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## **TETRAPHYLLIDEAN CESTODES (ONCHOBOTHRIIDAE AND PHYLLOBOTHRIIDAE) INFECTING THE TOPE SHARK (*GALEORHINUS GALEUS*) IN LIBYA**

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**Key Words :** Shark – Libyan – *Acanthobothrium coronatum* – postlarval stages – spiral.

### **ABSTRACT**

50 specimens of the tope shark *Galeorhinus galeus* were collected from the Libyan coastal waters near Misurata city in Libya. Adults and postlarval stages of 9 different species of tetraphyllidean cestodes isolated from the spiral of *Galeorhinus galeus* were redescribed, namely *Acanthobothrium coronatum*, *Calliobothrium eschrichti*, *Clydonobothrium elegantissimum* and *Phyllobothrium* sp. (adults), *Acanthobothrium* sp., *Echeneibothrium variabile*, *Echeneibothrium* sp., *Scyphophyllidium giganteum* and *Pseudoanthobothrium hanseni*, (postlarvae). The present redescription added more details about the body length and scolex measurements of some species. All species are reported for the first time from Libyan Mediterranean.

### **INTRODUCTION**

The tope shark *Galeorhinus galeus* (Triakidae) is eaten in Libya and considered a commercial marine fish in the fish market. This species is carnivorous, feeds on fishes, mollusca and cephalopods. Consequently, it is more exposed to infection by cestodes than other marine fish, and is therefore selected for the present investigation. Libya was selected as the area since the shark *Galeorhinus galeus* is a common throughout most of the year. Although some information on the parasites of marine fishes from

other areas is known, differences in the parasite fauna of a widely distributed species can be expected with different geographical locations (Manter, 1955). The objective of this investigation was to study the natural parasite fauna of the tope shark from one region of its distribution and to extend our knowledge about the prevalence and distribution of Tetraphyllidean parasites in *Galeorhinus galeus* in the Libyan Mediterranean Sea in Libya. In Egypt, research has been done on elasmobranchs and its parasites (Hassan, 1976).



**MATERIAL AND METHODS**

A total of 50 samples of the tope shark *Galeorhinus galeus* (Triakidae) ranging in size from 45-60 cm were collected from the Libyan coastal waters near Misurata city in Libya. Fishes were examined for cestodes as soon as possible. Recovered cestodes were first relaxed, flattened then fixed in hot 70% alcohol or 5% formaline. Parasites were examined then stained using aceto-alum carmine stain. Drawings were made to the scale using a Camera Lucida. Measurements are in millimetres, unless otherwise stated. The identification of worms were made according to Khalil *et al.* (1994) and Williams & Jones (1994). The methods followed in collection, fixation, staining, clearing and mounting are described in Al-Bassel (1990).

**RESULTS AND DISCUSSION**

All parasite species described below belong to the order Tetraphyllidea and are isolated from the spiral of the shark *Galeorhinus galeus* from the Mediterranean in Libya. These parasites include:

**1- *Acanthobothrium coronatum*** (Rudolphi, 1819) Van beneden, 1849 (Onchobothriidae) (Figs. 1, 2, 3, 4, 5).

**Description:** (based on 3 specimens).

The entire strobila acraspedote, euapolytic and 6.24-7.20 x 0.14-0.20. Scolex, 0.36-0.40 x 0.26-0.30, carries 4 bothridia, each divided into 3 loculi, each is 0.26-0.30 by 0.0066-0.0075. A pair of bifid hooks

is attached to each bothridium. The hook handle is 0.048-0.052, the inner prong is 0.11-0.12 and the outer 0.097-0.099 in length. The accessory sucker is 0.0333-0.037 in diameter, found at the apex of each bothridium. The peduncle is 0.12-0.15 long. The mature proglottid is 4.3-4.6 x 0.96-0.99. The genital atrium is anterolateral and irregularly alternating. The number of testes in each mature proglottid varies from 22 to 25 occupying the two lateral (poral and antiporal) fields and distributed in the prevaginal and postvaginal regions. Vas deferens is convoluted in front of the vagina and leads into a pear-shaped cirrus pouch, 0.41-0.45 long and 0.20-0.23 wide. Ovary is H-shaped, and formed of two deeply branched lobes, each 1.13-1.20 x 0.24-0.26, joined distally by a transvers isthmus. Vitellaria arranged in two lateral bands along the sides of the proglottid. Uterus median, 3.04-3.09 x 0.40-0.45, extending anteriorly to terminate blindly near to the proximal end of the proglottid.

The specimens studied agreed fully with the major characters of the type species *Acanthobothrium coronatum*, but there are certain minor differences in the measurements of the scolex and its hooks. The present report extends its geographic range to the Libyan Mediterranean.

**2- *Calliobothrium eschrichti*** Van Beneden, 1850 (Onchobothriidae) (Fig. 6, 7, 8, 9).



**Description:** (based on 7 specimens).

Worms euapolytic, 1.14-1.19 x 0.070-0.088. Scolex 0.5-0.7 x 0.33-0.38 with 4 bothridia, carried on cephalic peduncle, 0.26-0.30 long. Bothridia, 0.30-0.35 x 0.11-0.13 each, divided into 3 loculi and carries a pair of hooks, 0.14-0.16 in length. Accessory sucker, 0.050-0.060 across, found on the apex of each bothridium. Strobila acraspedote, of few number of segments: immature segments 3-5, mature segments 2-4, each 0.24-0.28 x 0.12-0.15. Testes 10-13, situated between the two lateral bands of vitellaria, 2 testes postporal on poral side. Cirrus pouch 0.030-0.035 x 0.015-0.017, containing coiled cirrus. Ovary bilobed, 0.025-0.028 x 0.014-0.017 located at posterior end of segment. Genital pore lateral, alternating irregularly and lies 40-60% length of segment from posterior end. Vagina expanded at base to form seminal receptacle, extending anteriorly along median line to level of cirrus pouch and joins genital atrium anterior to cirrus pouch. Vitellaria one row of vitelline follicles on each side of segment. Uterus in the form of simple, median, blind tube, 0.17-0.19 long, extending anteriorly to terminate about 0.050-0.064 from the proximal end of the segment.

This species was redescribed by Nasin *et al.*, 1997. The present specimens are similar to Nasin's specimens in all characteristics except for further details about the body length, and its geographic

range extending to the Libyan Mediterranean.

**3- *Clydonobothrium elegantissimum*** (Lonnberg, 1889) Euzet, 1959 (Phyllobothriidae) (Figs. 10, 11, 12, 13).

**Description:** (based on 3 specimens).

The strobila acraspedote, anapolytic, 11-13 x 0.61-0.69. Scolex unarmed, 0.53-0.58 x 0.65-0.70, with small apical myzorhynchus and 4 large bothridia with crumpled and loculated margin. Each bothridium measures 0.22-0.26 in diameter. Peduncle, 0.88-0.94 long. Mature proglottid 2.50-2.85 x 0.65-0.69. Testes numerous, distributed in poral and antiporal fields. Genital atrium anterolateral and irregularly alternating. Cirrus pouch oval, 0.33-0.38 x 0.17-0.19, it contains a convoluted vas deferens. Ovary bilobed, each lobe 0.41-0.45 x 0.17-0.19. Vitellaria are in the form of two lateral double bands along the sides of the proglottid. Vagina expands at base into a seminal receptacle and extends medio-anteriorly to join genital atrium anterior to cirrus pouch. Uterus a blind tube, 1.56-1.80 long, extending anteriorly the level of cirrus pouch.

The same species was described from marine fishes in France (Euzet, 1959). The present description agrees fully with the original description, but with minor differences in the measurements of the scolex and uterus. The present report extends its geographic range to the Libyan Mediterranean.



**4- *Phyllobothrium* sp.**

(Phyllobothriidae) (Figs.14,15).

**Description :** (based on scolex of one specimen).

Scolex large, 0.93 x 1.31, with apical glandular organ and 4 bothridia, each deeply branched, with very small accessory sucker having folded and curled margin. Each bothridium measures 0.18 x 0.27. Peduncle 2.2 x 0.75.

Based on above description, the species described herein appears closely related to *P. lactuca* Van Beneden, 1850, but it is appropriate to examine a number of intact mature specimens before arriving to a definite identity.

**5- Postlarvae of *Acanthobothrium* sp. (Onchobothriidae) ( Figs.16,17 ).****Description:** ( based on 3 specimens).

The entire postlarva is elongate unsegmented, 1.57-1.60 x 0.21-0.25. Scolex, 0.22-0.27 x 0.25-0.30, with apical accessory sucker 0.075 -0.078 in diameter. Scolex carries 4 bothridia 0.16-0.19 x 0.052-0.058 each, divided into 3 loculi by 2 transverse septa; hooks not seen.

Postlarvae of *Acanthobothrium* sp. were reported by Williams & Jones (1994) from *Oliva sayana*. The present material are similar to Williams's specimens in all characteristics but there are certain minor differences in the body length and scolex measurements. The present report extends its geographic range to the Libyan Mediterranean, and presents a new host record.

**6- Postlarvae of *Echeneibothrium* *variabile* Van beneden,1850**

(Phyllobothriidae) (Figs.18,19).

**Description:** (based on 3 specimens).

The entire postlarva is 1-1.2 long 0.21-0.24. Scolex, 0.27-0.29 x 0.32 - 0.34, with apical retractile invaginated myzorhynchus, 0.086-0.089 x 0.091-0.096, and 4 pedunculated bothridia each, 0.27-0.28 x 0.070-0.074 divided by transverse and longitudinal septa.

These postlarvae evidently belong to the genus *Echeneibothrium* Van Beneden, 1850. The only related species is *Echeneibothrium variabile* outlined by Khalil *et al.* (1994).The present report extends its geographic range to the Libyan Mediterranean.

**7-Excysted metacystode (early larva) of *Echeneibothrium* sp. (Phyllobothriidae) (Figs.20,21).****Description:** (based on one specimen).

The entire stage is 1.07 by 0.29. Scolex, 0.26 x 0.40, with apical everted myzorhynchus and 4 sessile cup-shaped bothridia, each 0.066 x 0.10.

The early larva described above evidently belongs to the genus *Echeneibothrium* Van Beneden, 1850. The present report extends its geographic range to the Mediterranean waters of Libya. Although the present material is similar to *Echeneibothrium variabile* Van beneden, 1850, it would be preferable to examine other mature



specimens before definitely designating a specific nomenclature.

**8- Postlarvae of *Scyphophyllidium giganteum* (van Beneden, 1858)**  
Woodland, 1927 (Phyllobothriidae)  
(Figs. 22, 23).

**Description:** (based on 3 specimens).

The entire postlarva is 1.54-1.59 by 0.46-0.50. Scolex oval, 0.79-0.82 x 0.86-0.89, without accessory suckers and carries 4 globular, sessile bothridia, 0.60-0.65 x 0.24-0.27 each, with irregular anterior opening.

The present postlarva evidently belongs to the genus *Scyphophyllidium* Woodland, 1927. The only related species is *S. giganteum* described by Woodland in 1927 from marine fishes in Plymouth. The present report extends its geographic range to the Libyan Mediterranean.

**9- Postlarvae of**

***Pseudoanthobothrium hanseni***  
Baer, 1956 (Phyllobothriidae)  
(Figs. 24, 25).

**Description:** (based on 7 specimens).

The entire worm is elongate and 1.41-1.50 x 0.49-0.55. Scolex, 0.27-0.30 in diameter, conjoint with the peduncle, with small contracted invaginated myzorhynchus, 0.092-0.099 x 0.087-0.089 and carries 4 cup shaped, sessile bothridia, 0.12-0.14 by 0.10-0.13 each.

Skinner (1975) redescribed *P. hanseni* from *Mugil cephalus* in Biscayne Bay, Florida. The present redescription agrees fully with that of Skinner (1975). But he did not

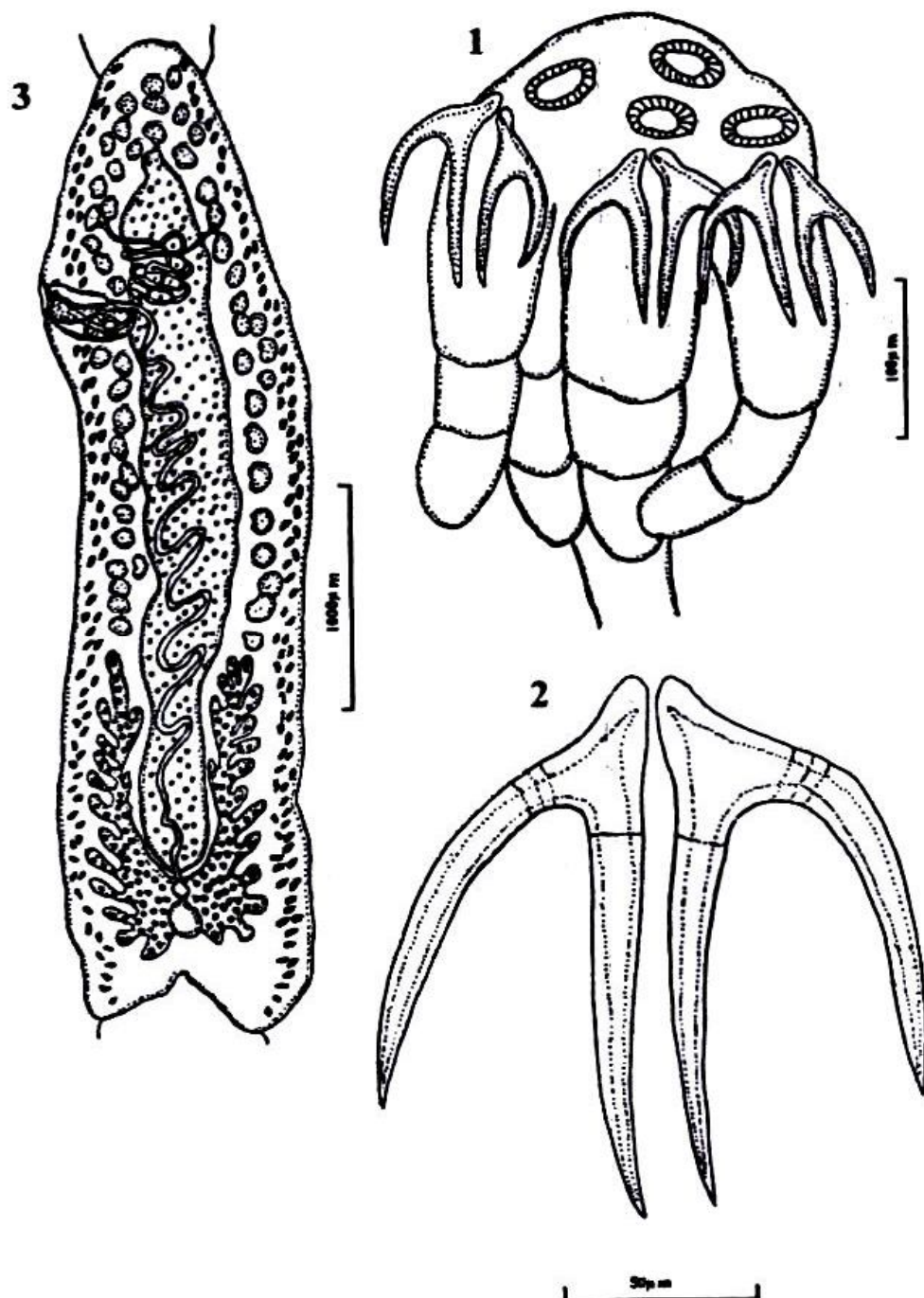
complete the identification to the specific level and named the material as plerocercoid larvae of Tetraphyllidea. The present redescription added more detail about the nomenclature of this species and extends its geographic range to the Libyan Mediterranean.

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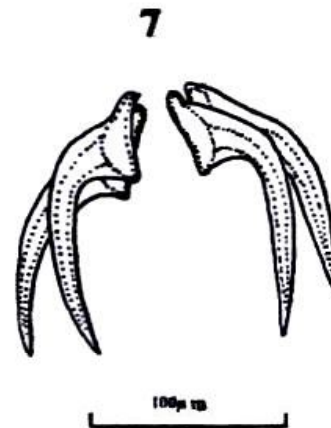
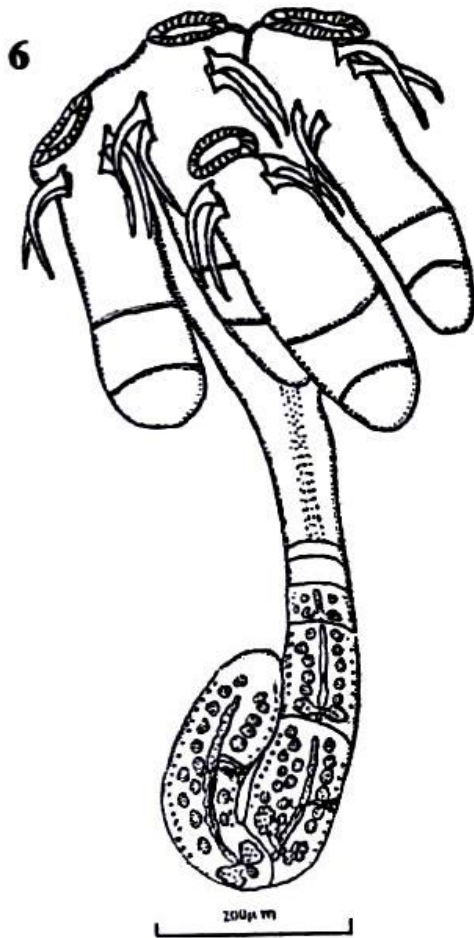
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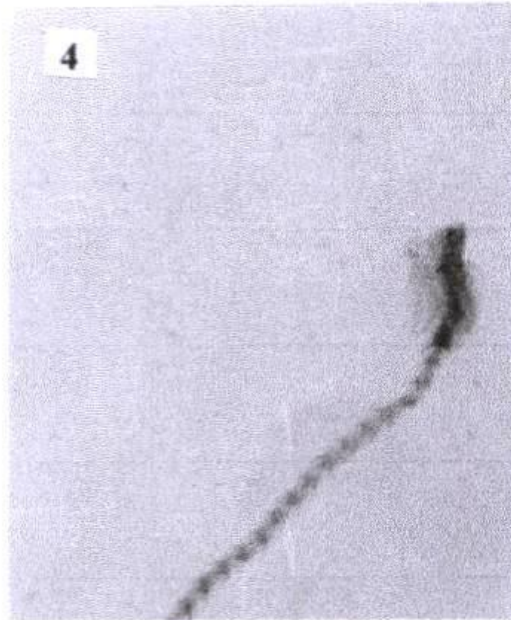
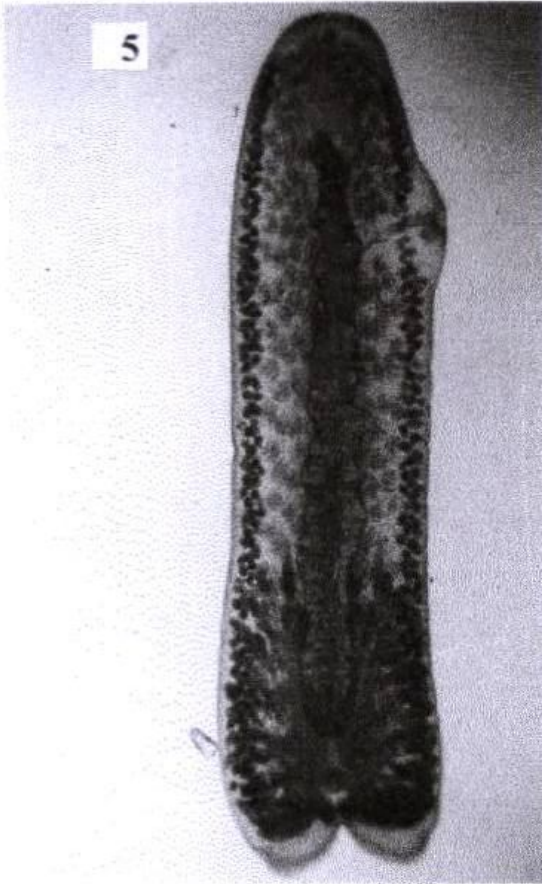
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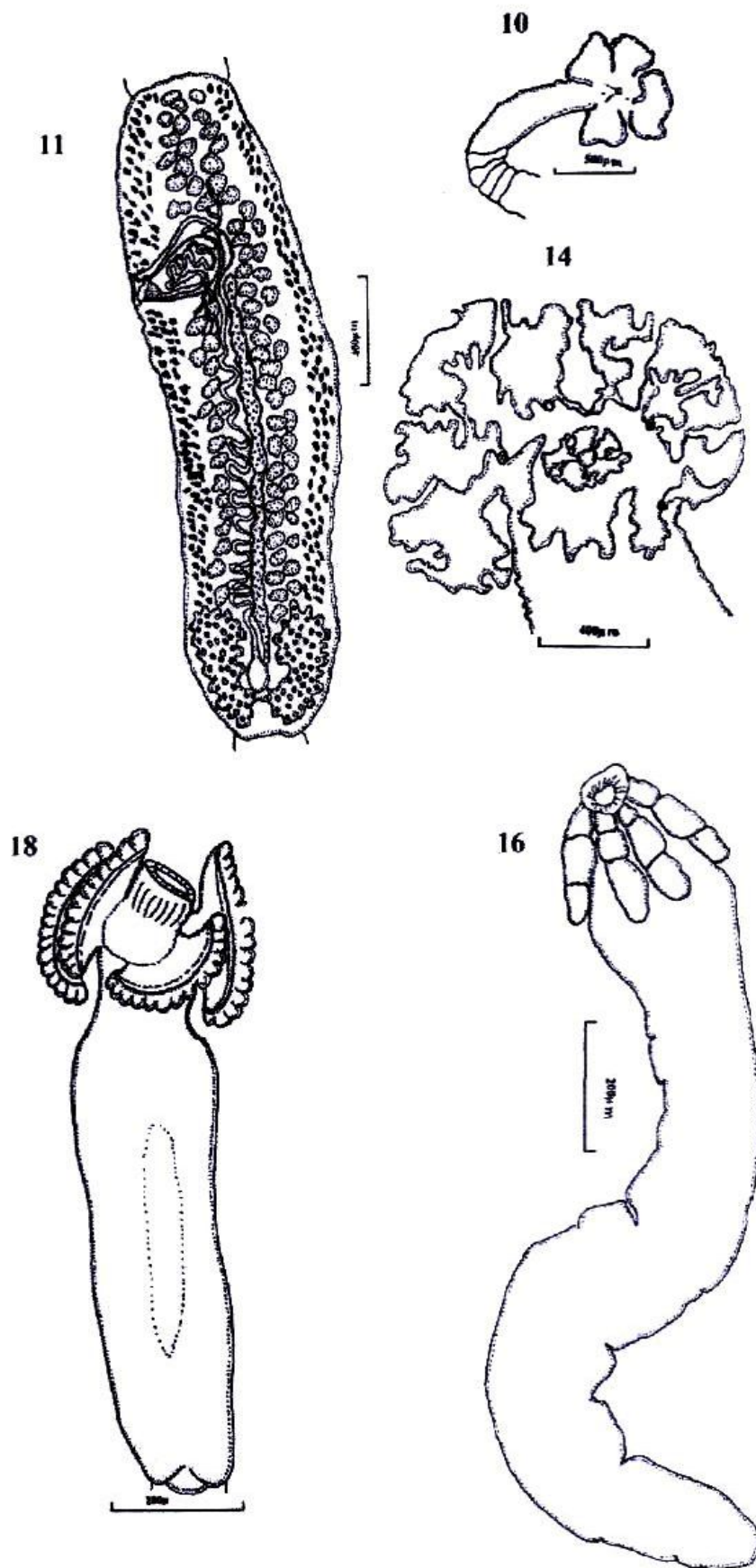




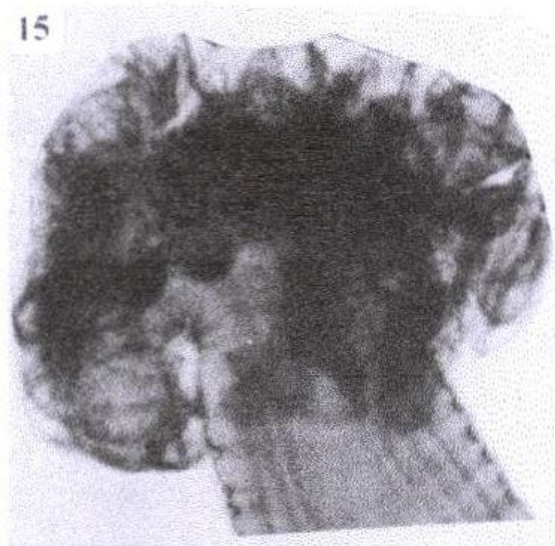
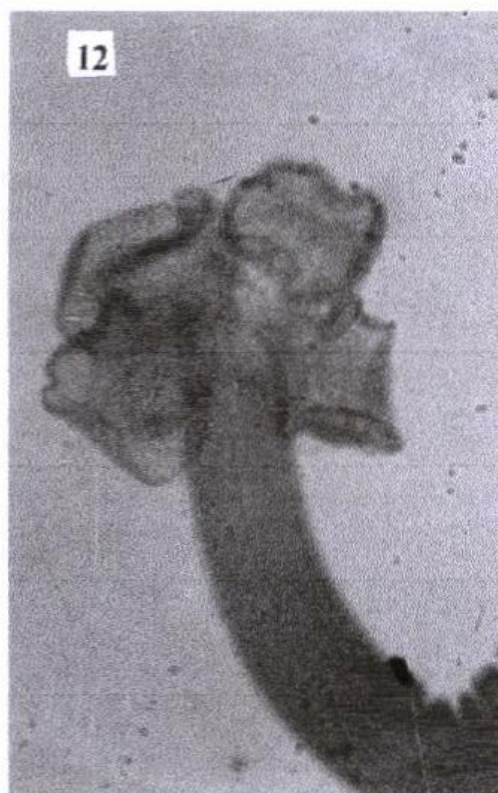
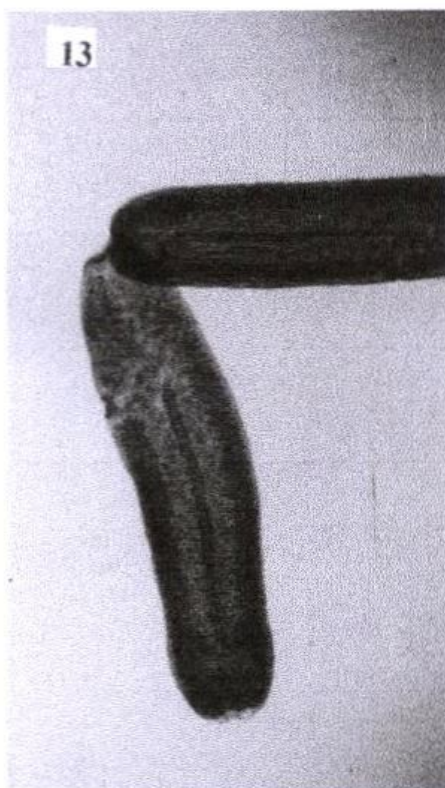










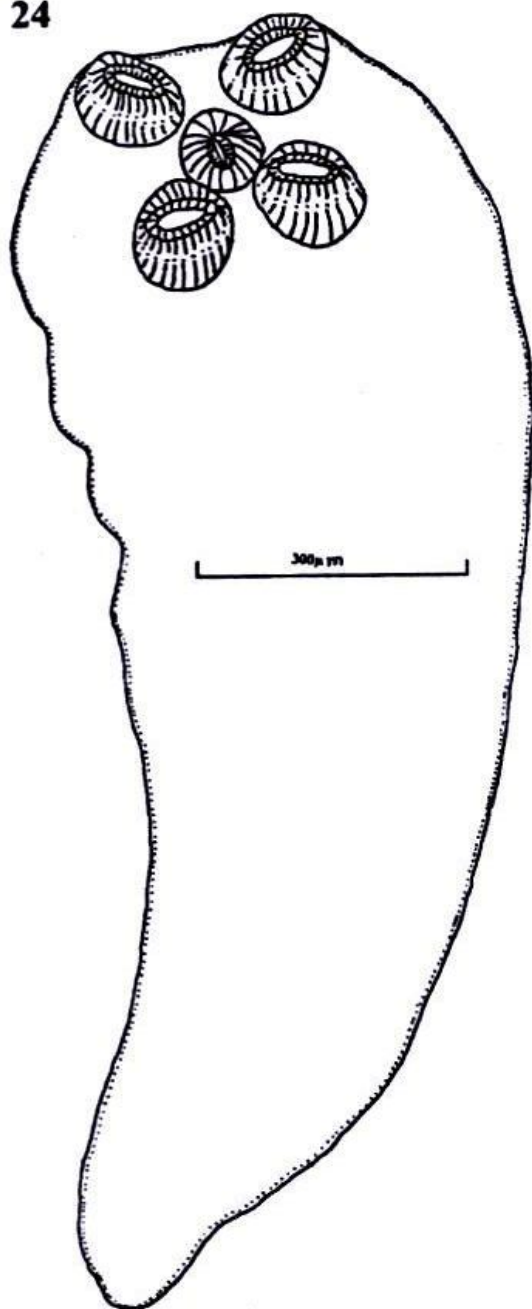








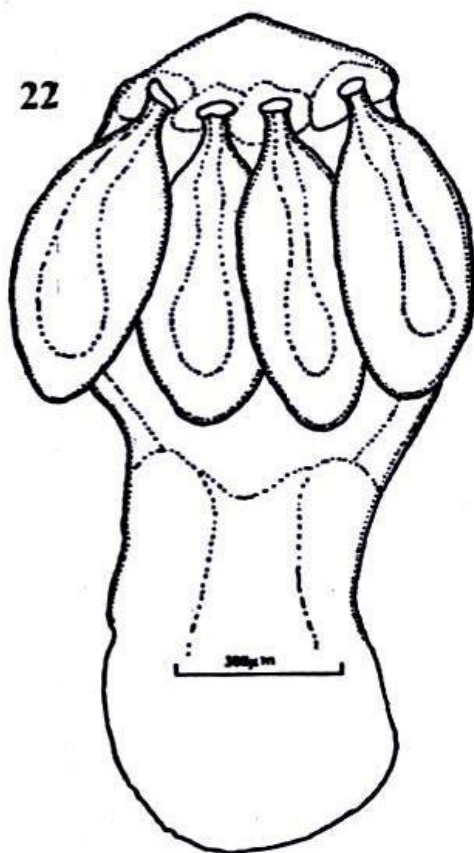
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## **ديدان شريطية تتوافلبيدية (اونكوبوثريدو وفيلوبوثريدو) تتطفل**

### **على اسماك القرش الثوب في ليبيا**

**ديهوم عبد الحميد الهاسل**

قسم علم الحيوان كلية العلوم باليوم فرع جامعة القاهرة

تم فى هذه الدراسة جمع وفحص ٥٠ عينة من اسماك القرش الثوب جاليور هينس جاليوس من المياه الساحلية الليبية بالقرب من مدينة مصراته حيث تم عزل واعادة وصف ٩ انواع من أمعاء الأسماك ، فيها أربعة من الديدان الناضجة وهى : اكانثوبوثريرم كوروناتم ، كاليوبوثريرم ايسكريكتى ، كليدونوبوثريرم الجانتيسيمم ، ونوع من فيلوبوثريرم ، خمسة وفى طور ما بعد السركة هى نوع من اكانثوبوثريرم ، اكينيبوثريرم فاريايل ، ونوع من اكينيبوثريرم ، سكيفوفيلبيديم جيجانتيم وبسيدوانثوبوثريرم هانسينى ، وقد أثبتت الدراسة وجود تطابق بين الوصف الحالى لهذه الانواع والوصف الاصلى لها مع وجود بعض الفروق التى تم اضافتها ، ولكن كل هذه الانواع تسجل لأول مرة من المنطقة الليبية للبحر المتوسط .



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