HAEMATOZOA of Some FALCONIFORMES (AVES) of Iraq

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Abstract

Twenty-two out of 97 specimens of falconiform birds collected at different areas of Iraq, which belong to nine species, were found infected with blood parasites. Five species of haematozoa were recovered. Microfilariae were the most common parasite with an infection rate of 12.4% followed by *Haemoproteas tinnunculus, Leucocytozoon toddi, Plasmodium fallax, P. relictum* and *Trypanosoma avium* complex with infection rates of 10.3%, 5.2%, 4.1% and 1% respectively. Two species, *Leucocytozoon toddi* and *Plasmodium fallax* are found to be new host records.

الخلاصة

من أصل 97 نموذجاً من الطيور الصقرية تم جمعها من مناطق مختلفة من العراق وجد بأن 22 منها مصابة بواحدة أو أكثر من خمسة أنواع من طفيليات الدم تم الحصول عليها. كانت اليرقات الدقيقة لديدان الفلاريا *(microfilaria)* هي الأوسع أنتشاراً وبمعدل أصابة يبلغ 12.4% يتبعها بالترتيب هيموبروتيوس تنكلس *Haemoproteus tinnunclus* وليوكوسايتوزون تودي *Leucocytozoon toddi* وبلازموديوم *Plasmodium* وتربانوسوما ايفيوم Trypanosoma avium وبنسب أصابة تبلغ (نوعان هما: *P. fallax* و *P. relictum*) 10.3% و 5.2% و 4.1% و 1% على التوالي. وقد سجل أثنان من الطفيليات هما *Leucocytozoon toddi* و *Plasmodium fallax* كتسجيلات جديدة للمضيف.

Introduction

The order falconiformes comprises 35 species of birds in Iraq. This includes vultures, eagles, buzzards, hawks, kites, harriers, falcons and osprey [1].

Surprisingly, although of their relatively high number of species among other Iraqi avian groups as well as their wide range of distribution throughout Iraq, only few works on their blood parasites had been carried out. Shamsuddin and Mohammad [2] were the first to report from four falconiform birds and recorded six species of haematozoa. Then, [3] provided some notes on blood parasites of three falconiform species reporting *Haemoproteus tinnunculus* and microfilaria.

The aim of the present work is to investigate haematozoa of some falconiform birds collected in Iraq as well as to discuss pertinent taxonomic notes on the parasites.

Materials and Methods

A total of 97 specimens of falconiform birds belong to nine species were examined by the author at different parts of Iraq during the period March 1998 to February 2002. Blood smears were taken from the brachial vein or sometimes from the heart, then air dried, fixed in absolute ethanol or methanol and stained with Giemsa's stain solution at strength of 1:10 at pH 7.2. Drawings were made with the aid of camera lucida.

Results

Table 1 summarizes the results on the incidence of parasites and infection rate of the examined birds. It shows that the total infection rate is 22.7% with one or more species of haematozoa ranging from 8.3% in long-legged buzzard to 34.7% in the kestrel.

Table 2 provides a list of the blood parasites and their distribution among the examined falconiform hosts in the present study. This would show that these birds were infected with six blood parasites including one species *of Haemoproteus,* one species *of Leucocytozoon,* two *species of Plasmodium, one species of Trypanosoma* and the microfilariae.

Infection with microfilariae ranked first among blood parasites with an infection **rate** of 12.4% and appeared in five host species (table 2). *Haemoproteus tinnunculus* (Wasielewski and Wulker, 1918) emend. Wingstrand, 1947 (Apicomplexa: Haemosporida) ranked second among the blood parasite groups with a total infection rate of 10.3%. It infects four bird species (table 2). *Leucocytozoon toddi* Sambon, 1907 (Apicomplexa: Haemosporida) (fig. 1) represents 5.2% of the total infection and ranked third among other parasite groups. It infects three bird species (table 2). The infection of four host species with *Plasmodium fallax* Schwetz, 1930 (Apicomplexa: Haemosporida) (fig. 2) and *P. relictum* Grassi and Feletti, 1890 (Apicomplexa: Haemosporida) represents only 4.1% of the total infection and ranked fourth among other blood parasites. The least infection rate is with *Trypanosoma avium* complex (Flagellata: Trypanosomatidae) that comes to only 1%. It infects one host specimen with relatively low rate of parasitemia.

Table 1: Incidence of haematozoa and infection rates among the Iraqi falconiform birds.

#	Common name	Scientific name	No. examined	No. infected	% inf. Rate
1	Steppe eagle	*Aquila rapax*	7	1	14.3
2	Serpent eagle	*Circaetus gallicus*	4	1	25
3	Steppe buzzard	*B. buteo vulpinus*	13	2	15.4
4	Long-legged buzzard	*Buteo rufinus*	12	1	8.3
5	Black kite	*Milvus migrans*	8	2	25
6	Sparrow hawk	*Accipiter msus*	6	1	16.7
7	Marsh harrier	*Circus aeruginosus*	8	2	25
8	Kestrel	*Faico tinnunculus*	23	8	34.7
9	Lesser kestrel	*Faico naumanius*	16	4	25
	Total		97	22	22.7

Table 2: a list of the blood parasites and their distribution among the examined falconiform hosts.

Parasite species	hosts	No. examine	No. infecte	% total infection
Haemoproteus tinnunculus	*Accipiter msus*	6	1	16.7
	Circus aueroginosus	8	1	12.5
	Faico tinnunculus	23	5	21.7
	Faico naumanius	16	3	18.7
Leucocytozoon toddi	*Buteo buteo vulpinus**	13	2	15.4
	Circus aueroginosus	8	1	12.5
	*Faico tinnunculus **	23	2	8.7
Plasmodium fallax	*Faico naumanius **	16	1	6.3
Plasmodium relictum	*Buteo buteo vulpinus*	13	1	7.7
	Buteo rufinus	12	1	8.3
	Milvus migrans	8	1	12.5
Trypanosoma avium	*Milvus migrans*	8	1	12.5

Microfilaria	*Circus aueroginosus*	8	1	12.5
	Aquila rapax	7	1	14.3
	Circaetus gallicus	4	1	25
	Faico tinnunculus	23	7	30.4
	Faico naumanius	16	2	12.5

* New host record

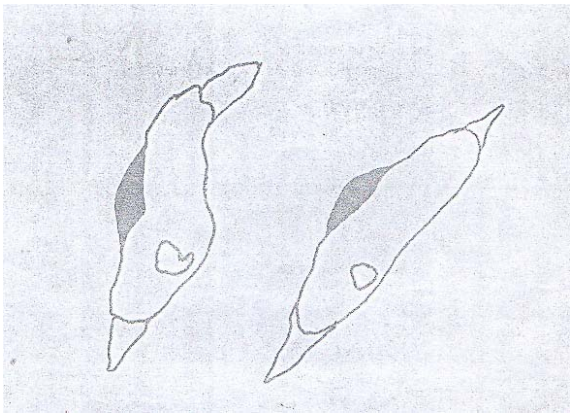

Fig. (1): Gametocytes of *Leucocytozoon toddi* from *Buteo vulpinus*

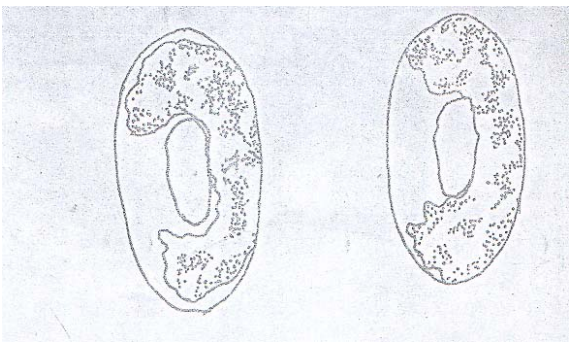

Fig. (2): Gametocytes of *Plasmodium fallax* from *Falcon Naumanius*

Discussion

Reporting of *Leucocytozoon toddi* from the kestrel *Faico tinnunculus* and the steppe buzzard *Buteo buteo vulpinus* and *Plasmodium fallax* from the lesser kestrel *Faico naumanius* constitute new host records.

Compared with the results of other studies as reviewed by [4], the Iraq falconiformes show low rates of infection with different genera of blood parasites. This may reflects the general arid or semi-arid habitats of Iraq that could not support high vector potentiality.

Except for microfilaria, which ranked first in this study, the results on generic distribution and prevalence among their falconiform hosts are in accordance with [4] who examined 147 falconiform species internationally. It is also with general agreement with studies of blood parasites of Iraqi avifauna of [2] and [3]. However, the results on infection rates showed relatively high percentage especially in the kestrel, *Faico tinnunculus* (table 1). This is may be due to smaller sample size of the present study. According to [4] the genus *Haemoproteus* is the most common among other blood parasites. In this study it ranked second among the parasite groups. This may reflects a difference in vector potentiality. It is reported worldwide from six species of genus *Faico* of the Family Falconidae and six species belong to five genera of the family Accipitridae [5,6]. Presence of *H. tinnunculus* in 12 members of two families of order Falconiformes is rather surprising, since there is evidence that *Haemoproteus* spp. are host family specific [4, 6, 7]. This may indicates that this assumption of specificity is not valid at least for this haemoproteid or the separation of the two host avian families is not justified. Although that this species requires review, its measurements and staining affinities showed no differences in the four different falconiform hosts in this study, which belong to three different genera and two families.

Leucocytozoon toddi was also reported in Iraq from *Accipiter nisus*, *Buteo rufinus* and *Circus aeruginosus* [2]. This species is frequently reported from members of Accipitridae worldwide but it is rather rare in Falconidae. This is true for the present study.

In regard to the infection with *Plasmodium* spp. in the present study, it seems that members of family Falconidae are less frequently infected than those of Accipitridae. Also, Infection with

P. fallax is less frequent than *P. relictum.* This is may be related to the difference in the availability of their vectors.

Trypanosomes of birds are extremely pleiomorphic and difficult to identify with certainty since trypanosomes from a single infected bird were transmissible to several bird species and also developed in a wide range of potential vectors [4]. However, [2] reported *T. avium* from *Circus aeruginosus* and *Faico tinnunculus*, and also from *Lanius collurio* (Passeriformes). So, in order to avoid adding more taxonomic confusion it seems reasonable to refer to the present specimens as *T. avium* complex until more is found about this matter.

The specific identity of microfilariae could not be detected in view of the absence of adult forms in the periphery blood.

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