

## ***Life cycle of Philophthalmus species for the first time in Egypt***

**H. S. Lotfy<sup>1</sup> and S. M. Abo El-Hadid<sup>2</sup>**

<sup>1</sup>Animal health institute, Beni-Suef, Dokki, Giza, Egypt

<sup>2</sup>Department of Parasitology, Faculty of Veterinary Medicine, Beni-Suef University, Beni-suef, Egypt

The present investigation succeeded in following up the life cycle of *Philophthalmus* species cercaria emerged from *Cleopatra bulimoides* snail till production of adult worm *Philophthalmus* species. This adult worm was extracted from the nictitating membrane of the eyes after 35 days post oral infection of one-day old ducks by metacercaria of *Philophthalmus* species. The worm *Philophthalmus* species have a mean length of 4.365mm. The most interesting result of the present study is the success in obtaining *Philophthalmus* species adult worm. Moreover *Philophthalmus* cercaria was described for the first time from snails collected from Beni-Suef Governorate, Egypt.

*Philophthalmus* trematodes were found to be inhabitants the nictitating membrane of birds (Dissanaik and Bilimoria, 1958). Cercariae of both *Philophthalmus hegeneri* and *Philophthalmus megalurus* were emerged naturally from *Batollaria minima* and *Pleurocerca acuta* snails in Florida, USA. The cercariae encysted directly to form encysted metacercaria, when infect chicks experimentally at one day old by pipetting in the eye, they develop after 35 days post infection to obtain the adult *P. hegeneri* and *P. megalurus* from eyes (Colgan and Nollen, 1977).

Ismail and Issa, 1987 in Jordan, Swarnakumari and Madhavi, 1992 in India, Radev *et al.*, 2000 and Diaz *et al.*, 2002, in Venezuela, they recorded that the snail *Melanoides tuberculata* was the intermediate host for *P. gralli*, *P. nocturnes* and *P. species*. They found that the snail emerged naturally cercariae which directly encysted. The encysted metacercaria was excysted by warm saline and then experimentally infect one day chicks in the orbit of the eye or orally. The adult worms were recovered from the eyes after 35-60 days post infection.

In Egypt, there is no any available literature about adult *Philophthalmus* species, but a few paper on cercaria of *Philophthalmus* species (Hassan, 1987 and Khalifa *et al.*, 1997), these authors found that the cercaria of *Philophthalmus* naturally emerged from *Cleopatra bulimoides* snail.

The main target of this study was to identify the intermediate host, larval stages and adult worm of *Philophthalmus* species.

### **Material and Methods**

#### **Snail (*Cleopatra bulimoides*).**

**Snail collection.** The snails were collected from Beni-Suef water branches then transferred in a little amount of channel water to the laboratory in Faculty of Veterinary Medicine, Beni-Suef.

**Maintaining of snails in the laboratory.** They were maintained according to El-Bahy (1984).

**Examination of snails.** snails were examined by exposure technique (Abdel-Ghany, 1955) or Crushing technique (Jackson, 1958).

#### **Cercariae.**

Identification and detailed morphological characters of the emerged cercaria was done according to Schell (1970).

The encystement of cercariae occurred directly after emergence from the snails. Exystation was done by warm saline, after that metacercaria was ready for infection of the ducklings.

**Experimental infection.** Three one-day old ducklings infected orally by 50-70 metacercaria for each and were reared on net floor boxes under observations. The ducklings were slaughtered after 35 days of infection, where internal organs, intestine and eyes were examined. The available worms were collected, relaxed, fixed, stained and mounted according to Prichard and Kruse (1982) and identified according to Yamaguti (1958) depending on characteristic morphological features of adults, its habitat in the final hosts, its snail origin and morphological features of the cercariae were taken also in consideration.

### **Results**

**Philophthalmus species cercaria** (Plate I, a & b). *Philophthalmus* species cercaria is Gymnocephalus type of cercariae. This cercaria

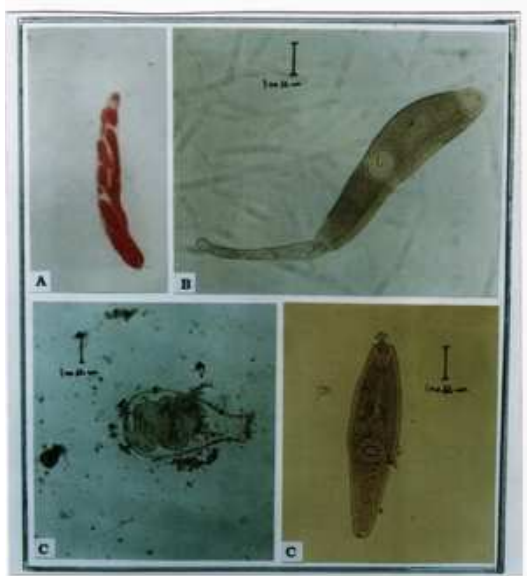


Plate (I):

- A- *Philophthalmus* sp. redia
- B- *Philophthalmus* sp. cercaria
- C- *Philophthalmus* sp. ECM
- D- *Philophthalmus* sp. excysted metacercaria



Plate (II):

- A- Fresh *Philophthalmus* sp. adult worm
- B- Stained *Philophthalmus* sp. adult worm

emerged naturally from *Cleopatra bulimoides* field collected snails. It is characterized by, the body measures 740-775x140-170um (750x160 um) while the tail measures 450-480x35-45um (465x40um). The body constricted in the region of ventral sucker. Its tegument is thick, spinous and highly papillated. Oral sucker is rounded, subterminal and measures 65-80 x 80-95 (75x90um). Ventral sucker is post equatorial and

lies at the junction of anterior two thirds with the posterior third of the body and measures 95-120um (110um in diameter). Wide mouth in the bottom of the oral sucker, followed by long tubular prepharynx, strong muscular pharynx is about midway between the oral sucker and intestinal bifurcations. Cytogenous glands are represented by large rectangular glands filled with rod let materials. The tail is provided with adhesive gland located at the posterior tip of the tail. These cercariae developed in daughter redia. **Encysted metacercaria (EMC):** (Plate I, c).

These cercariae are rapidly encysted on any nearest solid objects losing its tail. The EMC wall is composed of several layers, the inner layer closely enveloping the metacercaria assume a characteristic flask shape, where the outer layer is irregular and distant from the inner layer. The EMC measure in length of 400-450um and 140-150um (425 x 145um) width. This encysted metacercaria could be excysted if vigorously moved the needle or induced excystation by placing it in saline at 37-39c. The excysted metacercaria measures 620-650 x 150-190um (635 x 170um). The oral sucker

reach 70-80 x 85-95um (75 x 90um.) The ventral sucker measures 90-100 x 90-100um (95 x 95um). This excysted metacercaria is infective to the final host.

**Adult *Philophthalmus* species** (Plate II). This adult worms extracted from the nictitating membrane of eyes after 35 day post oral infection of ducks by metacercaria of *Philophthalmus* spp. cercaria . The body of the worm was fusiform, and measures 3.63-5.1 x 0.72-1mm (4.365x0.86m). The oral sucker is sub terminal, located at anterior end of the body and measures 0.3-0.4 x 0.24-0.34mm (0.35 x 0.29mm). The pharynx located immediately posterior to the oral sucker, which is nearly oval in shape and measures 0.24-0.26 x 0.28-0.34mm (0.26x0.3mm). The cirrus pouch extended posteriorly to acetabulum. Two simple intestinal caeca ending posteriorly. Acetabulum located at anterior third level of body and measures 0.4-0.46 x 0.44-0.5mm (0.43x0.47mm). The oesophagus was short and bifurcates before the level of acetabulum. The ovary is oval in shape, median, peritesticular, in the posterior third of the body and measures 0.24-0.28mm (0.26mm) in diameter. Testes are oval, tandem, located in posterior part of the body and smooth surfaced. An anterior testis measures 0.36-0.6 x 0.38-

0.64mm (0.37 x 0.62mm). The posterior one measures 0.3-0.34 x 0.34-0.5mm. The genital pore is located at the intestinal bifurcation. The uterus is postacetabular, pretesticular, intercaecal, containing young embryonated eggs or more mature oculate miracidia. The vitellaria is exteracaecal, symmetrical tubular, with several irregularly spaced constrictions.

Discussion

#### **Philophthalmus species cercaria.**

This cercaria belongs according Schell (1970) to *Megalurus cercariae* which is characterized by possessing adhesive gland in the tip of the tail and having no excretory canal in base of the tail. In 1896 Looss described cercaria distomatosa which shedded from *Cleopatra bulimoides* in Egypt. This cercaria is similar to that is recorded by Hassan (1987), but the tail/body ratio was 1.118 while in the present study the cercaria was 1.644. They are similar in the shape of the encysted metacercaria, which is flask-shape. More over oral/ventral suckers ratio was 0.75. Khalifa *et al.* (1997) described certain type of cercaria from *Cleopatra bulimoides* but different in body/tail ratio 1.409 and oral/ventral suckers ratio 0.583. Nollen and Murray (1978) said that the identification of *Philophthalmus* cercaria depended on tail length and the snail intermediate host. Finally, this cercaria was described for the first time from snail collected from Beni-Suef Governorate.

#### **Philophthalmus species adult worm.**

This adult worm produced after obtaining on *Philophthalmus* cercaria from *C. bulimoides* snail and encysted metacercariae and experimental infection in ducks. This worm species have a mean length of 4.365mm and its detailed morphological features come in agreement with the previous description of corresponding species by, Ismail and Issa (1987), Swarnakumari and Madhavi (1992), Colgan and Nollen (1977) and Radev *et al.* (2000).

This worm species has special zoonotic importance where Lamothe-Argumedo *et al.* (2003) recorded parasite causing conjunctivitis for human in Mexico as first record in 2003.

The most interesting result of the present study is the success in obtaining *Philophthalmus*

species adult worm. Moreover *Philophthalmus* cercaria was described for the first time from snails collected from Beni-Suef Governorate, Egypt.

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