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PROTOZOAL AND RICKETTSIAL INFECTIONS AMONG CLINICALLY ILL PIGEONS IN ASSIUT, EGYPT: PREVALENCE, BIODIVERSITY, AND POTENTIAL PUBLIC RISK

ALAA M. ABD EL-SALAMA[1], AHMED K. DYAB [2A,B], MOHSEN I. ARAFA[3] , ASMAA A.E. NASR[4], SALWA MAHMOUD ABD- ELRAHMAN [5]

[1]Private Veterinary Clinic

[2a] Department of Medical Parasitology, Faculty of Medicine, Assiut University, 71526 Assiut, Egypt.

[2b] Department of Parasitology, School of Veterinary Medicine, Badr University in Assiut, New Nasser City, Assiut, Egypt

[3]Animal Health Research Institute (Parasitology), Agriculture Research Center (ARC) Assiut Lab. Egypt

[4]Animal Health Research Institute (Poultry Diseases), Agriculture Research Center (ARC) Assiut Lab. Egypt

[5]Department of Parasitology, Faculty of Veterinary Medicine, Assiut University, 71526 Assiut

(*Correspondence: ahmed2015@aun.edu.eg ORCID 0000-0002-4021-7904)

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ABSTRACT

Pigeons (*Columba livia*) are closely related to humans and serve various purposes as birds. Both domestic and racing pigeon (*Columba livia*) populations are vulnerable to several protozoal infections that pose health challenges to the pigeons and may impact public health. Therefore, this study aimed to investigate the prevalence, biodiversity, and effects of protozoan infections in domestic and racing pigeons in Assiut Governorate, focusing on zoonotic infections. A total of 140 clinically ill pigeons, comprising 92 domestic and 48 racing pigeons of varying ages, were examined for gastrointestinal, blood, and tissue protozoal infections from February 2023 to April 2024. The birds were necropsied and examined for gastrointestinal, blood, and tissue protozoal infections. The overall protozoal infection rate was 98.6% among the examined pigeons, which was higher in racing pigeons at 100%, compared to 97.8% in domestic pigeons. Additionally, the prevalence varied slightly with climate and age, showing higher rates in colder climates and among squabs. The commonly observed protozoan was *Trichomonas sp.,* found in 90% of the samples (126 out of 140), followed by *Cryptosporidium sp*. at 48.6% (68/140), *Atoxoplasma* at 37.1% (52/140), and *Haemoproteus* at 34.3% (49/140). *Leucocytozoon* had a prevalence of 14.3% (20/140), while both *Toxoplasma* and *Ehrlichia* had the same prevalence of 12.9% (18/140). *Aegyptianella* was found in 11.4% (16/140) of samples. *Microsporidia* had a prevalence of 7.1% (10/140), and *Eimeria* and *Plasmodium* each had a prevalence of 5.7% (8/140). The least frequently observed protozoan was *Cyclospora*, found in 2.9% of the samples (4/140). This research highlights the prevalence and diversity of protozoal infections in pigeons and the public health risks associated with some protozoa's zoonotic nature. This emphasizes the need for targeted control measures to reduce the impact of these parasites on pigeon health.

Keywords: Pigeon, Race, Domestic, Zoonotic protozoa, *Toxoplasma, Trichomonas sp., Cryptosporidium, Atoxoplasma,* and *Haemoproteus, Agyptenella, Leucocytozoan sp., Plasmodium sp.*

Corresponding author: AHMED K. DYAB

E-mail address: ahmed2015@aun.edu.eg

Present address: Department of Medical Parasitology, Faculty of Medicine, Assiut University, 71526 Assiut, Egypt. ORCID 0000-0002-4021-7904

INTRODUCTION

Pigeons (*Columba livia* domestica) are globally adapted birds (except poles); almost every town and city is home to pigeons. They coexist with humans and are linked to their habitation (Marques *et al.*, 2007). Pigeons are bred as an interesting meat source, pets, experimental systems, racing birds, recreational organisms, and cultural icons (Santos *et al.,* 2020). Pigeon meat is tasty, nutritious, digestible, and very beneficial to human health, particularly because it boosts blood components in the body (Kabir, 2024**).** Pigeon racing is an exciting, growing, and multimillion-dollar sport, increasingly so in Egypt (Saleh *et al.*, 2024). However, flying over great distances in the sky and contact with foreign and wild birds expose these birds to several health hazards (Struthers, 2024).

Pigeon parasitism poses a significant challenge to poultry production and has considerable economic implications as it severely hinders growth and egg production, increasing their vulnerability to other infections. This issue is particularly concerning with protozoan parasites, which can be categorized into intestinal parasites such as *Trichomonas gallinae*, *Cryptosporidium spp.,* and *Giardia spp*., (Albogami *et al.,* 2023) as well as blood parasites like *Plasmodium spp. Leucocytozoon spp., Haemoproteus spp.,* and *Aegyptinella spp*. (Saikia *et al.,* 2019). Additionally, tissue parasites, such as Toxoplasma further complicate the situation. Both domestic and racing pigeon populations are susceptible to various parasitic infections, which significantly impair their growth, productivity, and overall viability. These infections can lead to serious clinical symptoms, such as poor condition, depression, lethargy, weakness, weight loss, reduced appetite, labored breathing, and mortality particularly among the young and may even result in fatal consequences, particularly in squabs (Albogami *et al.,* 2023).

Pigeons frequently interact with people, as well as with other domestic and wild birds and animals. As a result, they can carry zoonotic infections, serving as hosts for more than 60 zoonotic pathogens. Some of these parasites can be asymptomatic and pose a zoonotic risk, highlighting the need for public health awareness and assessment (Radfar *et al.,* 2012). Additionally, pigeons fly freely around cities and buildings, leaving their droppings behind, which can contaminate human structures. Their tendency to reproduce rapidly may also pose public health concerns (Vasconcelos *et al.,* 2018). This study assessed the prevalence, biodiversity, and potential public health risks of protozoal infections among clinically ill domestic and racing pigeons in Assiut Governorate, Egypt.

MATERIALS AND METHODS

Study area and selected pigeon

This study was conducted from Feb 2023 to May 2024 in Assiut, which is found at 27° 10’51.46” N and 31° 11’1.25” E latitude. Assiut's climate is desert, non-rainfall; its average annual temperature is 23°C (1°C to 45°C). A total of 140 clinically ill pigeons were collected from poultry diagnostic clinics and poultry markets in various areas of Assiut City, the selection was based on exhibiting one or more of these signs (fever, anaemia, depression, weight loss, reduced appetite, labored breathing, and mortality particularly among the young and in some cases necrotic lesions within the mouth and oral cavity). The studied birds in the selected areas were categorized into (92 domestic and 48 race) aged 3 weeks squabs (70) and 1-year adults (70). They were delivered directly to the laboratory of the Parasitology Department, Faculty of Veterinary Medicine, Assiut University, for isolation of different samples and Further identification of parasites.

1. Intestinal content examination:

The alimentary tract of each bird was dissected out into the crop with the oral cavity and intestine. The crop and intestinal

contents were directly examined by the following methods:

1. Direct smear examination

Part of the intestinal or crop content was put on a clean slide and mixed with a drop of 0.9% saline, mixed well till forming a uniform smear, then examined under a microscope for the presence of any protozoan (oocysts and motile flagellates) (Abd-ELrahman *et al.*, 2023).

2. Formalin Ether Concentration Technique (FECT)

The following method was followed as described by Mohamed *et al.* (2024). A part of the intestinal or crop content was mixed in 0.9% saline, strained, and left to settle for 30 minutes. The liquid on top was poured off, and then 7 mL of 10.00% formal saline and 3 mL of ether were added to the remaining sediment and then centrifuged. The top three layers were poured off, and smears from the sediments of each specimen were stained by "Kinyoun's acid-fast stain" to detect acid-fast protozoa (Cryptosporidium, Cyclospora, and Microspora) (Lamido *et al.*, 2022).

3. Sporulation of coccidian oocyst

For perfect identification, the coccidian oocysts were sporulated by mixing the positive samples with 2.5% potassium dichromate solution in small Petri dishes. They were daily aerated and examined to follow up the process of sporulation. The contents of these Petri dishes were concentrated by the flotation technique and collected for further microscopic examination (Abd-ELrahman *et al.*, 2022).

2. Blood and Tissue examination

2.1- Thin blood film examination

Blood samples were taken from the jugular vein in ethylene-diamine tetra acetic acid (EDTA) tubes. Three thin smears from the blood were prepared, air-dried, and fixed in methanol and stained with 10% Giemsa (KAMEL *et al.*, 2024).

2.2- Tissue impression smear

The brain, lung, liver, and kidney of each bird were removed separately, well-washed in normal saline, dried with filter paper, and labelled. Organs' current-cut surfaces were prepared on clean glass slides within one hour of taking. The smears were air-dried at room temperature, fixed in absolute methanol for 2-3 min., and stained with 10% Giemsa's stain working solution (Gamboa-Suárez *et al.*, 2024).

All stained smears were examined by the oil immersion lens (100X). Parasites were identified according to their morphological features as described by Levine (1985), Urquhart *et al.* (2003), and Thrall *et al.* (2004).

Statistical analysis

The total parasitic infection and prevalence of each parasite were estimated by dividing the number of infected birds by their total number. The variables (age, rearing goal, either domestic or race, and weather condition) were examined for their relationships with the parasite occurrence using the Chi-square test ($\chi 2$) of independence formula by IBM SPSS Statistics 25 software. P value was considered statistically significant at < 0.05 and a 95% confidence level (Abd-Elrahman *et al.*, 2024).

Ethical Statement

The study design and all bird handling procedures followed the Ethical Committee, Faculty of Veterinary Medicine, Assiut University, regulations (Approval No. 06/2024/0270).

RESULTS

Clinical manifestation and postmortem examination:

The examined pigeons displayed general symptoms including poor condition, depression, lethargy, weakness, weight loss, reduced appetite, labored breathing, and mortality, particularly among the young. The owners of race pigeons reported

a loss of flying desire, rapid exhaustion during races, poor performance, and nervous behaviour in their birds. Ectoparasites, including flies (*Pseudolynchia canariensis* = *P. canariensis*) and/or lice (*Menopen gallinea*), were encountered on the bodies of most birds (Fig. 1). At necropsy, varying degrees of pathological lesions, including pericarditis, pneumonia, hepatitis, airsacculitis, and enteritis were observed (Fig. 2).

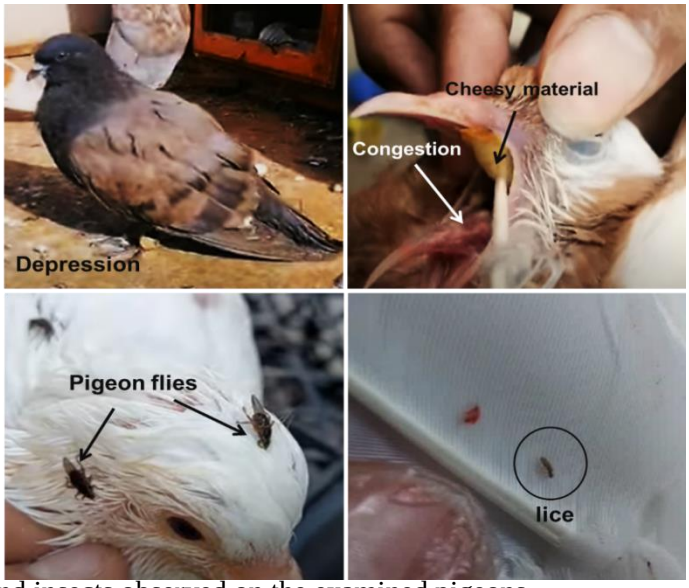

Fig. 1: Some symptoms and insects observed on the examined pigeons

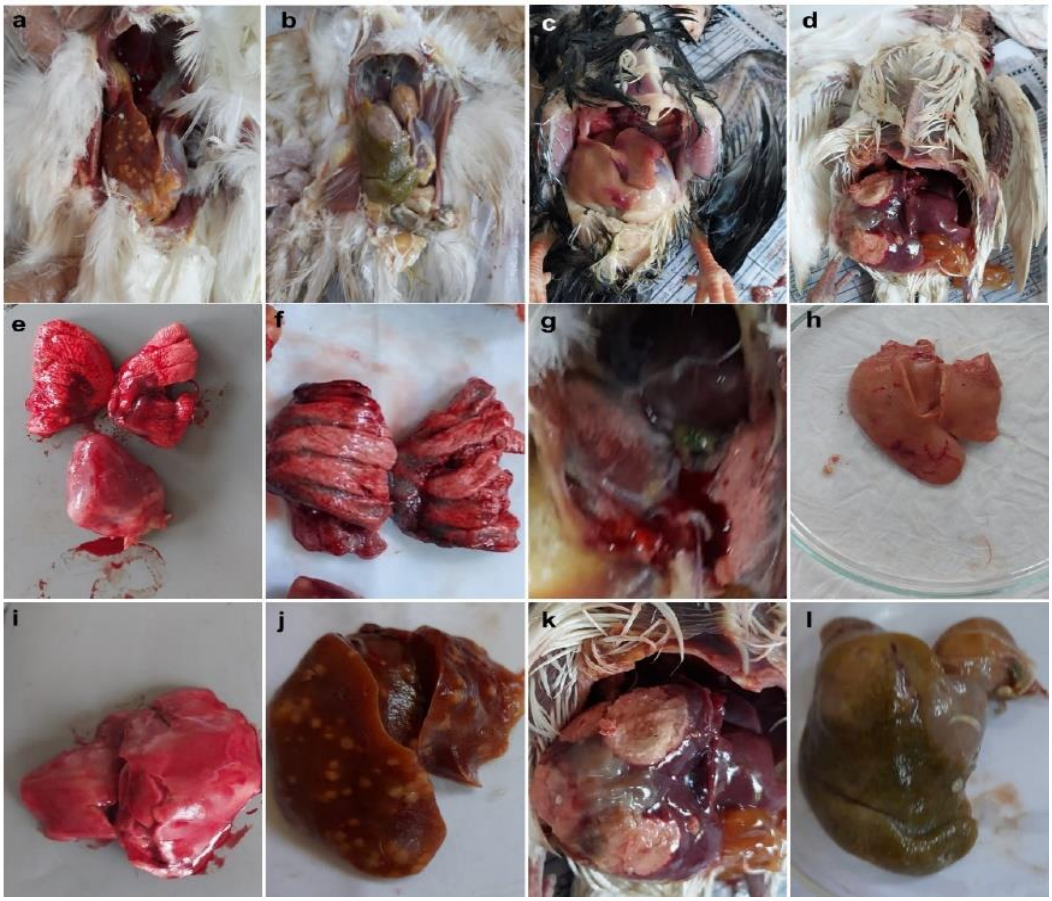

Fig. 2: The common variable post-mortem lesions observed in the studied pigeon. **a-d:** general view of some pigeons during necropsy. **e-g:** Different degrees of pneumonia, pericarditis**,** and **h-l:** hepatitis

Prevalence of protozoal infection among domestic and race pigeon

In total, 98.6% (138/140) of the examined pigeons had a protozoal infection; the overall rate was non-significantly (P value = 0.467) greater in race pigeons (100%; 48/48) than domestic (97.8%; 90/92) and in squabs (100%; 70/70) than in adults (97%; 68/70) (P value=0.314). In race pigeons, both squabs and adults had the same infection rate (100%), while in domestic, squabs were non-significantly (P value = 0.166) more infected (100%; 60/60) than adults (93.8%; 30/32) (Table 1).

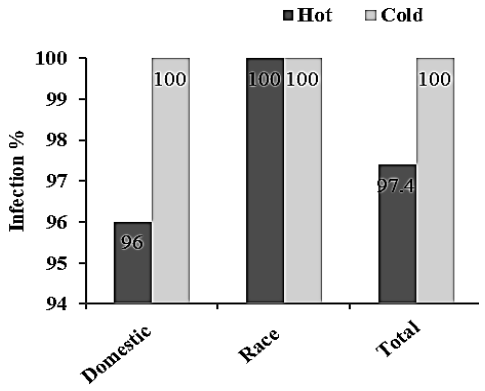

Fig. 3: Prevalence rate of protozoal infection among domestic and race pigeons

Climatic prevalence of protozoal infection among domestic and race pigeons

The overall prevalence of protozoal infection in both domestic and racing pigeons showed a non-significant (P value = 0.355) variation between hot and cold climates, although cold climates had a higher prevalence (100%; 64/64) than hot (97.4%; 74/76). But when comparing the difference in prevalence of protozoal infection in each pigeon category, a non-significant (P value = 0.354) higher prevalence was recorded among domestic pigeons (100%; 42/42 in cold versus 96%; 48/50 in hot). In race pigeons, the infection rate was the same during hot and cold climates (100%; 26/26 and 22/22, respectively) (Fig. 3).

Variety of protozoa in domestic and race pigeons

1. Blood protozoa (Hematozoa)

Six protozoan and rickettsial species were detected within blood cells of the examined pigeons: *Haemoproteus*, *Aegyptianella*, and *Plasmodium* in the red blood cells and *Atoxoplasma*, *Leuckocytozoon*, and *Ehrlichia* inside the white blood cells (Fig. 4). The most frequently observed blood protozoon was *Atoxoplasma*, with a total prevalence rate of 37.1% (52/140), followed by *Haemoproteus* (34%; 48/140), *Leuckocytozoon* (14%; 20/140), *Ehrlichia* (13%; 18/140), *Aegyptianella* (11%; 16/140), and *Plasmodium* (5.7:8/140) (Table 2). The prevalence of each protozoon varied non-significantly between domestic and race pigeons and between pigeons of different ages (P value > 0.05), except *Atoxoplasma* spp., which was significantly (P value = 0.048) greater in adults (48.6%; 34/70) than squabs (27.1%; 19/70). *Haemoproteus* and *Atoxoplasma* showed greater prevalence rates during cold climates (59%; 38/64 and 63%; 40/64, respectively) than hot (13.2%; 10/76 and 15.8%; 12/76, respectively), which were highly significant (P value = 0.00) (Table 2).

2. Gastrointestinal protozoa

Trichomonas, *Cryptosporidium*, *Cyclospora*, *Microsporidia*, and *Eimeria* species were detected during examination of the intestinal smears of pigeons (Fig. 5). *Trichomonas sp.* was the commonly encountered gastro-intestinal protozoal infection with a total prevalence rate of 90% (126/140), followed by *Cryptosporidium sp*. (48.6%; 68/140), *Microsporidia* (7.1%; 10/140), and *Eimeria sp.* (5.7%; 8/140). *Cyclospora* was the least detected protozoon, with a total prevalence rate of 2.9% (4/140).

The prevalence rate of each protozoon varied non-significantly between domestic and racing pigeons and different ages (P value > 0.05), except for *Eimeria sp.*, which had a significantly (P value = 0.039) higher prevalence rate in adults (11.4%; 8/70). The prevalence rates of each gastrointestinal protozoan non-significantly different between hot and cold climates except for the *Eimeria sp.* and *Trichomonas sp.*, which were significantly higher (P value = 0.025 and 0.046, respectively) during cold climate than hot (12.5%; 8/64 versus 0%; 0/76 and 100%; 64/64 versus 81.6%/62/76, respectively).

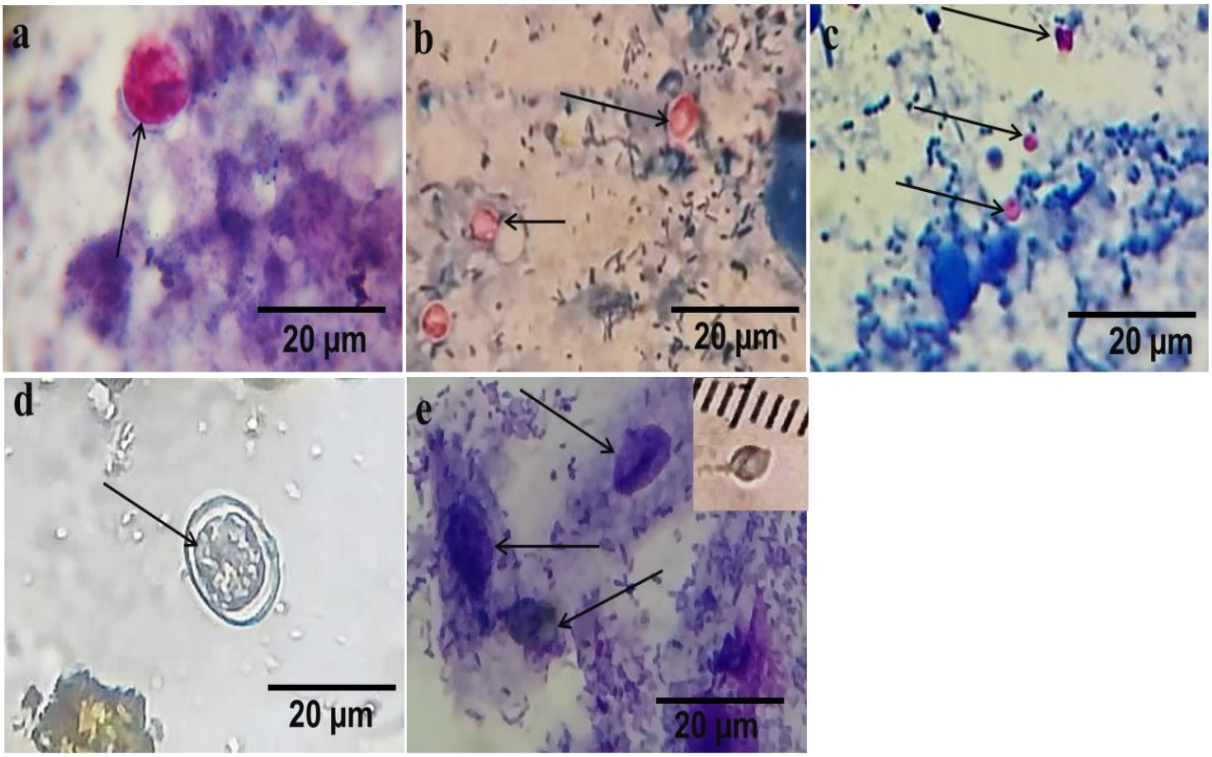

Fig. 5: Photomicrographs from giemsa stained smears of pigeon showing **(a)** *Cyclospora sp*., **(b)** *Cryptosporidium sp.*, **(c)** *Microsporidia sp.*, and **(d)** *Eimeria sp*. (40X) non sporulated oocysts in intestine. **(e)** *Trichomonas gallinae* trophozoites in crop. Oil immersion lens (100X).

3. Tissue protozoa

Toxoplasma gondii, *Cryptosporidium*, and *Trichomonas* were found in different tissues (brain, lung, liver, and kidney) of both domestic and racing pigeons (Fig. 6). *Toxoplasma gondii* schizonts and tachyzoites were detected in 18/140 (12.9%) impression smears from the brains and lungs of the examined birds. *Cryptosporidium sp*. was observed in 52/140 (37.1%) impression smears from lungs and kidneys. *Trichomonas* was detected in 14/140 liver impression smears with a percentage of 10%.

The prevalence rates of *Toxoplasma* and *Cryptosporidium* were non-significantly higher (P value = 0.117 and 0.634, respectively) in domestic pigeons than in race (17.3%; 16/92 versus 4.1%; 2/48 and 39.1%; 36/92 versus 33%; 16/48, respectively). *Trichomonas* prevalence rate was significantly higher (P value = 0.044) in domestic pigeons than in races (15.2%; 14/92 versus 0%; 0/48). No significant difference between squabs and adults in the prevalence rate of tissue parasites (P value > 0.05); however, the prevalence of *Toxoplasma* and *Cryptosporidium* spp. was higher in squabs than adults (17.1%; 12/70 versus 8.6%; 6/70 and 42.9%; 30/70 versus 31.4%; 22/70, respectively). Conversely, tissue *Trichomonas* prevalence was higher in adults than in the young (11.4%; 8/70 versus 8.6%; 6/70).

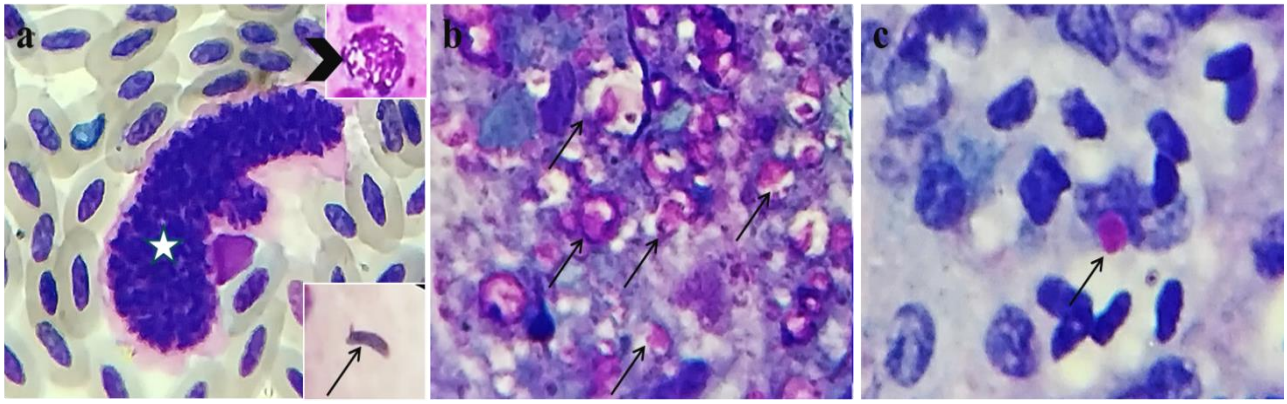

Fig. 6: Photomicrographs from Giemsa stained smears of pigeon showing (a) the developmental stages of *Toxoplasma gondii;* cyst (white star) in lung, and (chevron) in brain, and a tachyzoite (arrow) in blood. (b) *Trichomonas sp* within hepatic tissue. (c) *Cryptosporidium* oocyst inside renal tissue. Oil immersion lens (100X).

Table 2: Diversity of protozoal infections among pigeon (domestic and race) and prevalence of each protozoon:

Organ	Protozoon@	Rearing goal			Age Phase			Climate condition			Total (t=140)
		Domestic (t=92)	Race (t=48)	P value	Squabs (t=70)	Adult (t=70)	P value	Hot (t=76)	Cold (t=64)	P value	
Blood	**Apicomplexa**										
	Haemoproteus	26(28.3)	22(45.8)	.142	20(28.6)	28(40)	.314	10(13.2)	38(59)	.00**	48(34.3)
	Leuckocytozoon	16(17.4)	4(8.3)	.304	8(11.4)	12(17.1)	.495	12(15.8)	8(12.5)	.695	20(14.3)
	Plasmodium	6(6.5)	2(4.2)	.687	2(2.9)	6(8.6)	.303	4(5.3)	4(6.3)	.859	8(5.7)
	Atoxoplasma	34(37)	18(38)	.964	19(27.1)	34(48.6)	.048*	12(15.8)	40(63)	.00**	52(37.1)
	Rickettsiales										
	Ehrlichia	10(10.9)	8(16.7)	.492	8(11.4)	10(14.3)	.721	4(5.3)	14(21.9)	.039*	18(12.9)
	Aegyptianella	14(15.2)	2(4.2)	.168	10(14.3)	6(8.6)	.452	8(10.5)	8(12.5)	.796	16(11.4)
Gastro-intestinal	**Apicomplexa**										
	Eimeria	4(4)	4(8)	.495	0(0.0)	8(11.4)	.039*	0(0.0)	8(12.5)	.025*	8(5.7)
	Cryptosporidium	48(52)	20(42)	.404	40(57.1)	28(40)	.151	32(42.1)	36(56.3)	.238	68(48.6)
	Cyclospora	2(2)	2(4)	.635	3(4.3)	2(2.9)	.99	2(2.6)	2(3.1)	.902	4(2.9)
	Sarcomastigophora										
	Trichomonas	39(42)	48(100)	.594	64(91.4)	62(88.6)	.324	62(81.6)	64(100)	.046*	126(90)
	Microspora										
	Microsporidia	78(85)	6(13)	.209	2(2.9)	8(11.4)	.164	8(10.5)	2(3.1)	.231	10(7.1)
Tissue	***Toxoplasma***	16(17.3)	2(4.1)	.117	12(17.1)	6(8.6)	.284	4(5.3)	14(21.9)	.039*	18(12.9)
	Cryptosporidium	36(39.1)	16(33)	.634	30(42.9)	22(31.4)	.322	26(34)	26(40.6)	.58	52(37.1)
	Trichomonas	14(15.2)	0(0)	.044*	6(8.6)	8(11.4)	.69	4(5.3)	10(15.6)	.15	14(10)

t= number of total examined pigeons. @: Data were expressed in number of infected (percentage). * Statistically significant difference ($p<0.05$), ** Statistically significant difference ($p<0.01$) by Chi square of independence using IBM SPSS statistics 25

DISCUSSION

This study investigated the prevalence and variability of protozoal infections in 140 clinically ill pigeons (92 domestic and 48 racing) found in Assiut Governorate, Egypt. The results revealed a total protozoal infection prevalence of 98.6% among the examined pigeons. This high prevalence highlights the widespread presence of protozoan parasites among pigeon populations in Assiut Governorate, Egypt, which may be due to improper management and biosafety. This high prevalence came in line with results from other studies conducted in different regions, including Radfar *et al.* (2012). Racing pigeons exhibited a 100% infection rate, slightly higher than the 97.8% observed in domestic pigeons. This result agrees with McKeon *et al.* (1997) and Adhikari *et al.* (2022), who reported a high rate of protozoal infection of 59% and 78.7% of pigeons in Pakistan and Nepal, respectively. Racing pigeons are more susceptible to protozoan infections due to the combined impact of physical stress, poor nutrition, and exposure to various environmental pathogens during races, as well as free-range flying and frequent contact with foreign and wild pigeons. These factors weaken their immune system, making them more vulnerable compared to pigeons kept indoors (Haag-Wackernagel & Moch, 2004).

The study found no significant variations in the total infection rates based on age. Overall, the infection rate was higher in squabs (100%) compared to adults (97%). This difference can be attributed to the immature immune systems of younger birds. This results in agreement with Bulbul *et al.* (2018)**.** Although there is a statistically non-significant relation to environmental conditions, higher prevalence rates of protozoal infections were observed during the colder months compared to the hotter months (100% versus 97.4%, respectively). This prevalence pattern of the protozoal infection is mostly correlated with Assiut's environment and relative humidity, which are optimal for protozoal oocyst viability and survival of the intermediate host of blood protozoa (ectoparasites). This contrasts with findings from other studies, which suggest that cooler temperatures and higher humidity favor the survival and transmission of certain protozoan parasites. During colder weather, pigeons are often kept in closer confinement, leading to increased contact and a greater spread of these parasites (Begum *et al.,* 2010).

The protozoal infections identified in this study were classified into three categories based on their targets. The most common category was gastro-intestinal infections, making up 90% of the cases. Blood and tissue protozoa were also present, each occurring at similar rates of 37%. Different protozoal species were recognized in a similar study conducted by Radfar *et al.,* (2012). Among gastrointestinal protozoa, *Trichomonas gallinae* was the most frequent protozoon at 90 % followed by *Cryptosporidium spp* (49%) while few percentages of *Microsporidia*, *Cyclospora*, and *Eimeria* (7%, 5.7%, and 3%) were recorded. This high prevalence of *T. gallinae* came in line with results from other studies (67.7%) in Nigeria (Terfa *et al.,* 2024) and 75.78% in Turkey (Gulegen *et al.,* 2005).

T. gallinae prevalence in race pigeons (100%) was greater than in domestic pigeons (42%), non-significantly higher in squabs than adults (91.4% versus 88.6%, respectively). *T. gallinae*, like many other gastrointestinal protozoans, serves as an indicator of the overall hygiene within a pigeon house. The higher infection rates by *T. gallinae* in cold (100%) than hot (81.6%) may be due to pigeons being in closer confinement during colder weather, which increases contact and the spread of the protozoon. The prevalence of *Cryptosporidium spp*. in the current study was higher among domestic pigeons (52%) compared to racing pigeons (42%). Similar findings were reported by Sari *et al.* (2008).

Additionally, the study found microsporidia and cyclospora at rates of 7% and 3%, respectively. The high percentages of *Cryptosporidium* and *Cyclospora* found in squabs (57.1% and 4.3%, respectively) compared to adults (40% and 2.9%, respectively) suggest that infections may occur at an early age. Due to their zoonotic nature, it is important to consider the precise role of pigeons as reservoir hosts for these microorganisms, which requires further investigation.

For blood protozoa, *Atoxoplasma* was the most frequently detected blood protozoon (37.1%) and *Haemoproteus* (34.3%), followed by *Leuckocytozoon* (14.3%), *Ehrlichia* (12.9%), *Aegyptianella* (11.4%), and *Plasmodium* was the least to be detected (5.7%). This variability in *hematozoa* indicates a diversity of the vector assemblages of these protozoa (ectoparasites) on bird bodies and dwells, which may be related to home range and other factors. The vectors of pigeon protozoa, including *P. canariensis,* are widely distributed over the world, especially during temperate and warm climates (Radfar *et al.,* 2012). *Haemoproteus* was more frequently seen among racing pigeons (45.8%) than domesticated (28.3%). The infection rate was non-significantly higher in adults (40%) than in squabs (28.6%), which is in line with previous findings (Radfar *et al.*, 2012). The higher prevalence of *Haemoproteus* in adults might be due to their longer time of exposure to the protozoon, transforming the bird to chronic or latent infections that could persist and become more noticeable as pigeons get older. This aligns with the findings of Bulbul *et al.* (2018) and Radfar *et al. (*2012).

In the present study, some protozoa were found residing within different tissues other than the gastrointestinal tract and blood. Some of these protozoa are zoonotic, such as *Toxoplasma gondii* (in the brain and lung tissues) and *Cryptosporidium spp*. (in the renal and respiratory tissues), with total prevalence rates of 13% and 37%, respectively, while others are avian (*Trichomonas*) with a prevalence of 10%. Our result is in agreement with Khalifa *et al.* (2020), who detected that 58% of domestic pigeons in Assiut tested by the latex agglutination test were positive for *T. gondii*. Nasr (2017) detected that the prevalence rate of renal cryptosporidiosis in broiler chickens in Assiut, Egypt, was 18.4% (9/49), and El-Khatam *et al.* (2016) proved the extension of *T. gallinae* to hepatic tissue by histopathological examination.

The prevalence of protozoal infections in pigeons significantly impacts their health and productivity, outweighing concerns about zoonotic effects and public health implications. It is essential to implement an integrated parasite control strategy that includes routine antiprotozoal treatments, pesticide dusting of birds, and thorough cleaning of their living environments. Additionally, it is crucial to educate pigeon owners about the importance of these control measures.

CONCLUSION

This study provides valuable insights into the prevalence and impact of protozoan parasites among domestic and racing pigeons in Assiut Governorate, Egypt, and highlights their biodiversity and heterogeneity based on bird age and climatic conditions. It underscores the likely serious health hazards these parasites pose to both domestic and racing pigeons as well as to humans. Future research should focus on developing effective prevention and treatment strategies.

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العدوى بالأوليات والريكيتسيا بين الحمام المصاب إكلينيكيًا في اسيوط، مصر: الانتشار، التنوع البيولوجي، والمخاطر المحتملة على الصحة العامة

الاء محمد عبد السلام، احمد كمال دياب، محسن ابراهيم عرفه، اسماء نصر ، سلوى محمود عبد الرحمن

Email: ahmed2015@aun.edu.eg ORCID 0000-0002-4021-7904
Assiut University web-site: www.aun.edu.eg

يتعرض كل من الحمام المنزلي وحمام السباق (كولومبا ليفيا) للعديد من حالات العدوى الأولية الطفيلية التي تشكل تحديات صحية للحمام وقد تؤثر على الصحة العامة. ولذلك، هدفت هذه الدراسة إلى دراسة مدى انتشار العدوى بالطفيليات الاولية والتنوع البيولوجي وتأثيراتها في الحمام المنزلي وحمام السباق في محافظة أسيوط، مع التركيز على الالتهابات الحيوانية المنشأ. تم فحص الحمام المريض سريريًا، والذي يضم 92 حمامًا منزليًا و48 حمامًا للسباق من أعمار مختلفة، بحثًا عن التهابات الجهاز الهضمي والدم والأنسجة في الفترة من فبراير 2023 إلى أبريل 2024. وكان المعدل الإجمالي للإصابة بالطفيليات الاولية 98.6٪ بين الحمام الذي تم فحصه، وهو أعلى في حمام السباق بنسبة 100%، مقابل 97.8% في الحمام المنزلي. بالإضافة إلى ذلك، يختلف معدل الانتشار قليلاً باختلاف المناخ والعمر. وكان أكثر الكائنات الأولية التي لوحظت هو Trichomonas sp.، الذي وجد في 90٪ من العينات (126 من أصل 140)، يليه Cryptosporidium sp. بنسبة 48.6% (140/68)، والأتوكسوبلازما بنسبة 37.1% (140/52)، والهيموبروتيوس بنسبة 34.3% (140/49). بلغ معدل انتشار الكريات البيض 14.3% (140/20)، في حين كان لكل من التوكسوبلازما والإرليخيا نفس معدل الانتشار 12.9% (140/18). تم العثور على الزاعجة المصرية في 11.4% (140/16) من العينات. كان معدل انتشار الميكروسبوريديا 7.1% (140/10)، وكان لكل من الإيميريا والبلازموديوم معدل انتشار 5.7% (140/8). وكان الطفيل الأقل ملاحظة هو السيكلوسبورا، حيث وجد في 2.9% من العينات (140/4). يسلط هذا البحث الضوء على مدى انتشار وتنوع العدوى بالأوالي في الحمام والمخاطر على الصحة العامة المرتبطة بالطبيعة الحيوانية المنشأ لبعض الطفيليات الاولية. وهذا يؤكد الحاجة إلى تدابير مكافحة مستهدفة للحد من تأثير هذه الطفيليات على صحة الحمام.