Research Journal of Parasitology

ISSN 1816-4943

Academic Journals Inc.

www.academicjournals.com

Research Journal of Parasitology 3 (3): 98-103, 2008
ISSN 1816-4943

Ixodid Tick Species Infesting Cows and Buffaloes and Their Seasonality in West Azerbaijan

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Abstract: The current research based on the determination of tick species living on both cows and buffaloes' skins and also the specification of the infestation variation in terms of age, gender and season was conducted from (March 2006 to February 2007). In the stated time span, the samples were collected from both genders of the cows and buffaloes in the population of 1800 for each group in twenty one cities of West Azerbaijan province. The analysis portrays the fact that 183 (10.16%) cows and 23 (1.7%) buffaloes have been infested. In both groups the higher infestation rate belongs to spring while the lowest one refers to winter and summer for cows and buffaloes, respectively, hence revealing significant meaningful relation between the abundant presence of tick and seasons. From 703 adult identified ticks on cows there was *Hyalomma anatolicum anatolicum* (49.78%), *Rhipiephalus bursa* (18.91%), *Hyalomma anatolicum excavatum* (11.95%), *Rhipiephalus sanguineous* (13.37%), *Dermacentor marginatus* (4.55%), *Boaphilus anulatus* (0.71%) and *Rhipiephalus thuranicus* (0.71%) and from 96 adult identified ticks on buffaloes there was *Hyalomma anatolicum-anatolicum* (69.57%), *Rhipiephalus bursa* (21.47%), *Hyalomma anatolicum excavatum* (8.69%) and *Dermacentor marginatus* (3.98%). The distribution of ticks on the cow body surface was in inguinal region (50.26%), perineum (30.1%), breasts (15.87%) and testis (3.7%), whereas in buffaloes, the distribution of tick was in inguinal region (60.86%), breasts (34.78%) and perineum (3.7%), respectively.

Key words: Ixodid tick, cow, buffalo, season, West Azerbaijan

INTRODUCTION

Tick born diseases of livestock constitute a complex of several diseases with different etiological agents, such as protozoa, rickettsia, bacteria and viruses. Ticks (Ixodidae) play a significant role as a vector of pathogens of domestic animals in Iran. Ticks biology and their distribution studies in Iran were initiated in 1810 when Dupre visited this country (Janbakhsh, 1956). Brumpt (1935) conducted a study on genus *Orinthodoros* ticks. Baltazard explained the characteristics of *Ornithodorus* ticks (Baltazard *et al*., 1952). The role of ticks in transmissions of *Borrelia* was reported by Janbakhsh (1956). The distribution of tick species that are able to infest animals in Iran is briefly reviewed on the basis of published records. Later Abbasian-Lintzen (1961) and Mazlum (1968, 1971) compiled a list of adult ticks collected from domestic animals. Filippova *et al*. (1976) presented data for 642 ixodid ticks taken from small-sized mammals, mainly rodents in different zoogeographical zones of Iran. Razmi *et al*. (2003) in a research found that 61.1% of the animals harboured *Hyalomma a. anatolicum*, 33.42% *Rhipicephalus sanguineus* and 0.05% *Hyalomma m. marginatum*. Hoogstral and Wassef (1979) and Hoogstral and Valdez (1980) studied ixodid ticks parasitizing wild sheep and goats in Iran

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focusing on maintaining natural foci of many hazardous diseases for human. Rahbari (1995) published ecological aspects of various species of ticks encountered on domestic animals in the Northwest of Iran and Razmi *et al.* (2002) published a list of tick species of domestic animals in the northeast of the country. However, there still seems to be a gap in our knowledge about the distribution of tick species in Iran. In recent years, the number of researches about the effects of climatic factors affecting the interactions between vectors, hosts and pathogens has been increased. In this sense, many studies have been conducted to understand the tick species composition. Fantastic studies concerning ticks were of interest to evaluate the distribution and composition of species affecting livestock, thus it was a main step in our knowledge of the pathogens that maybe transmitted by tick and, hence, result in negative economic effects on animal production and public health (Bouattour *et al.*, 1999).

MATERIALS AND METHODS

Field Study Area

This study was carried out from March 2006 to February 2007 in all urban and rural areas located in West Azerbaijan province, northwest of Iran. An average population of 615587 cows (448235 Iranian local breed cows, 146205 hybrids and 21147 Frisian) was distributed in this area. The climate of the area is semi Mediterranean, with cold winters and semi-warm summers with an average annual rainfall of 300-400 mm. The mean annual temperature ranges from -30 to 38°C. The coldest area is the northwest and the warmest area is south of The Urmia lake. The cattle are reared using a traditional management system characterized by extensive grazing on natural pasture. Cattle are moved to pasture in the morning and brought back to the village in the evening. During the winter months, the cattle are fed indoors. Local breed cattle are dominant in the region.

Sample Size and Tick Examination

All the ticks were manually removed from the cattle. The removed ticks from cattle were taken into labeled bottles with cotton wool dampened showing the collection points. During this period, a total of 703 ixodid ticks (277 male, 393 female, 33 larvae) specimens were collected. Collected ticks were preserved in glycerin and 70% alcohol (1:9) (this solution prevents the samples from drying and breaking) and then the samples were transferred to the parasitological laboratory of the Faculty of Veterinary Medicine, Urmia University, Urmia, Iran. The collected ticks were counted and speciation was done by using the identification-keys of Kaiser and Hoogstraal (1963) and Mazlum (1972).

RESULTS

Out of 703 collected ticks from cows, 350 *Hyalomma anatolicum* ticks (49.78%) were identified as the most abundant species while 5 *Boophilus annulatus* ticks (0.71%) were as the least species. Species ticks diversity is shown in Table 1.

Identified ticks on cows according to contamination rate respectively were: *Hyalomma* 434 (61.73%), *Rhipicephalus* 232 (33%), *Dermacentor* 32 (4.55%) and *Boophilus* 5 (0.71%). Counts of tick larvae showed that the largest number of larvae were generally present in June and July. A total of 69 ticks were directly collected from buffaloes. They belong to the genus *Hyalomma* and *Rhipicephalus*, among which *H.a. anatolicum* 48 (69.57%), *H.a. excavatum* 6 (8.69%) and *R. bursa* 15 (21.74%) (Table 1). The occurrence of ticks was more noticeable in spring in cow and buffaloes. Larvae exist in cows in spring and summer, while in buffaloes it is limited to spring (Table 2).

Contamination to species Dermacentor and *Boophilus* didn't observed in West Azerbaijan buffalos. The collected data didn't support any scientific analyses in terms of the number of tick and humidity, since it was not a control variable in the study.

Table 1: Numbers of ticks on cow collected in West Azerbaijan

Species	No. of males	No. of females	Total	Frequency (%)
Cow				
H.a. anatolicum	157	193	350	49.78
H.a. excavatum	34	50	84	11.95
R. bursa	53	80	133	18.91
R. sanguineus	38	56	94	13.37
R. turanicus	2	3	5	0.71
D. marginatus	14	18	32	4.55
B. annulatus	0	5	5	0.71
Buffalo				
H.a. anatolicum	22	26	48	69.57
H.a. excavatum	3	3	6	8.69
R. bursa	11	4	15	21.74

Table 2: Numbers of ticks in the seasonal collected in West Azerbaijan

Season	Male count	Female count	Larvae	Total
Cow				
Spring	103	200	9	312
Summer	55	116	24	195
Autumn	73	48	-	121
Winter	46	29	-	75
Buffalo				
Spring	11	15	5	31
Summer	-	7	-	7
Autumn	12	5	-	17
Winter	8	6	-	14

Table 3: The percentage of tick species attaching to different body areas of cows and buffaloes

Species	Testis region (%)	Breast region (%)	Perineal region (%)	Groin region (%)
Cow				
Hyalomma	5	14	35	46
Rhipicephalus	4	12	44	40
Dermacentor	-	10	21	69
Boophilus	-	-	100	-
Buffalo				
Hyalomma anatolicum	-	37	7	56
Rhipicephalus bursa	-	31	15	54

As it is shown in Table 3 except for perineal region in cows which contamination rate was 100%, groin was the highest infested region both in cows and buffaloes.

DISCUSSION

In the present study carried out in the West Azerbaijan of Iran, *H.a. anatolicum*, *H.a. excavatum*, *R. bursa*, *R. thuranicus*, *D. marginatus* and *B. anulatus* were recovered from cattle and *H.a. anatolicum*, *H.a. excavatum* and *R. bursa* were recovered from buffalo. This study showed that *H.a. anatolicum* and *R. bursa* were the major tick species of cattle and buffalo in the northwest of Iran, the climate of which is semi Mediterranean. cattle and *H.a. anatolicum*, *H.a. excavatum* and *R. bursa* were recovered from buffalo. This study showed that *H.a. anatolicum* and *R. bursa* were the major tick species of cattle and buffalo in the northwest of Iran, the climate of which is semi Mediterranean. *R. turanicus* and *B. annulatus* on cattle and *H.a. excavatum* on buffalo were less frequently seen. According to Mazlum (1971), in Azerbaijan province, *H.a. anatolicum* is the most prevalent tick among Ixodid ticks, which is in complete agreement with the present study. This finding thus lends support for the peak activity of the hard ticks is in June to July in the northern regions of Iran (Mazlum, 1971). Previous studies by Hoogstraal and Valdez (1980) and Filippova *et al*. (1976)

presented data for 24 species of ixoidid ticks taken from wild animals in Iran. All of these studies have confirmed that *Boophilus annulatus* species have just occurred in animal in Iran. The study displays only five *B. annulatus* females.

The distribution of *Rhipicephalus* species in region showed that *R. turanicus* is minor species among the three species of *Rhipicephalus* that recorded in different parts of Iran, however these species are dominant in the mountainous area in the central part of Iran, These finding is in full agreement with Rahbari *et al*. (2007). *Rhipicephalus* species as a vector of *Babesia ovis* were still intensively studied (Razmi *et al*., 2002).

H.a. anatolicum recorded over widely scattered area from Golestan to Guilan, is a vector of causative organism of tropical theileriosis (Hooshmand Rad, 1967) and transmits a variety of pathogenic organism such as *Theileria lestoquardi*, The *Equi* and Crimean-Congo hemorrhagic fever virus (Walker *et al*., 2003) several cases of Crimean-Congo fever which have been reported in human since summer 1999 in different areas of Iran (Izadi *et al*., 2004). Therefore, it is a treat to animal improvement program and is known as an important tick vector in Iran (Nabian *et al*., 2007).

An investigation carried out in Tekab (West Azerbaijan province), revealed the presence of *Ornithodoros tholozani* (family: Argasidae) in the region (Tileco, 1997). In another study conducted in East Azerbaijan, only the seven species of genera *Hyalomma* (*H. Marginatum*, *H. d. detritum*, *H.a. anatolicum*), *Rhipicephalus* (*R. bursa*), *Heamaphysalis* (*H. sulcata*), *Dermacentor* (*D. marginatus*) and *Boophilus* (*B. annulatus*) were reported (Piazak, 1991). Ababassian and Mazlum were not able to find *Haemaphysalis inermis* in Azerbaijan province (Abbassian-Lintzen, 1960; Mazlum, 1971) that was contradictory with present findings.

Dumali *et al*. (2005) a total of 179 ticks (136 female, 43 male) belonging to *Hyalomma* species were collected from cattle from three towns of Eastern Turkey. Ticks were identified to be *H.a. anatolicum*. In another study in Kayseri region of Turkey, a total of 1,585 ticks consisting of *R. turanicus* (2.27%), *R. bursa* (2.14%), *R. sanguineus* (0.94%), *H. marginatum* (17.16%), *H.a. excavatum* (24.73%), *H.a. anatolicum* (19.62%), *D. niveus* (1%), *B. annulatus* (16.71%), *O. lahorensis* (0.25%), *Hyalomma* spp. *nymphs* (7.31%) and *B. annulatus nymphs* (7.82%) were collected (Ica *et al*., 2007).

It was reported by Ica *et al*. (2007) that *Rhipicephalus* species were generally found in spring, others like *Hyalomma* in late spring, summer and early autumn, *B. annulatus* in September, October and December, *D. niveus* in December, January and February and *O. lahorensis* in December. Immature forms (nymphs) of *Hyalomma* species were found in summer and autumn, while *B. annulatus* nymphs were observed in October, November and December.

However, Aktas *et al*. (2004) reported that *H.a. anatolicum* and *H.a. excavatum* were the major tick species of cattle in the east of Turkey, the climate of which is arid. *H. detritum* and *H.m. marginatum* were less frequently seen on cattle. The arid regions may not be favorable for these ticks which are usually considered as species of semi-arid regions.

Nabian *et al*. (2007) found *R. bursa* as the minor species in Golestan and Ardebil which were only collected from sheep but *R. sanguineus* was the numerous and prevalent tick which was found in Golestan, Mazandaran and Ardebil but collected data in present study showed that *R. bursa* (18.91%) had the most frequency in *Rhipicephalus* species, however, in another study (Rahbari *et al*., 2007) *R. bursa* as a dominant sheep tick in the Zagros mountainous area and could not be found in the semi dessert area and in the Persian Gulf area, whereas *R. sanguineus* was the major species in the north part (Caspian Sea area) and in the semi dessert area. *R. turanicus* is mostly found in a semi dessert area with fever occurrence in the Zagros mountainous area and it is also absent or very rare in the north part and Persian Gulf area.

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