EGYPTIAN ACADEMIC JOURNAL OF

BIOLOGICAL SCIENCES

E

MEDICAL ENTOMOLOGY & PARASITOLOGY

ISSN
2090-0783

WWW.EAJBS.EG.NET

Vol. 14 No. 1 (2022)

Citation: *Egypt. Acad. J. Biolog. Sci. (E-Medical Entom. & Parasitology Vol.14(1) pp **33-37**(2022)*
DOI: 10.21608/EAJBSE.2022.227178

Egypt. Acad. J. Biology. Sci., 14 (1):33–37 (2022)

Egyptian Academic Journal of Biological Sciences
E. Medical Entomology. & Parasitology

ISSN: 2090–0783
www.eajbse.journals.ekb.eg

Prevalence and Identification of Tick Species Infesting Goats and Sheep in Pakistan

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ARTICLE INFO
Article History
Received:7/3/2022
Accepted:22/3/2022
Available:25/3/2022

Keywords:
Boophilus; Dermacentor; Hyalomma; Obligate ectoparasites; Pakistan; Ticks

ABSTRACT

Ticks are blood-sucking ectoparasites of humans wild and domesticated animals. The tick transmits pathogens to them and acts as a vector of several diseases especially Lyme and Crimean-Congo Haemorrhagic Fever. Livestock industry plays a significant role in the economy of Pakistan and proves a main food source, fiber and income for poor farmers of the country. Infestation of tick species was observed on domesticated animals especially goats and sheep in the country. There was a need to identify them to species level so proper control measures should be adopted. For these purposes, the current study was conducted to identify ticks found on small ruminants. Six tick species *Amblyomma variegatum, Boophilus decoloratus, Dermacentor marginatus, Hyalomma dromedarii, H. anatolicum* and *H. excavatum* were identified which belong to four genera. *H. anatolicum* and *A. variegatum* were found on both examined sites such as tail and ear while all remaining species were recorded on the tail. Female goats and sheep are highly infested with tick burdens than males. The maximum tick infestation was recorded in the tail followed by the ear. The tail has long hair which provides a suitable site for tick hiding as well as provides favorable environmental conditions for tick growth and development. There is a need to test many other alternative management strategies against tick species.

INTRODUCTION

Various agricultural economies, notably Pakistan's, are strongly reliant on the cattle industry. Farmers in Pakistan gained money by selling and acquiring cattle (Ramzan et al., 2018; 2019). Bones and skins are incredibly valuable animal products that are utilized by humans for a number of purposes (Kakar and Kakarsulemankhel, 2008). Animals are important to humans not just as a source of protein, but also as a source of skins and bones (Kakar and Kakarsulemankhel, 2008).

Ectoparasites and endoparasites wreak havoc on the cattle industry in a variety of ways. Ticks (Acari) are blood-sucking ectoparasites that transmit protozoal, bacterial, and viral infections to wild and domestic animals all over the world, including cows, sheep, buffaloes, and calves. Anaplasmosis, ricketsiosis, and ehrlichiosis are all diseases carried by ticks (Sajid *et al.,* 2008).

The most infectious of these illnesses, Crimean Congo hemorrhagic fever (CCHF), is the most dangerous to animals. Three main tick families such as Nuttalliellidae, Argasidae and Ixodidae (Guglielmone *et al.,* 2010) have been reported in the world. There are around 200 and 700 species belonging to Argasidae and Ixodidae families, respectively, whereas Nutteliellaide has only one species. Ticks are found all throughout the world (Jongejan and Uilenberg, 1994) and are the second most common disease vector after mosquitos (Bars, 2009; Ramzan *et al.,* 2020; 2021).

Ticks wreak havoc on resource-strapped agricultural communities, particularly in tropical and subtropical regions, where 80 percent of the world's cattle are reared. Tick infestations result in not just physical pain from tick bites and blood loss, but ticks may also transmit a variety of diseases, including zoonotic viruses, posing a severe public health risk (Alim et al., 2011; Jabbar et al., 2015).

Tick infestation in farm animals is linked to a number of risk factors, which have a straight influence on the zoonotic and non-zoonotic tickborne illnesses (TBDs). Environmental variables such as climate and habitat type have been studied in different regions of the world to see how they affect tick dispersion patterns (Kabir *et al.,* 2011; Ramzan *et al.,* 2021).

MATERIALS AND METHODS

A cross-sectional study was carried out from May 2018 to December 2018. Ticks were collected from goats and sheep and identified to species level by using previous morphological keys. Domesticated animals such as goats and sheep play a key role in the economy of the country and are an important source of income for poor people. Total 120 tick specimens were collected from 200 animals including 100 goats and 100 sheep. The collection was done from urban as well as rural areas from all stages of hosts such as adults, kids and both sexes (males and females). Ticks were collected from the tail and ear of the host. Ticks were preserved in 70% Ethyl alcohol and identified under a microscope by using keys (Walker, 2014).

RESULTS AND DISCUSSION

In the study area, six tick species belonging to four genera were identified. The identified tick species were *Amblyomma variegatum, Boophilus decoloratus, Dermacentor marginatus, Hyalomma dromedarii, Hyalomma excavatum* and *H. anatolicum*. *H. anatolicum* was recorded in the highest number followed by *H. excavatum, D. marginatus, H. dromedarii, B. decoloratus* and while *A. variegatum* in lowest number (Table 1 and Figure 1). Ramzan *et al.* (2020) had conducted a study to identify tick species found on small and large ruminants in Pakistan and reported seven tick species such as *Hy. excavatum*, *Hy. anatolicum, R. singuanieus*, *Hy. dromedarii*, *R. microplus, D. marginatus* and *Haemaphysalis punctata* while many other early scientists have also identified similar species in various regions of the country (Chhillar *et al.,* 2014; Ganjali *et al.,* 2014; Rehman *et al.,* 2017; Sultana *et al.,* 2015). Our current study findings are almost similar to the previous studies.

Table 1. Prevalence of tick species on domestic animals in the study area.

Tick species	**N**	**Prevalence %**
Amblyomma variegatum	3	2.5
Boophilus decoloratus	4	3.33
Dermacentor marginatus	19	15.83
Hyalomma dromedarii	24	20
Hyalomma excavatum	29	24.17
H. anatolicum	41	34.17
Total ticks	120	100

Table 2. Collection sites of identified tick species on animals in the study area.

Tick species	**Collection sites**
Amblyomma variegatum	Tail and Ear
Boophilus decoloratus	Ear
Dermacentor marginatus	Tail
Hyalomma dromedarii	Tail
Hyalomma excavatum	Tail
H. anatolicum	Tail and Ear

It was observed that *H. anatolicum* and *A. variegatum* were found on both examined sites such as tail and ear while all remaining species were recorded on the tail. The maximum tick infestation was recorded in the tail followed by the ear (Table 2). The tail has long hair which provides a suitable site for tick hiding as well as provides favorable environmental conditions for tick growth and development. It has been observed that female goats and sheep are highly infested with tick burden than males. Rony *et al.,* (2010) had investigated a similar finding of infestation rate in young hosts while the same was reported by Tsai *et al.* (2011) and Khalil *et al.* (2018). No significant difference was observed in sex in the current study area. Our findings are in line with the findings of Abera *et al.* (2010) they had also observed no significant differences in sex.

B. decoloratus was collected from both hosts while *A. variegatum, H. dromedarii* and *H. anatolicum* were collected from sheep while all others were collected from goats (Table 3).

Table 3. Collection of tick species from selected hosts in the study area.

Tick species	**Domesticated animals**	
	Goat	**Sheep**
Amblyomma variegatum	X	√
Boophilus decoloratus	√	√
Dermacentor marginatus	√	X
Hyalomma dromedarii	X	√
Hyalomma excavatum	√	X
Hyalomma anatolicum	X	√

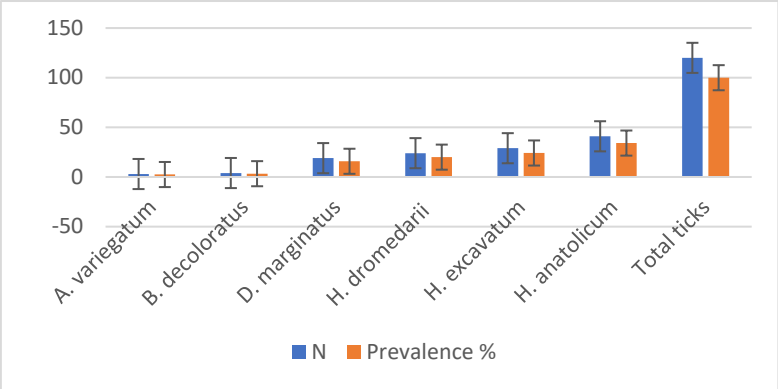

Fig.1. Prevalence and identified tick species from the study area.

Conclusion:

Ticks are becoming a major threat to the livestock industry in the country for a few years. They suck or feed on the blood and cause directly or indirectly serious zoonotic diseases to hosts such as humans, animals, birds, reptiles and wild animals, etc. The growth and development of the host are highly affected during a severe attack of ticks on the host. The summer is a suitable month for tick growth and distribution. Ticks can spread through the migration of their hosts like selling and purchasing animals as well as birds. The proper control measure should be adopted to control this notorious pest in the country. If not, proper control measures are adopted then it invades other areas of the country.

Conflict of Interest:

The authors have no conflict of interest.

Acknowledgment:

The authors are highly thankful to all concerned institutes.

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