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PREVALENCE AND IDENTIFICATION OF IXODID TICK GENERA IN FRONTIER REGION PESHAWAR

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ABSTRACT

A study to investigate hard tick (Ixodid) infestation and genera identification in 30 different herds in randomly selected 15 villages of Frontier Region Peshawar was carried out during August 2003 through February 2004. Ticks were identified for their genera, in Parasitology Laboratory, Veterinary Research Institute, Peshawar. The effect of month, age, status of body condition, post treatment effect of acaricides, housing and grazing systems on tick infestation was recorded. Out of 1279 farm animals studied, 255 cattle, 97 buffalo, 273 sheep, 544 goat and 110 donkeys were studied for tick infestation. About 13.37 % of the total observed farm animals were found tick infested with highest infestation in cattle (20.4%) followed by sheep (12.8%), goat (12.1%), buffalo (11.3%) and donkey (6.4%). The most commonly prevalent ticks were belonging to genus Boophilus (46.1%) followed by Hyalomma (31.25%), Rhipicephalus (17.93%) and Amblyomma (4.61%). Tick infestation was higher in late summer and lower in winter. The effect of age, status of body condition and post treatment effect of acaricides was found non-significant.

Keywords: tick, ixodid, herd, genera, infestation, disease, animal.

INTRODUCTION

Parasitic diseases are the most prevalent in the province of N.W.F.P. causing huge losses of livestock wealth. Only ecto and endoparasites cause 40% production losses to our herds (Irfan 1984). Ectoparasites especially ticks play a major role of vector in spread of different diseases of livestock and human beings. Surveillance studies have indicated high prevalence of different ticks in domestic and wild animals in the country (Hussain 1980, Cheema 1992). In addition to production losses various fatal haematozoan diseases like babesiosis, theileriosis and anaplasmosis and many ricketsial diseases are also transmitted through ticks which further increase the losses to the livestock industry and province (Gray and Potgieter 1982). The problem of tick infestation warrants of launching urgent control program. For this purpose the knowledge of different species/genera of the prevalent ticks on different animals' species deemed to be essential.

The present study was planned to identify different genera of prevalent tick species on different livestock hosts in Frontier Region (F.R) Peshawar. F.R. Peshawar is bounded from East with Nizampur, from South with Kohat and from West with the tribal area of Dara Adamkhel. F.R. Peshawar is hilly and dry with very little irrigation facilities. This study was designed to identify different genera of hard ticks prevalent in farm animal species. Different studies have been conducted on various aspects of tick prevalence in various parts of the country and from abroad. However, similar information for F.R. Peshawar was lacking.

MATERIALS AND METHODS

A study investigating hard-ticks (Ixodidae) infestation and their genera identification was carried out in F.R. Peshawar. Part of the data was collected from survey and field observation while further examination leading to genera identification were carried out in Parasitology Laboratory, Veterinary research Institute, Peshawar. Representative samples from 30 herds were studied periodically for 7 consecutive visits i.e. from August 2003 to February 2004. The infestation rate was categorically determined examining different body parts of host species through naked eye. The following field information supporting the study was collected:

- Name of farmer
- Name of village
- Number of farm animals
- Species of farm animals (cattle, buffalo, sheep, goat and donkey)
- Month of observation (August 2003 to February 2004)
- Age
  < 1 year, 1-2 year, > 2 year for cattle, buffalo and donkey
  < 6 months, 6-12 months, >12 months for sheep and goats
- Sex (Male/Female)
- Health status (Fatty, Fair and Bony)
- Post acaricide infestation (Yes or No)

Ticks Collection

Ticks were collected from all infested body parts in labeled capped bottles. Collection was made using forceps and care was taken to avoid decapitulation. Ticks were transferred to empty petridish and left for 15- 20 minutes for bringing back to relax status at the laboratory. Enough ethanol (70%) was added to the petridish containing ticks as preservative. Ticks were remained floating in the ethanol for unidentified period till identification. Ticks were subjected to identification

process using keys (Soulsby 1986, Urquhat *et al.* 1987) adopting the following procedure:

Ticks Processing

Ticks were shifted in potato tubes having 15% of Potassium hydroxide (KOH). The solution containing ticks was boiled for 15-20 minutes and then allowed to cool. After cooling ticks were removed and passed through grades of ethanol (20%, 40%, 50%, 60%, 70%, 80%, 90% and 95%). In each grade of ethanol ticks were kept consecutively for 2 hours, before shifting to the higher grade. Ticks were then washed with tape water and transferred to clove oil for 24-48 hours. All the collected ticks were identified under microscope using proper keys. Permanent mounts of ticks were prepared on glass slide using Canada balsam as sticking agent. A cover slip was applied over the slide to make it permanently mounted.

RESULTS AND DISCUSSION

Ticks Identification

About 13.37% of the total observed animals (1279) pertaining to all species of farm animals were infested with ticks (Table-1). Among these, 20.4% of cattle were infested. Cattle were found to be the most susceptible for tick infestation followed by sheep (12.8%), goat (12.1%), buffalo (11.3%) and donkey (6.4%) (Table-1). Although donkey comprise a few of the herds in a very low number and was observed the most resistant specie among the farm-animals. Some authors (Nasim and Hamid, 1986 and Khan, 1993) reported a higher concentration of ticks in different farm animal zone, which proves a variation for tick prevalence in different agro-climatic zones of the country. Nasim and Hamid (1986) reported tick infestation 33.7% in cattle, 22.8% in buffaloes, 16.67% in goats and 10.4% in sheep in N.W.F.P. Khan (1993) reported that tick infestation was 28.2%, 18.8%, 14.7% and 12.3% in cattle, sheep, buffalo and goat in Faisalabad, respectively. All these findings show highest susceptibility of cattle to ticks prevalence.

Table-1. Total animals examined and infested with Ticks.

Animal species	Animal observed	Animal infested	
		No.	Percent
Cattle	255	52	20.4
Buffalo	97	11	11.3
Sheep	273	35	12.8
Goat	544	66	12.1
Donkey	110	7	6.4
Total	**1279**	**171**	**13.37**

Month and Tick Infestation

Months significantly ($P < 0.05$) affected ticks infestation rate in cattle, sheep and goat except in buffalo and donkey. Maximum infestation was observed in August and lowest in December and January. 25.8% infestation was observed in August, 21.3% in September, 15.8% in October, 10.5% in November, 6.7% in December, 6.7% in January and 8.4% in February (Table-2). The results showed that infestation rate was highest in August and followed a diminishing trend in the succeeding months. This explains the association of an enhanced tick's activity with increased hotness and dampness of the environment. Tick infestation was influenced by temperature and humidity (Khan, 1996). Das-ss (1994) reported a similar trend for tick's activity. The author observed a higher ticks' infestation in cattle and buffalo at its peak during June-September and lowest during November-February in India. Latha *et al.* (2004) examined the seasonal activity of ticks on sheep and goat in India and reported their high infestation in rainy season.

Table-2. Infestation rate (%) in farm animals across different months.

Month	Cattle	Buffalo	Sheep	Goat	Donkey	Average
August	35.1	28.6	25.0	21.5	18.8	25.80
September	32.4	21.4	20.5	19.7	12.5	21.30
October	27.8	14.3	17.9	12.7	6.3	15.80
November	18.9	7.7	7.7	11.5	7.1	10.58
December	8.3	7.1	5.1	6.3	-	6.70
January	8.6	-	5.1	6.5	-	6.73
February	10.8	-	7.9	6.6	-	8.4
Significance of Difference	P< 0.01	NS	P<0.05	P<0.01	NS	

NS = Non Significant

Age wise Ticks infestation

Table-3 indicates infestation rate across different age groups. Age had no effect (P > 0.05) on tick infestation in farm animals, however, younger animals (below 1 year age) were found most affected across the farm species. In cattle, (young stock) aged below 1 year was suffering 24.5 %, against the yearlings (1-2 year age) (20.5%) and adult animals (above 2 years age) (19.2%). The same trend was observed in buffaloes, donkeys and the small ruminants. In buffaloes infestation was higher in young stock (20.8%) followed by yearling (20.0%) and adults (6.3%). In donkey infestation was maximum in young stock (20.0%) followed by yearling (8.3%) and adults (4.9%). In small ruminants animals were grouped differently than large animals. Animals below six months were grouped as under-weaned, weaned as 6-12 months and adult as above 12 months of age. In sheep and goat infestation was almost similar and higher in under-weaned and weaned stock (15.8%, 13.9%) and (15.4%, 14.5%), respectively, than infestation in adult stock (9.8%, 10.3%). It trend in the infestation variation shows that resistance in the animals are building up as the age advances and the animals become more adoptable than in younger state irrespective of the farm species.

Das-ss (1994) reported highest ticks incidence in young calves (47.99%), growing (41.19%), heifer (39.82%) and adult cattle (35.35%). Sort (1973) reported that younger cattle were more susceptible to ticks infestation.

Table-3. Infestation rate (%) in farm animal species across different age groups.

Age group	Cattle	Buffalo	Donkey	Sheep	Goat
< 6 months	24.5	20.8	20.0	15.8	13.9
6 – 12 months				15.4	14.5
> 1 year	20.5	20.0	8.3	9.8	10.3
1-2 year				-	-
> 2 year	19.2	6.3	4.9	-	-

Status of body condition and Tick Infestation

Table-4 shows tick infestation in different body conditional status animals. Body condition did not affect ticks infestation across different farm animal's species significantly (P > 0.05), although visibly different. In cattle, infestation was similar and higher in fair conditioned (21.1%) and bony animals (20.0%) than fatty (17.8%) ones. In buffalo, infestation was higher in bony animals (18.2%) followed by fair conditioned (12.9%) and fatty (4.2%) animals. Highest infestation was recorded in bony animals (14.0%), followed by fair conditioned (12.6%) and fatty (12.2%) sheep. Infestation in goat was highest in fair animals (13.3%) followed by bony (10.3%) and fatty (7.2%) animals. In donkey maximum infestation was observed in fatty animals (9.1%) followed by bony (7.7%) and fair conditioned (5.8%).

Tick infestation with in the same conditioned group across different farm animal's species was not different, however, prevalence rate was higher in bony (14.64%), followed by fair conditioned animals (13.3%) and in fatty animals (10.1%). The observations indicate that bony conditioned animals are least resistive to tick infestation and lacking enough body potential to build resistance with age advancement. Over-conditioned animals on the other hand showed reasonable combat to the infestation. Zaman (1997) observed no differences for tick prevalence in good and poor body condition. Sort (1973) also reported that general condition of cattle was not related to tick infestation.

Table-4. Infestation rate (%) in farm animal species across different body conditional status.

Animal Species	Bony	Fair	Fatty
Cattle	20	21.1	17.8
Buffalo	18.2	12.9	4.9
Sheep	14	12.6	12.2
Goat	10.3	13.3	7.2
Donkey	7.7	5.8	9.1
Average	**14.6**	**13.3**	**10.1**

Post-treatment effect of Acaricides

Table-5 shows post-acaricide Infestation rate of ticks in farm animal's species. Animals in 1-2 month post-treatment period with acaricides were observed for tick's infestation. Post treatment did not significantly (P > 0.05) affect the infestation across different species in farm animals. However, those treated with acaricides were infested slightly lower (6.7%) than the untreated one (15.7%). In cattle, infestation rate in animals treated with acaricides was lower (13.8%) than untreated (21.2%). Same trend was observed in buffalo where the acaricide treated group (2.9%) was lower in infestation than the untreated group (16.1%). In sheep and goat infestation was lower in treated group (7.1% and 3.3%) than in untreated group (13.1% and 12.6), respectively. No result was

obtained in donkey as no treatment with acaricides against ticks was reported. It is obvious from the above findings that both the treated and untreated carry the tick load although differently. Tick presence in treated animals may be due to the application of poor concentration of acaricide or the use of poor-efficacy drugs available in market. Dawning *et al.* (1952) reported that Toxaphane would provide protection against ticks for 12-14 days. Similarly, spraying only the animals and leaving the tick's sanctuaries untouched, do not relieve the stock from the ticks load.

Table-5. Post-acaricide infestation rate (%) of Ticks in farm animals.

Animal Species	Treated	Untreated
Cattle	13.8	21.2
Buffalo	2.9	16.1
Sheep	7.1	13.1
Goat	3.3	12.6

Genus identification and prevalence rate of hard Ticks in farm animals' species

Ticks were collected from randomly selected herds in different villages of F.R. Peshawar and processed for genus identification in Parasitology Laboratory, Veterinary Research Institute, Peshawar. The infested Ticks were belonging to the following four genera:

- *Boophilus*
- *Hyalomma*
- *Rhipicephalus*
- *Amblyomma*

Out of the total (1960) collected specimens of Ixodid ticks only 1170 (59.74%) were having all the body parts intact and were studied for genera identification. The most commonly infested ticks were belonging to genus *Boophilus* (46.1%) followed by *Hyalomma* (31.2%), *Rhipicephalus* (17.9%) and *Amblyomma* (4.6%) (Table-6). Different other studies reported higher number of genera involved in farm animal infestation (Sharif, 1928; Shardar *et al.*, 1998; Mc Carthy, 1967). A study conducted at Maharashtra (India) by Shardar *et al.*, (1998) found *Boophilus*, Haemaphysalis, *Hyalomma*, *Amblyomma*, *Nosoma* and *Rhipicephalus* in bovine farm animals at 40%, 16.96%, 20.14%, 10.22%, 4.56% and 1.96% concentration, respectively. Nasim and Hamid (1986) reported the same genera of ticks in addition to *Haemaphysalis* and *Dermacentor* in cattle, buffalo, sheep, goats, camels and dogs in various districts of N.W.F.P., but found *Hyalomma* as the most common followed by *Boophilus*, *Haemaphysalis*, *Rhipicephalus* and *Dermacentor*. Mc Carthy (1967) found eight different genera of ticks namely as *Boophilus*, *Rhipicephalus*, *Hyalomma*, *Amblyomma*, *Dermacentor*, *Haemaphysalis*, *Ixodes* and *Aponoma* from various parts of Pakistan. The lower number of the genera observed might be due to a limited area specified for the current study. In a limited study carried out by Hussain (1980) and Khan (1993) reported four genera, although different from each other, for the ticks infesting local farm animals in their respective studies.

Table-6. Infestation rate (%) of identified Tick's genera in farm animals.

Animal Species	*Boophilus*	*Hyalomma*	*Rhipicephalus*	*Amblyomma*
Cattle	43.40	36.65	16.88	3.05
Buffalo	53.12	31.25	15.62	-
Sheep	37.57	29.69	24.84	7.87
Goat	56.52	19.92	16.30	7.2
Donkey	43.18	33.33	21.42	4.54

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