Prevalence of Blood Parasites in Local Chickens in Qaradagh District, Sulaimani – Iraq

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Summary

Hemosporidians are intracellular protozoan parasites found in blood cells and tissues of their avian hosts. They are worldwide distributed and occur in a variety of avian species, including domestic chicken. Blood parasites among village chickens in Qaradagh district, Sulaimani Province in Kurdistan region Iraq, were surveyed during the period of March-June for the year 2012. Haemoparasites investigation was done by microscopic examination of stained blood films which prepared from 170 local chickens *(Gallus domesticus).*The overall prevalence of all species of haemosporidian parasites over the studied period in tested individuals was 133 (78.2%) with 114 (85.7%) single and 19 (14.3%) mixed genera infections. *Plasmodiumspp*. was the most prevalent haemoparasite (52.6%) followed by *Haemoproteus spp.*, (19.5 %) and *Leucocytozoon spp.* (13.5%).The study has reported high prevalence rate of haemoparasites. There isn't enough information about prevalence of avian blood parasites in the studied area, the present study detect for the first time existent of haemoparasites.

Keywords: Parasites, *Plasmodium, Haemoproteus, Leucocytozoon*, chicken.

Introduction

Haemosporidian parasites are common blood parasites of reptiles, birds, and mammals with some stages of development in both tissues and circulating blood cells of infected hosts (1). Haemosporidians are intracellular protozoan parasites found within the blood cells and tissues of their avian hosts, they are worldwide distributed and occur in a variety of avian species, including domestic chicken, the avian haemosporidian parasites (Phylum-Apicomplexa) are taxonomically diverse and cosmopolitan in distribution infecting most bird families (2). The most commonly recorded parasites in smears of peripheral blood are unicellular eukaryotic parasites of the genera, *Haemoproteus*,*Leucocytozoon* and *Plasmoduim* (3).

Avian haemosporidian parasites can vary in their degree of host specificity, and a broad host range might even increase the general transmission rate leading to a high prevalence in several host species (4). Several studies have addressed the geographical distribution of genetically distinct blood parasites in different regions and habitats (5). As successful transmission depends on the presence of the vector, infections occur more often in the warmer months of the year. The infective stage is the sporozoite which is present in the salivary glands of the insect vector (6). Microscopy remains the cornerstone of diagnostic laboratory testing for blood and tissue parasites (7).

Chickens (*Gallus domesticus*) are widely kept in studied area as the free-range village chickens forming the largest proportion compared to other farm birds, and previous accounts of blood parasites in chicken in Sulaimani Province is relatively scarce, so the study was aimed to determine the prevalence and type of hemoparasites infecting village chickens bordering the Qaradagh district in Sulaimani Province, Kurdistan.

Materials and Methods

The study was carried out in Qaradagh district, which located in about 45 Km, far away from Sulaimani Province, Kurdistan region, Iraq.

To determine the prevalence of Haemoproteidae infection in village chickens blood samples were collected from 170 chickens (*Gallus domesticus*) of different ages and sex from March to June 2012 in 10 sites bordering the Qaradagh district in Sulaimani

Province. After the brachial vein was swabbed with 70% ethanol approximately 1 ml of blood was collected. For each individual two blood slides were made for morphologic identification of blood parasites.

Blood films were prepared and air dried within 5-15 second after preparation. Air-dried thin blood smears were fixed with absolute methanol for 5 min on the day of preparation. Fixed smears were air dried and packed into paper bands, later the blood films were stained in a 10% working solution of stock Giemsa's stain . Blood smears were examined under oil immersion (X100) for detection the presence of hematozoa including *Plasmodium*, *Haemoproteus*, *Leucocytozoon*for about 10 min. Infection was determined by detection of intra erythrocytic schizonts or gametocyte stage of parasites (8 and 9).

Results and Discussion

The data were comprised of 170 individual village chickens from 10 sites bordering Garadahg district, Sulaimani Province in kurdistan region Iraq , of which 133 (78.2%) were harbor Haemosporidia includes parasites from all three genera, overall prevalence were calculated without regard to age or sex, which are listed in table (1).

Table, 1: Prevalence of blood parasites in local chickens (*Gallus domesticus*) in Qaradagh, Sulaimani, Kurdistan region/ Iraq 2012

Villages bordering study site	No. of chickens examined	No. of Positive	Percentage prevalence
Siwisinan	23	20	87
Koshksarw	13	10	76.9
Bardi	19	18	94.7
Gomata	28	18	64.3
Masoyi	12	10	83.3
Ali awah	25	19	76
Balkha	10	4	40
Awa spy	14	13	92.9
UmerQala	15	12	80
Sarchawa	11	9	81.8
Total	170	133	78.2

The findings of this study are consistent with (10) in Nigeria and (11) in Kenya, who reported the same three haemoparasites *Plasmodium spp., Haemoproteus spp* and *Leucocytozoon spp.* during their study (figures 1, 2 and 3) respectively, and the high prevalence of blood parasites is similar to the result obtained (11) as they reported that 114 (79.2%) were infected with haemoparasites in Kenya, also, in Uganda prevalence rate shown (61.9%) (12).

Plasmodium spp. was the most prevalent haemoparasite (52.6%) (70/133), followed by *Haemoproteus spp*.19.5% (26/133) and lastly *Leucocytozoon spp*.13.5% (18/133). Of the 133 infected birds, 114 (85.7%) had single infection, while 19 (14.3%) had more than one genera of haemoparasites as shown in table, 2.

Table, 2: Prevalence of Haemoparasites in local chickens (single or mixed infection).

Haemoparasite present in chicken	Number of chicken infected with haemoparasites	Percentage Prevalence
Plasmodium species	**70**	**52.6**
Haemoproteus species	**26**	**19.5**
Leucocytozoon species	**18**	**13.5**
Plasmodium species &Haemoproteus species	**7**	**5.3**
Plasmodium species&Leucocytozoon species	**10**	***7.5***
Leucocytozoon species&Haemoproteus species	**2**	**1.5**
Total	**133**	**100**

The chicken's blood smears in this study were collected from several habitats, where mosquitoes and biting midges were abundant (13). Similar to the result of current study were found (14) *Plasmodium spp.* accounted for 5.6% of the infections, followed by *Haemoproteus spp.* (2.6%), *Leucocytozoon spp.* (0.3%), also (10 and 11) were found that *Plasmodium spp.* were the most prevalent haemoparasite compare to others. The Current study showed highest prevalence of haemoparasite during spring months, because in the spring, with the onset of breeding activity and the emergence of vectors, parasite populations become elevated in the birds and high levels of transmission occur, and the lowest prevalence was observed in autumn, (15). The chickens of this study were collected from several habitats, where mosquitoes and biting midges were abundant (13).

Leukocytozoone spp. was the least found haemoparasite during this study. Low prevalence of *Leukocytozoon spp.(*13.5%) in

comparison with *Haemoproteus spp.* (19.6%) may be due to decreased the numbers of *Simulium*fly near human domiciles (16).The results of current study were similar to the findings of researchers (13) in Zimbabwe were 4 of 94 (4.3%) chickens harbored *Leucocytozoon spp*., while (11) reported that 75 (65.8%) of tested chicken had *Leucocytozoon spp.* In spite of high prevalence rate of different haemoparasite species, in present study chickens did not show any symptoms of illness. Resistance to blood parasites in birds may be genetic or may be more prevalent in birds from certain locations (17). Additionally, resistance may be associated with age, as older birds may have an acquired immunity (18 and 19). Infected birds may serve as reservoirs for infection for more vulnerable species such as waterfowl (20).

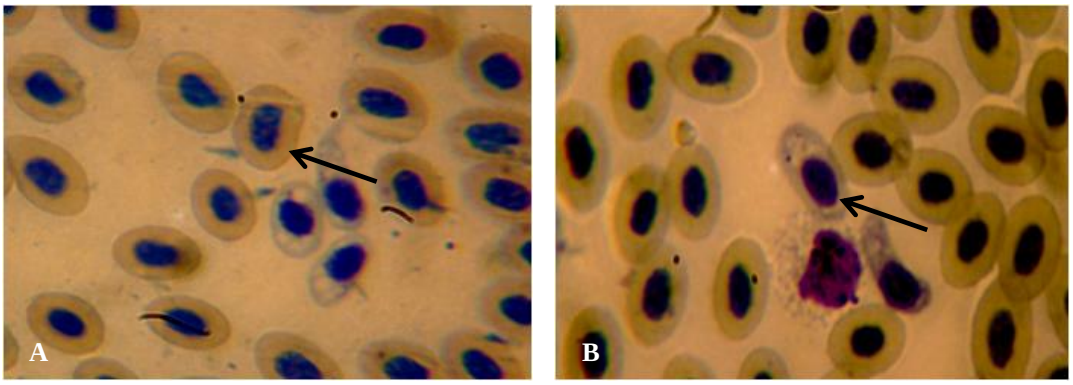

Figure 1; A and B: Chickens blood smears showing *Plasmodium spp.*

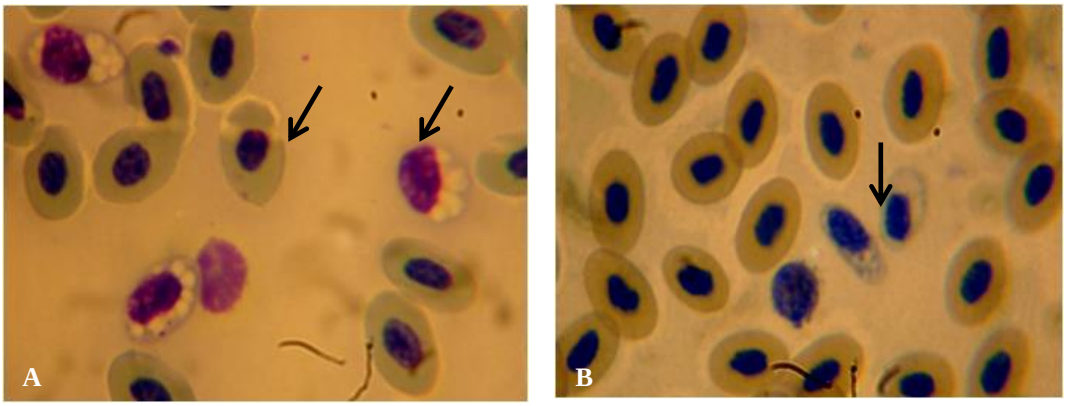

Figure 2; A and B: Chickens blood smears showing *Haemoproteusspp.*gametocytes

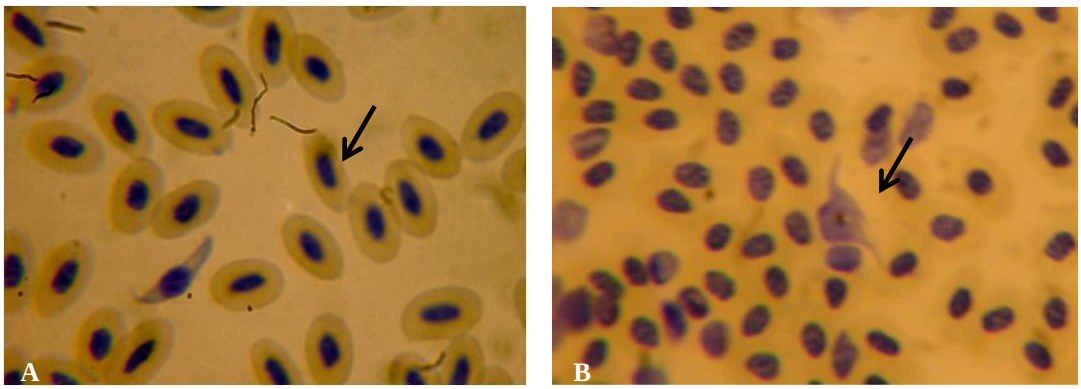

Figure 3; A and B: Chickens blood smears showing *Leucocytozoon spp.*gametocytes

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انتشار طفيليات الدم في الدجاج المحلي في منطقة قرداغ، السليمانية – العراق

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الخلاصة

تعد طفيليات الهيموسبوريدينز Haemosporidians من الأوالي التي تعيش في داخل خلايا الدم وأنسجة الطيور. تنتشر هذه الطفيليات في جميع أنحاء العالم في أنواع عديدة من الطيور ومنها الدجاج المحلي. تم في هذه الدراسة مسح طفيليات الدم للدجاج المحلي لقرى منطقة قرداغ في محافظة السليمانية في اقليم كردستان العراق للفترة من آذار لغاية حزيران 2012, اذ تم التحري عن طفيليات الدم بواسطة الفحص المجهرى لمسحات الدم المصبوغة والمحضرة من 170 من الدجاج المحلي .أظهرت نتائج هذه الدراسة نسبة عالية من الاصابة بطفيليات الدم حيث لوحظ ان 133 من مجموع ال 170 دجاجة التي شملتها هذه الدراسة كانت مصابة بهذه الطفيليات بنسبة (78.2%) , وكانت 114(85.7 %) من هذه الاصابات مفردة (نوع واحد من الطفيليات) 19اي بنسبة (14.3%) اصابة الباقية مختلطة (اكثرمن نوع واحد من الطفيليات). سجلت أعلى نسبة اصابة بطفيلي البلازموديوم (52.6%) وثانياً على نسبة اصابة بطفيلي الهيموبروتيس (19.5%) فيما كانت أقل نسبة اصابة بطفيلي الليوكوسايتوزون (13.5%). وان هذه الدراسة اثبتت وجود نسبة عالية من طفيليات الدم ولاتتوفر معلومات وافية عن معدلات الاصابة بطفيليات الدم في الطيور في منطقة الدراسة، وقد أثبتت نتائج هذه الدراسة و لاول مرة وجود هذه الطفيليات في المنطقة ولذلك فان هناك ضرورة لأجراء دراسة أخرى عن تأثيرات الاصابة بهذه الطفيليات في الحالة الصحية و الإنتاجية للدجاج باستخدام تقنيات أكثر حساسية للكشف عن الأصابة بهذه الطفيليات مثل تقنية ال PCR والفحوصات المصلية التي قد ينتج عنها تقديرات أكثر دقة لمعدلات الأصابة.

الكلمات المفتاحية: طفيليات، بلازموديوم، هيموبروتيس, ليوكوسايتوزون، طيور.