

## BLOOD PARASITES OF SOME PASSERIFORM BIRDS IN BAGHDAD AREA, CENTRAL IRAQ

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### ABSTRACT

Examining of passeriform birds collected in Baghdad area revealed presence of seven species of blood parasites belonging to three genera, *Haemoproteus*, *Leucocytozoon*, and *Plasmodium*. Records of microfilariae (larval nematodes) were also indicated. Results showed wide distribution of *Plasmodium relictum* among passerine hosts.

### INTRODUCTION

Some of free living passerines have become highly adapted for living in the urban environments and sometimes have become avian pests, and they are, also, common near animal agricultural settings (Morishita *et al.*, 1999). On the other hand, avian haematozoa, especially haemosporidia, including species of *Haemoproteus*, *Leucocytozoon* and *Plasmodium* are transmitted by blood-sucking dipteran insects (krizanauskiene *et al.*, 2006), and with few exceptions, these parasites occur worldwide, irrespective of climatic barriers (Wiersch *et al.*, 2007). They are supposed to have negative fitness consequences for their hosts as they decrease reproductive success (Marzal *et al.*, 2005). Also, the sexually selected characters and other evolutionary traits are more likely to exhibit strong correlation with haematozoan prevalence (Scheuerlein and Ricklifs, 2004).

Order Passeriformes in Iraq encounters 161 species (Allouse, 1962; Salim *et al.*, 2006). Of them, 118 species recorded from the central and southern parts.

Shamsuddin and Mohammad (1980) were the first to report on haematozoa of some Iraqi birds. They examined 37 passeriform species recording 5 species of *Haemoproteus*, 1 of *Plasmodium* and records of microfilariae from 6 passerine hosts. Then Mohammad (1990) examined 15 species of them recording 6 species of *Haemoproteus*, 2 of *Leucocytozoon*, and records of *Trypanosoma* and microfilariae from 2 and 4 passerine hosts respectively. Later, two papers devoted to haematozoa of 3 species of endemic passeriform birds, *Hypocolius ampelinus*, *Turdoides alterostris* and *T. caudatus* which are considered to be of conservation concern describing 2 new species of *Haemoproteus* and one species of *Leucocytozoon* in addition to record another species of *Haemoproteus* (Mohammad, 2002, 2003).

The aim of the present work is to investigate about the incidence, infection rate and distribution among hosts of the blood parasites of Passeriform birds collected in Baghdad area, Central Iraq.

## Blood Parasites of Some Passeriform Birds

### MATERIALS AND METHODS

A total of 190 birds of the Order Passeriformes, belonging to 13 families, 23 genera and 30 species were randomly mist-netted from different areas in and around Baghdad City, Central Iraq, during the years 2009 to 2011. Thin blood smears were made immediately from each bird, air dried, fixed in absolute methanol or ethanol, and stained with Giemsa's stain at strength 1:10 at pH 7.2 for one hour. The parameters used for identification of parasites, were determined following the methods of Bennett and Campbell (1972) as modified by Forrester *et al.* (1977) and Mohammad (1990). Photomicrographs were taken with a digital camera attached to Micros MCX100 compound microscope.

### RESULTS AND DISCUSSION

Table 1 summarizes the results of examining the periphery blood of the studied birds. This would show that 20 out of 190 birds (10.5%) were infected with one or more of blood parasites belonging to genera *Haemoproteus*, *Leucocytozoon*, and *Plasmodium*. Records of microfilariae (filarial nematodes) infections were only recorded as positive or negative since it was not possible to verify their generic as well as specific identities due to the absence of mature forms in the periphery blood.

Table 1 reflects low overall infection rate of 2.2% for all of four *Haemoproteus* spp. Shamsuddin and Mohammad (1980) and Mohammad (1990) reported 13.9% and 12.8 respectively. These results may reflect the differences in environmental conditions of collection sites of their studies. It also shows that four species of *Haemoproteus*, namely, *H. turdoides* from babblers (Timaliidae), *H. hypocolius* from grey hypocolius (Hypocoliidae), *H. fringillae* from masked shrike (Laniidae) and *H. danilewsky* from house sparrow (Ploceidae) are recorded. Infection intensity of *H. lanii* (fig. 1) is severe and with high parasitemia. This is in accordance with Mohammad (1990) who found severe infection of *H. lanii* in shrikes. Combination the findings of the present results and that of Mohammad (1990) suggests that this haemoproteid is well established in Iraq.

Only one Leucocytozoid, *Leucocytozoon fringillinarum* (fig. 2) is recorded from house sparrow (Ploceidae), chiffchaff (Sylviidae), common redstart (Turdidae) and white-cheeked bulbul (Pycnonotidae) with an overall infection rate of 6.3%. Gill and Paperna (2005) found that 79% of house sparrows of Jordan valley infected with this parasite. This is almost equal to 12.5 times the present result. This is may be because that they examined visceral rather than peripheral blood. However the present infection rate is not far from 4.3% and 4.8% recorded by Shamsuddin and Mohammad (1980) and Mohammad (1990) respectively.

Results also show that the lesser short-toed lark *Calandrella rufescens* is infected with *Plasmodium relictum* (fig. 3). Bennett *et al.* (1982) found no parasites in blood smears of the same host. Shamsuddin and Mohammad (1980) examined 3 species of larks in Iraq and found no haematozoa, while Mohammad (1990) examined 5 species of larks and recovered *Haemoproteus alaudae*, *Leucocytozoon fringillinarum* and *L. majoris*, but no report on any *Plasmodium* species. Although 11 specimens of larks were examined in this study, no record of *Haemoproteus* was reported. This agrees with the findings of Shamsuddin and Mohammad (1980) who examined 10 specimens of larks and found no species of haematozoa. However, Mohammad (1990) who examined 37 specimens belonged to 5 species of larks found *Haemoproteus alaudae* in all of the examined host species. It seems that present results reflect smaller sample size used in this study as well as that of Shamsuddin and Mohammad (1980). On the other hand, *Plasmodium relictum* is reported here from *Phoenicurus phoenicurus*, *Pycnonotus leucogenys*, *Turdoides altirostris*, *T. caudatus* and *Passer domesticus*, which

belong to another 4 avian families of Order Passeriformes. It is a common mosquito-transmitted blood protozoan of wild birds that has a worldwide distribution. It has been reported from at least 411 avian species from 67 avian families in 83 countries and is considered to be relatively non-pathogenic and non-invasive (Glushchenko, 1962, 1963; Burtikashvili, 1971, 1978; Subkhonov, 1972; Yakunin, 1972, CAB International, 2011). Identification of this parasite in this study depends mainly on morphic, morphometric and staining characteristics, and it seems necessary to re-examine these parasites with advanced methods like protein electrophoresis, gene sequence, PCR etc. to clarify their taxonomic status more precisely. However, the present results are in general agreement with Bennett *et al.* (1982) who found *P. relictum* in 270 species belong to 51 avian families. According to them it was recorded from Alaudidae, Anatidae, Phasianidae, Cuculidae, Irenidae, Columbidae, Ploceidae, Paridae, Strigidae, Campephagidae, Spheniscidae, and Falconidae. They emphasized that *Plasmodium* spp. occur over a range of several avian families and especially *P. relictum*, *P. circumflexum* and *P. vaughani* have extensive host ranges encompassing a number of avian families and orders. The overall infection rate for *P. relictum* is 3.7% from the total sample. This seems high compared with 1.4% of Shamsuddin and Mohammad (1980) and 0% in Mohammad (1990), but it is very low when compared with 28.2% of Bennett *et al.* (1982). The most likely reason for this is the environmental differences and the availability of insect vectors of *Plasmodium* spp.

#### LITERATURE CITED

- Allouse, B. E. 1962 Birds of Iraq vol. 3 (Passeriformes). Ar-Rabitta Press, Baghdad, 288pp.
- Bennett, G.F. and Campbell, A.G. 1972 Avian haemoproteidae. I. Description of *Haemoproteus fallisi* n. sp. and a review of the haemoproteids of the family Turdidae. Can. J. Zool., 50: 1269-1275.
- Burtikashvili, L.P. 1971 [blood parasites of Passeriformes birds from Georgia]. Materialy Pervogo s'ezda Vsesoyuz. Obshch. Protozoologov. Baku: 19-21. (in Russian).
- Burtikashvili, L.P. 1978 [Blood parasites of wild birds in Georgia]. Metsniereba, Tbilisi, 1: 1-123. (in Russian).
- CAB International 2011 Invasive Species Compendium (Beta) ([www.invasivespecies.net](http://www.invasivespecies.net)).
- Forrester, D.J., Greiner, E.C., Bennett, G.F., and Kigaya, N.K. 1977 Avian haemoproteidae. 7. A review of the haemoproteids of the family Ciconiidae (storks) and descriptions of *Haemoproteus brodkorbi* sp. nov. and *H. peircei* sp. nov. Can. J. Zool., 55: 1268-1274.
- Gill, H. and Paperna, I. 2005 Leucocytozoonosis in the Israeli sparrow, *Passer domesticus biblicus* Hartert, 1904. Parasitol. Res., 96: 373-377.
- Glushchenko, V.V. 1962 [New data on the seasonal dynamics of blood parasites of birds from the Kiev forest]. Zb. pr. Zool. muz. Akad. nauk. Ukr SSR, 31: 56-62. (in Russian).
- Glushchenko, V.V. 1963 [Principles of the distribution of avian blood parasites in relation to the ecology of their hosts]. Materialy do vivchennya fauni Ukraini. Zb. pr. Zool. muz. Akad. nauk. Ukr SSR, 32: 57-63. (in Russian).

#### Blood Parasites of Some Passeriform Birds

- Krizanauskiene, A., Hellgren, O. Kosarevt, V., Sokolov, L., Bensch, S. and Valkiunas, G. 2006 Variation in host specificity between species of avian hemosporidian parasites: evidence from parasite morphology and cytochrome B gene sequences. *J. Parasitol.*, 92(6): 1319-1324.
- Marzal, A. de Lope, F., Navarro, C. and Møller, A. P. 2005 Malarial parasites decrease reproductive success: an experimental study in a passerine bird. *Oecologia*, 142: 541–545.
- Mohammad, M.K. 1990 Blood parasites of some Iraqi wild birds. *Iraqi J. Sci.*, 31(Supplement):31-39.
- Mohammad, M.K. 2002 Blood parasites of the babblers of Iraq. *Bull. Iraq nat. Hist. Mus.*, 9(4): 33-40.
- Mohammad, M.K. 2003 Haematozoa of the grey hypocolius *Hypocolius ampelinus* Bonaparte (Aves: Hypocoliidae) in Kerbala Province, Middle of Iraq. *Bull. Iraq nat. Hist. Mus.*, 10(1):49-57.
- Morishita, T.Y., Aye, P.P., Ley, E.C. and Harr, B.S. 1999. Survey of Pathogens and Blood Parasites in Free-Living Passerines. *Avian Diseases*, 43:549-552.
- Salim, M.A, Porter, R.F. Christensen, S. Schiermacker-Hansen, P. and Al-Jbour, S. (2006). *Field Guide to the birds of Iraq*. Amman: Nature Iraq & BirdLife International. (In Arabic).
- Shamsuddin, M. and Mohammad, M.K. 1980 Haematozoa of some Iraq birds with description of two new species, *Haemoproteus pterocles* and *Leucocytozoon nycticoraxi* (Protozoa: Haemosporina). *Bull. Nat. Hist. Res. Centre*, 7(4): 111-154.
- Subkhonov, M. 1972 [Malaria parasites in the birds of Tadzhikistan] in: *Voprosy zoologii Tadzhikistana* (M. N. Narzkiulov and I. A. Abdusalyamovl, eds.). *Trudy Inst. Zool. I parazitol. AN Tadjh. SSR*. Donish, Dushanbe: 279-286.
- Scheuerlein, A. and Ricklefs, R.E. 2004 Prevalence of blood parasites in European passeriform birds. *Proc. R. Soc. Lond.*, B 271: 1363-1370.
- Wiersch, S.C., Lubjuhn T., Maier, W.A. and Kampen, H. 2007 Haemosporidian infection in passerine birds from Lower Saxony. *J Ornithol*, 148: 17–24.
- Yakunin, M.P. 1972 [Blood parasites of the wild birds of southeast Kazakhstan]. *Tr. Inst. Zool. Akad.nauk. Kaz. SSR*, 33: 69-79.

Table 1: Family, species, common name, number of examined and infected birds and parasite species.

Family and Species	Common name			Parasite
Alaudidae				
<i>Alauda arvensis</i>	Sky lark	2	-	
<i>Ammomanes cincturus</i>	Bar-tailed desert lark	1	-	
<i>Calandrella rufescens</i>	Lesser short-toed lark	2	1	<i>Plasmodium relictum</i>
<i>Galerida cristata</i>	Crested lark	4	-	
<i>Melanocorypha bimaculata</i>	Bimaculated lark	2	-	
Family Hirundinidae				
<i>Riparia riparia</i>	Sand martin	3	-	
<i>Hirundo rustica</i>	Barn swallow	3	-	
Family Corvidae				
<i>Corvus frugilegus</i>	Rook	1	-	
Family Timaliidae				
<i>Turdoides altirostris</i>	Iraq babbler	8	1	<i>Plasmodium relictum</i>
<i>Turdoides caudatus</i>	Common babbler	23	2	<i>Haemoproteus turdoidis</i> , <i>Plasmodium relictum</i>
Pycnonotidae				
<i>Pycnonotus leucogenys</i>	White-checked bulbul	28	2	<i>Leucocytozoon</i> , <i>Plasmodium relictum</i>
Family Turdidae				
<i>Cercotrichas galactotes</i>	Rufous bush robin	1	-	
<i>Phoenicurus phoenicurus</i>	Common redstart	2	2	<i>Leucocytozoon</i> , <i>Plasmodium relictum</i>
<i>Oenanthe oenanthe</i>	Northern wheatear	1	-	
<i>Oenanthe deserti</i>	Desert wheatear	1	-	
<i>Saxicola torquata</i>	Stonechat	3	-	
<i>Turdus merula</i>	Black bird	2	-	
Family Sylviidae				
<i>Hippolias pallida</i>	Olivaceous warbler	3	-	
<i>Prinia gracilis</i>	Graceful prinia	2	-	
<i>Phylloscopus collybita</i>	Chiffchaff	3	2	<i>Leucocytozoon</i>
Family Motacillidae				
<i>Motacilla alba</i>	White wagtail	4	-	
Family Hypocoliidae				
<i>Hypocolius ampelinus</i>	Grey hypocolius	6	1	<i>Haemoproteus hypocolius</i>
Family Laniidae				
<i>Lanius collurio</i>	Red-backed shrike	3	-	
<i>Lanius isabellinus</i>	Isabelline shrike	1	-	
<i>Lanius nubicus</i>	Masked shrike	3	1	<i>Haemoproteus lanii</i> , <i>H. fringillae</i> ,

Blood Parasites of Some Passeriform Birds

				Microfilaria
Family Sturnidae				
<i>Sturnus vulgaris</i>	Starling	12	-	
Family Fringillidae				
<i>Emberiza citrinella</i>	Yellowhammer	1	-	
Family Ploceidae				
<i>Passer domesticus</i>	House sparrow	55	7	<i>Haemoproteus danilewsky</i> , <i>Leucocytozoon fringillinarum</i> , <i>Plasmodium relictum</i>
<i>Passer hispaniolensis</i>	Spanish sparrow	1	1	Microfilaria
<i>Passer moabiticus</i>	Dead sea sparrow	9	-	
<b>Total</b>		<b>190</b>	<b>20</b>	

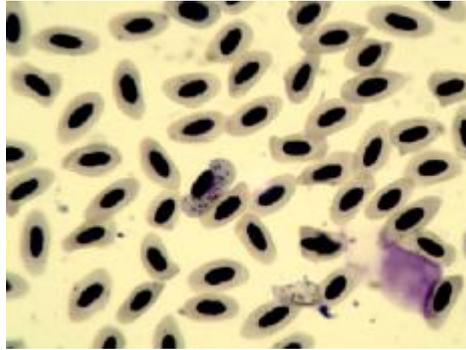


Fig. 1: *Haemoproteus lanii* from the masked shrike *Lanius nubicus*.

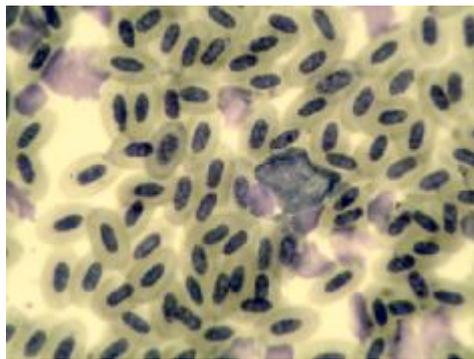


Fig. 2: *Leucocytozoon fringillinarum* from the house sparrow *Passer domesticus*.

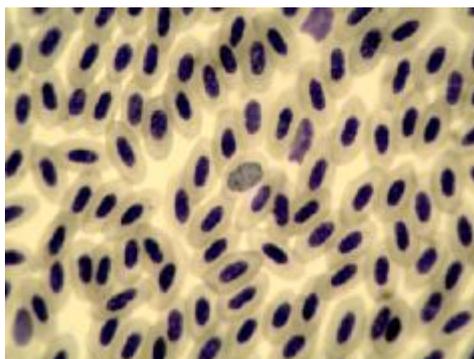


Fig. 3: *Plasmodium relictum* from the lesser short-toed lark *Calandrella rufescens*.

## طفيليات الدم في بعض الطيور العصفورية في منطقة بغداد وسط العراق

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### الخلاصة

اظهر فحص الطيور العصفورية التي جمعت من منطقة بغداد وجود سبعة انواع من طفيليات الدم تعود الى ثلاثة اجناس هي *Haemoproteus* و *Leucocytozoon* و *Plasmodium*. كما تم ايضا تسجيل وجود المايكروفلاريا (يرقات ديدان خيطية). بينت النتائج توزيعا واسعا للطفيلي *Plasmodium relictum* بين المضاف العصفورية.