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An investigation of *Babesia* spp. in sheep, cattle and goats in AL-Qadisiya province

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Abstract
This paper provides a comprehensive overview of Babesia parasites, which are tick-borne pathogens of both domestic and wild animals. It highlights the economic impact of these parasites on the livestock industry. The diagnosis of Babesia is discussed, with a focus on traditional microscopic examination of blood smears stained with Romansky stains, particularly Giemsa stain. This method is noted for its cost-effectiveness and rapid results, despite challenges in detecting low parasite loads. The document describes the characteristic morphology of the parasite, including its ring, oval, and Maltese cross forms within red blood cells. The disease, babesiosis, is characterised by symptoms such as fever, anaemia, and haemoglobinuria, and its transmission by ixodid ticks is explained.
Keywords :Babesia , babesiosis , redwater fever

التحقيق في Babesia spp. في الأغنام والأبقار والماعز في محافظة القادسية

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الملخص
تقدم هذه الورقة نظرة شاملة عن طفيليات البابيزيا، وهي مسببات الأمراض التي ينقلها القراد لكل من الحيوانات الأليفة والبرية. ويسلط الضوء على التأثير الاقتصادي لهذه الطفيليات على صناعة الثروة الحيوانية. تمت مناقشة تشخيص البابيزيا، مع التركيز على الفحص المجهري التقليدي لمسحات الدم الملطخة بصبغات رومانسكي، وخاصة صبغة جيمزا. وتشتهر هذه الطريقة بفعاليتها من حيث التكلفة ونتائجها السريعة، على الرغم من التحديات في الكشف عن انخفاض أحمال الطفيليات. تصف الوثيقة الشكل المميز للطفيلي، بما في ذلك أشكاله الحلقية والبيضاوية والصليب المالطي داخل خلايا الدم الحمراء. يتميز مرض البابيزيا بأعراض مثل الحمى وفقر الدم والبيلة الهيموجلوبينية، ويوضح انتقاله عن طريق القراد الأكسودي
الكلمات المفتاحية: البابيزيا، داء البابيزيا، حمى المياه الحمراء

Introdction

Babesia parasites are tick-borne diseases and obligate intraerythrocytic protozoa belonging to the phylum Apicomplexa *(Lee, S. E. et al 2018)*, Wild and domestic

animals are reservoir hosts for more than 100 *Babesia* spp*(Aktas, M., et al 2007). Babesia* spp. have a direct impact on productivity and economics for animals; these pathogens are transmitted by hard ticks *(Merck,C.o.(2006).),* Babesiosis is a protozoan parasite carried by vectors that affect the veterinary and medical fields *(Schnittger L, et al 2012)* Some hard ticks belonging to the Hyaloma, Rhipicephalus, and Dermacentor families deliver apicomplexan intraerythrocytic protozoa of the genus Babesia to a wide range of wild and domestic vertebrate animals, especially to domestic animals such as cows, sheep, goats, dogs, mice, rats, cats and birds, as well as humans, Babesiosis pathogenic agents are different species of the genus Babesia. Hemolytic anemia is a common consequence of babesiosis, which has been linked to many Babesial species, particularly B. bovis and B. bigemina*(Ord RL, et al 2015)* , Apicomplexan shapes inside an erythrocyte appear as rings, ovals, maltan crosses, pears, and amoeboid forms with a length of 1-2.5 or 2.5-5 µl (*Mirahmadi H, et al 2022),* For animals, the usual approach to diagnosing babesiosis depends on microscopic parasites methods in Giemsa-staining of venous blood samples and evaluation of clinical symptoms throughout the acute stage of the illness *(Terkawi MA, et al 2012)* ,Microscopic examination of blood smears stained with Romansky stains, especially the Giemsa stain, through the hundred years that have passed is the gold standard test for diagnosis. Many blood parasites and Rickettsia*(Ravindran, R. et al 2007)* , Microscopic examination by using Giemsa stain is considered the fast, sensitive which ranging from 10-5 -10-6 and non-expensive methods to diagnose *Babesia* species in different host*(Bose ,R., et al 1995*) , the genera plexa, order Piroplasmida) are protozoan parasites that Babesia and Theileria (phylum Apicominfect erythrocytes of a variety of vertebrate hosts, including domestic and wild animals, with some Babesia spp. Also infecting humans. The parasites are transmitted by Ixodid ticks. In the arachnid host, sexual reproduction takes place followed by sporogony. Resulting sporozoites are transmitted in the tick's saliva during the
bloodmeal. Babesia spp directly infect erythrocytes, where they asexually multiply to produce pear-shaped merozoites in the process of merogony. *(Hunfeld Ket al 2008)*

Clinical signs

During acute phase, babesiosis is characterized by fever, anorexia, lethargy, haemoglobinuria diarrhea, as well as to emaciation, anemia and jaundice in more prolong severe cases(*Brites-Neto J, et al 2015)* , Afterword acute infections, the healthier animals frequently sustain subclinical infections that act as a source of babesiosis infection and latent vector for natural transmission *,(Sharma A, et al 2016)*

Material and methods

Equipment	*Manufacturing company/country*
Compound Light microscope	*Olympus/ Japan*

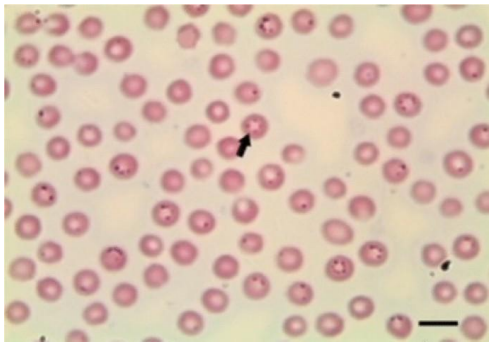
material	*Manufacturing company/country*
Gram stain	*BDH*

Result

In this study we collect the samples from different places from al dywanyia governorate from 2025/1/ 30 _ 2025/8/30

Months	Babesiosis Susceptible animals (total number) of the owner	Sheep	Cattle	Goat
January	266	1	4	1
February	204	3	0	0
March	327	4	4	0
April	379	3	0	0
May	559	2	2	0
June	709	3	2	0
July	244	4	6	0
August	312	2	4	0

Microscopic image of a blood sample stained with Giemsa stain from a sheep that shows the presence of *Babesia* spp inside an erythrocyte. 100x



Microscopic examination Thin blood smears stained with Giemsa stain on slides were employed to identify the presence of protozoa based on morphological

characteristics as described by Soulsby .Briefly, a blood drop was placed on a slide and was spread out on this slide by another slide to make a thin smear. Then, the smear was left on a bench to dry and then to be absolutemethanol-fixed for 5mins, followed by staining with Giemsa stain for 30mins. Later, the slide was water-washed and left to dry. Finally, the slides were examined under a light microscope using an oil immersion lens *(Soulsby EJL et al 1969).*

Discussion

The data collected during this study from January to August 2025 demonstrate a significant presence of Babesia parasites in livestock within the Diwaniyah governorate. The high number of positive cases, particularly in January and February, suggests a seasonal pattern, which may be linked to specific environmental conditions or the life cycle of the vector. The findings confirm that the disease is endemic in the region, affecting a range of animal hosts, including cattle, sheep, and goats.

Our methodology, which relied on the morphological identification of the parasite within red blood cells using blood smears stained with Gram stain, proved effective. The various parasitic forms—rings, ovals, and pears—were clearly visible, confirming the utility of this traditional diagnostic approach for initial screening.

The observed susceptibility rates in different animal species warrant further investigation. The presence of Babesia in multiple hosts highlights the complexity of the disease's transmission cycle in the local ecosystem. As the literature notes that Babesia is transmitted by ticks, our findings strongly imply a robust and active tick population in the study area. This poses a considerable risk, not only to livestock but also to human health, as certain Babesia species are known to be zoonotic. The potential for human infection, with symptoms ranging from fever to anaemia, underscores the public health implications of this outbreak.

Conclusion

In conclusion, this study successfully documented a widespread outbreak of babesiosis among livestock in the Diwaniyah governorate. We confirmed a high prevalence of the Babesia parasite from January to August 2025, affecting cattle, sheep, and goats. The study demonstrates the effectiveness of morphological analysis via blood smears as a reliable diagnostic tool. The results highlight the urgent need for local control measures to manage the spread of the disease and protect both animal and public health.

Recommendations

- Establish a comprehensive surveillance programme to monitor the prevalence of babesiosis in the Diwaniyah governorate throughout the year.

- Implement effective tick control strategies for livestock. This is crucial as ticks are the primary vectors of the disease.
- Initiate public health awareness campaigns to educate residents and farmers on the symptoms of babesiosis in both animals and humans, and to promote preventative measures.
- Conduct further research using advanced diagnostic methods, such as PCR, to identify the specific Babesia species and the local tick vectors responsible for the outbreak. This will allow for the development of more targeted interventions.

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