



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2017; 5(6): 2404-2407

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Received: 15-09-2017

Accepted: 19-10-2017

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## Blood parasites in Galliformes from the some districts of Absheron region

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### Abstract

In the present study, fecal and blood samples of chickens and quails were collected to determine the presence of intestinal and blood parasites from the Absheron region of the Baku. A total of 313 chickens (*Gallus gallus domesticus*) and 273 quails (*Coturnix coturnix*) have been selected and gathering place is different localities during 2015-2016. The study on prevalence of intestinal parasites as follows: *E.mitis* 37.7%, *E.tenella* 42% in chickens, and *E.bateri* 44% in quails. Plasmodium was detected in 69 chickens (22%) and in 76 quails (28%). *Leucocytozoon*, *Haemoproteus* had lower prevalence rates 20.7%, 19.2% for chickens and 32.6% and 28.5% for quails respectively.

**Keywords:** Absheron, microscopy, parasites, *Plasmodium*, *Haemoproteus*.

### 1. Introduction

Haemosporidians have been studied since 1884 until recent years [1]. Mixed infection haemoparasites and coccidia has been found and described by many authors [2].

Avian haemoparasites are known to be pathogenic to domestic poultry causing high mortalities, reproductive failure, retardation of growth, reduced productivity [3]. The genus *Leucocytozoon* is divided into two subgenera: *Akiba* and *Leucocytozoon* - based on the vector species. Acute outbreaks of leucocytozoonosis have been reported in chickens, quail. *L.caulleryi*, *L.sabrazesi*, and *L.schoutedeni* in chickens. *Leucocytozoon macleani* have been reported in quail and in chickens [4].

Among malaria parasites, *P.juxtannucleare* is responsible for observed outbreaks of particularly severe malaria in domestic birds. It primarily infects chickens (*Gallus gallus domesticus*) [1].

*Haemoproteus* is the most common blood parasite in domestic and nondomestic birds. More than 120 species have been reported. *Haemoproteus* sp. have been described in free-ranging ducks, quails and turkeys but are rare to absent in commercial flocks. *Haemoproteus* is considered nonpathogenic in most avian species. Infected birds are often seen as asymptomatic carriers, showing mainly chronic parasitaemia. There is very limited number of studies on bird blood parasites in Azerbaijan [5].

Coccidiosis is a chronic parasitic disease of various animal species. Infections are caused primarily by *Eimeria* sp. protozoa, which live mainly in the epithelium of the small intestine. The most pathogenic species of *Eimeria* in chickens include *E.necatrix*, *E.tenella* and *E.acervulina* and *E.maxima*.

*Eimeria tenella* is one of the most pathogenic coccidia to infect chickens. This acute infection occurs most commonly in young chicks. It may be characterized by mortality. *Eimeria mitis* cause subclinical coccidiosis associated with marked weight loss.

The goal of our study was to examine birds for the presence endoparasites (avian blood and intestinal parasites).

### 2. Materials and Methods

A total of 586 birds were viewed to diagnose blood and intestinal parasites. The blood smears were air dried, fixed in 100 % methanol for 5 min and stained with Giemsa (pH 7.2) for 45 min for the presence of blood parasites. Fecal samples of birds were diluted into 2.5% aqueous potassium dichromate (K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>) and kept in Petri dishes for sporulation at room temperature to check for the presence of intestinal parasites. After sporulation oocysts were recovered by centrifugation with saturated salt solutions as described by Darling (1997) [6]. The blood and

fecal slides were viewed using the microscope AXIO SCOPE A1 (Carl Zeiss Jena). We inspected at least 100 fields on each smear; the number of parasites was counted at  $40\times, 1,000\times$  magnifications under oil immersion. The genus and species of parasites were determined upon their morphological traits according to Valkiunas (1997) and Krylov (1996) [6].

### 3. Results and Discussions

Many recent studies have focused on avian blood parasites [7]. *Coturnix coturnix* was the first recorded natural host for *P. elongatum* from D.I. Khan. The pathogenesis of Haemoproteus infection in poultry is still poorly understood, although infections have been associated with muscle pathology, hepatomegaly and splenomegaly [8]. It is reported that based on the current taxonomy, 3 species of *Leucocytozoon* and 3 species of *Trypanosoma* are found in domestic chickens *Gallus gallus domesticus*, mainly in tropical and subtropical regions [9]. Chicken and quails are exposed haemosporidians which are known to be highly pathogenic to domestic poultry with mortalities as high as 90% [10].

We analyzed 586 birds. High magnification under oil immersion ( $\times 1,000$ ) was used for identification of trophozoites and gametocytes usually with a round or elongate shape in the red blood cells.

*Genus Plasmodium, Marchiafava and Celli, 1885*  
Plasmodium spp.

A total of 69 chickens was infected with Plasmodium sp. In birds were found to be infected with the: macrogametocyte, erythrocytic meronts and trophozoite of P. sp. Some trophozoites were oval in shape and some were lobulated. The trophozoites were found in 16 chickens. It had a nucleus. The measurements of the trophozoites were  $4.1\pm 0.24 \mu\text{M} \times 2.9\pm 0.28 \mu\text{M}$ . Invasion intensity ranged from 2 to 8 per 100 microscopic fields (Fig. 1).

A total of 22 chickens was infected with erythrocyte meronts of Plasmodium sp.  $4.4\pm 0.18 \mu\text{M} \times 2.95\pm 0.15 \mu\text{M}$  in measurement (Fig. 2). The invasion intensity was 2-4 parasites per 100 microscopic fields. The macrogametocytes were detected in 31 chickens (Fig.3). The measurements of the macrogametocytes of Plasmodium sp. were  $4,06\pm 0,04 \times 1,43\pm 0,03$ . The measurements of the nucleus were  $1,9\pm 0,14 \times 0,95\pm 0,2$ . Invasion intensity ranged from 2 to 4 per 100 microscopic fields. A total of 65 chickens were infected with the gametocytes of *Leucocytozoon* sp. The gametocytes are found in spindle-shaped host cells.

The measurements of the macrogametocyte of *Leucocytozoon* sp. from blood smears of chickens were  $10.4\pm 0.3 \mu\text{M} \times 4.9\pm 0.28 \mu\text{M}$  (Fig.4). Invasion intensity ranged from 2 to 4 per 100 microscopic fields. The nucleus of parasite was  $3.3\pm 0.13 \mu\text{M} \times 2.4\pm 0.21 \mu\text{M}$  in measurement.

The mature round gametocytes of *Leucocytozoon* sp. from chickens are found in erythrocytes (Fig.5). The measurements of the macrogametocyte of *Leucocytozoon* spp. from blood smears of chickens were  $14.6\pm 0.3 \mu\text{M} \times 12.7\pm 0.19 \mu\text{M}$ . Invasion intensity ranged from 1-2 per 100 microscopic fields. The nucleus of parasite was  $3.75\pm 0.13 \mu\text{M} \times 3.0\pm 0.09 \mu\text{M}$  in measurement.

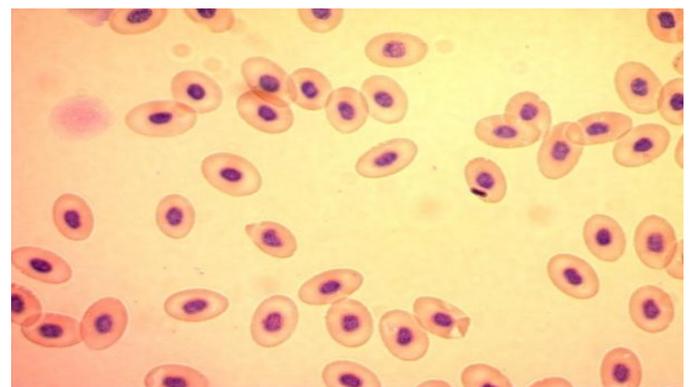
A total of 76 quails was infected with Plasmodium sp. The trophozoite of Plasmodium sp. is ring shaped and 1-2 microns in size (Fig.6). The erythrocyte meronts were  $6,36\pm 0,03 \mu\text{M} \times 4,94\pm 0,04 \mu\text{M}$  in measurement (Fig.7). The invasion intensity was 2-4 parasites per 100 microscopic fields.

In spindle-shaped host cells the macrogametocyte of *Leucocytozoon* sp. of quails was  $13.4\pm 0.15 \mu\text{M} \times 5.0\pm 0.11 \mu\text{M}$  in measurement (Fig.8). The nucleus of parasite was  $2.1\pm 0.1 \mu\text{M} \times 1.5\pm 0.08 \mu\text{M}$  in measurement. The mature round gametocytes of *Leucocytozoon* sp. of quails was  $15,0\pm 0,28 \times 7,36\pm 0,05$  (Fig.9). The nucleus of parasite was  $2,21\pm 0,12 \mu\text{M} \times 1,04\pm 0,02 \mu\text{M}$  in measurement. Among the 313 investigated chickens and 273 quails, Plasmodium was detected in 69 chickens (22%) and in 76 quails (28%). *Leucocytozoon*, *Haemoproteus* had lower prevalence rates for chickens 20.7% (65/313), and 19.2% (60/313), and for quails 32.6% (89/273) and 28.5% (78/273) respectively. The prevalence of haemoparasites - *Plasmodium*, *Haemoproteus* and *Leucocytozoon* in birds is a result of a dynamic process such as vector-host-environment [11]. In our study the frequency of *Leucocytozoon* and *Haemoproteus* in chickens was lower than in quails but the frequency of *Plasmodium* in quails was higher than in chickens.

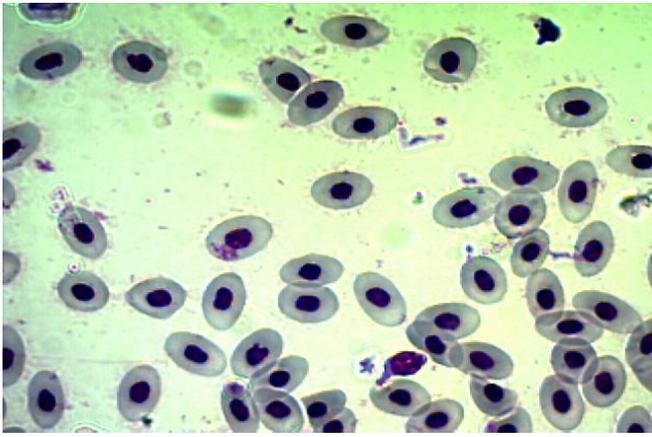
From feces and blood of investigating birds, we obtained 2 species of *Eimeria* and an unidentified species of *Leucocytozoon*, an unidentified *Plasmodium* and *Haemoproteus*. The mixed infection was detected *Leucocytozoon* and *Plasmodium* in chickens and *Eimeria tenella* + *Eimeria mitis* + *Leucocytozoon* 2% (313/8), *Plasmodium* + *Eimeria tenella* + *Eimeria mitis* -4% (313/12) was found in chickens (Fig. 10). The total prevalence values for these parasites were 37.7 % for *Eimeria mitis* (118/313) and 42% *Eimeria tenella* (131/313) in chickens. *Eimeria bateri* was found in quails 44% (120/273) (Fig.11), *Eimeria tenella* + *Eimeria mitis* (Fig.12). We also studied the effect of *Artemisia absinthum* (1500 mq/kg) on 30 chickens experimentally infected with *E. mitis* on biochemical indices in blood.

### 4. Conclusion

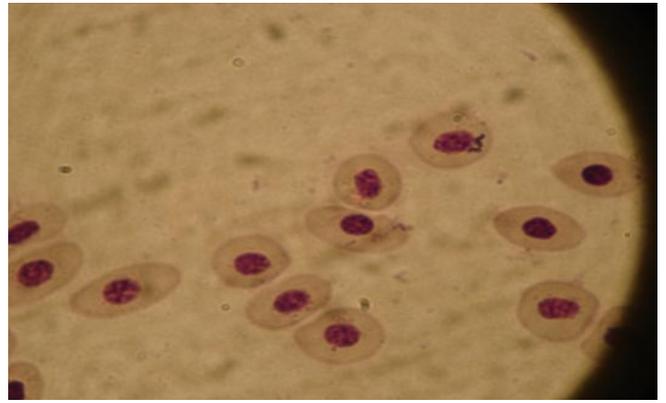
The present study was carried out on blood parasites of fecal samples and blood smears from 586 birds -313 chickens and 273 quails from Absheron region. In chickens and quails blood parasites - *Leucocytozoon*, *Plasmodium* and *Haemoproteus*. *Eimeria bateri* in quail and mixed infection *Leucocytozoon* + *Plasmodium* and *E. tenella* + *E. mitis* in chickens were detected. We revealed influence of *Artemisia absinthum* on 30 chickens infected with *Eimeria* and found that wormwood 1500 mq/kg gives the best therapeutic and prophylactic effect. Natural infection of chickens and quails with blood parasites has been reported by many authors, but this research may be regarded as a first contribution on blood parasites in domestic birds in Azerbaijan.



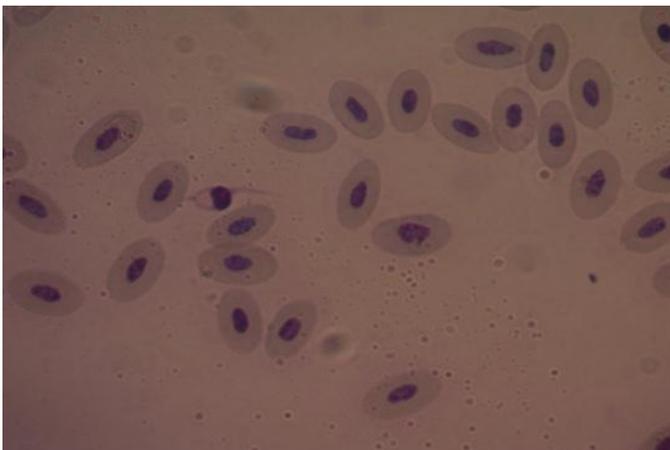
**Fig 1:** Trophozoite of Plasmodium sp. from blood smears of chicken (*Gallus gallus domesticus*)



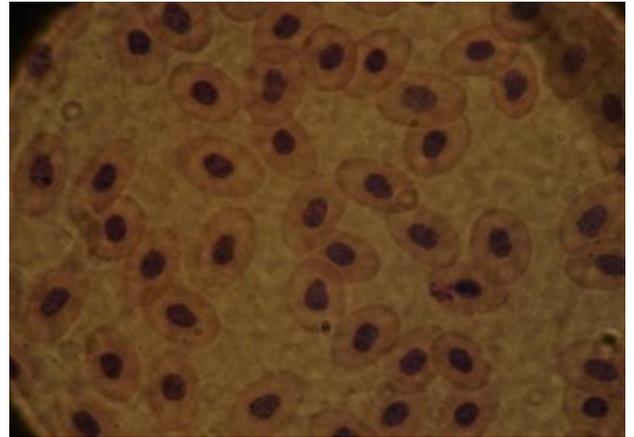
**Fig 2:** erythrocytic meronts of *Plasmodium* sp. from blood smears chickens (*Gallus gallus domesticus*)



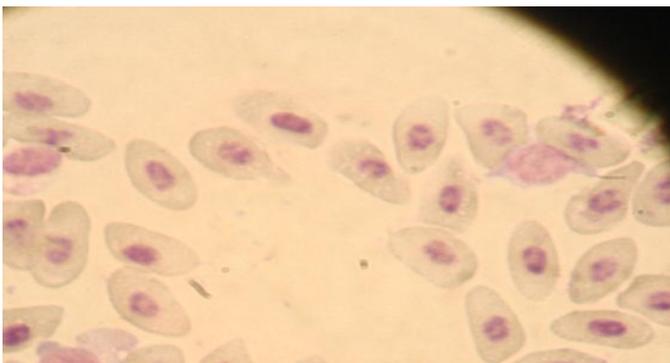
**Fig 6:** trophozoite of *Plasmodium* sp. from blood smears of quails (*Coturnix coturnix*)



**Fig 3:** The macrogametocytes of *Plasmodium* sp. from blood smears chickens (*Gallus gallus domesticus*)



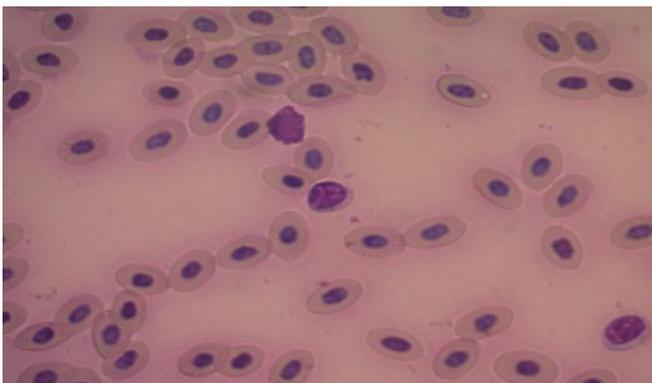
**Fig 7:** erythrocytic meronts of *Plasmodium* sp. from blood smears of quails (*Coturnix coturnix*)



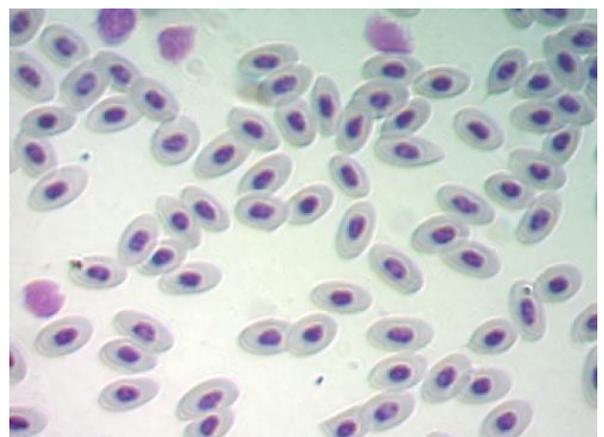
**Fig 4:** Blood smears of chicken (*Gallus gallus domesticus*) infected by *Leucocytozoon* sp.



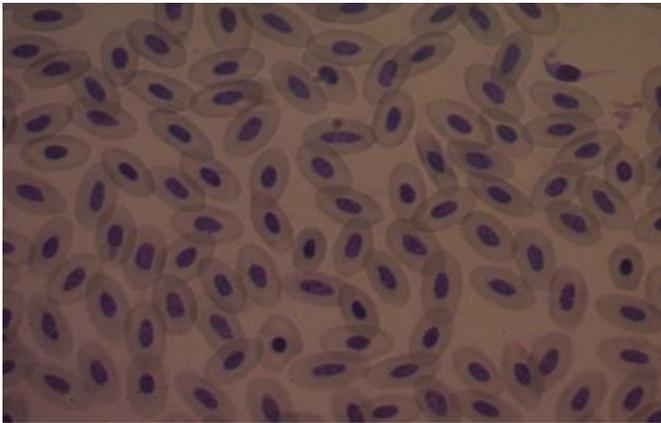
**Fig 8:** macrogametocyte of *Leucocytozoon* spp. from blood smears of quails



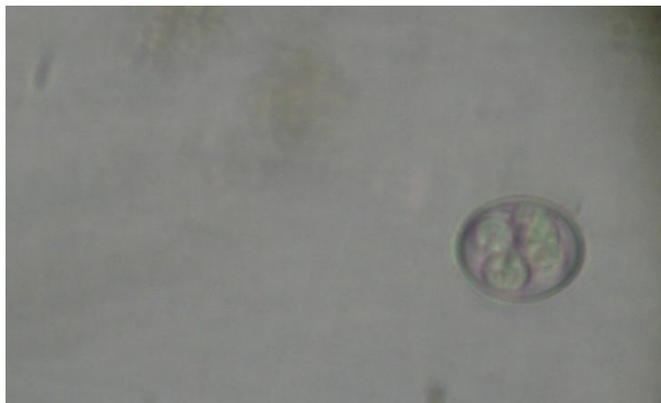
**Fig 5:** Blood smears of chicken (*Gallus gallus domesticus*) infected by *Leucocytozoon* sp. (round gametocytes)



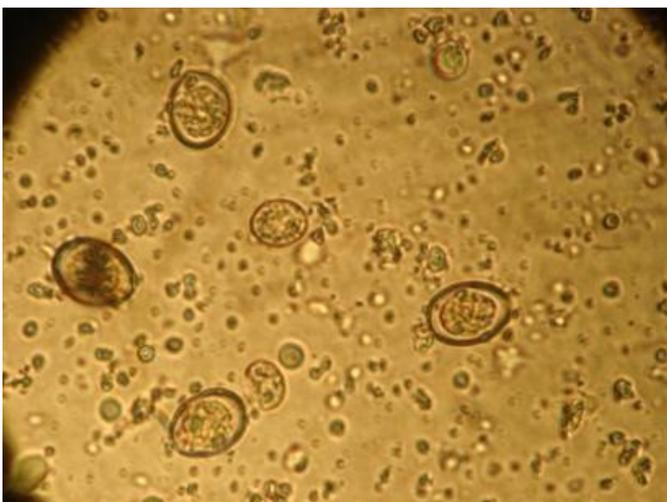
**Fig 9:** macrogametocyte of *Leucocytozoon* spp. from blood smears of quails (round gametocytes)



**Fig 10:** mixed infection of *Leucocytozoon* spp. with *Plasmodium* from chickens



**Fig 11:** *E. bateri* from feces of quails



**Fig 12:** *E. tenella* and *E. mitis* from feces of chickens

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