



Microscopic diagnosis Babesia parasite of sheep in Babylon Province

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Abstract

Babesia species are intraerythrocytic protozoa of the phylum apicomplexa. The merozoite stage of *Babesia* have diagnostic significance and are found as intracellular inclusion of infected red blood cells. The trophozoite stages appears as ring forms which measure about (1–5 μ m). These parasites are transmitted by hard ticks and can cause a zoonotic disease known as babesiosis. The study was conducted in Babil Province to detected and diagnosis *Babesia* parasite in sheep based on age, sex and region, samples were examined during the period from October 2025 to April 2026. The sample were examined using traditional methods with blood smear stained with Gemisa and the total infection rate was approximately 37.33% of 150 samples (56/150). The incidence rate among males uses approximately 34.88% out of (15/43) while the incidence rate among females was approximately 38.31% out of (41/107). There was no difference between the incidence rates among males and female. Injuries were recorded based on location (AL-Qasim,, AL-Hashimiya , AL-Kifl , AL-Musayib , AL-Shomali) districts. The infection rate in AL-Qasim district was approximately 95.23% out of (20/21) and in the and in the AL-Hashimiya district it was 50% out of (8/16), In the AL-kifl district il, the infection rate was approximately 26.31% out of (10/38), while in AL-Musayib district it was approximately 21.05% of (8/38) and in AL-shomali district it was 27.02% out of (10/37). Recorded injuries in areas with high moral difference ($P < 0.01$). Approximately 50% of lambs aged

(1–12) months were infected, out of total of (6/12), while the infection rate in older lambs aged (1–2) year was approximately 25.80% of (8/31). The percentage of adult aged (2–4) years was 48.57% of (17/35), while the older adult were over four years old, 34.72% of the (25/72) recorded as infected. There is no significant difference in terms of injury across age groups.

keywords: ,Blood smear, Giemsa stain, Microscopy, *Babesia*, protozoa, sheep

Introduction

Babesiosis is a disease caused by intraerythrocytic protozoa with many clinical features that are similar to those of malaria, *Babesia* spp, circulate in a natural tick-reservoir host cycle and are usually transmitted to humans through the bite of an infected tick, occasionally through blood transfusion, and rarely through perinatal transmission or organ transplantation (Krause. P. J. 2019).

More than 100 species of *Babesia* can live in both domestic and wild animals. The *Babesia ovis*, *Babesia motasi*, and *Babesia crassa* are all known to cause ovine babesiosis. The ticks that carry these *Babesia* species belong to the genera *Hyalomma*, *Rhipicephalus*, and *Boophilus*. (Hattem, 2020). *Babesia* spp tiny (1–5 µm long) and look like pears, circles, or ovals. They are Apicomplexan protozoan parasites that live inside red blood cells and are spread by ticks (Carpi, A., et al., 2017). The main cause of ovine babesiosis, it causes clinical signs like fever, hemolytic anemia, hemoglobinuria, and jaundice. weakness, loss of appetite, and death (Sevinc. F., et al., 2013). In sheep, *Babesia motasi* and *Babesia ovis* are more common (Kage. 5 et., 2019). Babesiosis is a very important disease for the economy, especially in small ruminants. This is because it affects adults more severely than young animals, which leads to direct losses through death and the need for quarantine rules that limit animal movement (Onoja et al., 2013). The first step in diagnosis *Babesia* spp 1888, babes is to look at it under a microscope. A blood smear stained with Gemisa stain is often used to find the parasite (Gunes et al., 2017). One way to find parasites is through microscopic examination. (Mosqueda et al., 2012; Gupta et al., 2017; Hassan et al., 2018).

Material and Method

sample collection

A total of 150 blood samples were collected from sheep, randomly drawn from various areas in Babylon province, including (Al-Qasim, Al-Hashimiyah, Al-kifl, Al-Musayyib, and Al-shamali) districts. Blood samples were collected in tubes containing the anticoagulant EDTA and gently shaken to prevent clotting. Sheep blood was drawn from the jugular and Marginal ear vein after disinfecting the area with 70% isopropyl alcohol using a single use veterinary syringe. Five milliliters of blood were drawn from sheep. Approximately 1-2 milliliters were taken to prepare a thin smear for microscopic examination. Samples are collected from male and female sheep. All blood samples undergo examination using microscopic.

Microscopic laboratory examination using Gemisa stain

prepare method thin blood smear using Gemisa stain according to (Cheesbrough, M. (2009).

1. To prepare a thin blood smear, take a very small drop of blood using small dropper and place it on a glass slide. Then, quickly pass it through another slide at an angle of 30–45 degrees.

2. fix the blood smear using methanol for 1–2 minutes.

3. prepare a diluted Gemisa stain 1:10 with buffer solution (pH=7.2).

4. The time for staining a blood smear is 30–35 according to (Cheesbrough, M. (2009)

5. washing and drying the glass slide: wash the slide with distilled water and leave it to air dry.

6. Examine the smear under a microscope using oil immersion with a (X100) to identify the parasite.

Result

Microscopic Examination

The microscopic examination of sheep blood samples showed that %37.33 out of (56/150) sheeps were found positive for Babesia parasite forms. The results of blood examination using Giemsa stain showed that (figures and tables).

FIGURES:

figure1: Babesia parasite forms (A.paired pyriform and B,C oval shape)in sheep blood smear with Giemsa stain (x100).

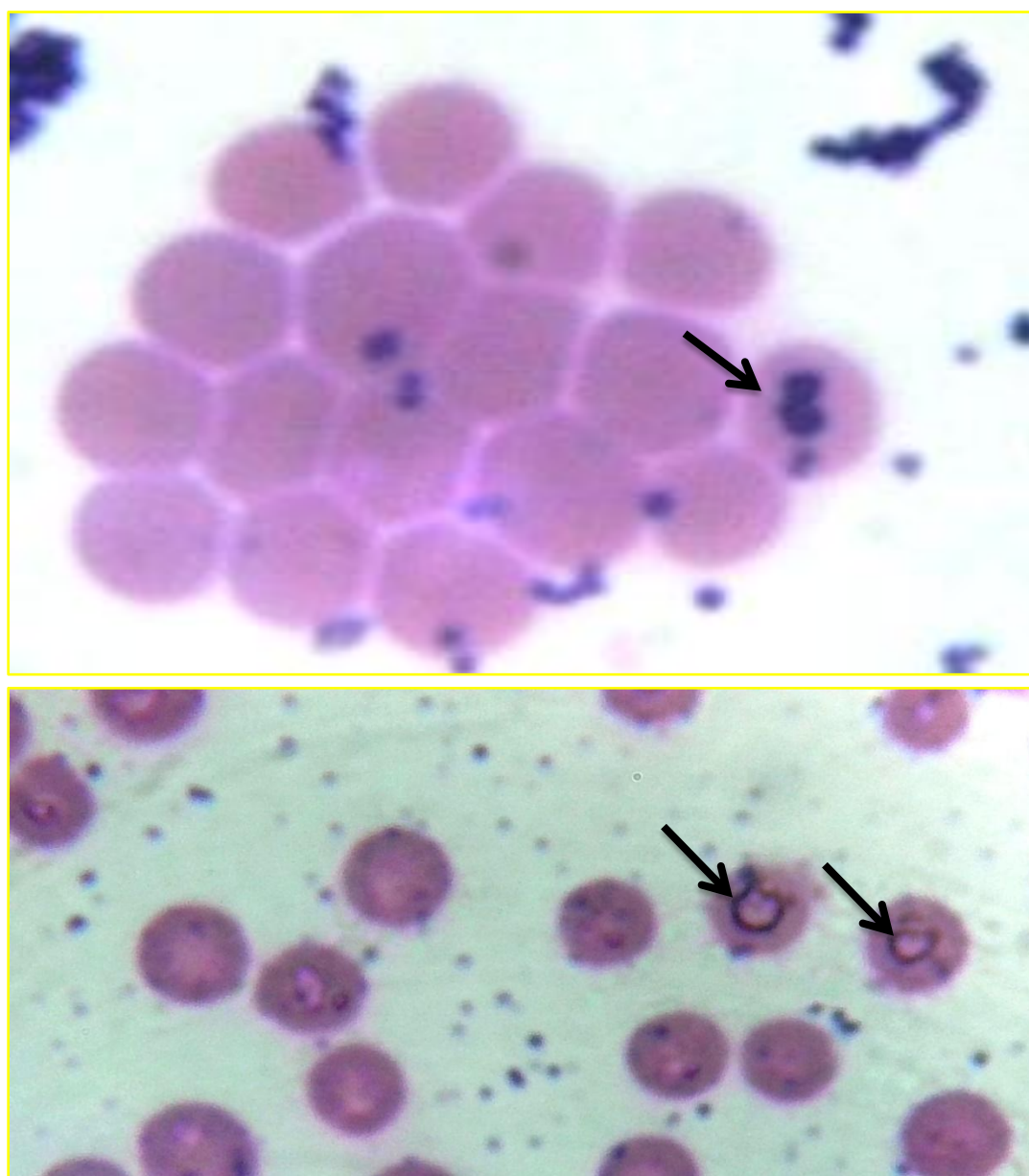


Figure2: *Babesia* parasite forms (pear-shaped of size 5 μm and rings of size 2 and 3 μm and pyriform shape) in sheep blood smear with Giemsa stain (X100).

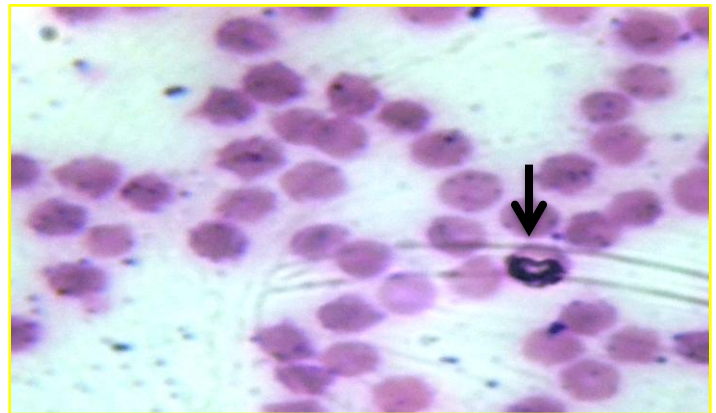
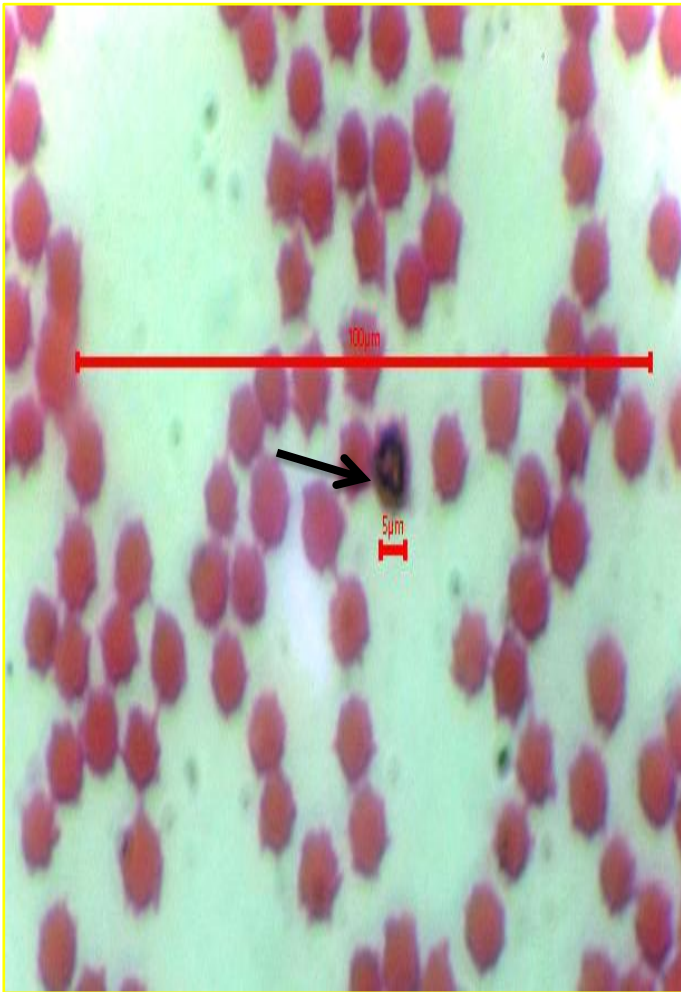


Figure3: *Babesia* parasite forms (pear-shaped ,ring,irregular shape) with Giemsa stain (X100).

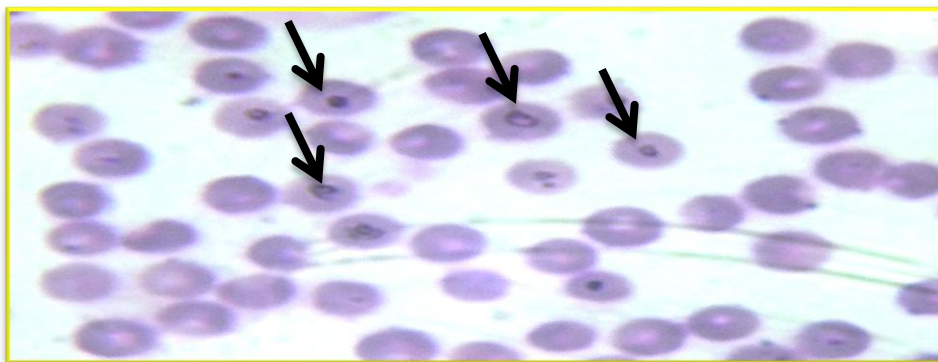


Table (1) Rate of Babesia spp. infection in sheep determined by microscopic examination

Total No samples	No of Babesia positive sample	No of Babesia Negative sample	Percentage of positive sample
150	56	94	37.33

Table (2) Rate of Babesia infection in sheep according to sex.

Sex	Total examined sample	No. of parasite positive	Percentage of positive samples
Male	43	15	34.88
Female	107	41	38.31
Total	150	56	37.33
Calculated X2		0.155	
Calculated P value		0.694*	

Table (3) Rate of Babesia spp infection in sheep determined by (microscopic examination) according to the geographical area.

Geographical area	Total No	Positive sample	Percentage of positive samples
AL-Qasim	21	20	95.23
Al-Hashimiyah	16	8	50
Al-Kifl	38	10	26.31
Al-Musayyib	38	8	21.05
Al-Shomali	37	10	27.02
Total sample	150	56	37.33
Calculated X2		39.15	
Calculated P value		<0.0001*	

Table (4) Rate of Babesia infection in sheep determined by microscopic examination according to the age.

Age	Total examination	No. of parasite positive	Percentage%
1-12-month lambs	12	6	50
1-2 year	31	8	25.80

2-4 adult	35	17	48.57
Older adult (>4years)	72	25	34.72
Calculated X2		4.68	
Calculated P value		0.197*	

Discussion.

–Microscopic diagnosis of *Babesia* species using traditional method, Examination with Giemsa stain in sheep.

The infection rate among sheep in Babil province was found to be 37.33% in this study. The infection was found to be relatively moderate, due to several reasons, which is a major cause of the spread of ticks among cause of the spread of ticks among animal between regions, as well as climatic and environmental changes. In addition, methods of diagnosis and preparation of animals. The current results of this study have confirmed that *Babesia* spp in sheep appear in blood smears as amoeboid, ovoid, round, double or single, annular or pear-shaped parasites inside red blood cells and the parasite appears blue in colour. This study is consistent with previous researchers. (Bai et al., 2002; Guana, 2010; Abdulla and Mohammed, 2014; Abdul-Hassan and Ali, 2016; Khalil and Kawan, 2022; Arwa and Kawan, 2022; Bidaa, 2025). In Sulaymaniyah province (Abdullah and Mohammed, 2014; Bydaa, 2025), described two types of *Babesia*: the small *Babesia* is *B. ovis* and the large *Babesia* is *B. motasi*.

In the city of Babylon, the infection rate among sheep was recorded at 37.33% of 150 samples (56/150). This result is roughly consistent with the results of a study conducted in the city of Mosul (Bydaa, 2025), which found a rate of 45.75% is roughly consistent with these results, while the rate recorded by (Abdulla, 2014) in Iraqi Kurdistan was 57.5% which is relatively higher than this result, while (Arwa and Kwan, 2022) recorded a relatively lower infection rate of 15.4% which differs from these results and is inconsistent with them.

A number of researchers have indicated that the incidence of *Babesia* infection is affected by geographical location, due to environmental and climatic changes in the region, lack of accurate diagnosis and tick control, and the awareness and cultural level of breeders and animals husbandry and care management. (Abdullah et al., 2019; Alanazi et al., 2019; Eliwa et al., 2021; Riaz et al., 2023 and Khalid, 2023).

Conclusion

The study showed that babesiosis is prevalent at a rate of 37.33% amongst sheep in Babil province, with clear regional variations—the prevalence being highest in Al-Qasim and lowest in Al-Musayyib—and a relatively higher incidence among females compared with males, as well as among young lambs (under one year of age) compared with other age groups. These findings suggest that the prevalence of the disease is influenced by environmental, management and immunological factors linked to region, sex and age, which calls for the intensification of veterinary control and surveillance programmes, particularly in the most affected areas and for the groups most at risk.

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