

**Journal of the Egyptian
German Society of Zoology**



**ON NEOSACCOCOELIUM AEGYPTIACUS N.GEN., N.SP.
(DIGENEA : HAPLOPORIDAE) AND DESCRIPTIONS OF
TWO NEW SPECIES OF GENUS SACCOCOELIUM**

El-Shahawi, G.A.Z.*; El-Gindy, H.J.; Imam, E.A.***
and Al-Bassel, D.A.***

* Dept. of Zoology, Faculty of Science,
Beni Suef Branch, University of Cairo, Egypt.

** Dept. of Zoology, Faculty of Science,
University of Cairo, Egypt.

*** Dept. of Parasitology, Faculty of Veterinary Medicine,
University of Cairo, Egypt.

Key words : Trematodes - Digenea - Haploporidae - Saccocoelium.

ABSTRACT

A new genus and species *Neosaccocoelium aegyptiacus* has been described from the intestine of *Mugil capito* caught from Lake Qarun in Egypt. It differs from all genera of the subfamily Haploporinae in having a coiled - tubular - like vitellaria and distinguishable eggs. The generic diagnosis of the new genus and a proposed key for the genera of Haploporinae are outlined. In addition to the new genus, two new species of genus *Saccocoelium* are also described.

The first *Saccocoelium portsaidensis* n.sp. is found in *Mugil capito* caught from Al-Rasswa fish farm at Port-Said Governorate. The second *Saccocoelium Saoudi* n.sp. is found in *Mugil cephalus* caught from Lake Qarun.

The two new species are easily distinguished from the other related species of genus *Saccocoelium*. A comparison is made between all the known species of this genus.

INTRODUCTION

Yamaguti (1971) suggested a key to subfamilies of Haploporidae on the basis of the shape and position of the vitellaria as follows:

Vitellaria single, median
..... Dicrogastrinae Yamaguti, 1958.

Vitellaria divided into two symmetrical compact masses or a small number of follicles or winding tubules Haploporinae Dollfus, 1927.

The different genera belonging to subfamily Haploporinae including vitellaria either two symmetrical compact masses such as *Haploporus* Looss, 1902; a small number of follicles such as *Saccocoelioides* Szidat, 1954; or single mass such as *Forticulcita* Overstreet, 1982. The trematodes of genus *Saccocoelium* were originally described by Looss, 1902 belonging to Haploporiid trematodes having short saccular caeca, single testis, cirrus pouch strongly developed, vesicula seminalis bipartite and vitellaria consisting of paired compact lobes of irregular shape, situated symmetrically at level of caecal ends. *Saccocoelium obesum* Looss, 1902 from *Mugil auratus*, *M. cephalus* and *M. chelo* from Trieste was designated as the type species of the genus, he also, in the same article described *S. tensum* from *Mugil chelo* from the same locality. In (1946) Dawes presented Looss's data on both *S. obesum* and *S. tensum* but he questioned the validity of *S. obesum*. In

(1961) Hunter and Thomas described *S. beauforti* from *Mugil cephalus* at Beaufort, North Carolina. In Egypt, Fischthal and Kuntz (1963c) redescribed *S. obesum* from the intestine of *Mugil cephalus* and *M. ramada* from Giza fish Market. They agreed with Dawes's suggestion that *S. tensum* is a synonym of *S. obesum*, they also considered *S. beauforti* as a valid species of the genus. Fares and Maillard (1974) studied the life cycle of both species *S. obesum* and *S. tensum* and agreed with Yamaguti, 1971 that the two species were valid.

MATERIALS AND METHODS

The present parasites were collected from the intestine of *Mugil cpito* and *Mugil cephalus* caught from Lake Qarun and Al-Rasswa fish farm in Egypt. The collected worms were cleaned by washing them several times with isotonic saline solution. Then they were examined alive and were relaxed between a slide and a thin glass slip, and fixed in 70% alcohol. They were stained in acetic acid alum carmine, differentiated in acid alcohol, cleared in clove oil and finally mounted in Canada balsam. Measurements were taken from mounted specimens, and all drawings were done by a Camera Lucida. All measurements of specimens and scales of figures are in millimeters unless stated otherwise.

RESULTS

Neosaccocoelium aegyptiacus

n. gen, n. sp.

(Fig. 1, Photo 1 and 2)

The following description is based on three mounted specimens collected from the intestine of *Mugil capito* by examining 150 fish caught from Lake Qarun in Egypt.

Description :

The body is elongate oval, and covered with tegumental spines measuring 4 - 5 μ long. The body measures 1.17 - 1.42 long and 0.37 - 0.46 wide. The length/width ratio varies from 2.55 - 3.83 : 1. The oral sucker is fairly rounded, subterminal measuring 0.10 - 0.15 long and 0.13 - 0.16 wide. The ventral sucker is also rounded ranging between 0.11-0.14 long and 0.12 - 0.15 wide and lies in the forebody. The ratio of oral sucker to ventral sucker is 1.07 : 1. The prepharynx is short and measures 0.067 - 0.070 in length. The pharynx is well developed, spherical in shape measuring 0.065 - 0.096 long and 0.10 - 0.105 wide. The oesophagus is very long, varies from 0.36 - 0.38 long and bifurcates at 0.067 - 0.072 behind the acetabulum. The intestinal caeca are moderately short, saccular in shape with very short terminal expansions and ending at 0.08 - 0.085 posterior to the testis. The caeca measure 0.15 - 0.21 long and 0.086 - 0.086 wide. The testis is large, oval in shape and lies at the middle of body, it measures 0.15 - 0.18 long

and 0.13 - 0.135 wide. The cirrus pouch is oval - shaped and lies between the middle of acetabulum and pharynx, it measures 0.22 - 0.27 long and 0.13 - 0.17 wide. The cirrus pouch includes an oval - shaped internal seminal vesicle, prostate gland cells, uterine vesicle and hermaphroditic duct. The metraterm leads into the uterine vesicle which measures 0.11 - 0.13 long and 0.07 Δ - 0.089 wide and opens in a hermaphroditic duct which measures 0.10 - 0.12 in length, the latter opens by the genital pore. The external seminal vesicle measures 0.08 - 0.089 X 0.043 - 0.048 in size and the internal seminal vesicle measures 0.091 - 0.099 X 0.048 - 0.057 in size. The genital pore lies at various levels between the pharynx and the acetabulum. The ovary is oval in shape and lies pretesticular at a level with the posterior half of acetabulum, it measures 0.096 - 0.11 long and 0.075 - 0.095 wide. The receptaculum seminis is large, conical in shape and lies beside ovary, it measures 0.10 - 0.19 long and 0.07 - 0.082 wide. The vitellaria consist of a very much number of fine follicles arranged in many coiled limbs, ribbon - like structures, occupying most of the body from the middle of cirrus pouch to the posterior extremity. The uterus lies in the hind body and discontinues with the vitellaria, it contains eggs in different phases of maturity. The eggs are zygote - shaped and embryonated or not and few (2 - 30) in number, they measure 32 - 36 X 20 - 24 μ in size. The body moreover contains a great

number of very small redia - like structures distributed in the hindbody and measure 0.015 - 0.018 long and 0.010 - 0.012 wide. The excretory vesicle is tubular in shape with terminal excretory pore.

Discussion :

The present new genus *Neosaccocoelium* differs from all genera of the subfamily Haploporinae in having a coiled tubular - like vitellaria and distinguishable zygote-shaped eggs. The new genus is closely related to the genus *Saccocoelium* Looss, 1902 in having saccular caeca and elongated body, but differs from it in having distinct vitellaria and distinguishable eggs. In *Saccocoelium* the vitellaria are two symmetrical compact irregular masses and non-operculated eggs, but in the present new genus the vitellaria are represented by a great number of fine follicles arranged in winding tubules and operculated eggs. The present authors believe that the above differences are sufficient to designate *Neosaccocoelium* as a new genus and suggest that the generic diagnosis of it as follows:

Haploporidae, Haploporinae. Body small, oral sucker subterminal, prepharynx long or short, pharynx strongly developed, oesophagus very much long, caeca elliptical, reaching backward beyond post - equatorial. Testis is submedian immediately post-caecal. Hermaphroditic pouch strongly developed between pharynx and acetabulum. Genital pore

level with post pharynx. Ovary posterior to acetabulum. Receptaculum seminis present. Vitellaria consists of very small granules arranged in coiled winding tubules extending from acetabulum to near posterior extremity. Uterus occupying hind body and overlapping with vitellaria. Eggs (zygote-shaped, large, operculated). Excretory vesicle is tubular elongate with terminal pore. Parasitic in mugilid fishes. *N. aegyptiacus* is the type species of the genus.

The following key is suggested to distinguish between the ten genera so far from the subfamily Haploporinae :

- * Vitellaria consisting of a single mass
Forticulcita Overstreet, 1982.
- * Vitellaria divided into two symmetrical compact masses or two follicular glands in foliate fields(1)
- * Vitellaria divided into free follicles or two large fields of follicles or lobed masses or bunch-like(2)
- * Vitellaria consist of great number of very small follicles arranged in coiled winding tubules, extending from acetabulum to near posterior extremity and the eggs are distinct
Neosaccocoelium n. gen.
- 1- Vitellaria divided into two symmetrical compact masses.....(3)
- * Vitellaria divided into two follicular glands, extending in

foliate fields from the lower edge of acetabulum to near body ends*Parasaccocoelium* Zhukov, 1971.

2- Vitellaria divided into two large fields of follicles, lateral fields from anterior to genital pore to near posterior extremity, central fields posterior anterior to testis and near genital pore.....
.....*Lecithobotrioides* Thatcher and Dossman, 1974.

* Vitellaria divided into free follicles or lobed masses or bunch like(4)

3- Caeca saccular
Saccocoelium Looss, 1902.

Caeca cylindrical
Haploporus Looss, 1902.

4- Vitellaria lateral, bunch - like, testis rounded, caeca long or short, cylindrical not enormous
Lecithobotrys Looss, 1902.

Vitellaria extending longitudinally ventral, lateral, partly posterior to caeca, testis rounded or elliptical, caeca short or half long
Saccocoelioides Szidat, 1954.

Vitellaria dorsal forming bunches, testis sigmoid and caeca enormous
Megacoelium Szidat, 1954.

Vitellaria in lobed or bunch - like masses, one on each side of ovary, testis elongate
Neohaploporus Manter, 1963.

Genus, *Saccocoelium*. Looss, 1902
1- *Saccocoelium portsaldensis* n.sp.
(Fig. 2, Photo 3 and 4)

The following description is based on four mounted specimens collected from *Mugil capito* by examining 50 fish caught from Al-Rasswa fish farm at Port-Said Governorate in Egypt. The new species is named on its new locality record.

Description :

The body is elongated smooth and measures 0.8 - 0.89 X 0.28 - 0.35 in size. The oral sucker is terminal sac-like structure provided with two equal dorsal and ventral lip - like structure, the latter marked by one row of fine nuclei on either lip margin. The dorsal lip-like structure measures 0.11 - 0.12 in length and the ventral lip - like structure measures 0.11 - 0.12 in length.

The ventral sucker is normal, rounded, situated in the forebody immediately posterior to cirrus sac and measures 0.10 - 0.12 in diameter. The prepharynx is very long 0.10 - 0.12 in length. The pharynx is weakly developed and hardly visible, it measures 0.020 - 0.023 X 0.019 - 0.023 in size. The oesophagus is also very long being 0.16 - 0.18 in length extending backward to the middle of the acetabulum. The two intestinal caeca are short, saccular, ending at the anterior margin of testis. They measure 0.10 - 0.12 long and

0.05 - 0.06 wide. The testis is large, spherical situated in the hind body and measures 0.15 - 0.17 long and 0.16 - 0.18 wide. The cirrus pouch is spherical - shaped and lies between the pharynx and the acetabulum, it measures 0.13 - 0.15 long and 0.13 - 0.14 wide. The cirrus pouch contains a small oval - shaped internal seminal vesicle 0.033 - 0.048 long, large hermaphroditic duct, 0.085 - 0.096 in length and prostate gland cells which are scattered inside the cirrus pouch. The external seminal vesicle measures 0.055 - 0.060 in length. The metraterm is hardly visible and leads to a tubular shaped uterine vesicle, the latter leads to a globular - shaped hermaphroditic duct which opens by the genital pore. The ovary is conical in shape and lies at the anterior end of the testis, it measures 0.084 - 0.10 long and 0.07 - 0.08 wide. Receptaculum seminis is not seen. The ootype is very small and lies immediately in front of the ovary between the two vitelline gland masses. The vitelline gland consists of two compact oval symmetrical masses at the level of anterior margin of testis. The right mass measures 0.06 - 0.068 long and 0.037 - 0.043 wide and the left mass measures 0.087 - 0.099 long and 0.03 - 0.039 wide. The uterus has many coiled limbs, it extends from the cirrus pouch to posterior of testis. The eggs measure 35 - 37 X 21 - 23 μ in size. The excretory vesicle is tubular in shape and opens posteriorly by a terminal excretory pore.

Discussion :

Saccocoelium portsaidensis n. sp. differs from all the known species of the genus by having terminal bilipped sac-like oral sucker, much elongated prepharynx, rudimentary pharynx and more larger hermaphroditic vesicle (Table 1).

The authors believe that all the above differences are sufficient to designate *S. portsaidensis* as a new species.

2- *Saccocoelium saoudi* n. sp. (Fig. 3 and Photo 5)

The following description is based on five mounted specimens collected from the intestine of *Mugil cephalus* by examining 150 fish caught from Lake Qarun in Egypt. The new species is named in the honor of the distinguished Egyptian Zoologist Prof. Dr. M. F. A. Saoud.

Description :

The body is elongated, tapering posteriorly and measures 1.22 - 1.33 long and 0.39 - 0.50 wide. Body surface is spined, each spine measuring 3 - 5 μ in length. The oral sucker is subterminal and measures 0.10 - 0.13 long and 0.11 - 0.12 wide. The ventral sucker lies in the first third of the body and measures 0.10 - 0.14 long and 0.12 - 0.14 wide. The suckers ratio varies from 0.95 - 1 : 1. The prepharynx is moderately short 0.02 - 0.04

in length. The pharynx is muscular, spherical and measures 0.05 - 0.06 long and 0.07 - 0.09 wide. The oesophagus is moderately short and bifurcates at 0.3 - 0.39 from the anterior end of the body, it measures 0.15 - 0.17 in length. The two caeca are unequal in length and both are saccular shaped. The right caecum ending at 0.52 - 0.58 from the anterior extremity and measures 0.16 - 0.18 in length. The left caecum ending at 0.45 - 0.51 from the anterior extremity and measures 0.10 - 0.13 in length. The testis is almost spherical in shape and lies in the hind body, it measures 0.20 - 0.24 long and 0.17 - 0.19 wide. The cirrus pouch is egg - shaped measuring 0.20 - 0.23 X 0.15 - 0.18 in size and encloses an oval internal seminal vesicle varying from 0.09 - 0.1 in length. The tubular uterine vesicle ranges between 0.05 - 0.055 in length. The hermaphroditic vesicle which is surrounded by prostatic cells, measures 0.079 - 0.085 in length. The genital pore lies in between the pharynx and the acetabulum. The ovary is oval - shaped and lies immediately pretesticular, it measures 0.12 - 0.15 long and 0.09 - 0.11 wide. The vitelline glands consist of two oval symmetrical masses situated between the caecal ends and the testis. The right vitellarium measures 0.09 - 0.12 X 0.05 - 0.07 in size and the left one measures 0.10 - 0.13 X 0.06 - 0.08 in size. The uterus extends from the middle of acetabulum to the posterior extremity. The eggs are embryonated and non operculated ; they measure 39

- 43 X 20 - 24 μ . The excretory vesicle is tubular and opens by a terminal excretory pore.

Discussion :

Saccocoelium saoudi n. sp. can be easily distinguished from *S. tensum* and *S. obesum* by the shorter oesophagus which bifurcates at about the end of the first fourth of the body, the unequal two caeca, the oval-shaped vitelline masses, as well as the small size of the eggs. The new species differs from *S. beauforti* on the basis of the shape of vitellaria, body length, the shape of excretory vesicle and the size of the eggs. Finally the new species differs from *S. portsaidensis* by having subterminal oral sucker, shorter oesophagus, longer prepharynx and well developed pharynx. The authors believe that all the above differences are sufficient to designate *S. saoudi* as a new species. The comparison between the different species of genus *Saccocoelium* is shown in Table (1).

REFERENCES

- DAWES, B. (1946): The Trematoda, with special reference to British and other European forms. Cambridge University Press. 644 pp.
- FARES, A. and MAILLARD, C. (1974): Research on some Haploporidae (Trematoda) parasites of the mullet. *Z. Parasitenk.*, 45 : 11-43.
- FISCHTHAL, J.H. and KUNTZ, R.E. (1963c): Trematodes parasites of fishes from

DESCRIPTIONS OF TWO NEW SPECIES OF
GENUS *SACCOCOELIUM*

- Egypt. Part V. Annotated record of some previously described forms. *J. Parasit.*, 49: 89-91.
- HUNTER, W.S. and THOMAS, L.J. (1961): A new species of *Saccocoelium* (Trematoda, Haploporidae) from Beaufort, N.C. *Trans. Amer. Micr. Soc.*, 80: 176-179.
- LOOSS, A. (1902): Die Distomen Unterfamilie der Haploporinae. *Arch. Parasit.*, 6: 129-143.
- MANTER, H.W. (1963): Studies on digenetic trematodes of fishes of Fiji IV. Families Haploporidae, Angiodictyidae, Monorchiidae, and Bucephalidae. *Proc. Helminth. Soc. Wash.*, 40: 112-117.
- OVERSTREET, R.M. (1982): *Forticulcita glabra* gen. n. et sp. n. (Digenea, Haploporidae) in a Red Sea Mullet. *Zool. Scri.*, 11: 83-85.
- SZIDAT, L. (1954): Trematodes nuevos de peces de agua dulce de la Republica Argentina Y un intento para aclarar su caracter marino. *Mus. Argen. Cien. Nat. Zool.*, 3: 1-85.
- YAMAGUTI, S. (1958): Systema helminthum Vol. 1. The digenetic trematodes of Vertebrates. Part II. Interscience Publ. New York.
- YAMAGUTI, S. (1971): Synopsis of digenetic trematodes of vertebrates. Tokyo, Keigaku Publ., 1074 pp.

TABLE (1)
A COMPARISON BETWEEN DIFFERENT SPECIES OF THE GENUS *SACCOCELIUM* LOOSS, 1902.

Characters	<i>S. obscurum</i> LOOSS * 1902	<i>S. lunsum</i> Looss, * 1902	<i>S. beaufoorti</i> Hurley & Thomas, 1961	<i>S. portsalensis</i> n. sp.	<i>S. saouli</i> n. sp.
Body shape	Fusiform, spined	Fusiform, spined	Variable, spined	Elongate, spined	Elongate, spined
Body size	1.47x0.51	0.98x0.44	0.55 - 0.60x 0.13 - 0.25	0.80 - 0.89 x 0.28 - 0.55	1.22 - 1.33 x 0.59 - 0.50
Oval sucker	0.18	0.12	0.083	Terminal with 2 lips 0.11 - 0.12 long, each	0.10 - 0.13 0.11 - 0.12
Ventral sucker	0.17	0.12	0.087	0.10 - 0.12 x 0.10 - 0.12	0.10 - 0.16 x 0.12 - 0.16
Suckers ratio	1.11:1	1:1	0.95:1		0.95 - 1:1
Prepharynx	0.15			0.10 - 0.12 long	0.02 - 0.04 long
Pharynx	0.12	0.08	0.083x0.037	0.020 - 0.023 x 0.019 - 0.023	0.05 - 0.06 x 0.07 - 0.09
Oesophagus	long	long	long	0.16 - 0.18 long	0.15 - 0.17 long
Caeca length	Saccular	Saccular	Saccular	0.10 - 0.12 x 0.05 - 0.06	Right, 0.16 - 0.18 Left, 0.10 - 0.13
Testis	0.19	0.19	oval	0.15 - 0.17 x 0.16 - 0.18	0.20 - 0.24 x 0.17 - 0.19
Cirrus pouch	0.38	0.22	Proacetabulum	0.13 - 0.15 x 0.13 - 0.16	0.20 - 0.23 x 0.15 - 0.18
Seminal vesicle	Bipartite	Bipartite	Bipartite	Bipartite	Bipartite
Ovary	0.15	0.12	Small	0.084 - 0.10 x 0.07 - 0.08	0.12 \square 0.15 x 0.09 - 0.11
Vitellaria	2 irregular	2 irregular	H-shaped	2 oval masses	2 oval masses
Eggs	60 x 30 u	50 x 30 u	85 x 53 u	35 - 37 x 21 - 25 u	39 - 43 x 20 - 24 u
Excretory vesic.	Saccular	H-shaped	Saccular	H-shaped	H-shaped
Hosts	<i>Mugil</i> spp.	<i>Mugil chelo</i>	<i>M. cephalus</i>	<i>M. capito</i>	<i>M. cephalus</i>
Locality	Mediterranean in Trieste	Mediterranean in Trieste	North Carolina	Al-Rasayn fish farm, in Egypt	Lake Darun, in Egypt

* Cited from Farns and Mailhard, 1976.

DESCRIPTIONS OF TWO NEW SPECIES OF
GENUS SACCOCOELIUM

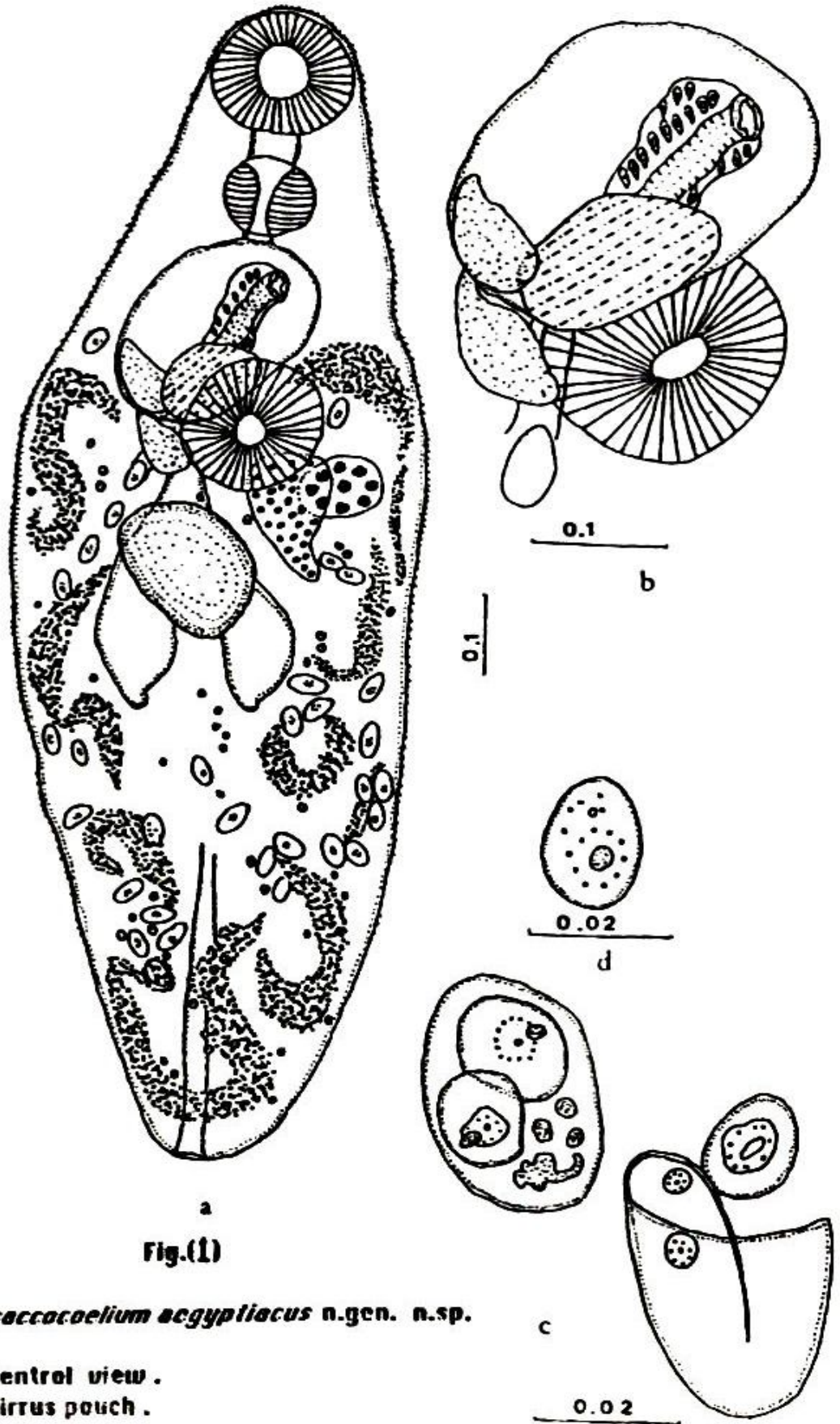


Fig.(1)

Neosaccocoelium aegyptiacus n.gen. n.sp.

- a) Dorsal view .
 b) Cirrus pouch .
 c) Eggs .
 d) Media-like structure .

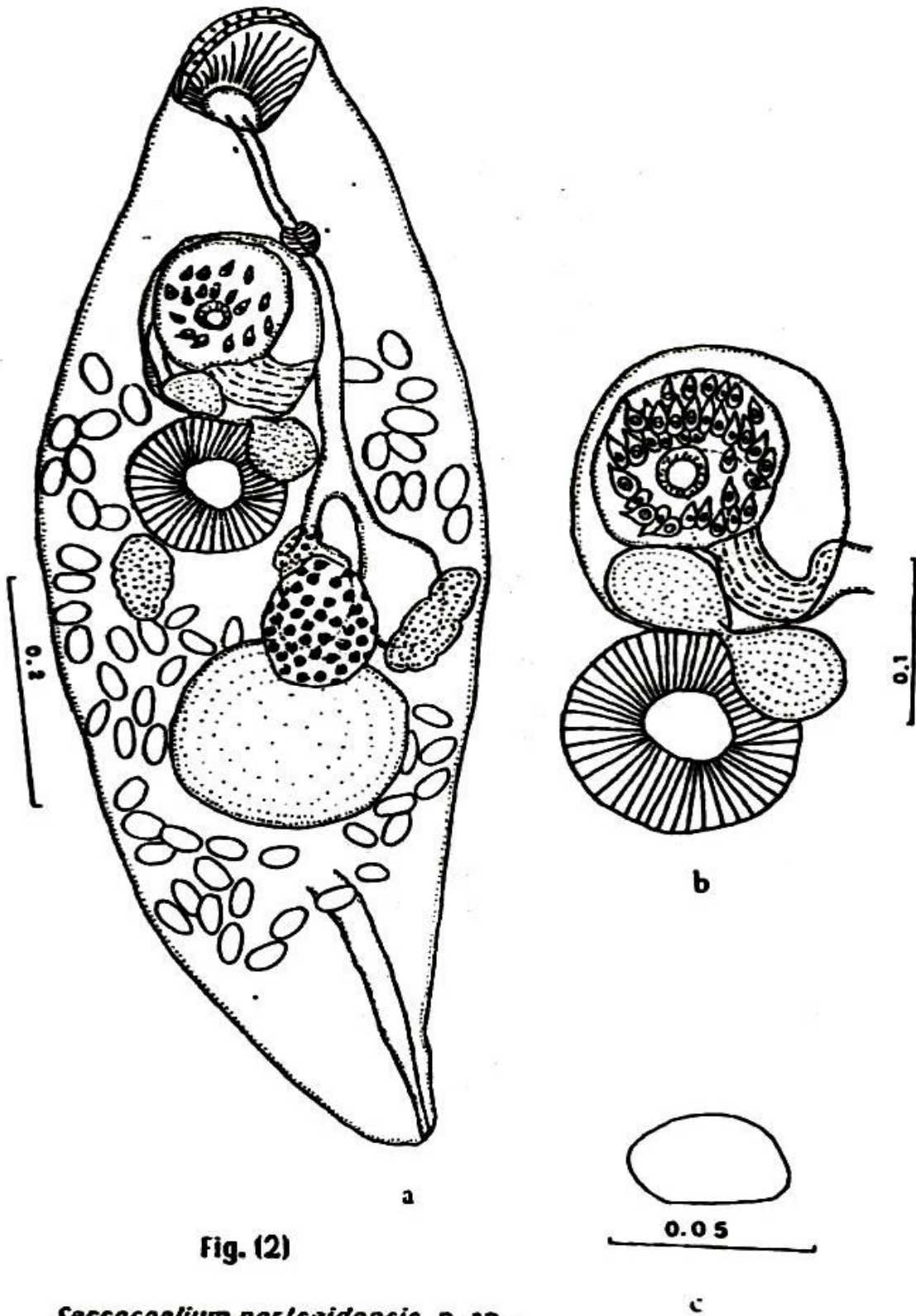


Fig. (2)

Saccocoelium portsaidensis n. sp.

- a) Ventrol view .
- b) Cirrus pouch .
- c) Eggs .

DESCRIPTIONS OF TWO NEW SPECIES OF
GENUS SACCOCOELIUM

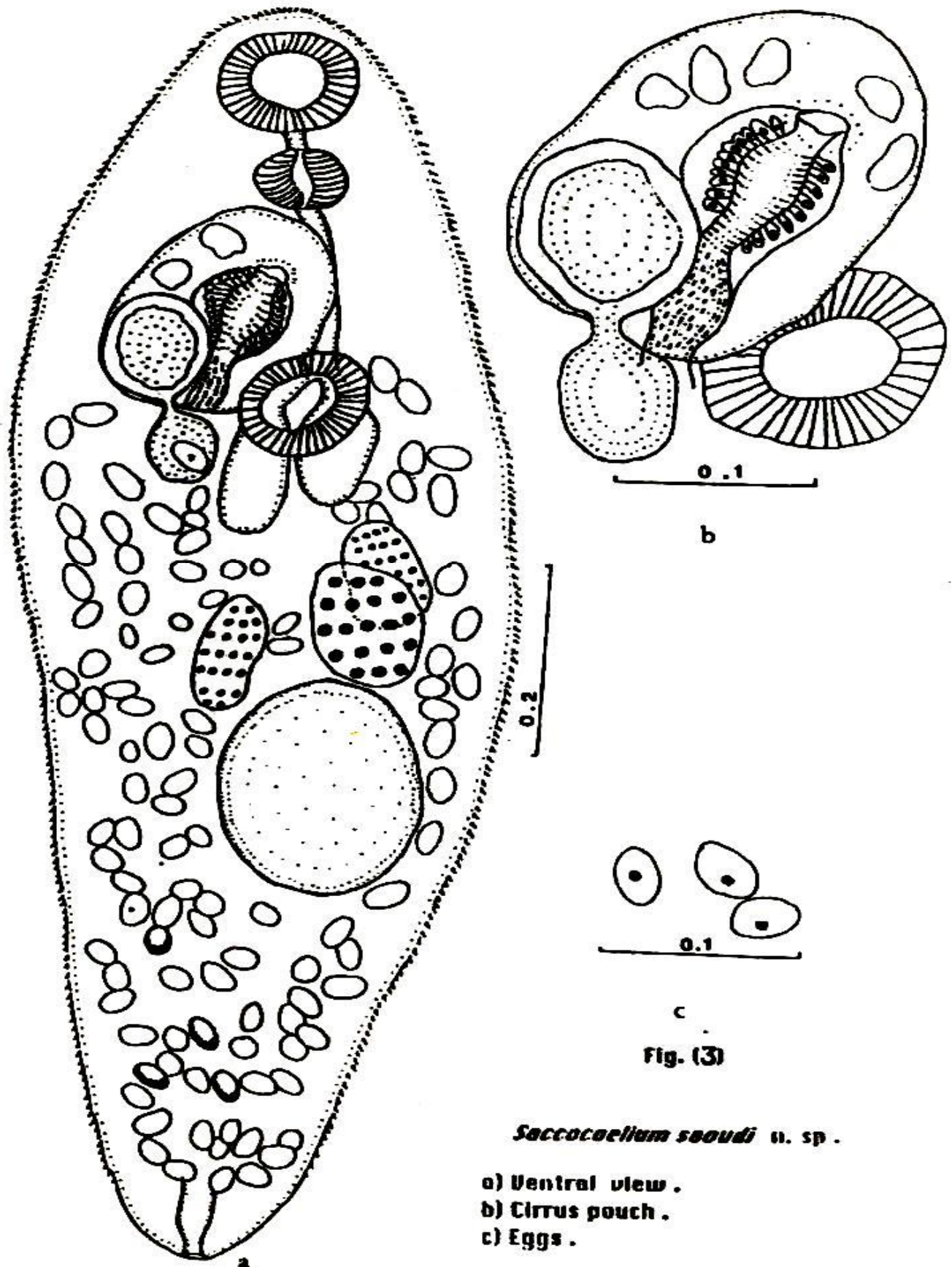


Fig. (3)

Saccocoelium saoudi n. sp.

- a) Ventral view.
b) Cirrus pouch.
c) Eggs.

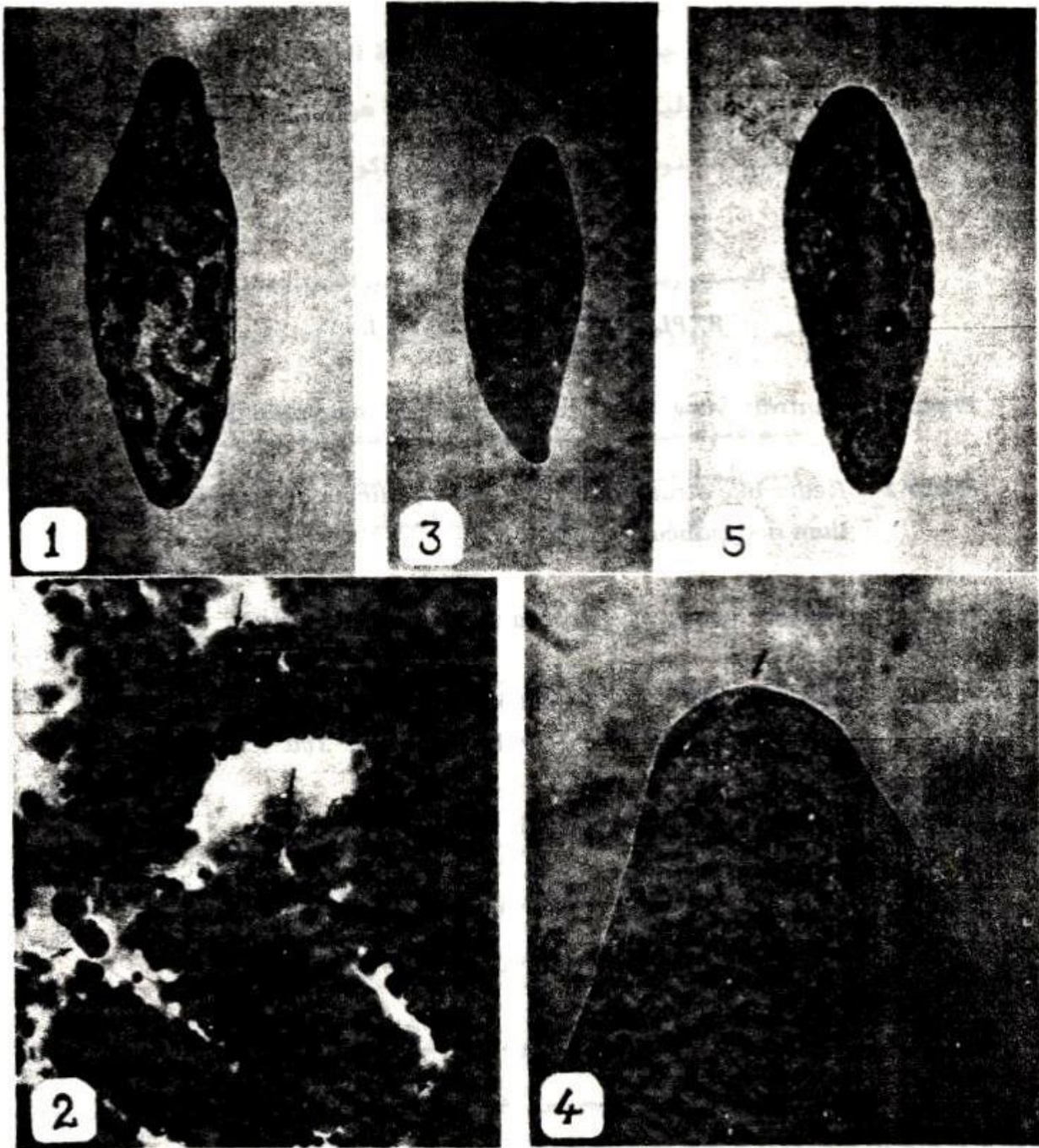


PLATE I.

EXPLANATION OF PLATE I.

Photo 1 Ventral view of *Neosaccocoelium aegyptiacus*. X 50.

Photo 2 Redia-like structure and vitelline follicles of *Neosaccocoelium aegyptiacus*. X 400.

Photo 3 Ventral view of *Saccocoelium portsaidensis*. X 60.

Photo 4 Anterior end of *Saccocoelium portsaidensis* to show lip-like structure of the oral sucker. X 300.

Photo 5 Ventral view of *Saccocoelium saoudi*. X 50.

جنس ونوع جديد من التريهماتوبا ثنائية العائل
نيوساكوسوليم اهجيبتياكس (فصيلة : هابلوبورينيدي)
ووصف لنوعين جديدين من جنس: اياكوسبوليم

جمال عبد المنعم زيدان الشهاوى^١ ، هند ابراهيم الجنسدي^٢
السيد عبد السروه وف امام^٣ ، ديهوم عبد الحميد الباسل^١

- ١- قسم علم الحيوان ، كلية العلوم ، جامعة القاهرة (فرع بنى سويف)
- ٢- قسم علم الحيوان ، كلية العلوم ، جامعة القاهرة
- ٣- قسم الطفيليات ، كلية الطب البيطرى ، جامعة القاهرة

تم وصف جنس ونوع جديد وهو نيوساكوسوليم اهجيبتياكس من أمعاء اسماك الطوبار
التي جمعت من بحيرة قارون .

وهذا الجنس يختلف عن كل اجناس (تحت فصيلة : هابلوبورينيدي) فى ان الفسدد
المحية لها شكل انبوي ملتف والبيض مميز وقد لخصت الصفات التشخيصية للجنس
الجديد ودليل لاجناس تحت فصيلة هابلوبورينيدي .

بالاضافة الى الجنس الجديد تم وصف نوعين جديدين من جنس ساكوسوليم ،
النوع الاول ساكوسوليم بورسعيد ينسب وجد فى اسماك الطوبار التي جمعت من مزرعة
الرسوه السمكية عند بور سعيد .

النوع الثانى ساكوسوليم سعوى وجد فى اسماك البورى الاصيل التي جمعت من
بحيرة قارون فى الفيوم .

والنوعان الجديدان يسهل تمييزهما من كل انواع جنس ساكوسوليم . وقد عملت
مقارنة بين كل الانواع المعروفة لهذا الجنس .