



STUDIES ON INTESTINAL PROTOZOA OF POULTRY IN GHARBIA GOVERNORATE

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ABSTRACT

The present study was conducted to detect the prevalence and the seasonal dynamic of protozoa infection among domesticated poultry (chicken, turkey, duck, geese and pigeon). The detected protozoa were *Eimeria* spp. in fowl, pigeon and duck and *Cryptosporidium* spp. The current study revealed that out of 1486 examined birds 636 (42.8%) were infected with intestinal protozoa. The incidences rate were 401 (62.3%) in fowls, 149 (46.2%) in pigeons, 96 (10.9%) in turkeys, 74 (18.3%) in ducks and 3 (8.3%) in geese. The seasonal dynamic revealed that the highest incidence of *Eimeria* and *Cryptosporidium* in all examined bird species was in Winter (61.5%, 15.4%), (42%, 3.6%), (14.1%, 44.2%), (15.7%) and (30%) for (fowl, pigeon, duck, turkey and geese respectively) while the lowest rate in *Eimeria* spp and *Cryptosporidium* in fowl was in Summer (36.3%) and Spring (8.3%) respectively. The lowest rate of protozoa in pigeons was in spring (20.4, 2.6%). *Eimeria* and *Cryptosporidium* showed fewer incidences in autumn (2.4%) and summer (3.2%) in ducks. *Cryptosporidium* had lowest rate in autumn in turkey (4.4%).

Key words: poultry protozoa, *Eimeria*, *Cryptosporidium*

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1. INTRODUCTION

Avian coccidiosis is a disease caused by *Eimeria* spp. and considered as one of the most extensive and common disease in spite of advances in chemotherapy, management, nutrition and genetics [1]. It causes not only economically important changes such as impaired growth, poor food utilization and depigmentation but can also produce change in the metabolism, tissue composition and dietary requirement, all of which impact adversely an effect on poultry production [2]. *Cryptosporidium* species are coccidial parasites that inhabit the microvillus border of the epithelial cells of respiratory and intestinal tract they were associated with respiratory manifestation and diarrhea in birds [3]. Avian intestinal infection have been documented for chicken [4], turkey [5], duck [6], geese [7] and pigeon [8].

2. MATERIALS AND METHODS

2.1. Collection of samples for intestinal protozoa.

Intestinal content of (643 chickens, 322 pigeons, 82 turkeys, 403 ducks, and 36 geese) of different ages, sexes and breeds were collected from poultry markets, private poultry farms and poultry slaughter houses during the period from January 2012 to January 2013 in Gharbia Governorate and transferred to the laboratory of Fac. Vet. Med., Moshtohor, Benha University for protozoal examination.

2.2. Examination of fecal samples for the presence of intestinal protozoa

2.2.1. Direct microscopic examination [9]

A pin head drop of intestinal contents was put on a microscopic slide, mixed well with a drop of saline 0.9% by the aid of a wooden stick, covered with a cover glass slip and examined under high power X40 of light

microscope for detection of any oocysts in feces.

2.2.2. Concentration floatation technique.

(By using of Sheather's sugar solution, [9]) Each fecal sample was concentrated with Sheather's sugar solution and centrifuged at 200 rpm. for 10-15 minutes. The float was examined by mixing it thoroughly with a drop of tap water and distributed on a clean glass slide to form a thin film, covered by cover glass slip and examined under high magnification power X40.

2.2.3. Sporulation of coccidian oocyst: [10]

In clean glass Petri dishes, the positive faecal samples for *Eimeria* species were mixed with 2.5% potassium dichromate solution at the depth of 3-5 mm. Petri dishes were covered and left to stand at room temperature. They were daily aerated and examined to follow up the process of sporulation. The identification of *Eimeria* spp. was according to [9]

2.2.4. Counting of oocyst of *Eimeria* species [11]

Fill a graduated tube at the 14 level with 0.1% sodium hydroxide, add feces until level rise to 15ml and mix well. Take off 0.15ml from the suspension and transfer it to a slide, put a cover and count the oocyst. The numbers of oocysts per gram faeces were calculated by multiplying the number of oocysts by 100. The low infection was < 200 oocyst/ gm, medium infection was 200-500 oocysts/ gm and severe infection was > 500 oocysts/ gm

2.2.5. Staining of *Cryptosporidial* oocysts

Safranin-methylen blue staining technique [12]

Thin smear from infected faeces was prepared by adding a drop of tap water on a microscopic slide, air dried, fixed briefly by one pass through the Bunsen flame. The smears were fixed in 3% pure hydrochloric acid HCL for 3-5 minutes, washed with tap water and stained with 1% aqueous safranin, heated thoroughly, preferably until boiling occurred, more stain was

added and heating continued if necessary. The slides were washed with tap water, counter staining by using of methylene blue for 30 seconds, washed with tap water, air dried and examined under oil immersion lens where *Cryptosporidium* oocyst appeared orange against bluish background. Giemsa stain [13]. The semidried smears were fixed in methanol for 10 minutes, stained with 10% buffered Giemsa for 30 minutes, then rinsed in tap water, air dried and examined. The oocysts appeared as blue bodies with dark granules inside it.

3. RESULTS

1486 birds (643 chickens, 322 pigeons, 82 turkeys, 403 ducks and 36 geese) were examined for enteric protozoa. Table 1 revealed that (42.8%) of examined birds had enteric protozoa. The detected protozoa were *Eimeria* species, which were found in 453 birds (30.5%) (325 chickens, 110 pigeons and 18 ducks) and absent in turkey and geese. *Cryptosporidium* species was found in 183 birds (12.3%) (76 chickens, 39 pigeons, 9 turkey, 56 ducks and 3 geese). Table (1 and 2) showed that chickens were mostly infected with *Eimeria* species (50.5%), followed by pigeon (34.2%) and ducks (4.5%) while Turkey and geese were free from infection. The single infection was recorded in 277 (43.1%) chickens, 72 (22.4%) pigeons and 16 (4%) ducks. The detected species of *Eimeria* were *E.tenella*, *E. acervulina*, *E.mitis*, *E.praecox* and *E.necatrix* in chicken, *E.columbae* and *E.labbeana* in pigeon and *E. battakhi*, *E. danailova*, *E. schachdagica* in ducks.

Table (1) displayed that the incidence of *Cryptosporidial* infection was high in ducks (13.8%) followed by pigeon (12.1%), chicken (11.8%) turkey (11%) and geese (8.3%).

Table (2) showed that the highest incidence of *Eimeria* and *Cryptosporidium* in all examined bird species was in Winter (61.5%, 15.4%), (42%, 3.6%), (14.1%, 44.2%), (15.7%) and (30%) for fowl, pigeon, duck, turkey and geese respectively

while the lowest rate in *Eimeria* spp and *Cryptosporidium* in fowl was in Summer (36.3%) and Spring (8.3%) respectively. The lowest rate of protozoa in pigeons was in spring (20.4, 2.6%). *Eimeria* and

Cryptosporidium showed fewer incidences in autumn (2.4%) and summer (3.2%) in ducks. *Cryptosporidium* had lowest rate in autumn in turkey (4.4%).

Table (1) incidence of enteric protozoa among examined birds

birds	No. of examined birds	No. of infected birds with <i>Eimeria</i> spp.	%	No. of infected birds with <i>Cryptosporidium</i> spp.		%	total of protozoa	%
				Crypt. baileyi	Crypt. meleagridis			
chicken	643	325	50.5	76	—	11.8	401	62.3
pigeon	322	110	34.2	39	—	12.1	149	46.2
turkey	82	0	0	—	9	11	9	10.9
Ducks	403	18	4.5	56	—	13.8	74	18.3
geese	36	0	0	3	—	8.3	3	8.3
total	1486	453	30.5	183	—	12.3	636	42.8

Table (2) incidence of *Eimeria* species among birds

birds	species of <i>Eimeria</i>		Single infection	%	Mixed infection	%	Total	%
				50	7.8			
Chicken (643)	E.acervulina	E.tenella	40	6.2	48	7.5	325	50.5
		E.praecox	66	10.3				
	E.necatrix	E.mitis	63	9.7				
			58	9.02				
pigeons (322)	E.labbeana		277	43.1	38	11.8	110	34.2
			35	10.8				
		E.columbea	37	11.4				
ducks (403)	E.battakhi	E.danilova	72	22.4	2	0.4	18	4.5
			7	1.7				
		E.schachadagica	4	1				
total(1368)			5	1.2				
			16	4				
			365	26.7	88	6.4	453	33.1

4. DISCUSSION

325 fowls, 110 pigeons and 18 ducks were found infected with *Eimeria* spp. at incidence of 50.5%, 34.2% and 4.5% respectively with general prevalence 30.5% while turkey and geese were free from infection. These results were relatively agreed with those of [14] in the general prevalence (23.5%), but she did not found *Eimeria* in ducks. Fowl prevalence also near to that recorded by [15], [14] in Egypt and [16] in Nigeria which were 55.7%, 43.9% and 52.9%. On the other hand it was higher than that mentioned by [17] (43.9%), and (30%) in Egypt [18], While the present result was lower than those recorded by [19] and [20] in Saudi Arabia, which were 94% and 80% respectively. The present incidence of *Eimeria* in pigeons (34.2%) was relatively near to that of [14] in Egypt (28.7%). It was relatively higher than that recorded by [21] in Egypt (23.4%). Higher incidence of *Eimeria* infection in pigeon were recorded by [22] (77.5%) in Egypt, [23] in Slovenia (71.9%), [24] in Poland (56.4%) and [25] in Egypt (61.36%).

Dealing with *Eimeria* species in ducks (*Anas domesticus*) *E.battakhi* (1.7%) , *E. danailova* (1%), *E.schachdagica* (1.2%) with over all prevalence 4.5% where it was recorded for the first time in Egypt. Little literature about *Eimeria* spp. in ducks but [26] in China agreed with our types only at *E.battakhi* but [27] in Ceskoslovenska agreed with us in *E.danailovi* while [28] in French recorded different species called *E. mulardi*. *Cryptosporidium* spp. was found in all examined birds species (12.3%) at incidences 11.8%, 12.1%, 11%, 13.8% and 8.3% for chickens, pigeons, turkeys, duck and geese respectively. Same results were reported by [14] in Egypt for general incidence (13.5%), and for chicken (12.6%), pigeons (13.3%) and geese (9.3%) but slightly lower for turkey (17.8%) and duck (24.2%). Also [29] in Egypt, [30], and [31] in China found similar results for chicken were 9.5%, 10.38% and 10.6% respectively.

Concerning with seasonal dynamics of protozoa in domestic birds the results agreed with [32] who reported that the highest prevalence of coccidiosis in the examined birds was in rainy season, [18] in Egypt reported the peak of fowl *Eimeria* was in winter and [33] in Egypt noticed the highest rate of chicken coccidiosis was in winter while our results differ than that reported previously [34] in Nigeria who reported the highest prevalence of coccidiosis disease was in summer. Our results in *Cryptosporidium* differ with [31] who reported the highest prevalence of *Cryptosporidium* infection in chicken was in spring.

5. REFERENCES

1. McDougald, L.R., Raid, W.M. 1991. Coccidiosis of poultry 9th (ed): Ames. Iowa. Iowa State university press pp.780-719.
2. Allen, P.C. 1986. Biochemical changes in the intestinal mucosa associated with coccidiosis. Research in Avian coccidiosis. Proceeding Georgia coccidiosis conference, university of Georgia, Athens.194-202.
3. Goodwin, M.A. 1989. Cryptosporidiosis in birds. Avian Path.,8:365-384.
4. Fletcher, O.J., Unaell, J.F., Page, P.K. 1975. Cryptosporidiosis of the bursa of fabricius of chicken. Avian Dis.19:640-639.
5. Hoerr, F.J., Ranck, F.M., Hasting, T.F. 1978. Reservoirary cryptosporidiosis in turkeys. J. Am. Vet. Med. Assoc. 137:1591-1593.
6. Richter, B., Wiegand-Tripp G., Burkhardt, E., Kalta E.F. 1994. Natural infection by *Cryptosporidium* in farm raised ducks and geese. Avian Path. 23: 277-286.
7. Proctor, S.J., Kemp, R.L. 1974. *Cryptosporidium anserinum* sp. n. (sporozoan) in adomestic goose "Anser anser" from Iowa.J.Protozool. 21:664-666.

8. Rodriguez, F., Oros, J., Rodriguez, J.L., Gonzalez, J. Gastro, P., Fernandez, A. 1997. Intestinal Cryptosporidiosis in pigeons (*Columba livia*). *Avian Dis.* 41: 748-750.
9. Levine, N.D. 1985. Entestinal cryptosporidiosis in pigeon (*Columba livia*). *veterinary protozoology*. Iowa State Univ. press Ames, 1st. ed pp. 365-367. *Avian. Dis.* 41:748-750.
10. Williams, R.B. 1969. Persistence of drug resistance in strains of *Eimeria* species in broiler chickens following a change of coccidiostate. *Research in Vet. Science* 10:490-492.
11. Fleck, S.L., Moody, A.H. 1988. Diagnostic technique in medical parasitology (1st. ed.), Baillere, Tindall, London.
12. Baxby, D., Dundell, N., Hart, C.A. 1984. The development and performance of a simple sensitive method for detection of *Cryptosporidium* oocysts. *J. Hyg. Camb.* 92:317-323.
13. Pholenz, J., Moon, H.W., Cheville, N.F., Bemrick, W.J. 1978. Cryptosporidiosis as a probable factor in neonatal diarrhea of calves *J. Am. Vet. Med. Assoc.* 172: 452-457.
14. El-Madawy R.S. 2001. Studies on some protozoan parasites in birds *M.Vet.Sci. Zagazig university Fac. Vet. Med.*
15. Abu-El Ezz, N.T. 1994. Immunological studies on *Eimeria* species in fowls. *PHD.Thesis, Fac. Vet. Med. Cairo University.*
16. Muazu, A., Masdoq, A.A., Ngbede, J., Salihu, A.E., Haruna, G., Habu A.K., Sati, M.N., Jamilu, H. 2008. Prevalence and Identification of Species of *Eimeria* causing coccidiosis in Poultry Within Vom, Plateau State, Nigeria *International Journal of Poultry Science* 7(9):917-918.
17. Ahmed, N.E., Negm Eldin, M.M., El-Akabawy, L.M., El-Madawy, R.S. 2003. Incidence of some protozoan parasites in birds. *Kafer El-shikh Vet. Med. J.* 1: 235-251.
18. Nowar, M.H. 2007. Field evaluation of methods of coccidian infection control in some poultry farms in Dakahlia Governorate. *Ph.D. thesis, Fac. Vet. Med. Kafer El-shieikh University.*
19. Kambrage, D.M., Abel, J.S., Mtambo, M.M., Muhayrwa, A.P., Kusiluka L.J. Kazwala, R.R. 1997. prevalence of *Eimeria* and *Cryptosporidia* oocysts in chickens in Tanzania. *Zim. Vet.J.* 28(2): 60-63.
20. Al-Qurashy, S., Al-Nasr, I. 2009. Validity of *Isospora lacazei* (Labbe, 1893) infecting house sparrow, *Passer domesticus* (L.), in Saudi Arabia. *Parasitol. Research.* 105 (4): 1105-1108.
21. Abdallah, O., Fetaih, H. 1995. clinicopathological and histopathological studies on coccidiosis in pigeons. *Egypt.J.Comp. path.and.clinic.path.* 8(2):10 – 107.
22. Ibrahim, F.M. 1997. Studies on *Eimeria* species infesting pigeons. *Ph.D. Fac. Vet. Med., Cairo Univ.*
23. Dovc, A., Zorman-Rojs, O., Rataj, A.V., Bole-Hribovsek, V., Krapez, U., Dobeic, M. 2004. Health status of free living pigeons (*Columba livia domestica*) in the city of Ljubljana. *Acta Veterinaria Hungarica.* 25 (2):219-226.
24. Stenzel, T., Koncicki, A. 2007. Occurrence of parasitic invasions in domestic pigeons (*Columba livia domestica*) in the Northern Poland. *Pol. Vet. Sci.* 10(4):275-278.
25. El-Sayed, K.M. 2009. Field survey on coccidiosis in pigeon in Sharkia Governorate. *M.V.Sc. Thesis, Fac. Vet. Med. Cairo University.*
26. Zuo, Y. X., Song, X. L., Lin, Y. Y., Tu, Y. 1990. Surveys on the species of coccidia in domestic ducks in Yunnan, China. *Chinese Journal of Veterinary Science and Technology,* 9:13
27. Pecka, Z. 1992. The life cycle of *Eimeria danailovi* from ducks *Folia Parasitologica (Ceskoslovenska Akademie Ved, Ceske Budejovice (CSFR). Parazitologicky Ustav).*
28. Pascalon-Pekelniczky, A., Chauve, C.M., Gauthey, M. 1994. Experimental infection of the mule duck

- by *Eimeria mulardi* sp. nov.: effects on body weight and modifications of different hematologic and biochemical parameters. Vet Res. 25(1):37-50.
29. Ahmed, H.R. 1992. Some studies on Cryptosporidia "Cocci" of chickens. M.V.Sc. Thesis, Fac. Vet. Med. Zagazig University.
30. El-Gawady, H.M., Elmeligy, A.A., Ghattasand, M.W., Tadros, S.W. 1998. Studies on cryptosporidiosis of chicken at port said . vet.Med. J. Giza, 46 (3): 293-302.
31. Wang, R., Jian, F., Sun, Y., Hu, Q., Zhu, J., Wang, F., Ning, C., Zhang, L., Xiao, L. 2010. large-scale survey of *Cryptosporidium* spp. in chickens and pekin ducks (*Anas Platyrhynchos*) in Henan, China: prevalence and molecular characterization. Avi. Path. 39(6):447-451.
32. Etuk, E.B., Okoli, I.C., Uko1, M.U. 2004. Prevalence and Management Issues Associated with Poultry Coccidiosis in Abak Agricultural Zone of Akwa Ibom State, Nigeria International Journal of Poultry Science. 3 (2):135-139
33. Al-Gawad, A.A., Mahdy, O.T.A., El-Massry A.A.N., Al-Aziz, M.S.A. 2012. Studies on Coccidia of Egyptian Balady Breed Chickens. Life Sci. J. 9(3):568-576.
34. Abdu, P.A., 2007. Manual of Important Poultry Diseases in Nigeria. 2nd Edn., MacChin Multimedia Designersm, USA., pp: 91.

دراسة على الطفيليات الاولية المعوية فى الطيور المستأنسة فى محافظة الغربية

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الملخص العربى

هدفت هذه الدراسة الى معرفة نسبة الاصابة والاصابة الموسمية للطفيليات الاولية التي تصيب الطيور المستأنسة وتشمل (الدجاج، الحمام، الرومي، البط والاوز). وقد تم فحص عدد 636 طائر بنسبة 42.8% مصابين بالطفيليات الاولية المعوية. وقد خرجوا من 1486 طائر تم فحصهم وهذه الاوليات هي طفيل الايميريا والكريبتوسبورديم وكانت معدلات الاصابة كالتالى (62.3%) من الدجاج، (46.2%) من الحمام، (10.9%) من الرومي، (18.3%) من البط و (8.3%) من الاوز مصابين بهذه الطفيليات وكانت هذه الطفيليات هي طفيل الايميريا فى الدجاج الحمام والبط بينما كان طفيل الكريبتوسبورديم فى كل انواع الطيور التي تم فحصها. كانت اعلى نسبة اصابة بطفيل الايميريا والكريبتوسبورديم فى كل انواع الطيور التي تم فحصها كانت فى فصل الشتاء بنسب (61.5% و 15.4%)، (42% و 3.6%)، (14.1% و 44.2%)، (15.7%) و (30%) لكل من الدجاج، الحمام، البط، الرومي و الاوز على الترتيب. وكانت اقل اصابة بطفيل الايميريا والكريبتوسبورديم فى الدجاج فى فصل الصيف (36.3%) والربيع (8.3%) على الترتيب. واقل اصابة بالاوليات فى الحمام كانت فى فصل الربيع (20.4% و 2.6%). وفى البط كانت اقل اصابة بالاييميريا فى الخريف (2.4%) والكريبتوسبورديم فى الصيف (3.2%). وكان طفيل الكريبتوسبورديم اقل ما يكون فى فصل الخريف بالنسبة للرومي (4.4%).

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