A REVIEW OF THE TRENATODE GENUS LECITHOBOTRYS (HAPLOPODIDAE), 1TH REDESCRIPTION OF LECITHOBOTRYS PUTRERSCENS LOOSS, 1902 AND LECITHOBOTRYS HELMYMOHAMEDI N. SP. FROM SOME EGYPTIAN LAKE QARUN FISHES.

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SUMMARY: The genus Lecithobotrys Looss, 1902 is briefly reviewed. L. putrescens Looss, 1902, is redescribed from Mugil cephalus, M. chelo and M. capito, caught from brackish Lake Qarun in Egypt, all are new hosts and locality records. Moreover, L. helmymohamedi n. sp. was described from M. cephalus and M. capito. The new species differs from other related species of the genus by the size and numbers of vitelline follicles, the body shape, the length of the oesophagus and the shape of the intestinal caeca. A key is presented to distinguish between the species known so far from the genus Lecithobotrys.

INTRODUCTION

Lake Qarun, is an inland closed basin of about 40km long and 5.7 km width, with an average depth of 4.2 m (Moroos and Meshal, 1984). It lies in an arid region occupying the deepest part of Fayoum depression in the Western Desert. The lake receives only brackish water annually estimated to be as much as 390 million cubic meter which conveys about 430000 tons of salts.

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to the lake each year (Meshal, 1973). A volume of water nearly equal to that of drainage influx is lost through evaporation and as a result the salinity of the water increases continuously as time passes.

The fish fauna of the lake was drastically affected by the increased salinity and those of freshwater origin gradually disappeared from the lake fauna. The only species from the original freshwater fauna that still exists in the lake is Tilapia zillii which naturally resists salinity (Khalil, 1978). No parasitological investigation has been reported on fishes of the lake with the single exception of a record of a parasitic copepod on the gills of T. zillii and Mugil spp. by Khalil (1978).

Looss (1902) established the genus Lecithobotrys for those Haploporid trematodes having short and wide ceca, extending back beyond the ventral sucker to the posterior border of the testis. Bifurcation of the intestine dorsal to the ventral sucker. Genital pore in front of the intestinal bifurcation. Testis median, not far behind the ventral sucker, between the caeca. Ovary median, in front of the testes. Vitellaria formed of seven spherical follicles on each side lateral to the middle of the caeca. Uterus with descending and ascending limbs, much folded in the posterior region behind the caeca and the gonads. Eggs very numerous, each containing a miracidium with eye-spots. L. putrescens Looss 1902 from Mugil auratus collected from Triest was designated as the type species of the genus.

Sharma and Gupta (1970) added L. vitellogena in Mugil parva from India. Martin (1973) added L. spretti from Liag argentus and Mugil cephalus from Australia. Szidar (1954) established the genus Sacocceloides to include S. magniovatus szidar, 1954 from Leporinus obtusidens from Argentina. However, Martin (1973) agreed with Overstreet's opinion (1971) and transferred S. magniovatus to the genus Lecithobotrys, on the basis of the presence of eye-spotted
miracidia and the more restricted distribution of vitellaria than in the type species of the genus saccocephalioides.

Yamaguti (1971) arranged the trematode families on the basis of life history information of the digenetic trematodes. Accordingly, the genus *Lecithobothrys* has been placed under the family Haploporidae Nicoll, 1914. Moreover, he divided the genus into two subgenera depending on the arrangement of the vitelline follicles and extension of caeca as follows:

1. Vitelline follicles massed together, forming symmetrical bunches; caeca usually short. ................
   ...........................................(Lecithobothrys) looss, 1902.

2. Vitelline follicles rather scattered; caeca long. ...............(paralecithobothrys) Freitas, 1934

He also listed *L. purpurescens* Looss, (Type species) under the subgenus *Lecithobothrys* and *L. brasilienensis* Freitas, 1948 (Type species) and *L. africanus* Manter and Pritchard, 1964 under the subgenus *paralecithobothrys*.

**MATERIAL AND METHODS**

Fishes were collected at the Marine Biological Station of Qarun Lake. Most of the fishes were alive and identified using four standard references by Boulangier (1907), Sandon (1950), Latif (1974) and Boraey (1974). The fishes were dissected and examined for helminth parasites. The parasites were fixed in cold or hot 70% alcohol after relaxation. They were stained using Harris's alum hematoxylin, Mallory triple stains (Weissner, 1968) and Gower's carmin (John and Smyth, 1958). Drawings were made to scale using a camera lucida. All measurements in millimeters unless stated otherwise. During the present investigation, the authors recorded trematodes belonging to the genus *Lecithobothrys* looss, 1902 from *Mugil cephalus*,
A review of the trematode Genus Lecithobotrya ...........

M. capito and M. chelo caught from Lake Qarun.

RESULTS AND DESCRIPTIONS

1. Lecithobotrya (Lecithobotrya) putrescens Looss, 1902 (Fig 1). The following description is based on seventy five specimens collected from Mugil cephalus, M. chelo and M. capito locally called "Bouri, Halilli and Tobar" respectively, caught from Lake Qarun during the period September-December, 1983-1987. (Measurements are based on 30 specimens).

Morphological Features:

The body is elongated, fusiform, tapering anteriorly and rounded at the posterior extremity, 1.34-2.51 long and 0.60-0.84 wide. The tegument is beset with minute sharp spines each measuring 4-5 µm in length. Apparently, these spines are easily shed, and several specimens are lacking these spines. The length to width ratio is 1.59 - 4.18: 1.

The oral sucker is larger than the ventral sucker, 0.12 - 0.20 long and 0.15-0.21 wide. The ventral sucker is round in shape, smaller than the oral sucker and measures 0.09-0.14 long and 0.12-0.15 wide. It lies at the end of the first third of the body. The ratio between the oral sucker to ventral sucker diameters is 0.85-1.4: 1.

The pharynx is small, pyriform in shape, 0.10-0.11 long and 0.07-0.10 wide. The prepharynx is fairly long measuring 0.006-0.014 in length. The oesophagus is fairly long, measuring 0.19-0.23 long. The intestinal caeca are short and wide, but they are relatively longer than in other haploporids, extending back far beyond the ventral sucker to a little distance posterior to testis. The bifurcation of the intestine occurs dorsal to the ventral sucker. The testis is
Table 1: A comparison between different species of the genus *Lecithobotrya* Loos, 1902

<table>
<thead>
<tr>
<th>Character</th>
<th><em>L. putrescens</em></th>
<th><em>L. putrescens</em></th>
<th><em>L. helvevombraci</em></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loos, 1902</td>
<td>Present material</td>
<td>n. sp.</td>
</tr>
<tr>
<td>Body shape</td>
<td>Fusiform, tapering</td>
<td>Fusiform, tapering</td>
<td>Elongate, tapering</td>
</tr>
<tr>
<td></td>
<td>anteriorly, rounded posteriorly</td>
<td>anteriorly, rounded posteriorly</td>
<td>anteriorly, and posteriorly</td>
</tr>
<tr>
<td>Length</td>
<td>2.3</td>
<td>1.54 - 2.51</td>
<td>1.08 - 1.39</td>
</tr>
<tr>
<td>Width</td>
<td>0.75</td>
<td>0.60 - 0.84</td>
<td>0.39 - 0.43</td>
</tr>
<tr>
<td>Length/width ratio</td>
<td>1.06 - 1</td>
<td>1.59 - 4.28:1</td>
<td>2.51 - 3.33:1</td>
</tr>
<tr>
<td>Segments</td>
<td>Spined</td>
<td>Spined, 4 - 5</td>
<td>Spined, 3 - 4</td>
</tr>
<tr>
<td>Oral sucker</td>
<td>Large, 0.21</td>
<td>0.12 - 0.20 x 0.15 - 0.21</td>
<td>0.11 - 0.14 x 0.10 - 0.15</td>
</tr>
<tr>
<td>Ventral sucker</td>
<td>0.15</td>
<td>0.09 - 0.14 x 0.12 - 0.15</td>
<td>0.10 - 0.12 x 0.09 - 0.12</td>
</tr>
<tr>
<td>Head</td>
<td>1.4: 1</td>
<td>0.85 - 1.4: 1</td>
<td>1.9 - 1.16: 1</td>
</tr>
<tr>
<td>Pharynx</td>
<td>Fairly long</td>
<td>Long, 0.06 - 0.06</td>
<td>Long, 0.02 - 0.04</td>
</tr>
<tr>
<td>Stomach</td>
<td>0.1 in diameter</td>
<td>0.10 - 0.11 mm 0.07 - 0.10</td>
<td>0.07 - 0.10 mm 0.05 - 0.15</td>
</tr>
<tr>
<td>Esophagus</td>
<td>Long</td>
<td>Long, 0.19 - 0.23</td>
<td>Long, 0.21 - 0.26</td>
</tr>
<tr>
<td>Intestinal tract</td>
<td>Short, bifurcate</td>
<td>Short, bifurcate</td>
<td>Short, saccula, bifurcate postacetabulum</td>
</tr>
<tr>
<td>Necta</td>
<td>Postacetabulum</td>
<td>Postacetabulum</td>
<td>Postacetabulum</td>
</tr>
<tr>
<td>Testis</td>
<td>Median, not far behind the acetabulum</td>
<td>Median, 0.22 - 0.31 x</td>
<td>Rounded, 0.13 - 0.16 x</td>
</tr>
<tr>
<td>Hermaphroditic organs</td>
<td>Relatively small</td>
<td>0.25 - 0.30</td>
<td>0.12 - 0.16</td>
</tr>
<tr>
<td>Seminal vesicle</td>
<td>External</td>
<td>External, 0.06 - 0.30, internal: 0.09 - 0.15</td>
<td>External: 0.07, internal: 0.08</td>
</tr>
<tr>
<td>Ovary</td>
<td>In front of testis</td>
<td>0.07 - 0.20 x 0.13 - 0.15</td>
<td>0.06 - 0.10 x 0.06 - 0.07</td>
</tr>
<tr>
<td>Vitellaria</td>
<td>7 follicles on each side of the body</td>
<td>7 follicles on each side of the body</td>
<td>19 - 25 follicles on each side of the body</td>
</tr>
<tr>
<td>Eggs</td>
<td>44 - 47 x 26 - 28 μ</td>
<td>19 - 21 μ</td>
<td>12 - 47 x 18 - 23 μ</td>
</tr>
<tr>
<td>Genital pore</td>
<td>Preacetabular</td>
<td>Preacetabular</td>
<td>Preacetabular</td>
</tr>
<tr>
<td>Excretory vesicle</td>
<td>Elongate, saccula</td>
<td>Elongate, saccula</td>
<td>Y - shaped</td>
</tr>
<tr>
<td>Acetabulum</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Location</td>
<td>Small intestine</td>
<td>Egypt, Lake Qarun</td>
<td>Egypt, Lake Qarun</td>
</tr>
<tr>
<td>Locality</td>
<td>Triest</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Location</td>
<td>Characteristics</td>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>Argentina</td>
<td>Intestines, very short</td>
<td>0.76</td>
<td>0.76</td>
</tr>
<tr>
<td>Brazil</td>
<td>Intestines, broadly shaped</td>
<td>0.70</td>
<td>0.70</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Intestines, broadly shaped</td>
<td>0.70</td>
<td>0.70</td>
</tr>
<tr>
<td>Australia</td>
<td>Intestines, rounded</td>
<td>0.70</td>
<td>0.70</td>
</tr>
</tbody>
</table>

**Notes:**
- The table continues with additional columns and rows, but the visible area does not provide sufficient information to transcribe accurately.
median; it is located not far behind the ventral sucker, between the caeca, measuring 2.0
2-0.31 long and 0.20-0.30 wide. The hermaphroditic pouch is egg-shaped, 0.15-0.28 long and 0.12-0.19
wide. It includes an oval-shaped internal seminal vesicle, prostatic duct, prostate bulb, and a hermaphroditic duct. The metraterm and prostatic duct join
together to form a hermaphroditic duct which opens by
the genital pore. The internal seminal vesicle measures 0.09-0.18 long while the external seminal vesicle
measures 0.06-0.30 long. The genital pore lies pre-
acetabularly in front of the bifurcation of the intestine, and opens on the left side of hermaphroditic
pouch.

The ovary is median, oval-shaped, lies in front of
the testis or on its right side. It measures 0.07-
0.20 long and 0.13-0.15 wide. The vitelline glands
are formed of seven spherical follicles on each side
lateral to the middle of the caeca. The uterus has
descending and ascending limbs, much folded in the pos-
terior region behind the caeca and the gonads. The
uterus occupies most of hindbody, and occasionally
part of forebody but it leaves a free space at poste-
rior extremity. The eggs are very numerous, measuring
40-42 µ long and 19-21 µ wide, each containing a mir-
acidium with eye-spots. The excretory vesicle is elo-
ngate saccular and has terminal excretory pore.

DISCUSSION

L. (lecithobotrys) putrescens Looss, 1902 was origina-
ly described from Mugil auratus collected at Triest.
In the present investigation, L. putrescens is recor-
ded from Mugil cephalus, M. cholo and M. capito from
Lake Qarun, all are new hosts and locality records.

As shown in Table 1, the present material is similar
to Looss's specimens in the main characteristics but
there are certain minor differences such as the posi-
tion of ovary lateral to the testis as well as certain
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Variations in measurements of the body organs. Thus, the specific diagnosis of *L. (Lecithobotrys) purpureus* is amended as follows:

**Body length** 1.34-2.51 x 0.60 - 0.34 **Length/width ratio** 1.59-4.18 : 1. **Oral sucker** 0.21 x 0.15-0.21. **Ventral sucker** 0.09-0.15 x 0.12-0.15. **Oral sucker/ventral sucker ratio** 0.85-1.4 : 1. **Prepharynx** 0.006-0.014 long. **Pharynx** 0.10-0.11 x 0.07-0.11. **Oesophagus** 0.19-0.23 long. **Caecele bifurcate dorsal to ventral sucker. Testis** 0.2 2-0.31 x 0.20-0.30. **Hermaphroditic pouch** 0.15-0.28 x 0.12-0.19. **External seminal vesicle** 0.36-0.30 long. **Internal seminal vesicle** 0.09-0.18 long. **Genital pore pre-acetabular. Ovary** 0.07-0.20 x 0.13-0.15. **Vitellarium follicular, with 7 follicles on each side of caecae. Eggs** 40-47 x 19-28 μ. **Excretory vesicle elongate saccular with terminal excretory pore.**

**Hosts**: *Mugil auratus*, *M. cephalus*, *M. chelo* and *M. capito.*

**Location**: Intestine.

**Locality**: Triest and Lake Qarun.

**Types**: Deposited in the Helminthological Collection, Department of Zoology, faculty of Science, Ain Shams University, No 366 (Type) from *Mugil cephalus* and No. 367 (Paratype).

2. *Lecithobotrys (Lecithobotrys) helmymonamedi* n. sp. (Fig 2)

The following description is based on sixteen specimens collected from *Mugil cephalus* and *M. capito* locally called "Bouri and Tobar" respectively, caught from Lake Qarun in October, 1983. The new species is named in the honour of the distinguished Egyptian Zoologist Prof. A.H. Helmy Mohamed.
Fig. 2 Laeis kobotrya (Laeis kobotrya helmyohamed n. sp. A. Ventral view. B. Terminal genitalia. C. Eggs.
Morphological features:

The body is elongated, tapering at both ends and measuring 1.08-1.30 long and 0.39-0.43 wide. Body surface spined, each spine measuring 3-4 µ in length but these spines are easily shed. The length to width ratio is 2.51-3.33 : 1. The oral sucker is subterminal relatively larger than the ventral sucker, 0.11-0.14 long and 0.10-0.15 wide. The ventral sucker is round in shape, preequatorial and measures 0.10-0.12 long and 0.09-0.13 wide. The ratio between the Oral sucker/ventral sucker diameters is 0.9-1.16:1.

There are remnants of eye-spots in pharyngeal region. The pharynx is pyriform, 0.07-0.10 long and 0.09-0.13 wide Prepharynx measures 0.02-0.04 in length. The oesophagus is long, bifurcates behind the acetabulum and measures 0.21-0.29 long. The intestinal caeca are short, saccular, ending at the middle of the body and reaching to about mid-testis level and measure 0.12-0.14 long. The testis is post-equatorial; round 0.12-0.16 in diameter and lies at the beginning of the hind body. The hermaphroditic pouch is oval-shaped, 0.16-0.25 long and 0.12-0.18 wide. The genital pore is ventral, lies a short distance anterior to ventral sucker. The external seminal vesicle measures 0.07 long while the internal seminal vesicle measures 0.08 long. The prostate bulb is spherical in shape and lies dorsal to the hermaphroditic duct which is well developed. The hermaphroditic duct is elongate. The internal seminal vesicle, prostate glands, prostate bulb and hermaphroditic duct are enclosed in the hermaphroditic pouch. The metraterm joins with prostatic duct to form the hermaphroditic duct that opens by the genital pore.

The ovary is median, oval-shaped, in front of testis and measures 0.06-0.10 long and 0.06-0.07 wide. The vitelline glands consist of two groups, each includes 15-25 small spherical follicles on each side of the intestinal caeca. The uterus has descending and
ascending limbs, lying in the hind body, as well, leaving a free space at the posterior extremity. The eggs measure 42-47 μ long 18-26 μ wide, each containing a miracidium with eye spots. The excretory vesicle is Y-shaped, with terminal excretory pore.

DISCUSSION

*L. (Lechithobothrya) helmymohamedi* n. sp. can be easily distinguished from all the other known species of the genus *Lechithobothrya* mainly by the size and numbers of vitelline follicles, the body shape, the length of the oesophagus and the shape of the intestinal caeca. (Table 1).

*L. (Lechithobothrya) helmymohamedi* n. sp. can be differentiated from *L. (Lechithobothrya) putrescens* (the genotype) by the suckers ratio, the shape and numbers of vitelline follicles, the size of the body, the shape and length of the intestinal caeca, the shape of the excretory and the external seminal vesicles. The new species can be easily differentiated from *L. (Lechithobothrya) magnivagitus* (szidar, 1954) Martin, 1973 by the suckers ratio, the body shape and size, the size and numbers of vitelline follicles, the size of the eggs, the length of the prepharynx and the shape of the pharynx.

*L. (Lechithobothrya) helmymohamedi* n. sp. can be easily distinguished from *L. (Lechithobothrya) vitelllosus* Sharma and Gupta, 1970 by the ratio of oral sucker/ventral sucker, the position of the bifurcation of caeca, the length of the prepharynx, the position of uterus and the size of the eggs.

*L. (Lechithobothrya) helmymohamedi* n. sp. can also be separated from the nearest species *L. (Lechithobothrya) sprunti* Martin, 1973 by the size of the body, the shape and number of the vitelline follicles, the size of the eggs, the length of the prepharynx, the size of the pharynx, the length of the oesophagus and the position and size of the ovary.
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The present authors believe that all the above differences are sufficient to designate *Leiothobotrys* (*Leiothobotrys*) helmymohamedi as a new species.

**Host**: *Mugil cephalus* and *M. capito*.

**Location**: Intestine.

**Locality**: Lake Qarun.

**Types**: Deposited in the Helminthological Collection, Department of Zoology, Faculty of Science, Ain Shams University, No. 368 (Type) from *M. capito* and No. 369 (Paratype).

The following key is suggested to distinguish between the five species known so far from the genus *Leiothobotrys* Looss, 1902.

Vitelline follicles massed together, forming symmetrical bunches, and ceca short .................................................. a.

Vitelline follicles rather scattered and ceca long .................................................. b

a. Bifurcation of two caeca preacetabular, vitelline follicles divided into two symmetrical groups, each composed of 8 follicles enclosed a circle, uterus occupying all hindbody .. *L. vitellus* Sharma & Gupta 1970

Bifurcation of two caeca postacetabular, vitelline follicles divided into two symmetrical compact groups not enclosing a circle, uterus leaving free space at posterior extremity............. 1

1. Caeca short tubular, vitellaria 7 follicles in each side of caeca .................................................

.................. *L. putrescens* Looss, 1902

Caeca short saccular vitellaria more than 7 follicles on each side caeca ............................................. 2


Prepharynx long, body elongate........................................... 3

3. Vitellaria 15-25 follicles in each side of caeca ............................................. *L. helmymohamedi* n. sp.

Vitellaria 7-10 follicles in each side of caeca

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b. Vitellaria 7 follicles and prepharynx absent

..............................L. brasiliensis Freitas, 1948
Vitellaria 11 follicles and prepharynx long

..............................L. africanus Manter & Pritchard, 1964

Acknowledgement

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REFERENCES


