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TREMATODE PARASITES OF THE EGYPTIAN CUCULUS (Centropus senegalenses aegyptius)

(With 2 Tables & 3 Figs.)

By

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ديدان التريماتودا بالكوكو المصرى

(سنتروبس سينجالينس ايجبيتاس)

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نوعان مختلفان من ديدان (الأيوميجاسيتس) ونوع آخر من (الفينوروبسلس) - وجد أنهم أكثر أنواع الديدان المفلطحة تطفلا بالكوكو المصرى (سنتروبس سينجالينس ايجيبتاس). وقد اتضح أن هذه الأنواع تختلف عن جميع الأنواع السابق وصفها من هذه الأجناس . لذلك فقد تم وضع صورة مورفولوجية مفصلة وأيضا تمت المقارنة مع الأنواع الأخرى. أيضا تم عمل رسومات بالكاميرا لوسيدا وصور فوتوغرافية ميكرسكوبية من العينات التي تم تحميلها.

SUMMARY

Two different Eumegacetes parasites and another Phaneropsolus species were found to be the most common trematodes infecting the Egyptian Cuculus (Centropus senegalenses aegyptius); shot from Edfina, Behera province, Egypt. These species appeared to be different from all the previously described related species. Therefore, full morphological picture was given together with complete differentiation from other related species. Camera lucida drawings as well as microphotos were made from mounted speciemens.

INTRODUCTION

Trematodes from the genera Eumegacetes (LOOSS, 1899) and Phaneropsolus (LOOSS, 1900), were very commonly met with infecting the avian birds in many localities of the world (YAMAGUTI, 1958). However, in Egypt there were few species related to these genera and all were from Assiut and Cairo provinces. The present work is a further step in the description of other worms of these genera infecting birds shot from Behera Province, Egypt.

MATERIAL and METHODS

This study included the dissection and thorough examination of the intestinal tract of 32 Centropus senegalenses aegyptius. These birds were shot from the locality of Edfina, Behera, Egypt, during the months of the year 1989. The observed trematodes were collected, washed and fixed after mild pressure in 10% formalin. They were stained in acetic acid alum carmire, dehydrated in ethanol and cleared in cresot. Mounting was done in canada balsam. Measurements, camera lucida drawings as well as photomicrographs were made from the mounted specimens.

RESULTS

Examination of the intestinal tract of Centropus birds shot from Edfina, Behera Province, Egypt; revealed the presence of Three different digenetic trematodes.

I - Description of the first detected parasite:

This trematode was described from numerous specimens collected from the large intestine of the Egyptian Cuculus. This parasite was a common one; being encountered from 28 out of the 32 examined bird.

The worm was pear shaped; broad posteriorly and tapering anteriorly and measuring 0.516-0.56 X 0.32-0.327 mm. The body was covered with transverse rows of backwardly directed spines. The mouth was subterminal, on the ventral surface and was surrounded by the oral sucker. The latter measured 0.068-0.077 mm. It was followed by the globular pharynx which measured 0.02-0.022 mm. The two intestinal caeca passed postero lateral and ending a short distance anterior to the ventral sucker. They were club shaped and their length ranged between 0.132 and 0.144 mm. The ventral sucker was smaller than the oral one and was located nearly in the center of th body; about 0.265-0.28 mm from the oral opening. It was circular in outline and measured 0.05-0.052 mm.

The testes were subglobular bodies with entire margins. The right testis was 0.125-0.13 X 0.11-0.115 mm while the left one was 0.12-0.125 X 0.11-0.115 mm. They were located symmetrically in line with the ventral sucker. The cirrus sac was located between the ventral sucker and the intestinal fork and being charactarestically spiral shaped. Its first curvature was always towards the left side. The genital pore was situated immediately posterior to the pharynx or at the same level and was always to the right side of the middle line of the body.

The ovary lied to the right of the ventral sucker, slightly anterior to it and was often overlapped by the right testis. It was subglobular in shepe, smaller than

the testis and measured 0.08-0.086 X 0.075-0.08 mm. The uterus was long and coiled in the posterior part of the body behind the testes. It opened to the exterior by the genital pore. The vitellaria were situated at the sides of the intestinal caeca; partly overlapping it and were in the form of coarse follicles. The excretory pore opened at the hind end of the body. A well defined seminal receptacle could be seen just posterior to the ventral sucker. The eggs were very small in size; measuring 0.014-0.016 in length & 0.007-0.008 mm in width. They were dark brown in colour. They were operculated and each contained a fully mature miracidium.

II- Description of the second detected parasite:

This trematode was collected from the large intestine of 3 out of the 32 examined Centropus senegalenses aegyptius shot from Edfina, Egypt. Each of the infected hosts contained 3 mature worms beside some immature ones.

The body was long and the lateral sides were nearly parrallel. It was 3.7-3.9 mm long and 1.2-1.3 mm wide. The anterior extremity was rounded while the posterior one was pointed. The cuticle was covered with transverse rows of spines. The oral sucker was subterminal, ventral and measured 0.52-0.55 X 0.58-0.62 mm; with posterior concavity into which the pharynx projected. Preoral space was very narrow. The ventral sucker was circular in outline and measured 0.65-0.68 mm in diameter. Its anterior border was 1.95-2 mm away from the oral opening. There were no prepharynx. The pharynx was transversely elongate and measured 0.18-0.21 X 0.24-0.26 mm. The two intestinal caeca were arising straight from the pharynx and were running nearly to a short distance before the posterior end of the body.

The two testes were symmetrical round or elongate; margins were smooth; lying midway between the ventral sucker and the intestinal fork. They were intercaecal. The right testis was 0.32-0.35 X 0.28-0.32 mm, while the left one measured 0.3-0.33 X 0.28-0.3 mm. The cirrus sac was thick walled, muscular, intercaecal and commencing pretesticular. Its proximal part was intertesticular and then curved from the right towards the left side in the form of C shaped curvature. The genital pore was submedian and ventral to the posterior part of the pharynx.

The ovary was dextral, ovoid and with smooth margins. It was located posterior to the ventral sucker and measured 0.26-0.29 X 0.16-0.18 mm. The vitelline follicles were in the form of coarse follicles occuping the lateral fields; partly overlapping the intestinal caeca. They extend from the testicular level till the posterior end of the intestinal caeca. The level was higher than that and extend posteriorly on the right side. The uterus filled the hind body with loops passing laterally and end in the genital pore.

The eggs were numerous, yellowish brown and with opercular collar. They were 0.022-0.026 X 0.012-0.014 mm. The excretory bladder was Y shaped. Its stem

was muscular and commencing at the ovarian level; narrowing to a short duct leading to the terminal pore. The long arms extending anterolaterally.

III- Description of the third detected trematode:

This trematode parasite was collected from 6 out of the 32 examined Centropus senegalenses aegyptius. Each infected host contained two mature worms in its rectum beside several immature flukes.

The parasite was oval in shape and its anterior and posterior ends were rounded. The entire body surface was covered with fine spines. The body measured 2.6-2.8 X 1.3-1.4 mm. The oral sucker was subterminal and measured 0.6-0.61 X 0.68-0.71 mm. The ventral sucker was 0.7-0.78 X 0.78-0.81 mm and its anterior border was 0.1-0.13 mm away from the anterior end of the body. The pharynx surrounded the oesophagus completely and it was 0.16-0.18 X 0.18-0.19 mm. The two intestinal caeca arising straight from the pharynx and running nearly to the posterior end of the body.

Testes were two symmetrical round to elongate; margins smooth; lying anterior to the ventral sucker. The right testis was 0.25-0.26 X 0.24-0.25 mm. The left one measured 0.23-0.24 X 0.23-0.25 mm. A well developed cirrus sac lied in the intertesticular region. the ovary was submedian in position, spherical in shape with smooth margins and measured 0.17-0.19 mm. It was located post acetabular and the post-ovarian space was 0.7-0.75 mm. Vitellaria were in the form of fine follicles that filled the lateral fields of the intestinal caeca; partly overlapping it. They fairly extended from just behind the testicular level to the posterior end of the intestinal caeca. The level was subequal anteriorly; a little higher on the right side than on the left one but never was anterior to th testicular level. The uterus filled the hind body with loops passing laterally to end in the genital pore. The latter was situated posterior to the pharynx and was deviated from the middle line towards the right side. The excretory bladder was Y shaped with long arms. The eggs were numerous, yellowish brown in colour and measured 0.018-0.02 X 0.008-0.009 mm.

DISCUSSION

I - First detected parasite:

The trematode under discussion with small pear shaped body; V-shaped excretory bladder; short intestinal caeca; testes symmetrical, subglobular and lateral to the ventral sucker; vitellaria at the sides of the intestinal caeca; long spiral cirrus sac and the whole body covered with spines; was found to be included in genus Phaneropsolus. This genus was founded by LOOSS (1900) to include P.microon (RUD., 1819); P.orbicularis (DIES, 1850); P.oviformis (POIR, 1886); P.longipenis (LOOSS, 1899)

and P.sigmoideus (LOOSS, 1899). Later on new species were added as P.isolense (BHALEREO, 1926); P.minor (ISKOVA, 1970) and P.borneoenses (FISCHTHAL and KUNTZ, 1973). Moreover, KHALIFA and EL-NAFFAR (1978) added P.assiuticus from the Egyptian birds.

The present material was found to be different from P.microon and P.isolense in some morphological features as having the opening of the genital pore in the neighbourhood of the pharynx; the absence of prepharynx and oesophagus; and the termination of the intestinal caeca slightly anterior to the ventral sucker. Moreover, the present species could be differentiated from other related species of that genus on the basis of other morphobiological characters particularly the length to breadth ratio; shape of testes and ovary and their relation to the ventral sucker; final hosts and localities (Table 1).

In the present species the two testes were symmetrical, subglobular and situated at both sides of the ventral sucker. Those of P.borneoenses were unequal and contagious with the intestinal caeca. P.longipenis had the testes anterior to the ventral sucker. Those of P.minor and P.isolense were spherical in shape but they were located a distance posterior to the ventral sucker. Similar to the present material, the testes were symmetrical and situated at the same level of the ventral sucker but unlikely they were definetly oval in outline in P.assiuticus.

The ovary of the present material was subglobular in shape and situated to the right of the ventral sucker overlapped by the larger right testis. It came much nearer to that of P.isolense but differed from it in being comparatively smaller. It was easily differentiated from that of P.oviformis which located behind the ventral sucker. Similar to the present material, the ovary lied medial or dorsomedial to the right testis in P.sigmoideus and P.assiuticus but unlikely it was oval in outline and not overlapped by the right testis in the former species and spherical but characteristically bigger than the testis in the latter.

Concerning the measurements of the eggs it was found that, P.sigmoideus eggs measured 0.019 X 0.008 mm; those of P.assiuticus were 0.024 X 0.013 mm; those of P.isolense were 0.02 X 0.009 while those of the present material measured 0.014-0.016 X 0.007-0.009 mm.

Regarding the final hosts and localities, non of the forementiored species were recorded from birds of genus Centropus. The present trematode was collected mainly from Centropus senegalenses aegyptius shot from Edfina, Behera, Egypt. However, P.sigmoideus was obtained from Passer domesticus in Egypt; P.minor was described from Falco sabbles at USSR; P.borneoenses from Pycnopotus species at Maloysia; P.isolense from Corvus isolense from Rangoon and P.assiuticus from Upupa epops at Assiut, Egypt.

From the forementioned description and discussion; it could be concluded that these points of differences is sufficient to justify the creation of a new species. We propose to name it P.alexandrinus. Table (1) showing the revision to the Egyptian species of Phaneropsolus described till now.

II- **Second detected parasite:**

Among the genera of Eumegacetes (TRAVASSOS, 1923) given by (YAMAGUTI, 1958); our species with elongated body; powerful suckers, testes inside the caecal arch; cirrus sac saccular and intertesticular; genital pore posterior to the pharynx; ovary in the posterior third; vitellaria more or less expanded anteriorly; eggs are small and numerous and the excretory vesicle is Y shaped; could be placed in genus Eumegacetes (LOOSS, 1900). This genus was created to include E.emendatus (DIES, 1850); Syn. E.triangularis (BRAUN, 1911) as the genotype. Several other species including E.upupae and E.orientalis (EL-NAFFAR and KHALIFA, 1980) from wild birds in Assiut, Egypt were recorded.

The present species appears to be much nearer to E.emendatus. It is similar with that species in having the testes midway between the ventral sucker and the intestinal fork; the ovary is ovoid and is located to the right of the middle line of the body; and the genital pore opened posterior to the pharynx. However, the present species differed from E.emendatus and also from all other hitherto known species of Eumegacetes including the Egyptian ones in having the vitelline follicles extending more proximally than the testicular level and more distally than the posterior end of the intestinal caeca; having a characteristic C shaped cirrus sac; having fine spines evenly distributed on its cuticle and having different length to breadth ratio with pointed posterior end. These differences are satisfactory for the creation of a new species. However, we suggest to name it Eumegacetes species (A); until further studies particularly inthe life cycle. Table (2) showing the comparison between the present species and the previously reported Egyptian ones.

III- **Third detected parasite:**

According to the keys given by YAMAGUTI (1958) our species was found to be included in genus Eumegacetes (LOOSS, 1900). The present species was found to be distinct from all other hitherto known species of that genus. Some of the points used for differentiating it from the other previously reported ones were the shape of the body; length to breadth ratio; suckers ratio; shape of testes and ovary and their situations and size of eggs. Beside, the most important point which is the presence of body spines.

The present species and the forementioned one E.species (A); were at first thought to be one and the same species which differed in size; but after careful examination they were found to be different from one another. They differed in

the shape of the body; length to breadth ratio; shape of testes and ovary and their situations and size of eggs. Also, the shape and structure fo the cirrus sac was different in these two species. Moreover, the shape and topography of the vitelline follicles was very clearly different. Table (3) showing the main points of difference between then, therefore, the forementioned described species could be regarded as a sepate and newly created one for which the name Eumegacetes species(B) was give unlil further studies.

Only one spinosed species related to genus Eumegacetes was described from the little green Egyptian bee eateer (Meropus orientalis cleopatra); under the name E.spinosus (FAHMY, et al. 1981). E.species (A) and E.species (B) shares with E.spinosus in some morphological features particularly the presence of body spines. However, the shape and distribution of these spine was markedly different from that of our material. The cuticle of E.spinosus charactarestically covered with conspicious sharp spines which are more dense in the anterior third of the body.

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Description of Plate (I):

Referance letters

C. Cirrus sac; C.G.P. Common Genital Pore; Ex.P. Excretory Pore; In. Intestinal caeca; L.T. Left Testis; O. Ovary; Os. Oral Sucker; Ph. Pharynx; R.T. Right testis; S.R. Seminal receptacle; U. Uterus; Vit.gl. Vitelline glands; Vs. Ventral Sucker.

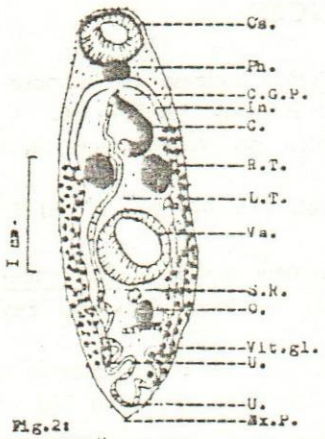


Fig.2: Sumogaceteo species(A);n.sp.

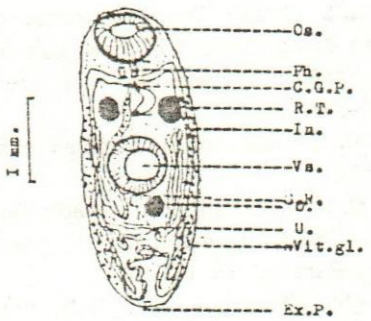


Fig.3: E.species(B); n.sp.

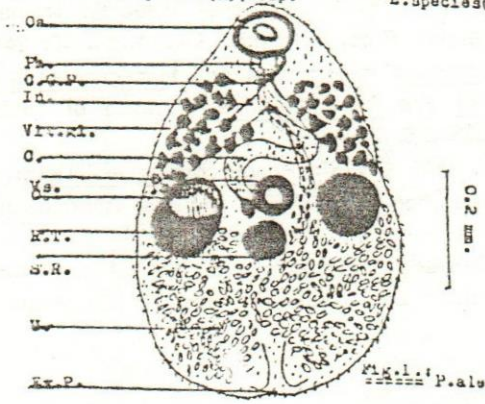


Fig.1: P.alexandrinus;n.sp.

Table (I)

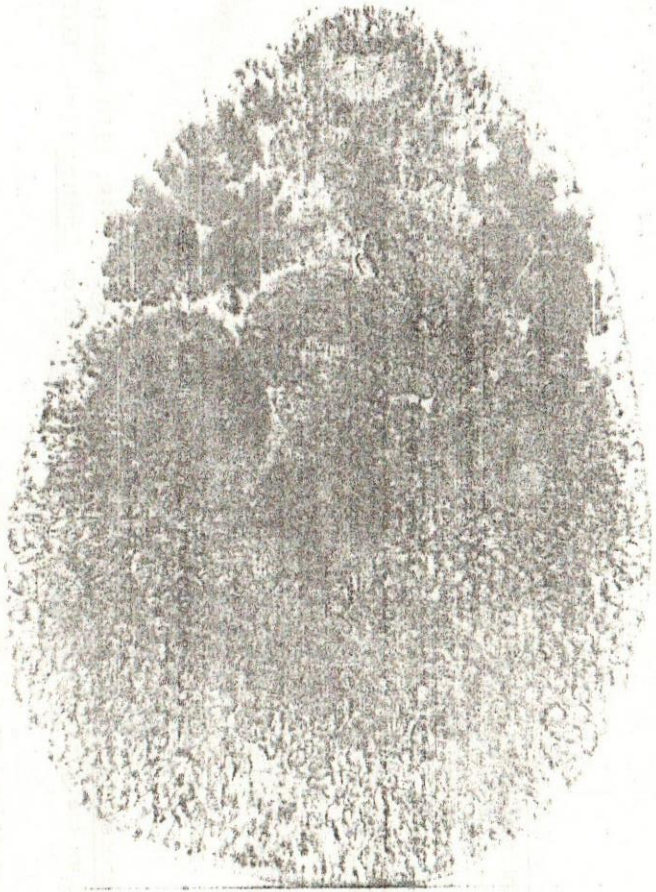
Revision to the Egyptian species related to genus Phaneropsolus.

Parasite	Rhaneropsolus sigmoideus Looss, 1899	Rhaneropsolus assiuticus Khalifa & El-Naffar, 1978	Rhaneropsolus alexandrinus (Present Material)
Host	Passer domesticus & Caprigulgus europaeus	Pycnonotus barbatus & Upupa epops	Centropus senegalenses aegyptius.
Location	Small intestine	Small intestine.	Large intestine.
Locality	Cairo, Egypt.	Assiut, Egypt	Edfina, Egypt.
Body shape	Elongated with pointed ends Max. Width at middle region	Pear shaped, Max. Width at post. 1/3.	Pear shaped, Max. Width at post. 1/4
Oral Sucker	Subterminal, circular & nearly equal Vent. Sucker	Subterminal, transversely elongate, slightly larger than Vent. Sucker	Subterminal, transversely elongate, clearly larger than Vent. Sucker
Ventral Sucker	Circular & nearly equal to the Oral - Sucker	Circukar, slightly smaller than Oral Sucker	Circular, smaller than Oral Sucker
Testes	Rounded & Slightly larger than the Oral Sucker	Oval Smaller than Oral Sucker	Subglobular, markedly larger than Oral Sucker
Ovary	Oval, Dextral & larger than right testis & Not overlapped by it	Spherical, Dextral, Larger than right testis & Partly overllaping it	Spherical, Dextral, Smaller than R.Testis & completerly overlapped by it.
Genital pore	Median, Post. Pharynx.	Submedian post. to Pharynx	Submedian level in with Pharynx.
Egg (U.)	19 X 8	24 X 13	15 X 7

Table (II)

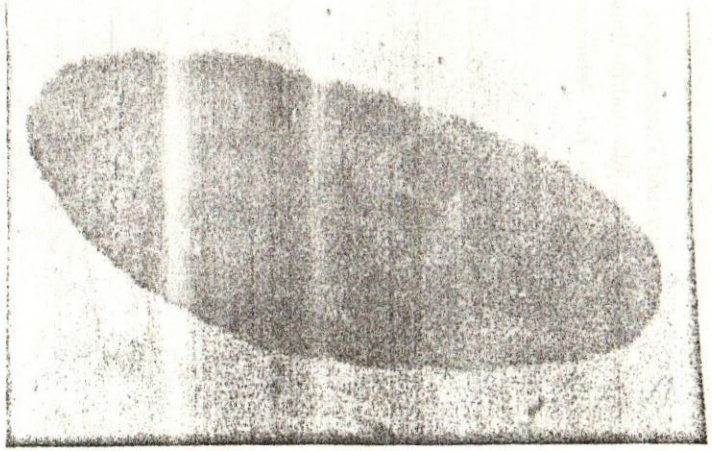
Comparison between the adults of Eumegacetes species; described from Egyptian birds (Measurements U.)

Parasite	Eumegacetes upupae El-Naffar & Khalifa, 1978	Eumegacetes orientalis; El-Naffar & Khalifa, 1978	Eumegacetes species (A); present material	Eumegacetes species (B); present material
Body shape	Oval with rounded ends	oval; post. end less rounded	Oval; pointed posteriorly	oval rounded ends
Cuticle	Aspinose	Aspinose	Spinoses	Spinosed
Total length	2900 - 2954	1200 - 1300	3700	2800
Max. Width.	1400 - 1500	500 - 600	1200	1400
Length/Breadth	201/1	204/1	3.2/1	2/1
Oral Sucker	510-518X576-580 Smaller	356-362X326-330 Bigger	520-550X580-620 Smaller	600-610X680-710 Smaller
Vent. Sucker	589-590X627-640 Bigger	320-326X315-316 Smaller	650 X 680 Bigger	700-800X780-810 Bigger
Pharynx	290-294X192-195 Longer than broad	168-172X130-133 Longer than broad	180-210X240-260 Broder than long	160-180X185-195 Broder than long
Testes Shape Location	Oval with smooth outline Do not come out lateral wall of intst. Caeca.	Pyramidal with irregular surface; Extended after lateral wall of Int. Caeca	Subglobular & Smooth Not reach int. Caeca	Subglobular & Smooth Not reach Int. Caeca.
Left Testis	380-384 X 307-310	130-133 X 192-194	300-330 X 280-330	230-240 X 230-245
Right Testis	396-400 X 339-341	175-177 X 160-164	320-350 X 280-320	250-260 X 240-255
Ovary	oval; located midway bet. Vent. S. and Post. end.	Kidney shaped; very nearer to Vent. S. than post. end	Oval; midway between V.S. and post. end	Subglob. Nearer to V.S. than to post. end
Vitellaria	begin post test. & end at post. end. Coarse follicles	end before post. extremity. Fine follicles	Anterior to test. level end after the int. Caeca.	At test. level & end before post of Int. C.
Eggs	22.4-24 X 11.2-12.8	17.6-19.2 X 8-9	22-26 X 12-14	18-20 X 8-9
Host	Upupa epops	Meropus orientalis	Centropus sp.	Centropus sp.



Microphoto (3): Phaneropsolus species recovered Centropus senegalenses aegyptius.

Microphoto (1): Eumegacetes species (A)



Microphoto (2): Eumegacetes species (B)