يرقات الديدان الورقية (الوشائج) المكتشفة من قوقع ميلانيا تيوبركولاتا فى محافظة أسيوط

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الملخص

وقد أنجز فى هذا البحث وصف يرقات الديدان الورقية التى اكتشفت من قواقع **ميلانيا تيوبركولاتا** . وقد أمكن اكتشاف ثمانية أنواع بهذا القوقع سيتم وصف أربعة منهـا فى هذا الجزء من البحث وهى :

(١) نوعان من سركاريا بارابلورولوفزسركس احداهما النوع (أ) وهو يماثل النوع الذى وصفه الجندى وحنا (١٩٦٣) والنوع (ب) يبدو نوعا جديدا .

(٢) نوعان من سركاريا زيفيديو وقد وجد أحدهما يماثل سركاريا **بيراميديم** (عبد العظيم ١٩٦٣) والنوع الثانى يبدو نوعا جديدا يسجل فى مصر لأول مرة .

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LARVAL TREMATODES RECOVERED FROM *MELANIA TUBERCULATA* IN ASSIUT PROVINCE

Part 1

(With 2 Tables and 5 Figures)

By

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SUMMARY

The larval trematodes recovered from *Melania tuberculata* in Assiut Province have been described and illustrated. Eight types of cercariae have been found, four of which will be discussed in this paper, these are. 1. Two types fo parapleurolphocercous cercaria, one of which (Type A) is identical with that described by EL-GINDY and HANNA (1963) while type (B) is suggested to be new.

2. Two types of xiphidiocercaria, one of them was identified as *Cercaria pyrenidum* AZIM, 1936 and the second type is suggested to be a new species. In addition it is a new record in Egypt.

INTRODUCTION

In Egypt *Melania tuberculata* is a widely distributed snail inhabitine both fresh and sometimes brakish water. According to *AZIM* (1938), *Melania* may be incriminated as an intermediate host of such a rich fauna of heterophyid worms recovered from dogs procured from all over Egypt, *El-GINDY* and *HANNA* (1963), reported on four types of cercaria from *Melania tuberculata* from Damietta and Guiza Governorates. They did not carry out any survey in Assiut. For this reason, the present work was done for the first time in this locality. in attempts to study the fauna of larval trematodes in *Melania tuberculata*, their biological characters and trials to produce the adult worm in experimental animals.

MATERIAL AND METHODS

Thousands of the snail, *Melania tuberculata* were collected from the mud of the banks of the secondary and tertiary canals arising from the River Nile. As soon as the snails were collected, they were transferred to the laboratory to be investigated for any larvae of trematodes. Exposure to light to harvest mature cercariae was usually done as a routine. In addition, the snails were crushed to find out the developmental stages of these larvae. Infected material was transferred to a conical flask at the neck of which a side tube arises.

Part of a thesis for PH.D. Degree.

The flask was nearly filled with water and the whole apparatus was covered with black paper, with the exception of the side tube which was left to sunlight or artificial bright light. Every half hour, the side tube was inspected by the aid of a hand lens to see any swimming cercaria. The cercariae were pipetted out to be examined microscopically wihle fresh. Some of them were fixed in alcohol or Bouin's fluid to be stained with acetic acid alum carmine as usual. The larvae other than cercariae were examined while fresh and also after being stained. Drawings were made with the aid of a Camera lucida. The apparatus which has already been described was found to be useful to isolate the phototropic types of cercaria.

RESULTS

Eight types of cercariae were recovered from *Melania tuberculata*,

1. *PARAPLEURO LOPHO CERCOUS CERCARIA* TYPE (A).

This heterophyid cercaria is commonly found specially in aged snails. It is rarely found concomitent with xiphidiocercaria. It is recovered from these snails all over the year, with the exception of the winter closure time when the population of snails was reduced to a minimum.

Morphological characters:

This is a large type of cercaria. The body is oval or elongated, measuring about 230 μ in its average length by 67 μ in its average breadth. The tail measures 437-440 μ by 31-33 μ. The other morphologic features are shown in Fig. 1 & 2.

Biological characters:

This cercaria is phototropic. Its viability diminishes after twelve hours at room temperature. When young *Tilapia nilotica* were exposed to this type of cercaria, metacercariae were found in the squashed dorsal muscles two days after exposure to the infection. The metacercaria measures about 245 μ in diameter. It possesses the same morphological characters of the mature cercaria (e.g. two eye spots and a wide excretory vesicle.) The muscles of the fish were fed to a young cat, but they did not attain maturity, possibly because the metacercariae were not ripe enough.

Rediae :

They differ in size and shape, being microscopic bottle-like bodies to large macroscopic tubes. Its morphologic structure is shown in Fig. 3.

2. *PARAPLEUROLOPHOCERCOUS CERCARIA* TYPE (B)

This is another heterophyid cercaria occasionally recovered from *Melania tuberculata*, from different localities of Assiut.

Morophological characters:

This is another large type of cercaria. Its body is oval or pear shaped measuring 227-275 μ in length and 90-100 μ in breadth. The tail measures 375-400 μ by 35-37 μ. Other morphologic features are shown in Fig. 4.

Biological characters:

This cercaria is phototropic. Encystation in fish could not be produced, due to lack of unifected fish at that time. It usually dies within 12 hours at room temperature, in tap water.

Redia:

It differes from that described in the preceeding type of *parapleurolophocercous* cercaria (Type A). It is cylindrical in shape, measuring about 1 mm. in length and 0.150-0.170 mm. in breadth. The oral sucker is powerful measuring 75 μ in diameter.

3. XIPHIDIOCERCARIA

Type A: *Cercaria virgulae, Cercaria pyramidum* AZIM, 1935

This type of cercaria is commonly recovered from *Melania tuberculata* of different ages. It is sometimes found mixed with other types of larval trematodes.

Morphological characters:

The body is oval and sometimes elongated. It measures about 114 by 68 μ, and the tail 100 μ x 17 μ. Its morphological features are shown in Fig. 5.

Biological characters:

It is a weak type of cercaria that cannot swim to the surface of water. It is not attracted to light, perhaps because it is a weak swimmer. Its life span is very short as it dies within twelve hours after its release from the snail. It neither encysts on vegetables nor in larvae of anopheline mospquitoes. Tadpoles and frogs exposed to infection with this type of cercaria do not show encysted metacercaria.

Sporocysts:

They are mostly rounded and rarely elliptical, containing from 5-7 cercariae.

4. *XIPHIDIOCERCARIA*

Type (B); *Cercariae Microcotylae*
"Cellulosae Subgroup"

It is a common type of cercaria recovered from *Melani tuberculata* in many localities of Assiut Province.

Morpholocgial Characters:

It is a small type of cercaria which superficially resembles the 'virgula' type but it is devoid of the 'virgula' organ. Its body measures 108-110 μ by 57-60 μ and the tail 100-110 μ in length.

Biological Characters:

It is a weak swimmer, and is not attracted to light. This may be explained by being unable to swim till the surface of water. It dies within 12 hours. It fails to encyst on vegetables. Encystation in tadoploes or *Anopheles* larvae was not attempted.

Sporocyst:

More or less similar to that of *Cercaria virgulae*. It is rounded or elongated.

DISCUSSION

Identity of the two types of parapleurolophocercous cercariae:

El-GINDY and *HANNA* (1963) recovered two types of parapleurolophocercous cercaria from *Melania tuberculata* collected from the affarent drains at the Lake Manzala. When the present cercaria (type A) is compared with the material found by the former authors,
it is found to be more or less indentical. However, this material is recorded for the first time in Assiut Provicne. Moreover, this type of cercaria could be encysted experimentally in skeletal muscles of fish *Tilapia nioltica*. On the other hand, when feeding kittens on *Tilapia* naturally infected with encysted metacercariae of unknown trematodes, they resulted into *Haplorchis yokogawi* according to the author's observations and *El-NAFFAR* (1970) in the same locality. It has been recorded by *AZIM* (1948) that dogs in Upper Egypt were infected naturally with two species of *Haplorchis*, namely *H. yikogawi* and *H. teichui*. Moreover, different species of *Halporchis* were reported in dosg by *FAHMY* and *SELIM* (1959) when they fed these animals with *Tilapia nilotica*. According to these findings, it could be suspected to find more than one type of Parapleurolophocercous cercaria (heterophid cercaria). More work should be done to correlate, on experimental basis, the actual morphological characters of the cercaria and the resulting adult worms. The second type of *Parapleurolophocercous* cercaria appears to be different from type (B)

described by *El-GINDY* and *HANNA* (1963) (Table 1). Thus, it appears that this type of cercaria is a new one which may result in the production of a new species of *Haplorchis* when their encysted metacercariae are fed to young puppies or kittens.

TABLE 1. The difference between the Parapleurolophovercous eercaria type (B) El-Gindy and Hanna (1963) and the type (B) in the present work.

Organ	Parapleurolophocercous cercaria type (B) of El-Gindy and Hanna (1963)	Parapleurolophocercous cercaria type (B) of the present work
Body.	87 u (70—100)by 41 u (28—60u)	227—235 u by 90—100 u
Oral sucker	18 μ—15 μ	25—46 μ by 30—31 u
Tail	328 μ (310—400 μ) by 15 μ (12—18 μ)	375 μ —400 μ by 35—37 μ
Eye spots	More or less similar to type (A)	In the first quarter of the body.
Penetration glands . .	The three posterior pairs are located between exc. vesicle and the lateral wall of the body.	More or less similar.
Excretory vesicle . . .	More or less rectangular in shap	Is rounded, with a thick wall of one layer of cuboidal cells. It measures about 50 μ in diame-ter.

Identity of the two types of Xiphidiocercariae:

Since the two types of cercariae under discussion possess a stylet at their oral sucker, they are classified under Xiphidiocercariae (= Stylet cercariae), of *LUHE* (1909). According to *DAWES* (1946) the chief characters by which different Xiphidiocercariae are distinguished from one another are the relative size of the suckers, the position of the ventral sucker, the nature of the gut, the number andposition of the penetration glands and the presence or absence of a fin-fold along the margins of the tail. *LUHE* (1909) recognized four groups, called *Cercasia microcotylae*, *Cercaria virgulae*, *C. ornatae* and *C. armatae*. *SEWELL* (1922) suhdivided the four groups of LUHE into Vesiculosa, Virgulae into 'Virgula', Paravirgula, Ornatae into Prima and *C. ornata* La VAL., and Armatae into Polyadena and 'Daswan. *McMULLEN* (1937) proposed the emendation of the superfamily Plagiorchioidia *DOLLFUS*, 1930 to include all trematodes which develop from this kind of cercaria, claiming that members of the family Plagiorchidae develop from cercariae belonging to the Polyadena group of Xiphidiocercaria.

One of the two cercariae (TypeA) under discussion possesses a characteristic "virgula" organ which consists of twopyriform sacs fused in the median line and have their pointed ends directed forward and situated near the oral sucker. Accordingly, this type of cercaria is identified under *Cercaria virgulae*. *El-GINDY* and *HANNA* (1962) reported on a Xiphidiocercaria from *Melania tuberculata* in Lower Egypt. When this type of cercaria is compared with the cercaria under discussion, it was found to be more or less identical. Further work should be attempted to produce the adult worm of this cercaria. It is the first time for this Xiphidiocercaria to be reported in Assiut Governorate. The present cercaria is more or less identical with the type described by *AZIM* (1936) which he named *Cercaria pyramidum* since he could produce encystation in the larva of *Anopheles* and suggested that it might grow to the adult trematode *Lecithodendrium pyramidum* which naturally infects the bat in Egypt. However, attempts to produce the cysts by feeding the Xiphidiocercaria to the *Anopheles* larvae was unsuccessful. However, the present cercaria type (A) could be identified as *Cercaria pyramidum AZIM*, 1936, and further work is suggested to be done to prove whether this type of cercaria grows to the adult *Lecithodrendrium pyramidum* LOOSS, 1896.

On the other hand, the second tyep of Xiphidiocercaria recovered from *Melania tuberculata* has characters similar to that suggested by LUHE (1909) for the "Cercariae Microcotylae" group. LUHE (1909) erected this group for

TABLE 2. **Comparison between type (B) cercaria and cercaria cellulosa, Looss, 1896.**

	Type (B) xiphidiocercaria of the present work	**cercaria cellulosa Looss, 1896**
Body	80—110 μ by 40—60 μ	175 *d* by 95 μ
Spines on culicle . . .	Not present	Present, covering the anterior region
Tail	80—90 μ with a pointed and × 10 μ.	145 u by 25 μ
Suckers	O.S. 18—20 μ	Ventral is smaller
	0.V. 15—18 μ	25 by 30 μ
Pnetration glands. .	. Two pairs at either sides and frontin of V.S.	Two on each side and located in front of V.S.
Exc. vesicle Sporocysts	Y—shaped	Have short cornae
Sporocysts	Rounded or elongated, contains crowds of cercariae	Irregularly ovoid contains 10-15 germ ball.
Snails	*Melania tuberculata*	*Paludina viviparae*

small cercariae, less than 0 2 mm long, in which the ventral sucker is smaller than the oral sucker and situated behind the mid body, the tail is not forked, not provided with a fin-fold and not of very different length from the body. There are two or four penetration glands and a simple bicornuate excretory vesicle. SEWELL (1922) regarded the group as representing the most primitive Xiphidiocercaria. The "Cellulosa group" of SEWELL have a very simple excretory system and only two penetration glands.

When the present cercaria type (B) is compared with cercaria Cellulosa LOOSS, 1896, it is found that they are more or less identical (Table 2). However, the cercaria described by LOOSS is recovered from a different snail, *Paludina vivipara*. Accordingly, type (B) described in the text could not be identified as cercaria Cellulosa LOOSS, 1896. It is thus suggested to be a new Xiphidiocercaria. It is the first time to report on this cercaria in Assiut Governorate.

REFERENCES

Azim (Abdel), M.A., (1936). On the life hisotry of *Lecithodendrium Pyramidum* LOOSS, 1896 and its development from a *Xiphiocercaria C. Pyramidum* sp. nov., from *Melania tuberculata. Ann. trop. Med. Parasit.* **30** (3), 351-356.

———, (1938). On the intestinal helminthes of dogs in Egypt. *J. Egypt. Med. Assoc.*, **2** (3), 1—5.

Dawes, Ben (1946). The trematodes, with special reference to British and otherr European forms, *Cambridge, The Univ. Press.*

El-Gindy, M.S. and Hanna. F.Y., (1963). Larval trematodes for snails, *Pirenella conica* and *Melania tuberculata*, with special reference to heterophylasis. *Bull. End. Dis. Bagdad.* **5** (2) 33.

El-Naffar, M.K., (1970). Studies on parasites of Nile fishes (some parasites in Assiut Proviuce Ph. D. Thesis, Faculty of Science, Assiut University.

Fahmy, M.A., and Selim, M.K., (1959). Studies on some trematodes parasites of dogs in Egypt, with special reference to the role played by fish in their transmission. Z. Parasitide, **19**, 3-13.

Looss, A., (1896). Recherches sur la faune parasitair de l'Egypt. *Med. Inst. Egypt.* 3, 296.

Luhe, M. (1909). Trematodes in Die Susswasser fauna Deutschlands Heft, **17**, (2) 177.

McMullen, D.B., (1937). The life history of three trematodes, parasites in birds and mammals belonging to the genus *Plagiorchis. J. Parasit.* **23**, 235—245.

Sewell, R.B.S., (1922). Cercaria indicae. *Ind. J. Med. Res.*, **10**, 5 pl. No. 370.

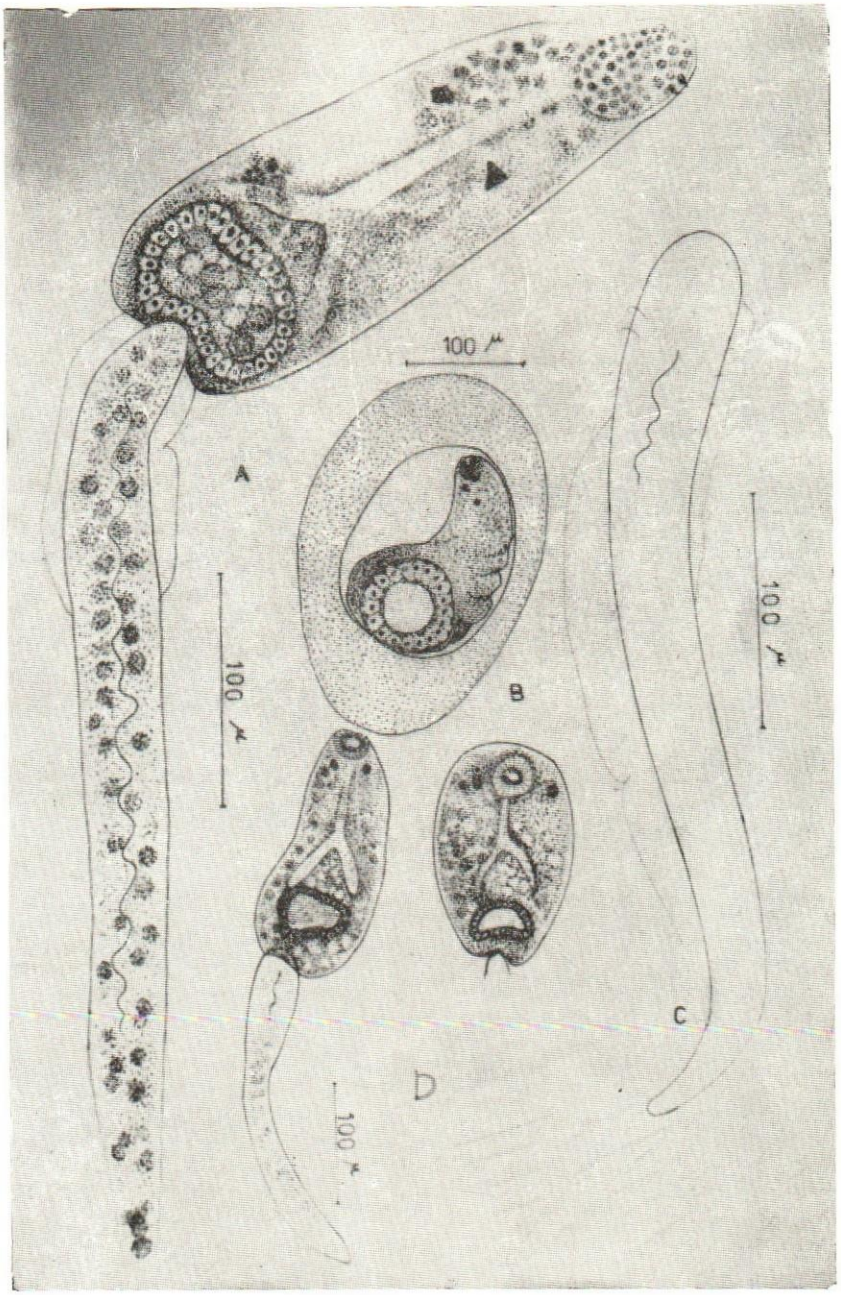

Fig. (1). Parapleurolophocercous cercaria type (A) a) Mature cercaira b) Encyste metacercaria in fish muscles c) Tail of cercaria showing dorsal and lateral fins d) Two immature cercariae.

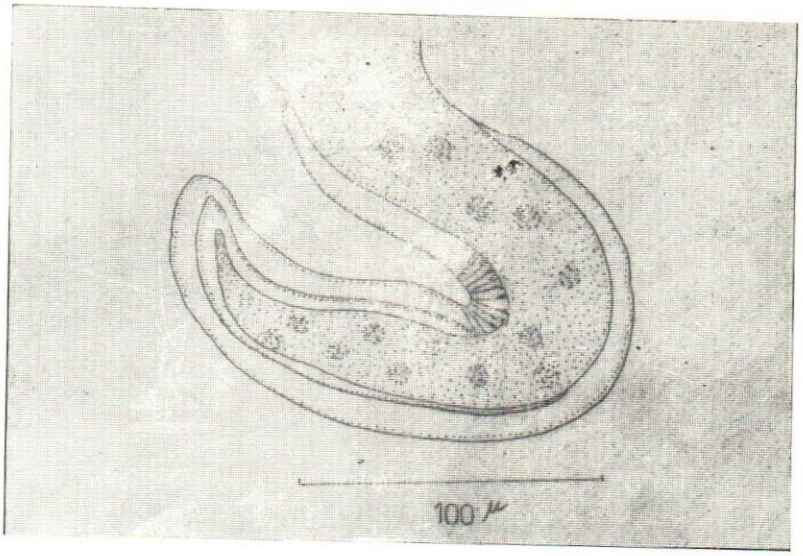

Fig 2). Posterior third of parapleurolophocercous cercaria, shwoing two layers of thin membranes.

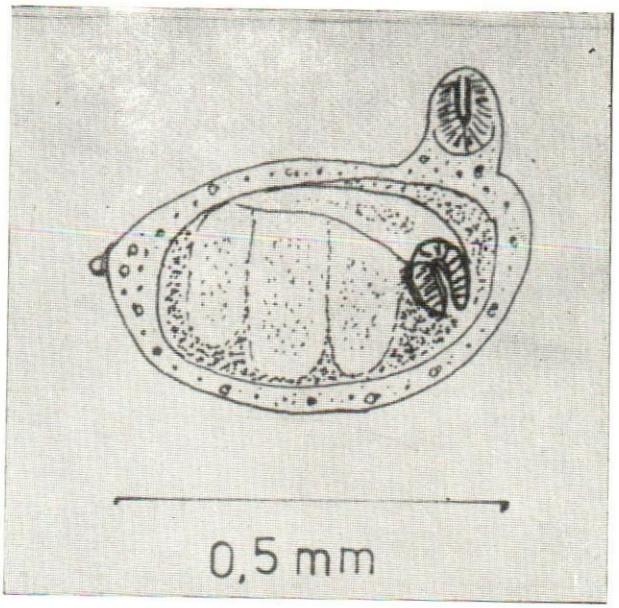

Fig. (3). Bottle-like reida of parapleurolophocercous cercaria type (A)

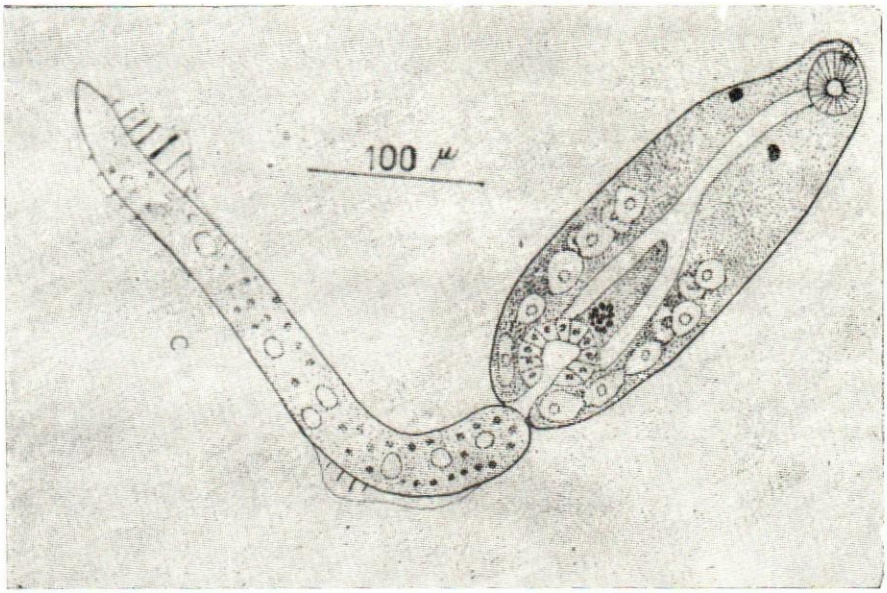

Fig. (4). Parapleurologphocercous cercaria type (B)

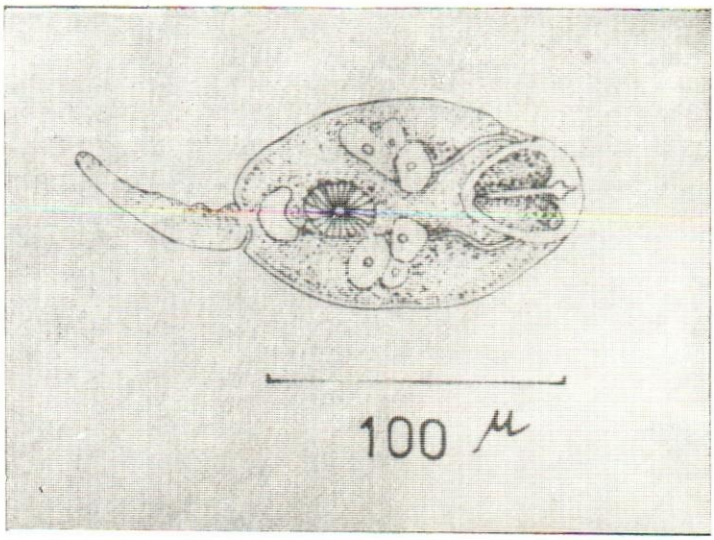

Fig (5). *Cercaria pyramidum* **Azim, 1935.**