Advances in Bioresearch
Adv. Biores., Vol 7 (6) November 2016: 44-47
©2016 Society of Education, India
Print ISSN 0976-4585; Online ISSN 2277-1573
Journal's URL:http://www.soeagra.com/abr.html
CODEN: ABRDC3
ICV Value 8.21 [2014]

Advances in Bioresearch

ORIGINAL ARTICLE

A Study on Soft and Hard ticks (Acari: Ixodidae) Collected from Livestock in Asadabad region, western Iran

Mansour Nazari[1]*, Mohammad Abdigoudarzi[2], Reza Goudarztalejerdi[1]
[1]Department of Medical Entomology, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran
[2]Razi Vaccine and Serum Research Institute, Department of Parasitology, Reference Laboratory for Ticks and Tick Borne Diseases, Karaj, Iran
*Corresponding author's email: ynazari@yahoo.com

ABSTRACT
Ticks are very important pests of wildlife, domestic animals, and humans in tropical and subtropical areas. Ticks transmit a number of pathogenic organisms to livestock and humans. This study was carried out to investigate the fauna of soft and hard ticks in Asadabad region. A total of 1039 animals (cattle, goat, and sheep) were examined over a period of one year during 2014 in eight villages in Asadabad region. The ticks were collected from each animal in a separate vial and preserved in 70% alcohol. They were examined under a binocular for identification of ticks based on diagnostic keys. Totally 1276 tick specimens were collected (1113 ticks from Ixodidae, and 163 ticks (inspecting the birds' nest and resting place of livestock) from Argasidae families. Among inspected animals, total infestation rate was 39.8% , maximum infestation rate was found in sheep (40%) followed by cattle (38.4%) and goats (36.4%)). Totally, six species from ixodidae family including Hyalomma marginatum (2%), Hyalomma anatolicum (1%), Hyalomma asiaticum (0.9%), Haemaphysalis sulcata (0.2%), Rhipicephalus bursa (20.2%) and Rhipicephalus sanguineus (75%) and three species from Argasidae family including Argas persicus (76.6%), Ornithodoros lahorensis (17.1%) and O. canestrini (6.1%) were identified. It has been shown by result that Rhipicephalus sanguineus is the prevalent tick species on infested livestock in Asadabad region. Consequently, further studies are needed to estimate what economic losses are caused by these species and to establish better measures for control of ticks.
***Keywords**: Ticks, Ixodidae, Argasidae, Fauna, Livestock, Asadabad*

Received 15/05/2016 Accepted 01/09/2016

How to cite this article:
M Nazari, M Abdigoudarzi, R Goudarztalejerdi.A Study on Soft and Hard ticks (Acari: Ixodidae) Collected from Livestock in Asadabad region, western Iran. Adv. Biores., Vol 7 [6] November 2016: 44-47. DOI: 10.15515/abr.0976-4585.7.6.4447

INTRODUCTION

Ticks are very important pests of wildlife, domestic animals, and humans in tropical and subtropical areas [1-4]. They are obligate external parasite of terrestrial vertebrates and all the stages of their life cycle are exclusively feed on blood and thereby cause severe economic losses [5-8]. Ticks transmit a number of pathogenic organisms like protozoan, rickettsiae, spirochaetes, and viruses and are among the most important vectors of disease affecting livestock and humans [9-15]. These include the agents of theileriasis, babesiasis, typhus disease, anaplasmosis, Crimean-Congo hemorrhagic fever, and tularemia in domestic animals and humans [16-21].The global economic losses due to ticks and tick-born disease have been estimated at 13.9 to 18.7 billion US$ (22). The Ixodidae ticks of livestock in tropical regions belong to the genera of Hyalomma, Boophilus, Rhipicephalus [23-26]. There are various ways to control ticks, but first of all, we should know about different tick species in a selected region to be detected and identified. Inclusive information regarding the availability of different species in different months of the year is very important in relation to plan necessary control strategies [27-28]. The present study was aimed to determine the tick species prevalence in domestic animals including cattle, goat, and sheep in Asadabad region and to recognize their seasonal variation and their related host preferences.

MATERIALS AND METHODS

Asadabad region is situated in Hamadan province. It is located between 34° and 35´ to 34° and 58´ northern latitude and between 47° and 50´ to 48° and 18´ eastern longitude. Its elevation from sea level is 1607 meters and its surface area is 1196 km^2 (Fig. 1). Livestock population according to veterinary sector's record is 12560 cattle, 20512 sheep and 4016 goats in Asadabad at the time of this study.

Ticks were collected from 1039 animals over a period of one year during 2014 in eight villages in Asadabad region. Two animal farms from each village were regarded for the study and five percent of animals including cattle, sheep and goats were inspected for the presence of ticks and ticks were collected by hand worn rubber gloves and using a pair of tweezers. The collections were arranged for each two weeks and the time of each collection was 30 min for each animal. Ticks were collected from all parts of the body such as ear, hand, chest, neck, under the tail, udder and testis. The infestation rate was categorically determined in different body parts of host species. The ticks were collected from each animal in a separate vial and preserved in 70% alcohol. Labeling for all specimens including location, host and date were made and environmental data including relative humidity and temperature was also recorded at each site. The samples were transferred to the laboratory of medical entomology of the School of Medicine, Hamadan University of Medical Sciences. The collected ticks were examined under an anatomical microscope for identification at the genus and species level. Final verification of tick samples was confirmed by Reference Laboratory for tick study at Razi Ins. (Karaj, Iran).

RESULTS

Over a period of one year during 2014 in eight villages in Asadabad region, a total number of 1276 ticks were collected from different localities of Asadabad region. The maximum numbers of collected Ixodidae ticks 786 (70.06%) were collected in the spring season followed by the summer 293(26.03%) and the autumn 34(3.0%). Notably, all *Hyalomma* spp. have been collected during spring time in Iran (late March up to the Middle of June). *Rhipicephalus* spp. were collected mostly during spring time and showed a decreasing rate of collection during summer and autumn. These ticks were collected from 1039 domestic animals (goats, sheep and cattle). The highest number of ticks was collected from sheep (n=824, 74.0%) followed by goats (n=194, 17.4%), and the minimum number of ticks was found on cattle (n=95, 8.5%). Totally, six species from Ixodidae family including *Hyalomma marginatum* (2%), *Hyalomma anatolicum* (1.2%), *Hyalomma asiaticum* (0.9%), *Haemaphysalis sulcata* (0.7%), *Rhipicephalus bursa* (20.2%) and *Rhipicephalus sanguineus* (75%) and three species from Argasidae family including *Argas persicus* (76.6%), *Ornithodoros lahorensis*(17.2%) and *O. canestrini* (6.2%) were identified (Table 1). It has been shown by result that *Rhipicephalus sanguineus* is the prevalent tick species on infested livestock in Asadabad region. The goat and sheep were infested with maximum numbers of ticks in under the tails. During this study period, a total of 1039 domestic animals including 12 cattle, 140 goats, and 886 sheep were examined in which 414 animals were infested to ticks (39.8%). A total of 1,068 ticks including 578 males, 393 females, and 97 nymphs were collected from these infested animals. The number of male ticks was found higher than female ticks in all the animals.

Figure 1. Location of Asadabad region, Hamadan Province, Iran

Table 1: Ticks fauna of Asadabad region, Hamadan Province, Iran (2014)

Family	Species	(%)
Ixodidae		
	Rhipicephalus sanguineus	75
	Rhipicephalus bursa	20.2
	Hyalomma marginatum	2
	Hyalomma anatolicum	1.2
	Hyalomma asiaticum	0.9
	Haemaphysalis sulcata	0.7
Argasidae		
	Argas persicus	76.6
	Ornithodoros lahorensis	17.2
	Ornithodoros canestrini	6.2

DISCUSSION

In a study by Gharekhani et al. 18000 sheep and 4200 cattle in three rural regions (mountainous, plateau and plain mountainous) were studied during 2010 to 2011in Hamadan province and the fauna and frequency of hard ticks species were determined [29]. A total of 1534 hard ticks were collected from animals. The results showed that *Hyalomma marginatum* was dominant species. In this study Asadabad was included in mountaineous region and has been pointed in that document. In this study the *H. marginatum* was found as a prevalent species. In our study *H*. *marginatum* was not found to be a prevalent species, and *Rhipicephalus sanguineus* was the prevalent species (75%). This difference could be explained regarding 4200 inspected cattle by Gharekhani et al., in 2015 [29]. It seems that more cattle inspection favor the results for *H. marginatum*. Omer et al. reported an infestation rate of 40% for cattle, 55% for sheep and 5% for goats which is in accordance with our data [30]. In a study on hard ticks affecting cattle, sheep and goats in Dohuk area from March 2005 until February 2006 in three areas (Dohuk surrounding area, Barwary Balla near Turkish border, and Eqre) [30]. The species collected from cattle were *Hyalomma anatolicum* and *Hyalomma marginatum*, while the species collected from sheep and goats were *Rhipicephalus bursa*, *Rhipicephalus turanicus*, *Haemaphysalis parva*, and *Hyalomma* spp. The occurrences of the ticks in the three areas were different; in Dohuk surrounding area they occurred at the beginning of March and disappeared in the middle of April. The spring time occurrence of ticks in Dohuk area is accordance with our study too. In a study by Yakhchali et al., in 2012 in Sanandaj suburb, the highest numbers of hard ticks were collected from sheep in the region. The predominant infesting tick in all animals examined was *Hyalomma anatolicum* with infestations of 25.32% (101/400) in cattle [31]. In our study also sheep was highly infested.

ACKNOWLEDGEMENTS

The authors would like to thank the Research Deputy of Hamadan University of Medical Sciences, Hamadan, Iran, for their valuable support and participation. This article is the result of a research project (No. 932202667).

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest in this article

REFERENCES

1. Bram R. (1975).Tick-borne livestock diseases and their vectors. 1. The global problem. World Animal Review (FAO).
2. Clifford CM, Hoogstraal H, Keirans JE. (1975).The Ixodes Ticks (Agarina: Ixodidae) of Nepal. Journal of medical entomology. 12(1):115-37.
3. Walker JB. (1991). A review of the ixodid ticks (Acari, Ixodidae) occurring in southern Africa. The Onderstepoort journal of veterinary research.58(2):81-105.
4. Nazari M, Najafi A. (2016).Epidemiological Study of Endemic Relapsing Fever in Hamadan Province, Western Iran. Journal of Arthropod-Borne Diseases.
5. Sonenshine D. Biology of ticks, vol. II. Oxford University Press, New York, NY; 1993.
6. Walker AR. (2003). Ticks of domestic animals in Africa: a guide to identification of species: Bioscience reports Edinburgh.
7. Ghosh S, Azhahianambi P, de la Fuente J. (2006).Control of ticks of ruminants, with special emphasis on livestock farming systems in India: present and future possibilities for integrated control—a review. Experimental & applied acarology. 40(1):49-66.
8. Nazari M, Bahrami D, Davari B, Salehzadeh A. Epidemiological Survey of Scorpion Sting Cases and Identification of Scorpion Fauna in Hamadan City, Iran (2013). Scientific Journal of Hamadan University of Medical Sciences. 2015;22(3):255-62.

9. Labruna MB, Whitworth T, Horta MC, Bouyer DH, McBride JW, Pinter A, et al. (2004).Rickettsia species infecting Amblyomma cooperi ticks from an area in the state of Sao Paulo, Brazil, where Brazilian spotted fever is endemic. Journal of Clinical Microbiology. 42(1):90-8.
10. Parola P, Davoust B, Raoult D. (2005). Tick-and flea-borne rickettsial emerging zoonoses. Veterinary research. 36(3):469-92.
11. Raoult D, Fournier PE, Fenollar F, Jensenius M, Prioe T, de Pina JJ, et al. (2001).Rickettsia africae, a tick-borne pathogen in travelers to sub-Saharan Africa. New England Journal of Medicine. 344(20):1504-10.
12. Barbour AG, Tessier SL, Todd W. (1983). Lyme disease spirochetes and ixodid tick spirochetes share a common surface antigenic determinant defined by a monoclonal antibody. Infection and Immunity. 41(2):795-804.
13. Grimm D, Tilly K, Byram R, Stewart PE, Krum JG, Bueschel DM, et al. (2004).Outer-surface protein C of the Lyme disease spirochete: a protein induced in ticks for infection of mammals. Proceedings of the National Academy of Sciences of the United States of America. 101(9):3142-7.
14. Yunker C. (1975).Tick-borne viruses associated with seabirds in North America and related islands. Medical biology. 53(5):302-11.
15. Labuda M, Nuttall P.(2004). Tick-borne viruses. Parasitology. 129(S1):S221-S45.
16. Meléndez RD, Coronado A, Mujica F, Cerutti F, Mosquera O. (1998). Levels of natural resistance to Boophilus microplus (Acari: Ixodidae) in Carora breed bulls. Revista de biología tropical. 46(3):691-6.
17. Kuttler K, Robinson R, Bell R. (1967). Tick transmission of theileriasis in a white-tailed deer 1. Journal of Wildlife Diseases. 3(4):182-3.
18. Mahone D. Babesia of domestic animals. Babesia, Theileria, Myxosporida, Microsporida, Bartonellaceae, Anaplasmataceae, Ehrlichia, and Pneumocystis. 2012.
19. Estrada-Peña A, Ayllón N, De La Fuente J.(2012). Impact of climate trends on tick-borne pathogen transmission. Frontiers in physiology. 3:64.
20. Ergonul O. (2012). Crimean–Congo hemorrhagic fever virus: new outbreaks, new discoveries. Current opinion in virology. 2(2):215-20.
21. Kaya A, Deveci K, Uysal İÖ, Güven AS, Demir M, Uysal EB, et al. (2012). Tularemia in children: evaluation of clinical, laboratory and therapeutic features of 27 tularemia cases. The Turkish journal of pediatrics. 54(2):105.
22. de Castro JJ. Sustainable tick and tickborne disease control in livestock improvement in developing countries. Veterinary parasitology. 1997;71(2):77-97.
23. Frans J. (2000).Final Report, Integrated Control of Ticks and Tick-Born Diseases (ICTTD).
24. Gale P, Stephenson B, Brouwer A, Martinez M, de la Torre A, Bosch J, et al. (2012).Impact of climate change on risk of incursion of Crimean-Congo haemorrhagic fever virus in livestock in Europe through migratory birds. Journal of applied microbiology. 112(2):246-57.
25. Cruz AC, Zweygarth E, Ribeiro MFB, da Silveira JAG, de la Fuente J, Grubhoffer L, et al. (2012).New species of Ehrlichia isolated from Rhipicephalus (Boophilus) microplus shows an ortholog of the E. canis major immunogenic glycoprotein gp36 with a new sequence of tandem repeats. Parasites & vectors. 5(1):1-12.
26. Madder M, Adehan S, De Deken R, Adehan R, Lokossou R. (2012). New foci of Rhipicephalus microplus in West Africa. Experimental and applied acarology. 56(4):385-90.
27. Nazari M, Saidijam M. (2007).Pediculus capitis infestation according to sex and social factors in Hamedan-Iran. PJBS.10(19):3473-5.
28. Nazari M, Goudarztalejerdi R, Payman MA. Pediculosis capitis among primary and middle school children in Asadabad, Iran: An epidemiological study. Asian Pacific Journal of Tropical Biomedicine. 2016;6(4):367-70.
29. Gharekhani J, Gerami-Sadeghian A, Sadeghi-Dehkordi Z, Youssefi M, Province H. (2015). Journal of Coastal Life Medicine. 3(8):612-5.
30. Omer LT, Kadir MA-A, Seitzer U, Ahmed JS. (2007).A survey of ticks (Acari: Ixodidae) on cattle, sheep and goats in the Dohuk Governorate, Iraq. Parasitology research. 101(2):179-81.
31. Yakhchali M, Bahramnejad K, Almasi O. (2012).Ticks (Acari: Ixodida: Ixodidae and Argasidae) abundance and associated risk factors for animals in the natural habitat of Sanandaj suburb, Iran. International Journal of Acarology. 38(4):353-61.