

**ISOLATION AND IDENTIFICATION OF SOME  
SHORT CESTODES INFECTING GREATER  
FLAMINGO (*PHOENICOPTERUS RUBER  
ROSEUS*) AT GIZA ZOO, EGYPT**

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**ABSTRACT**

*Investigation of the gastrointestinal tract of fifteen greater flamingo (*Phoenicopterus ruber roseus*) at Giza Zoo, Egypt revealed that it was infected with five species of short cestodes belonging to three families of order Cyclophyllidea (two spp. Belonging to *F.Hymenolepididae*, two spp. Belonging to *F.Progynotaeniidae* and one sp. belonging to *F. Metadilepididae*). The recovered Hymenolepidean cestoda were *Sobol-  
evicanthus gracilis* and *Cladogynia phoeniconaiadis* with prevalence rate 20% for each while the detected Progynotaeniidean cestoda were *Gynandrotænia stammeri* and *Leptotaenia ischnorhyncha* with infection rate 13.3% for each. Meanwhile, the only recorded Metadilepidean cestode was *Yapolepis sp.* with prevalence 26.7%. The morphological features of those cestodes were discussed. This study provides the first record of *S. gracilis*, *G. stammeri*, *L. ischnorhyncha* and *Yapolepis sp.* In Giza Zoo, Egypt.*

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## INTRODUCTION

Wild birds play an important role in our life because they act as a host and disseminator for many ectoparasites, endoparasites, bacterial and viral diseases which affect both human and domestic birds. The diet of aquatic wild birds usually contains arthropods, earth worms, fish and crustaceans, many of those are intermediate hosts for helminthes. Therefore, aquatic wild birds are expected to carry high parasitic burden. Flamingo as a wild aquatic bird require a diet reach in brine shrimps *Artemia parthenogenetica* (crustacea) to give their plumage pink, without it their feathers turn white. Those brine shrimps are intermediate hosts for several cestodes whose final hosts are water birds *Sánchez et al., (2007)*. Therefore, Flamingos (*Phoenicopterus ruber roseus*) have a high risk of infection with those cestodes. In Egypt, the parasitic fauna of Flamingos are not previously studied, except what done by *Oraby (1993)*. So, more research studies are needed to cover this shortage. The present study aimed to evaluate the prevalence and description of short cestodes infecting Flamingos at Giza Zoo, to aid in mapping of parasitic fauna of flamingos at Egypt.

## MATERIALS AND METHODS

A total of 15 freshly dead greater flamingos (*Phoenicopterus ruber roseus*) were collected sporadically from Giza Zoo, Egypt. Greater flamingo was identified according to *El-houssini (1954)*, *Brown et al., (1982)* and *Cerny (1987)*. After dissection of each bird, the gastrointestinal tract washed with normal saline (0.9% Na cl) and sedimented. The sediment was examined by stereodissecting microscope for collection of cestodes. The isolated cestodes were washed in normal saline and mounted for examination according to *Kruse and Pritchard (1982)*, *Beaver et al., (1984)* and *Schmidt (1992)*. The specimens were identified according *Yamaguti (1959) and Khalil et al., (1994)*.

## RESULTS

Parasitological examination revealed that greater flamingo was found to be infected with five short cestodes belonging to three families of order Cyclophyllidea; two spp. of F. Hymenolepididae, two spp. of F. Progynotaeniidae and one sp. of F. Metadilepididae. The Hymenolepidean cestodes were *Sobolevicanthus gracilis* and *Cladogynia phoeniconaiadis* with prevalence rate 20% for each while Progynotaeniidean cestodes were identified as *Gynandrotaenia stammeri* and *Leptotaenia ischnorhyncha* with infection rate 13.3% for each. Meanwhile, the only recorded Metadil-epidean cestode was *Yapolepis sp.* with prevalence rate 26.7%, table (1).

**Table (1):** Prevalence of short cestodes recovered from greater flamingo (*Phoenicopterus ruber roseus*) collected at Giza Zoo.

Short cestodes	No. of ex. bird	No. infected	Prevalence %
1- <i>Sobolevicanthus gracilis</i>	15	3	20
2- <i>Cladogynia phoeniconaiadis</i>	15	3	20
3- <i>Gynandrotaenia stammeri</i>	15	2	13.3
4- <i>Leptotaenia ischnorhyncha</i>	15	2	13.3
5- <i>Yapolepis sp.</i>	15	4	26.7

**The morphological description of recorded cestodes was illustrated as follows:**

**1- Order:** Cyclophyllidea Van Beneden in Braun, 1900

**Family:** Hymenolepididae Ariola, 1899.

**Genus:** *Sobolevicanthus Spasskii and Spasskaya, 1954.*

**Species:** *Sobolevicanthus gracilis Spasskii and Spasskaya, 1954* (Fig. 1-6).

**Site of infection:** intestine.

The worm was small cestode with up to 21 proglottids. The whole body length measured 1.06-1.12 mm. in length by 0.20-0.22 mm. width. The scolex measured 0.08-0.11 mm. length (with non protruded rostellum) by 0.14 mm. width. It was of retractable rostellum, armed with sigle crown of eight hooks and four unarmed suckers. Proglottids were broader than long, craspedote. The mature ones measured 0.20-0.22 mm. wide by 0.04-0.05 mm. long. While the gravid ones had nearly squarish appearance and measured 0.09-0.22 mm. wide by 0.07-0.10 mm. long. Reproductive organs per proglottid were single consisting of three rounded, smooth testes arranged in triangle manner, while ovary was lobed, median and ventral to testes. External and internal seminal vesicles present. Vitellarium was compact, median and dorsally postovarian. Uterus was saccular. Genital pores were unilateral.

**2- Order:** Cyclophyllidea Van Beneden in Braun, 1900.

**Family:** Hymenolepididae Ariola, 1899.

**Genus:** *Cladogynia* **Baer, 1938.**

**Species:** *Cladogynia phoeniconaiadis* **Baer, 1937** (Fig., 7-10)

**Site of infection:** intestine.

It was a medium sized short cestode. The scolex measured 0.26-0.28 mm. in length and 0.28-0.29 mm. width and consisted of retractable rostellum, with sigle crown of eight hooks and four unarmed suckers. Proglottids were distinctly craspedote. The mature ones measured 0.21-0.24 mm. width by 0.07-0.09 mm. long. Testes were three, rounded, arranged in row and situated in medulla. Ovary was lobed, median and ventral to testes. Vitellarium was compact and postovarian. Seminal receptacle was well developed. Uterus was reticular.

**3- Order:** Cyclophyllidea Van Beneden in Braun, 1900.

**Family:** Progynotaeniidae *Fuhrmann, 1936.*

**Genus:** Gynandrotaenia *Fuhrmann, 1936.*

**Species:** *Gynandrotaenia stammeri Fuhrmann, 1936* (Fig., 11).

**Site of infection:** intestine.

It was a small cestode with 4-9 proglottids, First proglottid behind scolex was female (0.16-0.22 mm. in width and 0.15-0.24 mm. in length) and the next was male (0.17-0.18 mm. in width and 0.13-0.18 mm. in length) with regular alteration which was a characteristic feature for this family. The total body length of worm measured 0.63-1.26 mm. by 0.17-0.21 width. Scolex was comparatively large and measured 0.25-0.39 mm. length by 0.17-0.20 mm. width. Prosclex was dome-shaped, retractable within metascolex. Rostellum was retractable with a single crown of six hooks. Male genital pores open laterally near posterior margin of proglottid, alternating regularly in successive male proglottids. Testes were numerous. Ovary was lobed, occupying most of medulla. Vitellarium was compact, transversely elongate near posterior margin of proglottid. Uterus was a median longitudinal duct, becoming sac-like when changed to gravid.

**4- Order:** Cyclophyllidea Van Beneden in Braun, 1900.

**Family:** Progynotaeniidae *Fuhrmann, 1936.*

**Genus:** Leptotaenia Cohn, 1901.

**Species:** *Leptotaenia ischnorhyncha* Lühe, 1936 (Fig., 12-14).

**Site of infection:** intestine.

It was a small cestode and measured 1.44 mm. long by 0.33 mm. width. The strobila wedged-shape and consisted of 13 proglottids having a characteristic regular alteration of female and male proglottids . Scolex was comparatively large and measured 0.33 mm. in length and 0.30 mm. in width. Rostellum retractable with a single crown of hooks. Cirrus was large and armed. Ovary was bilobed and large. Vitellarium was compact and postovarian. Uterus was saccular and filling whole of medulla. Male genitalia was completely developed in posterior proglottids only.

**5- Order:** Cyclophyllidea Van Beneden in Braun, 1900.

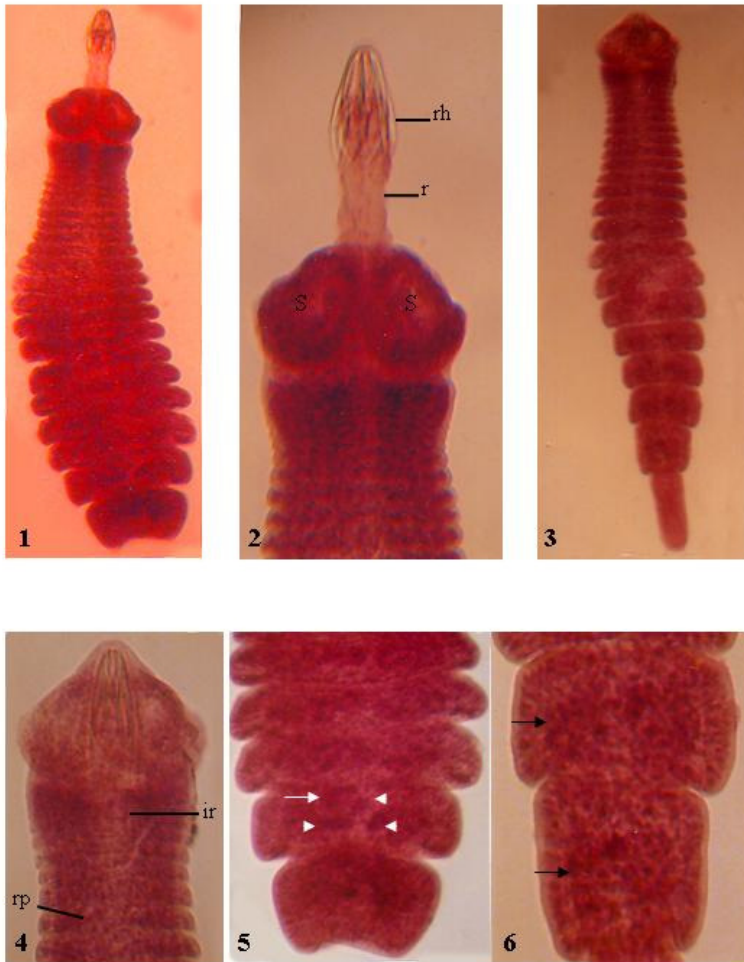
**Family:** Metadilepididae *Spasskii, 1909.*

**Genus:** *Yapolepis Mariaux, 1991.*

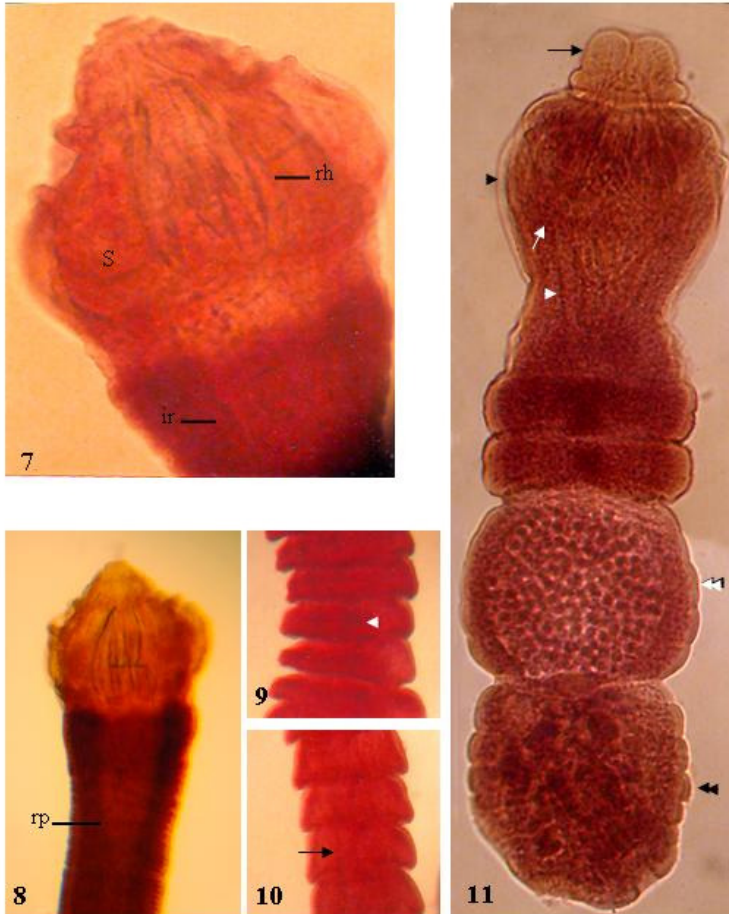
**Species:** *Yapolepis sp.* (Fig., 15-17).

**Site of infection:** intestine.

The worm was a small cestode with 18-20 proglottids. The total body length was 0.91-0.98 mm. and 0.16-0.22 mm. in width. The scolex measured 0.19 mm. in length and 0.15 mm. in width and consisted of unarmed sucker-like rostellum without saccular sheath and four unarmed suckers. Proglottids were craspedote and wider than long. The mature ones measured 0.15-0.22 mm. in width and 0.04-0.06 mm. long and toward gravide ones had nearly squarish appearance and measured 0.10-0.12 mm. in width and 0.06-0.08 mm. long. Genital pores unilateral. Genital organs single per proglottid, where testes dorsal to ovary in one field. Cirrus sac pyriform, thick walled reaching middle of proglottid. Vitellarium was compact, medium and near posterior margine of proglottid. Uterus saccular and in median field.



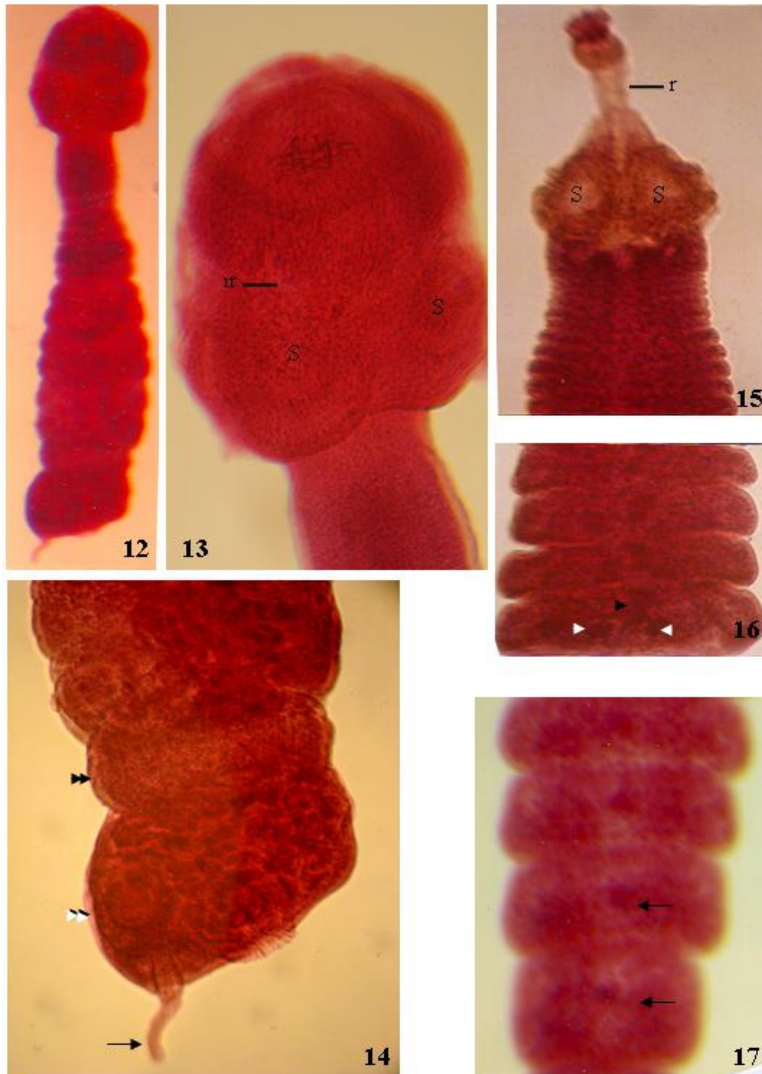
**Figs. (1-6): *Sobolevicanthus gracilis*; 1- Entire worm showing protruded rostellum x4 , 2- Scolex showing rostellum (r), rostellum hooks (rh), suckers (s) x10, 3- Entire worm with non protruded rostellum x4, 4- Scolex showing invaginated rostellum (ir) and rostellum pouch (rp) x10, 5- Mature proglottids showing three testes (white arrow head), Ovary (white arrow) x10, 6- Gravid proglottids showing gravid uterus (black arrow) x10.**



**Figs. (7-10): *Cladogynia phoeniconaiadis***; 7- Scolex showing invaginated rostellum (ir), rostellum hooks (rh), suckers (s)  $\times 10$ , 8- Scolex showing rostellum pouch (rp)  $\times 5$ , 9- Mature proglottids showing testes (white arrow head) $\times 10$ , 10-Gravide proglottids showing gravide uterus (black arrow)  $\times 10$ .

**Fig. (11) *Gynandrotaenia stammeri***; showing prosclex (black arrow), metascolex (black arrow head), suckers (white arrow), rostellum pouch (white arrow head), male proglottid (double white arrow head) and female proglottid (double black arrow head)  $\times 10$ .





**Figs. (12-14): *Leptotaenia ischnorhyncha***; 12- Entire worm x2.5, 13- Scolex showing invaginated rostellum (ir) and suckers (s) x4, 14- Posterior end of worm showing female proglottid (double black arrow head) and male proglottid (double white arrow head) with cirrus (black arrow) x10.

**Figs. (15-17) *Yapolepis sp.***; 15- Scolex showing protruded rostellum (r) and suckers (s), 16- Mature proglottids showing testes (white arrow head), ovary (black arrowhead), 17- Gravid proglottids showing gravid uterus (black arrow) x10.

## DISCUSSION

Cestodes of five species of three families belonging to order Cyclophyllidea were recovered, identified and morphologically studied from greater flamingo aiding in mapping of parasite infection for this kind of aquatic birds at Giza Zoo, Egypt. The occurrence of this large number of cestodes greater flamingo is attributed to its high need to diet rich in brine shrimps which contain cysticercoids of many Cyclophyllidean cestodes of aquatic birds *Georgiev et al., (2005)*, *Snàchez et al., (2006)* and *Snàchez et al., (2007)*.

*Sobolevicanthus gracilis* was isolated from greater flamingos with infection rate 20% as a new host record for the parasite at Giza Zoo, Egypt, while *Canaris et al., (1981)* and *Farias and Canaris (1986)* found it as a new host record in Green-winged teal and Mexican duck with prevalence rate 23% and 10.8% respectively. The morphological description of *S. gracilis* agreed with that illustrated by *Spasskii and Spasskaya (1954)*.

In regard to *C. phoeniconaiadis* coincident with that described by *Baer (1937)* except for the absence of pseudoscolex and microtriches from posterior surface of proglottids.

The recovered Progynotaeniidean cestodes; *G. stammeri* and *L. ischnorhyncha* have the same habitate and all morphological features with characteristic regular alteration of female and male proglottids as described by *Fuhrmann (1936)*.

Finally, *Yapolepis sp.* Characterized by having unarmed sucker-like rostellum without saccular sheath in agreement with *Mariaux (1991)*, but its habitate was in greater flamingos (aquatic birds) disagreeing with *Spassakii (1959)* who mentioned that this worm present in non aquatic birds. This difference may attributed to resident life of greater flamingos in Giza Zoo, leading adaptation of the parasite to infect aquatic birds or may be accidental pathway.

This study provides the first host records of *S. gracilis*, *G. stammeri*, *L. ischnorhyncha* and *Yapolepis sp.* in greater flamingos at Giza Zoo, Egypt.

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## عزل وتصنيف بعض الديدان الشريطية القصيرة التي تصيب البشاروش بحديقة الحيوان بالجيزة - مصر

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نتيجة فحص الجهاز الهضمي لعدد 15 طائر من البشاروش من حديقة الحيوان بالجيزة بمصر تبين إصابتها بخمسة أنواع من الديدان الشريطية القصيرة تنتمي إلى ثلاثة عائلات من رتبة السيكلوفيليدى، حيث تم عزل نوعان من الديدان الشريطية القصيرة من كلا من عائلة هيمينوليبيدي و عائلة بروجينوتينيدى ونوعاً واحداً من عائلة ميتا داى ليبيدي.

الديدان الشريطية المنتمية لعائلة هيمينوليبيدي هي سوبوليفيكانسس جراسيلس، كلادوجونيا فيونى كنيادس بمعدل إصابة 20% لكلاً منها. بينما المنتمية لعائلة بروجينوتينيدى كانت جيناندروتينيا ستاميرى ، لبتوتينيا إسكينورينكا بمعدل إصابة 13.3% لكلاً منها. في حين كانت الدودة الشريطية الوحيدة المسجلة لعائلة ميتا داى ليبيدي هي يابوليس سبيش بمعدل إصابة 26.7%. وقد تم توضيح الوصف المورفولوجى لهذه الديدان الشريطية. تعتبر هذه الدراسة الأولى التي يتم فيها تسجيل الأنواع الآتية؛ سوبوليفيكانسس جراسيلس، جيناندروتينيا ستاميرى، لبتوتينيا إسكينورينكا و يابوليس سبيش بحديقة حيوان الجيزة بمصر.