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A study on Hard Ticks' Diversity and Seasonal Dynamics on Domestic Animals in Thi- Qar Provinces

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Abstract:

To determine and classify the seasonal distributions of the major hard tick species (Ixodidae) on cattle , dogs, and buffaloes ,samples were collected from districts and sub-districts across Thi-Qar Province (southern Iraq), and an observatory was conducted between January and December 2024. A total domestic animals (cattle, buffaloes, and dogs) 3.812were examined , from which 11333 mature hard ticks were recovered. To ascertain the seasonal diversity. Two species from two genera (*Hyalomma* and *Rhipicephalus*) were found; *Hyalomma anatolicum* (62.76%) and *Rhipicephalus turanicus* (37.24%) were the most prevalent ticks. Although variations in tick abundance were observed among the surveyed localities, Chi-square analysis revealed no statistically significant differences in infestation rates between locations ($P > 0.05$). The findings provide updated baseline data on the distribution of hard ticks infesting domestic animals in Thi-Qar Province.

Keywords: Ixodidae, Seasonal Variation, *Hyalomma anatolicum, Rhipicephalus turanicus.*

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Introduction

Ticks(Acari: *Ixodidae*) are hematophagous arthropods, infamous carriers of diseases that affect humans and animals, and a growing health and economic concern in tropical and subtropical areas [1]. The veterinary and public health fields are seriously threatened by the numerous viruses that ticks can carry [2]. Hard ticks play a significant role as a reservoir of numerous newly emerging and reemerging infectious diseases. These pathogens include bacteria (*Rickettsia* spp), spirochetes (*Anaplasma* spp., *Borrelia* spp., and *Ehrlichia* spp.), protozoans (*Babesia* spp., and *Theileria* spp), and arboviruses (Crimean-Congo hemorrhagic fever virus, tickborne encephalitis virus) [3]. These ravenous ectoparasites are found worldwide, ranging from the Arctic to tropical climates, and they may infest people, wild terrestrial vertebrates, and semi-aquatic animals[4]. *Rhipicephalus microplus* cow tick infestations have an economic impact on the livestock business in various countries, with losses from this tick alone estimated to be between $22 and $30 billion annually [5]. Numerous environmental elements that influence tick dispersal and adaptability are primarily linked to the abundance of ticks in different places [6]. Ticks, along with other hematophagous arthropods, spend their lifetime in a habitat in which their reproductive and developmental success is dependent on a range of factors such as habitat type, vegetation cover, host presence, host behaviour, and geoclimatic factors (temperature and humidity), among others [7].

To implement integrated pest management (IPM) for hard ticks in this area to lower population densities of cattle and dogs to control their intensity, to reduce the economic and health losses by people, and to develop less environmental pollution through the use of acaricides. These research works have provided an in-depth insight into tick infestation in dogs and cattle in Iraq [8].

According to credible research, five tick genera, *Hyalomma*, *Haemaphysalis*, *Rhipicephalus*, *Ornithodoros,* and *Argus* have been reported[9]. Among these, species like *Rhipicephalus* turanicus and *Hyalomma* anatolicum are regarded as being of significant veterinary concern because of their widespread range and propensity to infest dogs and cattle. Despite previous reports on tick occurrence in different parts of the country, continuous monitoring is essential to understand local and seasonal variations in tick distribution[10, 11]. Therefore, the present study aimed to

determine and classify the seasonal distribution of major hard tick species infesting cattle and dogs in Thi-Qar Province, southern Iraq.

Materials and Methods:

Between January 2024 and December 2024, a significant number of ticks were gathered from the residences of various animals, and samples were collected from districts and sub-districts across Thi-Qar Province (southern Iraq), including cows, buffalo, and dogs. Forceps were used to separate the ticks, which were then stored in sterile glass vials with airtight caps and tiny cotton pieces moistened with 1% mycostatin solution to avoid mould development and dehydration. Ticks that were collected were kept and fixed in 70% ethyl alcohol [12]. Shape, size, mouth parts, head, and the back shield (scutum) and corona (posterior ventral signs) are the six primary characteristics that were used to identify ticks [13-15]. Some of the samples were submitted to the research centre in the natural history museum of the University of Baghdad to diagnose and document the specimens.

Statistical analysis

The Chi-square test was used to examine the current study findings, using the SPSS statistical analysis program version 26.

Results

The present survey revealed two species of two genera of hard ticks, Hyalomma and Rhipicephalus, of infected cattle and dogs in the sampled counties, that is, Hyalomma anatolicum and Rhipicephalus turanicus. The genus *Hyalomma* encloses ticks which are more common in the present study and constitutes the most diversified in terms of the number of one type of a tick that was collected 62.76% of the total sample used in the present study 2 species, accounting for 62.76% of the total 11,333 collected ticks (7,113 specimens), were collected with *H.anatolicum* Sayid dakhil has the highest percentage of *H.anatolicum* (17.10 %). However, the AL-Manar district had the lowest rate (1.59%). Other counties have the percentage around the mentioned typical average. *Rhipicephalus turanicus* was the second most typical species (37.24%).

Table (1): Distribution of hard tick (lxodidae) on livestock in 12 survey localities of Thi-Qar province

Location	*Hyalomma*	%	*Rhipicephalus*	%	Total number	%
Albatha	823	11.57	423	10.02	1246	10.99
Algarraf	688	9.67	299	7.09	987	8.71
Almanar	113	1.59	50	1.18	163	1.44
Alnasr	999	14.04	731	17.32	1730	15.27
Suq alshuyukh	1216	17.10	723	17.13	1939	17.11
Alfajr	534	7.51	185	4.38	719	6.34
Qaleat sukar	244	3.43	434	10.28	678	5.98
Altaar	250	3.51	77	1.82	327	2.89
Alfadhiliya	497	6.99	83	1.97	580	5.12
Alasilah	428	6.02	739	17.51	1167	10.30
Sayid dakhil	1015	14.27	272	6.45	1287	11.36
Ur	306	4.30	204	4.83	510	4.50
Total	7113	62.76	4220	37.24	11333	100
$CalX^2$= 19.1		$TabX^2$= 19.68		DF= 11		p. value 0.058

Table (2): Result of natural history museum identification

NO	Host	Result of the identification
1	Dog	*Rhipicephalus turanicus*
2	Dog	*Hyalomma anatolicum*
3	Cow	*Hyalomma anatolicum*
4	buffalo	*Hyalomma anatolicum*

Discussion

Our analysis finds several factors that may have led to the reduction in the intensity of ticks over the past 50 years, such as better rearing conditions of cattle and dogs, cattle and breed age, cattle immunity and acaricides, changes in the annual rainfall, and the significant decrease in the precipitation rate over the last several decades in Thi-Qar[16].

In the present study, Suq Alshuyukh has the highest rates of the infestation; there were as

many as 10.56 ticks in the winter per cow and 35 ticks in the summer per cow. This suggests that, in comparison to other areas of Thi-Qar, this district needs additional veterinary services to aid in the elimination of hard ticks.

According to recent research and surveys conducted in the study region, the most prevalent species of tick afflicting the cows was *Hyalomma anatolicum*. *H. Anatolicum* was present throughout central and southern Iraq [17]. Additional Hyalomma species and species of other tick genera that are seen on dogs and cattle.

Additionally, study results indicated that the greatest infection rates were seen in Sayid Dakhil and suq alshuyukh. Both provinces are devoid of vegetation. The ecological circumstances at the collecting sites, variations in plant cover from year to year, animal rearing procedures, and the use or lack thereof of acaricides may all contribute to this variation in infection rate [18].

Though Altaar province is dry and would otherwise appear an ideal place to have the proliferation of *Hyalomma* species, the results of both almanar and qaleat sukar are understandable due to their being agriculturally intensive areas that have adequate irrigation. The low infestation was probably due to a tick control exercise in this province.

According to our outcomes, the infestation rates of *H. anatolicum* and *R. turanicus* in the southern provinces are significantly lower than those reported by [19]. This might indicate better circumstances for cow rearing since the initial research conducted fifty years ago[19].

Conclusion

The current study provides comprehensive, current data on the distribution of hard ticks (Ixodidae) that infest livestock and dogs in Thi-Qar Province in 2024. Only two tick species were identified, and they were both members of the Rhipicephalus and Hyalomma genera. Hyalomma anatolicum was the dominant species, and Rhipicephalus turanicus came in second. This finding confirms these species' continued dominance in southern Iraq and highlights their importance for veterinary treatment.

Acaricide use, vegetation cover, animal husbandry methods, and local environmental variables all had an impact on tick infestation rates, which differed significantly between administrative districts and sub-districts. Districts like Suq Al-Shuyukh and Sayid

Dakhil had higher infestation levels, whereas those with better livestock management and tick control practices had lower rates. The relevance of climatic conditions in tick population dynamics was highlighted by the obvious seasonal changes, with higher infection intensities during warmer months.

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دراسة حول تنوع القراد الصلب وديناميكية الموسمية على الحيوانات الاليفة في محافظات ذي قار

الخلاصة

لتحديد وتصنيف التوزيع الموسمي لأنواع القراد الصلب الرئيسية (Ixodidae)على الأبقار والكلاب والجاموس، جُمعت عينات من عدة مناطق وناحيات في محافظة ذي قار (جنوب العراق)، وأُجريت عملية رصد خلال الفترة من يناير إلى ديسمبر 2024. فُحص ما مجموعه 3812 حيوانًا أليفًا (أبقار وجاموس وكلاب)، عُثر على 11333 قرادة صلبة بالغة منها. ولتحديد التنوع الموسمي، وُجد نوعان من جنسين (*Hyalomma* و*Rhipicephalus*)؛ وكان أكثر أنواع القراد انتشارًا هما *Hyalomma anatolicum* بنسبة(62.76%) و *Rhipicephalus turanicus* بنسبة(37.24%). على الرغم من ملاحظة اختلافات في وفرة القراد بين المواقع التي شملها المسح، إلا أن تحليل مربع كاي لم يُظهر فروقًا ذات دلالة إحصائية في معدلات الإصابة بين المواقع ($P> 0.05$). توفر النتائج بيانات أساسية محدثة حول توزيع القراد الصلب الذي يصيب الحيوانات الأليفة في محافظة ذي قار.

الكلمات المفتاحية: Ixodidae، التباين الموسمي، *Hyalomma anatolicum*، *Rhipicephalus turanicus*