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Impact Assessment of Tick Species, *Rhipicephalus (Boophilus) microplus* on the Milk Productions of Cattle's in the Quetta City Of Province Balochistan, Pakistan

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Abstract: The current study was conducted to focus on the effect of *Boophilus microplus* on the yield of milk production in cattle'sstudied in various farm houses of Quetta City of province Balochistan of Pakistan. In the present study, a total of 773 *Boophilus microplus* tick samples were collectedfrom 150 infested cowspecies, in various farm houses of Quetta. Ticks were identified on the basis of their morphological features and their impact on milk production of infested cows were observed and recorded in liters. The obtained results revealed that milk production was appeared to be decline in different species of infested cow due to *Boophilus microplus*. Red Sindhi, Sahiwal and Dahnicows when in fested with *Boophilus microplus* showed 0.5 litre decrease in milk production, while in fested Walaeeti cow revealeda significant decrease, that was 2 to 3 litresdecline in milk production. Thus, our present study proved that heavy load of tick *Boophilus microplus* could be responsible for decline in milk production and thestudy will be useful to estimate the economic losses caused as a result of the effect of ticks on dairy cattle.

Key words: Ticks · *Boophilus microplus* · Infestation Cows

INTRODUCTION

Ticks areectoparasites of reptiles, birds and mammals, as they are obligate and blood sucking arachnids. Ticks are vector of large number of disease including *Therelichiosis, Anaplasmosis, Bebesioses, Typhus* and *Enrlichiosis* etc. [1]. Ticks have hematophagousmode of nutrition as their blood sucking habit is rapacious, so they impoverishes the hosts due to their requirement of lot of blood for rapid development. Due to heavy infestation of ticks, cattle takes more feed for fulfillment of requirement of parasite, then it effects the retarded growth of young ones, while adults may remain internally weak stunted, thin and production of milk in dairy cows became greatly reduced [2]. During the summer season, ticks prevalence becomes much higher than winter season as previously reported by Nousheen *et al.* [3]. In cattle's and buffalos, genus *Hyalomma* is most prevalent followed by those belonging to *Boophilus* [2]. The percentage of infestation of tick species that are mostly reported to parasitize on cattle's are arranged in decreasing orderwere as follows; 46.1% for *Boophilus*, followed by *Hyalomma* 31.25%, *Rhipicephalus* 17.93%, *Amblyomma* 4.61%, respectively as previously reported by Manan *et al.* [4]. Genus *Boophilus* are hard ticks found in Australia, America, Asia and Africa. Nowadays, *Boophilus*are included in *Rhipicephalus* and are enormously important for the livestock industry in the world. *Boophilus* species are one host hard ticks that are affecting mainly cattle including buffaloes, cows, antelopes, deer, sheep's, goat and horses, while birds, cats, dogs and humans do not affected by *Boophilus*. Some important species of genus *Boophilus* are *Boophilus microplus,* which isalso known as cattle ticks. *Boophilus annulatus* called as American cattle ticks and *Boophilus decoloratus* also called as blue ticks. *Boophilus microplus* mainly causes the significant economic loses to the livestock industry in turn of production of meat, death of affected animals and decreased milk yield and also damaged hide [5].

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Rhipicephalus microplus (formerly *Boophilus microplus*) is most important tick parasite of livestock throughout the globe. It is a hard type of tick belongs to the family Ixodidaeand can be found on several hosts *i.e.*, buffalo,cattle, donkeys, horses, goats, deer, dogs, pigs sheep and other wild animals. It is also known as hard tick because when observed from above, it contain dorsal shield (scutum) and mouthparts (capitulum) are protruded frontward. Large number of ticks on animals can cause decrease in rate of production of milk and also scratch hides.Along with the transmission of various diseases, *R. microplus* is also able to prejudice milk production because of the fact that every female tick is capable of ingesting 1.0 mL blood from the cow during its parasite phase, which cause the loss of weight of about 1.0 gram and thus reducing and effecting the production of milk by about 8.9mL. From economic point of view, *Rhipicephalus microplus* charge farmers approximately 7.30/head/year US$, while taking into account the treatment costs and production losses are also included [6-8]. *R. microplus* can is also be responsible for transmitting babesiosisand Babesiaequi, that is the cause of condition known as equine piroplasmosis. A progressive economic loss to livestock industry is mostly cause by the various parasitic diseases that are responsible for lower level of productivity in affected animals [9].

In Pakistan, Manan *et al.* [4] found that, water buffaloes in Peshawar city were parasitized by ticks of the genera *Hyalomma sp., Boophilus sp*. and *Rhipicephalus sp.*, with percentages of parasitized animals ranged from 24 to 53%, respectively. In addition, Kakar and Kakar Suleman Khel [10] also reportedthe occurrence of ticks of *Boophilus sp.* that is 6.9% on water buffaloes in the Quetta city. Effect of *Boophilus microplus* on cattle production includes *i.e.*, direct effect, includes weight loss, damage of leather and irritation, which indirect effect is transmission of tick borne pathogenic disease and myasisis also occurs at the point of bite. Thus, present study was conducted to focus mainly on measuring the impacts of tick on the yield of milk production and thestudy can be helpful to create a safe quarantine zone for cattle'sto have greater milk production in the future.

MATERIALS AND METHODS

Sampling: Tick specimens were collected from the different body parts of cowswithout damaging their mouthparts using forceps picking them form cow and preserved in 70% ethyl alcohol during the sampling period extend from March 2014 to December 2014. Complete verification was maintained for each tick specimen for their source regarding species of the host. Permanent whole mounts of the tickswere prepared with the help of method following by Soulsby [11]. Both identification and morphological characterization of ticks was carried out by using a stereoscopic microscope according to the keys followed by McCarthy [12] and Estrada-Pena *et al.* [13], and separate the *Boophilus microplus* among the other tick species. Randomly, ten cows were selected to examine decline in milk production of four selected cow species of the present study.

RESULTS AND DISCUSSION

A total of 200 cowsbelonging to four selected species *i.e.*, Sahiwal, Red Sindhi, Dahni and Walaeetiwere studied in different farms of Quetta City during the period from March 2014 to December 2014 as shown in Table 1, respectively. While the distribution of *Boophilus microplus* on different life stages of these four cow species were observed and recorded in Table 2, respectively.

In general, the tick problem varies considerably in different climatic areas, but it has no significant impact according to age, however, younger animals (below 1 year age) were found to be most affected across the age groups of each farm species as previously determined by Abdul *et al*. [14]. Furthermore, many other factors like diet, sex, lactation also have influence on the load of ticks carried by an animal. For example, O'Kelly and Seifert [15] and Seifert [16] reported that wheat straw diet, male sex and wet cows or lactating cows shows large load as compare to Lucerne diet, female sex and dry cow that revealed small load of ticks, but pregnancy had no impact. Tick numbers are subject to seasonal changes [17]. In addition, the type of species also shows variation in their resistance to risk of ticks, *i.e.*, *Bos indicus* cattle and their crosses not only carry fewer ticks but their resistance is also highly heritable than in *Bos taurus*. Economic production losses caused by the cattle tick seemed to be indicating that an average of one mature tick per day caused a growth rate reduction equivalent to at least 450 grams a year. At least 35 percent loss of appetite isalso attached to interfering with the growth process through the intermediation of a tick toxin that could come from the saliva and injected into the host. Moreover, due to long time tick infestation, *B. microplus* can induces anemia in infected cow.

Table 1: Total number of cattle's studied in different farms of Quetta City during the period from March 2014 to December 2014.

	Infested animals				
Total number of samples (N)	Adult Males (above 2 years)	Adult Females (above 2 years)	Young (below one year)	Younger (above 1 year)	Not infested
200	38	40	50	30	50

Table 2: Distributions of *Boophilus microplus* on different life stages of cow.

	Number of *Boophilus microplus* on each life stages of cow (N)			
Year 2014	Adult Males	Adult Females	Young	Younger
March	19	10	20	10
April	10	9	14	20
May	18	20	15	20
June	20	14	18	30
July	14	20	30	40
August	27	25	24	50
September	13	28	28	10
October	14	24	24	20
November	10	20	20	10
December	5	20	20	10
Total number of samples	150	190	213	220
% frequency	19.4	24.6	27.6	28.5
Rank	D	C	B	A

Table 3: Shows the impact of *Boophilus microplus*on the milk production of four cow species.

Cow species	No. of *Boophilus microplus*	Milk production in infested cows (Litres)	Milk production in uninfected cow (Litres)
Red sindhi	146	3.5	4
Dahni	189	3.5	4
Walaeeti	247	9-10	10-12
Sahiwal	278	6.5	7

Seifert *et al.* [18] reported that the average blood uptake (0.3 ml) of enlarged adult female quantity is about twice of its own weight and it had lost ability to adequately replace blood protein such as haemoglobin and plasma albuminbecause of an immunological response. Tick infestation also resulted in a change in body composition for example, infested animals had relatively more fat and less muscle than their uninfected ones [19].

In addition, the comparison of milk production in liters of infested species withthe non-infested cowspecies were also calculated and recorded in Table 3, respectively.

The results of the present study revealed that Red Sindhi, Sahiwaland Dahnicows when infectedm with *Boophilus microplus* shows 0.5 liter decrease in milk production as compare to those individuals of this specieswhich were non infested cows. While Walaeeti species that was infected with 247 *Boophilus microplus* showed significant decrease in milk production that is 2 to 3 liters in comparison to Walaeeti cows that were not infected as shown in Table 3, respectively. Our results were in accordance to the Horn [20], who reported the predictable decrease of more than 50% of milk production in most of dairy farms of Brazil. According to Bedane *et al.* [21], most livestock owners and health professionals believe that ticks are the major cause of udder damage and teat blindness, which is a major influencing factor responsible for the decline in cow milk production. Certainly, extreme load of ticks could be responsible for more than collapse of lactations, but can also lead to the death of host. *Anaplasmamarginale*, which is also transmitted by *B. microplus*, is another parasite that causes tick fever in cow[22]. From the present study, it was concluded that *Boophilus microplus*h as an impact on huge reduction of milk production of most cow species which are infested with it. Therefore, application of proper tick control mechanisms will give emphasis on application of insecticides like acaricides on udder to reduce the teat blindness.

CONCLUSION

From the obtained results it was concluded that the cattle tick (*Boophilus microplus*) is responsible for the decline of milk production in cattle's. *Boophilus microplus* also have an adverse effect on growth rate, body composition, weight loss, anemia, loss of appetite and failure to replace lost proteins in cattle's. Thus, infestation of cattle ticks is significant reason responsible foreconomic losses to the all industry associated with dairy industry throughout the world. Thence, present work is very important from livestock point of view, because it has its own worth in cattle farming. By adopting certain measures we can get rid of the ticks that may cause severe damage to the livestock. The utilization of vaccines, especially when stock is moved from a tick-free to a tick-infested area to the control of ticks is on prospect and there are many methods by which farmers as well as veterinarians can devise and employ to get rid of ticks that cause low milk productivity in cattle's.

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