

Full Article

Determination the frequency of Ixodid ticks on the sheep in Khorasan Razavi province, Iran

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ABSTRACT

A survey was carried out to investigate the frequency of hard tick species (Acari: Ixodidae) on sheep in Khorasan Razvi province. A total of 812 ticks were collected from the sheep of different areas of Khorasan Razavi province five species were identified as follow: *Rhipicephalus turanicus* (59.23%), *Hyalomma marginatum turanicum* (25.73%), *Hyalomma excavatum* (14.8%), *Hyalomma anatolicum* (8.3%), and *Dermacentor niveus* (4.8%). The frequency of tick infestation in southern parts was greater than northern parts of the province. *R. turanicuss* and *H. m. turanicum*. Were dominant ticks in the province.

Keywords: Ixodid tick, sheep, Khorasan Razavi province

INTRODUCTION*

Ticks are blood sucking arthropods belong to the class arachnids. Once they attach to a host for a blood meal, they cause irritation and infection of the skin and anemia. Ticks are one of the major vectors that transmit important pathogens such as *CCHF virus*, *Babesia spp*, *Theileria spp* and *anaplasma spp* to man and animal around the world (Morel 1989, Soulsby 1982). Knowing the prevalence of the tick species, which are involved in transmission of the diseases, and their geographical distributions, are important issues to control the tick and tick-borne diseases. Khorasan

Razavi province is economically impressed by an agricultural and animal husbandry, including sheep breeding. So far, several studies have been done were done about tick fauna in different areas of Iran (Abbasian 1961, Mazlum 1971, Rahbari 1995, Razavi & Saifi 2006, Nabian *et al* 2007), but, little information is available about the frequency of ixodid tick species on sheep of Khorasan Razavi province. The aim of this study was to determine the frequency of tick infestation on the sheep.

MATERIALS AND METHODS

Field study area. Khorasan Razavi province is located in N 35° 6' 7.2911" latitude and E

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59° 6' 15.0329" longitude and has an area of more than 127000 square kilometers (Figure 1).



Figure 1. Locality where the fields work was carried out (Khorasan Razavi Province)

The climate is semi-arid with cold winters and moderate summers. The temperature of province increase from north to south and mean annual temperature ranging between 13.6 °C and 17 °C. From natural features point of view, Khorasan province is divided into two northern and southern parts. The northern part is mountainous which in its lower areas, fertile plains are formed and suitable conditions for agricultural and animal husbandry development are made available. The southern part constitutes of low plains with low hills and poor vegetation cover. The population of sheep in this province estimates 5,087,404 in for 2008. (Khorasan Razavi Provincial Veterinary Service, unpublished data).

Tick collecting. The tick samples were collected from infested sheep that grazed in 20 different areas of

Khorasan Razavi province (Figure 1). After collecting, tick samples were separately stored in 70% ethanol and labeled with the date and the name of the field until the species determination. First, the male and female ticks were diagnosed based on the ratio the size of scutum to the dorsal surface. Then, ticks species were identified under a stereo-microscope, according to general identification keys (Hoogstraal 1956, Walker *et al* 2003, Estrada- Pena *et al* 2004, Apanaskevich & Horak 2005, 2008).

RESULTS

A total of 812 ticks (215 male and 556 female) were collected from the sheep of different areas of Khorasan. The results of this study revealed that the tick fauna of the sheep was comprised of 5 species in Khorasan Razavi Province. The frequencies of male and female ticks are presented for each species. (Table 1).

Table 1. The prevalence of tick species in sheep of Khorasan Razavi province.

Tick species	No of		Total	(%)
	Male tick	Female tick		
<i>R. turanicus</i>	192	289	481	59.23
<i>H.m.turanicum</i>	117	92	209	25.73
<i>H.excavatum</i>	30	46	76	9.3
<i>H.anatolicum</i>	24	8	32	3.9
<i>D. niveus</i>	13	1	14	1.72
Total	216	556	812	100

The most frequent tick species in Razavi Khorasan province were *R. turanicus* and *H. m turanicum* (Table 1). *D.niveus* was found in Northern part of province (Table 2).

Table 2. The prevalence of different species of Ixodid ticks in southern and northern parts of Khorasan Razavi province.

Tick species	Southern part		Northern part	
	No of tick	(%)	No of tick	(%)
<i>R. turanicus</i>	338	66.01	143	47.66
<i>H.m.turanicum</i>	132	25.75	77	25.66
<i>H.excavatum</i>	34	6.6	42	14
<i>Ha.anatolicum</i>	8	1.56	24	8
<i>D.niveus</i>	0	0	14	4.6
Total	512	100	300	100

DISCUSSION

In this study, *R.turanicus* had the highest frequency among collected tick species in northern and southern of Khorasan Razavi province. *R. turanicus* is a tick of savanna, steppe, desert and Mediterranean climatic regions. It occurs in southern Europe, northern Africa and Asia. Many domestic and wild animals can be hosts for this tick, but heavily infestation is found in sheep (Estrada- Pena et al. 2004). *R.turanicus* has been reported with high prevalence in the sheep of mountainous area such as Khorasan province, Iran (Rahbari et al. 2007). Some studies have been shown that *R.turanicus* could be as the vector of *B.ovis* (Friedhoff, 1997; Hafez et al.1982; Shayan et al, 2007). *H. m.turanicum* had also high frequency in this study. This tick is known as pale legged *Hyalomma*. It is originated from the Middle East. Adult ticks feed on cattle, sheep, goats, horses and large wild herbivores. *H. m.turanicum* is not known to be a main vector pathogen disease to domestic animals, it is considered as a vector of the virus causing Crimean-Congo hemorrhagic fever in human (Estrada- Pena et al. 2004). *H. m.turanicum* has been recorded from cattle, sheep, horse and camel in many parts of Iran (Mazlum, 1971). Some studies have been shown that *H. marginatum* is

one the abundant tick in sheep and goats of Khorasan province (Razmi et.al. 2003, 2004).

H. excavatum and *H.anatolicum* had low frequencies among collected ticks of Khorasan Razavi Province. These ticks are adapted to the Mediterranean and steppe climates of North, Africa and to steppe and desert climates elsewhere. The distribution of *H.anatolicum* and *H.excavatum* is overlapped in some areas. Cattle, sheep, goats, camels, horses and donkeys are the hosts of two species. Both *H. excavatum* and *H. anatolicum* have been reported all over of Iran (Rahbari et al 2007, Nabian et al 2009). Although the ability of *H. excavatum* to act as vector of pathogens such as *Theileria spp* is uncertain (Estrada- Pena et al 2004), but, Razmi et al (2003 b) showed that the *H. excavatum* was the dominant tick on the cattle in Khorasan province and acts as vector of tropical theileriosis. *H.anatolicum* also was reported from the cattle, the sheep and the goats of Khorasan province and is an important vector of *Th. annulata* and *Th. lestoquardi* in Iran (Razmi et al 2003a, b, c).

D. niveus found with very low frequency among collected tick in the current study species. *D. niveus* is distributed in semi desert and steppe zones from the western Mediterranean area to southern Russia, Iran, and Afghanistan. Adults of this study parasitize all the kinds of domestic herbivores, often camels, and wild sheep, goats, deer, pigs, and wolves. Immature feed on rodents, hedgehogs, and hares (Hoogstraal & Valdez 1980, Filippova et al 1983). *D. niveus* have been reported from domestic sheep and goat in Khorasan province (Mazlum 1971, Nabian et al 2008b). *D. niveus* is known as a vector of CCHF (Yashina et al 2003). Based on the results of this study, it is concluded that *R. turanicus* and *H. m. turanicum* are dominant tick species in sheep of Khorasan Razavi provinces and should be done more studies about role of these species in transmission of blood parasites.

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References

- Abbasian, L. (1961) Records of tick (Acarina: Ixodidae) occurring in Iran and their distributional data. *Acarologia* 3:546-559.
- Apanaskevich, D.A. and Horak, I.G. (2005) the genus *Hyalomma* Koch, 1844. II. Taxonomic status of *H. (Euhyalomma) anatolicum* Koch, 1844, *H. (E.) excavatum* Koch, 1844 (Acari, Ixodidae) with redescrptions of all stages. *Acarina* 13:181-197
- Apanaskevich, D.A and Horak, I.G. (2008) the genus *Hyalomma* Koch, 1844: V. Re-evaluation of the taxonomic rank of taxa comprising the *H. (Euhyalomma) marginatum* Koch complex of species (Acari: Ixodidae) with redescription of all parasitic stages and notes on biology. *International Journal of Acarology* 34:13-42
- Estrada- Pena, A., Bouattour. A., Camicas.J.L, Walker. A.R. (2004). Ticks of domestic animals in Mediterranean region, a guide to identification of specie Bioscience Reports, UK.
- Friedhoff, K.T. (1997) Tick-borne diseases of sheep and goats caused by *Babesia*, *Theileria* or *Anaplasma* spp. *Parassitologia* 39:99-109.
- Haféz, M., El-Refäi, A.H., Michael, S.A. (1982). Experimental transmission of some blood parasites by *Rhipicephalus* species in Egypt II. The role of *R. turanicus* in transmitting *Babesia ovis* in sheep. *Journal of the Egyptian Society of Parasitology* 12:543-549
- Hoogstraal, H. (1956). African Ixodoidea. Vol 1 Ticks of the Sudan, Naval Medical Research; USA
- Mazlum, Z. (1971). Ticks of domestic animals in Iran: Geographic distribution, host relation, and seasonal activity. *Journal of Veterinary Faculty, University of Tehran, Iran* 27: 1-32.
- Morel, P. (1989). Tick-borne diseases of livestock in Africa. In: Fischer M and Ralph S (Ed), *Manual of Tropical Veterinary Parasitology*. Pp: 301-391. CAB international, London.
- Nabian, S., Rahbari, S., Shayan, P., Haddadzadeh, H.R. (2007). Current Status of Tick Fauna in North of Iran. *Iranian Journal of Parasitology* 2:12-17.
- Nabian, .S. Rahbari, S., Changizi, A., Shayan, P. (2009). The distribution of *Hyalomma Spp.* ticks from domestic ruminants in Iran. *Medical and Veterinary Entomology* 23: 281-283.
- Rahbari, S., Nabian, S, Shayan, P. (2007). Primary report on distribution of tick fauna in Iran. *Parasitology Research* 101 (Suppl 2):S175-S177
- Rahbari, S., Nabian, S, Shayan, P, Sedghian, M... (2008). A Study of *Rhipicephalus* species in Iran. *Jouranl of Veterinary Research* 63: 195-198.
- Razmi, G.R., Naghibi, A., Aslani, M.R., Fathivand, M., Dastjerdi, K. (2002). An epidemiological study on ovine babesiosis in the Mashhad suburb area, province of Khorasan, Iran. *Veterinay Parasitology* 108: 109-115.
- Razmi, G.R., Naghibi, A., Aslani, M.R., Dastjerdi, K., Hossieni, H. (2003a). An epidemiological study on babesia infection in small ruminants in Mashhad suburb, Proviencie of Khorasan, Iran. *Small Ruminants Research* 50:39-44.
- Razmi, G.R., Ebrahimzadeh, A., Aslani, M.R. (2003b). A Study about Tick Vectors of Bovine Theileriosis in an Endemic Region of Iran. *Journal of Veterinary Medicine B* 50: 309-310
- Razmi, G.R., Hossieni, M., Aslani, M.R. (2003c). Identification of tick vector of ovine Theileriosis in an endemic region of Iran. *Veterinary Parasitology* 116:1-6.
- Remington, D.R., Schork, M.A. (1970). *Statistic with Application to the Biological and Health Sciences*. Prentice-Hall, Englewood Cliff, NJ, UK.
- Shayan, P., Hooshmand, E., Rahbari, S., Nabian, S. (2007). Determination of *Rhipicephalus spp.* as vectors for *Babesia ovis* in Iran. *Parasitology Research* 101: 1029-1033
- Soulsby, E.J.L. (1982). *Helminths, Arthropods and protozoa of domesticated animals*, 7th edition, Bailliere Tindal. London. UK.
- Walker, A.R., Bouattour, A., Camicas, J.L., Estrada- Pena, A., Horak, I.G., Latif, A., Pegram, R.G., Preston. P.M. (2003). *Ticks of domestic animals in Africa, A guide to identification of species*. Bioscience Reports, UK.
- Yashina, L., Petrova, L., Seregin, S., Vyshemirskii, O., Lvov, D., Aristova, V., Kuhn, J., Morzunov, S., Gutorov, V., Kuzina, L., Tyunnikov, G., Netesov, S., Petrov, V., 2003. Genetic variability of Crimean-Congo hemorrhagic fever virus in Russia and Central Asia. *Journal of General Virology* 84: 1199-1206.