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Preliminary coproscopic examination of ornamental birds in Alexandria Province, Egypt

Dewir A., ELShanat S.
Department of Parasitology, Faculty of Veterinary Medicine, Alexandria University
Abis, Alexandria, Egypt
Post Code: 21944
*Author of correspondence: selshanat@alexu.edu.eg

Abstract:

Recently, the attention for ornamental birds has increased significantly. This in turn has been reflected in the growth of their trade, and has become a good source of cash income for owners and traders on a small scale. However, there was no attention for studying the parasites that infecting these categories of birds. The current study aims to study the parasites infecting the ornamental birds particularly, the gastrointestinal parasites that infecting these birds. Since 100 fresh fecal samples of 10 species of birds were collected during period from April to September 2016 from pet-shops at Alexandria Province, Egypt. The current study revealed that, the overall incidence of gastrointestinal parasites was 31% and the infestation was concentrated only in 8 species where cockatiel spp recorded the highest incidence (64.7%) followed by Hamam hazaz (50%) then Fisher rose (44.44%), Zebra spp (40 %), Australly (35 %) finally, 20 % was for Gawa spp. Whereas Redram pet, Canary and Badgy recorded no infestation rate at all. The infestation was restricted in three groups of endoparasites (Protozoa are represented in Eimeria, Trematodes are represented in Echinostoma and Nematodes are represented in Ascaridia and Contracaecum spp).

Key words: *gastro-intestinal parasites;pet birds;prevelance;Alexandria*

Introduction:

The influence of parasites on host growth, reproduction and survival were evaluated in different studies ***(Merino and Potti, 1995; Stjernman et al. 2004 and la Puente et al 2010).***

Birds have vital share in ecosystem and it is not surprising to be found in house or zoo as captive birds **(Papini et al. 2012).** Captivity seems has a pivotal role in increasing parasitic infection among birds since data on free-living birds refer to few or virtual no parasites at all ***(Hofstatter and Guaraldo, 2015).*** This is might be attributed to keeping birds for long period in restricted housings and the stress arising from illness, injuries or adaptation to new environment ***(Smith,1993 and Krone and Cooper 2002).***

Birds can be attacked by several types of endoparasites such as Nematodes, Trematodes, Cestodes and protozoa.

Nonetheless, Despite of many studies have been done on avian medicine including parasitic diseases, very few literature have been recruited to study parasitic infection in pet or zoo birds ***(Altman et al.1997; Olsen and Orosz 2000).***Some published studies included case reports ***(Luppi et al. 200 and Kwon et al. 2005).*** Or examination of a single parasitic infestation **(Rohela *et al. 2005* and Wang et al. 2011)** while others studied intestinal parasites in a limited range of zoo species (***Hollamby et al. 2003; Cordón et al. 2008 and Yusufu et al. 2004)***

Among the literatures that were performed to investigate endoparasites in wide range of avian species ***(Patel et al. 2000; Hofstatter and Guaraldo, 2015 and Hoque, et al. 2014).*** In captive birds, the reinfection rate of parasites that have direct life cycle is higher compared with free ranging birds due to they might be loaded with high number of parasites that lead to increase severity of disease ***(Sasseville et al. 1988 and Lierz et al. 2010).*** As well as, to validate this fact, ***(cordon et al. 2009)*** found in a survey performed in garden in Spain that most prevalent parasites were nematodes and coccidian. Capillaria was the most prevalent among nematodes and Blastocystis and coccidian (mostly Eimeria spp) are most prevalent among protozoa. Almost, half of the samples examined for gastrointestinal parasites in Nehuro zoo were positive for parasitic infection. Eggs of Capillaria and Ascaris were abundant followed by Eimeria oocysts while the presence of *Ascardia galli* and *Cotugnia digonopora* was very rare and only were found in postmortem findings ***(Patel et al. 2000).*** In the same context one third of the samples that were surveyed in some zoos in Brazil were Eimeria (coccidian) and Capillaria, Ascaridia and Heterakis (nematodes) ***(Hofstatter and Guaraldo, 2015).*** In different manner, there were often no difference between type of parasites that infect domestic and wild birds since ***(Hoque et al. 2014)*** Ascaridia spp, Capillaria spp. and Heterakis spp were observed in both types of birds.

Coccidian and Balantidium spp were recorded with Capillaria, Ascaris and Strongyloides as the most prevalent gastrointestinal parasites in 14 species of zoo birds in zoo in Nigeria (***Otegbade and Morenikeji, 2014).***

Coccidia (mainly Eimeria spp. /Isospora spp./Caryospora spp.), Capillaria spp., ascarids (mainly Ascaridia spp./Porrocaecum spp.), Heterakis spp., Trichostronyglus spp. and Amidostomum spp. were the most frequently recovered Parasites from captive birds ***(Globokar et al. 2017).*** Zoo birds and pet birds were examined for endparasites infection in Italy and the overall infection was 36.6% (42.2% for zoo and 27% for pet birds) both showed single infestation and mixed infestation with Strongyles-Capillarids (8.9%), Ascaridia (6.8%), Strongyles (5.5%), G. duodenalis Assemblage A (5.3%), Coccidia (4.1%), Cryptosporidium (4%), Porrocaecum (2.7%), Porrocaecum-Capillarids (2%), and Syngamus-Capillarids (0.7%) ***(Papini et al. 2012).***

Locally, there are very rare papers concerning the gastrointestinal parasites of pet birds in Egypt but there is one recent investigated the prevalence

in zoological garden ***(Elshahawy and Abou Elenien, 2015).*** They recorded different type of parasites such as Ascaridia spp. (4.1%), Heterakis spp. (8.3%), Capillaria spp. (5.6%), Contracaecum spp. (2.8%), Strongyloides avium (2.8%), Strongyloides pavonis larvae (4.1%), 2 protozoan parasites Eimeria spp. (25%) and Cryptosporidium spp. (11.1%).

Material and methods:

Study area and samples collection:

The study was conducted on pet birds from pet birds' shops at Alexandria Province, North of Egypt between April and September 2016. A total 100 fecal samples were collected from pet birds' shops from different 10 species of ornamental birds where Cockatiel (n= 17), Zebra (n=5), Fisher rose (n=9), Hamam hazaz (n=6), Gawa (n=10), Australly (n=20), Berkadellow (n=10), Redram pet (n=7), Canary (n=7) and Badgy (n=9). Freshly passed fecal samples of the birds were collected before daily routine cleaning of the cages in the shops. All samples were picked in plastic bags which were clearly marked with the time, date of collection and species of the birds. The samples after that were transported to laboratory of the Parasitology Department, Faculty of Veterinary Medicine, Alexandria University and examined within 48 hours.

Samples examination:

The samples were macroscopically examined for possible presence of nematodes /or cestodes or any fragment of parasites and microscopically for presence of parasite stages. A part of each sample was mixed with 2.5% Pot. dichromate in petri dishes and kept at room temperature for sporulation of coccidian parasites. As well as another part of the same sample was taken for tradition fecal examination. Individual fecal samples were examined by routine flotation and sedimentation methods. During floatation technique saturated NaCl solution with specific gravity 1.2 was used while sedimentation procedure was done using tape water. Furthermore, staining of faecal smear with acid fast stain was applied using modified Ziehl Nelseen technique for detection of Cryptosporidium. Identification of egg, cyst, oocyst and Larva was conducted under light microscope.

Results:

The undertaken study was conducted in the period from April to September 2016 to determine the prevalence of gastrointestinal parasites of pet birds from pet shops at Alexandria province. The overall percentage of prevalence of parasites infecting birds was 31%. The study was performed on 10 different species of pet birds since the cockatiel spp was received the highest infestation rate (64.7) followed by Hamam hazaz (50%), Fisher rose (44.44%), Zebra (40%) and Australly (35%) respectively while the species of Gawa and Berkadellow were recorded the same percentage (20%) but in contrast there were three species did not receive any parasitological infestation rate, Redram pet, Canary and Badgy, Table (1). A total of three categories of parasites were detected one protozoan parasite including (Eimeria spp.), one fluke parasite including (Echinostoma spp) and one round worm including (Ascaridia spp and Contracaecum

spp). The most recorded prevalent parasite spp was Ascaridia spp (13%) followed by Echinostoma spp (9%) then Eimeria spp (5%), Contracaecum spp (4%) Fig 1 (1-4) and Table(2).

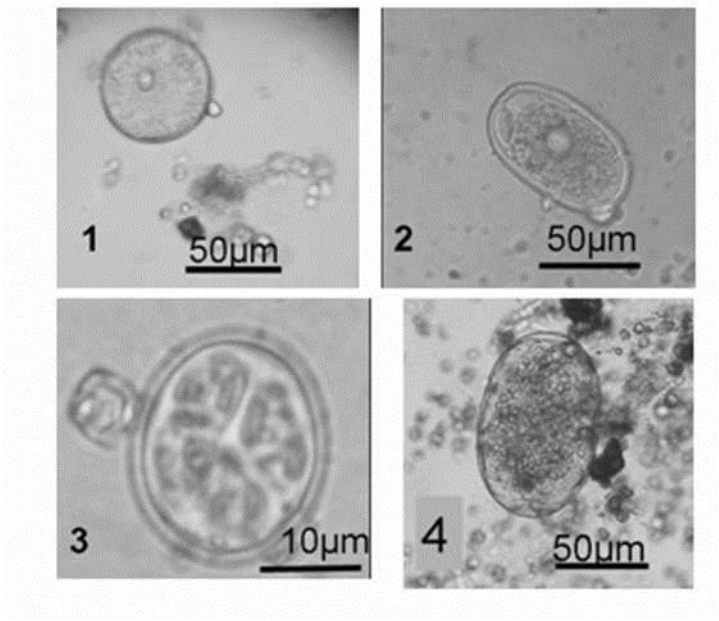

Fig 1: showing the recovered stages of obtained parasites:

1- Contracaecum spp egg (scale bar = 50 µm).
2- Ascaridia spp egg (scale bar = 50 µm).
3- Eimeria spp sporulated oocyst (scale bar = 10 µm).
4- Echinostoma spp egg (scale bar = 50 µm).

Table 1: Overall incidence (%)of gastro-intestinal parasites in the examined birds:

Bird spp	No. of Examined	No. of Infested	%
Cockatiel	17	11	64.7
Zebra	5	2	40
Fisher rose	9	4	44.44
Hamam hazaz	6	3	50
Gawa	10	2	20
Australly	20	7	35
Berkadellow	10	2	20
Redram pet	7	0	0
Canary	7	0	0
Badgy	9	0	0
Total	100	31	31

Exam: Number of the examined birds
Infested: Number of the infested birds
%: Percentage of infestation

Table 2: Occurrence (%) of gastro-intestinal parasites among each species of birds

	Total No.	No. of infested	Parasites							
			Eimeria spp	%	Echinostoma spp	%	Ascaris spp	%	Contracaecum spp	%
Cockatiel	17	11	0	0	7	41.17	3	17.64	1	5.88
Zebra	5	2	0	0	0	0	2	40	0	0
Fisher rose	9	4	0	0	0	0	4	44.44	0	0
Hamam baraz	6	3	3	50	0	0	0	0	0	0
Gawa	10	2	2	20	0	0	0	0	0	0
Australly	20	7	0	0	0	0	4	20	3	29.4
Berkadellow	10	2	0	0	2	20	0	0	0	0
Redram pet	7	0	0	0	0	0	0	0	0	0
Canary	7	0	0	0	0	0	0	0	0	0
Badgy	9	0	0	0	0	0	0	0	0	0
Total	100	31	5	5	9	9	13	13	4	4

Discussion:

An overall 31 (31%) of 100 bird faecal sample were found positive for gastro-intestinal parasites in the current study. Whereas ***(Papini et al. 2012)*** found overall infestation rate, 35.6% (42.2% of zoo birds and 27% of pet birds). In other past studies the prevalence rate were (48.11 and 21.9 %) in zoo birds in India and Nigeria ***(Patel et al. 2000; Otegbade and Morenikeji 2014)*** while the rate was 51.6 in zoo birds in Spain ***(Pérez Cordón et al. 2009).*** In Egypt, prevalence rate was 63.9% among zoo birds ***(Elshahawy and Abou Elenien, 2015).***

The gastro-intestinal parasites that were recovered from this work were limited in three categories protozoa, Nematodes and Trematode worms. The most prevalent group of parasites were Nematodes (Ascaridia spp & Contracaecum spp) followed by Trematodes (Echinostoma spp) and protozoa (Eimeria). This finding partially support the results obtained by **(Cordon et al. 2009)** where they found the most prevalent parasites were Nematodes and Coccidian. As well as our finding came similar to idea that assume that Nematodes and Protozoa are easily transmitted over than other types of parasites because their direct life cycle ***(Rossanigo and Gruner, 1995)***, in addition to, they considered the nematodes are responsible for the most helminthes diseases in veterinary medicine because they do not need intermediate host. Furthermore, captive conditions such as keeping

birds for long period in restricted area, sharing the same feeders, crowdedness in the cages and system of hygienic measures all of these conditions increase the chances of transmission especially faecal-oral parasites. Among the recovered Nematodes, Ascaridia spp were the most prevalent since it recorded infestation rate of 13% while (**Papini et al. 2012; Elshahawy and Abou Elenien, 2015)** reported lowest rate (4.1%) and 6.8 % of Ascaridia spp. In contrast to ***(Globokar et al.2017)*** since they showed infestation rate of 16.6%. Another spp of nematodes worm was recorded as well, Contracaecum spp with prevalent rate of 4%, this finding is closely similar to those were found by ***(Elshahawy and Abou Elenien, 2015)*** that showed infestation rate of the same spp by 2.8% as well as they represented Contracaecum spp as a new recorded parasite for the first time in Egypt.

Regarding protozoa this work revealed Eimeria spp sporulated oocyst, it estimated 5% infestation rate similar to what recovered by ***(Papini et al. 2012; Hofstatter and Guaraldo, 2015)*** 4.1% and 3.5 % respectively but a far distance to the findings that obtained by ***(Elshahawy and Abou Elenien, 2015)*** where they recorded 25% infection rate for oocyst of Eimeria spp. Concerning the only Trematode spp that was discovered during our work Echinostoma spp egg,. almost of all papers that showed the endoparsites in pet, zoo or captive birds did not include any Trematodes evidence except the studies that investigate the aquatic, domestic, wild or migratory birds, they only showed evidence of Trematode worm ***(Choe et al. 2014).*** This is realistic because the presence of intermediate host of Echinostoma in their environment but in captive or pet birds it is difficult to be infected with Echionstoma. It is Difficult to say how Echinostoma get access into these pet birds but the only suggestion is that these birds came already loaded with the parasite before entrance to their cages. Though of the modified Ziehl Nelseen technique is used to investigate cryptosporidium, this study did not detect any trace for these parasites. At the end, the hygienic measurement and over crowdedness of pet birds in their location play an important role in increasing infestation of parasites particularly those of direct life cycle. Therefore, it is recommended to recruit monitoring observation system and preventive and control scheme to get

ride the re-infection otherwise use separating cage for each bird.

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الملخص العربي

دراسه مبدئيه على الطفيليات المعديه المعويه فى طيور الزينه فى محافظه الإسكندريه, جمهوريه مصر العربيه

اميرة وحيد دوير, شريف كمال الشناط

قسم الطفيليات كليه الطب البيطرى جامعه الاسكندريه

أبيس، الإسكندريه

الرمز البريدى:٢١٩٤٤

للمراسله:selshanat@alexu.edu.eg

حديثا تم الإهتمام بطيور الزينة, كما أدى إلى نمو التجارة فيها وجعلها مصدر رزق لصغار المربيين والتجار. ومع هذا لم يكن هناك إهتمام بالطفيليات التى تصييب هذه الطيور. الدراسة الحالية تهدف لدراسة الطفيليات وخاصة الطفيليات المعدية المعوية التى تصييب هذه الطيور. حيث تم جمع ١٠٠ عينة من البراز من ١٠ فصائل مختلفة من طيور الزينة فى الفترة من إبريل إلى سبتمبر ٢٠١٦ من محلات طيور الزينة بالإسكندرية, جمهورية مصر العربية. وأسفرت الدراسة عن نسبة إصابة كلية من الطفيليات المعديه المعويه بلغت ٣١%. و تركزت العدوى فقط فى ٨ فصائل من طيور الزينه حيث كانت أعلى إصابه فى طيور من نوع الكوكتيل (٦٤.٧%) ويليها حمام هزاز (٥٠%), فيشرروز(٤٤.٤٤%), الزيبرا (٤٠%), استرالى(٣٥%), واخيرا٢٠% لطيور الجاوا. بينما الطيور من فصائل ريدرام بيت وكنارى و بادجى لم يسجلوا أى نسب عدوى. كما إنحصرت العدوى فى ثلاث مجاميع من الطفيليات المعديه المعويه (الأوليات تمثلت فى ايميريا, المثقوبات وتمثلت فى ايكينوستومم, وأخيراً الديدان الإسطوانيه التي تمثلت فى كل من اسكارديدالكونتراسيكوم).