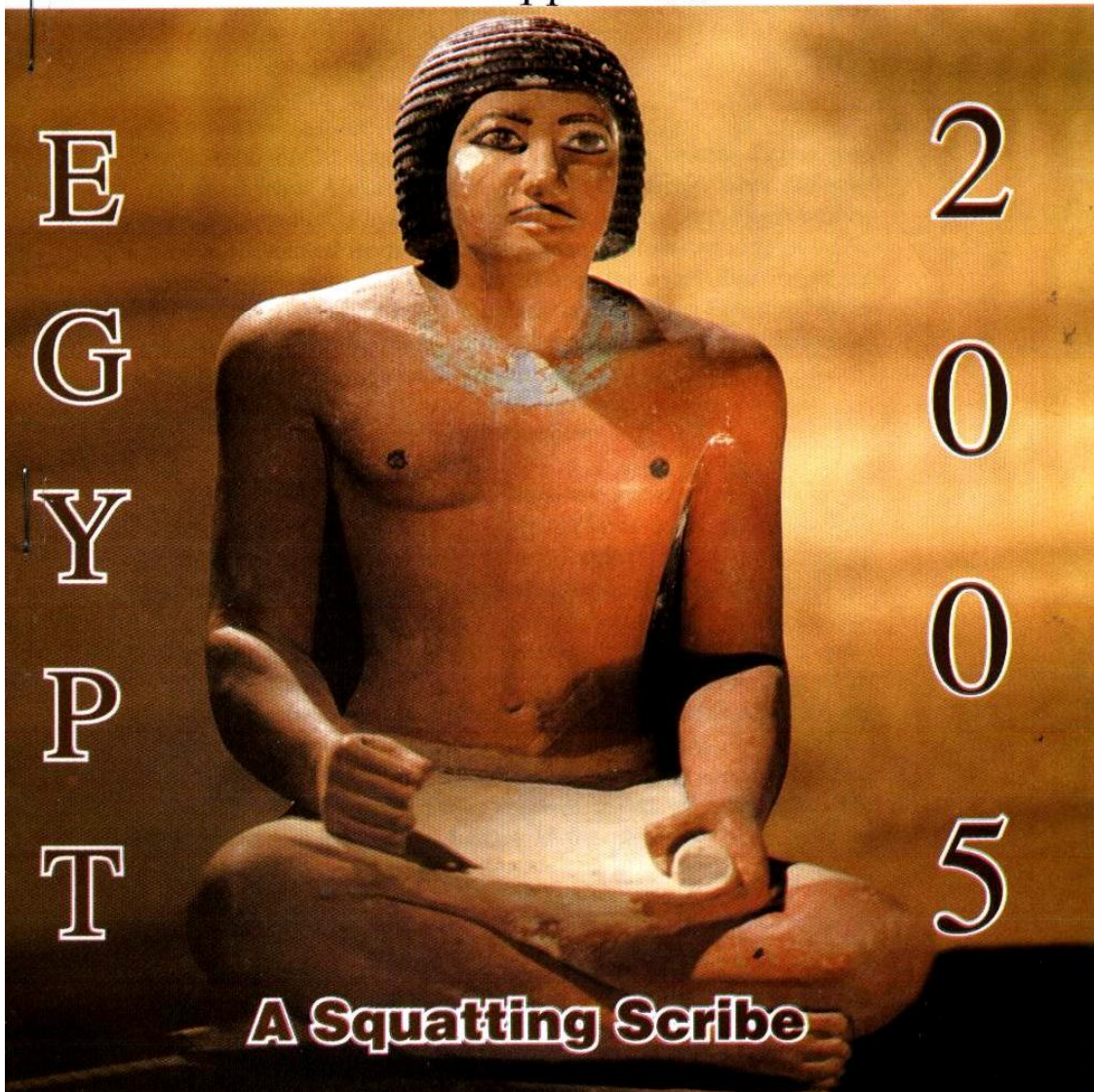


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**STUDIES ON *PHYLLOBOTHRIUM LACTUCA*
(CESTODA: PHYLLOBOTHRIIDAE) AND *PHILOMETRA*
SALGADOI (NEMATODA: PHILOMETRIDAE)
PARASITIZING *BOOPS BOOPS* FROM THE
MEDITERRANEAN SEA, EGYPT**

By

DAYHOUM ABDEL-HAMID AL-BASSEL

Department of Zoology, Faculty of Science, Fayoum University,
Al-Fayoum, Egypt

Abstract

A total of 30 specimens of *Boops boops* marine fishes were collected from Alexandria fish market. The fishes were dissected out for parasites. *Phyllobothrium lactuca* (Cestoda: Phyllobothriidae) was isolated from the intestine and *Philometra salgadoi* (Nematoda: Philometridae) was isolated from the ovary. Both were identified using standard keys, and examined by Scan Electron Microscopy (SEM). Some morphological features reported were unique. The two parasites represent new hosts record of *B. boops*.

Introduction

Khalil and Jones (1994) outlined the generic diagnosis of genus *Phyllobothrium* Van-Beneden, 1850 as follows: scolex with four bothridia, each sessile or pedunculated, with an accessory sucker. Margin of bothridia folded, curled, with or without loculi. Apical glandular organ sometimes present. Strobila craspedote, or acraspedote, apolytic or anapolytic. Genital pores lateral, irregularly alternating, sometimes, unilateral along part of strobila. Testes numerous, post to vaginal, not portal-sided. Ovary posteriorly, four-lobed or bilobed in cross-section. Vitelline follicles lateral in elasmobranchs. A cosmopolitan species. Several species of *Philometra* cause mild to severe pathology in fish. Aged and dying worms locked in the abdomen or trapped in

tissue provoke severe inflammatory response, granuloma and fibrosis (Paperna and Zwerner, 1976). Infection with *N. gymnarchi* in the lungs and *T. bagri* in the mouth vicinity cause only light local tissue reaction (Khalil, 1969). Anderson and Chabaud (1983) outlined the generic diagnosis of genus *Philometra* (Philometridae: Philometrinae). Anderson (1992) outlined seven species of genus *Philometra* and summarized the development and transmission of it as follows: This is a common parasite of fish. The gravid female is generally well marked, because it is large, packed with larvae and frequently occurs in readily observed parts of the host's body and even, at certain times of the year, protrudes from the anus. In the more primitive species, the gravid female occurs under the skin of the body, the fins, the cheek pouches and rarely the gill arteries. These kinds of females elicit a break in the tissues which exposes them to fresh water, whereupon they burst and release their numerous larvae. In more specialized species, females become gravid in the body cavity and migrate to the anal region, expose themselves to water, and burst. Philometridae occur in body cavities or penetrate subcutaneous tissues. Males are short-lived and the ovoviviparous females extrude their posterior end through the skin to release larvae into the water. The fish become infected by ingesting infected copepods (Molnar, 1966; Paperna and Zwerner, 1976). Family Philometridae is represented in Africa by two genera: *Nilonema gymnarchi* in the lung-like air bladder sacs of *Gymnarchus niloticus* and *Thwaitia bagri*, under the skin lateral to mouth in *Bagrus bayad* (Khalil, 1969). Gravid *N. gymnarchi* presumably escapes from the lungs into the water to discharge larvae (Khalil, 1969). Gravid *T. bagri* only appears during December to February. Strict seasonality reported in some species of *Philometra* was linked with the host reproductive season (Paperna and Zwerner, 1976).

The aim of the present work was to study the parasites infecting *Boops boops* trapped from the Mediterranean Sea in the vicinity of Alexandria

Materials and Methods

30 *Boops boops* marine fishes were collected from Alexandria fish market. Nematodes were removed from the ovary of

fish and rinsed in saline, fixed in cold 10% buffered formalin and cleared in lactophenol for morphological study. Some specimens were postfixed in ethanol, dehydrated in a graded series of ethanol and treated with acetone-ether, dried, coated with approximately 60A gold/palladium and examined with scanning electron microscope (SEM). Cestodes were first relaxed and fixed in 10% formaldehyde, washed and prepared for SEM (Al-Bassel, 2002). Unless otherwise stated, measurements are in mm.

Results and Discussion

1- *Phyllobothrium lactuca* Figs (1-6):

The description is based on 3 specimens: Entire strobila acraspedote, euapolytic and worm moderately short, possessing few segments. Scolex large, 1340-1460x935-990 with apical glandular organ measures 200-210x190-198, possessing 4 large bothridia. Each nearly oval in outline 340-380x350-370. Bothridial wall divided into two distinct layers. Inner layer larger than outer one with two pore-like structures, outer one with thick curved margin on external border. Each bothridium possesses an accessory sucker measures 75-90x80-103. Four bothridia inclined slightly inwards. Peduncle elongate 1700-1900x300-390, covered with transverse tegumental folds. Numerous loculi emerged mainly from bothridium internal surface.

Norman (1997) reported cysticerci of *Phyllobothrium delphini* in peritoneal cavity of the common dolphin in Australia. He found cysticerci in the subcutaneous blubber and a localized lymphoplasmacytic host response to the presence of cysticerci. *Phy. squali* was re-described and illustrated in marine fish of the Black Sea by Vasileva *et al.* (2002). Mokhtar-Maamouri and Zamali (1981) described *Phy. pastinacae* from the spiral valve of *Dasyatis pastinaca* from Tunisia Gulf. They outlined scolex divided into four distinctly curled bilobed bothridia with marginal loculi, without post vaginal testes, lateral genital atrium always in posterior 1/4 of segments, about 100 testes. Williams (1959) described and illustrated *Phy. sinuosiceps* from *Hexanchus griseus* (the six gilled shark). Margolis and Boyce (1990) reported *Phyllobothrium* sp. from *Anadromous Chinook* (Salmon) from New Zealand. Agusti *et al.* (2005) described and SEM illustrated microtriches of tetraphyllidean metacestodes

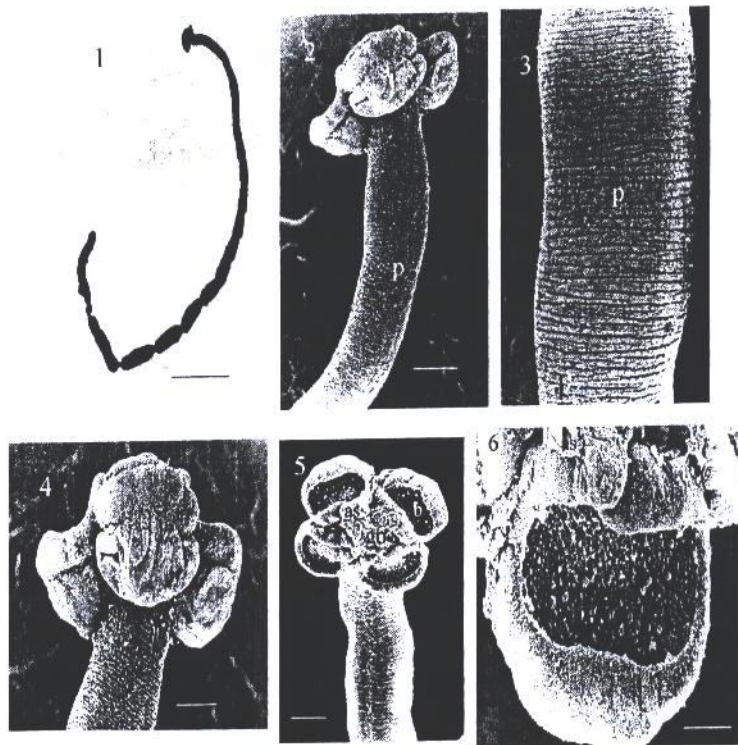


Fig. 1: Entire worm of *Phyllobothrium lactuca* (S. bar 1700 μ m).

Fig. 2: Anterior end of *Phyllobothrium lactuca*, (lateral view) s- scolex, p-peduncle (S. bar 170 μ m).

Fig. 3: Transverse foldes of peduncle of *Phyllobothrium lactuca*, p- peduncle (S. bar 500 μ m).

Fig. 4: Anterior end of *Phyllobothrium lactuca*,(dorsal view) b- external side of bothridium (S. bar 98 μ m).

Fig. 5: En-face view of anterior end of *Phyllobothrium lactuca*, as- accessory sucker , go- glandular organ, b- internal side of bothridium (S. bar 98 μ m).

Fig. 6: Enlarged Fig. 5 for showing loculi, as- accessory sucker (S. bar 47 μ m).

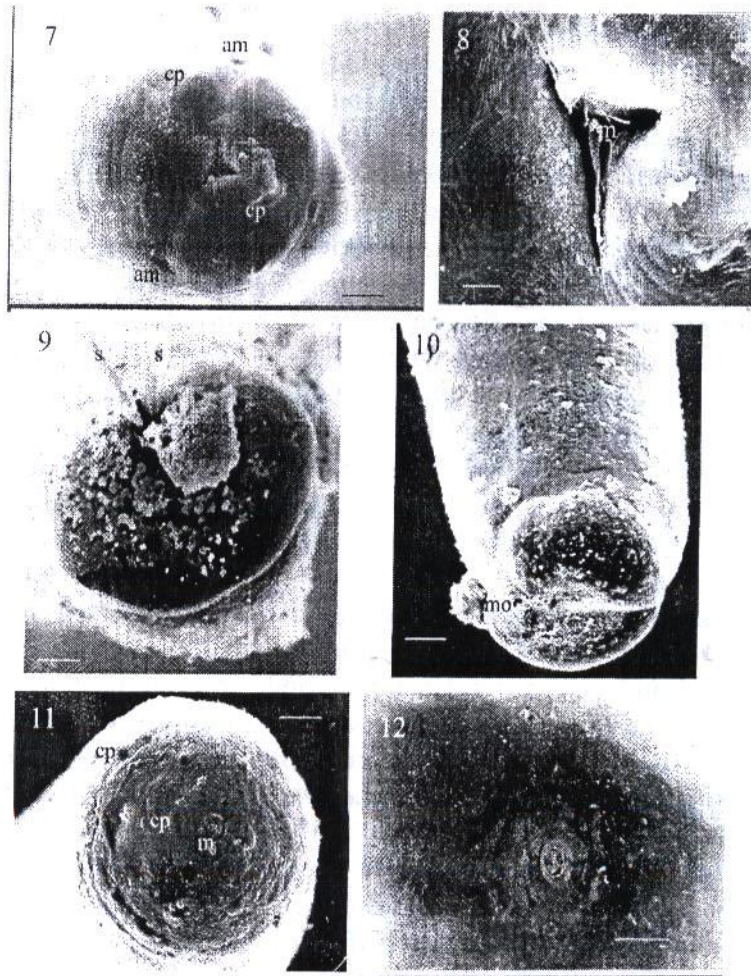


Fig. 7: Anterior end of female *Philometra salgadoi* en-face view, cp- cephalic pappilae, am-amphid, (S. bar 18 μ m).

Fig. 8: Enlarged of Fig. 7 for showing mouth opening, m- mouth (S. bar 6 μ m).

Fig. 9: Posterior end of male *Philometra salgadoi* apical vie, s- spicule (S. bar 18 μ m)

Fig. 10: Posterior end of male *Philometra salgadoi* lateral view showing two cuticular folds ,mo- cloaca opening (S. bar 22 μ m).

Fig. 11: En-face view of the anterior end of male *Philometra salgadoi*, cp- cephalic pappilae, m- mouth (S. bar 18 μ m).

Fig. 12: Anterior end of *Philometra* first stage larvae (S. bar 9 μ m).

from the striped dolphins (*Stenella coeruleoalba*) from Western Mediterranean. Fernandez *et al.* (2003) investigated 17 species of fishes for helminthes parasites, found five worms including *Phyllobothrium* sp. in the intestine. Al-Bassel (2003) re-described *Phy. lactuca* Van Benden, 1850 (one specimen) by light microscopy from the tope shark *Galeorhinus galeus* from the Mediterranean Sea in Libya. The writer preferred to examine more than one specimen of *Phy. lactuca* Van Benden, 1850 by SEM for clarify the specific characters of this species. The present description fully agreed with the main characteristics original description but there with minor differences in body length, however, *B. boops* is considered new host for this species.

2- *Philometra salgadoi* (Figs.7-12):

Male: (Figs. 9,10,11): The following description is based on four specimens: Body thread-like, whitish, with a smooth cuticle. It measures 2736-3384x40-50. Cephalic end rounded, oral aperture small surrounded by two circles of cephalic papillae and two lateral amphids (Fig.7). Outer circle of four large, dorsolateral and ventrolateral papillae, and inner circle of four minute papillae (Fig. 7,11). Body posterior end broad, lobular, with a pair of preanal and postanal small flat papillae near cloacal aperture. Two cuticular folds and two phasmids located on posterior extremity (Fig.10). Spicules well sclerotized, simple, narrow, needle-like, and somewhat unequal in length (Fig.9). Right specule 111-132 long and left one 89-98 long, maximum width of both spicules medially 4-5 (Fig.9).

Female: (Figs 7,8): The following description is based on one specimen: Body filiform with smooth cuticle, measures 90032x400. Anterior end rounded, bearing eight conspicuously large, fleshy cephalic papillae, oral aperture triangular, two small amphids near mouth (Figs.7,8). Posterior end rounded, bearing two small papilla-like projections. First larval stage isolated from female uterus measures 315-370x13-20, with a very small mouth (Fig. 12).

Blaylock and Overstreet (1999) described *Margolisianum bulbosum* (Nematoda: Philometridae) from the Southern Flounder, *Paralichthys lethostigma* (Pisces: Bothidae), in the Mississippi region, USA. Merella *et al.* (2005) described *Philometra jordanoi* male from the ovary of a dusky grouper *Epinephelus*

marginatus for the first time in western Mediterranean Sea. Frantova *et al.* (2005) described the adult body wall female *Ph. Obturans* by scanning electron microscopy in Czech Republic, Branisovska. Moravec (2004) examined the original literature concerning species of *Philometra* parasitic in the abdominal cavity of European cyprinids revealed that *P. abdominalis* Nybelin, 1928 is a junior synonym of *P. ovata* (Zeder, 1803), a parasite of cyprinids of the genera. Moravec (2004) reviewed and discussed the taxonomy and biology of dracunculoid nematodes parasitic in fishes. Moravec *et al.* (2003) reported *Ph. lateolabracis* (Nematoda: Philometridae) in the gonads of wild and cultured dusky grouper *Epinephelus marginatus* (Lowe) from waters near Balear Island (Spain, Mediterranean Sea. Moravec *et al.* (2002) described the female of *Ph. ophisterni* sp. n. from the intestine and mesentery of the swamp-eel *Ophiternon aenigmaticum* from a canal of the Papaloapan River in Tlacotalpan State, Mexico. It has minute cephalic papillae, a well developed anterior oesophageal bulb and large caudal projections. Pazooki and Molnar (1998) described *Ph. Karunensis* from the swim bladder and abdominal cavity of *Barbus sharpeyi* caught from freshwater of southwest of Iran. Males distinctly differ from the known species in the spicules' length and gubernaculum. Vidal-Martinez *et al.* (1995) described *Ph. (Ranjhinema) salgadoi* from the ocular cavity of female *Epinephelus morio* from Gulf of Mexico. It has 8 conspicuously large, crescent-shaped, fleshy cephalic papillae of external circle and 2 small, sub-terminal papilla-like projections on caudal end. Moravec *et al.* (1988) reported *Ph. lateolabracis* from *Parupeneus indicus* originating from Indian Ocean near Somalia. Deardorff *et al.* (1986) reported female *Philometra* sp., as first case of an adult nematode in an open lesion. This nematode invaded a puncture wound in a fisherman's hand while he was filleting an infected carangidae fish *Caranx melampygus* in Hawaii. Moravec (1978) re-described *Ph. obturans* from pike (*Esox lucius*) from the basin in Czechoslovakia. Molnar and Fernando (1975) described male and re-described female of *Ph. cylindracea* a parasite of yellow perch. This species has a one-year development cycle starting as infective larvae in June and become mature, larvigerous worms on next June. Experimentally, *Cyclops* was a suitable intermediate

host. Moravec *et al.* (2001) described *Ph. salgadoi* (Nematoda: Philometridae) from ocular cavity of *Epinephelus morio* in Mexico. The present material is similar to Moravec's specimens in the main characteristics but with minor differences in body length, however *B. boops* was considered new host and extends its range of distribution to the Egyptian side of Mediterranean Sea.

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