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RESEARCH ARTICLE

LIGHT MICROSCOPICALLY STUDY OF THREE HELMINTH PARASITES INFECTING RAJA BATIS LINNAEUS, 1758 (ELASMOBRANCHII: RAJIIDAE) RECORDED IN THE RED SEA, EGYPT

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ABSTRACT

When a dissection made to three specimens of skate *Raja batis* Linnaeus, 1758 flattened cartilaginous fishes bought randomly from the Red Sea city markets, were found naturally infected with three specimens of helminth parasites two species of digenea *Monorchismonorchis* Stossich, 1890, *Lecithochiriumpriacanthi* Yamaguti (1953) and one of tetrabothridea *Echeneibothriumminutum* Williams, 1966 impeded in spiral valve wall. The morphology and morphometric characterization were carried out by light microscopy. Species were recorded for the first time from Rajidae specimen in a new locality Red sea, Egypt .The present Monorchis species is characterized by its smaller size, smaller ovary; testes tandem and vitellaria are in the form of two lateral groups, near the caeca bifurcation, and the numbers of follicles vary from 7-9 on the right side and 7-11 on the left side. *Lecithochiriumpriacanthi* characterized by elongated slender body with acetabulum larger than oral sucker and tapered conical anteriorwith bluntposterior ends, supplied with a very short retracted short tail (ecsoma)end and two opposite small oval testes. This species is unique by two compact masses, 6-7 ovals to digitiform lobes vitellaria just posterior to ovary. *Echeneibothriumminutum* Williams, 1966 has very special features as acraspedote, euapolytic, Scolex consists of the head proper and a cephalic peduncle, the head bears the dorsal and ventral bothridia each of which is oval, flattened, andloculi arranged in 12–14 rows.

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INTRODUCTION

So far the study of marine fish parasites is considered a flute and therefore the current study is interested to know two species of digenea as well as a specimen of cestode that infect accidentally elasmobranch fish Raja batis in Red sea province as new locality and host. Batoid fishes are distinguished from the other elasmobranch by having the pectoral fins connected to the sides of the head and trunk to form a wing. The purpose of this work was to describe morphmetrical and morphological characteristics of detected helminth parasites. Willams and Jones, 1994; Abdou *et al.* 2001insisted that marine fish may play roles as intermediate or definitive hosts for a numerous of helminthic parasites; also, Overstreet,1969 reported more than 12 genera of marine fishes as hosts of helminth parasite in addition to digenetic trematodes are very common parasites of marine fishes. Numerous trematodes and cestodes have been reported from mosquito fish *G. affinis* in North America, as summarized in Hoffman, 1999; Sarah Brock and William F. Font 2009 and El-Garhy *et al.* 2017 in Egypt .The gravity of worms comes from being invade the gastrointestinal tract of marine fish hosts (Mishra *et al.,* 2013).

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Hemiuridae *Lecithochiriumpriacanthi* Yamaguti (1953) is the most dominant family attacked fishes found inside digestive tract and with wide geographic distribution in the world Bartoli et al., 2005; present isolated *Lecithochirium* Luhe, 1901 is the most common genus of this family with wide geographic distribution in the world (Nigam *et al.,* 2018; Shih *et al.,* 2004); *Lecithochirium* sp. Reported as apre adult from infect swim bladder in *Sardinellaaurita* may be an accidental host; which are known to serve as second intermediate hosts of a number of HemiuroidsGibson and Bray, 1986. Genus *Lecithochirium* contains several species parasitic in marine fish; Surekha and Lakshmi 2005 reported that genus has specific taxonomic features like a well-developed ecsoma and a presomatic pit, seminal vesicle bipartite and coiled, vitellarium condensed and usually divided into 6-7 oval to digitiform lobes and with massive uterine convoluted. Yamaguti, 1971 gave diagnostic generic features of *Lecithochirium* genus are male gonads, fish host and harboring site in hoststomach and pyloric part of intestines; with testes being symmetrical, and immediately posterior to acetabulum; now contains at least more than 100 species (Surekha and Lakshmi, 2005). Nahhas and Cable, 1964 as well Manter, 1954 collected *lecithocherium* sp. in different species of marine fishes and Dyer *et al.* 1985 from the coastal waters of western and southwestern Puerto Rico in *L. buccanella*; recently

Williams and Bunkley-Williams, 1996 reported this worm from a wide range of hosts and Al-Zubaidy (2010) recorde *Lecithochirium* sp from marine fish *Carangoidesbajad* in Coast of Yemen. Hoberg, 1996 has pointed out his research point is very important that the feeding habit, geographic distribution and navigate from one to another possible exposure marine fishes to parasites. Tapeworms belonging to the order Tetraphyllidea Carus, 1863 comprise a unique and small group of parasites of Elasmobranchii- Rajidae parasitizing the shark ray Naylor *et al.* 2012. According to key of the cestodes parasites of vertebrates by Khalil *et al.* 1994 this order of parasites is characterized by very special qualities, strobilaacraspedote, scolex with four pedunculated globular, saclike bothridia, lacking or present apical organ. Bothridia conspicuously muscular, bothridial aperture toward anterior end of scolex, rarely scolex lacks bothridia, perpendicular to scolex axis, surrounded by continuous sphincter of circular muscles, and one marginal accessory sucker. Testes numerous, medullary, evenly distributed in preovarian field in mature segments, postvaginal testes absent on poral side, Cirrus sac containing armed cirrus. Ovary posterior lobulated, H-shaped. Vagina opening anterior to cirrus sac, not crossing cirrus sac, vaginal sphincter present. Genital pores lateral, irregularly alternating, vagina and male duct join conspicuous genital atrium. Uterus median tubular, ventral uterine pore may be present. Vitellaria follicular, lateral, extending full length of segment.Eggs fusiform.Adult in spiral valve of elasmobranchs and holocephalids. Parasites of Rajiformes, Rajidae .The genus *Echiniebothrium* was established by Van Beneden (1849) with *E. typus* from the spiral valve of *Raja clavata L* as type species.

MATERIALS AND METHODS

During this study, three of Elasmobranchii *Raja batis* Linnaeus, 1758 bought from the Red sea market was examined for detect helminth parasite. Spiral valve and small intestinal contents were examined under a stereo microscope .An examination showed presence of two digenea attached to host's intestinal wall; while cestode parasite was impeded in folds of spiral valve, most of the gravid proglottids are found detached. Worms were carefully removed and cleaned of host tissue in distilled water for about one hour before being preserved in 70% ethanol. Parasite specimens were prepared as whole mounts for light microscopy.Flukes were fixed in 5% formalin, flattened with minimal cover slip pressure; Wash twice with distilled water and stained with ace to carmine stain. The specimens were then dehydrated in ascending series of ethanol and mounted on Canada balsam on glass-slides under cover-slips .Identification was done by Yamaguti, 1971 and Khalil *et al.* 1994; Drawings made with the help of Camera lucida and measurements are given length by width in millimeters unless otherwise indicated.

RESULTS

In the light of the obtained results, 3 Rajidae fish was observed naturally infected with two digenetic trematode *Lecithchiriumpriacanthi* Yamaguti, 1953; *Monorchusmonorchus* Stossich, 1890 may be an accidental host and one common tetrabothridea *Echeneibothriumminutum* Williams, 1966 were recorded in intestine and wall spiral intestine of the Elasmobranchii fish *Raja batis* Linnaeus, 1758 respectively. The morphology and morphometric characterization were carried out by light microscopy.

-Family: MonorchidaeOdhner, 1911
Monorchis Looss, 1902

Monorchismonorchis **(Stossich, 1890) (Figs.1a, 2a)**

The adult worm is tiny and pyriform to oval, smooth, without tegumintal spines (unarmed) measuring 1, 1 X0.72mm. its anterior and posterior ends were round; Prepharynx is lacking; a small pharynx (ph) globular, follow the oral sucker and measures 0.043 to 0.076 mm. long by 0.048 to 0.068 mm. wide by 0.051 to 0.059 mm. oesophagus is long, 0.011-0.018mm in length, the oral sucker is slightly sub-terminal, rounded or cup shaped measuring 0.07x0.08mm. The ventral sucker is pre-equatorial, rounded, measuring 0.08x0.09mm and slightly larger than oral one. Esophagus is bifurcated at level of anterior end of genital atrium, sometime previtellarium; the intestinal caeca are thick–walled club shaped and measures 0.183-0.208 in length. The vitellaria are composed of numerous small grapes-like follicles in the form of two lateral groupslying dorsal to the intestinal caeca, near the caeca bifurcation; the numbers of follicles vary from 7-9 on the right side and 7-11 on the left side .The testes are tandem; located at the middle of the posterior half of the body each measure 0.076-0.082 x 0.075-0.081. Seminalreceptacle spherical or ovoid, largely dorsal and slightly anterior to acetabulum. The ovary is nearly spherical, smaller than testes and situated between the testes, in the same line, it measures 0.052-0.055 x 0.054-0.056mm. The cirrus pouch (Cp) is well developed and oval in shape;, pre-acetabular in position (lies between two pyramidal masses of follicles and the ventral sucker); it measures 0.16- 0.17x 0.10-11; prostatic vesicle (pv) ovoid to elongate, not apparent in many specimens; seminal vesicle (sv) a slightly sinuous tube ending dorsal to acetabulum; entering ventral side of prostatic vesicle slightly posterior to its middle. The genital opening has a slight – shaped appearance and lies in the mid – distance between the oral and ventral suckers. Uterus voluminous, occupying whole post-testicular space and has many coiled limbs, forms a large number of narrow convolutions chiefly in a longitudinal direction. Excretory vesicle Y -shaped with short stem and opens at the posterior end with a terminal excretory pore. Eggs are oval in shape and measures 0.035-0.041x0.018-0.025.

Family: HemiuridaeLuhe, 1901
Subfamily: Hemiuroidea Faust, 1929
Genus: LecithochiriumLuhe, 1901

Lecithochiriumpriacanthi **Yamaguti (1953)(Figs.1b,2b).**

Elongated flattened fluke with bulging around the ventral sucker; tapered conical anterior end and cylindrical posterior end, unarmed tegument. Body have particular short retracted strong ecsoma (es), Mature trematod long measured 1.4-1.8mm (1.5 mm), and 0.34-0.45 mm (0.40 mm) in width at level of testes,. The oral sucker is funnel shaped, subterminal with a diameter of 0.10-0.19 mmX0.11-0.18, minute sensory papillae around rim was detected. Prepharynxabsent. Muscular pharynx spherical, well developed, immediately behind oral sucker (0.0 31–0.054 long, 0.031–0.052 wide). Esophagus is very short, indiscriminate (0.0 29–0.052 long). Intestinal caeca wide, with a bifurcated tube one on each side of body, reaching the anterior part of the tail, pre-ecsoma, measures 0.32-0.35 in length. Acetabulum prominent rounded (vs), located in the end of the first third of the body, very large 0.28-0.38 mm X0.26-0.36 in diameter, ratio of length of oral sucker to length of

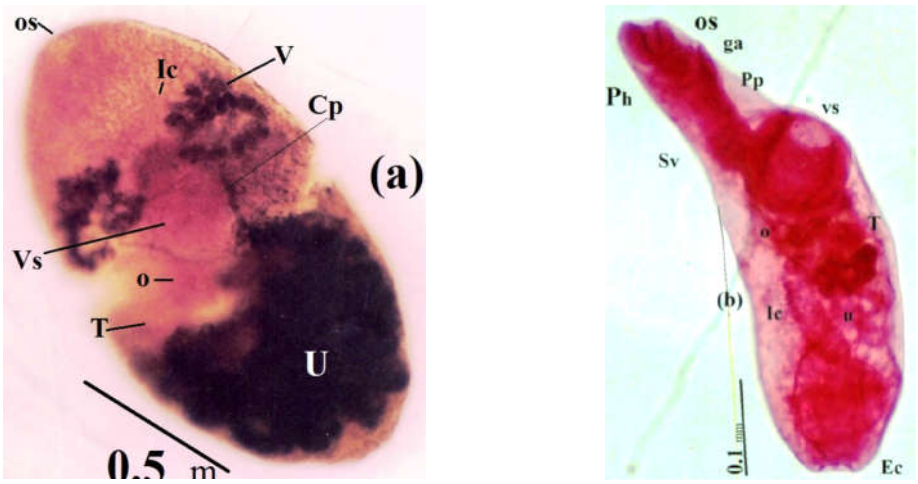
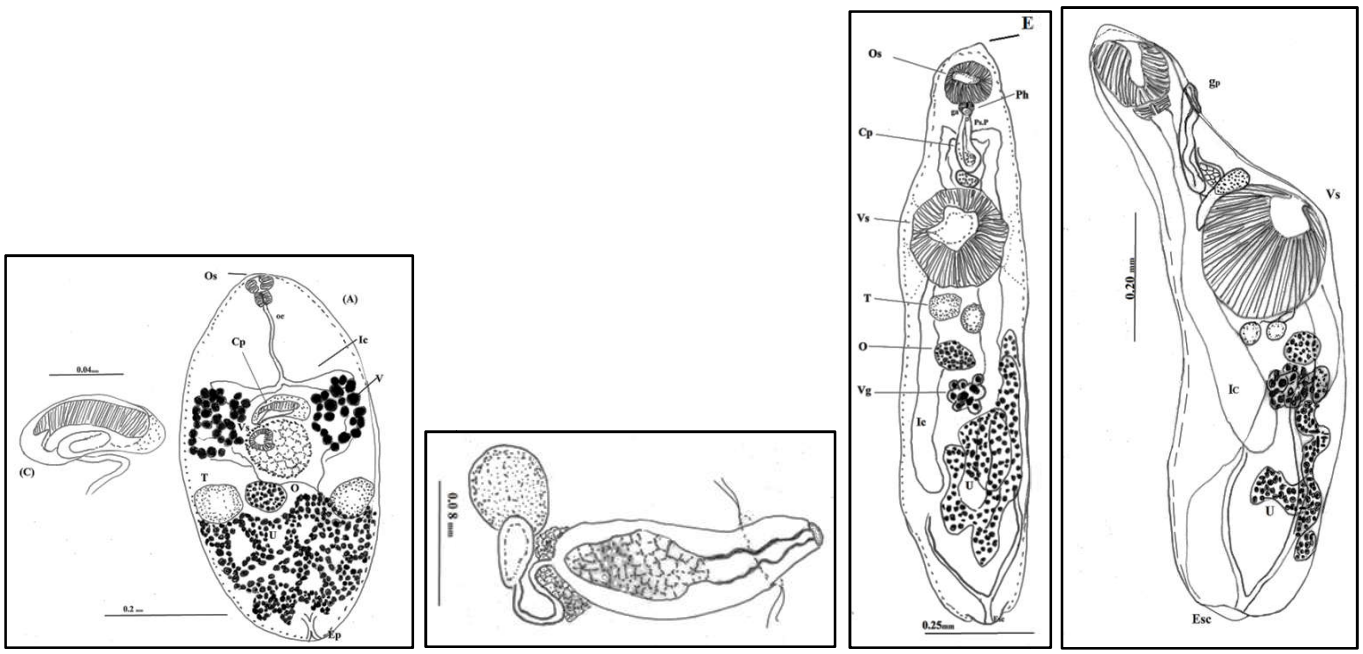
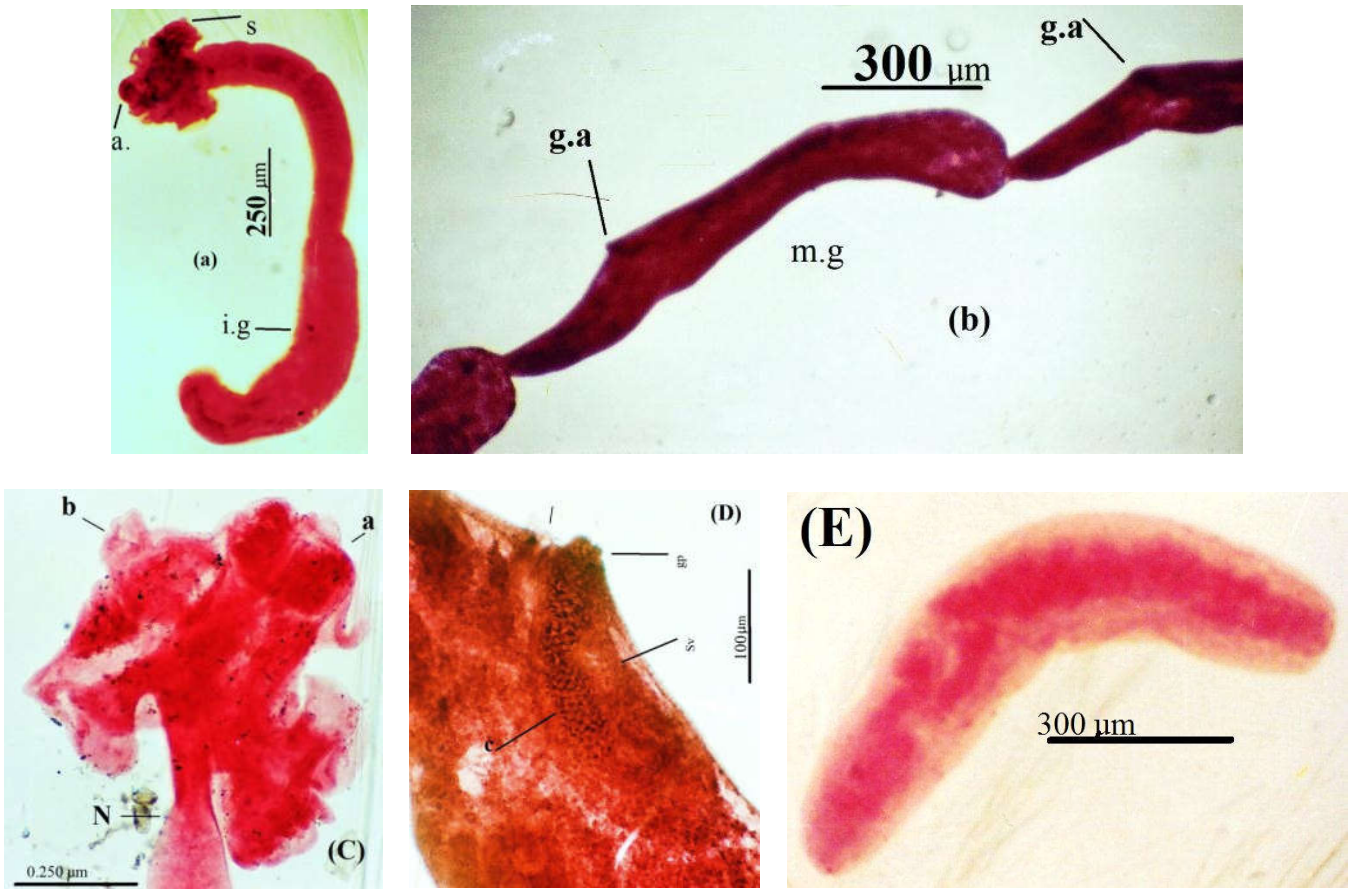


Figure 1. Photomicrographs (a)*Monorchismonorchis* oval worm , Subterminal oral sucker (Os), Pharynx (Ph), Seminal vesicle (Sv), Ventral sucker (Vs), Ovary (O), Large coiled uterus (U),), two oval testes (T), Lobed vitellaria (V) and Intestinal caeca (Ic) and cirrus pouch(Cp) and *(b)Lecithochiriumpriacanthi* showing elongated body pointed anteriorly and broad posteriorly terminated at a short ecsoma (Ec). Genital atrium(ga): behind the oral sucker, between the intestine armi ,Subterminal oral sucker (Os), Pharynx (Ph),prestatic pit (Pp), Seminal vesicle (Sv), Ventral sucker (Vs), Ovary (O), little coiled uterus (U), one pair oval testes (T), Vetellaria oval in shape and adjacent to the ovary (V) and Intestinal caeca (Ic) extend to near the posterior end of body



Figures 2. Line drawings (A) adult *Monorchismonorchis* unarmed small worm oval, long oesophagus , the vitelline glands (vg) are in the form of two pyramidal masses lying above and dorsal to the intestinal caeca, (T) testes are tandem ; (C) detail of cirrus pouch (Cp) of *Monorchis* ;(B) lateral and ventral views of *Lecithochiriumpriacanthi* showing short retracted ecsoma (es) , Acetabulum prominent rounded (vs), elevation projecting into the lumen of the oral sucker (E),presomatic pit (Pp), vitelline glands(vg) compact mass and consists of seven pieces are wrapped, twisted and convoluted posterior to ovary ,Oral sucker (Os), Ventral sucker (Vs), Pharynx (Ph), Intestinal caeca (Ic), Testes (T), Ovary (O) ,genital pore (Gp) , Seminal vesicle (Sv), excretory tube (Ep).and (D) detail cirrus pouch (Cp) of *Lecithochiriumpriacanthi*

ventral sucker 1:1.8–2.5., minute sensory papillae present around rim of acetabulum and small pit-like depression (non-glandular presomatic pit) anterior to ventral sucker present; hump-like thickenings or elevation (E) projecting into the lumen of the oral sucker present. Testes two small, rounded, opposite, subequal, subspherical, slightly overlapping posterior margin of ventral sucker (postacetabular), 0.032 x 0.029 mm. Seminal vesicle bipartite, overlapping anterior half of ventral sucker, connecting with base of cirrus sac via male duct being surrounded by free prostatic cells. Metraterm thin-walled, entering cirrus sac ventrally, communicating with male duct immediately anterior to spherical prostate vesicle forming hermaphroditic duct; hermaphroditic duct occupying anterior 2/3 of sinus sac. Cirrus pouch large, clavate, long and near the caeca bifurcation. Ventrogenital pore median, opening at level of pharynx, into thin walled ventrogenital sac enclosing muscular, unspinedgonotyl and acetabulum. The ovary is nearly spherical or globular in shape, post testicular; located in middle third of hindbody, larger than testes, it measures 0.050-0.055 x0.055-0.058, often contiguous with or overlapping with testes. Mehlis' gland and Laurer's canal not observed. Seminal receptacle absent. Vitellariapostovarian, lobed, compact masses located posterior to ovary; the vitelline glands tubular and consists of 7 pieces are wrapped, twisted and convoluted posterior to ovary.



Figures 3. Photomicrographs *Echeneibothriumminutum*showing a craspedote small worms,(a) immature whole worm with scolex(s) ,apical organ (a) and immature segment (i.g) .(b) mature proglottids longer than broad, pyriform cirrus pouch, genital pores lateral, regularly alternating,cephalic peduncle or neck (n)., scolex bearing four stalked bothridia, myzorhynchus to each bothrium(c), Ovary bilobed dumb-bell H-shaped, magnification of cirrus pouch containing armed cirrus with tiny spines(D),gravid segment (E)

Uterus was long, extensive, having coils extending both anterior and posterior to ovary; extend from ovary to end of intestinal caeca. The Eggs are small and measures 0.024-0.025x0.012-0.013.The excretory vesicle is elongate, tubular in shaped and opens at the posterior end with a terminal excretory pore.

Phyllobothridae Braun, 1900.
Echeneibothrium van Beneden, 1849
Syn. Discobothrium van Beneden, 1870

***Echeneibothriumminutum* Williams, 1966 (Figs.3, 4)**

Worms are of small, a craspedote, euapolytic. Measuring from 3.5mm to 5.7 mm in length, and have from 40 to over 90 segments. Genital pores lateral, regularly alternating, in one direction, open in the posterior third of the proglottid and a little protruding. Thescolex large, distinctly marked off from strobili, laterally expanded, bearing four pedunculatedbothridia, in the form of suckers, wider than long, with apical sucker (a) and facial loculi (L);neck (n) or cephalic peduncle present; bothridial margins with thin velum. Loculi arranged in 12–14 rows; loculi of central row longer than loculi of anterior and posterior rows. Scolex with a well formed myzorhynchus to each bothrium, apical retractile myzorhychus of variable size each divided by transverse and longitudinal septa. Themyzorhynchus when fully extended is long and slender with a small sucker at its tip, but when retracted assumes a vase-like appearance.

The bothridia (b) are usually wider at mid length and slightly narrow at the posterior end, the four bothridia measure 0.38-0.50 long by 0.18-0.23 mm wide there is quite a considerable variation in the comparative sizes of theloculi. Each bothridium is surmounted by a very muscular cushion bearing a single accessory sucker.There is a longer unarmed cephalic peduncle, 0.8 - 1.1mm in length. Segmentation begins immediately posterior to the cephalic peduncle. There are two pairs of longitudinal excretory canals; the ventral is much wider than the dorsal, the genital ducts passing between the two longitudinal canals. Scolex consists of the head proper and a cephalic peduncle. It measure varies with the state of contraction of the worm 1.2-1.3 x 0.89- 1.1 mm;the bothridia are project beyond it laterally and occupy almost the whole length of the scolex. The middle loculus is the smallest, and the most anterior is usually fractionally larger than the posterior. Mature proglottids longer than broad, loosely connected with each other, almost 3-5 times longer than broad, convex lateral margins and measures about 0.07-0.08 in length and 0.22-0.24 in width .In the mature proglottid, testes numerous usually between 20 – 26, arranged in 2–4 irregular columns anterior to cirrus sac, pre-ovarian, anterior 1/3 region of the segment, measuring0.010-0.019 in diameter. Vas defernce is convoluted in front of the vagina and opens into a pear-shaped cirrus pouch (cp), 0.38-0.41 long and 0.18-0.21 wide. Vas deferens sinuous, lying dorsally, between the testes and anterior lobes of ovary extending from ootype region to anterior margin of cirrus sac may be expanded to form external seminal vesicle. Internal seminal vesicle absent.

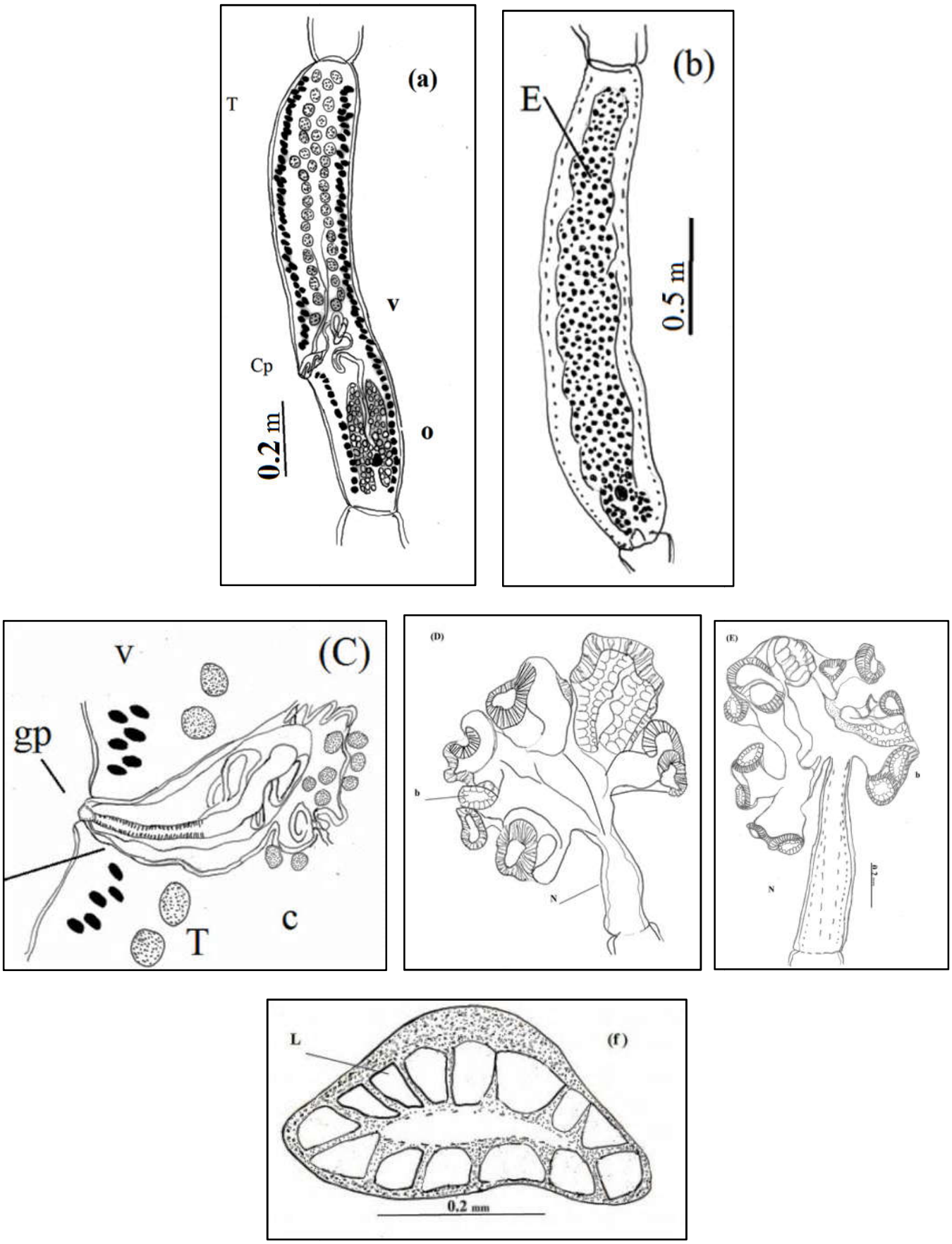


Figure 4. Line drawings *Echeneibothriumminutum* (a) Mature terminal proglottid showing, (o) Ovary consisting of multiple irregular lobes on each lateral side, essentially H-shaped, Scolex with retracted apical organ (a) scolexbroad anteriorly, cephalic peduncle or neck (n) .Vitelline follicles in lateral columns, several follicles, at level of cirrus sac and vagina, extending throughout the entire segment, (T)Testes medial, arranged in 2 irregular columns, extending to level of ovary, genital pores lateral, unilateral ., with apical sucker; bothridial margins with thin velum. (d), (c) Detail of cirrus pouch pyriform , cirrus sac thin-walled, tilted posteriorly, containing coiled cirrus which armed with spinitriches (f) Detail of bothria with loculi (L) there are12- 14 loculi to each bothridium, comprising, one posterior and twelve lateral loculi, single, longitudinal septum, many transverse septa, forming 2 rows, (E) Eggs

The cirrus-sac is large, oval or pyriform in shape, curved and measures 0.11-0.12 in length and 0.05-0.08 in width, contains a coiled vas deferens, measures 0.23 in length and 0.26 in width swollen to form a seminal vesicle, which on leaving the pouch turns forwards to lie in the anterior median field, where it becomes very convoluted and may occupy much of the region between the excretory canals. On entering the cirrus sac, the vas deferens is thrown into long protracted armed cirrus by tiny spines. Vagina sinuous, extending as wide tube from ootype along midline of proglottid to anterior margin of cirrus sac, then laterally to open into genital atrium anterior to cirrus sac; seminal receptacle and uterine pore not observed. Ootype large, round in shape, post ovarian, near the posterior margin of the segment. Ovary distinctly bilobed, large in size lying in the posterior margin of the segment part of the proglottid.Each lobe consisting of multiple irregular lobules on each lateral side, essentiallydumb-bell H-shaped and measures 0.21-0.23 in length and 0.12-0.14 in width. The two lobes are connected at the posterior one third of the ovary by a narrow isthmus. Vitelline follicles are arranged in lateral columns on each lateral side of proglottid, extending from near anterior margin of proglottid to posterior margin of proglottid. Each vitelline mass measures 0.012-0.014 in diameter. The vitelline duct arises from the follicles on either side and they unite to form a common vitelline duct. The ootype is surrounded by a compact Mehlis' gland. Uterus saccate,median, 3.01-3.04x 0.38-0.40, ventral, extending from ovarian isthmus to anterior margin of proglottid having small lateral branches, uterine tube is coiled running anteriorly from ootype region, to the ovary, extends anterior to the cirrus pouch.

DISCUSSION

Monorchus worm was discovered by Stossich (1890) in the Adriatic Sea, and confirmed by Looss, 1902, Odhner, 1911 and Sey, 1970in the numerous marine fish as *Spondyliosomacantharus*, and *D. annularis* Radujković *et al.,* 1989 discovered this parasite in the small intestine of *Arnoglossuslaterna*. As shown in characters, the present sample agreed fully with the original description in the main features but there are minor differences such as variations in measurements of the body organs. It was also quoted by Pogoreltseva (1952), Dolgikh and Naidenova (1967) and Naidenova and gaevskaya (1978) in *Spicaramaena*, and *D. annularis* from the black sea. Timon-david (1967) and Papoutsoglou (1976) isolated it in numerous marine fishes but the present description represent new host and new locality recorded. *Lecithochorium* specimens agree well with the morphological features of the species given by Yamaguti, 1953 was commonest digeneans infecting the digestive tract of *Priacanthushamrur* marine fishes, and present *Lecithochirium* sp. was also the commonest genus (Shih *et al.,* 2004), but the present species is distinguished from this species in the presence of vitellarium condensed and usually divided into 6-7 oval to digitiform lobes and with massive uterine coils and a short eversible tail (ecsoma). In the present specimens, the details of the sinus sac, the bipartite prostatic vesicle, and the vitelline lobes are as in (*L. microstomum*. Chandler, 1935) Manter, 1940. The recorded parasite herein has the same general morphology of its family but with different characteristics than their members. Maybe easily distinguished from all the other known trematode species mainly by the whole small size; the length of the esophagus, present of presomatic pit; the position of the intestinal bifurcation and genital opening; shape and locality, number of vitelline follicles. Manter, 1954 pointed out that there are many variations and combinations of characteristics and thus mostly arbitrary, One or more of the following three characteristics seem most appropriate: The presence or absence of a glandular presomatic pit; elevations in the wall of the oral cavity; and the characters of the male vesicle within the sinus sac. Present work differs from species of *Lecithochirium* Luhe, 1901 and *L. rufoviride* Rud, 1819. It is characterized by present of hump-like thickenings projecting into the lumen of the oral sucker, a well-defined presomatic pit, and a prostatic vesicle in the cirrus sac. The hump-like elevations in pre oral cavity do not occur in most species described in *Lecithochirium*.

Present worm differed from species detected in marine host *Anguilla Anguilla* in Egypt by El-Garhy *et al.* 2017 in few characters such as length, host, position of genital pore but shared distinctive characteristics of genus *Lecithochirium* Yamaguti (1953): elongated slender body with a ventral sucker larger than oral sucker, one pair opposite testes, Vetellaria (6-7oval in shape), Uterus coiled, Another species *L. grandiporum* reported from *Sauridatumbil* by Morsy *et al.* 2012 along Egyptian Red Sea coast and differed from the present one in its papillated, more larger ventral sucker and reversible longer ecosoma and multilobated digitiform vitellarium. In the present study showed some similarity to *L. tetraorchis* Shih *et al.,* 2004, but may be distinguished from it by average total length; by the number of testes two pair in the last, the present worm have genital pore posterior to pharynx while in *L. tetraorchis* near the anterior margin of oral sucker, and by the vitelline lobes which are much longer and thinner in the current species and vice versa. Genus *Echeneibothrium* erected, by Beneden, 1850, its type species *E. benedeni*. Later on, 43species are added to this genus by various workers in the world most of the parasites of Rajidae.The current species can be diagnosed as follows - Small worm of 3.5-5.7mm length with 40 -90 proglottids. Scolex with dorsal and ventral unarmed bothridia. Long unarmed cephalic peduncles present (neck). acraspedote and apolytic with distinct segmentation, cylindrical posterior segment twice or thrice the breadth,, anterior position of regular alternating genital pore, having number of loculi 12-14. Two pairs of dorsal and ventral excretory vessels. Presence of 10-13 pairs of testes in mature proglottids.

The vagina opens behind the cirrus.Thebilobed ovary.Most of the proglottidsare gravid. No uterine pore and the myzorhynchus, when contracted this structure swells. Two species of *Echeneibothrium* that have a comparable number of loculi to the bothridia and a similar number of testes to these specimens, are *E. maculatum* Euzet, 1959, and *Echeneibothrium* sp. Williams, 1966. However, they are larger worms, the former measuring 3-10 mm and the latter up to 7 mm in length, and occur in a different definitive host, *Rajaclavata.* Of the other recorded species of *Echeneibothrium*, there are several with similar proportions in the bothridia to the Icelandic material, but they all have a considerably higher number of testes, usually more than twenty per segment, and are altogether larger worms *Echeneibothriumminutum* Williams, 1966. The worms are slightly larger than the specimens described by Williams, 1966 measuring between 3.5 to 5.7 mm in length as opposed to 2 mm for Williams' material. There is a corresponding increase in the number of segments, the myzorhynchus is fractionally larger, and the spine-covered, muscular bothridia are absent. In the original description of *E. minutum* the bothridia are quoted

as being 0.27 mm long, but are figured at about 0.5 mm. All the other features of this worm correspond closely with the original description by Willium, 1966. In the present material the bothridia are usually between0.38-0.50 mm in length, varying in shape and size quite considerably according to the degree of contraction or relaxation of the musculature at the time of fixing the worms. *E. minutum* has twenty loculi to each bothridium, as indeed do all the worms in this collection, but there appears in several instances to be only 14 loculi. Several species of *Echeneibothrium* have 10 loculi to their bothridia and have a testes number which falls within the range of this material *E. myzorhynchum.* The specimen studied agreed fully with the magor characters of the type Al-Bassel,2003 from the top shark *Galeorhinusgaleus* in libya, but there are certain minor differences in the measurements of scolex and its bothria, but the present tapeworm has a very similar morphology in many respects to *E.variabile* Beneden, 1849, and *Echeneibothriumfaxanum* Manger, 1972 but differs in having only 12-14 loculi, as opposed to 16 in two latter, in the characteristic shape and comparatively small size of the myzorhynchus. *E. variabile* is more commonly found in *R. clavata*. Euzet (1959) describes a variety of *E. variabile* from R. batis with a comparable number of loculi to *E. faxanum*, but the huge size of the myzorhynchus renders it unlikely to be synonymous with the species described here. *E.faxanum* Manger, 1972, has affinities with, particularly in the similar shape and size of the myzorhynchus, but can be discounted as there are eighteen distinct loculi to each bothridium. Finally, Williams (1966) describes a worm from *R. batis* caught in British waters as Echeneibothriumsp.

Conclusion

This is the first study on the helminth fauna of *Raja batis* from new locality the Red sea, Egypt. *Monorchusmonorchus* and *Lecithochiriumpriacanthi* are two digenean species as well as *Echeneibothriumminutum* were isolated and compared with the parasites of the same genus isolated previously from different host species in worldwide.

REFERENCES

Abdou, NL, Heckmann, RA, Beltagy, SM, Ashour, AA, 2001. *Pseudoplagioporusinterruptus*Durio and Manter, 1968 and *Hamacreadiumagyptia* sp. n. (Trematoda: Opecoeliidae) fromthe Red Sea fish in Egypt. *J. KAU. Mar. Sci,* .12:175-88.

Al- Bassel, D.A.H. 2003. Tetraphyllideancestodes (Onchobothriidae and Phyllobothriidae) infecting the tope shark (*Galeorhinchusgaleus*) in Libya. J.Union Arab Biol.Cairo.Vol. 20(A): *Zoology*, 15-28.

Al-Zubaidy, A, 2010. First record of *Lecithochirium* sp. (Digenea: Hemiuridae) in the marine fish *Carangoidesbajad* from the Red Sea, coast of Yemen. *J. KAU. Mar. Sci.,* 21:85-94.

Bartoli, P, Bray, RA, Gibson, DI. 2003. Opecoelidae(Digenea) from western Mediterranean fishes: 3 rare species. *Syst. Parasitol.,* 55:81-95.

Dolgikh, A.V. and N.N. Najdenova. 1967. Helminth fauna of *Diplodusannularis*. *Nauch. Dokl. Vyssh. Shk. Biol. Nauk.,* 11: 13-16.

Dyer, W.G., E.H. Williams Jr. and L.B. Williams, 1988. Digenetic trematodes of marine fishes of Okinawa, Japan. *Journal of Parasitology,* 74: 638–645.

El-Garhy. M. Nesma, Mostafa, Ali Al ghamdi, Salwa A. H. Hamd, and Kareem Morsy, 2017. Description of two digenean parasites *Lecithochiriumpriacanthi* Yamaguti, 1953 (Hemiuridae) and *Pseudopecoeloidesartherinomori* Aken'ova *et al.* 2009(Opecoelidae) infecting Anguillidae and Serranidae marine hosts in Egypt.J. Egypt. Soc. Parasitol. (JESP), 47(2), 341 – 348.

Euzet, L. 1959. Recherchessur les cestodestétraphyllides des sélaciens des cotes de France. Ph.D. Dissertation.Université de Montpellier, Montpellier, 263 pp.

Gibson, D.I., Bray R.A. 1986: The Hemiuridae (Digeneaof fishes from the north-east Atlantic. *Bull. Br. Mus. (Nat. Hist.), Zool. Ser.,* 51: 1-125.

Hoberg, E.P. 1996. Fauna diversity among avian parasite assemblages: The interaction of history, ecology and biogeography in marine system. Bull. *Scandinavia Society.Parasitol.,* 6: 65-89.

Hoffman, G. L. 1999. Parasites of North AmericanFreshwater Fishes, 2nd ed. Cornell University Press, Ithaca, New York. 539 pp.

Khalil, L. FA., Jones and R. A. Bray, 1994. Keys to the Cestode Parasites of Vertebrates. Wallingford: CAB International, United kingdom.752 pp. ISBN 0-85198-879-2.

Luhe, M. 1901. UberHemiuriden (EinBeitragzurSystematik der digenetischen Trematoden. (Zool. Anz. 24:473-88.

Madhavi, R. 1975. Digenetic trematodesfrommarine fishes of Waltair Coast, Bay of Bengal.Family: Opecoelidae. *Riv. Parassitol.,* 36:153-64.

Manger B.R. 1972. Somecestode parasites of the elasmobranchs *Raja batis*and *Squalusacanthias* from Iceland.

Manter, HW, 1940. Digenetic trematodes offishes from the Galapagos Islands and the neighboringPacific. Allan Hancock Pacific Expeditions. 2, 14:325-97.

Manter, HW, 1947.The digenetic trematodesof marine fishes of Tortugas, Florida. Am. Midland.Nat. 38:257-416.

Manter, HW, 1954: Some digenetic trematodesfrom fishes of New-Zealand. Trans. Roy. Soc.New Zealand. 82, 2:475-568.

Manter, HW. 1934: Some digenetic trematodesfrom deep water fishes of Tortugas Florida. Carnegie.Inst. Wash. Publ. 435:257-62.

Mishra, S. S. Chandra, A.M. Saxena. 2013. Two New Trematodes of Family Acanthocolpidae Luhe, 1906 From Marine Fish *Leiognathusdaura* (Cuvier) from the Cost of Puri, Orissa, India", *Iranian J. Parasitol.,* (494 – 498)- 8 (3).

Morsy, K, Bashtar, AR, Abdel-Ghaffar, F, Baksh, W. 2012. First record of *Lecithochiriumgrandiporum* (Digenea: Hemiuridae) infecting the lizard fish *Sauridatumbil* from the Red Sea. *Parasitol. Res.,* 111, 6:2339-44.

Nahhas, F. and Short, R. B. 1965. Digenetic trematodes of marine fishes from Apalachee bay, Gulf of Mexico. *Tul. Stud. Zool.,* 12: 39-50.

Najdenova, N.N. and A.V. Gaevskaja. 1978. Revisionof some trematodes species parasites of the Black sea fishes. *Biol. Morya.,* 45:49-55.

Naylor G.J.P., Caira, J.N., Jensen K., Rosana K.A.M., White W.T., Last P.R. 2012. A DNA sequence based approach to the identification of shark and ray species and its implications for global elasmo branch diversity and parasitology. *Bull. Am. Mus. Nat. Hist.,* 367, 262 pp.

Nigam. Anita, Satish Chandra and A. M. Saxena. 2018. Two new digenetic trematode of the genus *Lecithochirium*luhe,

1901 from marine fishes at puri, odisha (india)natural and social sciences (impact: ijranss) ISSN (P): 2347-4580; ISSN (E): 2321-8851 Vol. 6, Issue 5, 43-50.

Papoutsoglou, S.E. 1976. Parasites of fishes from Saronicos Gulf Athens-Greece.Thalassographica 1: 69-102.

Paradižnik andbrankoradujković.2007.Digeneatrematodes in fish of the north adriatic seavesnaactaadriatica, 48(2): 115-129

Pogoreltseva, T.P. 1952. New trematodes of fish of the Black Sea. Trudy Karadah. Nauch.Stat.T.I. Vyazem'skoho, 12: 29-39.

Radujković, B.M., P. Orecchia& L. Paggi. 1989. Parasites des poissonsmarins du Montenegro:Digenes (Marine fish parasites from the Montenegro). Acta Adriat., 30(½): 137-187.

Randall, JE, 1983: Red Sea reef fishes. London:IMMElPublicationCompany.

Sarah Brock and William F. Font.2009.Helminths of the Western Mosquitofish (Gambusiaaffinis) in Bayou Traverse, Louisiana, U.S.A Comp. Parasitol., 76 (2),, pp. 210–221.

Sey, O. 1970. Parasitic helminthsoccuringinAdriatic fishes. *Acta Adriat.,* 13(6): 1-16.

Shih, H.H., Liu, W. and Zhao, Z.Q. 2004.Digenean fauna in marine fishes from Taiwanese water with the description of a new species, *Lecithochiriumtetraorchis* sp. nov. *Zoological Studies,* 43(4): 671-676.

Surekha, P. and Lakshmi, C.V. 2005. *Lecithochiriumtestelobatus* n. sp. (Digenea: Hemiuridae) from the Lizard fish, *Sauridaundosquamis* from Andhrapradesh Coast. J. *Parasitic Diseases.,* 29(2): 143-146.

Timon-David, P. 1967. Contribution à la connaissance des trématodesdigénétiques parasites des poissons du littoral provencal (Contributionof trematodesdigeneas parasites of fishes from Marseille). Ph. D. Thesis, 266 pp.

Willams, H, Jones, A, 1994. Parasitic worms of fishes. Taylor and Francis, London.

Williams, E. H., JR. and Bunkley-Williams, L. 1996. Parasites of offshore big game fishes of Puerto Rico and the western Atlantic. Puerto Rico Department of Natural and Environmental Resources, San Juan, Puerto Rico and the Uni.

Williams, H. H.1966. The ecology, functional morphologyand taxonomy of *Echeneibothrium* Beneden, 1850(Cestoda: Tetraphyllidea),a revision of the genus andcomments on *Discobothrium Beneden*,1871 ,*Pseudanthobothrium* Baer, 1856, and Phormobothrium Alexander, 1963. *Parasitology*, 56, 227-285.

Yamaguti, S, 1940: Studies on the helminthfauna of Japan, Part 31- Trematodes of fishes. *Japn. J. Zool.*, 9:35-108.

Yamaguti, S, 1953. Parasitic worms mainlyfrom Celebes: Part 3. Digenetic trematodes of fishes, II.Acta Med. Okayama 8:257-95.

Yamaguti, S, 1970. The digenetic trematodes ofHawaiian fishes. Tokyo: Keigaku Publishing Co.

Yamaguti, S, 1971. Synopsis of Digenetic Trematodes of Vertebrates. 1. Tokyo: Keigaku Publishing Company.

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