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IXODIOD TICK FAUNA INFESTING SHEEP AND GOATS IN THE MIDDLE AND SOUTH OF IRAQ

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ABSTRACT

A total of 215 sheep and 87 goats were carefully searched for ixodid ticks from January to December 2015 at different regions of the middle and south of Iraq. The detached ticks count 1533 ticks from sheep with intensity of 8.4 and count 332 ticks from goats with intensity of 6.8. Tick species recovered from sheep and their incidence rates were: *Rhipicephalus turanicus* (39%), *Hyalomma anatolicum* (28%), *R.* (*Boophilus*) *annulatus* (11%), *Hyalomma* sp. (9%), *H. turanicum* (6%), *H. excavatum* (6%) and *R. leporis* (1%) while the tick species recovered from goats and their incidence rates were: *R. turanicus* (64%), *H. anatolicum* (24%), *H. turanicum* (6%), and *Hyalomma* sp. (6%). The results were discussed with the pertinent literature.

Key words: Ixodidae, *Hyalomma*, *Rhipicephalus*, sheep, goat, Iraq

INTRODUCTION

Tick fauna of domestic animals are rather well documented in Iraq (Hoogstraal and Kaiser, 1958; Robson and Robb, 1967; Robson *et al*., 1968a,b,c,, 1969a,b,c; Abdul-Rassoul and Mohammad, 1988; Al-Azawi and Al-Obeidy, 1988; Shamsuddin and Mohammad, 1988; Mohammad, 1996; Muhaidi *et al*., 2010; Mohammad and Jassim, 2011; Hasson, 2012; Shubber *et al.*, 2013; Shubber, 2014; Shubber *et al*., 2014; Mohammad, 2015). All of these works were of general survey type dealing mainly, with few exceptions, on domestic mammals. Only few papers focused on certain animal species like that of Hasson and Yaqub (2010), Al-Ramahi (2011), Al-Rammahi *et al*. (2013), and Mohammad and Jassim (2011). Papers devoted for sheep very few including of Hasson and Yaqub (2010) Mohammad and Jassim (2011) and Kadir *et al*. (2012), but none was devoted for goats.

On the other hand, sheep *Ovis aries* Linnaeus, 1758 and goat *Capra hircus* (Linnaeus, 1758) are major domestic animals in Iraq and raised in large numbers throughout the country for their meat and for a lesser extent for milk and wool. They both play an integral in the agricultural economy in Iraq.

Hard ticks as blood sucking ectoparasites and also vectors of human and animal diseases are considered as one of the most important arthropods (Sarani *et al*., 2014). Like any other mammal, these two animals, sheep and goats, are subject of tick infections with both ixodid and argasid ticks (Mohammad, 1996). Tick infestation may leads to infestations with *Babesia*, *Thaleria*, *Rickettesia* and many viral diseases causing severe losses in regard to their meat, milk and skin or even animal's death (Ameen *et al.*, 2012).

The goal of this paper is to determine the specific identity of the ixodid tick fauna and their distribution among sheep and goats in the middle and south of Iraq.

MATERIALS AND METHODS

The study area in the middle and south of Iraq lies between 44°-48° E and 30°-33° N and includes provinces of Baghdad, Kerbala, Wasit, Babil, Al-Qadisiya and Al-Muthana provinces (fig. 1), the general climate conditions are as follows: continental climate, annual precipitation < 200mm, temperature ranges 0-50°C, summer dry and long about 6 months while winter wet and short (Iraq Ministries, 2006).

Material examined: Collection of ticks was undertaken from January 2015 to December 2015. The animals examined were 215 sheep and 87 goats in different regions of the middle and south of Iraq. Following Schauff (2015), the examined animals were carefully searched and all ticks were removed from each individual animal, then the ticks were kept in 70% ethanol or methanol. Identification was done following the keys provided by Hoogstraal and Kaiser (1958), Mohammad (1996) and Shubber (2014).

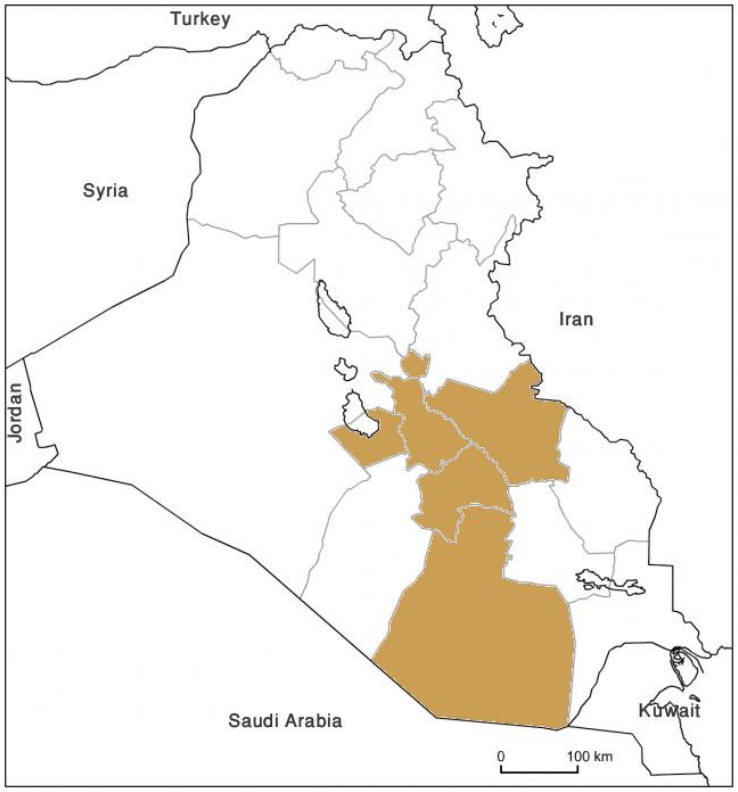

Fig.1: Map of Iraq showing the studied area in the middle and south of Iraq

RESULTS AND DISCUSSION

A total of 302 animals including 215 sheep and 87 goats were examined for infestation with ixodid ticks. The infested hosts of the two species of animals were 231 and the overall infestation percentage rate came to 76.5%. This rate seems high in comparison with Zangana *et al*. (2013) who found 68.3% in Duhok province, and from Hasoon and Al-Zubaidi (2012) who found it 50% in Wasit province. This is probably because of different climatic and ecological conditions among different regions of studies and also the difference in animal care practices as well. It also differs from Shubber *et al*. (2014) who found it 41.4% although both studies were carried out in middle and south of Iraq. This may be related to the difference in climatic conditions of the years of their works, 2012 for the former and 2015 for the present work especially in annual rainfall rates. Biu *et al*. (2012) found a noticeable effect of humidity on the egg laying of ticks in Nigeria.

It was found that 182 out 215 (84.7%) of sheep were infested with ixodid ticks, while 49 out of 87 (56.3%) of goats were found infested. This is in general agreement with many other studies on ruminants which found that sheep acquired more infestation rate as well as tick burden than goats in Iraq and abroad (Abunna *et al*., 2012; Hasoon and Al-Zubaidi, 2012; Zangana *et al*., 2013; Shubber *et al*., 2014; Mohammad, 2015; Shah *et al*., 2015; Sultana *et al*., 2015). The difference in infestation rates between the two animals is related to the nature of body structure between both animals which is characterized by thin body skin in the ear and large fat tail area in sheep which provide relatively wide area for ticks for attachment and to get larger number of ticks than goats. This is true especially for tick species incidence and not necessarily tick burden since it is affected by macro-environment such as climatic condition and plant cover in the field rather than micro-environment like the location of infestation on the host body.

Composition of tick community depending on developmental stages collected from animals (table 1) showed almost no difference between the two studied animals, except for percentage of larvae being higher in goats (1.2%) compared with 0.05% in sheep. This is may be attributed to smaller sample size of goats in this study which inflates this ratio. Male numbers in both animals always exceed those of females. The probable reason for collecting more males than females is that females usually dropped off after getting the host blood meal to produce and lay eggs away from the host while males usually stay attached.

In regard to intensity in sheep and goats it was found 8.4 and 6.8 in sheep and goat respectively, and in general agreement with Robson and Robb (1967) Robson *et al*. (1968a,b,c; 1969a,b,c). Locations of infestations are the same for animals including anus, ear, tail (fat-tail in sheep) femur, udder, head and around eyes.

Table 1: tick fauna structure according to developmental stages of ixodid ticks infestations in sheep and goats.

Developmental Stage	Sheep		Goats	
	No. ticks	% of total	No. ticks	% of total
Male	875	57.1	170	51.2
Female	543	35.4	134	40.4
Nymph	108	7	24	7.2
Larva	7	0.05	4	1.2

On the other hand, table 2 showed the tick species infested the studied animals. It would show that sheep were infested with 7 species belonging to 2 genera, *Hyalomma* and *Rhipicephalus* while goats infest with 4 species belonging to 2 genera *Hyalomma* and *Rhipicephalus* also with absence of *H. excavatum, R.* (*Boophilus*) *annulatus* and *R. leporis. Hyalomma excavatum* was usually recorded from sheep and goats at very low infestation rate (Moshavirinia *et al*., 2012; Shubber *et al*., 2014) and since number of goats relatively low, so its absence in goats was not surprising. *Rhipicephalus* (*Boophilus*) *annulatus* was recorded from wide range of domestic animals including sheep and goats and its absence could be attributed to the low number of examined goats. Presence of *R. leporis* may be accidental on sheep. It was usually recorded from wild animals only like wild hares, foxes and jackals. The table would show also that *R. turanicus* had the highest infestation in both hosts but with far different rates. It was only 39% in sheep and 64% in goats. This result may be explained in view of host preference of this tick. *Hyalomma turanicum* is a tick of arid regions (Geevarghese and Dhanda, 1987). It was reported in Iraq with rather low infestation rates (Ameen *et al*., 2012; Zangana *et al*., 2013; Shubber *et al*., 2014).

Table 2: tick species and their percentage of tick community in sheep and goats.

Tick species	% incidence	
	Sheep	Goats
Hyalomma anatolicum	28	24
Hyalomma excavatum	6	-
Hyalomma turanicum	6	6
Hyalomma sp.	9	6
Rhipicephalus (*Boopilus*) *annulatus*	11	-
Rhipicephalus leporis	1	-
Rhipicephalus turanicus	39	64

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مجموعة القراد الصلب المتطفل على الأغنام في وسط وجنوب العراق

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الخلاصة

تم فحص 215 رأسا من الضأن و87 رأسا من الماعز بعناية بحثا عن القراد الصلب في الفترة بين كانون الثاني–كانون الاول ٢٠١٥ من مختلف المواقع في وسط وجنوب العراق. بلغ عدد القراد المستحصل 1533 قرادة من الضأن وبشدة اصابة تبلغ 8.4 قرادة/مضيف و 332 قرادة من الماعز بشدة اصابة تبلغ 6.8 قرادة/مضيف. كانت الانواع المستحصلة من الضأن ونسب تواجدها كالآتي:

Rhipcephalus turanicus (39%), *Hyalomma anatolicum* (%28), *R.* (*Boophilus*) *annulatus* (11%), *Hyalomma* sp. (9%), *H. turanicum* (6%), *H. excavatum* (6%) and *R. leporis* (1%).

اما في الماعز فكانت كالآتي:

R. turanicus (64%), *H. anatolicum* (24%), *H. turanicum* (6%) and *Hyalomma* sp. (6%).

وقد نوقشت النتائج في ضوء البحوث ذات العلاقة.