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CERCARIA ASWANI SP. NOV. RECOVERED FROM BIOMPHALARIA ALEXANDRINA INHABITING THE RIVER NILE INFRONT OF THE HIGH DAM

(With 1 Table & 1 Fig.)

By

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سركاريا اسواناي نوع جديد متطفل
فى قواقع بيومفلاريا الكسندرينا في نهر النيل
أمام السد العالي

أحمد مندور ، رفعت خليفة ، محمد السيد ، عاطف ابراهيم

سركاريا أسواناي نوع جديد من السركاريا تم وصفه من قواقع بيومفلاريا الكسندرينا التى تعيش فى نهر النيل أمام السد العالي (بأسوان ـ مصر العليا) . وجد أن السفات العامة لجنس إكينو ستوما بالاضافة الي وصف تراكيب جديدة لم توصف من قبل في سركاريا هذا الجنس وتم رسمها . و نتيجة لهذه الدراسة تم اقتراح اسم سركاريا أسواناي نوع جديد علي هذه السركاريا ومحافظة أسوان منطقة جديدة لهذا الطفيل . وقد تم اجراء تجارب معملية لعدوي البط والكتاكيت والفئران بالميتا سركاريا ولكنها لم تنجح ، وقد أوصي باجراء دراسات معملية مستقبلية للحصول على الطور البالغ لهذه السركاريا وتكملة دورة الحياة .

SUMMARY

A new echinostome cercaria has been collected from Biomphalaria alexandrina inhabiting the River Nile infront of the High Dam (Aswan, Upper Egypt). The morphological characters are basically that of the genus Echinostoma in general, but new additional structures were observed, described and illustrated. As a result, it was considered a hitherto unknown cercaria, to which the name Cercaria aswani sp. nov. is proposed. Moreover, Aswan is considered a new locality for this parasite. Experimental trials to infect rats, ducklings and chickens with encysted form was not successful. Further trials were recommended to obtain the adult worms and to study the complete life cycle.

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INTRODUCTION

Many workers such as SEWELL (1922); BEAVER (1937) and ITO (1977, 1978)have described different types of echinostome cercariae in different localities allover the world. However, Aswan area is considered a new area for investigatios of cercariae of echinostomes which infect birds. For this reason the present work was conducted to study the cercariae of echinostomes in this locality followed by trials to get the adult worms either from naturally infected birds or after attempts to do experimental infections.

MATERIAL and METHODS

8260 Biomphalaria alexandrina snails were collected from tributaries of the River Nile infront of the High Dam. They were divided into batches of ten snails; each of which were put in 500 ml beakers containing dechlorinated water. When cercariae shedded out, the infected snails were isolated in separate beakers. It was found tht 727 of the snails (8.8%) harboured echinostome cercariae. The cercariae when collected alive, their behaviour in water was studied. They were exposed to vital stains, then some of them were fixed and stained with acetic acid alum carmine. Camera lucida drawings were carried out, and measurements were calculated in microns.

Trials were made to encyst the cercariae in non infected (laboratory bred) Biomphalaria alexandrina and left for ten days. They were fed to rats, ducklings, and chickens. They were examined daily for eggs of echinostomes for 15 days, after which they were autopsied for the presence of adult or immature worms.

RESULTS

Cercaria Fig. a, b:

Morphology: Large echinostome cercariae emerged from naturally infected Biomphalaria alexandrina snails. Living cercariae are whitish in colour and exhibiting active movements characteristic for echinostomes.

The body Fig. a, is elongated fusiform in shape, with very well developed head collar. The body measures 407-427 u x 160-180 u. Body surface is covered with minute spines extending from the posterior level of the collar to the posterior end of the body. There are ten setae on the anterior end of the body. The head collar bears thirty-seven spines arranged in two alternating rows comprising six corner spines on each side. A well developed oral sucker is spherical, subterminal in position and measures

50.4-56.3 u in diameter. It is followed by a prepharynx and muscular pharynx which measures 43-48 u x 35-39 u. The pharynx leads into a long oesophagus which divides just anterior to the ventral sucker into two intestinal caeca which terminate near the posterior end of the body. The ventral sucker is well developed, post-equatorial and measures 61-71 u in diameter. There is a row of eight openings just above the anterior margin of the oral sucker. These openings are the terminals of eight ductules formed of two groups; each one composed of four ductules. Each group of ductules originates from two large receptacles located at the middle of oral sucker Fig. b. These ductules stain very deeply with Nile blue sulphate. They might represent the remains of escape gland cells which were utilized during the cercarial emergence.

Genital premordia are represented by two mases of cells connected together by an irregular line of cells across acetabulum. The anterior mass is more or less spherical in outline; situated in the middle line just anterior to the ventral sucker.

The posterior mass is pear-shaped, a little bigger than the anterior and deviated from the middle line. It lies a short distance posterior to the ventral sucker.

Excretory vesicle consists of one chamber. Two main collecting tubes arise from the lateral anterior surface of the excretory vesicle and run forwards to the mid-region of the prepharynx to end in descending tubules. The number of flame cells are fifteen pairs. The number of refractile concertions in the ascending tubes are 30-35 on each side. Caudal excretory duct divides into two lateral branches in the proximal region of the tail. Cystogenous glands fill the whole body of this cercaria except the cephalic region. They are rounded in shape and contain granular material.

Tail is longer than the body. It measures 430-450 x 43-52 u. Its posterior end is tapering. There is a constriction on the posterior part of the tail Fig. a. The posterior third of the tail is provided with dorsoventral fin fold.

Encysted metacercaria Fig. c:

The present cercariae were found to encyst experimentally in clean laboratory bred Biomphalaria alexandrina snails. Encysted metacercariae are spherical in shape and measure 142-165 u in diameter. The outer wall measures 5 u in thickness. Excretory granules, acetabulum, oral sucker and collar spines are usually visible through the cyst wall. The number of collar spines was difficult to count but the six corner spines were easily seen.

Trials to get adult worms by feeding metacercariae to albino rats, ducklings and chickens failed.

DISCUSSION

Echinostome cercariae are easily recognized by the "head collar" and "collar spines" and are further characterized by a complete gut, including long caeca. They are vigorous swimmers and move swiftly by the action of a long and powerful tail (DAWES, 1946).

Several writers have expressed the opinion that echinostome cercariae can not be separated in small natural groups (CORT, 1915; DUBOIS, 1929; WESENBERGLUND, 1934 and MILLA, 1936). SEWELL (1922) recognized four groups called "Echinatoides", "Coronata", "Echinata", and "Megalura". The present cercaria belongs to the group "Echinatoides" which is characterized by a fin fold on the tail.

The present echinostome cercaria possessed many characters and features of the genus Echinostoma (RUD., 1809) such as having 37 collar spines arranged in double alternating rows and a tail provided with a dorsoventral fin fold.

Seven 37-spined Echinostoma cercariae were previously described. These are:

E.revolutum (FROELICH, 1802) LOOSS, 1899 described by BEAVER (1937) and PATNAIK and RAY (1966); E.lindoense by SANDGROUND and BONNE, (1940) and LIE (1964); E.rodriguesi by HSU, et al. (1968); E.barbosia by LIE and BASCH (1966), E. paraenesi by LIE and BASCH (1967); E.audyi by LIE and UMATHEVY (1965) and E.liei by JEYARASASINGAM, et al. (1972). The last parasite was synonymized with E.caproni by HUFFMAN and FRIED (1991). With the exception of E.revolutum which possesses one fin fold on the tail, all other cercariae have two or more caudal fin folds.

Although the present cercariae bear a superficial resemblance to cercariae of E.revolutum yet they differ in measurements and many specifications. Table 1, shows the differences in number of corner spines, number and arrangement of openings of escape glands, the contents of cystogenous glands, shape of excretory vesicle, number of flame cells and the location of the single fin fold. Moreover, E.revolutum metacercariae developed in ducklings and rats while the present cercariae were refractory to these final hosts. Therefore, the present cercaria is not cercaria of E.revolutum.

Therefore, the present cercariae are not identical with any 37-spined Echinostoma cercariae. As well, they could not be larval stage of any of echinostomes previously described from Egypt.

Accordingly, the present parasite is suggested to be a new one, to which the name Cercaria aswani sp. nov. is proposed with the following characters:

Snail host: Biomphalaria alexandrina.
Locality: Aswan (new locality).

CERCARIA ASWANI SP. NOV.

Measurements:

Body: 407-427 x 160-180 u.
Oralsucker: 50.4-56.3 u in diameter.
Ventral sucker: 61-71 in diameter.
Escape glands: 8 in two groups.
Tail: 430-450 x 43-52 u with dorso-ventral fin fold.

Type species: is deposited in the Dept. of Parasitology, Assiut, Faculty of Med. and Dept. of Zoology, Aswan, Faculty of Science Assiut, Egypt.

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Table (1): Comparison between cercariae of *Echinostoma revolutum* described by several authors and the present cercariae.

Cercaria	Tsuchimochi (1924)	Tubangui (1933)	Johnston and Angel (1941)	Beaver (1937)	Caballero and Larios (1940)	The present cercaria
Body	280-420X200-350u	330-520X150-250u	284-350X92-109u	323 X 95 u	429-585X117-156u	407-427X160-180u
Tail	540-750 u long	400-480X37-50u	284-384X38 u	450 u long	312-409 u lon	430-450X43-52 u
Oral sucker	54-66X45-66 u	54-62X50-62 u	44 X 37 u	41 X 46 u	29-33X16-24 u	50.4-56.3 u diam.
Pharynx	30-35X28-30 u	25-30X20-27 u	not mentioned	17 X 21 u	61 u in diam.	43-48X35-39 u
Ventral sucker	69-75X75-78 u	58-75X62-83 u	48 u in diam.	58 u in diam.	61-65 u in diam.	61 - 71 u.
No. of Escape glands outlets	Not mentioned	Not mentioned	8 openings arranged in 2 rows of 4 each	6 openings arranged along anterodorsal of oral sucker	Not mentioned	8 openings, in two groups, of 4 each, each group collected in large receptacle at oral sucker region.
Cystogenous glands contents	Not mentioned	Not mentioned	Not mentioned	rod-like material	Not mentioned	Oval shaped
Tail fin fold	Not mentioned	Not mentioned	One, dorsally	One, dorsally	-	One, dorso ventrally.
No. of flame cells	Not mentioned	Not mentioned	16 pairs	16 pairs	Not mentioned	15 pairs
Body spine distribution	Spinose	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Spinose
1st intermediate host	Not mentioned	Not mentioned	Not mentioned	*Bulinus truncatus* *Biomphalaria glabrata*, *Bulinus tropicus*	Not	*Biomphalaria alexandrina*
Final host	Ducklings	House pigeons	Pigeons	Rats	doves, guinea-pig, and rats	Unknown

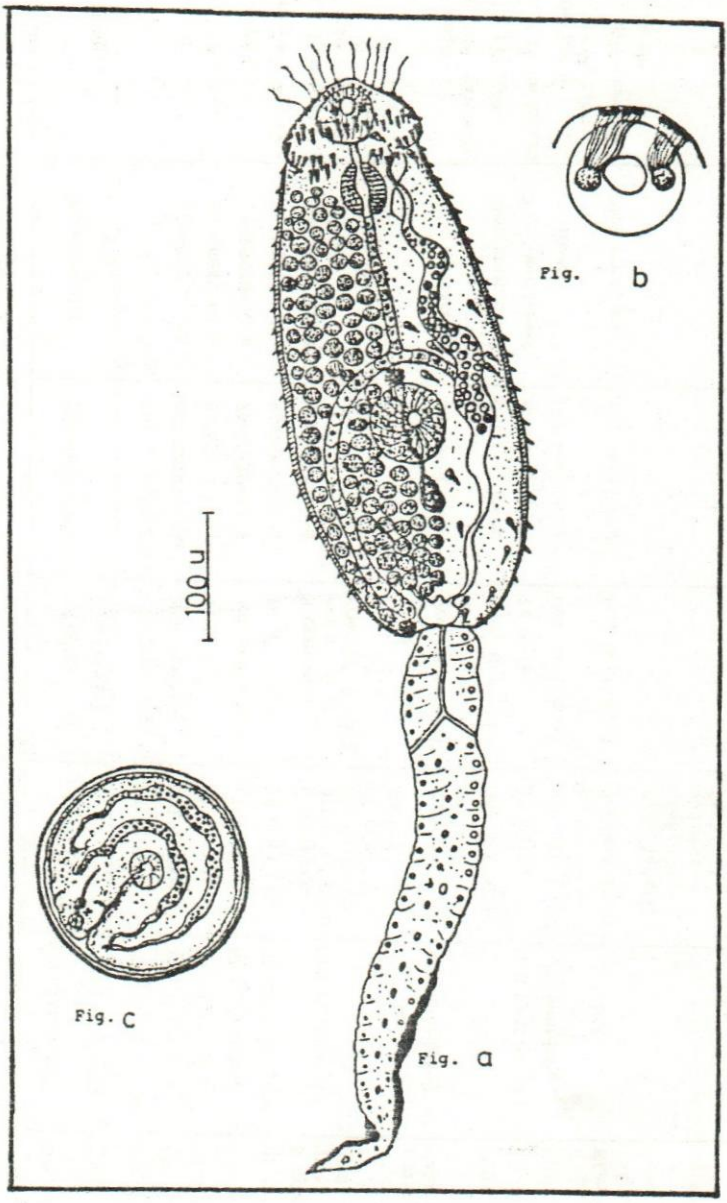
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Fig. b
Fig. C
Fig. a