Hard Tick Distribution of Camels in and Around Galkaio District, Somalia

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Abstract

A cross sectional study aimed to identify available tick species, determine the distribution and assess the risk factors for infestation was conducted from March to May 2017 in Galkaio District, central Somalia. Adult ticks were collected from 384 randomly selected camels and identified to species level. Stereomicroscopic investigation were employed. A total of 576 adult tick species were collected from different body parts. The study revealed that there was high tick infestation in the study area with an overall prevalence of 371 (97

Index terms— camel; hard tick; distribution; prevalence, galkaio.

tick species, determine the distribution and assess the risk factors for infestation was conducted from March to May 2017 in Galkaio District, central Somalia. Adult ticks were collected from 384 randomly selected camels and identified to species level. Stereomicroscopic investigation were employed. A total of 576 adult tick species were collected from different body parts. The study revealed that there was high tick infestation in the study area with an overall prevalence of 371 (97%). Two tick species from one genera were identified Hyalommadromedarii and Hyalommatrancatum. Among the species identified in the study area Hyalommadromedarii was the most abundant (56.8%) followed by Hyalommatrancatum (43.2%). In the present study, the prevalence of all tick species was higher in female animals than male animals but statistically insignificant (p>0.05). There was no statistically significant variation (P>0.05) in prevalence of Hyalommadromedarii and Hyalommatrancatum between age categories, but body condition and animal origin showed statistically significant variation (P<0.05) and good body conditioned animals were highly infested by ticks compared to poor and medium conditioned animals. Majority of Hyalommadromedarii and Hyalommatrancatum were attached to premium region. There was statistically significant difference between all tick species and ticks 'predilection site ($p < 0.05$). This study showed high rate of hard tick distribution in the study area and appropriate strategic management and further study is recommended to improve the health and performance of Camel.

1 I. Introduction

amels are the most capable animal species in utilizing marginal areas and in survival and production under harsh environmental conditions that are inhospitable to other domestic animals (Schwartz and Dioli, 1992). Many pastoral groups and communities in diverse ecological zones throughout the world are depending on camels for their livelihood. This dependence consists of utilization of camel meat, milk, leather and wool, exportation of live camels, uses as an important sport, tourism resource and use as animals for packing, transport and riding (Snow et al., 1992). Most importantly, in mixed species the camel feed on plants and parts of plants that are not eaten by other conventional livestock due to its size to browse the highest strata. Thus, reducing competition and enhancing complementariness **??**Wilson, 1998).

It is an important working animal of the arid and semi-arid ecosystem because of its unique adaptive physiological and anatomical characteristics (Rabana et al., 2011). However, camel production is conversely affected by the occurrence of various diseases, inadequate veterinary services and feed shortage (Bekele, 2010). According to the UN Food and Agriculture Organization (FAO, 1977) estimates, there are approximately 15 million dromedary camels in the world, of which 65% are found in the northeast African states of Somalia,

Ethiopia, Sudan and Kenya. The Somali community (in Kenya, Somalia and Ethiopia) has the largest population and highest density of camels in the world, and to the same extent this animal also pervades the Somali culture. Historically, the geographical area that is now Somalia may have been a focal point in the introduction and dispersal of the domesticated dromedary (Abokor, 1993).

Various internal and external parasitic diseases have been reported to be the major problems affecting the health, productivity and performance of camel. Ticks are one of the most important parasites among the factors affecting the health, productivity and performance of camels (Anwar and khan, 1998;Bekele, 2010) by transmitting various disease causing agents, and causing blood loss, irritation, inflammation, hypersensitivity and damage to hide and under **??**Wall and Shearer, 2011;Walker et al., 2003). Ticks are responsible for losses caused by their attachment to animal hides, by the injection of toxins, and/or by the transmission of diseases that reduce yield. The globalization have ensured that hard ticks can travel to new environments and become established with wide success, and as they travel so can their disease (Walker et al., 2003).

Hard ticks are the most important external parasites of camel in the world and can easily constitute a limiting factor to successful stock farming unless appropriate measures are taken to control them (Howell, Walker &Nevill 1978). The geographic distributions of many original ticks are, however, not related with gross climatic conditions of the world, but rather with factors within the microclimate of the vegetation within their distribution variety. The most endemic tick species in Somalia are Rhipicephaluspulchelus, Hyalomma Tick damage hide and skin of livestock including camels. There is no available data about hard tick distribution in the study area and the country in general. Due to unavailability of hard tick information this study aimed to identify and to assess distribution of hard ticks in Galkaio district, Somalia.

2 a) Study area

This study was conducted in Galkaio district, Puntland state of Somalia. Galkaio is situated in northcentral of Somalia, in the heart of Mudug region. Five villages were included in this study which are under Galkaio district namely Taalla'ad, Jeehdin, Tawakal, Dhagahyo'ad and Halabookhad. Mean annual rainfall is 200-300 mm bimodal, average temperature is 32.7 degree Celsius and altitude is 302. (Muchiri, 2007).

3 b) Study population and study design

The Study animals were consist indigenous breeds of one hump camels managed under pastoral production system, that allows free grazing always mixed with livestock from other villages, and in that the animals move from feed shortage area to a better grazing area. Galkaio district was purposively selected based on camel population, accessibility and convenience. Cross sectional study was conducted from February to May to estimate distribution of camel hard ticks among the one humped camel herds kept under pastoral management system in Galkaio district.

4 c) Sample size determination

The desired sample size was determined by assuming 50% expected prevalence of tick distribution at 95% confidence interval and 5% absolute precision. Therefore, the relevant formula for the desired sample size was based on Thrusfield **??**2005).n = Z 2 Pexp (1 -Pexp) d 2

Where; n = required sample size Pexp = expected prevalence and d 2 = desired absolute precision. Z = constant from normal distribution table at a given confidence level. The calculated sample size was 384.

5 d) Hard tick collection and laboratory examination

General physical examination was conducted on each camel. Information regarding to age, sex and body condition were recorded in careful manner. The age and body condition of camels were determined based on their dentition and hump structure as described by (Schwartz and Dioli, 1992; **??**ACIA, 1995). After proper restraining hard ticks were collected from tick loving soft areas of the skin such as ear, legs, tail, under tail, around anus, nose, perineum, neck and eyes using hand and steel forceps. The ticks from each animal were separately stored in 35% formalin in a single labeled bottle.

The collected ticks were identified to species level at Parasitology Laboratory of Faculty of Veterinary Medicine in Red Sea University using stereomicroscope. Identification was done using standards recommended by (Hoogstraal, 1956;Walker et al. 2003).

6 e) Data analysis

All collected data were entered to MS excel sheet and analyzed by using SPSS version 20. The distribution and hypothesized risk factors like age, sex, origin, predilection site and body condition was related using chi-square test (x 2) and $p<0.05$ were considered as statistically significant in all cases.

This study was performed in February to May 2017 in 5 villages of Galkaio district, namely; Taalla'ad, Jeehdin, Tawakal, Dhagahyo'ad and Halabookhad. Out of 384 examined camels, 371 (97%) were harboring different species of hard ticks. Total of 576 adult ticks collected, 327 (56.8%) were H. dromedarii spp. and 249 (43.2%) were H. tranctumspp. Table (1) shows sex distribution of the identified ticks. HyalommaDromedarii

male was 263(45.7%), HyalommaDromedarii female was 64(11.1%), Hyalommatrancatum male was 84(14.6%) and Hyalommatrnacatum female was 156(28.5%). Hard ticks collected from nine different sites. 31% of the ticks were collected from premium region, 15.8% from the ear, 11.6 from tail, 11.45% from the anus, 10.4% from the nose, 7.8% from the eyes, 5.6% where from under the tail, 3.6% from the neck and the least area was tail with 2.25% (Table **??**3). Different villages showed statistically significant difference of hard tick distribution ($P<0.05$). Peak number (36.76%) of the hard ticks were collected from Halabookhad village, followed by Dhagaxyo'ad (24%), Tawakal (22.74%), Jeehdin (9%), lastly Taala'ad with smallest number (8.5%). in Tigray region of Ethiopia whom also found 8.9%. this great variation of tick burden in different countries could be climatic difference, production system factors, use of acaracide and Ivermectin, seasonal availability is also another important factor, this study was done in a dry season and the situation in the rainy season is unknown.

Both age and sex categories of the host in relation with the hard tick distribution was statistically not significant ($P<0.05$). In sex it disagrees with (Ayele T. and Mohammed M. 2013) who found that female hosts are affected more than male and the possible reason could be female camels reared for milk in pastoral areas can reduce the number of examined male camels. This study also clearly figured out that tick infestation in adult (> 5 yrs.) was almost similar to that of the young (< 5 yrs.) which is almost comparable with that of Eyerusalem, 2008. This might be due to young animals mostly dwelling around the home and have access to contact with other species of animals; therefore, the chance of getting tick infestation is almost similar to that of adult camels.

According to the body condition of host animals, this study showed statistically significant difference ($P<0.05$) between the good, medium and poor body conditioned animals. Good body conditioned animals where highly affected compared to poor and medium conditioned animals. This result is contrary to that of (Ayele T. and Mohammed M. 2013) and (Eyerusalem, 2008) both found that poor body conditioned animals are much affected. This could be that good conditioned animals attract ticks due to accumulation of fat and skin of the good conditioned animals is much softer then poor and medium conditioned animals.

7 V. Conclusions

The result of this study indicates that ticks are wide spread throughout the study area and animals are infested with different species of tick. It is well known that ticks cause severe economic loss either by transmitting a variety of disease or by damage to hide and skin. The important and abundant tick species investigated in the study area were, Hyallomadromedarii and Hyalommatrancatum and the prevalence was 56.8% and 43.2%. The study indicated that there was high tick prevalence in the study area.

8 VI. Acknowledgments

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9 Conflicts of Interest:

The authors declare no conflict of interest.

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II. Materials and Methods

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III. Results

Tick species	Male	Female	Total	Percentage dist.
Hyalommadromedarii	263(45.7%)	64(11.1%)	327	56.8%
Hyalommatrancatum	84(14.6%)	165(28.5%)	249	43.2%
Total	347(60.3%)	229(39.7%)	576	100.0%

Table (2) shows tick burden compared with age, sex and body condition categories. Only body condition score showed statistically significant difference (P<0.05) where sex and age did not display any significance. Good body conditioned animals showed high burden of both HyalommaDromedarii and Hyalommatrnacatum compared to thos and medium body condition.

Figure 1: Table 1 :

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sex			Age		Body condition		
	Male	Female	< 5 yrs	> 5 yrs	Poor	Medium	Good
H. dromadarii	46		66	261	7	42	278
	(8%)	(4.9%)	(11.5%)	(453%)	(1.2%)	(7.3%)	(48.3%)
H. trancatum	281	221	42	207	4	10	235
	(48.8%)	(38.4%)	(7.3%)	(35.9%)	(0.7%)	(1.7%)	(40.8%)
Total	74	502	327	468	11	52	513
	(12.8%)	(87.2%)	(56.8%)	(81.2%)	(1.9%)	(9.0%)	(89.1%)
P-Value, Chi square	0.316, 1.006		0.312, 1.020			0.001, 13.805	

Figure 2: Table 2 :

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Attachment site	Tick species		
	H. dromedarii	H. tracatum	Percentage
Ear	58	33	15.8%
Eyes	23	22	7.8%
Nose	35	25	10.4%
Neck	15	4	3.29%
Perineum	104	79	31.8%
Leg	28	39	11.6%
Tail	9	4	2.25%
Under tail	24	8	5.7%
Around anus	31	35	11.45%

Figure 3: Table 3 :

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Area	Hyalommadromedarii	Hyalommatrancatum	Total	Percenta
Taala'ad	39	10	49	8.5%
Jeehdin	31	21	52	9%
Tawakal	85	46	131	22.74
Dhagahyo'ad	58	80	138	24%
Halabookhad	114	92	206	35.76
Total	327	249	576	100%

IV. Discussion

In this study only two species of hard ticks were identified namely Hyalommadromedarii and Hyalommatrancatum contrarily other researchers found more hard tick generas and species (Samere et al., 2014; Ayele T. and Mohammed M. 2013; Mohsen et al., 2013; van Straten, Jongejan 1993).

Figure 4: Table 4 :

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