Tehran University of Medical Sciences Publication
http:// tums.ac.ir

Iranian J Parasitol

Open access Journal at
http:// ijpa.tums.ac.ir

Iranian Society of Parasitology
http:// isp.tums.ac.ir

Short Communication

Prevalence and Rate of Parasitemia of *Haemoproteus columbae* in *Columba Iiviadomestica*in Southwest of Iran

Amir DEHGHANI SAMANI [1], *Khodadad PIRALI KHEIRABADI [2], Azam DEHGHANI SAMANI [3]

1. *Dept. of Clinical Sciences, Faculty of Veterinary Medicine, Shahrekord University, Shahrekord, Iran*
2. *Dept. of Parasitology, Faculty of Veterinary Medicine, Shahrekord University, Shahrekord, Iran*
3. *Faculty of Veterinary Medicine, Shahrekord University, Shahrekord, Iran*

Received 24 July 2013
Accepted 11 Oct 2013

Keywords
Haemoproteus columbae,
Domestic pigeons,
Ectoparasite,
Iran

***Correspondence**
Email:
khpirali@yahoo.com

Abstract

Background: Parasites affect the health and productivity of birds. *Haemoproteus columbae* occurs in pigeons widely in tropical and subtropical regions. The present investigation was concentrated on the prevalence of *H. columbae* and rate of parasitemia in domestic pigeons in southwest of Iran.

Methods: Pigeons regimented in three groups, less than six months old, between six and twenty four months old and more than twenty four months old.Then stained blood smears were studied for presence of *H. columbae* and finally rate of parasitemia in every group calculated.

Results: Mature and immature stages of *H. columbae* gametocytes were found in 24% of blood smears prepared from 100 healthy domestic pigeons. Mean of parasitemia in infected pigeons was 9.58%. Mean size of macrogametocytes was 4µm×15µm and mean size of microgametocytes was 3µm×12µm. Mean of parasitemia in infected females was more than males and pipers. Mean of parasitemia in infected old pigeons (pigeons with more than twenty four months old) was more than pigeons with less than six months old and pigeons between six and twenty four months old.

Conclusion: This study show the prevalence and rate of parasitemia in domestic pigeons in southwest of Iran. We should be care about this parasite in pigeons by knowing the prevalence and high risk groups.

Introduction

Haemoproteus species are commonly occurring avian haemosporidian parasites (1). *Haemoproteus columbae* occurs in pigeons widely in tropical and subtropical regions (2). The natural hosts of this parasite include domestic pigeons *(Columba Iiviadomestica),* many species of wild pigeons, mourning doves *(Zenaiduramacroura),* turtle doves and other wild bird species (3). It is usually non-pathogenic and in pigeons causes disease when they are stressed (4).

The gamonts of *H. columbae* develop from tiny forms to elongated, crescent-shaped forms, which partially encircle the nucleus of the host cell. The host cell's nucleus may be displaced but not to the edge of cell. The mature gamonts of *H. columbae* occupy the host cell completely. They distort it and push the host cell's nucleus to one side. The vector of *H. columbae* is a hippoboscid fly that named *Pseudolynchi acanariensis*. Both *H. columbae*and *P. canariensis*are widely distributed in the world, particularly in warm and temperate climates (5).

Furthermore, Pigeons of the order Columbiformes are ubiquitous birds and can be found in virtually every town and city around the globe (6). Studies, to date, have determined that the most common blood parasite found in pigeons is *H. columbae* and the infection rate may be as high as 75% ranging from 6 to 86% (7-12). *H. columbae* and its vector, *P. canariensis*, are present in North of Iran (13). The aim of this study was detecting the prevalence and mean rate of parasitemia in infected pigeons in Iran.

Materials and Methods

The study was carried out from 2012 to 2013, involving 100 pigeons from six localities including Saman (latitude, 32° 27' 06" N and longitude, 50° 54' 38" E), ShahreKord (latitude, 32° 19' 32" N and longitude, 50° 51' 52" E), Hafshejan (latitude, 32° 13' 32" N and longitude, 50° 47' 38" E), Shoorab (latitude, 32° 29' 14" N and longitude, 50° 55' 46" E), Nafch (latitude, 32° 25' 26" N and longitude, 50° 47' 22" E) and Ben (latitude, 32° 32' 33" N and longitude, 50° 44' 40" E) in Shahr-eKord inChaharmahal and Bakhtiari in southwest of Iran. Overall, 100 pigeons were households and kept in a metal cage. Thirty nine Pigeons from Saman, 22 Pigeons from ShahreKord, 8 Pigeons from Hafshejan, 5 Pigeons from Shoorab, 8 Pigeons from Ben and 18 Pigeons from Nafch were studied. Maturity, sex, age, presence of ectoparasites and kind of ectoparasites of all pigeons were recorded. Pigeons regimented in three group, less than six months old (22 pigeons), between six and twenty four months old (54 pigeons) and more than twenty four months old (24 pigeons). A small amount of blood (~50µl) via brachial vein puncture was taken. Blood smears were air dried and fixed in absolute methanol for 5 minutes immediately after sample collection and later stained with Giemsa stain 10% for 15 min. Then the slides were carefully studied and prevalence and positive cases were recorded. Louse flies were monitored carefully by observing birds while they were sampled.

The rate of parasitaemia was determined by counting the number of parasited Red Blood Cells (RBC) and number of total RBC in the 10 microscopic fields of smears with *H. columbae*, and then mean of parasitemia was calculated via division of infected RBC to total RBC in 10 microscopic fields.

The data were expressed as the Mean±SEM. Groups were compared using one-way ANOVA for repeated measurements. Tukey test was used for post hoc analysis. A value of $P<0.05$ was considered significant.

Results

One hundred pigeons were studied from six different locations comprising 38 (38%) males, 40 (40%) females and 22 (22%) piper. Blood

samples were collected and its examination resulted in 24 (24%) pigeons were infected by *H. columbae* that 9 (37.5%) were male, 9 (37.5%) were female and 6 (25%) were pipers. Mean of parasitemia in infected pigeons to *H. columbae* were 9.58%. In 15 pigeons (15%) ectoparasites was observed; 4 (26.6%) were male, 9 (60%) were female and 2 (13.4%) were pipers, and 12 (80%) were infected by louses, 2 (13.3%) by *P. canariensis* and 1 (6.7%) by louses and *P. canariensis*. Eight (8%) pigeons were infected by *H. columbae* and ectoparasites simultaneity. Two (25%) were male, 5(62.5%) were female and 1 (12.5%) was pipers. In stained blood smears, only mature gamonts of *H. columbae* were seen within red blood cells. Usually one gametocyte was seen in each red blood cell, but in few red blood cells more than one gametocyte was seen. Mean size of macrogametocytes was 4µm×15µm and mean size of microgametocytes was 3µm×12µm.

Discussion

This study show that prevalence of *H. columbae* in domestic pigeons in southwest of Iran and the mean of parasitemia in infected pigeons. Mean size of macrogametocytes was 4µm×15µm and mean size of microgametocytes was 3µm×12µm. Mean of parasitemia in infected females was more than males and pipers. Mean of parasitemia in infected old pigeons (pigeons with more than twenty four months old) was more than pigeons with less than six months old and pigeons between six and twenty four months old.

In Queensland (14), Colombia (15), Bulgaria (16) and the United States (17), the prevalence rate for *Hemoterous* spp. ranged from 20% to 32%. The prevalence of blood parasite in pigeons and birds in Japan (18), Costa Rica (19) and Alaska (20) was lower than 10%. *H. columbae* infects pigeons which are associated with human settlements. Throughout the world prevalence of *H. columbae* in feral pigeons in different geographical area varies from 14 to 100% (21). Yunus and Arsalan (22) reported 74% (73/98) of pigeons collected from a local zoo were infected with blood parasites. Moreover, 105 *Columba livia* in Galapagos Island were investigated and 89% were infected with *Hemoterous spp*. (23). Dranzoa. (24) examined 34 pigeons and the survey of ectoparasites revealed that *Pseudolynchi acanariensis* was the most prevalent parasite (100%).

Conclusion

Results obtained from this study show the prevalence and rate of parasitemia in domestic pigeons in southwest of Iran, also show that mean of parasitemia in infected females and infected old pigeons (pigeons with more than twenty four months old) was more than other groups. We should be care about this parasite in pigeons by knowing the prevalence and high risk groups.

Acknowledgements

The authors are grateful to the Deputy of Research, University of Shahrekord for financial support of this project.

References

1. Bennett GF. Companion bird medicine. Edited by E.W. Burr. Ames: Iowa State University Press; 1987.
2. Springer WT. Other blood and tissue protozoa, in Diseases of Poultry, edited by M.S. Hofstad, 6th edition. Ames: Iowa State University press; 1972.
3. Soulsby EJL. Genus Haemoproteus Kruse in Helminths, Arthropods and Protozoa of Domesticated Animals, 7th edition, London: Bailliere Tindall; 1986. p. 700-706.
4. Zinkl JG. Avian Haematology, in Schalm's Veterinary Haematology. 4th edition, edited by N.C. Jain. Philadelphia: Lea &Febiger; 1986. p. 256-273.
5. Soulsby EL. Helminths, Arthropods and Protozoa of Domesticated Animals. 7th Edition. Bailliere Tindall: London; 1982. p. 56-80.

6. Pontes TC. Available at http://www.pragasurbanas/pombos.htm, accessed on July 27. 2006.
7. Qureshi MI, Sheikh AH. Studies on blood protozoan parasites of poultry in Lahore District. Pakistan J Sci. 1978; 30: 165-167.
8. Aguirre A, Mena A, Barnett L. Epizootiological considerations of Haemoproteus infections of pigeons. Rev Avi. 1986; 30: 275-281.
9. Mandour AM, Abdel RhamanAM, Abdel Salem FA. A toxoplasma (Lankesterella) columbae sp. nov.in the domestic pigeon *Columba livia* in Assiut Province (with one figure). Vet Med J. 1986; 17: 95-97.
10. Stabler R, Kitzmiller M, Braun NJ. Blood parasites from band-tailed pigeons. J Wildlife Manage. 1977; 41: 128-130.
11. Kaminjolo J, Tikasingh S, Ferdinand ES. Parasites of the common pigeon (*Columba livia*) from the environs of port of Spain, Trinidad. B Anim H Pro.1988; 36: 194-195.
12. Subbiah TV, Joseph SA. A note on the occurrence of *Trypanasomahanne* in the blood of the domestic pigeon, *Columba Livia.* Cheiron.1988; 17: 136-139.
13. Youssefi MR, Gerami AS, Esfandiari B. Prevalence of *Haemoproteus columbae* Infection in *Columba Livia*in North of Iran. World J Zoo.2010; 54: 275-277.
14. Adlard RD, Peirce MA, Lederer R. Blood parasites of birds from southeast Queensland. Ornithol. 2004; 104: 191-196.
15. Rodrigusz OA, Matta NE. Blood parasites of birds from eastern plains of Colombia. Memorias Institute of Oswaldo Cruz.2001; 96: 1173-1176.
16. Shurulikov P, Golemansky V. Haemoproteids (Haemosporidia: Haemoporteifdae) of wild birds in Bulgaria. Acta Protozool.2002; 41: 359-374.
17. Garvin MC, Remsen JV, Bishop F. Hematozoa from passeriform birds in Louisiana. J Parasitol.1993; 79: 318-321.
18. Murata K. Prevalence of blood parasites in Japanese Wild Birds. J Vet Med Sci. 2002; 64: 785-790.
19. Valkiunas G, Iezhova TA, Brooks DR. Additional observations on blood parasites in Costa Rica. J Wild1ife Dis. 2004; 40: 555-561.
20. Deviche P, Greiner EC, Manteca X. Interspecific variability of prevalence in blood parasites of adult passerine birds during the breeding seasons in Alaska. J Wildlife Dis. 2001; 37: 28-35.
21. Paperna I. Haemoproteus Cloumbae infection of feral pigeons in Singapore and Israel. Raffless B Zool. 2002; 50: 281-286.
22. Yunus G, Arsalan M. Blood parasites of wild pigeons in Ankara District. Turkish J Vet Anim Sci. 2001; 25: 169-172.
23. Luis RP, Alarcon DS, Merkel J, Miller RE, Parker PG. Survey for *Haemoproteous* spp., *Trichomonas galinae*, Chlamydophil a *Psittaci* and *Salmonela* spp. In Galapagos Islands Columbiformes. J Zoo Wildlife Med. 2004; 35: 60-64.
24. Dranzoa C, Ocaido M, Katete P. The ecto-gastro-intestinal and haemo-parasites of live pigeons (*Columba livia*) in Kampala, Uganda. Avian Pathol.1999; 28: 119-124.