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Identification of Three Species of Ticks *Hyalomma anatolicum Anatolicum, Hyalomma aegyptium and Dermacenter andersoni* in Quetta Cityof Balochistan, Pakistan

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Abstract: The present study was conducted in the Quetta city of Balochistan the current study focused on thecollection and then identification of various species of ticks from the local farms of Quetta. During this study 384 samples of ticks were erratically isolated from buffaloes and cows of various farm houses of Quetta from the vicinity of Jan Muhammad Road throughout the time period of April 2013 to June 2014. These samples were then microscopically analyzed and identified up to specie level. Then ANOVA (F-statistics; $p<0.05$)was found to be large and statistically insignificant (when $p>0.05$) and it was concluded that very large number of cows and buffaloes were infested and affected by three species of ticks including *Hylomma aegyptium, Hylomma anatolicum anatalicum* and *Dermacentor andersoni.* It was revealed that Local Sahiwal and Freezen Sahiwal cows and buffaloes were less susceptible to the infestation of all these ticks as compared to Australian cows which were more infested and affected by these ticks. Milk productivity of Australian and Sahiwal cows and buffaloes was also found to be reduced and this might be due to the infestation of cows and buffaloes by these ticks.

Key words: Ticks · *Hyalomma anatolicum Anatolicum* · *Hyalomma aegyptium* · *Dermacentor andersoni* · Cows

INTRODUCTION

Ectoparasites have been renowned as somber menace for native animals because they can cause austere allergy, irritation as well as toxicosis. Moreover ectoparasites are also been illustrious for their act of transmitting numerous bacterial and protozoan diseases in *Homo sapiens* and animals [1-4]. Ectoparasites, chiefly ticks, play a vital role when researchers' dialogue about health concerns of domestic animals and world's cattle population ofapproximately80% is vulnerable to infestation of tick [5]. Ticks can be responsible for causing direct damages through tick apprehension, damage to hides, blood loss as well as udders, production of toxin and decrease in weight of animal body [6-8] or secondarily through spread of viral protozoan and bacterial infections that can be the cause of promoting secondary disease condition for instance dermato phytos is and screw-worm myiasis [9] and decline in milk production as well as diminutive growth [10]. Ticks are well known and extremely specific group of obligate ectoparasites of mammals, birds and reptiles that have feeding habit of blood sucking. Ticks are hub of fascination for voluminous investigators because of their role of serving as vector in dissemination of diverse diseases in livestock and human beings all over the biosphere. There is different genus of ticks but *Hyalomma* is unique and further most significant genus of ticks, it has extensive series of host and topographical distribution. Hyalomma is a member of Family Ixodidae commonly known as hart ticks and it is largest tick family. Numerous investigators deliberated several species of Hyalomma ticks in different parts of world [11]. The fauna of Hyalomma ticks was studied in the region of Afghanistan by Kaiser and Hoogstraal [12]. Mondal *et al.* [13] and Islam *et al*. [14] conducted their survey based research in Bangladesh and they concluded that the genus Hyalomma ticks are commonly found in the region. Various genus of ticks were reported by Shahardar *et al*.

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[15] that includes, Hyalomma, Boophilus, Amblyomma, Haemaphysalis, Rhipicephalus from buffalo and cattle in the region of India [16] deliberated H. anatolicum anatolicum that was collected from different localities that includes the following Mezaiadda, Loralai, Ziarat, Qallat, Sibi, Harnai, Noshki,) and also studied H. aegyptium fromarea of Balochistan known as Noshki.Ticks are regarded as the most relevant vectors of disease-causing pathogens in domestic and wild animals. Rhipicephalus (Boophilus) microplusthat is known as cattle tick, hampers production of livestock in subtropical and tropicalregions of the biosphere where these ticks are endemic [17, 18, 20] has reported this in recent times that *H. aegyptium*was discovered to be a significant carrierof numerous zoonotic mediators such as *Rickettsiaspp., Anaplasma spp., Theileria spp., Ehrlichia spp., Crimean-Congo hemorrhagic fever virusand Coxiella spp.Hyalomma aegyptium* has life cycle with emblematicthree hosts and it is known as hard tick [21]. Therefore, the distribution of *Hyalomma aegyptium* is delimited to principal hosts distribution that is to Balkan countries, Mediterranean bioregion ranging from Atlantic coastland of Morocco over Northern Africa, Afghanistan, Middle East, Pakistan and Central Asia in the vicinities of Caucasus and stepic regions [22, 23]. Nevertheless, although infrequently described hares and hedgehogs are supplementary hosts which can be consumed by adults for the nourishing purpose in natural circumstances [24, 25]. Yet, *H. aegyptium* larvae and nymphs are found to be less host-specific and they forage on numerous vertebrates including lizards, tortoises, small mammals, birds as well as even humans [21, 26, 27]. Researchers investigated the common species of ticks that are responsible for parasitizing animals in the region of Poland and the names of those species are as following *Dermacentor reticulatus* and *Ixodesri cinus*. The formerspecies of ticks vary in their habitats, distribution, host specificity and seasonal activity. *D. reticulates* is restricted to central and eastern parts of region the country with numerous innovative emphases in the west and middle-west. Whereas the specie of *Ixodes ricinus* is the further most predominant and extensively dispersed [28]. The aim of the research work was to identify the ticks in different cows of Quetta city.

MATERIALS AND METHODS

Samples Collection and Treatment: A total of 384samples of ticks were randomly isolated and collected from buffaloes and cows of different farm houses of Quetta from Jan Muhammad Road during the time period of April 2013 to June 2014. The age of animals under study ranges from 6 months to 3 years. And most of the animals were female that were investigated during this study. Naked eye inspection was exploited to isolate and collect ticks from several organs like ear, under arms, belly, legs and skin though intensely investigating cow and buffaloes skin for the absence and presence of the ticks. After locating ticks keenly sampling was performed and the ticks were detached cautiously from different organs of the animals to evade killing. Meanwhile the ticks were transferred to 70% ethyl alcohol present in the collecting bottles. Subsequently, all the bottles were properly categorized signifying the host, the site of attachment as well as date of collection following the method of Mahrukh [11]. All the samples were brought to the Zoology Laboratory of University of Balochistan (UOB). Later preparation of permanent slides was carried out in the light of the technique that was defined by Cable [29], at the end ticks were scrutinized under compound microscope and the samples of ticks of different species were identified up to the specie level with the aid of identification keys of established by Lloyd [30-32].

Statistical Analysis of Data: The data collected from eachstudy animal were recorded properly in a format prepared for this purpose. These data were uploaded into Microsoft Excel 2007 computer program. ANOVA F-statistics at 5% level ($p<0.05$) was analyzed to observed the significance of variations between the means of three ticks species as well as among six farm samples. All statistical analysis was carried out by using Minitab demo 14.1 version.

RESULTS AND DISCUSSION

Total 384 samples of tick were isolated from the different organs of buffaloes and cows of various farm houses of Quetta from the surroundings of Jan Muhammad road throughout the time period of April 2013 to June 2014. These samples were investigated and identified up to specie level. During the analysis of variations (ANOVA) between means of three ticks species among six dairy farms, the value of F-statistics was found to large and highly insignificant at 5% level ($p>0.05$), as shown in Tables 1 and 2, respectively.

The ticks collected belonged to two different genera *Hyalomma* and *Dermacenter*. Maximum numbers of *Hylomma anatolicum anatolicum* were recorded in the buffaloes and cows ofSmad dairy farm and Meer Ahmed

Table 1: Frequency distributions of cow populations collected from the six dairy farms of Quetta during the study period from April 2014 to March 2015

	Sampling areas					
Cows species	Smad dairy farm	Irif Jan dairy farm	Jan Baba dairy farm	Sadullaha dairy farm	Meer Ahmed dairy farm	Mubark Khan dairy farm
Area code	F1	F 2	F3	F4	F5	F6
Sahiwal	10	20	10	20	10	20
Sahiwal freezen	12	18	20	21	20	13
Jerssy	15	14	14	17	22	14
Australian cow	18	14	14	13	15	10
Total number of cow samples studied in each farm (N)	55	66	58	71	67	55
% frequency of cow samples studied in each farm	14.7	17.6	15.5	19.0	17.9	14.7
Mean±S.D	13.8±3.5	16.5± 3.0	14.5± 4.1	17.8± 3.6	16.8±5.4	13.8±3.5
					Grand total	374

ANOVA F- Statistics = 0.23; P-value= 0.940 (insignificant when $p \geq 0.05$).

Table 2: Frequency distribution of three tick species collected from the six dairy farms of Quetta

	Sampling area				Total number of tick samples		
Ticks species	F1	F2	F3	F4	F5	F6	(N)
Derma center adenernsoni	19	23	17	16	27	17	119
Hyalomma aegyptium	22	19	28	18	21	16	124
Hyalomma anatolicum anatolicum	27	24	19	30	18	23	141
Total number of the sample of each species	66	64	64	66	56	68	66
% frequency of each species	17.2	16.7	16.7	17.2	14.6	17.7	17.2
Mean±S.D	22.0±2.6	21.3±5.9	21.3±7.6	22.0±4.6	18.7±3.8	22.7±4.0	22.0±2.6

ANOVA;F- Statistics = 1.16; P-value= 0.339 (insignificant when $p \geq 0.05$).

dairy farm followed by the number of *Hyalomma aegyptium* recorded in the cows and buffaloes of Jaan Baba dairy farm. Maximum number of both *Hyalomma aegyptium* and *Hylomma anatolicumanatolicum* were recorded in all the cows of all theselected farm houses of Quetta.

Ticks are extensively distributed in different parts of the body of its host such as mammary gland, udder, ear, neck, tail, groin and anal area region of which udder, dewlap, anal area and tail regions are the most infested parts of animal body [33].

Hyalomma Aegyptium: Hyalomma aegyptium also knownas common tortoise tick is distributed from Morocco, Spain and south France to Southern Asia. Adults, nymphs and larvae of *Hylomma aegyptium* target mainly tortoise, dog, cattle, roe deer, wild boar, European hare, pig, wild deer, jackals, fox, mustelid, hamster, horse, hedgehog, squirrel and birds. This tick is spread by migrating birds, such as *Anthus t. trivialis*, *Emberizacaesia* and *Coturnix c. coturnix* by Serkal, [34]. The genus *Hyalomma* comprises 15 species public and veterinary health importance. Three of the 15 species have 2, 3 and 4 subspecies, respectively. *H aegyptium,* mostly parasitize tortoises and livestock and small wildlife from Pakistan to both sides of the Mediterranean basin and Russia by Tavassoli [35]. In all the cows and buffaloes *H aegyptium* was found. It was widely distributed in different parts of the body of buffaloes and cows such as neck, tail, mammary gland, udder, groin and anal area region of which udder, dewlap, anal area and tail regions [35]. Most of the cows and buffaloes were also affected by decreased body condition, tick bite wounds, severe irritation and alopecia which agree with the results of Tavassoli [35]. It was also found that *H aegyptium* had profound effects on the milk productivity of cows. Australian cows had less productivity of milk than local Sahiwal cows because local Sahiwal cows and buffaloes are less comparatively susceptible to tick infestation than imported European breed Sajid [36].

Hyalomma Anatolicum Anatalicum: Hyalommaanatolicum anatalicum parasitizes mainly the domestic animals, particularly cattle. The detachment and dropping rhythm of the species is so adjusted that it occurs only at the time when the cattle are resting in the sheds. The engorged ticks that drop in the sheds find suitable niches in the cracks and crevices, where the females oviposit and the larvae and nymphs moult to the next stage. The questing larvae that hatch from the eggs and the unfed nymphs and adults that emerge from the previous stages could easily find their hosts within the same cattle-sheds.

This type of tick was also recorded on the cows and buffaloes of Quetta. The adults of *Hyalomma anatolicum anatalicum* were mostlydistributed on axilla, udder and groin while nymphs and larvae were mostly distributed on ears, neck, tail and also on the axilla. This is in agreement with [36] who also reported same distribution of ticks on different parts of cattle body. It was also recorded that cows and buffaloes infested by these ticks were affected by different diseases and had low milk productivity. Local Sahiwal cows and buffaloes were found to be less susceptible to these ticks than Australian cows, Friesian Sahiwal [36].

Dermacenter Adenernsoni: Dermacentor andersoni, commonly known as the Rocky Mountain wood tick, is a species of tick. It can cause tick paralysis. This tick is well known as a vector of the Rocky Mountain spotted fever rickets in the northwestern U.S. and Canada, the Colorado tick fever virus and the bacteria which causes tularemia (hunter's disease). This type of tick was also found in the cows and cattle of Quetta. It was mostly distributed on the withers and the back of heads of cows and buffaloes of different dairy farms of Quetta, which is in agreement with the studies [36]. Cows and buffaloes infested by these ticks were affected by tick bite wounds and severe irritation of Wilkinson and Lawson [37]. Local Sahiwal cows and buffaloes were comparatively less infested and affected by these ticks than Australian cows and buffaloes [37].

CONCLUSIONS

From the studies conducted on the on the four different species of cows and buffaloes of Quetta it was revealed that ticks belonging to two different genera i.e. *Hylomma* and *Dermacentor* or three species *Hylomma aegyptium, Hylomma anatolicum anatalicum* and *Dermacentor andersoni* were found and distributed ondifferent organs of cows and buffaloes of different dairy farms of Quetta. Local Sahiwal cows, Sahiwal freezen cows were found to be comparatively less susceptible to these ticks than Australian cows. Most of the cows and buffaloes were infested by these ticks and were affected by different diseases such as decreased body condition, tick bite wounds, severe irritation and alopecia.

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