J Parasit Dis (Jan-Mar 2015) 39(1):37–40
DOI 10.1007/s12639-013-0267-8

ORIGINAL ARTICLE

J P D

Prevalence of ixodid ticks on cattle, sheep and goats in Ilam County, Ilam Province, Iran

Ali Loui Monfared · Mohammad Mahmoodi · Roohollah Fattahi

Received: 9 February 2013 / Accepted: 16 February 2013 / Published online: 12 March 2013

Abstract This survey was performed to find out the infestation rate of Ixodidae ticks in domestic ruminants in Ilam County during 21 March 2009 to 23 August 2009. Sampling was performed in 25 villages and 15 animal farm from different areas of this County. A total of 1,316 ticks were collected from 416 cattle, 208 sheep and 147 goats. The overall prevalence of ticks was recorded: 43, 23.5, and 49/6 % in cattle, sheep, and goats respectively. The number of ticks that collected from cattle, sheep, and goat were 328, 573, and 415 respectively. According to the host, *Hyalomma anatolicum anatolicum* (71.4 %), *Hyalomma asiaticum asiaticum* (17.6 %) and *Rhipicephalus bursa* (11 %) were collected from cattle. *Hy. anatolicum* (32.1 %), *Rh. bursa* (42.2 %), *Rhipicephalus sanguineus* (17.3 %) and *Haemaphysalis inermis* (8.4 %) were collected in sheep. *Rh. bursa* (41.5 %), *Rh. sanguineus* (43.2 %) and *Ha. inermis* (15.3 %) were observed in goats. In this study, ticks infestation rate of cattle, sheep and goat were (43 %), (23.5 %) and (49.6 %) respectively. In this survey the ticks distribution on the body surface of infested ruminants the highest infestation was found in the udder and tail (21 %) in cattle, ear (42.5 %) and tail (30 %) in sheep and ear (63 %) and tail (17 %) in goats. The lowest number of ticks in body surface of ruminants was observed in the ear and shoulder (2 %) in cattle, head and neck (2 %) in sheep and udder (7 %) in goats. *Hy. anatolicum anatolicum*, *Rh. Sanguineus* and *Rh.bursa* were dominant tick in domestic ruminants of Ilam County.

Keywords Ixodidae ticks · Domestic ruminants · Ilam

A. Loui Monfared
Paraveterinary Faculty of Ilam, University of Ilam, Ilam, Iran

M. Mahmoodi
Ilam Veterinary Department, Ilam, Iran

R. Fattahi (✉)
Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran
e-mail: fatahy@ut.ac.ir

Introduction

The ixodid tick species are the most abundant tick parasites infesting ruminants. Ticks have been recognized as the notorious threat due to severe irritation, allergy and toxicosis (Niyonzema and Kiltz 1986; Sajid et al. 2008).

Ticks of Ixodidae family not only cause lower production of animals but also transmit a number of bacterial, protozoal, rickettsial, spirochaetal and viral diseases to human and domestic animals (Rezaei et al. 2011).

The problem of tick infestation warrants of launching urgent control programs. For this purpose, the knowledge of different species/genera of the prevalent ticks on different animal species deemed to be essential (Manan et al. 2007).

Ixodidae family is one of the largest families of parasitic ticks that infest domestic ruminants. So far at least 13 genus and 650 species of Ixodidae ticks have been identified and reported (Horak et al. 2002).

Ilam Province particularly Ilam County is one of the most important centers of breeding and maintenance of domestic ruminants in west of Iran.

According to the statics of Ilam veterinary department Cattle, sheep and goats population were 8,052, 2,00,000 and 1,20,000 respectively in Ilam County in 2009. The objective of this study was to determine the species of ticks infesting domestic ruminants and evaluation of ticks'

distribution on the body surface of infested ruminants in Ilam County of Iran.

Materials and methods

The study was conducted in seasonal activity of ticks in Ilam County from 21 March 2009 to 23 August 2009. This area is located in the west of Iran at a latitude of 33° 38′ north and longitude of 46° 26′ east. It has a mountainous climate with cold winter and dry summer. The mean elevation of the city is about 1,319 m above sea level. This county is near to Iraq country from the west, iwan County from the north, Mehran and Darre shahr County from the south and Shirvan–chadavol County from the east.

Ticks were collected from 4 regions of animals' body surface. These consisted of head (head, ears and neck), shoulder (shoulder and axillaries area), anal (tail, anal and perianal region) and udder (udder and groin around). For this study, 25 villages and 15 farms were selected from different areas of this county. Then 416 cattle, 208 sheep and 147 goats were selected randomly and they were investigated for tick infestation. The collected specimens were transferred into the holding tubes and preserved in 70 % alcohol and transferred to the laboratory Parasitology of Ilam department of veterinary medicine for further studies. A determination was done by using a stereo microscope according to the identification key of Kerinas and Litwak (1989)

Results

In the present survey, a number of 1,316 ticks were collected. The number of ticks that collected from cattle, sheep, and goat were 328, 573, and 415 respectively (Table 1). In our survey according to the host, *Hy. anatolicum anatolicum* (71.4 %), *Hy. asiaticum asiaticum* (17.6 %) and *Rh. bursa* (11 %) were collected from cattle. *Hy. anatolicum anatolicum* (32.1 %), *Rh. bursa* (42.2 %), *Rh. sanguineus* (17.3 %) and *Ha. inermis* (8.4 %) were collected in sheep. *Rh. bursa* (41.5 %), *Rh. sanguineus* (43.2 %) and *Ha. inermis* (15.3 %) were observed in goats (Table 2). In this study ticks infestation rate in cattle, sheep and goat were (43 %), (23.5 %) and (49.6 %) respectively. On the animals' body surface the highest infestation was found in the udder (37 %) and tail (21 %) in cattle, ear (42/5 %) and tail (30 %) in sheep and ear (63 %) and tail (17 %) in goats. The lowest number of ticks on animals' body surface was observed in the ear and shoulder (2 %) in cattle, head, and neck (2 %) in sheep and udder (7 %) in goats (Table 3). The mean number of ticks on cattle, sheep, and goat were 1.8, 3.5, and 2.4 respectively. In this study *Hy. anatolicum anatolicum*, *Rh. Sanguineus* and *Rh.bursa* were the dominant tick in domestic ruminants of Ilam County.

Discussion

Ticks are implicated in the transmission of different pathogens such as viruses, bacteria, protozoa and filarial nematodes in animals and humans (Dantas-Torres 2008). Therefore information about how the regional distribution and abundance of species ticks is necessary.

In this study, the overall prevalence of ticks was recorded 43, 23.5, and 49.6 % in cattle, sheep, and goats respectively. The findings of this study showed the occurrence of three genus and five species of hard ticks in Ilam County. According to this survey, an infestation to hard ticks in goats was higher than other ruminants.

The results of this study showed that *Hy. anatolicum anatolicum* was the dominant tick on cattle while *Rh. bursa* was the dominant tick on sheep and *Rh. sanguineus* was the dominant tick on goats. Also *Rh.bursa* exhibited the lowest frequency in cattle and *Ha. inermis* exhibited the lowest frequency in sheep and goats.

In parallel to our study *Hy. anatolicum anatolicum* was recorded over widely scattered throughout Iran. It is a vector of the causative organism of tropical theileriosis and it transmits a variety of pathogenic organism such as *Theileria lestoquardi*, *Th. equi, B.cabali*, *Trypanosoma theileri* and Crimean-Congo haemorrhagic fever virus (Nabian et al. 2007).

In the study was carried out by Nasiri et al. (2010), on sheep in Abdanan County, southeast of Ilam Province, two genera and five species were collected including: *Hy. marginatum* (44.67 %), *Hy. anatolicum* (43.17 %), *Hy.asiaticum* (6.37 %), *Hy. dromedarii* (5.55 %), *Ha. sulcata* (0.24 %). These results similar to our findings but in this survey genus *Rhipicephalus* have not been observed. Ilam County is situated in the cold mountainous region of

Table 1 Prevalence of ticks in domestic ruminants of Ilam County

No. of cattle			No. of sheep			No. of goats		
Examined	Infested (%)	Isolated ticks	Examined	Infested (%)	Isolated ticks	Examined	Infested (%)	Isolated ticks
416	179 (43 %)	328	208	49 (23.5 %)	573	147	73 (49.6 %)	415

Table 2 Percentage of tick species collected from domestic ruminants in Ilam County

Percentage of isolated ticks on animals Tick species identified	Cattle	Sheep	Goats
Hyalomma anatolicum anatolicum	71.4	32.1	–
Hyalomma asiaticum asiaticum	17.6	–	–
Rhipicephalus bursa	11	42.2	41.5
Rhipicephalus sanguineus	–	17.3	43.2
Haemaphysalis inermis	–	8.4	15.3

Table 3 Tick infestation rate in outer surface of domestic ruminant in Ilam County

Animals	Udder (%)	Ear (%)	Head and neck (%)	Shoulder (%)	Tail and anal (%)	Groin (%)
Cattle	37	2	28	2	21	10
Sheep	18	42	2	–	30	8
Goats	7	63	–	–	17	13

Iran, The mean elevation of this county is about 1,319 m above sea level and the average annual rainfall is 700 mm. Whereas Abdanan township is located in the Southeast of Ilam County and has a tropical climate, The mean elevation of this city is about 119 m above sea level and the average annual rainfall is 250 mm. Ticks presence and their abundance can be affected by these natural conditions.

Rhipicephalus bursa and *Rh. Sanguineus* were reported in different part of Iran (Nabian et al.2007; Telmadarraiy et al. 2004; Moshaverinia et al. 2012; Rahbari et al. 2007; Nabian and Rahbari. 2008; Yakhchali et al. 2011).

Rhipicephalus sanguineus is considered a globalized tick and is able to transmit pathogens such as Rickettsia rickettsii, Coxiella burnetii, Ehrlichia species and Anaplasma species (Sarih et al. 2005; Dantas-Torres 2008) and Leishmania infantum (Coutinho et al. 2005).

Rhipicephalus bursa can transmit Babesiosis of small ruminants (Babesia ovis); bovine babesiosis (Babesia bigemina); bovine anaplasmosis (Anaplasma marginale) Anaplasmosis of small ruminants (Anaplasma ovis), (Satta et al. 2011).

In our survey *Ha. inermis* was not observed in cattle and exhibited the lowest frequency in sheep and goats. This species has been observed in north and northwest of Iran (Rahbari et al. 2007). Different Species of *Haemaphysalis* can transmit various pathogens such as: Theileria Sergenti, Crimean-Congo hemorrhagic fever virus, ovian babesiosis, Babesia major strains, Rickettsia sibirica, tick paralysis, Anaplasma ovis, Anaplasma bovis and Rickettsia hulinii (Satta et al. 2011).

In this study the ticks distribution on the body surface of infested ruminants the highest infestation was found in the udder and tail (21 %) in cattle, ear (42/5 %) and tail (30 %) in sheep and ear (63 %) and tail (17 %) in goat. The lowest number of ticks in body surface of ruminants was observed in the ear and shoulder (2 %) in cattle, head and neck (2 %) in sheep and udder (7 %) in goats.

Most of the ticks in this study infested sites with shorter hair and thinner skin. The higher tick infestations on these sites could be ascribed to the fact that ticks prefer warm, moist, and hidden sites with a good vascular supply and thin skin (Muchenje et al. 2008).

In conclusion, according to our results, *Hy. anatolicum anatolicum, Rh. Bursa and Rh sanguineus* are dominant hard ticks species in this area. Because of their ability to transmit different pathogens to animals and humans, prevention measures should be considered to reduce their population.

References

Coutinho MT, Lacerda L, Sterzik A, Fujiwara RT, Botelho JR, De Maria M, Genaro O, Linardi PM (2005) Participation of *Rhipicephalus sanguineus* (Acari: Ixodidae) in the epidemiology of canine visceral leishmaniasis. Vet Parasitol 128:149–155

Dantas-Torres F (2008) The brown dog tick, *Rhipicephalus sanguineus* (Latreille,1806) (Acari: Ixodidae): from taxonomy to control. Vet Parasitol 152:173–185

Horak IG, Camicas JL, Keirans JE (2002) The Ixodidae, Amblyommidae and Nuttalliellidae (Acari: Ixodida): a world list of valid ticks names. Exp Appl Acarol 28:7–15

Kerinas JE, Litwak TA (1989) Pictorial key to the adults of hard ticks, family Ixodidae (Ixodida:Ixodidea). J Med Entomol 26:435–470

Manan A, Khan Z, Ahmad B, Abdullah (2007) Prevalence and identification of Ixodid tick genera in frontier region Peshawar. J Agric Biol Sci 2(1):21–25

Moshaverinia A, Dini M, Azizzadeh M (2012) Prevalence of ixodid tick infestation of sheep in the Arasbaran region of Iran. J Parasit Dis 36(2):230–233

Muchenje V, Dzama K, Chimonyo M, Raats JG, Strydom PE (2008) Tick susceptibility and its effects on growth performance and carcass characteristics of Nguni, Bonsmara and Angus steers raised on natural pasture. Animal 2:298–304

Nabian S, Rahbari S (2008) Occurrence of soft and hard ticks on ruminants in Zagros mountainous areas of Iran. Iran J Arthro Dis 2(1):16–20

Nabian S, Rahbari S, Shayan P, Haddad zadeh HR (2007) Current status of tick fauna in north of Iran. Iran J Parasitol 2(1):12–17

Nasiri A, Telmadarraiy Z, Vatan doost H, Chinikar S, Moradi M, Oshaghi MA, Salim abadi Y, Sheikh Z (2010) Tick infestation rate of sheep and their distribution in Abdanan County, Ilam province, Iran, 2007–2008. Iran J Arthro Borne Dis 4(2):56–60

Niyonzema A, Kiltz HH (1986) Control of ticks and tick borne diseases in Burundi. ACIAR Proc 17:16–17

Rahbari S, Nabian S, Shayan P (2007) Primary report on distri-bution of tick fauna in Iran. Parasitol Res 101(2):175–177

Rezaei H, Mirzaei M, Nematollahi A, ashrafihelan J (2011) Survey of ixodide tick population in domestic ruminants in east Azerbaijan Iran. Glob vet 6(4):399–401

Sajid MS, Iqbal Z, Khan MN, Muhammad G (2008) Point prevalence of hard ticks (ixodids) infesting domestic ruminants of lower Punjab Pakistan. Int J Agri Biol 10(3):49–51

Sarih M, M'Ghirbi Y, Bouattour A, Gern L, Baranton G, Postic D (2005) Detection and identification of *Ehrlichia* spp. In ticks collected in Tunisia and Morocco. J Clin Microbiol 43:1127–1132

Satta G, Chisu V, Cabras P, Fois F, Masala G (2011) Pathogens and symbionts in ticks: a survey on tick species distribution and presence of tick-transmitted micro-organisms in Sardinia, Italy. J Med Microbiol 60:63–68

Telmadarraiy Z, Bahrami A, Vatandoost H (2004) A survey on fauna of ticks in West Azerbaijan Province Iran. Iran J Public Health 33(4):65–69

Yakhchali M, Rostami A, Esmaelzadeh M (2011) Diversity and seasonal distribution of ixodid ticks in the natural habitat of domestic ruminants in north and south of Iran. Rev Med Vet 162(5):229–235