

## Prevalence of Pseudo-malaria (*Haemoproteus* spp.) Infection in Many Species of Birds

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**Abstract:** This study was aimed to revealed the distribution of pseudo-malaria which causes by *Haemoproteus* spp. in many species of birds in Al- Qadisiya province in Iraq. A total of 254 blood specimens from six types of birds were screened microscopically to look for *Haemoproteus* spp. using Giemsa stain. Blood samples were collected from the veins of 32 house sparrow (*Passer domesticus*), 60 wild pigeons (*Columba livia*), 25 quail (*Cotunix coturnix*), 20 white- cheeked bulbul (*Pycnonotus leucotis*), 40 domestic ducks (*Anas platyrhynchos domesticus*) and 77 chickens (*Gallus gallus domesticus*).

Results showed that all of studied birds were infected with *Haemoproteus* spp. the gametocytes observed in 85(33.5%) specimens of birds' blood smears. They was %18.8 in the house sparrow, %63.3 in the wild pigeons, %20 in the quail, %15 in the white- cheeked bulbul, %17.5 in domestic ducks and %33.8 in the chickens. Highest infection with *Haemoproteus* spp. was observed among bird in wild pigeon (%63.3) and domestic chicken (%33.8), while the lowest infection was recorded in two cases which are in white- cheeked bulbul (%15) and domestic ducks (%17.5).

Present study shows that this protozoan parasite is capable of infecting many species of wild and domestic birds. So that we suggesting that this parasite have a wide range to infect its hosts from birds and these birds would be considered as a vital reservoir host of *Haemoproteus* spp. contributing to infect other birds.

**Keywords:** *Haemoproteus* spp. pseudo-malaria, blood parasite

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### 1. INTRODUCTION

*Haemoproteus* is a genus of protozoa that are parasitic in birds, reptiles and amphibians (1). The name *Haemoproteus* was first used in the description of *Haemoproteus columbae* in the blood of the pigeon *Columba livia* by Kruse in 1890. This was also the first description of this genus (2). Two other genera – *Halteridium* and *Simondia* – are now considered to be synonyms of *Haemoproteus* (3).

The protozoa are intracellular parasites that infect the erythrocytes. They are transmitted by blood sucking insects including mosquitoes, biting midges (*Culicoides*), louse flies (*Hippoboscidae*) and tabanid flies (*Tabanidae*) (4, 5).

Infection with this genus is sometimes known as pseudo-malaria because of the parasites' similarities with *Plasmodium* species (6).

Within the genus there are at least 173 species. Of these over 140 occur in birds, 14 orders and 50 families of birds are represented. These include gamebirds (*Galliformes*), waterfowl (*Anseriformes*), raptors (*Accipitriformes*, *Falconiformes*, *Strigiformes*), pigeons and doves (*Columbiformes*), and perching birds or songbirds (*Passeriformes*) (7).

Infections with most *Haemoproteus* species appear to produce subclinical infections. Post-mortem findings include enlargement of the spleen, liver and kidneys. These organs may appear chocolate-brown due to hemozoin deposition. Cytologic imprints may reveal schizont-laden endothelial cells (6, 8). Some species of *Haemoproteus* will also form large, cyst-like bodies within the skeletal muscles that resembling those seen with *Sarcocystis* species infections (9).

Pigeons infected with *Haemoproteus columbae* may develop enlarged gizzards, Flocks of bobwhite quail (*Colinus virginianus*) may become infected with *Haemoproteus lophortyx*.(10) Infected birds may suffer from reluctance to move, ruffled appearance, prostration and death. Other findings include parasitemia and anemia (8, 11). Large megaloschizonts may be present in skeletal muscles,

particularly those of the thighs and back. The average cumulative mortality for flocks experiencing outbreaks may be over 20% (12).

Experimental infection of turkeys with *Haemoproteus meleagridis* resulted in lameness, diarrhea, depression, emaciation, anorexia and occasionally anemia (6, 13). Muscovy ducks infected with *Haemoproteus nettionis* suffered lameness, dyspnea and sudden death.

In other avian species, anemia and anorexia have been reported occasionally (8,14). Importantly, new records of *Haemoproteus* are discovered constantly and should still be monitored for effects on host condition (15).

Because of the capability of *Haemoproteus* spp. to infect many birds and its risk on birds' health, economically as caused loss of poultry, and the role of birds in the dissemination of infection with this parasite, our study aimed to investigate the prevalence of *Haemoproteus* spp. in many species of birds in different regions in Al-Qadisiya province, Iraq.

## 2. MATERIALS AND METHODS

### 2.1. Collection of Blood Samples and Examination

A total of 254 birds were collected from different regions of Al- Qadisiya province between February 2015 to November 2015, Birds included six species which are: 32 House sparrow (*Passer domesticus*), 60 wild pigeon (*Columba livia*), 25 Quail (*Coturnix coturnix*), 20 White-cheeked bulbul (*Pycnonotus leucotis*), 40 domestic duck (*Anas platyrhynchos domesticus*) and 77 domestic chicken (*Gallus gallus domesticus*).

Blood samples were collected from the wing vein of the birds. Thin smear was prepared, made air dried. These blood films were made which after fixing with methyl alcohol were stained with Giemsa's stain. Then the slides were examined under microscope for the detection of the protozoa using immersion oil objective(x100).A thorough examination of each slide was made from 20/30 fields(12).

### 2.2. Statistical Analysis

Data generated were analysed on the computer statistical package SSPS using Chi-square test. Differences expressed as significant at  $P < 0.05$  (16).

## 3. RESULTS

Results revealed through examination of 254 samples from examined birds belonging to six species of birds under study that the percentage of the overall infection with *Haemoproteus* spp. ( pseudo-malaria ) was 33.5% (Fig.1). The results in Table1. showed the prevalence of *Haemoproteus* spp. according to species of birds which revealed the highest infection percentage was in wild pigeon (*Columba livia*) which reached to 63.3% and the least in White- cheeked bulbul (*Pycnonotus leucotis*) which reached to 15%.

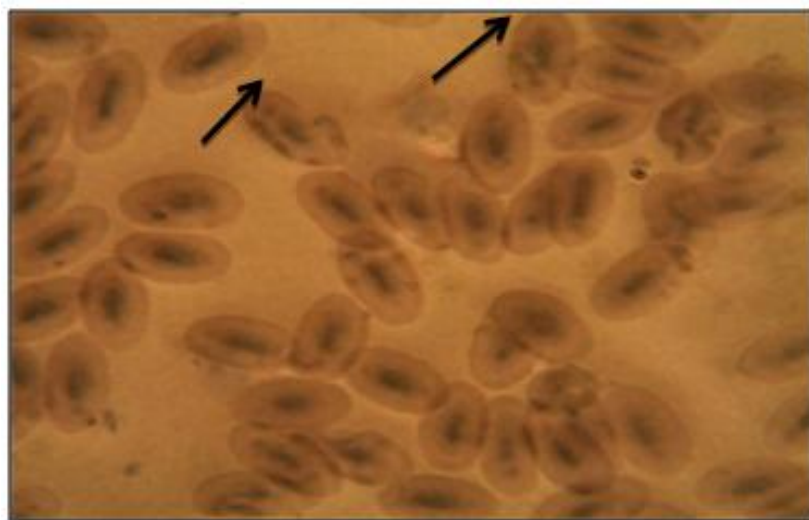


Figure1. Pseudo-malaria parasite (*Haemoproteus* spp.) in bird blood smear

## Prevalence of Pseudo-malaria (*Haemoproteus* spp.) Infection in Many Species of Birds

**Table1.** The prevalence of *Haemoproteus* spp. infection according to species of birds

Species of birds	No. examined	No. positive	Positive %
<i>Passer domesticus</i>	32	6	18.8
<i>Columba livia</i>	60	38	63.3
<i>Coturnix coturnix</i>	25	5	20
<i>Pycnonotus leucotis</i>	20	3	15
<i>Anas platyrhynchos</i>	40	7	17.5
<i>Gallus gallus domesticus</i>	77	26	33.8
Total No.	254	85	33.5

### 4. DISCUSSION

The genus *Haemoproteus* includes a large number of intracellular protozoan parasites of birds distributed all over the world (17). It is the most common blood parasite of birds and has been reported from 67% of total bird species (7). The pathogenicity of this parasite can vary depending upon the species of the parasite from altered physiology up to mortality (8,18). *Haemoproteus columbae* widely occurs in pigeon in tropical and subtropical regions. *H. lophortyx* infection in captive bobwhite quail has been reported from California, USA (10).

From Asia 4.5% prevalence of *Haemoproteus* spp. among hens and another different domestic birds has been recorded (19). The highest percentage of infection with this parasite was in pigeon (63.3%), many of researches reported a high infection in feral pigeon, the present study agree with previous researches (17,20,21). Also some researches record infection in quail, domestic ducks, chickens and house sparrow (8, 10, 11, 18, 22).

This variation in the percentages attributed to the different areas and environments which samples were collected from it, as well as the different among studied birds in their sensitivity and resistance to infect with this parasite, its age (20). We know that the vectors *Pseudolynchia canariensis* and *Culicoides* spp. flies is capable to feed on pigeon, chicken and house sparrow, some reports detect that *P. canariensis* have a weak host specificity (5). Thus the detection of *Haemoproteus* spp. in wild and domestic birds is very significant because of their movement from one source to another and contact with their intermediate host lead to disseminate pseudo-malaria infection. Therefore birds may be considered as a biological transporter of *Haemoproteus* spp. that could transport infection to other birds.

Finally, The presence of *Haemoproteus* spp. in all sex species of studied birds, this refer to ability to infect a wide range of hosts and give us an evidence that this parasite can infect many variety of birds hosts.

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