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LARVAL TREMATODES RECOVERED FROM MELANIA
TUBERCULATA IN ASSIUT GOVERNORATE[⊗]

Part II

(With 2 tables and 4 figures)

By

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SUMMARY

The larval trematodes recovered from Melania tuberculata in Assiut Governorate have been described and illustrated. Eight types of cercariae have been found, four of which were included in the first part of this paper, the other four are discussed here in this part. These are:

- 5) Cercaria of gigantobilharzia, the first time to be identified.
- 6) Cercaria notocotylus sp., being the first time to be recorded in Egypt.
- 7) Cercaria assiuti n.sp., the first record in Egypt.
- 8) Amphistome cercaria is reported for the first time and it is suggested to be a new type of cercaria.

INTRODUCTION

Melania tuberculata is widely distributed in Egypt, inhabiting both fresh and sometimes brakish water.

The objective of the present paper is to throw further light on its fauna of trematodes, their biological characters and trials to reproduce the adult worms in experimental animals.

⊗ Part of Ph. D. Thesis, Assiut University.

Material and methods were included in the first part of this paper.

RESULTS

5-APHARYNGEAL BREVIFURCATE OCELIATE

CERCARIA

Cercaria of Gigantobilharzia

This type of cercaria is commonly collected from Melania tuberculata, caught in Koum Abou Sheel and Welidiah canals during the period from September to January and to a lesser extent in May and June.

Morphological Characters:

The body is more or less oval in shape, measuring about 130 u in length by 43 u. in maximum breadth. The tail stem is longer than the body, measuring about 217 by 20 microns. It is thick at its base and tapers towards the origin of the furcal rami. Each ramus measures about 50 u in length. Other morphological features are shown in Fig.(6).

Biological Characters:

This cercaria is phototropic and antigeotropic. Its life span is moderately short since the cercaria was found to die after 12 hours. During life, they are actively motile. They could not produce infection in rats, mice, cats, frogs, and ducks, but they readily infected chickens by either feeding or through intact skin. The pre-patent period was from 6-8 weeks, after which terminal and subterminal spined ova could be recovered from the stools of the experimentally, fected birds.

Sporocysts:

They are thread-like when examined by the naked eye. They reach a few millimeters in length. Mature cercariae could be seen emerging from one and. A cellular layer (most probably germinative in its nature) lines the inner wall of

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the sporocyst.

6-MONOSTOME CERCARIA

Ephemera Type: Cercaria of Notocotylus sp.

This is a rare type of cercaria. It has only been found in Kom About Sheal (Assiut).

Morphological Characters:

This cercaria is spoon-like. The total length is about 730-765 u. The body is 350-380 by 150-170 u and the tail is longer than the body measuring 380-415 by 41.5-60 u. Other morphological features are shown in Fig. (7).

Biological Characters:

This type of cercaria is phototropic. It readily encysts as soon as it leaves the snail. It either encysts on vegetables or even on the slide. It could not produce infection in experimental animals, rats and mice.

The encysted metacercaria: still possesses three eye spots and a thick cyst wall. It measures about 0.5 mm in its diameter. The outer rim of the parasite is deeply pigmented.

Redia:

It is motile, containing three to four cercariae one of them is about to be mature. The redia has an anterior oral sucker and two subterminal expansions at either sides. The redia measures about 1 mm by 0.3 mm.

7-DISTOME LEPTOCERCOUS CERCARIA CERCARIA

ASSIUT n.sp.

This is a rare type of cercaria recovered in Melania tuberculata collected from the two localities previously mentioned.

Morphological Characters:

The body is more or less oval in shape, measuring about

233 u by 100 u. The tail is as long as the body length and it reaches 40 u. Other morphologic features are shown in Fig. (8).

Biological Characters:

The cercaria is weakly motile and it is not attracted to light. It neither encysts on vegetables nor on the slide during a period of 12 hours, after which it dies. It seems to encyst on something different from plants.

Sporocyst:

It is usually found in the form of small and short succular tubes. The outer wall is finely granular. The sporocyst contains cercariae of different developmental stages. On one occasion a cercaria was found emerging at one side of the sporocyst wall.

8-AMPHISTOME OCELLATE CERCARIA

This type is rarely found in Melania tuberculata. Morphological characters:

The body is pear-shaped, measuring 112-115 u by 80-82 u. An oral sucker is found lying at the anterior end, measuring 27 - 29 by 30 u.

The tail is simple and long measuring 162-165 u in length by 18-18 u. in maximum breadth. Other morphological characters are demonstrated in Fig. (9).

Biological characters:

They could not be studied because of the rarity of the material, which has only been recovered on one occasion.

DISCUSSION

Identity of the furcocercous cercaria:

Since this type of cercaria possesses a furcked tail, two furcal rami shorter than the tail stem, two eye spots,

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2 suckers and absence of a pharynx, it is thus classified under group (1) of MILLER (1929) as a pharyngeal brevifurcate distome cercaria (= schistosomatid cercaria).

This type of cercaria has been recovered by LEIPER 1915 in Egypt from Melania tuberculata, and Planorbis boisayi. He pointed out its resemblance to Cercaria ocellata LAVALETTI, (1855), and suggested that it was the cercaria of Bilharzia-lla polonica KOWLAIEWSKI (1895). The present material may be comparable with the type found by LEIPER (1915), since it is recovered from Melania tuberculata and shares the characters of the fin folds covering the furcal rami. Nevertheless, detailed description by LEIPER is lacking to confirm this suggestion. AZIM (1935) recovered an apharyngeal brevifurcate ocellate type of cercaria from Melania tuberculata collected from Dakhla Oasis, which was identified as Cercaria cellulosa LOOSS, 1896. Moreover, he observed that the infection by the cercaria was common during the season from September to January, and became less common during the subsequent spring and summer months. He illustrated a camera-lucida drawing of the cercaria which differs from the present cercaria, in that the former is lacking fin folds around the tail furcae, and the penetration glands are grouped behind the ventral sucker.

In the present material, fin folds were detected surrounding the tail furcae and the penetration glands were grouped anterior to the ventral sucker. AZIM (1935) failed to produce the infection in a variety of animals, while during the present work, the authors succeeded to establish the infection in chickens and the adult worms were isolated. Accordingly, this type of cercaria is identified as the cercaria of Gigantobilharzia sp., until further work establishes a definite specific name for the adult fluke. This work has

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shown that the suggestion of LEIPER (1915) is not valid, and also the specific name of the cercaria given by LOOSS (1896) should be a nominal.

It might be noteworthy that it is the first time to recover this type of cercaria in Assiut locality and to produce the adult worm in experimentally infected chickens.

Identity of the Ephemera type of cercaria:

Since the present type of cercaria possesses only one sucker (a terminal oral sucker), it is classified under the Monostome group of LEBOUR (1911). Moreover, the mature cercariae possess three pigmented eye spots, thus it is identified as one of the members of the Trioculate group of FAUST (1917) which corresponds to the Ephemera group of SEWELL (1922). About sixteen species of the Ephemera type of cercaria are recorded. However, it is the first time to report on this type in Egypt. This group of cercaria encysts on stones, water plants and no other intermediate host being required. According to DAWES (1946), some of these cercaria develop to the adult monostomes (= Notocotylineae). *Notocotylus aegyptiacus* (ODHNER, 1905), KOSSAK, 1911 is the only species recorded in the caecum of the domestic duck in Egypt. For this reason, the present cercaria might be the cercaria of *Notocotylus aegyptiacus*. However, this could not be conclusive unless experimental infection produce the typical worms in the caecum of ducks fed on the encysted metacercariae of this type of cercaria. On the other hand, the cercaria under discussion superficially resembles the type previously described in Formosa by YAMAGUTI (1934) which he named cercaria of *Notocotylus magniovatus*, but there are some differences as shown in Table (1).

From this table, it could be concluded that the present type of cercaria is quite distinct from cercariae *Notocotylus magniovatus* and it is possible that it is cercaria

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of *Notocolytus aegyptiacus*.

Identity of the leptocercous cercaria:

According to the available literature, it seems that this is the first report on this type of cercaria from *Melania tuberculata* in Egypt. However, it seems identical with a cercaria found in Formosa which has been recovered from *Melania tuberculata* by NAKAGAWA(1915). When both types are compared (Table 2), it is clear that the present cercaria is quite different in many respects. For this reason, the writers suggest that it is a new type of cercaria to which the name *Cercaria assiuti* is proposed.

Diagnosis:

Body: measures 230-240 u in length and 100 - 110 u in breadth. Oral sucker: 30-33 u in diameter.

Ventral Sucker: lies in the middle third of the body. It is nearly equal to the oral sucker in its diameter.

Excretory vesicle: is 6-shaped lying just posterior to the ventral sucker.

Tail: is as long as the body length, while the breadth is 40 u near its base. The tail originates from a shallow notch in the posterior border of the body.

Parthenita: This cercaria develops in sporocysts.

Locality: Assiut Governorate, Egypt.

Type material: Deposited in the Department of Parasitology, Faculty of Medicine, Assiut University.

Identity of the amphistome cercaria:

From the present description, this type of cercaria is classified under the amphistome group of LUHE (1909). SEWELL (1922) classified the amphistome cercaria into "Pigmentata" and "Diplocotylea" types: and BEAVER (1929) has pointed out that SEWELL's classification is appropriate. The two types are differentiated on the basis of some characters, the

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important of which is the deeply pigmented body of the "Pigmentata" group. According to this character, the cercaria under discussion is identified under the latter group. This type of cercaria cannot be considered as *Cercaria pigmentata* of *Paramphistomum cervi* because of the great difference in size. Moreover, the present cercaria cannot be diagnosed as a young stage of *C. pigmentata* for the simple reason that it has already encysted on green vegetables.

According to the available literature, the present cercaria appears to be a new one. Further experimental work is required to reveal the adult trematode which would be the base for identification of the present cercaria. However, the writers suggest that this Amphistome cercaria might give the adult worm in birds. It should be mentioned here that it is the first time to report on this type of cercaria in Egypt.

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Table 1

Comparison between the present type of cercaria and cercaria
Notocotylus magniovatus YAMAGUTI, 1934.

	Present cercaria	Cercaria of <u>Notocotylus magniovatus</u>
Body	350-360 by 150-155 U	263-336 U by 126-147 U
Oral sucker	33-34 U in diameter	26-37 U
Ventral sucker	Absent	Absent
Tail	377-415 U by 4.15 U	242-433 U by 52-83 U
Cup-shaped attaching structures	present	present
Cyst	With three eye spots measuring 155-160 U in diameter.	Not mentioned
adult worm	<u>Notocotylus</u> <u>Aegyptiacus</u>	<u>Notocotylus</u> <u>Magniovatus</u>

Table 2
 The difference between Cercaria assiuti and the cercaria found
 by NAKAGAWA (1915) from Melania tuberculata in Formosa.

	NAKAGAWA'S material (1915)	Present material
Body	300 by 126 U	230-240 U by 100-110 U
Oral sucker	36 U	30-33 U.
Ventral sucker	30 U	30-33 U.
Tail	180 U	230-240 U by 40 U.
Locality	Formosa	Assiut, Egypt.
Snail	<u>Melania tuberculata</u>	<u>M. tuberculata</u>
Parthenita	redia	Sporocyst
Life cycle	unknown	unknown

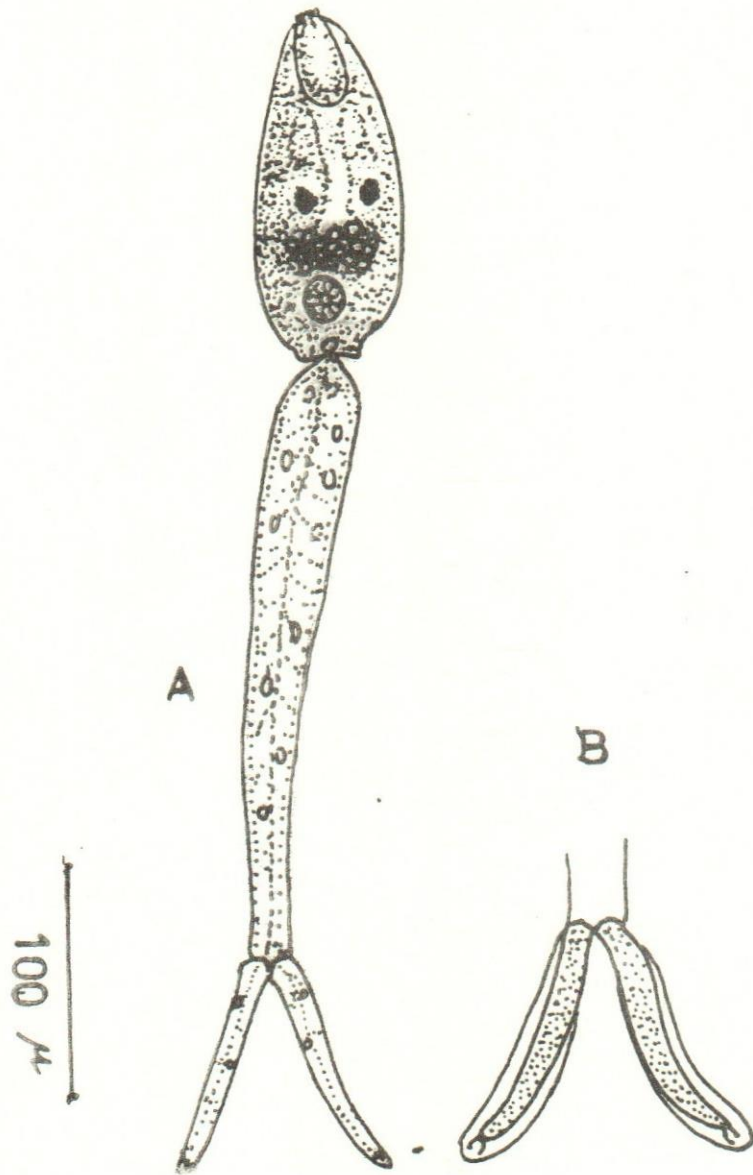


Fig. (6): An ocellate apharyngeal hrevifyrcate
carcaria from Melania tuberculata (A).
The furci are covered by a thin membrane (B).

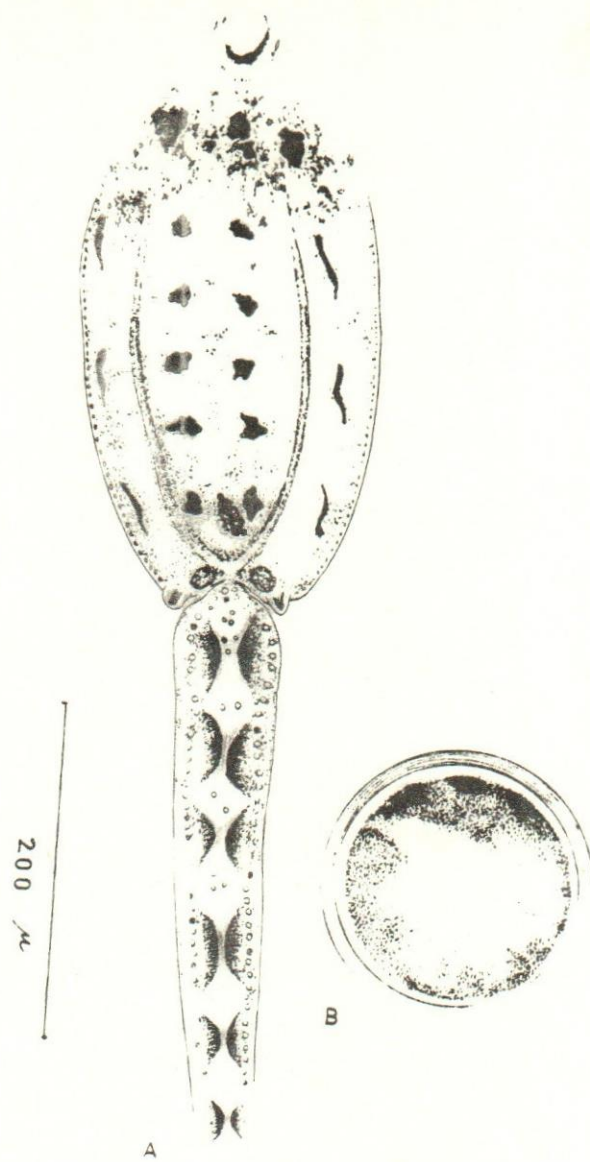


Fig. 7 Cercaria of Notocotylus sp.

a) Mature cercaria, b) Encysted metacercaria.

Notice three eye spots in both the cercarial and metacercaria.

100 μ

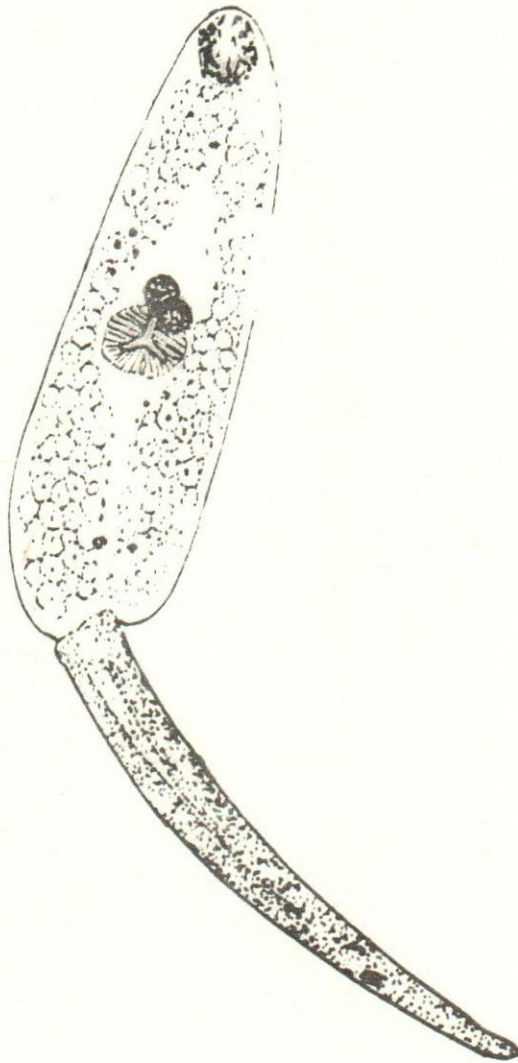


Fig. (8). Cercaria assluti. n. sp.

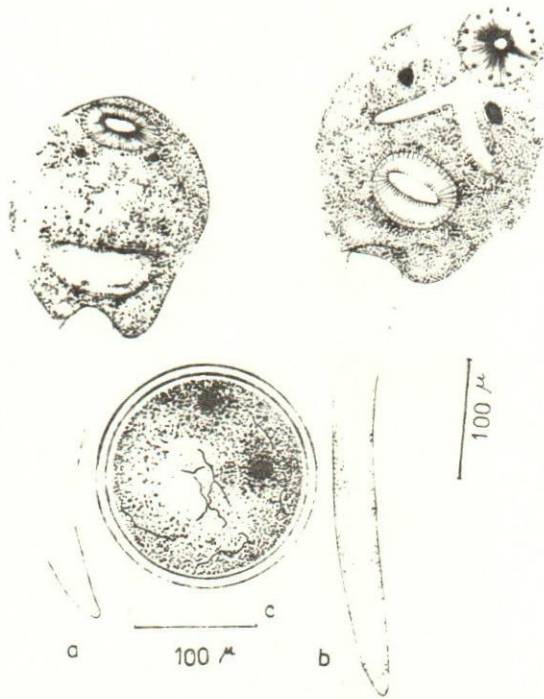


Fig. 9 An amphistome ocellate cercaria
 a) Immature cercaria b) Mature cercaria
 c) Encysted metacercaria on vegetables.