

## An investigation of *Babesia* spp. in goats in AL-Qadisiya province

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### Abstract

The study designed to evaluate the microscopic features of *Babesia* spp. Of goats, and know the effect of age, sex and the month of year on rate of infection. Sixty eight (68) blood samples were collected from jugular vein of suspected goats (aged 1 month to 4 years) during the period from September 2014 to April 2015 from different regions in AL-Qadisiya province. Samples were transmitted to laboratory for make blood smears. Results of microscopic examination showed that *Babesia ovis* and *Babesia motasi* appeared in ring form, double and single pyriform inside the RBCs. Eight (8) (11.7%) goats out 68 cases were positive. The highest rate of infection was (62.5%) in October, while the lowest rate was (15%) observed in March, also there was negative results seen in (November, December, January, February, April) and there was significant differences at level ( $P < 0.05$ ). The highest rate of infection observed in (1-2) years of age with significant ( $P < 0.05$ ) differences. No effects of gender were seen in examined goats. In conclusions, both *Babesia ovis* and *Babesia motasi* are present in Iraqi goats. *Babesia ovis* is considered the main type spreading in Iraq.

**Key words:** Babesiosis, *Babesia ovis*, *Babesia motasi*, microscopic features of *Babesia*.

### التحري عن طفيلي البابيزيا في ماعز محافظة القادسية

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### الخلاصة

صممت هذه الدراسة لمعرفة الصفات المجهرية لطفيلي البابيزيا ومعرفة تأثير عمر وجنس الماعز واشهر السنة على نسبة الإصابة. تم جمع 68 عينة دم من الوريد الوداجي للماعز من مختلف أفضية ونواحي محافظة القادسية وتم نقل العينات الى المختبر لعمل المسحات الدموية. اجريت الدراسة المقدمة خلال الفترة من شهر ايلول 2014 ولغاية شهر نيسان 2015 وتراوحت اعمار الحيوانات من 1 شهر ولغاية 4 سنوات. أظهرت نتائج الفحص المجهرى الشكل الحلقى والشكل الكمثرى المفرد والمزدوج لطفيلي *Babesia ovis* و *Babesia motasi* داخل كريات الدم الحمراء وظهرت نسبة الإصابة الموجبة (11.7%) 8 من 68 حالة. أن نتائج الفحص المجهرى طبقاً لأشهر السنة سجلت أعلى نسبة إصابة بلغت قمته (62.5%) في شهر (تشرين الأول) وكانت أقل نسبة إصابة (15%) في شهر (أذار) ولم تظهر إصابة في بعض أشهر السنة والتي تضمنت (تشرين الثاني ، كانون الاول ، كانون الثاني ، شباط ، نيسان) ومع وجود فرق معنوي بمستوى احتمالية ( $P < 0.05$ ). اعتماداً على أعمار الحيوانات المدروسة بلغت أعلى نسبة إصابة في عمر (1-2) سنة مع وجود فرق معنوي عند مستوى احتمالية ( $P < 0.05$ ). أشارت الدراسة المقدمة الى أنه لا يوجد تأثير لجنس الماعز على نسبة الإصابة والتي أظهرت نتائج مقاربة في كلا الجنسين. نستنتج من ذلك وجود كل من طفيلي *Babesia ovis* و *Babesia motasi* في الماعز العراقي ويعتبر طفيلي *Babesia ovis* هو النوع الأكثر انتشاراً في العراق.

**الكلمات المفتاحية:** البابيزيا ، البابيزيوسز ، *Babesia ovis* ، *Babesia motasi* ، الصورة المجهرية للببليزيا.

### Introduction

Haemoprotozoan are the main livestock production constraints all over the world (1). Babesiosis causing severe economic loss and it is caused by *Babesia ovis*, *Babesia motasi* and *Babesia crassa*. The parasites are

widespread in tropical and subtropical parts of the world (2). The life cycle of the parasites have (2) phase, the asexual phase that reproduce inside erythrocytes, while the sexual phase typically takes in Ixodid ticks

which acquire and transmit the parasites during the blood meals (3). The disease cause different clinical signs such as fever, jaundice, hemolytic anemia and hemoglobinuria (4). The microscopic examination of Giemsa stained blood smears remains the most appropriate for the diagnosis of the disease but due to the low sensitivity of the method made it does not use in epidemiological investigations (5). *Babesia ovis*, *Babesia taylori*, and *Babesia foliata* considered as small *Babesia*, while *Babesia motasia* and *Babesia crassa* are large *Babesia*. The infectious species are including *Babesia ovis* and *Babesia motasia* which are highly pathogenic more than other types, while *Babesia crassa* is moderate or non-pathogenic in most countries (6). The most important drugs that use in Babesiosis treatment are Dimidine derivatives group, Quinoline derivatives group and Acridine derivatives group (7). The Study aims to evaluate the prevalence of *Babesia* spp. in goats by using microscopic examinations and study the effects of age, sex and month of year on the prevalence of parasite.

## Materials and methods

### Samples collection:

## Results

### Microscopic examination

The results of examination showed that 8/68 (11.7%) cases of examined goats were given positive result

### Diagnostic characterization of *Babesia* spp.

*Babesia* parasites were seen in both thin and thick blood smears as ring form, double and single pyriform inside the RBCs and stained with blue color (Fig. 1).

### Prevalence of Babesiosis in goats according to months of study

The highest rate of infection (62.5 %) was observed in October and the lowest rate (15%) in March, while the other months (September, from November toward February and April) were showed negative results with significant differences at ( $P<0.05$ ) (Table 1).

The study was carried out during September 2014 until April 2015 in AL-Qadisiya province center and its villages such as Daghara, Somer, and Sadeer. Total of 68 blood samples were collected from goats, some of them were collected randomly and the other from goats clinically suspected infected with Babesiosis. Five mil-liters (5ml) of blood sample were obtained from the jugular vein after disinfectant the area by ethanol 70%, also 2ml more were collected from the ear vein. All samples were put in anticoagulant tubes, kept cool and transmit to the laboratory for microscopic examination.

### Microscopic examination:

Blood smears (thick and thin) were prepared by placing a drop of blood on glass slide, spread on slide by another one and left to dry by air, then fixed by methanol for (3-5) minutes and stained with Giemsa stain for 30 minutes, washed by tap water and left to dry after drying they examined under the oil immersion lens of light microscope (8).

### Statistical analysis:

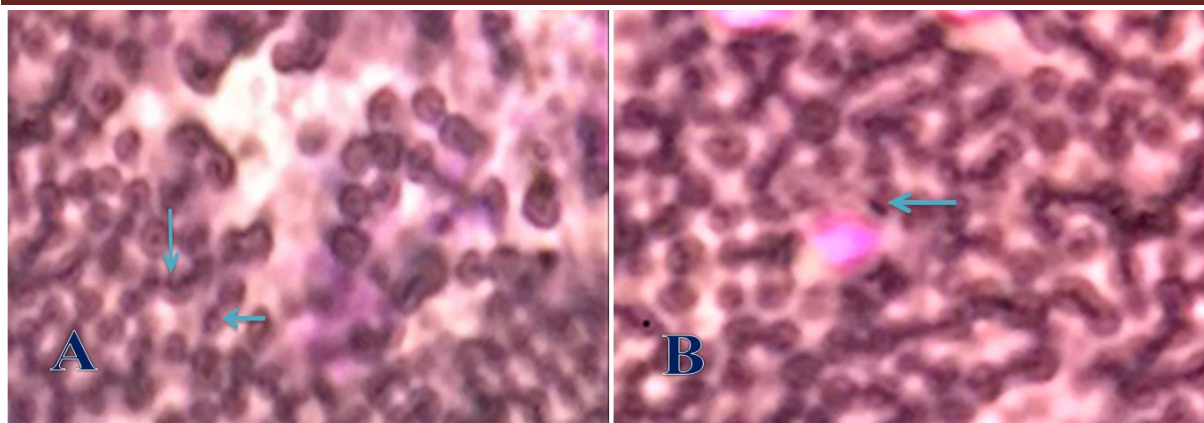
Results were analyzed using SPSS program (version 19) software 2010, and Chi-square test. The  $p<0.05$  was considered as statistically significant (9).

### Prevalence of Babesiosis in goats according to age

The results showed that the highest rate of infection (26.6%) and (10%) that were observed at the ages (1-2) year and (7-12) month respectively, while the lowest rate of infection (6.6%) that was observed at the ages (3-4) year and the negative results was observed at the ages (1-6) month. There were significant differences at level ( $P<0.05$ ) (Table 2).

### Prevalence of Babesiosis in goats according to sex of animal

Prevalence of Babesiosis in males and females goats in current study statistically was no difference. The prevalence rate in males was (7.1%) (2 positive samples out of 28 total screened), while in females was (15%) (6 positive samples out of 40 totals screened) (Table 3).



**Fig. (1):** Thick blood smear stained by Giemsa stain shows *Babesia spp.* inside a goat red blood cells, A; ring form, B; perform form (X100).

**Table (1):** Prevalence of Babesiosis in goats according to months of study

Month	Examined No.	Positive No.	Percentage (%)
September	10	0	0 C
October	8	5	62.5 A
November	12	0	0 C
December	4	0	0 C
January	3	0	0 C
February	3	0	0 C
March	20	3	15 B
April	8	0	0 C
Total	68	8	11.7

Similar letters refers to non-significant differences, different letters refers to significant differences at ( $P < 0.05$ ).

## Discussion

The results of present study showed that, *Babesia* parasite are seen in thin and thick blood smears of goats as ring form, double and single pyriform inside the RBCs and this in agreement with (10,11) who observed the pyriform, oval and amoeboid shape. On the other hand, our study pointed to the rate of infection in goats 8 (11.7%) positive case out of (68) cases. This is agreed with (12) (with little difference) who observed (17.70%) in sheep and (12.12%) in goats in central of Anatolia/ Turkey. According to the months of study our result in goats appeared that the rate of infection was increase and reached to (62.5%) in October and the rate was decrease

**Table (2):** Prevalence of Babesiosis in goats according to age

Age	Examined No.	Positive No.	Percentage (%)
1-6 month	3	0	0 C
7-12 month	20	2	10 B
1-2 year	15	4	26.6 A
3-4 year	30	2	6.6 B
Total	68	8	11.7

Similar letters refers to non-significant differences, different letters refers to significant differences at ( $P < 0.05$ ).

**Table (3):** Prevalence of Babesiosis in goats according to sex of animals

Sex	Examined No.	Positive No.	Percentage (%)
Male	28	2	7.1 A
Female	40	6	15 A
Total	68	8	11.7

Similar letters refers to non-significant differences, different letters refers to significant differences at ( $P < 0.05$ ).

to become (15%) in March while the other months from September and November towards February and April were showed negative results. This is different from (13) who recorder that Babesiosis is the common disease in caprine in dry area, on the other hand, our results was confirms with the finding of (14) who reported that Babesiosis was linked with rainfall. The current study pointed to that the highest rate of infection (26.6), (10%) that was observed in the ages (1-2)year and (7-12) month there is significant differences at level ( $p < 0.05$ ), while the lowest rate of infection (6.6%) was observed in ages (3-4) year and the negative

results was observed in (1-6) month. The negative results in gides at age (1-6) months may be due to the innate immunity and this in agreement with (15) which pointed to that the innate immunity can protect the animals to age (9) months while (16) reported the infection in new borne (calves) and he referred to that the infection of these animals in this small age may be occurred due to the transition of the parasite through the placenta, also results showed that rate of infection in females was (15%), while in males was (7.1%) so there is non-significant differences between them at level ( $P < 0.05$ ),

our results were not confirmed with the results of (17) when they found the rate of infection in females that infected with *Babesia motasi* were more than the males in goats in Duhok governorate in Iraq. (7) referred to that both the males and females had the ability to infect with Babesiosis and there was no important to animals' sex during the infection of blood parasites.

In conclusions: Both *Babesia ovis* and *Babesia motasi* are present in Iraqi goats, and *Babesia ovis* is considered the main type spreading in Iraq.

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