

ORIGINAL ARTICLE

Investigation of ticks infecting sheep and seasonal changes of their population in Eyvan city

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Ticks are arthropods that are the most important pests in the veterinary industry, which transmit important and dangerous diseases of humans and animals. Eyvan city located in the northern half of Ilam province and one of the most important centers of agriculture and animal husbandry is the province of Ilam. Hence, it is essential to identify the correct method for struggle tick and study the season's abundance and type of host. This study was carried out at the level of shambles in the city of Eyvan and from the first of April of 2016 to March of 2017. From the 1,500 sheep of different age, 220 viruses (14.66%) were infect with ticks. The average number of ticks in infected sheep was 2.9 ticks per sheep. The results showed that in sheep, 220 (38.66%) were male and 350 (61.40%) were female ticks. The tick identified on the sheep was related to 5 species and 3 ticks. The most frequency was related to the hyalomma genus, which includes *Hyalomma asiaticum asiaticum* (34.21%), *Hyalomma anatolicum anatolicum* (19.30%), also, the highest infection rate was in sheep in the city of Eyvan in June. In general, the prevalence and severity of infection were low but a relatively high species diversity was observed.

Key words: tick; sheep; *Hyalomma*

Introduction

Ticks are arthropods, which are considered as mandatory blood-feeding ectoparasites of vertebrate, especially wild animals, and only about 10% of its species are feeding from humans and domestic animals, especially cattle and sheep (Moradi et al., 2009). Ticks problems are common in many parts of the world, especially in warm and temperate regions. Nowadays, the health and economic damages caused by ticks in many parts of the world and in Iran have caused many loses to animal breeders (Naman et al., 2007). The presence of ticks in livestock causes localized lesions at the site of bite and systemic lesions in the form of death caused by anemia, paralysis caused by tick, and transmitting of different diseases such as theileriosis and babesiosis (Rasouli et al. 2009). The keeping and breeding of sheep and cattle, and goat in Iran has had a long history. Based on available evidence, the first sheep was probably emerged in Asia (Iran), and sheep and goat have spread from Iran to parts of the world. In Iran, despite developments in animal husbandry, the breeding of some small animals such as sheep and goat are still performed traditionally (Kalani et al., 2011). Eyvan city is in the northern half of Ilam province. It is one of the most important centers of agriculture and animal husbandry in the province of Ilam. As animal husbandry is one of the main jobs in Eyvan city, there are many livestock in the region, where displacement of them from summer quarters to winter quarters leads to diseases transmitted by them. Based on the statistics released by the Livestock Affairs Department of Ilam Province, there are about 198698 types of livestock in the province, which about 6.2% of them are in Eyvan city. There are 87151 sheep in Eyvan city based on these statistics (Livestock Affairs Department of Ilam Province, Jihad Organization). Hence, it is essential to identify the ticks and study the seasonal abundance and type of host of them to select the correct method to struggle with ticks and control the diseases transmitted by them. Conducting studies on types of ticks contributes to identify the epidemiological aspects of the ticks and to clarify the importance and position of struggle and control them in various regions. By obtaining knowledge on distribution of carrier ticks and the position and presence of them in each region, we can evaluate the epidemiological status of the diseases caused by ticks (Kayat Nouri, Hashemzadeh Farhang, 2011).

Methodology

Investigation was performed from April of 2016 to March of 2016. During this period, livestock farms of Eyvan city were randomly sampled from the body surface of the sheep. By specifying all characteristics, including type of livestock, gender of

livestock, age of livestock, sampling was performed from isolated ticks. As most of ticks are located in low-hair parts of animal, the areas under tail, groin, and inguinal, armpit, ear, and around it was reviewed.

The hard ticks sink their oral appendages to skin of the livestock so that by removing them from the body surface of the animals, appendages remain at the site of bite and in addition to inflammation, sensitivity of itching and infection make it difficult to identify the tick. Thus, sampling needs to be performed with caution and by using a specific method. In this study, ticks were collected in a way that when they were seen, they were taken by forceps and shaken gently so that their oral appendages to be released. When they resisted, alcohol-impregnated cotton was placed on the tick to be isolated from host. We placed the collected ticks within glassy containers containing 70% ethyl alcohol and 5% glycerin. Then, they were transferred to the laboratory for diagnosis.

Results

Results of this research revealed that, out of 1500 sheep with different ages, 220 sheep (14.66%) were infected with ticks and 1280 (85.34%) were healthy sheep. Out of these infected ticks, 570 ticks were identified and isolated from sheep. The mean number of ticks in infected sheep was 2.59 ticks per sheep and the maximum number of ticks isolated from an infected sheep was 6 (Fig. 1).

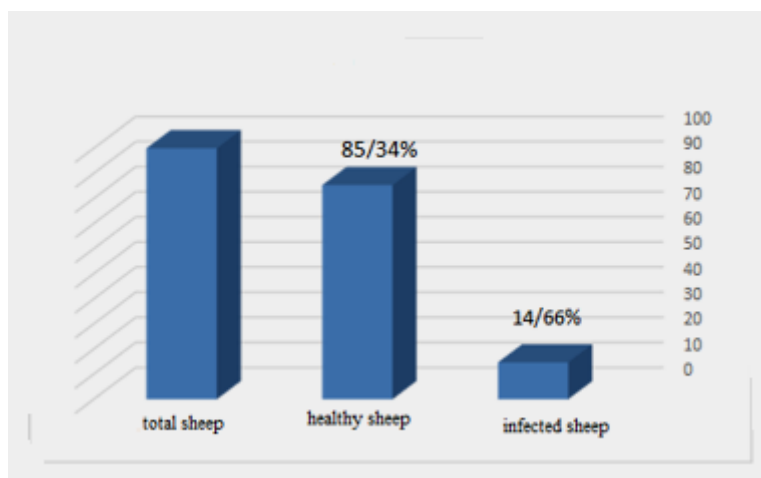


Fig. 1. Frequency of sheep infected with hard ticks in Eyvan city

In sheep, 220 (38.60%) male ticks and 350 (61.40%) female ticks were observed (Fig. 2). The presence of a short lateral groove, middle groove without a connection to parma, an oval parma at the back of the male scrotum were useful in determining the male gender identity (Abdi Goudarzi, 2003).

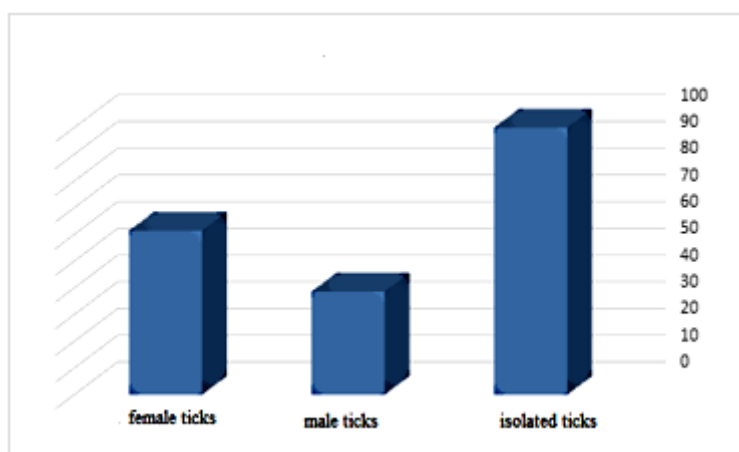


Fig. 2. The prevalence of hard ticks in sheep of Eyvan city by gender

The identified ticks were from 5 species and 3 genera. The identified genera include *Hyalomma*, *Rhipicephalus*, and *Dermasentur*.

From genus *hyalomma* genus, species *Hyalomma asiaticum asiaticum* (34.21%) and *Hyalomma anatolicum anatolicum* (19.30%), from genus *Rhipicephalus*, species *Rhipicephalus sanguineus* (17.54%) and *Rhipicephalus bursa* (13.15%), and from genus *Dermasentur*, only species *Dermasentur marginatus* (15/80 percent) were identified and isolated.

Accordingly, genus *hyalomma* has the highest percentage (34.21%) and genus *Rhipicephalus* has the lowest percentage (13.15%) of ticks collected from body surface of the sheep in Eyvan city (Fig. 3).

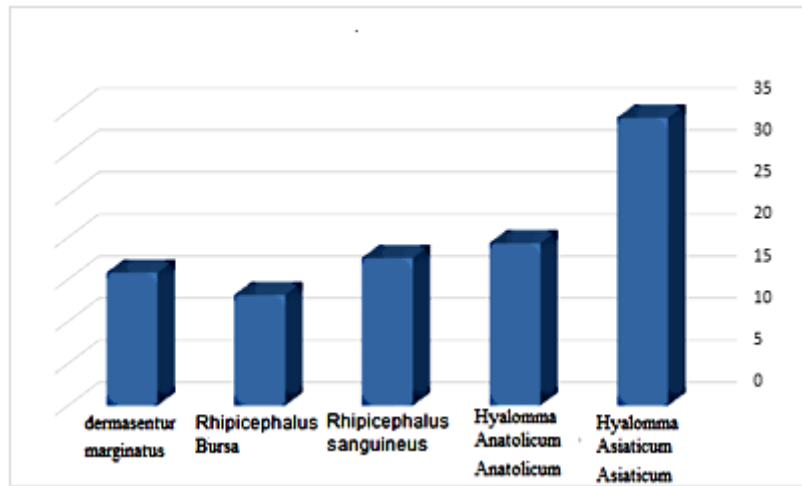


Fig. 3. Frequency distribution of diversity of species identified in sheep of Eyvan city

The frequency of infection with ticks in various parts of the sheep body of the sheep was 43.5% in tail, 32.45% in groin, 13% in head and neck, 5.2% in testicles and 5.85% in breast (Figure 4).

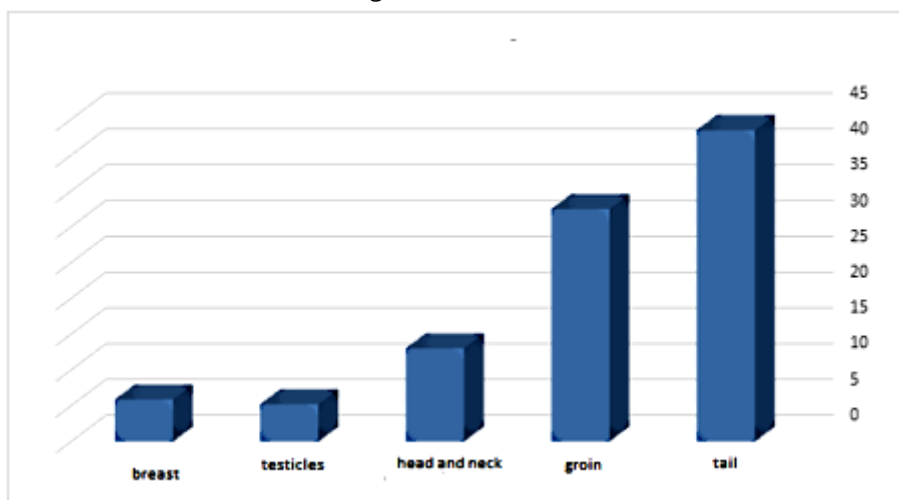


Fig. 4. Frequency distribution of ticks collected from different parts of the sheep body parts in Eyvan city

The highest rate of infection in sheep is seen in June month and the lowest infection rate is seen in December. Thus, the peak of infection is in the warm seasons. Reduction in relative humidity in summer season is one of the effective factors in the survival of ticks at grassland, so that the population of ticks is reduced by reduced relative humidity. However, by increasing the relative humidity and rainfall in autumn, the second rhythm of infection begins, but it is not significant due to the reduction in temperature (Fig. 5).

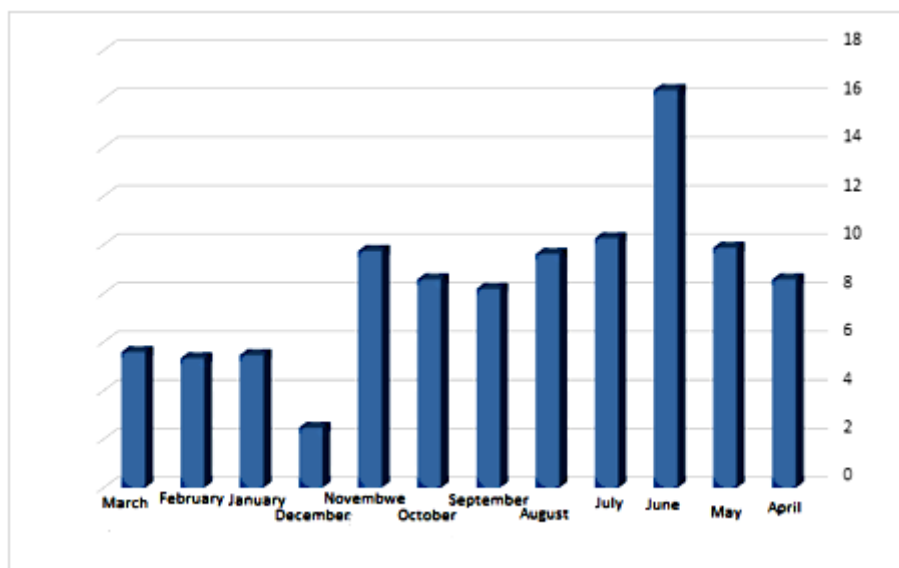


Fig. 5. Infection rate of sheep in different seasons of year in Eyvan city

Discussion

Based on findings of this research, the highest frequency was related to *Hyalomma* genus, which included the species of *Hyalomma asiaticum asiaticum* (34.21%) and *Hyalomma anatolicum anatolicum* (19.30%) and the lowest frequency was related to genus *Rhipicephalus* and species *Rhipicephalus bursa* (13.15%). In another study conducted in Qom, the rate of sheep infected to tick was obtained to be about 9.6% (Farzin Nya et al, 2012).

Taheryan et al (2014) examined the distribution and determination of soft and hard tick fauna in Khorramabad city. They stated that they isolated four genera of *Hyalomma*, *dermasentur*, *Hyalomma asiaticum*, and *Hyalomma marginatum* from the caught ticks. Three species of *Hyalomma anatolicum*, *Hyalomma asiaticum*, and *Hyalomma marginatum* were identified from genus *Hyalomma*, the species sulkata was identified from *Haemaphysalis*, and *Sanguinius* was identified from genus *Rhipicephalu*. In a study conducted by Changizi in 2014 under title of investigation the prevalence and risk factors of tick infection in the two regions of Semnan region, he stated that the tick species effective in the infection in summer-quarter and winter-quarter regions is *Hyalomma marginatum marginatum* and the species *Dermasentur marginatus* and *Dermasentur rauscemensis* were significant ticks.

Another variable investigated in this research was the location of the tick on the host. The frequency of tick infection in the different parts of the sheep body was reported as follows: tail (43.5%) and the groin (32.45%) testicles (5.2%) and breast (5.85%). Yakhchali and Haji Hassanzadeh in 2004 reported that the most common location for tick was the areas free from dense hair. In 2011, Changizi reported that as the highest frequency of ticks in sheep is seen in summer season and on breastbone of the livestock, it is recommended that the livestock spraying to be performed locally in the mentioned time, in addition to common spraying before displacing the sheep to summer-quarter regions. This spraying leads to saving in pesticide consumption.

Alyae and Ghaderpour conducted a study to determine the diversity and intensity of ticks infecting the Kazeroun city sheep in 2013. The frequency of tick infection in different parts of the sheep body was reported as follows: 41% in the tail, 23% in groin, 20% in head and neck, 14% in breast, and 2% in testicles, which they were consistent with results of this research.

The highest rate tick infection in Eyvan sheep was in June and the lowest infection rate was in December. Moradi et al (2009) conducted a research entitled "examining the rate of infection of sheep to livestock tick and determining their distribution in Bahar city and they stated that 9.37% sheep were infected to tick and the rate of infection in the spring was more than that in other seasons. Studies conducted by Razmi and Ramoon in 2012 showed that in the Tandoori National Park, where the sampling was carried out at the vegetation level, the highest frequency of ticks was seen from March to July and the lowest frequency was seen in September.

They stated that the Tandoori National Park had the highest rainfall in the spring, and appropriate conditions such as high humidity, high temperatures (25-27 ° C) and dense vegetation leads into increased activity of many tick species. In the dry months of the summer, significant reduction was seen in ticks, which could be due to low relative humidity and high temperature throughout the day. Review of the results suggests that tick infection in sheep of Eyvan city did not have high intensity, but in terms of diversity of ticks, the found species were very important found to be important in terms of transmission of diseases and anemia and it requires serious control. In addition, slight differences in the results of this research with those of other studies can be justified by type of management and using the methods to struggle ticks in livestock, diversity of weather conditions of the regions, geographical location, the vegetation of the region, and different races of livestock.

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