Metazoan parasite fauna of wild sea bass; *Dicentrarchus labrax* (Linnaeus, 1758) in Egypt

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Abstract: Marine parasites are of immense ecological and economic importance in both wild and cultured marine fish. In this study a total number of 100 sea bass *Dicentrarchus labrax* (Linnaeus, 1758) collected from the Mediterranean Sea, Egypt during the period from August 2017 till January 2018 were investigated for their metazoan parasite fauna. Thirteen metazoan parasites were found. Three copepods *Lernanthropus kroyeri, Caligus minimus* and *Ergasilus* sp. One monogenean *Diplectanum aequans*. Seven digeneans *Transversotrema patialense*, *Derogenes varicus, Metadena crassulata, Pseudoacanthostomum panamense, Pseudallacanthochasmus grandispinu*s, *Acanthostomum spiniceps* and *Timoniella praeterita*. Two nematodes *Anisakis simplex* and *Hysterothylacium aduncum*. The results show that the parasite infections were mainly due to the monogenean *D. aequans* (76%). To our knowledge the digeneans *T. patialense*, *D. varicus, M. crassulata, P. panamense* and *P. grandispinu*s are recorded for the first time in Egypt. Furthermore, *T. patialense*, *M. crassulata, P. panamense* and *P. grandispinu*s are new host record.

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1. Introduction

Dicentrarchus labrax now constitutes the most superior commercially fish species in the Mediterranean area (**Antonelli et al, 2009**). The largest producers of it are Greece, Turkey, Italy, Spain, Croatia and Egypt **(FAO, 2008)**. The Egyptian production from European sea bass reached about 19,027 tons **(Gafrd, 2011).** Egypt is topographically situated along side great areas of fresh and marine water. Egypt is one of the coastal countries that must take benefit from fish proteins. Marine fish act either final or intermediate host for parasites which may cause injuries and even death to these fishes **(Shih and Jeng, 2002**). Parasitic infections of marine fishes may lead to economical loss to the nations. The parasite fauna of marine fishes is extremely rich and diverse and has the largest total biomass. Many parasites are highly pathogenic to their hosts, and may affect their number, reduce the quality of raw fish and fish products, or be harmful to a human (**Korotaeva, 1973**). Parasites are important category of pathogens, which occurs at various stages of development in fish. The parasites invade various tissues and organs of fish (skin, gills, eye, kidney, liver, intestine, spleen, heart and brain).

In recent years, crustacean parasitic diseases are becoming more frequent in the aquacultures and considered the more parasitic problem on cultured marine fish **(Tansel and Fatih, 2012).** The major groups of Crustaceans fish parasites; are Isopoda and Copepoda **(Öktener and Sezgin, 2000)**. Disease outbreaks and mortalities caused by *L. kroyeri* are frequently observed in sea bass culture and economic losses occur as the result of reduced feed conversion, growth reduction, mortality, loss of product value and treatment costs **(Manera and Dezfuli, 2003)**. Caligid species are generally defined as sea lice. They cause serious harm to host fishes by feeding on the epidermal tissue, blood, and mucus of fishes **(Kabata, 1979).**

The *Diplectanidae* is a family comprising approximately 20 genera and more than 250 described species parasitizing the gill of a wide range of marine and some freshwater fishes. Diplectanosis caused by *Diplectanum aequans* (and *D. laubieri*) is one of the most significant ectoparasitic diseases of sea bass *D. labrax* **(Whittington and Chisholm, 2008).** According to **(Cribb et al, 2002)** digenea have over 100 families, well over 1000 genera and many thousands of species, a lot of them are of great importance to marine ecosystems. The most commonly observed parasites in marine food fishes are roundworms (nematodes). Actually, a number of different species are involved, and it is difficult to distinguish between them. All are in the family *Anisakidae* and are properly referred to as Anisakid nematodes (**Hilderbrand et al, 2003**). The present study was directed to provide data on metazoan parasites and their infection prevalence in wild sea bass collected from the Mediterranean Sea, Egypt.

2. Materials and Methods

Sample collection:

A total number of 100 sea bass (ranged from 40 to 250 gm weight and 10 to 30 cm length) were collected randomly from fish markets in Kafrelsheikh governorate during the period from August 2017 till January 2018 and transported in ice box to the laboratory of pathology and parasitology department, faculty of veterinary medicine, Damanhour University where it examined.

Parasitological examination:

All external and internal organs of each fish were examined separately with the aid of a dissecting microscope. The collected trematodes were washed in a 0.6% saline solution and fixed in 70% ethanol; they were stained with alum carmine, dehydrated and then cleaned in xylene and mounted in Canada balsam. Nematodes and Crustaceans were fixed in 70% ethanol, cleared in glycerol and mounted in glycerin gelatin. All parasites were identified using selected identification keys of **Yamaguti (1958, 1959, 1961 and 1971), Hoffman (1967), Paperna (1996) and Woo (1995)**.

For scanning electron microscopy:

The specimens of *D. aequans* were washed several times in isotonic saline solution and shaken vigorously to relax and remove any attached debris then washed in phosphate buffer solution and fixed in 3% glutraldehyde (ph 7.4) at 4c in 0.1 M phosphate buffer then washed three times in the same buffer (30 minute). Specimens were post fixed in 1% osmium tetra oxide in 0.1 M phosphate buffer solution for 1-2 hours then washed three times in the same buffer. Fixed specimens were dehydrated through series grades of ethanol. Complete dehydration was performed in 2 changes of absolute ethyl alcohol and dried in critical point drying apparatus then mounted on stubs with double adhesive tape, coated with gold and examined with a JEOL 5300 JSM electron microscope at an accelerating voltage of 25 K.V according to **Harras (2012).**

3. Results:

1: Prevalence of parasitic infection among examined *D.labrax:*

The analysis of 100 specimens of sea bass revealed high parasite diversity. A total of 13 different parasite species were found reaching 87% total infection rate. Their list, life stage, infection rate and site of infection in the host were reported in table (1).

The ectoparasites were represented by copepods and monogenean. Three copepods species were found with (18%) total infection: *L. kroyeri* **(van Beneden, 1851)** present attached to the gill filaments with infection rate (18%), *C. minimus* **(Otto, 1821)** in the mouth cavity and on the gill arche of the infected fishes with (6%) infection rate and the third copepod Ergasilus species was also found attached on the gill filament of one fish (1%). the monogenean *D. aequans* **(Wagener, 1857)** which showed highest infection rate among the collected parasites (76%) and commonly present attached on the gill filament of infected host.

Among endoparasites, 7 species of Digenea, 2 of Nematoda were found. Digenetic trematodes were found with total prevalence 33%. Within this group, one species of Transversotrematidae, *Transversotrema patialense* **(Soparker, 1924)** were found under the scales of one examined fish (1%). *Metadena crassulata* **(Linton, 1910 after Yamaguti 1971)** was found in the anterior portion of intestine with (3%) infection rate. Adult of *Derogenes varicus* **(Müller, 1784)** was present in the gastrointestinal tract with prevalence rate (7%) of examined sea bass. *Pseudoacanthostomum panamense* **(Caballero, Bravo-Hollis and Grocott, 1953)** was present in the gastrointestinal tract with infection rate (13%). *Pseudallacanthochasmus grandispinus* **(Velasequez 1961, after Yamaguti 1971)** detected mainly in the anterior portion of intestine with total prevalence (9%). *Acanthostomum spiniceps* **(Looss, 1899** after **Brooks 1980)** was found in (5%) of examined sea bass Acanthostominae (Cryptogonimidae), *Timoniella imbutiforme* **(Molin, 1859)** observed mainly in the anterior and middle part of intestine with highest infection rate among digenetic trematodes (27%).

Two taxa of Nematoda were found in total prevalence (24%) of the examined sea bass: *Anisakis simplex* **(Dujardin, 1845)** was found as 3rd stage larva in the gastrointestinal tract and abdominal cavity of (13%) of the examined fish. *Hysterothylacium aduncum* **(Rudolphi, 1802)** was detected as 4th larval stage and adult in gills, ovary, stomach and intestine of 19 (19%) out of 100 examined fish.

2- Morphological description of the collected parasites:

2.1: Morphological description of the collected copepods: -

A) *Lernanthropus kroyeri* **(Van Beneden,1851)**: The bodies appeared elongate in both sexes. Cephalothorax with dorsal shield slightly narrower anteriorly, anterolateral corners more rounded than posterolateral corners. A deep constriction is found between the cephalothorax and pregenital trunk. There are 4 pairs of thoracic leg, the first one is biramous. The female is easily recognized by the presence of the two egg-sacs which were clearly seen macroscopically (plate 1).

B) *Caligus minimus* **(Otto, 1821):** It is commonly known as sea louse. It has 2 pairs of antennae with 2 lunules at each side of the cephalothorax and 4 legs. The cephalic zone, lateral zones, and thoracic zone are clearly identified. The last part of the *C. minimus* is the abdomen (posterior tagma), which includes an abdomen and caudal rami, can be clearly recognized (plate 2 figure A, B).

C) Ergasilus species: The body length of mature females may range from 0.5 to 1.7 mm. they have white to yellowish coloration and appear nodule-like egg sacs on the attacked gills. They have single median eyespot toward the anterior end. Also, terminal powerful curved claws. There were four pairs of segmented swimming legs (Plate 2 figure C).

Table 1 – List of Parasites of wild sea bass *Dicentrarchus labrax* from the Mediterranean Sea, Egypt during the period from August 2017 till January 2018.

Parasite		stage	Site	NI.	%	T%
Crustacea	*Lernanthropus kroyeri van Beneden, 1851*	P and A	GF	18	18	18
	Caligus minimus Otto, 1821	P and A	M,GA	6	6	
	Ergasilus sp.	A	GF	1	1	
Monogenea	*Diplectanum aequans (Wagener,1857)*	A	GF	76	76	76
Digenea	*Transversotrema patialense (Soparker, 1924)*	A	Sk	1	1	33
	Metadena crassulata (Linton, 1910 after Yamaguti 1971	A	AI	3	3	
	Derogenes varicus (Müller, 1784)	A	GIT	7	7	
	Pseudoacanthostomum panamense (Caballero, Bravo-Hollis and Grocott, 1953)	A	GIT	13	13	
	Pseudallacanthochasmus grandispinus (Velasequez 1961, after Yamaguti 1971)	A	AI	9	9	
	Acanthostomum spiniceps (Looss, 1899 after Brooks 1980)	A	GIT	5	5	
	Timoniella imbutiforme (Molin,1859) Brooks, 1980	A	GIT	27	27	
Nematode	*Anisakis simplex (Dujardin, 1845)*	L3	GIT, AC	13	13	24
	Hysterothylacium aduncum (Rudolphi, 1802)	L4, A	GC,GIT,AC,O	19	19	

Number examined = 100

NI: number infected; %: prevalence rate; T%: total prevalence; A: adult; P: pre-adult; L3: 3^{rd} stage larva; L4: 4^{th} stage larva; SK: skin; GF: gill filament; GA: gill arch; GC: gill cavity: M: mouth; AI: anterior intestine; GIT: gastrointestinal tract; AC: abdominal cavity; S: stomach; I: intestine; O: ovary.

2.2-Morphological description of the collected trematodes:

A) *Diplectanum aequans* **(Wagener, 1857)**: A small monogenetic trematode with maximum length 1.3 mm. the prohaptor has 4 cephalic lobes with two groups of head glands and two pairs of eye spots. The opisthaptor has a squamodisc, two pairs of large anchor and 14 marginal hooks (plate 3,4).

B) *Transversotrema patialense* **(Soparker, 1924)***:* A digenetic trematode characterized by flat, transversally elongated or lancet-shaped body. no oral sucker, ventral sucker small, rounded; testis big with 6-8 lobes; one ovary; eye-spots present (plate 5 Figure A, B).

C) *Metadena crassulata* **(Linton, 1910 after Yamaguti 1971)**: A digenetic trematode with oval or elongate oval body, round oral sucker without oral spines and opens terminally or may subterminally. Ventral sucker unspecialized. short Oseophegus and pharynex. Caeca blind. uterus mainly in the hind body. Vitelline follicles are two lateral groups or form a transverse band (plate 5 figure C).

D) *Derogenes varicus* **(Müller, 1784)**: the body is elongated with oval oral sucker. The ventral sucker located in the middle of the worm and larger than the oral sucker. Elongated pharynx. Ovary almost spherical, located behind testes (plate 5 figure D).

E) *Pseudoacanthostomum panamense* **(Caballero, Bravo-Hollis and Grocott, 1953):** Body elongated, oral sucker funnel shape with enlarged oral spines open terminally. Ventral sucker found on the anterior part of the body. Short prepharnyx and oseophegus. Intestinal bifurcation in mid-forebody or just before ventral sucker. two tandem separated testes. Lobed ovary between ventral sucker and testes (plate 6 figure A).

F) *Pseudallacanthochasmus grandispinus* **(Velasequez 1961, after Yamaguti 1971)**: Elongated body. Oral sucker bowl-shaped surrounded by Circumoral spines arranged in a single row and larger than ventral sucker which located on the anterior portion of the body. Long prepharynx and muscular pharnux. Long intestinal caeca extending up to posterior end of the body. Testes two, tandem, almost round and equal in size. Ovary single and present anterior to the testis. Uterus remains packed with eggs mostly on posterior half of the body (plate 6 figure B).

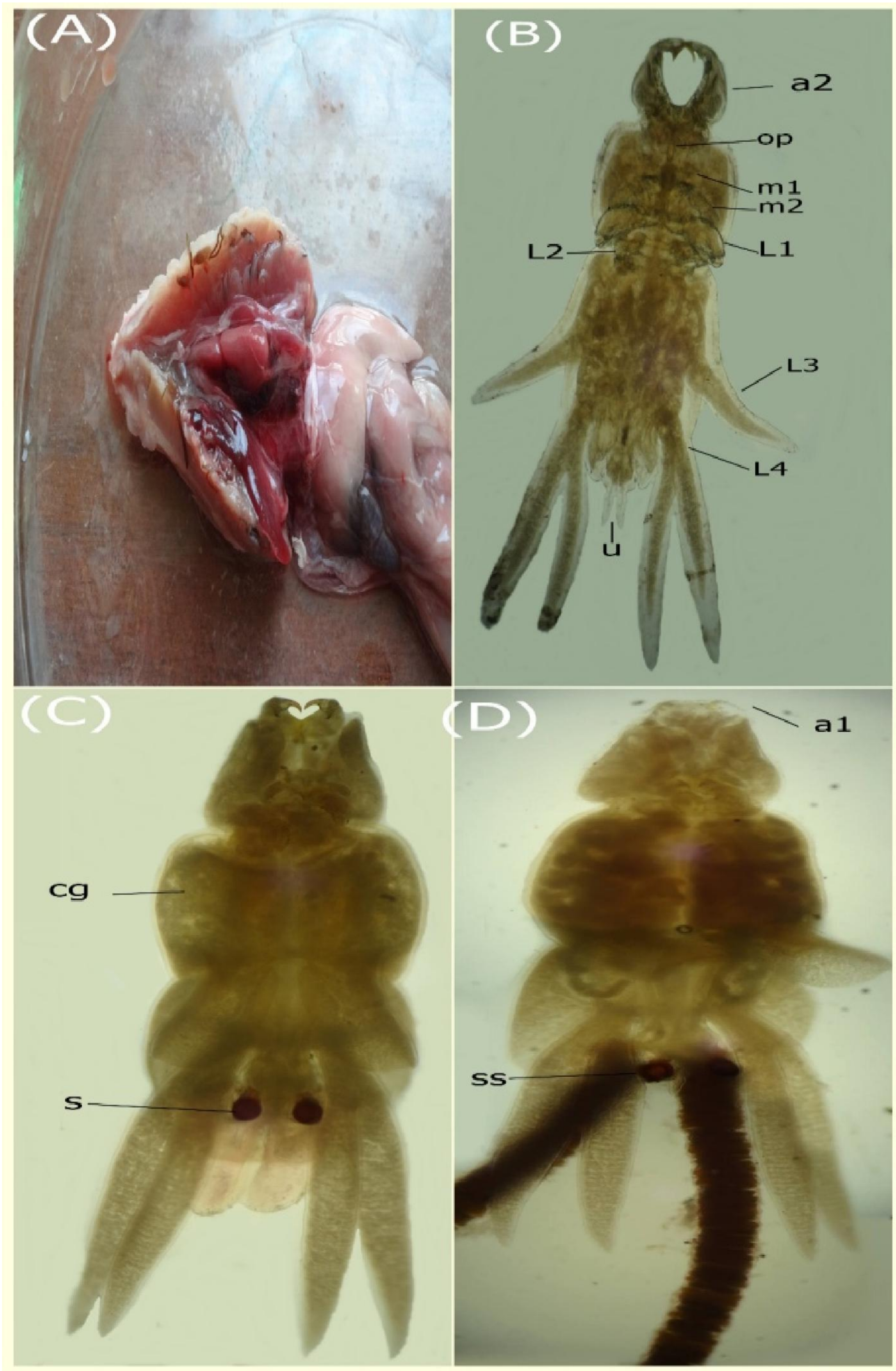

Plate (1): - figure A: specimens of *L. kroyeri* attached to gill filament of infected sea bass; figure B: Microscopic appearance of preadult male of *L. kroyeri*. (X10); figure C; Microscopic appearance of mature male L. *kroyeri*. (X4); figure D: Microscopic appearance of mature female L. *kroyeri*. (X4). a1: 1st antenna; a2: 2nd antenna; op: oral opening; m1: 1st maxilla; m2: 2nd maxilla; L1: 1st leg; L2: 2nd leg; L3:3rd leg; L4: 4th leg; s: spermatophore; ss: spermatophore sac; u: uropod.

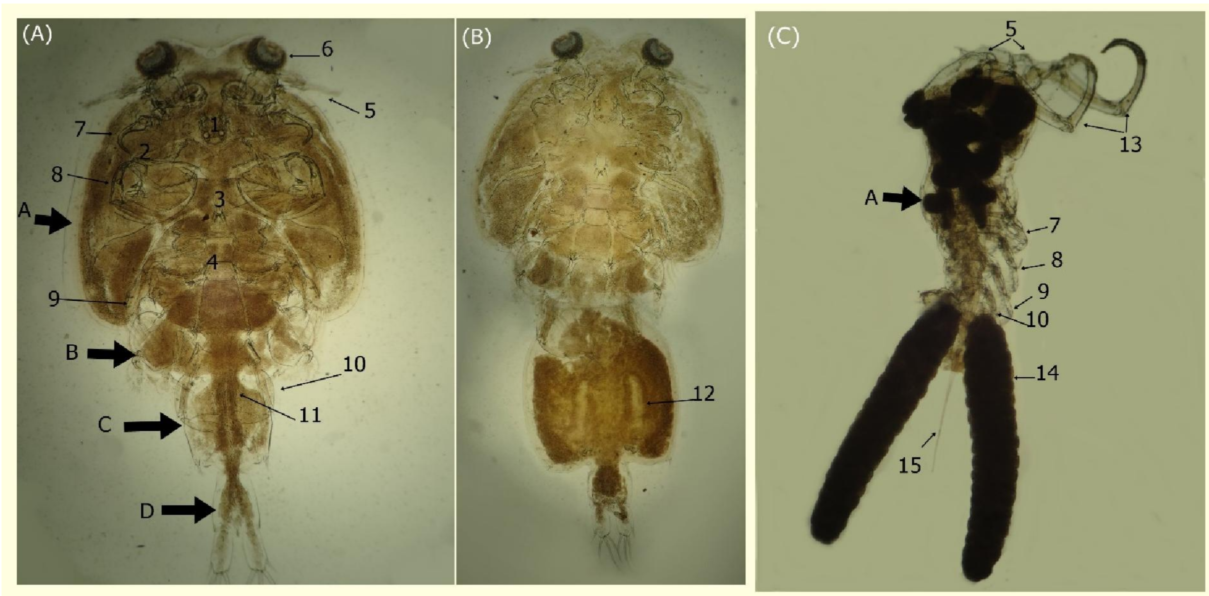

Plate (2): figure A: microscopic appearance of pre-adult male of *C. minimus* (X10); figure B: microscopic appearance of adult male of *C. minimus* (X4); figure C: microscopic appearance of *Ergasilus* sp. (X4). A: cephalothrax; B: apron; C: genital complex; D: abdomen; 1: cephalic zone; 2: lateral zone; 3: thoracic zone; 4: tagma; 5: first antenna; 6: lunule; 7: 1st leg; 8: 2nd leg; 9: 3rd leg; 10: 4th leg; 11: intestine; 12: genital segment;13: 2nd antenna; 14: egg sac; 15: caudal ramus.

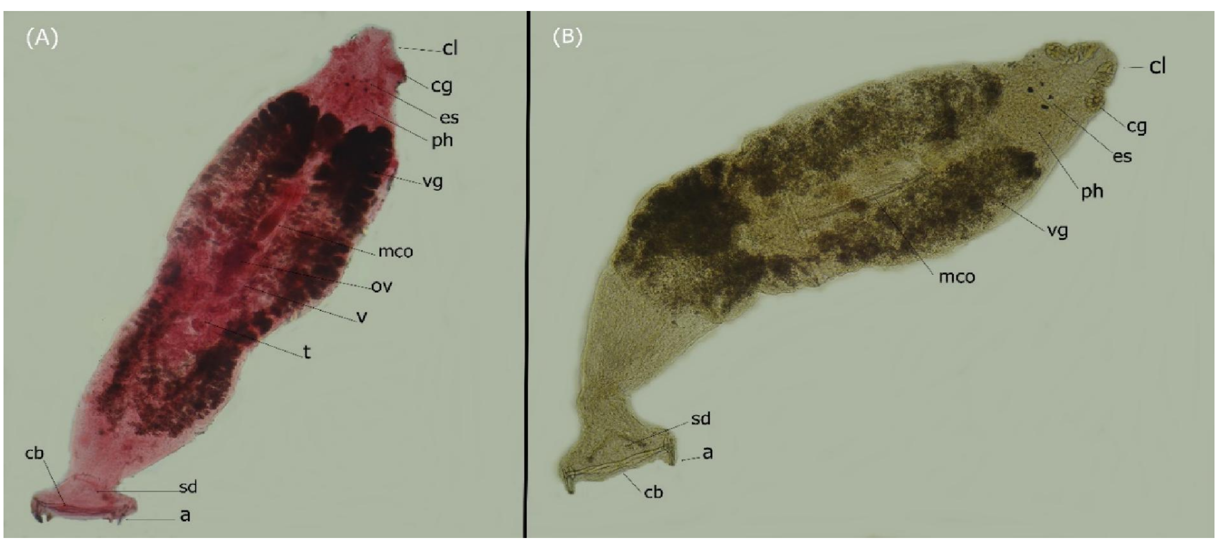

Plate (3): carmine stained (A) and wet mount specimens (B) of *D. aequans*. X 10; a: anchor; cb: connecting bar; sd: squamodisc; t: testis; ov: ovary; v: vagina; mco: male copulatory organ; vg: vitelline gland; ph: pharynx; es: eye spots; cg: cephalic gland; cl: cephalic lobe.

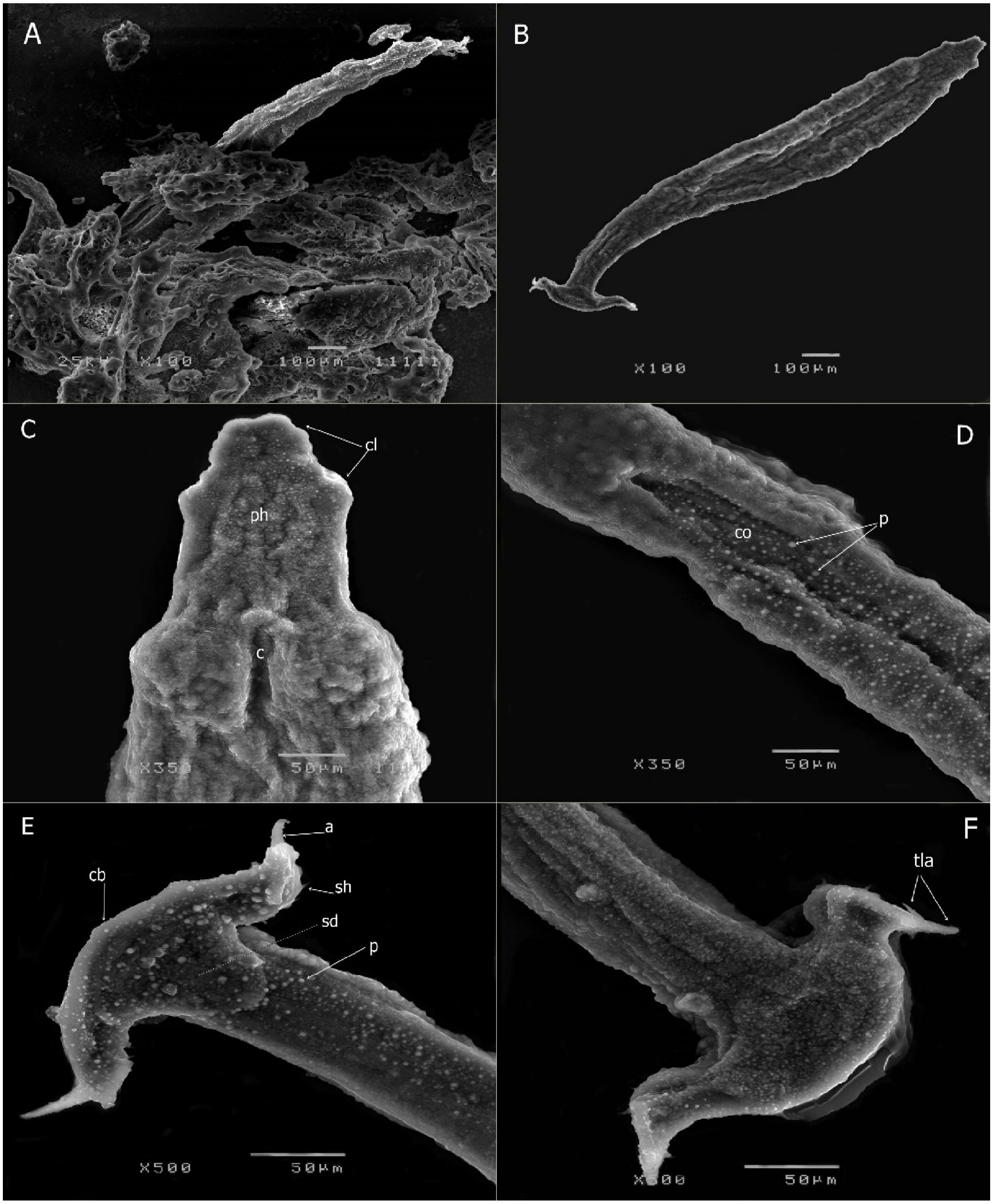

Plate (4): Scanning electron microscopy of *D. aequans*. A: *D. aequans* embedded in gill tissue; B: whole specimens; c: prohaptor indicate cephalic lobe (cl), pharynx (ph) and cleft of copulatory organ; D: copulatory organs (co) and papillae (P) scattered on the whole body; E: opisthaptor indicate scattered papillae (p), squamodisc (sd), large anchor (a), small hooklets (sh) and connecting bar (cb); F: opisthaptor indicate two large anchor (tla).

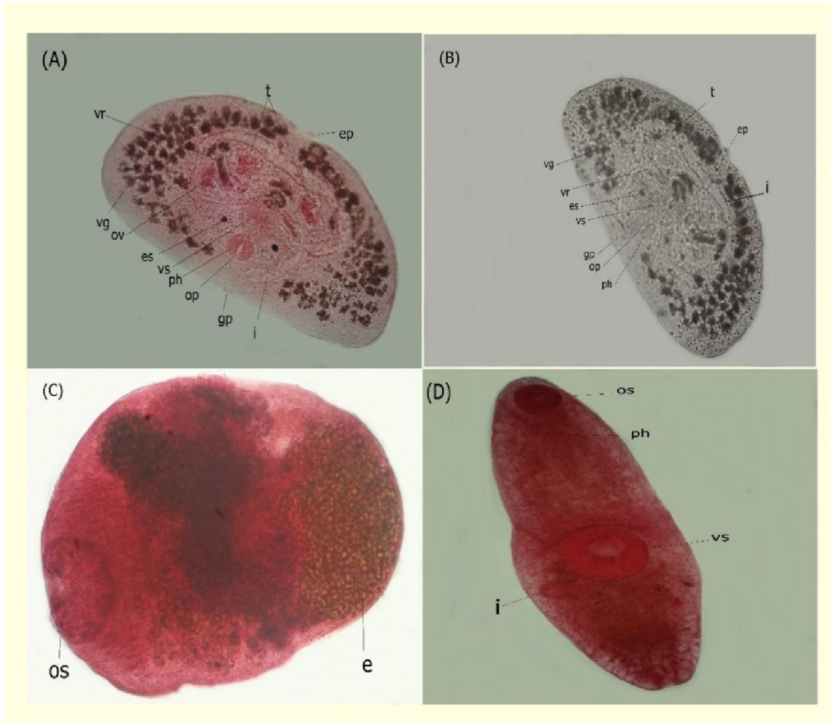

Plate (5): carmine stained (A) and wet mount specimens (B) of *T. patialens* (X10); (C): carmine stained specimen of *M. crassulata* (X10); (D): carmine stained specimen of *D. varicus* (X10); op: oral opening; os: oral sucker; ph: pharynx; vs: ventral sucker; es: eye spots; ov: ovary; t: testis; vg: vitelline gland; vr: vitelline reservoir; i: intestine; gp: genital pore; ep; excretory pore; e: egg.

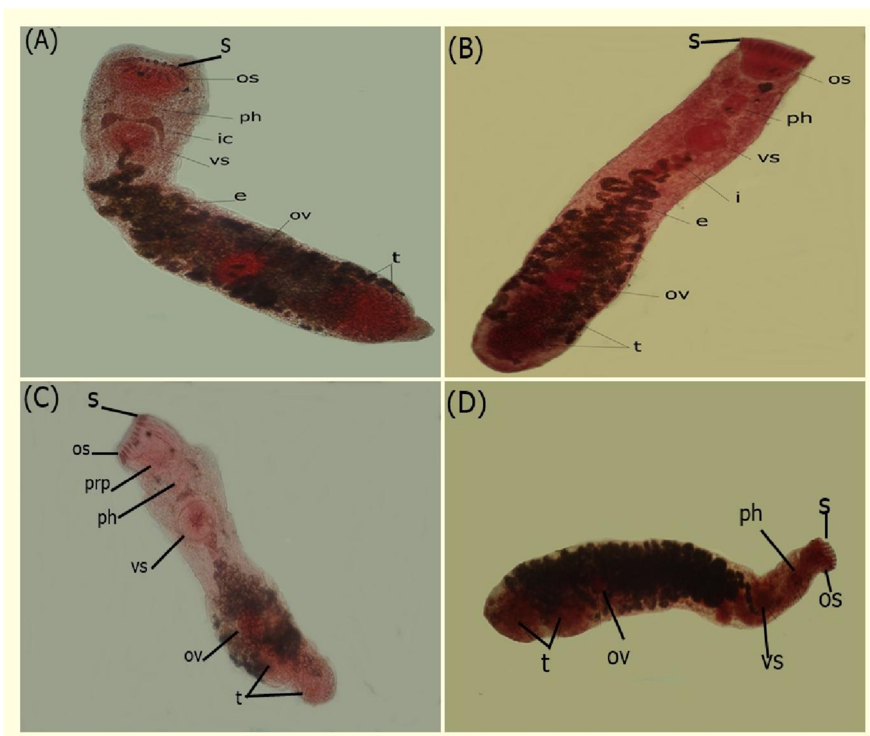

Plate (6): figure (A): microscopic appearance of carmine stained *P. panamense* (X 10); (B): microscopic appearance of carmine stained *P. grandispinus* (X10); (C): microscopic appearance of carmine stained *A. spiniceps* (X10); (D): microscopic appearance of carmine stained *T. imbutiforme* X5; os: oral sucker; s: spines; prp: prepharynx; ph: pharynx; vs: ventral sucker; i: intestine; e: egg; ov: ovary; t: testis.

Plate (7): figure (A): Encapsulated larvae of *Anisakis* sp. revealed the anterior end, a prominent boring tooth and oral lips; figure (B): A prominent Boring tooth and 3 lips in the anterior end of encapsulated larvae of *Anisakis* sp; (C): anterior end of *A. simplex* 3rd stage larva (X 10) showing boring tooth (t), esophagus (o) and nerve ring (nr); (D): posterior end of *A. simplex* 3rd stage larva (X 10) showing anus (a) and mucron (m).

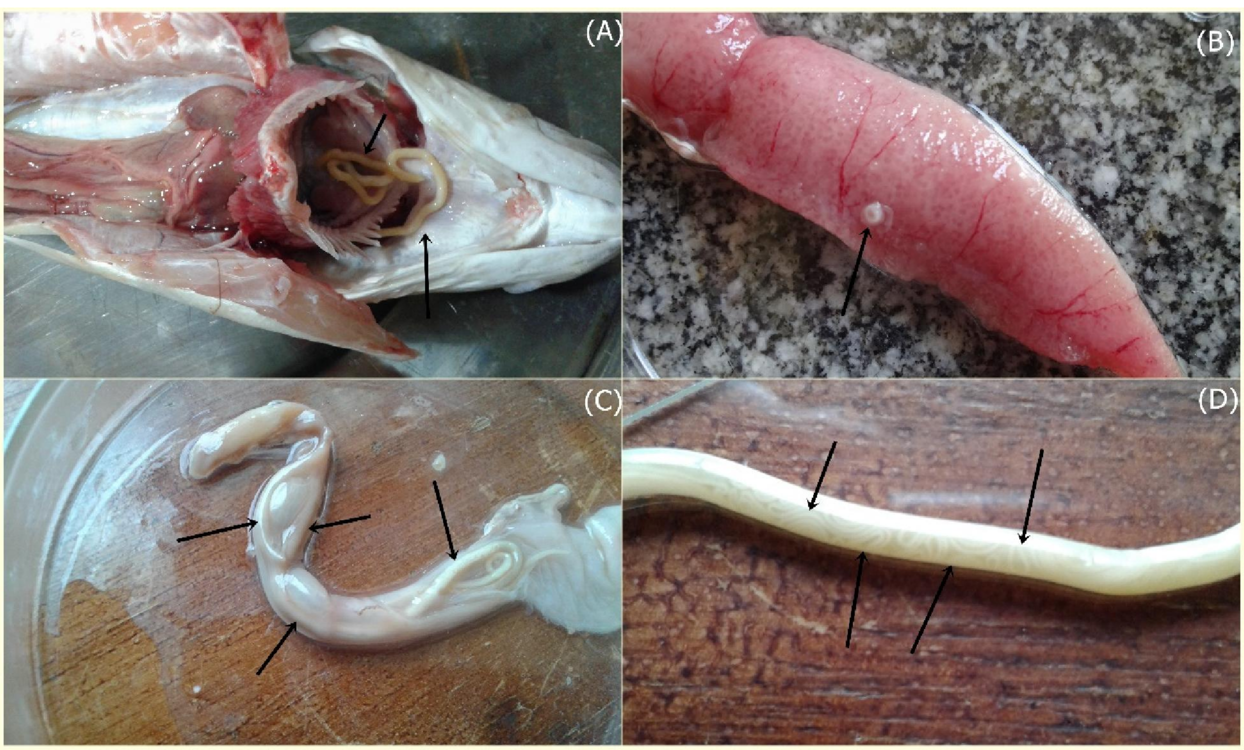

Plate (8): *H. aduncum* in gill cavity (A), ovary (B) and intestine (C) of infected sea bass (arrows), (D): female *H. adunum* filled with larvae (arrows).

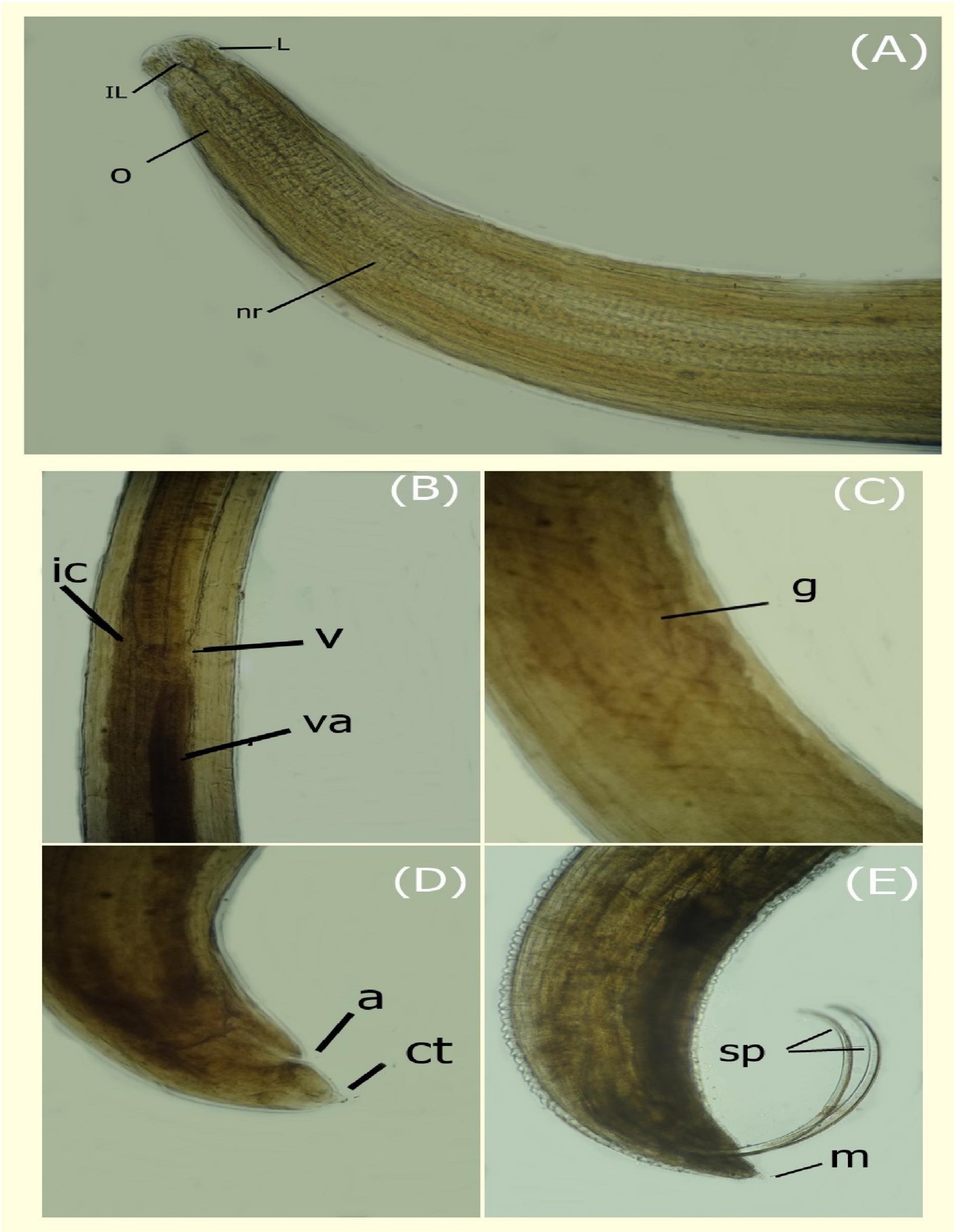

Plate (9): microscopic appearance of *H. aduncum*. Figure (A): anterior end (X10) showing. lips (L), interlabia (IL), esophagus (O) and nerve ring (nr); (B): ventricular region (X10) showing intestinal ceci (ic), ventricular (v) and ventricular appendix (va); (C): mid region (X10) showing well developed gonads (g); (D): caudal end of female (X10). Showing anus (a) and cactus tail; (ct): caudal end of male (X10) showing two equal spicule (sp) and mucron (m).

G) *Acanthostomum spiniceps Looss* **(1899 after Brooks 1980)**: Body was elongate. Oral sucker was terminal, funnel-shaped with a crown of spines. The prepharynx was long and in midway between tow suckers. Its esophagus is short, bifurcating a little in front of acetabulum, ceca opening outside at posterior extremity. Acetabulum relatively small, located in anterior half of body. Testes tandem, or somewhat diagonal present posteriorly to a single ovary (plate 6 figure C).

H) *Timoniella imbutiforme* **(Molin,1859 after Brooks, 1980)**: A relatively large digenetic trematode with maximum length 2.8 mm Body. The oral sucker is elongated surrounded by about 15-18 spines. Muscular pharynx. Acetabulum is smaller than the oral sucker and located on the anterior part of the body. one ovary present anterior to two testes tandemly located (plate 6 figure D).

2.3-Morphological description of the collected nematodes:

A) *Anisakis simplex* **(Dujardin 1845)**: the body is medium size, white to cream colored when alive; thickest posteriorly and tapers gradually towards the anterior end. Has three relatively small lips surround the mouth and a prominent boring tooth is seen titled the body axis. Intestine ends with an anus. Tail is short, rounded and ending with a small mucron (plate7).

Hysterothylacium aduncum **(Rudolphi 1802)**: The body is thinner anteriorly. There are three lips and interlabia; lips about as long as wide, slightly constricted at anterior end; interlabia length about half of lip length; Characteristic « cactus tail » present. The adult male has ventrally 2 equal spicules while the adult female has vulva opening in the posterior end of the first third of the body (plate 8,9).

4. Discussion:

Parasitic copepods have worldwide distribution and are economically important parasites in marine fish (**Kabata 1970**). In the present study the prevalence of *L. kroyeri* was 18%. This result is nearly similar to that obtained by **Noor El-Deen et al. (2013)** who recorded about 20% of the examined sea bass was infected with *L.* *kroyeri.* While our result is lower than that obtained by **Manera and Dezfuli (2003)** who recorded (35%) infection among sea bass. Morphologically our result was in agreement with that obtained by **Eissa et al (2017)**. the second parasite under discussion is *C. minimus*, it obtained from the mouth cavity and the gill arch of infected fish with 6% infection rate. Also, **Sterud (2002)** found *C. minimus* in mouth cavity of infected sea bass with 15.4% infection rate, concerning to its morphological characters, it was similar to that obtained by **Tanrikul and Percin (2012)** and **Eissa et al (2017)**. One fish only was found infected with *Ergasilus* species (1%) the parasite was present attached to its gill filaments, Also **El-Boghdady et al (2015)** have been found *Ergasilus* species attached to the gill filament of 20 % of examined *D. labrax* with the same morphological characters. *D. aequans* is more commonly found on sea bass in the Mediterranean **(González-Lanza et al. 1991),** our study revealed that *D. aequans* was the dominant species among the collected parasites with prevalence rate (76%) similar result obtained by **Sterud (2002)** and **Emre et al. (2014)** who found *D. aequans* was the most prevailing parasite with infection rate (100%) and (71.2%) respectively. On the other hand, **Brahim Tazi et al., (2016)** recorded *D. aequans* in *D. labrax* with lower prevalence rate (20%). The morphological features of *D. aequans* in our study are similar to that obtained by **Toksen (1999)**.

Digenean trematodes parasitize a wide-range of fish hosts, and are found in fresh, marine and brackish water fish and many species are found in numerous fish host species. To our knowledge among 7 digenetic trematodes recorded in the present study, 5 represented first record in Egypt; *T. patialense*, *D. varicus, M. crassulata, P. panamense* and *P. grandispinu*s. Furthermore, *T. patialense*, *M. crassulata, P. panamense* and *P. grandispinu*s are new host record. *T. patialense* was the only digenetic trematodes isolated from the skin of examined fish with (1%) infection rate. It had been recorded under the scales of Asian sea bass *Lates calcarifer* by **Cribb et al (1992).** Also, **Vo et al. (2011)** have found *T. patialense* infect beneath of the skin of one specimen out of 90 *Epinephelus bleekeri* fish in Vietnam. **Womble et al. (2015)** recorded 3% infection rate with *T. patialense* from the skin of examined Zebra fish in California. Morphologically *T. patialense* in our result was closely related to that obtained by **Vo et al. (2011)** the presence of ventral sucker was the main difference between *T. patialense* and *treptodemus latus* because the later was lacking both oral and ventral sucker **Manter (1961).** *M. crassulata* was isolated from the anterior part of intestine of infected fish with 3% infection rate. Our result is lower than that obtained by **Mendoza et al. (2016)** who recorded that 29.41% was the infection rate of *M. crassulata* among examined lane snapper (*Lutjanus synagris*) in the Southern Gulf of Mexico. They added that the infection was restricted in the intestine of infected fish concerning to its morphological description it was morphologically similar to its original description obtained by **Yamaguti (1971)**. **Zander and Reimer (2002)** reported that *D. varicus* is a widespread parasite found in moderate, subarctic, Antarctic and sub-Antarctic waters. It was recorded in more than 100 teleost fish species, mainly marine and occasionally freshwater fish. In our study *D. varicus* was isolated from gastrointestinal tract of the infected fish with 7% infection rate. Although it considered a first record in Egypt, *D. varicus* had been already isolated from the gastrointestinal tract of 10 out of 13 examined sea bass *D. labrax* **Sterud (2002)**. But, **Amel et al. (2009)** reported a prevalence of *D. varicus* was 3% in the examined *Mullus surmuletus*, from coast of Oran, Algeria, Mediterranean Sea, while morphologically it was similar to the description obtained by **Al-Zubaidy and Mhaisen (2011)**: Concerning *Pseudoacanthostomum panamense* it was found in the gastrointestinal tract of infected sea bass with 13% infection rate, our result is higher than that obtained by **Carvallho et al. (2014)** who found that 1.59% of examined catfish (*Sciades proops*) from the estuarine region of the Japaratuba River in Brazil, was infected while it was morphologically similar to its original description obtained by **Yamaguti (1971)** the *Pseudallacanthochasmus grandispinus* was found in the anterior part of intestine with infection rate 9%, it has been already found in the intestine of *Pomadasys basta* collected from india **Hafeezullah and Siddiqi (1970)** and its morphological characters were similar to that reported by **Miller and Cribb (2008)** who isolated it from intestine and pyloric caeca of five species of Lutjanidae (*Lutjanus adetii, L. argentimaculatus, L. carponotatus, L. fulviflamma* and *L. russelli*) in Western Australia and was considered it a synonym of *Siphoderina* and the new combinations *S. grandispinus* (Velasquez, 1961) and *S. magnivesiculum* (Gaevskaya et Aljoshkina, 1985) its morphological characters. Concerning the last two digenetic trematodes *Acanthostomum spiniceps* and *Timoniella imbutiforme,* they have been already recorded in **Egypt**. In our study *Acanthostomum spiniceps* was isolated from the gastrointestinal tract of infected sea bass with 5% infection rate this result is lower than that obtained by **Morsy et al. (2013)** who reported 40% of the examined African snook (*Lates niloticus*) of the river Nile, Egypt was found to be naturally infected with *Acanthostomum spiniceps concerning to its morphological characters it was similar to that obtained by* **Morsy et al (2013)** and **Eissa et al (2017)**. Regarding to *Timoniella imbutiforme* it was the most dominant digenetic trematodes in our study, it was found in the gastrointestinal tract of 27% of the examined sea bass this result agrees with **Erik (2002)** and **Maather (2007)** that isolated *Timoniella imbutiforme* from gastro intestinal tract of *D. labrax* from Norway and Egypt respectively, and morphologically it was similar to the description recorded by **Culurgioni et al (2010)**.

Concerning the 2 nematodes *Hysterothylacium aduncum* and *Anisakis simplex*. Fish are infected with these parasites through ingestion of zooplankton intermediate hosts **Erik (2002)**. *Anisakis* sp. has a considerable pathogenic potential for humans eating raw, infected fish. In our study, *A. simplex* was found as larval stage in gastrointestinal tract and abdominal cavity of 13% of examined *D. labrax,* Also **Erik (2002)** found *Anisakis* sp. Larvae in the gastrointestinal tract and abdominal cavity of *D. labrax*. While **Choi et al. (2011)** reported higher infection rate with *A. simplex* (34%) in the whole-body cavity, viscera, and muscles of the examined fish species. Morphologically *A. simplex* in our result are closely similar to that obtained by **Harras (2012)** and **El-Boghdady et al (2015).** *Hysterothylacium aduncum* was isolated as larval and adult stages from gill cavity (first habitat record), gastrointestinal tract, abdominal cavity and ovary of infected *D. labrax* with 24% infection rate similar result was obtained by **Felizardo et al. (2009)** who reported that *A. simplex* and *H. adunum* were found infecting the abdominal cavity, mesentery, intestine, liver, stomach mucosa, stomach, ovaries, abdominal musculature of *Paralichthys isosceles*. Our prevalence is higher than that obtained by **Ru¨ ckert et al. (2008)** and **Kalay et al. (2009)** who recorded that the infection rate of *H. adunum* was (11.4%) and (6.25%) respectively. While our result is lower than that obtained by **Morsy et al. (2013)** who recorded (44.2%) infection. Concerning the morphological description our result was similar to that obtained by **Morsy et al. (2013)** and **Harras (2012)** but the later was reported that the caudal end of male *H. adunum* had unequal spicules while in our result it had equal spicules.

In conclusion the variation between our study and other studies may be attributed to type of the host, age of sea bass, feeding habits, time of collection and locality from which fish samples obtained.

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