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STUDIES ON HELMINTH PARASITES INFESTING SOME WILD BIRDS IN SUEZ CANAL AREA AND SINAI PENINSULA

(With 3 Table and 36 Figures)

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دراسات على الديدان التى تصيب الطيور البرية فى منطقة قناة السويس وشبة جزيرة سيناء

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أجريت هذه الدراسة وذلك لتقييم الإصابة الطفيلية لعدد ٢٠ طائر من نوع أبو قـــردان ، ٢٠ بومة ، ١٥ بشاروش تم تجميعهم من منطقة قناة السويس وشبه جزيرة سيناء ، وقـــد بلغـت نسبة الإصابة الكلية بالديدان ٤١,٨% ، حيث مثلت الديدان الإسطوانية (نيمـــاتودا) ٣٦,٤% الديدان المفلطحة (تريماتودا) ١٤,٦% وديدان الرأس الشوكية والديدان الشريطية (سيســـتودا) ١,٨% ، وقد أوضحت النتائج أن طيور أبو قردان مثلت أعلى نسبة إصابة للديـــدان (٧٥%) فى الطيور التى تم فحصها ، وسجلت النتائج ١١ طفيل تم تجميعهم من الطيور التي خضعـت لهذه الدراسة ، كما تمت دراسة معملية بإعطاء بعض حويصلات للديـــدان المفلطحـــة- تـــم تجميعها طبيعياً من عضلات وأعضاء بعض أسماك المياه العذبة لبعض من الطيور البريـــة (أبو قردان) والطيور المستأنسة (البط).

SUMMARY

The study was designed to evaluate the prevalence and descriptions of helminth parasites infesting some wild birds 20 buff backed heron, *Ardeola ibis ibis*; 20 little owl, *Athene noctua* and 15 flamingo *Phoenicapterus ruber* collected from Suez canal area and Sinai-peninsula. Also, the study was done to evaluate a trial to feed some metacercariae obtained from fish to some wild and domestic birds. The total infestation rate of helminth parasites among the examined wild birds was 41.8%. The study revealed that nematodes were the most

prevalent parasites (36.4%), infesting the examined wild birds. it was followed by trematodes (14.6%), acanthocephala and cestodes (1.8% for each). Buff backed heron showed the highest infestation rate with helminths (75%), followed by little owl (25%) and flamingo (20%). Also, the results denoted that buff backed heron represented the highest rate of infestation with nematodes (70%). Elven helminth species were detected as *Nephrostomum ramosum* (20%), *Apharyngostrigea ibis* (15%), Synhimantus invaginatus (35%), *Synhimantus equispeculatus* (10%), *Microtertramere spiralis* (20%) and *Microtetramere sp.* (5%) were infesting the buff backed heron, while *Nephrostomum ramosum* (5%), *Microtetramere spiralis* (10%), *Filicollis sp.* (5%) & *Oochoristica sp.* (5%) were infesting the little owl; *Tetramere sp.* (6.7%), *Cosmocephalus sp.* (6.7%) & *Striatofilaria sp.* (13.3%) were infesting flamingo. *Tetramere sp.* and *Striatofilaria sp.* were first recorded among wild birds from Egypt. The prevalence, descriptions of the previously mentioned parasites and experimental feeding of buff backed heron and duckling with some metacercariae obtained from naturally infested fresh water fishes were carried out and discussed.

Keywords: *Helminth Parasites, Wild Birds.*

INTRODUCTION

Wild birds constitute a potential hazard for domestic species and human being due to spreading of infections specially the parasitic ones (Khalifa & El Naffar, 1983 and Abd El-Fattah 1996).

These birds are fed on arthropods, molluscs, fishes, reptiles & rodents in which many of them act as an intermediate host for helminths (Joseph, 1979 & Ahmed, 1994).

Many authors studied the incidence and morphological characters of helminth parasites of wild birds (El-Naffar and Khalifa, 1975; Buscher, 1978; El-Naffar et al. 1978; Hegazi, 1978; Ashmawy and El-Sokkary, 1991; El-Sokkary 1992; Ahmed, 1994; and Mahdy & El Ghaysh, 1998). The taxonomic identification of the majority of *metacercariae* in fish is not feasible and the trematods are usually not differentiated sufficiently at this larval stages (Roberts, 1978 and Paperna, 1980).

A trial of experimental infection of domestic and wild birds by feeding on metacercariae obtained from naturally infested fresh water fishes was studied by several workers including (Mayer, 1960. Martin,

1961, Khalifa & El-Naffar, 1978, Shalaby 1985; Abd El-Salam et al., 1987, Amer et al., 1988, Marianne 1990 and Mahdy, 1991). The knowledge on parasitic data of wild birds in Egypt is still scanty, not only due to little of works but also due to the wide range and different species of these birds. The aim of this work was an attempt to investigate the prevalence and descriptions of the helminth parasites infesting buff backed heron. *Ardeola ibis ibis;* Little owl *Athene noctua* and flamingo, *Phoenicapterus ruber*. Also, experimental studies were done by feeding some *metacercariae* obtained from *Tilapia nilotica* and *Clarias lazera* to wild and domestic birds (heron and ducklings).

MATERIALS and METHODS

A total of 55 wild birds [20 buff backed herons, *Ardeola ibis ibis;* 20 little owls *Athene noctua* and 15 flamingo *Phoenicapterus ruber*]. were collected from Suez canal area and Sinai peninsula. Birds were identified according to El-Houssini; (1954), Brown et al. (1982) and Cerny (1987). Each bird was dissected separately. The alimentary tract, viscera and body cavity were opened, washed with physiological saline and sedimented. The sediments were examined by dissecting microscope for collection of heminths. The horny layer of gizzard was removed and examined for any embedded parasites. The collected helminths were washed with physiological saline and mounted according to Beaver et al (1984), and identified according to (Wardle and Mcleod 1952 and Yamaguti, 1961, 1963, 1971, El-Naffar and Khalifa 1975, Mahdy, 1991 and Ahmed 1994). 15 buff backed herons (*Ardeola ibis ibis)* and 15 one day old ducks were kept in a suitable cage. They were fed on balanced ration. and proved to be free from any trematode infestation by faecal examination. The birds were divided into three groups. Each group was composed of 5 herons and 5 ducks. The first group were fed on *Clinostomum* metacercariae collected from *Tilapia nilotica* (muscles and organs). The second group were fed on unidentified metacercariae collected from muscles of *Clarias lazera.* The last group were kept as control. Faecal samples of all groups were examined daily for trematode eggs. The birds were sacrificed (after 7 days) when began to shed trematode eggs. They were examined for the adult termatodes.

RESULTS

I- Prevalence of helminth parasitic infestation:

Table (1) revealed that the total infestation rate was 41.8% among examined wild birds. Herons showed the highest infestation rates (75%), followed by little owl and flamingo where the infestation rates were 30 & 25% respectively. Nematodes were the most prevalent parasites (36.4), followed by trematodes (14.6%), while acanthocephala and cestodes representing the lowest rate of infestation (1.8%). The highest infestation rate of nematode was denoted in heron (70%), followed by flamingo (26.7%) and little owl (10%). Also, herons representing the highest rate of infestation by trematodes (35%) followed by little owl and flamingo in which the infestation rates were 5 and Zero% respectively. Cestodes and acanthocephala were recorded only from little owl.

Table (2) revealed that *Synhimantus invaginatus* was the most prevalent parasite detected among herons (35%), followed by *Microtetramere spiralis* (20%), *Nephrostomum ramosum* (20%), *Apharyngostrigea ibis* (15%), *Synhimantus equispeculatus* (10%) and *Microtetramere sp* (5%). In little owl, *Microtetramere sp.* constitute the highest rate of infestation (10%), followed by *Nephrostmum ramosum, Filicollis sp. Oochoristica sp.* (5% for each). While in flamingo, *Striatofilaria sp.* revealed the highest infestation rate (13.3%), followed by *Tetramere sp* and *Cosmocephalus sp.* Where the infestation rate reached to 6.7% for each.

II- Morphology:

1- *Nephrostomum ramosum (Echinostomatidae)*

This trematode was collected from the small intestine of buff backed heron and little owl. The body: Elongate measured 17-18 mmX 2-3mm with average of 17.3 X 2.7 mm (Fig. 1). The head collar was reniform carrying a single dorsally uninterrupted row of strong spines (45 – 48) (Fig. 3). No prepharynx with short oesophagus. Acetabulum was funnel shaped and located in the first quarter of the body (Fig. 2).

2- *Apharyngostrigea ibis (Strigeidae)*:

This fluke was isolated from small intestine of buff backed heron. It measured 2.9 – 4.8 (average 3.9mm) in length and formed from two portions; pear shaped fore body which was sharply constricted from cylindrical hind body (Fig 4). The oral sucker was smaller than the ventral one and the pharynx was absent (Fig. 5).

3- Synhimantus sp. (Spirurida, Acauridae):

This nematode parasite was collected from the gizzard of buff backed heron. The anterior end had recurrent anastomosing cordons. Oesophagus was cylindrical. The cervical papillae were tricusped and posterior to cordons. Two species were recorded *Synhimantus invaginatus* (Fig 6,7&8) and *Synhimantus equispeculatus* (Fig 9,10 & 11).

4- Tetramere sp. (Spirurida, Acauridae):

Only the female worm was collected from underneath the horny layer of gizzard in flamingo. The mature female was almost spherical in shape measured 4-5mm X 2m with well marked transverse striations in middle region and longitudinal depression (Fig. 12). Mouth with small lips. Buccal capsule cylindrical in shape (Fig. 13). Egg with thin shell and embryonated (Fig. 14).

5- Microtetramere sp. (Spirurida, Acauridae) :

Males only were collected from proventriculus of buff backed heron and little owl. They had cylindrical buccal capsule. Two species were recorded, *Microtetramere spiralis* (Fig. 15 & 16) and *Microtertramere sp.* (Fig. 17 & 18).

6- Cosmocephalus sp. (Spirurida, Acauridae):

Only one female was recorded from proventriculus of flamingo. Cordons long recurrent, anastomosing laterally applied to margins and forming a backwardly directed loops immediately behind their origin on each side of the lips (Fig. 19, 20 & 21).

7- Striatoloflaria sp.:

Only two males of this parasite were recorded in cutaenous tissue of flamingo. Its both extremities were rounded (Fig. 22 & 23) cuticle with spiral striations. Male tail without caudal alae. The spicules short unequal, sadle shaped, curved and gubernaculum absent. Only one pair of post – anal papillae were present (Fig. 24).

8- Filicollis sp. (Filicollidae):

Only one female was recorded from the small intestine of little owl. The proboscis form a globular bulb with anterior constriction. Neck is long (Fig. 25 & 26).

9- Oochoristica sp. (Cyclophilidea Subfamily Linstownae):

This species of tape worm was recorded from intestine of little owl. Is medium sized with segmentation longer than broad. Genital aperture irregularly alternating. Testes are few in number. Genital set was approximate and located median (Fig. 27, 28 & 29) Gravid uterus break into egg capsules each contains one egg (Fig. 30 & 31).

III- Experimental studies by feeding of heron & duckling by metacercariae:

The results shown in Table (3) revealed that the unidentified *metacercariae* (Fig. 33) which were taken from *Clarias lazera* muscles and fed to wild bird of group (2), began to deposit trematode eggs (Fig 34) at 7th day of infection. After sacrification of the birds, adult trematode were found in small intestine which was identified as *Mesostephanus appendiculatus* (Fig. 35 & 36). While the birds of group (1) which were fed *Clinostomum metacercariae* (Fig. 32) taken from *Tilapia nilotica* and of group (3) which were left as negative control did not deposit any eggs for one week post infection, (group 1 & 3), no trematode stages were found in post – mortem.

DISCUSSION

The present study revealed that the infestation rate of helminth parasites was 41.8% among examined wild birds. These results were lower than that recorded by Borgsteede (1989) and Ahmed (1994), who recorded that infestation rate reached to 81and 57.6% respectively. On the other hand, these results were higher than that recorded by (Hegazi 1978), 21.7% and Abd El-Fattah (1996), 38.6%. The difference in infestation rate in this study than the previous works may be due to the different of bird species and its localities.

Concerning the birds examined in this study, buff backed heron *(Ardeola ibis ibis)* representing the highest peak of infestation by helminth parasites (75%), this result was lower than that reported by Ahmed (1994) (100%), while higher than that recorded by Hegazi (1978), 61.7%. This variation may be attributed to the difference of heron localities.

Among different types of helminths detected in the present study was that the nematode represented the most prevalent parasites among examined birds (36.4%). This result disagrees with Wagner & Ruedy (1981) 10%, Hegazi (1978), 2.6%; Ahmed (1994) 25.9% while nearly agrees with the results detected by Mahdy & El-Ghaysh (1998) 85% and Borgsteede (1989), 81%. Moreover, nematode infestation in buff backed heron was (70%), higher than little owl (10%) and flamingo (26.7%). This might be due to the food habits of such bird, as heron commonly feeds on arthropods and earth worm which plays a major role in transmission of nematodes as intermediate and paratenic hosts. In the present study the prevalence of trematode infestation was (14.6%),

appeared lower than that of Ahmed (1994) 37.6% and Amer & Desoky (1995) 33.3%, while higher than that of Abd El-Fattah (1996) 3.7% and Hegazi (1978) 3.8%. Acanthoephala sp. was recorded only in little owl with percentage reached to 1.8% during this study. This is in agreement with Hegazi (1978) among heron and Ahmed (1994) in Egyptian nightjar, while it varied with that of Wagner & Ruedy (1981) 25% and Abd El-Fattah (1996), 18.9%. The difference in prevalence of helminth parasites (nematode, trematode and acanthcephala) in the present study with other previous works might be attributed to the ecological factors influencing the wild birds as well as the intermediate hosts in different geographical localities.

Elven helminth parasites were recorded in wild birds during this study, namely, *Nephrostomum ramosum* and *Apharyngostrigea ibis* as trematode; *Synhimantus invaginatus, Synhimantus equispeculatus, Tetramere sp. Microtetramere spiralis, Microtetramere sp, Cosmocephalus sp.* and *Striatofilaria sp.* as nematode, *Filicollis sp.* as Acanthocephala and *Oochoristica sp.* as cestode. *Synhimantus invaginatus* was the commonest parasite recorded in heron during this study and this agreed with that of Mousa & Mahdy (1998), while *Microtetramere sp.* representing the prevalent parasite in little owl and this disagreed with that of Ahmed (1994). Ramalingam & Samuel (1978) reported *Microtetramere bubo* from gizzard & intestine of great horned owl and *Microtetramere sp.* from proventriculus of snowy owl. *Striatoflaria sp.* was the commonest parasite infesting flamingo during this study.

The detected helminth parasites of wild birds during this study were identified according to the morphological criteria described by Wardle & Mcleod (1952). Yamaguti, (1961), (1963), (1971), El-Naffar & Khalifa (1975), Mahdy (1991), Ahmed (1994) and Mahdy & El-Ghaysh (1998). *Tetramere sp.* and *Striatofilaria sp.* which were identified from flamingo appeared to be firstly recorded from wild birds in Egypt. *Oochoristica sp.* was recorded from intestinal tract of one little owl. This cestode was detected from lizards and snakes by Wardle Mcleod (1952). The presence of tapeworm in little owl may be accidental due to the feeding of owl on lizards & snakes.

The orally given undifferentiated *metacercariae* were passed in ducks and herons and its adult trematode which were found in small intestine is identified as *Mesostephanus appendiculatus* with prepatent period of 7 days. These results are in line with Mahdy (1991). The differentiation between *Mesostephanus appendiculatus* and

Prohemistomum vivax are very difficult (Fahmy et al., 1984) and El-Bouhy et al. (1988). Auob (1991), recorded that *Mesostephanus appendiculatus* characterized by absence of the ventral concavity which is the main difference between *Prohemistomum vivax* and *Mesostephanus appendiculatus* (El-Naffar and Khalifa, 1975). Our specimen hase no ventral concavity so they are identified as *Mesostephanus appendiculatus*. *Clinostomum* metacercariae which were fed to heron and ducks (group 1) were not passed in this hosts during the period of experiment. On the other hand Amer et al (1988) collected *Clinostomum complanatum* adult worm from buccal cavity of chickens after 4-6 day post-infection. Mahdy (1991) found immature flukes after 2 days from infection in chicks. The difference between our experiment and that obtained by Amer et al. (1988) may be due to the difference of hosts used in the experiment.

Our results concluded that helminth parasitic infestation among wild birds varied according to their types, localities and feeding habits of birds. *Tetramere sp. & Striatofliaria sp.* were recorded for the first time from wild birds in Egypt. Ducklings may be unsuitable host (need further investigation) for passage of *Clinostomum* metacercariae.

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LEGEND OF FIGURES

(Fig. 1): *Nephrostomum ramosum,* adultworm, X 6.4.

(Fig. 2): *Nephrostmum ramosum,* anterior end, showing funnel shaped acetabulum located at first quarter, X 16.

(Fig. 3): *Nephrostomum ramosum,* head collar, showing uninterrupted single row of strong spines, X 100.

(Fig. 4): *Apharyngostrigea ibis* adult worm, X 25.

(Fig. 5): *Apharyngostrigea ibis* adult, showing smaller oral sucker than ventral one and absence of pharynx X 40.

(Fig. 6): *Synhimantus invaginatus,* anterior end, showing cordons and tricusped cervical papillae X 100.

(Fig. 7): *Synhimantus invaginatus,* male posterior end, showing two unequal spicules X 100.

(Fig. 8): *Synhimantus invaginatus,* female, posterior end, X 100.

(Fig. 9): *Synhimantus equispeculatus* anterior end, X 100.

(Fig.10):*Synhimantus equispeculatus* male posterior end, showing nearly two equal long spicules X 100.

(Fig. 11): *Synhimantus equispeculatus* female posterior end, X 100.

(Fig. 12): *Tetramere sp.* female worm, spherical shape with longitidinal depression and transverse striations X 25.
(Fig. 13): *Tetramere sp.* female, anterior end, showing cylindrical buccal capsule X 250.
(Fig. 14): *Tetramere sp.* egg, X 250.
(Fig.15):*Microtetramere spiralis* male anterior end, showing cylindrical buccal capsule X 250.
(Fig.16):*Microtetramere spiralis* male posterior end, showing very unequal two spicules with tapering posterior end X 100.
(Fig. 17): *Microtetramere sp.* male anterior end X 250.
(Fig. 18): *Microtetramere sp.* male posterior end, X 250.
(Fig.19):*Cosmocephalus sp.* female anterior end, Showing long recurrent anastomosing cordons X 100.
(Fig. 20): *Cosmocephalus sp.* female anterior end. X 250
(Fig. 21): *Cosmocephalus sp.* female posterior end X 100.
(Fig. 22): *Striatofilaria sp.* male anterior end X 100.
(Fig. 23): *Striatofilaria sp.* male posterior end, X 100.
(Fig. 24): *Striatofilaria sp.* male posterior end, showing short unequal and sadle shaped spicules X 250.
(Fig. 25): *Filicollis sp.* female anterior end, X 40.
(Fig. 26): *Filicollis sp.* female posterior end, X 40.
(Fig. 27): *Oochoristica sp.* Scolex X 100.
(Fig. 28): *Oochoristica sp.* mature segment, X 25.
(Fig. 29): *Oochoristica sp.* mature segment X 100.
(Fig. 30): *Oochoristica sp.* gravid segment X 25.
(Fig. 31): *Oochoristica sp.* egg capsule X 250.
(Fig. 32): Excysted *Clinostomum* metacercaria, X 6.4.
(Fig. 33): Metacercaria collected from *Clarias lazera* muscles X 100.
(Fig. 34): *Mesostaphanus appendiculatus* egg X 250.
(Fig.35):*Mesostaphanus appendiculatus* adult, showing oral, ventral sucker and prominent vaginal sphincter, X 100.
(Fig.36):*Mesostaphanus appendiculatus* showing testes & ovary X 100.

Table 1: Infestation rate and prevalence of different types of Helminths detected among examined birds.

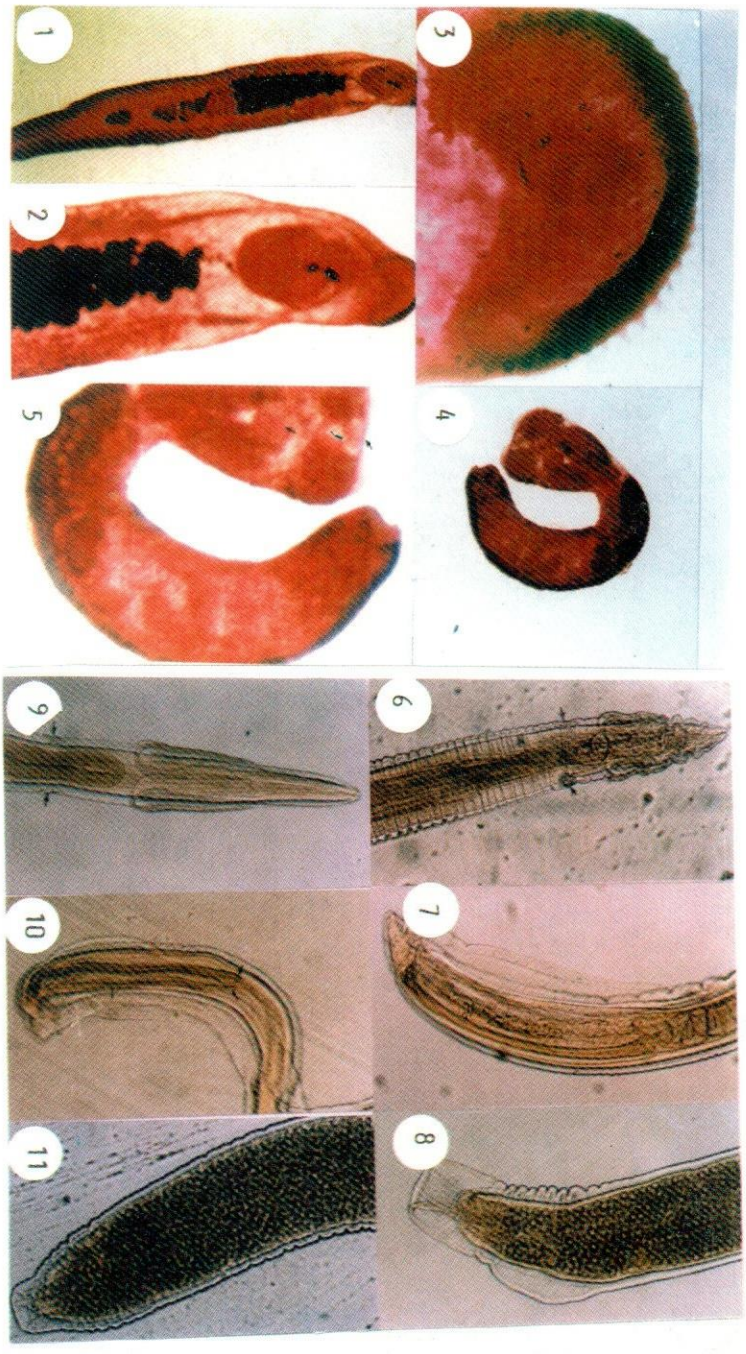
Type of Birds	Number			Trematodes		Cestodes		Nematodes		Acanthocephala	
	Exam	Infes.	%	Infes.	%	Infes.	%	Infes.	%	Infes.	%
Buff backed heron	20	15	75	7	35	-	0.0	14	70	-	0.0
Little owl	20	5	25	1	5	1	5	2	10	1	5
Flamingo	15	3	20	-	0.0	-	0.0	4	26.7	-	0.0
Total	55	23	41.8	8	14.6	1	1.8	20	36.4	1	1.8

Table 2: Distribution of helminth species among examined wild birds.

Wild birds		Trematode sp.		Nematode species							Acanth.	Cestode
		Nephrostomum ramosum	*Aopharyngostrigela ibis*	*Synhimantus Invaginatus*	*Synhimantus Equispeculatus*	*Tetramere sp.*	*Microtetramere Spiralis*	*Microtetramere Sp.*	*Cosmocephalus Sp.*	*Striatofilaria Sp.*	*Filicollis Sp.*	*Oochoristica Sp.*
Buff backed heron	No	4	3	7	2	-	4	1	-	-	-	-
	%	20	15	35	10	0.0	20	5	0.0	0.0	0.0	0.0
Little owl	No	1	-	-	-	-	-	2	-	-	1	1
	%	5	0.0	0.0	0.0	0.0	0.0	10	0.0	0.0	5	5
Flamingo	No	-	-	-	-	1	-	-	1	2	-	-
	%	0.0	0.0	0.0	0.0	6.7	0.0	0.0	6.7	13.3	0.0	0.0
Total	No	5	3	7	2	1	4	3	1	2	1	1
	%	9.1	5.5	12.7	3.6	1.8	7.4	5.5	1.8	3.6	1.8	1.8

Table 3: Results of experimental feeding of buff backed heron and duckling by *Clinostomum and unidentified metacercariae*.

Groups	Feeding cysts	Seats of cysts & type of fish	No. of cysts taken	Types No. of birds	Time of egg deposition	Time of sacrification
First group	*Clinostomum metacercariae*	Muscles and organs of *Tilapia nilotica*	8 8	5 buff backed heron 5 duckling	- -	One week for all groups
Second group	*Unidentified metacercariae*	From muscles of *Clarias lazera*	20 20	5 buff backed heron 5 duckling	7 day 7day	
Third group	Control negative	Have no cysts.	- -	5 buff backed heron 5 duckling	- -	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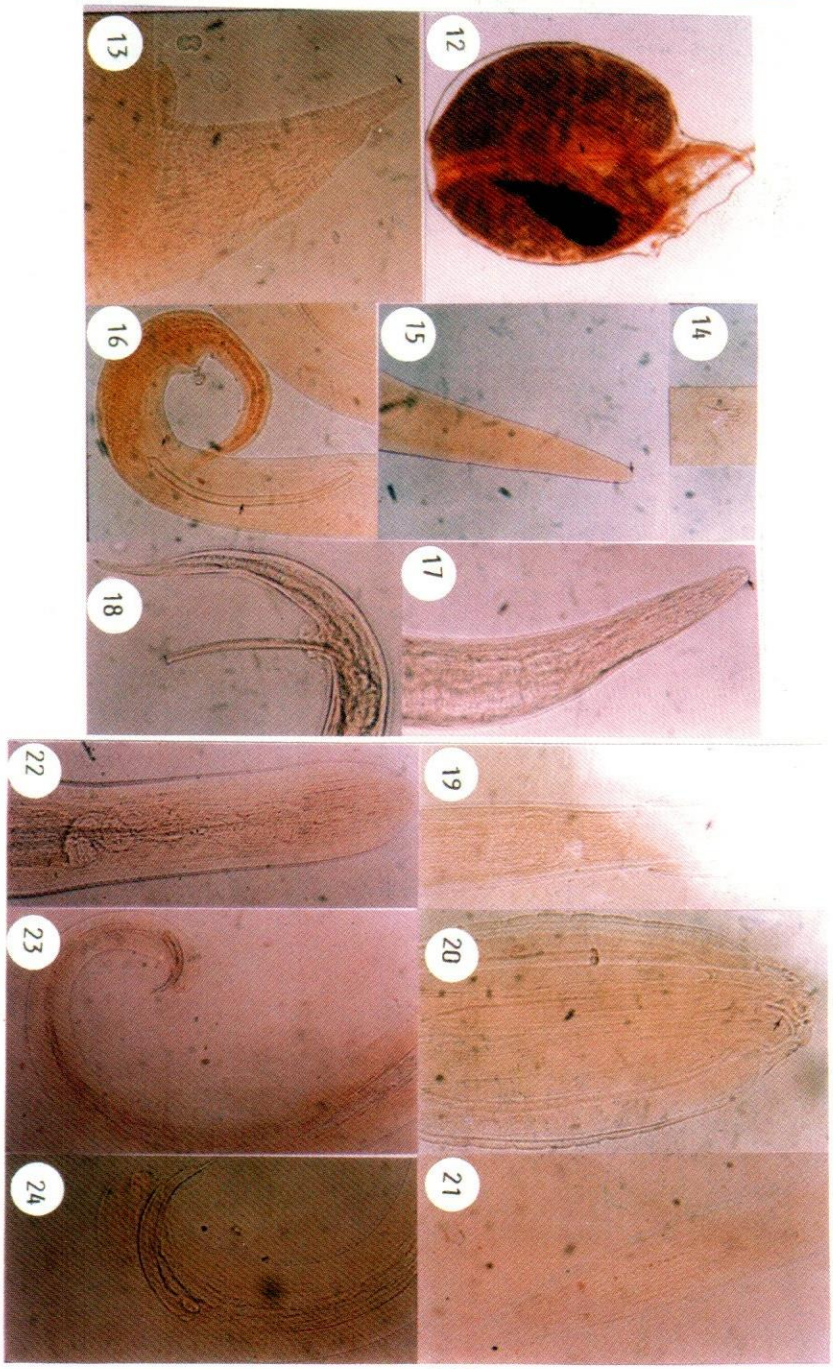
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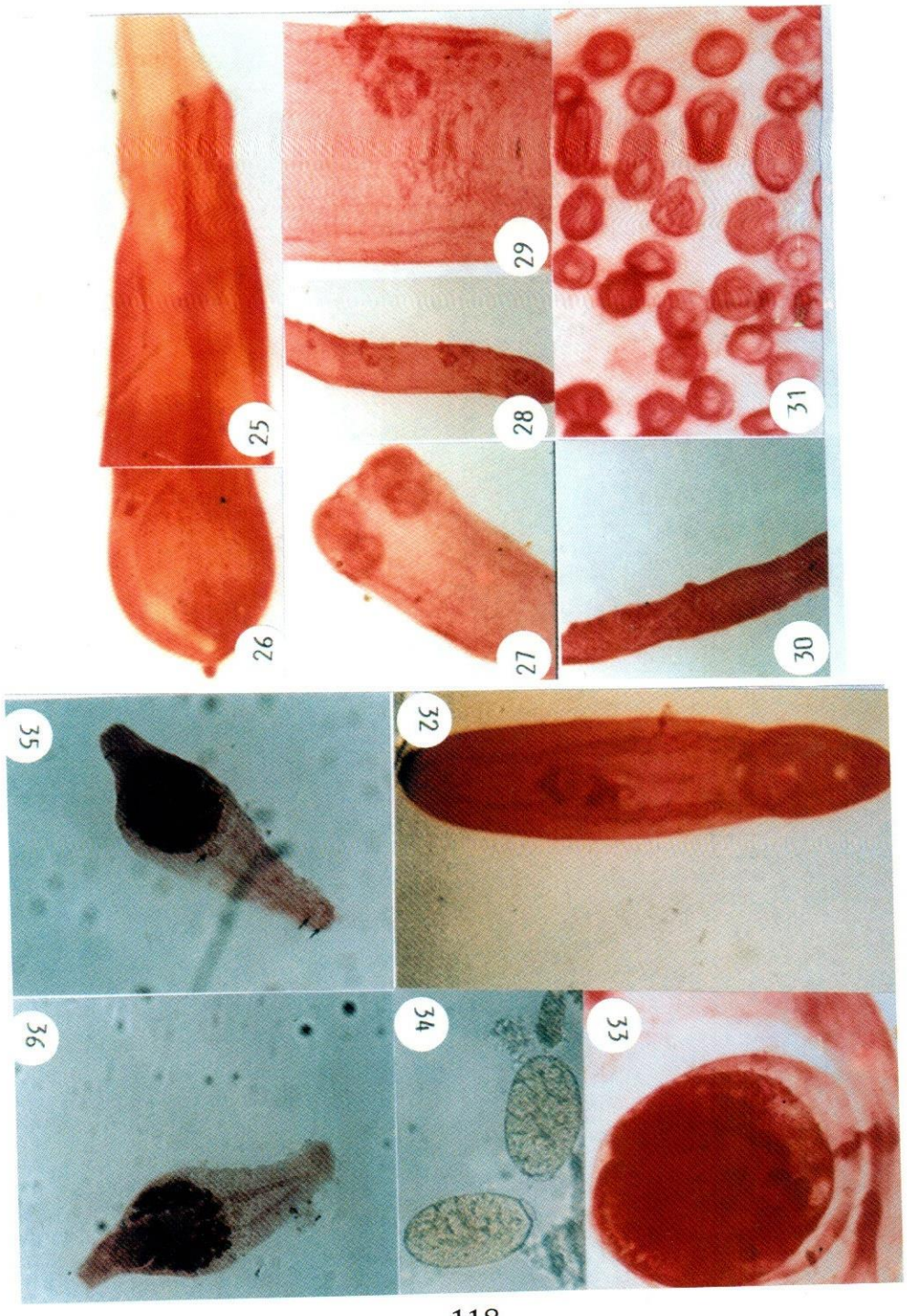
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