

The identification of genus, species and distribution of hard and soft Ticks collected from livestock and fowl bodies in Aleshtar and Aligodarz counties, Lorestan Province, Iran

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Abstract: Hard ticks (Ixodidae family) transmit Arboviruses, bacteria and parasites to human and animals. One of the most important viruses that ticks transmit from animals to human is Crimean-Congo hemorrhagic fever virus, the fact that its importance has been proved. So the study of fauna of ticks in the area, for the control and prevention of the mentioned disease, is of great importance. Ticks were collected from four geographical sites (North, South, West and East) of each county. Bodies of sheep, goats and cows in 30 villages (each village 20 livestock) of Aleshtar and Aligodarz counties were examined and ticks were collected from their bodies. Genus and species of ticks were identified in laboratory. Six hundred livestock were examined and 321 ticks were collected from their bodies. Among them 2 genus including *Hyaloma*, and *Rypicephalus* were identified. Two species of genus *Hyaloma* (*Hyaloma anatolicum*, and *H. asiaticum*), and one species of genus *Rypicephalus* (*Rypicephalus sanguineus*) were identified. 286 ticks (89.1%) of *Rypicephalus sanguineus* was collected, so the dominant species of the area was *Rypicephalus sanguineus*. 35 (10.9%) *Hyaloma* with two identified species had most population of collected ticks after *Rypicephalus sanguineus*. *Argas persicus* was identified as only soft tick in the area that was collected from fowl bodies. In this study two genus and three species of hard ticks (Ixodidae family) were collected from livestock and only one species was collected from fowls. Due to importance of ticks as vectors of diseases to humans, control of these external parasites and campaign against them are important tools in prevention of vector – borne diseases. [Mohammad Hassan Kayedi, Mahmmod Reza Taherian, Asadolah Hosseini-Chegeni, Ali Chegeni-Sharafi, Hamid Mokhayeri, **The identification of genus, species and distribution of hard and soft Ticks collected from livestock and fowl bodies in Aleshtar and Aligodarz counties, Lorestan Province, Iran.** *Life Sci J* 2016;13(1s):1-6]. ISSN 1097-8135 (print); ISSN 2372-613X (online) <http://www.lifesciencesite.com>. 1. doi:[10.7537/marslsj1301s1601](https://doi.org/10.7537/marslsj1301s1601).

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1. Introduction

Ticks are one of the most important blood feeding Arthropods. They transmit Arboviruses, Bacteria and parasites to humans. Ticks are ectoparasites of livestock and other animals.

Ticks are vectors of Crimean-Congo Hemorrhagic fever virus. The disease is zoonosis and ticks transmit the virus from cattle's to humans. Disease has been reported from many provinces of Iran, including Lorestan province. In a study that has been carried out in Lorestan province in West of Iran the infection rate of Crimean-Congo Hemorrhagic fever virus in ticks that have been collected from bodies of livestock have been reported as 6.7% (1).

The goal of present study is to identify hard and soft ticks up to Genus and species that were collected from livestock in Aleshtar and Aligudarz counties, Lorestan Province, Iran.

2. Material and Methods

Lorestan province in the western part of the country covers an area of 28175 square kilometers and consists of 1.73% of the countries area that is neighbored by Hamedan and Markazi provinces from the north, Khuzestan province from the south, Isfahan from the east and Ilam and Kermanshah provinces from the west. This province has about 6.5 million livestock, 5.5% of the countries livestock population and has been ranked sixth among the provinces (2). The provinces livestock are formed of 72% small livestock (goats and sheep) and 28% large livestock (cows and calves). (3)

This study was carried out in the spring and winter of 2014-15 in the villages of Aligudarz and Aleshtar counties. Using classified samples from four regions (west, east, north, and south) of Aleshtar and Aligudarz counties, 30 villages and from each village 20 livestock were chosen and sampling was done using staples, taken from the groin, tail, neck etc. and

the ticks were separated from the livestock. Poultry and their nests were also searched for soft ticks. Searching for and collecting the ticks was done twice a year, once in the hot season and once in the cold.

After entering the villages the houses that had livestock in them were searched and examined one by one for the presence of ticks. After finding the ticks, staples were used to remove the ticks from the livestock. The collected samples from each village were put in a glass container and the date and specifications of the village were indicated on them. Then the collected hard ticks from every village were sent to the parasitology and entomology lab (agricultural research center) and the faculty of health of Lorestan University of Medical Sciences by our colleagues. In the laboratory, validated diagnostic keys for example the Russian diagnostic method key and other keys were used to detect and determine the specifications of the ticks (4,5). In total around 600 livestock were chosen as samples and the ticks on their bodies were collected.

In villages that had poultry in them, their nests and all their seams and gaps and soils inside and outside of the nests were searched carefully for soft ticks. The collected soft ticks were placed in glass containers and after specifying the place and time of collection, the containers were sent to the lab.

3. Results

Of at least 600 livestock that were studied, 321 hard ticks from the Ixodidae family were collected, 287 in spring and 34 in autumn and winter. The amount of ticks in all of the livestock was 0.535. From that amount 175 were male (54.52%), 144 were female (44.86%) and 2 were collected as nymphs (0.62%). No soft ticks from the Argasidae family were collected from the livestock's bodies.

Two Genus of *Hyalomma* and *Rhipicephalus* ticks were separated from the livestock. From the Genus *Hyalomma* two species *anatolicum* and *asiaticum* and from the Genus *Rhipicephalus* species *sanguineus* were identified. The two nymphs that were collected were from the *Hyalomma* Genus.

The *Hyalomma* tick had the greatest diversity with two kinds of species found and the rest consisted of only one kind of species.

From the perspective of the ticks population the *Rhipicephalus sanguineus* had the most population compared to other species with 286 (89.10%) ticks. Therefore this tick is introduced as the areas predominant tick. In second place is the *Hyalomma* with two kinds of species (*Hyalomma anatolicum* and *Hyalomma asiaticum*) and a total of 35 (10.90%) ticks.

Also by investigating the poultry nests, a lot of soft ticks were found that all belonged to the *Argas persicus* species. The amount and kind of ticks collected is shown in Table 1.

Table 1. Prevalence and percentage of soft Ticks, collected from poultry nests in Aleshtar and Aligudarz counties, Lorestan province, Iran, spring collection

Species of Tick	No	Male, No (%)	Female, No (%)	Nymph, No (%)
<i>Argas persicus</i>	125	51 (40.80%)	42 (33.60%)	32 (25.60%)

- The results of collecting ticks in spring

From all the ticks that were collected in spring, 141 of them were from sheep (49.13%), 137 from

goats (47.74%) and 9 were collected from cows (3.13%) which can also be seen in Table 2.

Table 2. Prevalence and percentage of Ticks, collected from livestock in Aleshtar and Aligudarz counties, Lorestan province, Iran, spring collection

Livestock	No of Ticks (%)	Male, No (%)	Female, No (%)	Nymph, No (%)
Sheep	141 (49.13%)	74 (52.48%)	66 (46.81%)	1 (0.71%)
Goat	137 (47.74%)	74 (54.01%)	62 (45.26%)	1 (0.73%)
Cow	9 (3.13%)	5 (55.56%)	4 (44.44%)	0 (0%)
Total	287 (100%)	153 (53.31%)	132 (45.99%)	2 (0.70%)

The amount of hard ticks from Aleshtar and Aligudarz counties in spring 2014 can be seen in Table 3. The species of ticks collected and also their gender is shown in Tables 4, 5 and 6 in order for sheep, goat and cows.

-The results of collecting ticks in autumn and winter

In total a number of 34 ticks were collected from the livestock's bodies in the counties of Aleshtar and Aligudarz in autumn and winter. The *Rhipicephalus Sanguineus* species was the most collected species

with 27 ticks collected. In second place was the *Hyalomma Asiaticum* with 7 ticks collected. From all the ticks collected in autumn and winter 31 were from sheep (91.18%) and 3 were from goats (8.82%) as

shown in Table 7. The species of ticks and their gender has been shown in Tables 8 and 9 in order for sheep and goats. No ticks were collected from cows.

Table 3. Prevalence and percentage of species of Ticks, collected from livestock in Aleshtar and Aligudarz counties, Lorestan province, Iran, spring collection

Species of Tick	No	Male, No (%)	Female, No (%)	Total
<i>Hyalomma anatolicum</i>	11	7 (61.64%)	4 (38.36%)	3.83%
<i>Hyalomma asiaticum</i>	15	13 (88.67%)	2 (11.33%)	5.23%
<i>Rhipicephalus Sanguineus</i>	259	134 (51.74%)	125 (48.26%)	90.24%
<i>Hyalomma</i> (nymph)	2	-	-	.70%
Total	287	154	131	100%

Table 4. Prevalence and percentage of species of Ticks, collected from sheep in Aleshtar and Aligudarz counties, Lorestan province, Iran, spring collection

Species of Tick	No	Male, No (%)	Female, No (%)	Total
<i>Hyalomma anatolicum</i>	1	1 (100.00%)	0 (0%)	0.71%
<i>Hyalomma asiaticum</i>	13	12 (92.31%)	1 (7.69%)	9.22%
<i>Rhipicephalus Sanguineus</i>	126	64 (50.79%)	62 (49.21%)	89.36%
<i>Hyalomma</i> (nymph)	1	-	-	0.71%
Total	141	77	63	100%

Table 5. Prevalence and percentage of species of Ticks, collected from goat in Aleshtar and Aligudarz counties, Lorestan province, Iran, spring collection

Species of Tick	No	Male, No (%)	Female, No (%)	Total
<i>Hyalomma anatolicum</i>	1	1 (100.00%)	0 (0%)	0.73%
<i>Hyalomma asiaticum</i>	2	1 (50.00%)	1 (50.00%)	1.46%
<i>Rhipicephalus Sanguineus</i>	133	70 (52.63%)	63 (47.37%)	97.08%
<i>Hyalomma</i> (nymph)	1	-	-	0.73%
Total	137	72	64	100%

Table 6. Prevalence and percentage of species of Ticks, collected from cows in Aleshtar and Aligudarz counties, Lorestan province, Iran, spring collection

Species of Tick	No	Male, No (%)	Female, No (%)	Total
<i>Hyalomma anatolicum</i>	9	5 (55.56%)	4 (44.44%)	100%
<i>Hyalomma asiaticum</i>	0	0	0	0%
<i>Rhipicephalus Sanguineus</i>	0	0	0	0%
<i>Hyalomma</i> (nymph)	0	0	0	0%
Total	9	5 (55.56%)	4 (44.44%)	100%

Table 7. Prevalence and percentage of species of Ticks, collected from livestock in Aleshtar and Aligudarz counties, Lorestan province, Iran, autumn and winter collection

Species of Tick	No	Male, No (%)	Female, No (%)	Total
<i>Hyalomma asiaticum</i>	7	3 (42.86%)	4 (57.14%)	20.59%
<i>Rhipicephalus Sanguineus</i>	27	19 (70.37%)	8 (29.63%)	79.41%
Total	34	22 (64.71%)	12 (35.29%)	100%

Table 8. Prevalence and percentage of species of Ticks, collected from sheep in Aleshtar and Aligudarz counties, Lorestan province, Iran, autumn and winter collection

Species of Tick	No	Male, No (%)	Female, No (%)	Total
<i>Hyalomma asiaticum</i>	5	1 (20.00%)	4 (80.00%)	16.13%
<i>Rhipicephalus Sanguineus</i>	26	18 (69.23%)	8 (30.77%)	83.87%
Total	31	19 (61.29%)	12 (38.71%)	100%

Table 9. Prevalence and percentage of species of Ticks, collected from goats in Aleshtar and Aligudarz counties, Lorestan province, Iran, autumn and winter collection

Species of Tick	No	Male, No (%)	Female, No (%)	Total
<i>Hyalomma asiaticum</i>	2	2 (100.00%)	0 (0%)	66.67%
<i>Rhipicephalus Sanguineus</i>	1	1 (100.00%)	0 (0%)	33.33%
Total	3	3 (100.00%)	0 (0%)	100%

4. Discussions

In total 287 ticks were collected from the livestock bodies in spring and 34 were collected in autumn and winter. All of the 34 ticks collected were caught in mid march 2015 when the weather wasn't cold and was warming up. From the beginning of November 2014 until mid march 2015 a lot of livestock were studied but no ticks were found (Table 3). The above findings show that from the start of November till mid march the population of ticks drops dramatically and with the start of the warmer seasons their population starts increasing and at the end of spring and the start of summer it reaches the maximum amount.

In a similar study carried out by Taherian et al. in 2010-11 in Khorramabad county, Lorestan province 3156 hard ticks were collected from 800 livestock. The amount of ticks in all of the livestock was 3.95 per livestock that was 7.38 times more than our study in Aleshtar and Aligudarz. Therefore the population of ticks in Khorramabad is much higher compared to Aleshtar and Aligudarz. The main reason for this can be the warmer weather in Khorramabad compared to Aleshtar and Aligudarz. As shown in the results the number of ticks in autumn and winter reduces dramatically in Aleshtar and Aligudarz due to the colder weather. In addition to the higher amount of ticks found in Taherian et al's research, there were also more species of ticks found in Khorramabad than in our study. Other than *Hyalomma*, *Rhipicephalus*, *Dermacentor* and *Haemaphysalis*, six different kinds of the species were also found that is much higher than the kinds of species found in the present study that was only two Genus and three species. All of these Genus and species that were found in our study in Aleshtar and Aligudarz were also found in Khorramabad that could be due to the warmer weather and also the higher amount of entries and exits of livestock from other provinces to Khorramabad county which is the capital city of Lorestan province (6).

In both studies *Rhipicephalus sanguineus* was the dominant species with 73% in Khorramabad and 89.1% in Aleshtar and Aligudarz. After the *Rhipicephalus Sanguineus*, the *Hyalomma* Genus was the most found in both studies with 23% of all ticks collected in Khorramabad and 10.90% in Aleshtar and Aligudarz.

In this study 2 Genus and 3 species of Ixodidae ticks were collected from livestock. The most kinds of species were found from *Hyalomma anatolicum* and *Hyalomma asiaticum*, both from the *Hyalomma* Genus (7,8).

In the study carried out by Yakhchali et al. in Bukan, Kurdistan province, the percentage of contamination was 88.57% in goats, 31.03% in sheep and 18.32% in cows. Two Genus of *Rhipicephalus* and *Haemaphysalis* had the most amount of ticks. The *Rhipicephalus sanguineus* had the most contamination with 85.7% that is in line with the current study (9).

In the study carried out by Hashemzadeh et al. in Mahabad, West Azerbaijan province, from the 643 ticks that were collected from sheep, 3 Genus of *Hyalomma*, *Haemaphysalis* and *Rhipicephalus* were found. From the kinds of species point of view, the *Hyalomma* Genus with two species of *anatolicum* and *axcavatum* and the *Rhipicephalus* Genus with two species of *bursa* and *sanguineus* had the highest diversity in species kinds. The *Hyalomma anatolicum* and *Rhipicephalus* ticks had the most contamination with 28.1% and 25.8% respectively (10).

In another study carried out by Telmadarreyi et al. in Ardebil province, 2080 ticks were collected from livestock. The highest amount of contamination to ticks, like the current study was in sheep and after that in cows and goats. From the species perspective, much like our study the *Hyalomma* Genus had the highest diversity. The *Hyalomma* and the *Rhipicephalus* Genus with 65.5% and 34.3% had the highest contamination amounts respectively. From the soft ticks perspective in Ardebil the highest amount of ticks was the *Ornitodoros* Genus and after that the *Argas* Genus (11). The soft ticks Genus found is in contrast with the current study, also the soft ticks in Ardebil were collected from the livestock while in our study soft ticks were not collected from livestock.

In the study carried out by Maghsud et al. in 2011 in Mashhad, Sabzevar and Taibad, from 100 ticks collected from livestock, *Hyalomma* and *Rhipicephalus* ticks had the most contamination in sheep (12).

In the study carried out by Hashemzadeh Farhang et al. in Karaj, 665 *Hyalomma* and *Rhipicephalus* ticks were collected from sheep and similar to the present study the *Hyalomma* Genus with two species of *anatolicum* and *axcavatum* had the

most diversity. *Hyalomma antalicum* had the highest amount with 34.31% but in contrast with our study *Rhipicephalus sanguineus* with 16.84% had the lowest tick diversity in the area (13).

In another study carried out by Bakhshai et al. in Jiroft and Kahnouj in Kerman province, from the 224 ticks collected the highest contamination consisted of the *Hyalomma* and the *Rhipicephalus* Genus. In the kinds of ticks species diversity point of view the *Hyalomma* tick with *anatolicum*, *axcavatum*, *marginatum* and *asiaticum* species had the highest diversity and compared to our study more kinds of the *Hyalomma* species were found. In Bakhshaies study the average amount of ticks on sheep was 3.7, which is more compared to our present study, and then the cows with 2.5 and finally goats with 1.1 ticks (14). Askarian et al carried out a study in tick fauna in Mazandran province, Iran (15).

In another study carried out by Shayeghi et al. in Amol, Babol and Nour in Mazandaran province that took place on different livestock like sheep, cows, and goats 6 Genus of hard ticks were found. The *Hyalomma* had the highest species kind diversity with the *anatolicum*, *marginatum* and *shulzei* species and had a higher diversity compared to the present study. The soft ticks collected were mostly consisted of the *Argas persicus* species with about 36% which was consistent with the present study (16).

Studies carried out around the world also had results similar to the ones in the present study (specially in terms of Genus and diversity of species). some are listed below.

In the study carried out by Yamauchi, T et al. in Chicogu, Japan, 10 species of hard tick were collected from livestock. The *Hyalomma* tick had the most diversity of species kinds with 6 kinds of species. (17)

In the study carried out by Kariuki, Ek et al. in Kenya, 8 Genus of hard ticks were collected from livestock. The *Hyalomma* and *Rhipicephalus* each with three species kinds had the greatest diversity (18).

In the study carried out by Santos in Portugal, 20 species of hard ticks were collected from the livestock. The *Ixodes* tick with 5 species had the greatest diversity and after that was the *Rhipicephalus* with 4 species (19).

In the study carried out by joungejan et al. in Sudan the *Rhipicephalus sanguineus* tick had the highest diversity. (20)

In the study carried out by Krcmar in Croatia, 21 species of ticks from 6 Genus were collected. The *Ixodes*, *Haemaphysalis* and *Rhipicephalus* had the greatest diversity with 7, 6 and 4 species respectively (21).

In the study carried out by wahid-ur Rehman et al. in Ravelpendi and Islamabad in Pakistan, it was

found that the livestock contamination was limited to the *Haemaphysalis* and *Hyalomma* ticks. The *Haemaphysalis Sulcata* had the highest contamination with 74%. The *Hyalomma* had the greatest diversity with 3 species (22).

The present study and other similar studies that have been carried out in different parts of the country shows that due to the geographical conditions of each region, such as weather conditions, mountainous or plains areas and the livestock, the dominant ticks of each region are different from the other regions. This point can be true to some extent for the different counties of each province and also the different areas in each city. In the counties of Aleshtar and Aligudarz the contamination to ticks between sheep and goats is very common and this matter needs the serious consideration and support of the health authorities in the province and the counties network of agriculture and veterinary.

The education of farmers on the importance of ticks and cleaning the animals and where they live, spraying the livestock in tick pools with appropriate insecticides and also spraying the livestock's dwelling are simple ways which have been welcomed by farmers and will have their cooperation and could have effective results.

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