Arab Gulf Journal of Scientific Research, 23 (1), pp 23-27 (2005)

Original Paper Ref. No 2317

Helminth Parasite Larvae Collected from Arabian Gulf Fish. 4. Description of Four Larvae Including Two *Metacercarae*, One *Didymozoid* and One *Acanthocephalan* from Emirati Coasts

الأطوار اليرقية لديدان الطفيليات من أسماك الخليج العربي: 4. وصف لأربعة يرقات تشمل إثنتين من *الميتاسركاريا*، وواحدة من مجموعة *الديديزومات* وواحدة من شوكيات *الرأس* من شواطىء دولة الإمارات

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Abstract: Four helminth larvae from different fish hosts caught from Emirati coasts are described. Two are metacercariae related to genus *Stephanostomum*, type (I) and (II). Type (I) was found encysted in body cavities of the Indian halibut *Psettodes erumei* and the areolate grouper *Epinephelus areolatus,* and type (II) in the golden stripped goatfish *Mulloides flavolineatus.* The third larva is related to *Acanthocephala* and identified as *Serrasentis sagittifer.* It was collected from the body cavity of the spotted lizard fish *Saurida undosquamis.* The fourth larva belongs to the didymozoid trematodes, and was found infecting the kidneys of different hosts, suchy as Saurida undosquamis, the Jack pomfret Parastromateus niger and the mackerel tuna Euthynnus affinis. The larvae related to *Stephanostomum* type (I) and (II) and the dydimozoid type are described for the first time in the Arabian Gulf.

Key words: Helminth parasites larvae, Arabian Gulf fishes, Emirati coasts, metacercaria, Didymozoid, Acanthocephala, *Stephanostomum, Serrasentis.*

المستخلص: تم وصف أربعة من الأطوار اليرقية للطفيليات الدودية، والتي تصيب الأسماك في دولة الإمارات، إثنتين من هذه اليرقات، تنتميان إلى نوعين مختلفين من مراحل *الميتاسركاريا* والخاصة بجنس *ستيفانوستوم* نوع أول ونوع ثاني. وقد وجد النوعان متحوصلان في تجاويف الجسم، النوع الأول متحوصلاً في أسماك *الخوفعة والهامور المنقط*. أما الثاني فكان متحوصلاً في أسماك *الحامر*. ينتمي النوع الثالث من اليرقات إلى طفيليات شوكية *الرأس*، وقد وجدت يرقاته متحوصلة في تجويف الجسم لأسماك *السنيوح*. أما النوع الرابع فهو يرقات *الديديوموزويدي* النادرة، والتي جمعت من الكلية في أسماك *السنيوح، والحلوايو، الكنعد*. من الجدير بالذكر أن يرقات النوع الأول والثاني، وكذلك *الديديموزويد* توصف لأول مرة من أسماك الخليج العربي.

كلمات مدخلية: الإمارات، أسماك، طفيليات دودية، *ميتاسركاريا*، *ستيفانوستوم*، *ديديوموزويدي*.

Introduction

Many types of helminth larvae were reported early from Arabian Gulf fishes (Merzayans, 1970); (Tigari, *et al.* 1975) and (Eslami and Mokhayer, 1977). (El Naffar, *et al.* (1992) gave a list of different helminth genera infecting Emirati fish included four in larval stages. Full descriptions of some anisakid larvae was reported by (Kardousha, 1992). Later on, he added a reviewed study on trypanorhynchan cestode larvae infecting fish off Emirati coasts (Kardousha, 1999). The work on trypanorhynchan larvae has been extended, and another two species were added (Kardousha 2003). The four larvae which were previously reported in El-Naffar's list come in focus for description in the present study. (El-Naffar, *et.al.* 1992).

Materials and Methods

During a thorough investigation on Emirati fish between 1990 and 1993, some helminth parasite larvae were found encysted in body cavities, and some organs in different hosts. Fishes were collected from different local fish markets in Abu Dhabi, Dubai and Ras Al-Khaima (West coasts of Emirates, Long. 55:16' E., and Lat. 24:27 N.). The larvae were collected fresh; some larvae were excysted out in saline. The excysted larvae observed alive were then prepared for fixation. Some of the larvae were left in cold saline till they released their proboscis, then fixed in (10%) formal saline, stained in aceto-carmine, dehydrated and mounted in Canada balsam. Drawings were made with the aid of a drawing tube. Measurements are given in millimeters unless otherwise stated.

Results

Table (1): Results review

Helminth Larvae	Host	Habitat	Description
(1) *Stephanostomum* sp. type (I) *Fig.(1) A and B *Fig.(5) A and C	*Psettodes erumi ((3) infected out of (50)) *Epinephelus areolatus ((2) infected out of (25))	Body cavity near heart and stomach	Based on (10) mounted metacercariae
(2) *Stephanostomum* sp. type (II) *Fig.(1) C and D *Fig.(5) B and D	Mulloides flavolineatus ((1) infected out of (55))	Body cavity near heart	Based on (10) mounted metacercariae
(3) *Serrasentis sagittifer* linton 1889 (Acanthocephala, Rhadinorhynchidae) *Fig.(2), (3), & (6)	*Saurida undosquamis* ((12) infected out of (150) examined)	Body cavity attached to mesenteries	Based on (5) larvae
(4) *Didymozoid larva* (Trematoda, Didymozoidae) *Fig.(4)	*Saurida* undosquamis, Parastromateus niger, and Euthynnus affinis	Kidneys	Based on (5) larvae.

1. *Stephanostomum sp. type (I) (Digenea, Acanthocolpidae)*
   Fig. (1) A and B
   Fig. (5) A and C

**Host:*

Psettodes erumi, ((3) infected out of (50)) and *Epinephelus areolatus,* ((2) infected out of (25))

**Habitat:*

Body cavity near heart and stomach.

**Description:*

(Based on (10) mounted metacercariae)

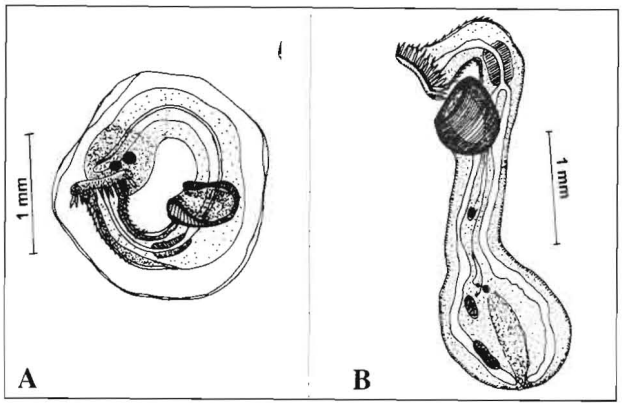

Fig. **(1), (A&B):** Metacercariae of *Stephanostomum* sp: Encysted meta and Excysted Larva of type (I)

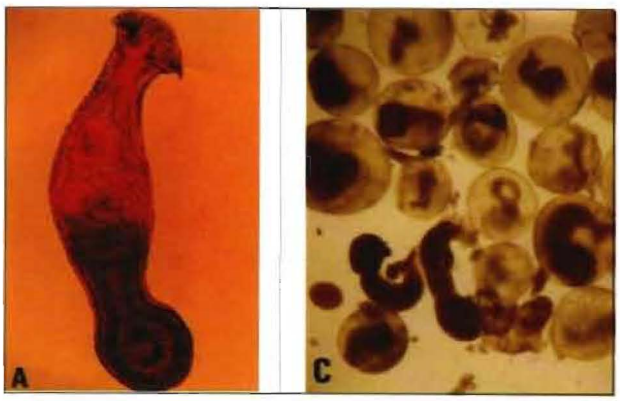

Fig. **(5) (A&C)**: Photomicrographs of Metacercariae of *Stephanostomum* sp: Excysted and Encysted larva of type (I)

The metacercariae cysts are rounded, translucent, (1.8-2.0mm) in diameter. Larvae can be clearly seen moving inside through a thin and translucent outer membrane. Larvae are curved inside giving a rounded shape (See, Fig. 1,A & 5C). When excysted, the larvae exhibit the general features of genus *Stephanostomum* (See, Fig. 1,B & 5A) Each larva has an oral sucker supported with strong perioral spines which are arranged in two alternating rows each with (18 spines). The body is spinose and the spines are largely anterior and become scarce posteriorly. Prepharynx, pharynx, and oesophagus, are clearly seen. Intestinal caeca reach the posterior extremity and are parallel to the round posterior end. Gonad premordia are detected, as is the excretory pore terminal (See, Fig. 5A).

2. *Stephanostomum sp. type (II)*
   Fig. (1) C and D
   Fig. (5) B and D

**Host:*

Mulloides flavolineatus ((1) infected out of (55)).

**Habitat:*

Body cavity near heart.

**Description:*

(Based on (10) mounted metacer-cariae)

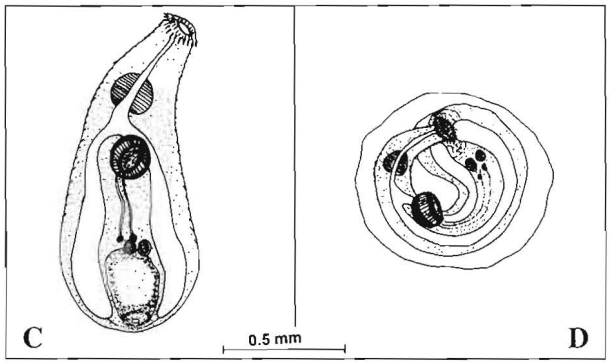

Fig.(1) (C&D): Metacercariae of *Stephanostomum* sp: Excysted and Encysted larva of type (2).

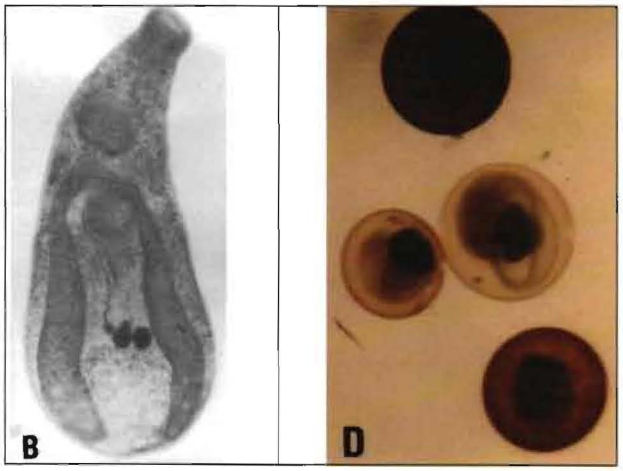

Fig. (5) (B&D): Photomicrographs of metacercariae of *Stephanostomum* sp: Encysted and Excysted larva of type (2)

The metacercariae cysts are rounded, translucent, smaller than those in type (I), (0.8-1.2.00mm) in diameter. The cysts have thick outer membranes but, larvae can be seen curved inside. Some cysts appear dark brown with outer walls of host origin (See, Fig. 5,D). When excysted, the larvae exhibit the general features of genus *Stephanostomum*, with pyriform body shape (See, Fig. 1,C and 5,B), two alternating perioral rows of powerfull spines, each with (16 spines), body spinose dorsally and ventrally. Prepharynx, pharynx, and short oesophagus, are seen. Some genital premordia were also detected. The excretory vesicle is sac-like and the pore is terminal (See, Fig. 5,B).

3. *Serrasentis sagittifer linton 1889 (Acanthocephala, Rhadinorhynchidae) [Figures (2), (3), and (6)]*

**Host:*

Saurida undosquamis, (12) infected out of (150) examined)

**Habitat:*

Body cavity attached to mesenteries.

**Description:*

(Based on (5) larvae).

(I) Male:

The body is elongated with a narrow posterior end, (7.75-8.8mm) long, and (0.64-0.72mm) wide, at the base of the proboscis. The probocis is club-shaped, broad anteriorly, (1.1-1.2mm) long, and (0.24-0.26mm) wide (See, Fig. 2,C, and 6,B). It has (22) longitudinal rows, each with (16) recurved hooks (See, Fig. 2,B). The anterior hooks are the largest, (0.098-0.01mm) long, while the smallest are the posteriors, (0.038-0.042mm) long. The neck is smooth, (0.25-0.28mm) long, by (0.22-0.30mm) wide. The double-walled receptacle is attached to the proboscis wall, (1.45-2.4mm) long, by (0.50-0.55mm) wide. The trunk is spinose anteriorly, and the spines are arranged in (9), collar rows, each with (18 spines) (See, Fig. 2,A). Collar spines are (0.034-0.038mm) long. Following the collar spines, (24) incomplete rows, like combs, are present, and extend beyond the med-level of the trunk (See, Fig. 2,A). Each comb has nearly (24 spines), which are (0.034-0.038mm) long. Two unequal, long and thin lemnisci arise from the base of the neck, and extend up to the med-level of the trunk, reaching a level beyond the testes. The shorter have a length of (3.2-3.8mm) and the longer is (3.6-3.8mm). The two (2) immature testes are ovoid, nearly equal and tandem, each (0.15-0.18mm). Premordia of four cement glands are detected with pyriform shape, located at the posterior end. The copulatory bursa is bell-shaped and muscular, with a ring like a sphincter (See, Fig. 2,A and 2,D).

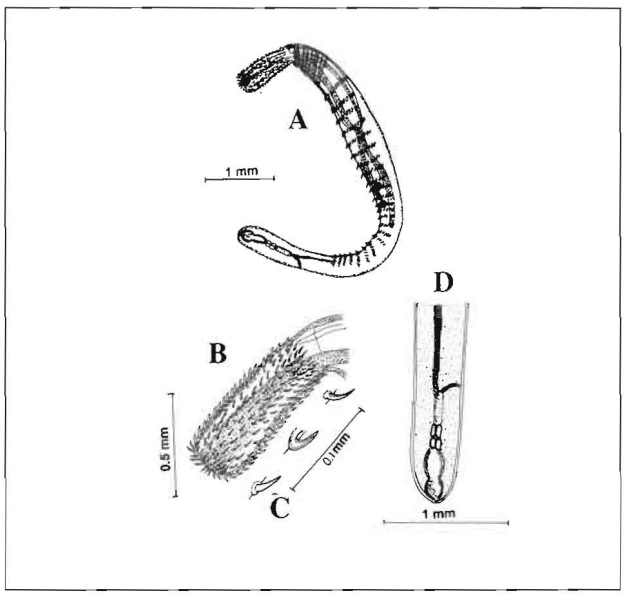

Fig.(2) (A-D): Male of *Serrasentis sagittifer* Larva:
(A) Whole mount of juvenile male.
(B) Enlarged proboscis with hooks profile.
(C) Profile of hooks type
(D) Posterior end of male with cement glands premordia and copulatory bursa.

(**II**) Female:

The body is longer than the male, (10.8-11.2mm) long, by (0.8-0.92mm) wide. The topography of the proboscis, hook arrangements, receptacle and lemnsci are as in the male. The length of the proboscis is (1.15-1.18mm), the large hooks are (0.082-0.088mm) long, and the small hooks are (0.068-0.070mm) long, (See, Fig. 3,D). The neck length is (020-0.22mm), the receptacles are (1.20-1.25mm) long, the short lemniscus are (3.20-3.25mm) long, and the long ones are (3.3-3.45mm) long. The trunk armature resembles the male, the collar spines are (0.027-0.029mm) long, and the comb spines are (0.027-.0.029mm) long (See, Fig. 3,A and 3,B). Some immature ovarian balls are seen near the receptacle in some specimens. The vagina is (0.19-0.22mm) long, and surrounded by two pairs of vaginal muscles. The uterus has a conical shape and is (0.067-0.069mm) long, with a maximum width equal (0.067-0.069mm) at its base (See, Fig. 3,D).

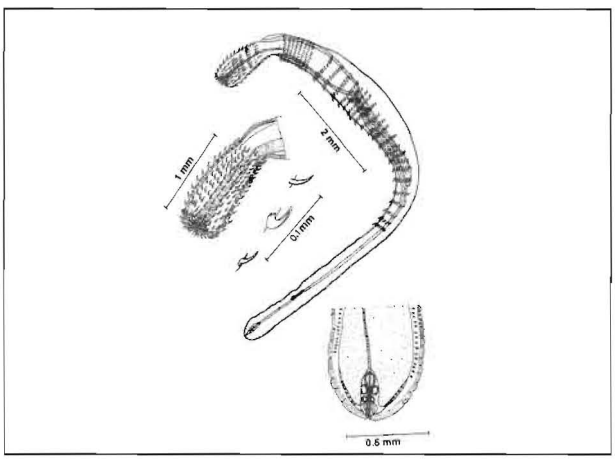

Fig. (**3**) (**A-D**) Female of *Serrasentis sagittifer* Larva.
(**A**) Whole mount of juvenile female.
(**B**) The enlarged proboscis with hooks profile.
(**C**) Profile of hooks types.
(**D**) Posterior end of female.

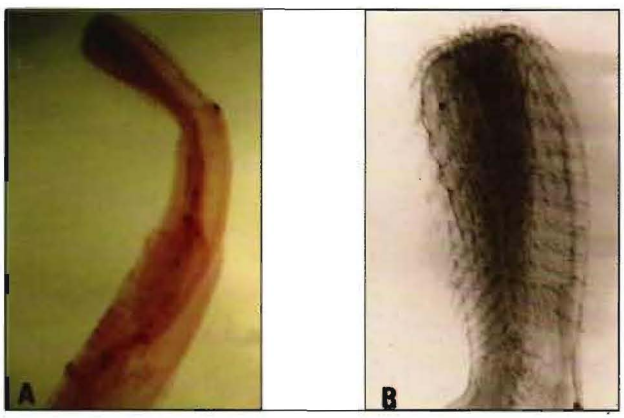

Fig.(**6**) (**A & B**): Photomicrographs of male *Serrasentis sagittifer*
(**A**) The anterior part showing the proboscis and receptable.
(**B**) The profile of enlarged proboscis.

4. *Didymozoid larva*
(Trematoda, Didymozoidae)
[Fig. 4]

**Hosts*:
Saurida undosquamis, Parastromateus niger and Euthynnus affinis

**Habitat:*
Kidneys

**Description:*
(Based on (5) larvae)

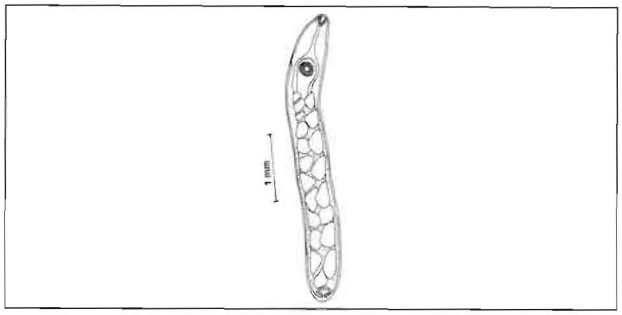

Fig. (**4**) The larva of didymozoid type.

The body is elongated, covered with a fine sheath of host origin, (3.8-4.4mm) long, by (035-0.52mm) wide. The oral sucker is subterminal with a deep mouth. The oesophagus is long, and bifurcating just anterior to the acetabulum. The caeca are divided into many chambers in the postacetabular region. The excretory vesicle has short arms, and the excretory pore is terminal.

Discussion

The general features of the two trematode larvae, of both types (I) and (II), particularly the number, shape and arrangments of perioral spines, suggest that, it belong to genus *Stephanostomum Looss* (1899), family *Acanthocolpidae Luhe* (1910). The architecture of the anterior part of larvae of type (I), and the number, and arrangment of peri-oral spines closely resemble S. qatarense (Saoud, *et al.* 2002). An unidentified adult specimen has been reported from Lutjanus cocceneus from Kuwait (Al-Yamani and Nahhas, 1981), and may have the same features of larvae type (II). Saoud, *et al.* 1988) described *Stephanostomum nagatyi* from *Epinephelus tauvina* caught from Qatari waters, but its peri-oral spines are completely different from both types of the present larvae. Later on, Saoud, *et al.* 2002) amended the genus, and described two species: *Stephanostomum qatarense* from *Thunnus albacares* and *Stephanostomum Triacanthi* from *Pseudotriacanthus strigilifer,* from Qatari waters.

(Amin, *et al.* 1984) firstly, described the larvae of *Serrasentis sagittifer* from Arabian Gulf fishes, specially, from different host types from Kuwait.

Later on, (Amin and Sey, 1996), recorded some encysted juveniles of *Stephanostomum sagittifer,* from different fishes, caught also from Kuwait. These larvae were also reported from Emirati fishes as genus *Serrasentis,* in a study of different helminth genera listed by (El Naffar *et al.* 1992). As far as can be followed, the current description is the first figured and detailed one in the Arabian Gulf. It was clearly noted that, these larvae have a wide range of fish hosts. About 13 fish species have been found infected with these larvae in the Arabian Gulf, including:

* *Saurida undosquamis.*
* *Bothus sp.*
* *Lutjanus coccineus.*
* *Lutjanus fulfiflamma.*
* *Nemipterus japonicus.*
* *Nemipterus tolu.*
* *Otolithus argenteus.*
* *Acanthopagrus berda.*
* *Mulloides auriflamma.*
* *Plectorhynchus indicus.*
* *Plectorhynchus arsius.*
* *Scomberoides orientalis.*
* *Upeneus sulphoreus.*

(Amin, *et al.* 1984) and (El Naffar, *et al.* 1992).

Didymozoid larvae have been recorded and described by many authors. (Fischthal 1982) described an immature larvae from the small intestine of *Caranx detex* from the Red Sea, but his specimens lacked the acetabulum. (Rekharani and Madhavi 1985) have also described didymozoid larvae from the intestine of *Valamugil cunnesius,* having the same features, but with an acetabulum.

Following the current descriptions, the present larva can be assigned as a didymozoid, and the kidneys can be considered as a new collected sites. Furthermore, these larvae are described for the first time in the Arabian Gulf region.

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Ref: 2317
Received 29/05/2004
In revised form 30/01/2005