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LEUCOCYTOZOONOSIS IN TURKEYS (*MELEAGRIS GALLOPAVO*)

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This study is the first report one species of parasites of the genus *Leucocytozoon* was found in the blood from domestic turkeys in Republic of Azerbaijan, collected in the period July 2013 till February 2014. *Leucocytozoon smithi* was found, described and figured in turkeys during the microscopic examinations of blood samples. Data on the morphology, size and prevalence of the observed parasite are given. The total presence of the *Leucocytozoon* in birds was 27,3% (n-32). The adult birds (aged > 8 months) had a higher prevalence of 29,3% (19/58) compared to chicks (aged < 8 months) 22,4% (13/59).

Key words: domestic birds, Leucocytozoon, blood parasite.

ЛЕЙКОЦИТОЗООНИ ІНДИЧОК (*MELEAGRIS GALLOPAVO*)

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У статті наводиться повідомлення щодо паразита роду Leucocytozoon, виявленому в крові свійських індичок (уперше для Азербайджану). Збір матеріалу проводився з липня 2013 по лютий 2014 року. При мікроскопічних дослідженнях у зразках крові свійських індичок був виявлений, описаний і сфотографований вид Leucocytozoon smithi. Наведено дані про морфологію, розмір і частоту народження паразита. Зараженість птахів паразитом Leucocytozoon становила 27,3% (n-32). У свійських птахів (старше 8 міс.) зараженість була дещо вищою (29,3% (19/58)), ніж у молодняка (нижче 8 міс.) – 22,4% (13/59).

Ключові слова: свійські птахи, Leucocytozoon, кровепаразити.

ЛЕЙКОЦИТОЗООНЫ ИНДЕЕК (*MELEAGRIS GALLOPAVO*)

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В данной статье приводится сообщение о паразите рода *Leucocytozoon*, обнаруженном в крови домашних индеек (впервые для Азербайджана). Сбор материала проводился с июля 2013 по февраль 2014 года. При микроскопических исследованиях в образцах крови домашних индеек был обнаружен, описан и сфотографирован вид *Leucocytozoon smithi*. Приведены данные о морфологии, размере и частоте встречаемости паразита. Зараженность птиц паразитом *Leucocytozoon* составляло 27,3% (n-32). У взрослых птиц (старше 8 мес.) зараженность была несколько выше (29,3% (19/58)), чем у молодняка (ниже 8 мес.) – 22,4% (13/59).

Ключевые слова: домашние птицы, Leucocytozoon, кровепаразиты.

INTRODUCTION

Bird blood parasites are a biological group of parasitic protista from *Hepatozoon, Atoxoplasma, Haemoproteus, Plasmodium, Fallisia, Leucocytozoon, Babesia, Trypanosoma* genera and the microfilaria of some helminthes.

Leucocytozoonosis is a disease of birds caused by obligate intracellular protozoa of the genus *Leucocytozoon*. The disease is transmitted by bite of Simuliidae (black flies) and clinical signs vary with the age and condition of the host [1].

Leucocytozoon is the largest haemoparasite encountered in birds. Leucocytozoonosis is a parasitic disease of anseriformes, turkeys, raptors, wild birds and columbiformes. L.simondi is found in anseriformes, L. smithi in turkeys, L. marchouxi in columbiformes, L.toddi in falconiformes, and L.ziemanni in owls, *L.bonasae* (grouse and ptarmigan) and L. *marchouxi* (pigeons and doves) [2,3]. *L. smithi* (Laveran et Lucet, 1905) infects both wild and domestic turkeys and is responsible for economic losses to the poultry industry.

Young birds manifest inappetence, weakness, listlessness, dyspnoea, and sometimes death within 24 h. Signs in adults appear less abruptly and consist of listlessness and a low mortality rate [4, 5]. Some other pathologic manifestations of the disease are anaemia, leukocytosis, splenomegaly, and liver degeneration and hypertrophy [6].

The genus *Leucocytozoon* is divided into two subgenera: *Akiba* and *Leucocytozoon* – based on the vector species [7]. *Leucocytozoon* affects circulating leucocytes and erythrocytes as well as tissue macrophages and endothelial cells, where in the latter it creates large tissue schizonts up to 700 μm in diameter.

The of the agricultural poultry have not been studied and blood parasites in wild birds have had only limited study in Azerbaijan [8].

Study of pigeons in Azerbaijan for 1980- years showed that 26,8 % of the birds were infected of *Haemoproteus*, 14,1%-*Leucocytozoon*, 2,7% -*Plasmodium* and it is estimated some new species blood parasites of birds [9].

This study had the aims to reveal haemoparasites in the turkeys (*Meleagridis gallopavo L.*) populations in the Absheron district of Azerbaijan.

MATERIALS AND METHODS

Collection of material on the fauna of blood parasites of domestic turkeys (*Meleagridis gallopavo L.*) carried out from September 2013 to December 2013. 117 young turkeys were examined from private farms of Absheron region of Azerbaijan. The birds were categorized into two age groups as follows: (aged < 8 months), and adult (aged > 8 months). Birds were released after taking a small amount of blood via bronchial venipuncture. Blood smear were made on site, and air dried, fixed with 100% methanol, and stained using a modified Romanovsky staining technique [10]. Presence and intensite of parasites was recorded.

Examination of blood smears were performed using the microscope with video camera (Carl Zeiss Axio Scope.A1) with oil immersion (400× and 1000×) for haemoparasites, which were identified to genus based on morphology at the laboratory of biochemical foundations of parasite-host of the relations of Institute of Zoology National Academy of sciences of Azerbaijan. The number of *Leucocytozoon* observed in 100 optic fields was recorded. We describe *Leucocytozoon smithi* (*Haemosporida, Leucocytozoidae*), which is the first *Leucocytozoon* parasite identified to species level in turkeys of Azerbaijan. This parasite is described based on the morphology of its blood development stages.

Data from the study were entered in Ms-Excel, for statistical processing the results used the tatistical program IBM SPSS Statistics 20.

RESULTS AND DISCUSSION

A total of 1species of *Leucocytozoon* was found in the blood of the birds studied. *Leucocytozoon* occurred in 32 of 117 birds (27,3%). This parasite showed an increase in prevalence rate with increase in age of the birds. The adult birds had a slightly higher prevalence of 29,3% (19/58) compared to chicks(aged < 8 months), 22,4% (13/59). The difference in rate of occurrence of *Leucocytozoon* among age groups was statistically significant ($p \leq 0.05$). Macrogametes stained dark blue with Giemsa, and the nucleus was ellipsoid and had several vacuoles occurring in darkly stained cytoplasm, according to all characteristics, the parasite was morphologically identified as *Leucocytozoon smithi* (27,3%) (Laveran et Lucet, 1905) in turkeys.

Description

***Leucocytozoon smithi* (Laveran et Lucet, 1905)** (Fig.)

Morphology: only elliptical gametocytes were seen.

The nucleus of the parasite is ellipsoid. The nucleolus could be seen in some cases.

Measurements of *Leucocytozoon smithi* (n=18).

Length of gametocytes 11.0-7.0 μm

Width of gametocytes 9.0-14.0 μm

Length of erythrocyte nucleus 22.0-40.0 μm

Length of gametocyte nucleus 4.0-6.0 4 μm

Width of gametocyte nucleus 1.8-3.09 μm

Host: Meleagris gallopavo L. (Galliformes)

Intensity of infection: found in 34 birds. An intensity of 8.0 parasites per 100 microscope fields was found.

Localities: Absheron

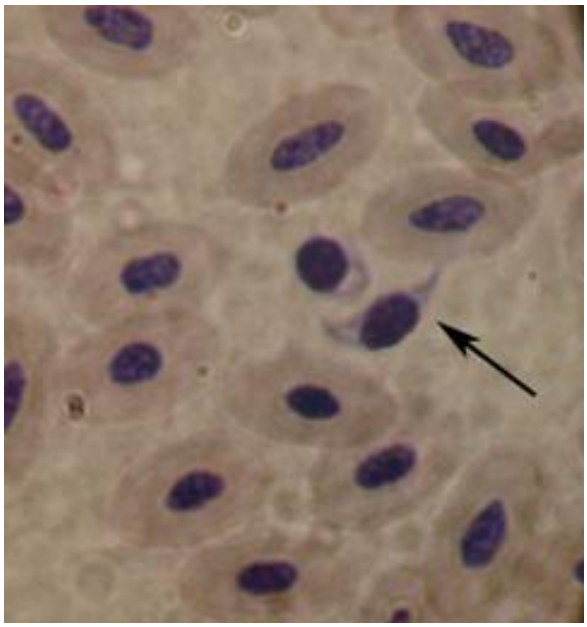

Fig. Turkey blood smear; gametocytes of *Leucocytozoon smithi* (Laveran et Lucet, 1905) in the peripheral blood of domestic turkey (Giemsa stain; Magnification 1000×).

DISCUSSION

Avian hematozoa parasites (Protista) are a heterogeneous group of organisms widely distributed worldwide [4,10]. Haemoparasites – *Leucocytozoon spp, Plasmodium spp., Haemoproteus spp, Aegyptinella spp,* and *Trypanosoma spp* are found in poultry in the tropical and temperate areas [11]. The lifecycles of haemoparasites require some arthropod vectors. These vectors include the mosquitoes, poultry soft tick (*Argas persicus*) and other flies. Haemoparasites cause anaemia and death by invading erythrocytes, which consequently are destroyed by the bird's immune system [12]. Leucocytozoon does not threaten human populations in terms of potential infection; infected poultry is not pathogenic in humans.

Similar observations of reports on *Leucocytozoon* have been reported in many birds in Iran [13], Africa [14], Israel [15], Spain [16], New Zealand [17], and USA [18] and near areas like as Turkey [19]. However, this is the first study the investigation of *Leucocytozoon* among domestic turkeys in Azerbaijan.

Infected adult turkeys showed no clinical signs. As usually in turkeys, *Leucocytozoon smithi* causes droopiness, incoordination, and occasionally convulsions that end in death. Clinical signs in older chicks included loss appetite, anorexia, move about with difficulty and a have tendency to lie down. These data are similar to ours.

CONCLUSION

Domestic avian species are susceptible to infection with *Leucocytozoon sp*. Our findings of *Leucocytozoon smithi* is the first report on and *Leucocytozoon* in turkeys in private farms of Absheron, in Azerbaijan. Further investigation is necessary to determining more accurately of haematozoan parasites among domestic birds and to understand the epidemiology of those parasites.

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