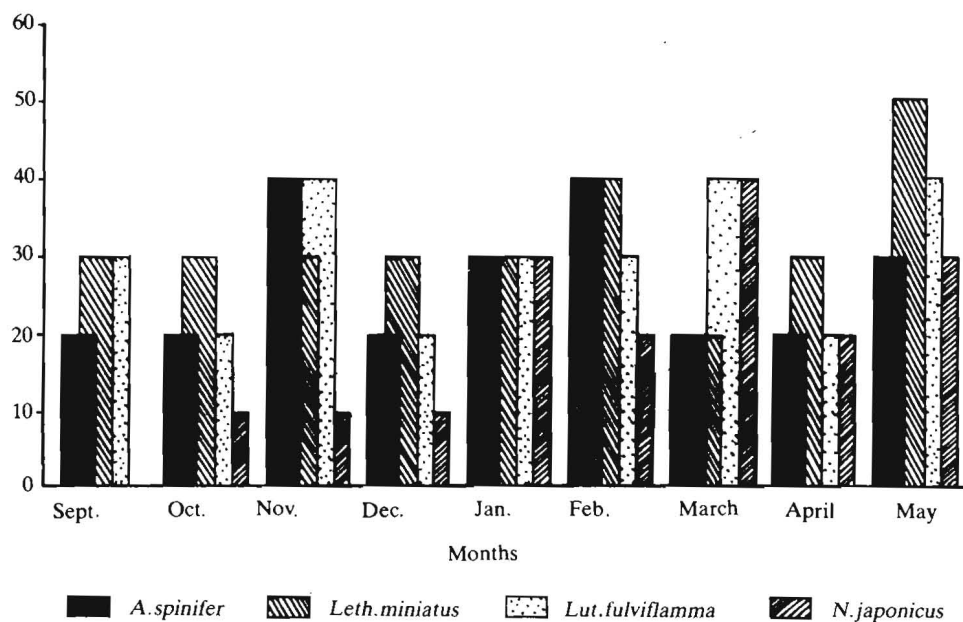


Fig. 6.A. Prevalence (%) of larvae in the fish species collected monthly during the period from September 1991 to May 1992 from the west coast.

Maximum Values of Prevalence
of (A + F) larvae from east coast

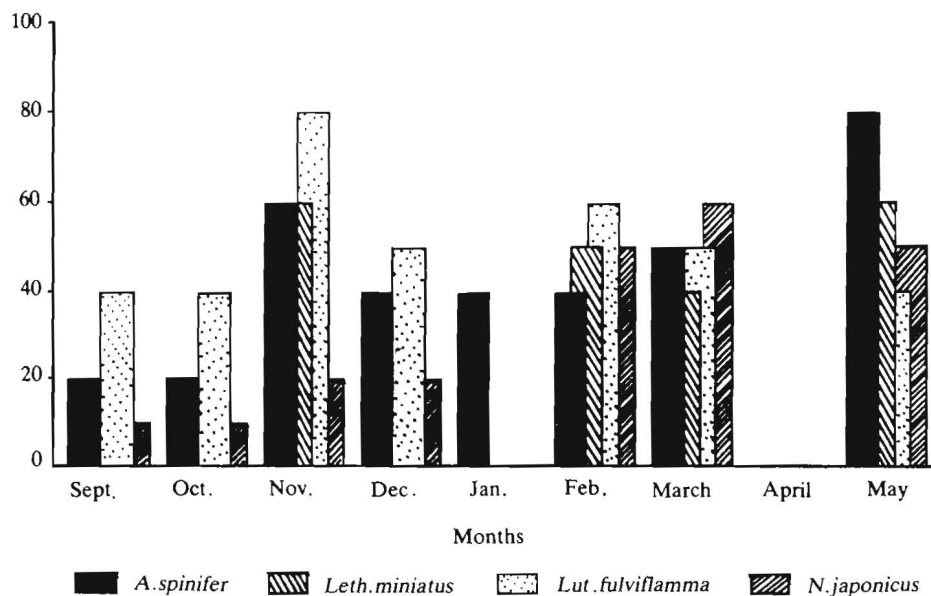


Fig. 6.B. Prevalence (%) of larvae in the fish from east coast.

Discussion

Since the *Anisakis* sp. type I larvae were first reported by Berland (1961) in Norwegian marine fish, extensive literature concerning their morphological features and pathogenicity in fish from different regions of the world has been published (Oshima 1972, Williams and Jones 1976, Smith and Wootten 1978, Gavrilyuk 1978, Hadidjaja *et al.* 1978, Gibson 1983, Fatima 1985, Ishikura and Namiki 1989, Su *et al.* 1991). A study by Eslami and Mokhayer (1977) has shown the presence of this parasite in the fish from the Iranian coast but neither the taxonomical nature of the larvae nor its morphology was described. The first report covering the description of the larvae of *Anisakis* sp. type I, found in the Arabian Gulf, was presented by Kardousha (1991).

The current study has demonstrated the occurrence of the larvae of *Anisakis* sp. type I and *Floriceps* sp. on the muscle surface, lining the body cavity, of the four species of fish investigated, however, there was species variation in the prevalence of the two parasites. Morphological studies have led to define the distinct characteristic diagnostic features of the two helminth parasites found on the UAE coast. The muscle infection by *Anisakis* larvae is controversial. The fact that the larvae were seen partially embedded and not encysted in the abdominal muscles may imply that these larvae could migrate post-mortem from their true encysted sites to the muscles. Smith (1984) stated that *Anisakis* larvae are capable of migrating post-mortem into the flesh of fatty fish species and are widely distributed throughout the tissues of the piscivorous fish. The plerocercoids of *Floriceps* sp. have not been located in the muscle.

Interestingly, all species of fish, except *Lethrinus miniatus*, from the east coast of UAE (Gulf of Oman) exhibited higher incidence of the parasites infection (42.7 % prevalence) when compared to that observed in the fish collected from the west coast of UAE (Arabian Gulf) (29.4% prevalence). There appears to be seasonal fluctuations in the total prevalence of the parasites larvae in that relatively higher prevalence was noted on both the coasts during the months of November, February-March and May indicating a trend of approximately two months cycle for larvae proliferation before reaching the peak values. This may be attributed to the differences in the level of pollution and water quality on the two coasts, for example, relatively less water salinity and temperature on the east coast could make the surroundings more favourable for parasite survival and growth. On the contrary, high water salinity and temperature on the west coast may be harmful to zooplankton, including crustaceans, which is considered as the first intermediate host of many types of fish helminths.

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دراسة عن بعض يرقات الديدان الطفيلية الشائعة التي تصيب أسماك الخليج العربي مع مقارنة للساحل الشرقي والغربي لدولة الامارات

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دولة الامارات العربية المتحدة

لقد أجريت هذه الدراسة تحت مشروع دراسة بيولوجية الأسماك التي تقوم
به شعبة البيئة البحرية بمركز بحوث الصحراء والبيئة البحرية في الفترة من يونيو
١٩٩١م وحتى مايو ١٩٩٢م.

وقد عُنيت الدراسة بفحص الأسماك المُجمعة بغرض دراسة الأطوار
اليرقية للطفيليات والتي لها أهمية طبية وإقتصادية هامة. والأسماك التي ركزت
عليها الدراسة هي أربعة أنواع اقتصادية هامة هي: النيسر (*Lutjanus*
fulviflamma) والشعري السولي (*Lethrinus miniatus*) والسلطان ابراهيم
(*Nemipterus japonicus*) والكوفر (*Argyrops spinifer*).

ومن اليرقات الطفيلية التي وُجدت بكثرة، نوعان من اليرقات الشريطية
(*Pleocercoids*) تتبعان رتبة (*Trypanorhynchids*)، النوع الأول يسمى
(*Floriceps* sp. *saccatus*) وهو شائع بين أسماك الخليج ويوجد في تجريف الجسم
ويصيب الأربعة أنواع من الأسماك.

أما اليرقة السقانية فهي (*Pterobathrum*) وهي شائعة أيضاً وتوجد في تجويف الجسم والعضلات الموجودة حول الأحشاء.

وقد وُجد أيضاً نوع ثالث وشائع أيضاً بين الأسماك وهي يرقة ال (*Anisakis*) التي جُمعت من تجويف الجسم حول الأحشاء وهي من اليرقات التي حظيت باهتمام كبير من الباحثين لأنها تسبب مرض ال (*Anisakiasis*).

وقد قارنت الدراسة نسبة الإصابة بهذه اليرقات في الأنواع الأربعة من الأسماك على مدى الشهور الاثني عشر والتي جُمعت من الشاطئ الشرقي والغربي للدولة، وقد بينت الدراسة أن نسبة الإصابة بهذه اليرقات في الساحل الشرقي أكبر منها في الساحل الغربي.

ويرى المؤلفان أن هذا ربما يرجع إلى أن نسبة التلوث في الساحل الغربي المطل على الخليج العربي أكبر منها في الساحل الشرقي المطل على خليج عمان مما يؤثر بدوره على نسبة الإصابة وهذا يحتاج إلى مزيد من الدراسة والبحث.