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SPECIES OF TICKS ON CAMELS AND THEIR MONTHLY POPULATION DYNAMICS

IN ARAR CITY, K S A

(With One Table and 3 Figures)

By

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دراسة أجناس القراد الجامد المتطفلة على الإبل في عرعر
وديناميكية تعدادها الشهري

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أجريت هذه الدراسة لجمع القراد الجامد من ٣٠٠ رأس من الإبل في مدينة عرعر بالحدود الشمالية بالمملكة العربية السعودية لمدة ١٢ شهرا ابتداءً من شهر يناير إلى شهر ديسمبر للعام ٢٠٠٦ وأظهرت الدراسة أن عدد القراد من جنس هيالوما كان هو السائد بنسبة ٩٦% وان الجنس الثاني كان أمبليوما ونسبته ٤% ويزيد عدد القراد كلما كانت الشهور ممطرة أو باردة.

SUMMARY

A study was conducted to identify the species of ticks found on camels (*Camelus dromedarius*) and their seasonal population dynamics in Arar city. Collection and identification of the ticks were undertaken at 1 year from January 2006 to December 2006. On each occasion, all the visible adult ticks were collected from the body of each camels and the ground. The most abundant species of ticks on the camels at the study area were *Hyalomma* (96%), *Amblyomma* (4.0%). The average tick load per camel was higher during rainy months (more than 30 ticks) than during dry months (less than 11 ticks). The study concluded that any strategy intended to mitigate problems of tick infestation of camels in this area should take into account the identified tick species and their seasonal abundance.

Key words: Camel, dromedary, *Hyalomma*, *Amblyomma*, prevalence, season, Arar (Al Hudud ash Shamaliyah)

INTRODUCTION

Arar is the capital city of The Northern Province of Saudi Arabia (Al Hudud Al Shamaliyah). It is situated in the Northern region at an elevation of 1,854 feet about 565 m. It has a large area of grassing therefore it has an important role in the animal resource in Saudi Arabia. Its area is about 100 Km². The temperature of Arar city is ranging from 44°C (in hot Summer) to -4°C (in Winter). Therefore it is very hot in Summer and much cool in Winter (Global Arabic Encyclopedia, 2008). This harsh condition is generally suitable to camels and for this reason they are the most important animal resource in Arar as in all Saudi Arabia. Only the Arabian camels (*Camelus dromedarius*) are reared in Saudi Arabia and they play a very important role in the life of Saudi people (as Arabian nation), they are used as meat, dairy, sports and transportation animals beside using as stored wealth for the future harsh times. Camels like other animals are affected with a number of diseases and parasites (Al-Zubaidy, 1995). The external parasites of camels include ticks, mites, and other parasitic arthropods e.g. myiasis flies (Al-Zubaidy, 1995; Soulsby, 1986). Generally it is well known that ticks are a major constraint on the world's livestock industry (Zelege and Bekele, 2004). They exert a major hindrance to improving animal production in the tropical and subtropical regions of the world by transmitting devastating and often fatal livestock diseases, causing blood loss, damage to hides and udder, and paralysis (Dalglish *et al.*, 1990). Ticks are classified into two families. The family *Ixodidae* or hard ticks and *Argasidae* or soft ticks (Soulsby, 1986; Urquhart *et al.* 1987). In this study attention is only paid to the hard ticks because they are the most common parasites affecting the livestock in Saudi Arabia and other Arab countries (Al - Zubaidy; 1995).

Ticks can transmit pathologic agents to a host mechanically or biologically which require that the infectious organism goes through some sort of development or maturation within the vector. The organisms can be transferred either transstadially (stage to stage) or transovarially (from female to offspring via the egg). Transstadial transmission usually occurs in three-host ticks while transovarian transmission is the most common in one host ticks. Some ticks employ all of the above methods of transmission. Heavy tick infestations are often responsible for considerable morbidity and mortality in both domestic and wild camel species (Zelege and Bekele; 2004). The most important ruminant blood parasites transmitted by ticks are *Theileria*

spp., *Babesia spp.* and *Anaplasma spp.* (Soulsby, 1986; Urquhart *et al.*, 1987; Walker, 1994). *Anaplasma marginale* and *Theileria camelus* parasites were reported to be found in camels (Soulsby; 1986), However *Babesia motasi* and *B. ovis* are parasites of sheep and goats (Urquhart *et al.*, 1987) all are transmitted by species of hard ticks which are infesting camels. According to a study performed by Gupta and Kumar (1994) it was found that hard ticks of *Hyalomma dromedarii* were the most abundant species infesting Indian dromedaries (90 %). In fact these ticks are well adapted to harsh desert conditions (Morel; 1989). This is supported by the studies made in Sinai, El Arish and El Hassanah center in Egypt where it was found that ticks of *H. dromedarii* and other *H. species* are the most common species infesting camels. It was also found that these animals and ticks were positive in blood of tested animals and guts and hemolymph of identified ticks (EL Kady, 1998; Mazyad and Khalaf, 2002). In this study ticks were collected from camels in order to open door for a major research project to study all areas of Al Hudud Al Shamaliyah Province (Arar) to investigate all the parasites infesting camels, sheep and goat since all these animals are reared closed to each other and may be infested by the same arthropods.

MATERIALS and METHODS

Collection of samples and identification of the collected ticks was performed according to Hoogstral (1956), Soulsby (1986) and Zeleke and Bekele (2004).

1-Tick Collection

Ticks were collected from the camels reared in camps around Arar city. These camps contain a moderate number of camels. Only owners of 2 camps cooperated with us to collect ticks from their animals. The camels owners collected the samples with us as we explained to them because they did not want us to disturb their animals. Samples were collected every month. The study period started from January until December (2006). Ticks were collected from 300 camels which we made sure they will stay for the study period. Collected ticks were put in plastic vials with Isopropyl Alcohol for disinfection and fixing the samples.

Ticks collected from each camp was put alone. After that the ticks were counted and then prepared for identification.

2-Tick identification

Each tick was examined under stereomicroscope for identification. This was performed according to the keys of hard ticks mentioned by Hoogstral (1956) and Soulsby (1986).

RESULTS

A total of 11540 adult ticks were collected from the camels and the ground during the monitoring period. Two genera of ticks were identified *Hyalomma* (96%) was the most abundant species encountered, this was followed by *Amblyomma* (4%). It was found that the number of ticks varied every month the maximum number was seen in December (2400 ticks) while the lowest number was seen in May and June (see Table 1 and Figure 1). However, *Amblyomma* species were not seen with samples during the period March – August (2006).

Table 1: Number of ticks collected from the study areas around Arar City during the study period

Months	No. of ticks			%
	<i>Hyalomma</i>	<i>Amblyomma</i>	Total	
January	1170	30	1200	10.40
February	1770	30	1800	15.60
March	660	--	660	5.72
April	180	--	180	1.56
May	60	--	60	0.52
June	60	--	60	0.52
July	120	--	120	1.04
August	300	--	300	2.60
September	1520	80	1600	13.86
October	1240	120	1360	11.78
November	1700	100	1800	15.60
December	2300	100	2400	20.80
Total	11080 (96%)	460 (4%)	11540	100

Fig. 1: The monthly variation of tick numbers collected during the study period.

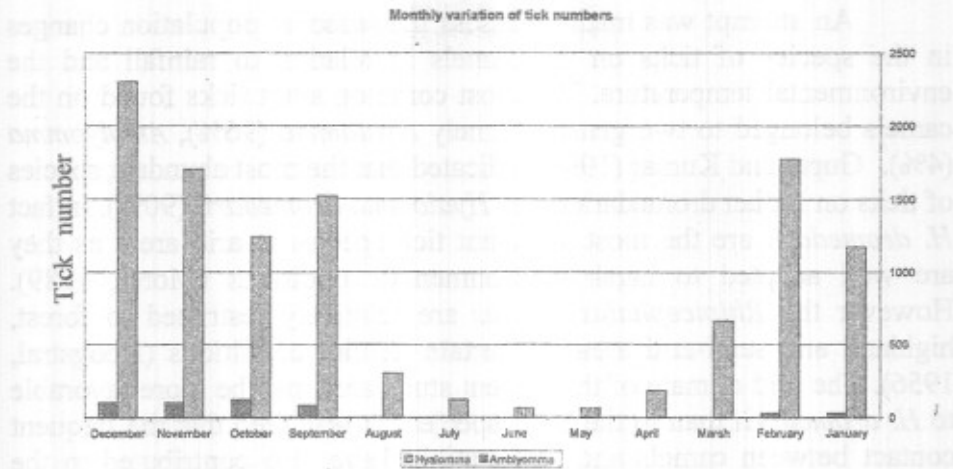


Fig. 2: The tick collected from the animals and ground, A: ticks feeding from camel, B: Engorged ticks on the ground, C: Engorged female ticks seeking breeding sites

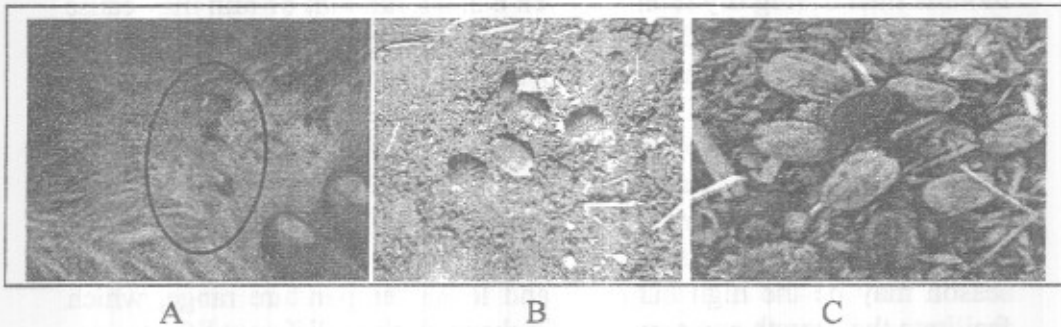
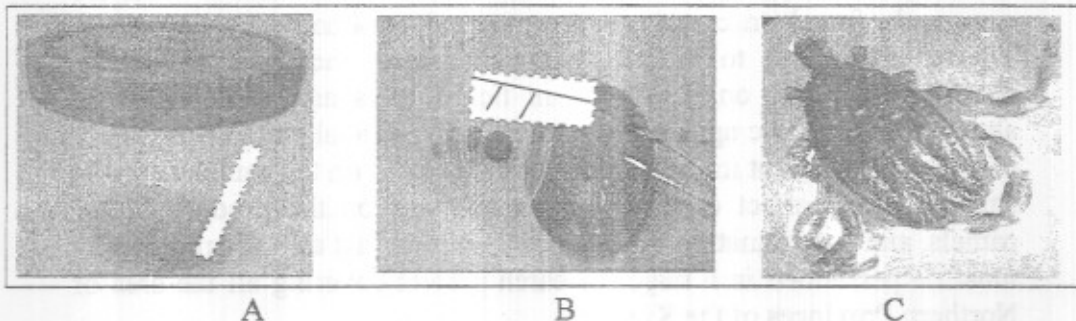


Fig. 3: The tick collected in plastic vials. A: Ticks inside the vial with alcohol B: Fixed ticks received for the test, C: Adult male *Hyalomma* tick



DISCUSSION

An attempt was made to assess the seasonal population changes in the species of ticks on the camels in relation to rainfall and the environmental temperature. The most common adult ticks found on the camels belonged to two genera, namely *Hyalomma* (96%), *Amblyomma* (4%). Gupta and Kumar (1994) indicated that the most abundant species of ticks on Indian dromedaries was *Hyalomma dromedarii* (90%). In fact *H. dromedarii* are the most abundant tick species in arid areas as they are well adapted to harsh environmental conditions (Morel, 1989). However the *Rhipicephalus* species are relatively restricted to forest, highland and semi-arid areas or certain rainfall conditions (Hoogstral, 1956). The arid climate of the present study area may be more favorable to *H. dromedarii* than to the other species. It was seen that the frequent contact between camels and cattle might have also contributed to the abundance of *Rhipicephalus* and *Amblyomma* species (Schwartz and Dioli, 1992).

Ticks were found on the camels throughout the monitoring period, although higher loads of ticks were observed during rainy months than during dry months. Even a small amount of rain may cause an increment in tick load. As well as the rainfall, the monthly maximum and minimum environmental temperatures appeared to affect the tick load. Although it was difficult to isolate the effect of temperature from that of rainfall, greater loads of ticks per camel were observed during the periods with lower maximum and higher minimum temperatures. Njanja (1991), Gupta and Kumar (1994) and Mushi *et al.* (1997) reported similar findings. The reason for the higher load of ticks during the rainy season may be the high humidity and lower temperature range, which facilitate the growth and survival of ticks at all their different life stages - egg, larva, nymph and adult (Hoogstral, 1956).

The overall result indicated that only a few species of ticks are commonly found on camels, with a marked seasonality in abundance. This suggests that, to be effective, tick control measures for camels should concentrate on the dominant tick species and their season of abundance. Strategic application of acaricide, especially at the beginning of wet months might minimize the burden of ticks on the camels. Further studies on the effect of these species of ticks on the productivity of camels, and determination of the minimum load that affects productivity must be performed in a major research project covering all the area of Northern Provinces of the Kingdom.

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