



## الانتشار الفصلي للبابيسية عند الأغنام في جنوبي سورية

# Seasonal Prevalence of *Babesia* in Sheep in South Syria

Received 15 May 2012 / Accepted 22 January 2013

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### المُلخَص

نتيجةً لنقص الدراسات حول نسبة انتشار داء البابيسية في جنوبي سورية، أجريت هذه الدراسة لتسليط الضوء على الانتشار الوبائي للبابيسية بالإضافة إلى تحديد الانتشار الفصلي لهذا المرض عند الأغنام في تلك المنطقة، وعلاقة ذلك بعمر وجنس الحيوانات المصابة. من أجل ذلك تم اختيار 32 عينة دم عشوائية في كل شهر (16 من النعاج و 16 من الكباش) ابتداءً من شهر كانون الثاني/يناير ولغاية كانون الأول/ديسمبر من عام 2010، وتم فحص ما مجموعه 384 شريحة دموية لتحديد وجود البابيسية عند الأغنام. أشارت الدراسة إلى أن ما نسبته 22.1% من الأغنام كانت مصابةً بالبابيسية، وبلغ الانتشار الفصلي للبابيسية ذروته في شهر تموز/ يوليو (37.5%)، بينما كانت أقل نسبة في شهر كانون الثاني/يناير وشباط/ فبراير (12.5%)، ولم تكن هناك فروق معنوية في نسبة انتشار البابيسية بين الذكور والإناث، وكذلك بين الأعمار المختلفة للأغنام المصابة.

الكلمات المفتاحية: البابيسية، الأغنام، سورية.

### Abstract

Due to the lack of information on the prevalence of babesiosis in sheep in south Syria this research was carried out to fill some of the knowledge gaps in the epidemiology of *Babesia* in addition to determine the seasonal prevalence of *Babesia* in sheep in south Syria and the relate of the prevalence with sex and age of the infected animals. Thirty-two blood samples (sixteen from ewes and sixteen from rams) were randomly sampled monthly from January 2010 to December 2010. A total of 384 sheep, thin blood smear- based diagnostic methods were used to assess the presence of *Babesia* in sheep. The study revealed that 22.1 % of sheep were infected with *Babesia*. Seasonally, the prevalence of *Babesia* infection in sheep reached highest level in July (37.5%), while reached the lowest level in January and February (12.5%). The prevalence of

*Babesia* infection between male and female and among different age groups of sheep was statistically non-significant.

**Keywords:** *Babesia*, Sheep, Syria.

## Introduction

Babesiosis is a hemoparasitic disease of domestic and wild animals in tropical and subtropical countries. The *Babesia* spp. is transmitted by various species of ixodid ticks, in which a sexual multiplicative cycle occurs (Soulsby, 1986; Morel, 1989)

Ovine babesiosis is the most important hemoparasitic tick-borne disease of small ruminants caused by *Babesia ovis*, *Babesia motasi* and *Babesia crassa* (Friedhoff, 1997).

*B. ovis* is highly pathogenic especially in sheep and causes severe infections, which is characterized by fever, anemia, icterus and haemoglobinuria, the disease is caused by *Babesia*, may be acute or chronic. Mortality rates in susceptible hosts range from (30 to 50%) in field infections. The pathogenicity of *B. motasi* is not high and appears to be moderately virulent. In contrast, *B. crassa* is considered as being non-pathogenic to small ruminants (Friedhoff, 1997; Hashemi-Fesharki, 1997).

Microscopic examination of Giemsa stained blood smears remains the most appropriate for the diagnosis of acute babesiosis, serological methods are frequently employed in determining subclinical infections in epidemiological studies. However, these methods lack specificity due to cross reactivity with other *Babesia* species; furthermore, false positive and negative results are commonly observed in these tests (Habela, 1990).

Due to the major economic impact of babesiosis is on the sheep industry this study were carried out to determine the seasonal prevalence of *Babesia* in

sheep in south Syria and to relate the prevalence data to sex and age of the infected animals.

## Materials and Methods

### • Sampling and experimental procedure

Due to the lack of recently information on the prevalence of babesiosis in sheep in south Syria, it was assumed for large sampling procedures an infection prevalence of 50%. Sample size was calculated based upon this prevalence, accepting desired absolute precision of 5% and a level of confidence of 95%. Consequently, about (384) sheep were tested to judge the mentioned prevalence estimation (Thrusfield, 1997).

From Hamman area- Darra province in south Syria, thirty-two blood samples (sixteen from ewes and sixteen from rams) were randomly collected monthly from January 2010 to December 2010, information on age and sex were recorded. The selected animals were clinically examined for the presence and number of hard ticks (Figure 1).



**Figure 1.** The presence of ticks on sheep.

## • Preparation of blood smears

The EDTA-anticoagulated blood smears were prepared immediately and added to blood samples. The blood smears were fixed with methanol for 5 min, stained with Giemsa at a dilution of 10% in phosphate buffered saline (PBS), pH =7.2 for (30) min, and then examined at 1000 X magnification for the presence of *Babesia* piroplasms using microscopy technique. The blood smears were recorded as negative for *Babesia* spp., if no piroplasms were observed in (200) oil-immersion fields. Objects suggestive of piroplasms were further scrutinized at 31,000 magnifications (Gelfand, 1995).

## • Statistical analysis

The results of the present study were analyzed using chi-square test. Significant association was identified when a P-value of less than (0.05) was observed (Snedecor, 1980).

## Results and Discussion

In the present study, the clinically examination of sheep shows that it has chronic icterus and persistent fever, mortality rates were 15% during one year.

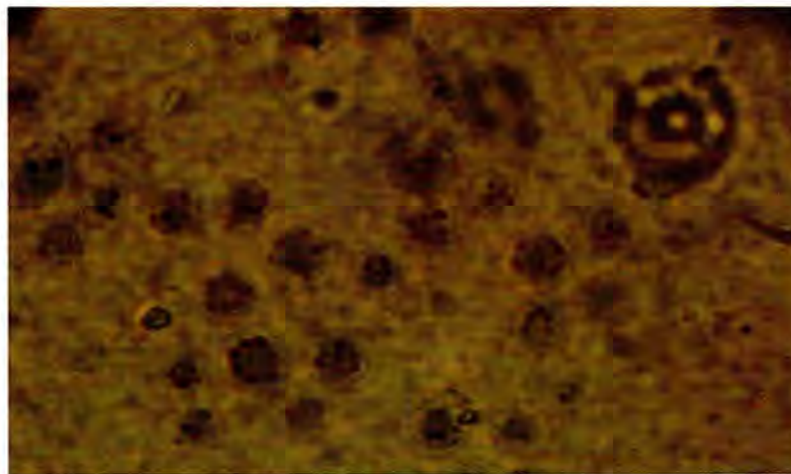


Figure 2. *Babesia* in red blood cells.

Sheep were found infested with hard ticks. *Babesia* detected inside erythrocytes were polymorphous and comprised double and single ring forms (Figure 2). The examination of Giemsa stained blood smears revealed the presence of *Babesia* in 85 /384 sheep samples (22.1%). The highest rate was in summer (%32.2) whereas the lowest rate was in winter (%13.5) and the infection rate in spring and autumn were (%20.8, %21.8) respectively as showed in (Table 1).

Table 1. Prevalence of *Babesia* infection by season in sheep using blood film examination.

Season	Positive percentage (%)	
Winter	13/96	13.5
Spring	20/96	20.8
Summer	31/96	32.2
Autumn	21/96	21.8
Total	85/384	22.1

The monthly-related prevalence of *Babesia* infection in sheep reached highest levels in July (%37.5). The lowest levels were in January and February (% 12.5) (Table 2).

**Table 2.** Prevalence of *Babesia* infection by months in sheep of Hamman area, Darra province, Syria.

Months	Infected animals	Male/Female
January	(12.5%) 4/32	2/2
February	(12.5%) 4/32	2/2
March	(15.6%) 5/32	3/2
April	(21.8%) 7/32	3/4
May	(25%) 8/32	4/4
June	(28.1%) 9/32	5/4
July	(37.5%) 12/32	7/5
August	(31.2%) 10/32	4/6
September	(25%) 8/32	4/4
October	(21.8%) 7/32	3/4
November	(18.7%) 6/32	3/3
December	(15.6%) 32 /5	3/2
<b>Total</b>	<b>(22.1% ) 85/384</b>	<b>43/42</b>

The prevalence of *Babesia* infection in all age groups and between male and female sheep and goats were not significantly different ( $P > 0.05$ ).

Animals were infected with different number of hard ticks. (Table 3).

**Table 3.** Prevalence of *Babesia* infection by age in sheep of Hamman area, Darra province, Syria.

Age	Infected animals	Mean of tick/Animal
Less than 6 month	(17.7%) 45 /8	20
month- 1 year 6	(28.5%) 18/63	32
year 1-2	(25%) 40 /10	38
year 2-3	(20%) 80 /16	34
More than 3 year	(21.1%) 33/156	31
<b>Total</b>	<b>(22.1%) 85/384</b>	<b>Age group/31</b>

In this study, 22.1 % of sheep were infected with *Babesia* using blood film examination. A higher and lower prevalence rates were recorded by many authors. Aktas et al., (2005) recorded *Babesia* spp in

4.4 % in eastern Turkey; Inci et al., (2002) detected *Babesia ovis* in 17.7% of sheep in Turkey. Razmi et al., (2003) recorded *Babesia ovis* in 23.5% from sheep in Iran. Such variation in the prevalence may be attributed to several factors including difference in localities and consequently difference in climatic conditions, which affect the vector activity. The reason of high percentage of infected sheep with parasitemia in this study, may be because the study region in Syria is considered an endemic region and the frequency of infective bites by ticks is very high and there is the possibility of infection or reinfection of the host by *Babesia*.

Regarding seasonal variation of prevalence of *Babesia* using blood film examination in sheep, in the summer, the highest prevalence proportion (32.2%) was recorded, followed by autumn and spring (21.8%, 20.8%) respectively and (13.5%) in winter. Many authors reported that the highest prevalence of *Babesia* in sheep was observed during summer, which is considered the season of high activity of tick vector, (Rodriguez, 1989; Trifonov, 1989). In the present study, the prevalence of *Babesia* infection in all age groups of sheep was statistically non-significant. In the enzootic area, the numbers of infected ticks are relatively high, young, and old animals being continuously exposed to the infected tick, perhaps accounting for the stability of the prevalence (Morel, 1989). In addition, there was not any significant difference between the prevalence of *Babesia* infection in male and female, similar finding was observed by Razmi et al., (2003).

## Conclusion

In conclusion, results obtained in the present study clarifies that *Babesia* is an important prevalent pathogen among sheep in south Syria due to the

abundance of the ticks vector as a result of the suitable climatic conditions and lack of sanitations, so it's important to controlling the tick vector which can break the transmission cycle.

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