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## IDENTIFICATION AND NUMBER OF IXODIDEA TICKS PARASITIZING DOMESTIC ANIMALS IN THE TERRITORY OF THE NAKHCHIVAN AUTONOMOUS REPUBLIC

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## ИДЕНТИФИКАЦИЯ И ЧИСЛЕННОСТЬ ИКСОДОВЫХ КЛЕЩЕЙ, ПАРАЗИТИРУЮЩИХ НА ДОМАШНИХ ЖИВОТНЫХ НА ТЕРРИТОРИИ НАХЧЫВАНСКОЙ АВТОНОМНОЙ РЕСПУБЛИКИ

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**Abstract.** The aim of the study was to examine the species composition of Ixodidae ticks in the Nakhchivan Autonomous Republic, the distribution extensiveness and intensity of individual genera and species. The research material was collected in 2017-2023. During the study, a total of 5865 domestic animals of 7 species were examined for tick infestation. Infestation was detected in 4536 of the examined domestic animals and 10629 ixodid ticks were collected from them. For each tick collection, the collection date, species composition, quantity, and developmental stage were recorded. The number, registration and species of ticks were determined using identification instructions. Genera and species were identified in the Parasitology laboratory of the “Veterinary Medicine” department of the Nakhchivan State University and the Nakhchivan Veterinary Scientific Research Experimental Station. The collected ticks consisted of 15 species belonging to the Ixodidea family, including *Dermacentor marginatus* Sulzer, 1776, *D.ushakova* Fil. et Pan. 1987, *D. nuttalli* Ol. 1928, *D. reticulatus* Fabri. 1794, *C. Can. et Fanz.* 1877, *Haemaphysalis punctata* Can. et Fanz.1877, *Haem.sulcata* Can et Fanz. 1877, *Hyalomma anatolicum* Koch, 1844, *H. asiaticum* P. Sch. Et E.Schl., 1929, *H.detritum* P. Schul., 1919, *H. marginatum* Koch, 1844, *H. kozlovi* Olenov, 1931, *H. scupense* P. Sch., 1918, *Rhipicephalus bursa* Can. Et Franz, 1877, *Rh. turanicus* B. Pom., 1940, *Rh. sanguineus* Lat., 1806. The most widespread among these species in the territory of the autonomous republic were *H. anatolicum* - 25.9%, *H. asiaticum* - 16%, *Rh.bursa* - 16.8%, *D.marginatus* - 14.5%. *H.detritum*, *H.marginatum*, *H.kozlovi*, *Rh.turanicus*, *Haem. punctata* species having epidemiological and epizootological significance were found in moderate numbers. The total number of these species varied between 2.7 and 6.7%, constituting 23.4% of the total collected material. Other species: *H.scupense*, *Rh.sanguineus*, *D.reticulatus*, *D.nuttalli*, *D.ushakova*, *Haem.sulcata* are very rare and, therefore, lack epidemiological and epizootological significance. Their numbers range from 0.2% to 0.6%. As a result of the agro-improvement measures implemented, both the extensiveness and intensity of infestation decreased, with an average of 1.8 ticks per examined animal and 2.3 ticks per infested animal.

**Аннотация.** Целью исследования было изучение видового состава иксодовых клещей в Нахчыванской Автономной Республике, экстенсивности распространения и интенсивности отдельных родов и видов. Материал для исследования был собран в 2017-2023 годах. В ходе

исследования было обследовано на зараженность клещами 5865 домашних животных 7 видов. Зараженность была обнаружена у 4536 обследованных домашних животных, у них было собрано 10629 иксодовых клещей. Для каждого сбора клещей регистрировались дата сбора, видовой состав, количество и стадия развития. Численность, учет и виды клещей определялись с использованием инструкций по идентификации. Роды и виды определялись в лаборатории паразитологии кафедры «Ветеринарная медицина» Нахчыванского государственного университета и Нахчыванской ветеринарной научно-исследовательской опытной станции. Собранные клещи включали 15 видов, принадлежащих к семейству Ixodidae, в том числе *Dermacentor marginatus* Sulzer, 1776, *D. ushakova* Fil. et Pan. 1987, *D. nuttalli* Ol. 1928, *D. reticulatus* Fabri. 1794, *C. Can. et Fanz*, 1877, *Haemaphysalis punctata* Can. et Fanz. 1877, *Haem. sulcata* Can et Fanz. 1877, *Hyalomma anatolicum* Koch, 1844, *H. asiaticum* P. Sch. Et E. Schl., 1929, *H. detritum* P. Schul., 1919, *H. marginatum* Koch, 1844, *H. kozlovi* Olenov, 1931, *H. scupense* P. Sch., 1918, *Rhipicephalus bursa* Can. Et Franz, 1877, *Rh. turanicus* B. Pom., 1940, *Rh. sanguineus* Lat., 1806. Среди этих видов на территории автономной Республики наибольшее распространение имели *H. anatolicum* - 25,9%, *H. asiaticum* - 16%, *Rh. bursa* - 16,8%, *D. marginatus* - 14,5%. *H. detritum*, *H. marginatum*, *H. kozlovi*, *Rh. turanicus*, *Haem.* В умеренном количестве обнаружены виды *Punctata*, имеющие эпидемиологическое и эпизоотологическое значение. Общая численность этих видов колебалась от 2,7 до 6,7%, что составило 23,4% от общего количества собранного материала. Другие виды: *H. scupense*, *Rh. sanguineus*, *D. reticulatus*, *D. nuttalli*, *D. ushakova*, *Haem. sulcata* встречаются очень редко и поэтому не имеют эпидемиологического и эпизоотологического значения. Их численность колеблется от 0,2% до 0,6%. В результате проведенных агротехнических мероприятий снизилась как экстенсивность, так и интенсивность заражения, в среднем на одно обследованное животное приходится 1,8 клещей, на одно зараженное животное — 2,3 клеща.

**Keywords:** animals, agriculture, tick, parasite, Nakhchivan.

**Ключевые слова:** животные, сельское хозяйство, клещ, паразит, Нахчыван.

The main part of the economy of the Nakhchivan Autonomous Republic is the agricultural sector. Despite the wide opportunities for the development of livestock farming, a number of parasitic and infectious diseases cause significant damage to the livestock economy every year. Among these diseases, blood-parasitic diseases are the most prominent [1].

On the other hand, it is known that the main transmitters and natural reservoirs of blood-parasitic diseases are ixodid ticks [7].

Since ixodid ticks are also transmitters of a number of infectious diseases of humans and animals, their detailed study should be considered a very important issue from both epidemiological and epizootological perspectives [2].

Therefore, it is of great importance to carry out anti-tick measures to improve the health of this area. It is impossible to plan such measures without knowing the distribution and number of ticks across various natural-territorial units.

Although the genus and species composition of ixodid ticks in the Nakhchivan Autonomous Republic was previously studied by us (1987-1990), over the years, the liquidation of collective farms (kolkhozes and sovkhoses), privatization of lands, and the intensive implementation of agromeliorative measures, along with the cultivation and irrigation of lands, have altered the fauna and number of ixodid ticks [3].

Therefore, the goal of our research was to determine the genus, species composition, and number of ixodid ticks in the autonomous republic in recent years.

### Materials and Methods

The research material was collected in 2017-2023. The collection date, species composition, number and development stage were taken into account for each tick collection [5].

We determined the number, made registration and identified tick species following the identification instructions [4, 6].

Ticks were separated by genus and species for preservation in the parasitology laboratory of the Department of “Veterinary Medicine” of the Nakhchivan State University and in the Nakhchivan Veterinary Scientific Research Experimental Station. Statistical processing of the collected material was carried out by calculating the extensiveness of infestation.

During the study, a total of 5,865 domestic animals of 7 species were examined for tick infestation, including 2,373 cattle, 2,086 sheep, 997 goats, 176 horses, 108 donkeys, 68 dogs, and 57 cats. A total of 10,629 Ixodes were collected from the examined domestic animals.

### Results and Discussion

As mentioned above, 5865 domestic animals of 7 species were examined for tick infestation, and 4536 of them were found to be infested, and 10629 ixodid ticks were collected from these animals. This amounted to 1.8 ticks per animal examined and 2.3 ticks per infested animal. The collected ticks consisted of 15 species belonging to the Ixodidea family, including

*Dermacentor marginatus* Sulzer, 1776, *D.ushakova* Fil. et Pan. 1987, *D.nuttalli* Ol. 1928, *D.reticulatus* Fabri. 1794, *C. Can. et Fanz.* 1877, *Haemaphysalis punctata* Can. et Fanz.1877, *Haem.sulcata* Can et Fanz. 1877, *Hyalomma anatolicum* Koch, 1844, *H.asiaticum* P. Sch. Et E.Schl., 1929, *H.detritum* P. Schul., 1919, *H.marginatum* Koch, 1844, *H.kozlovi* Olenov, 1931, *H.scupense* P. Sch., 1918, *Rhipicephalus bursa* Can. Et Franz, 1877, *Rh.turanicus* B. Pom., 1940, *Rh.sanguineus* Lat., 1806 (Table 1).

Table 1

SPECIES COMPOSITION AND PERCENTAGE  
OF IXODID TICKS COLLECTED FROM DOMESTIC ANIMALS

№	Collected tick species	Total number	Infested, %	Tick sex ratio			
				Females		Males	
				number	%	number	%
1.	<i>H. anatolicum</i>	2759	22.8	1592	57.7	1167	42.3
2.	<i>H. asiaticum</i>	1698	17.6	997	58.7	701	41.3
3.	<i>H.detritum</i>	718	7.4	443	61.7	275	38.3
4.	<i>H.marginatum</i>	612	2.5	378	61.8	234	38.2
5.	<i>H.kozlovi</i>	544	3.2	286	52.6	258	47.4
6.	<i>H.scupense</i>	15	0.2	5	33.3	10	66.7
7.	<i>Rh.bursa</i>	1787	17.2	1012	56.6	775	43.4
8.	<i>Rh.turanicus</i>	336	7.4	198	58.9	138	41.1
9.	<i>Rh.sanguineus</i>	137	3.9	65	47.4	72	52.6
10.	<i>D.marginatus</i>	1543	10.0	968	62.7	575	37.3
11.	<i>D.reticulatus</i>	8	0.1	2	25.0	6	75.0
12.	<i>D.nuttalli</i>	45	0.3	17	37.7	28	62.3
13.	<i>D.ushakovae</i>	27	0.1	8	26.6	19	70.4
14.	<i>Haem. punctata</i>	283	4.2	153	54.0	130	46.0
15.	<i>Haem.sulcata</i>	117	3.1	56	47.9	61	52.1
Total		10629	100	6180	58.1	4449	41.9

The most widespread of these species in the territory of the autonomous republic were *H. anatolicum* — 25.9%, *H. asiaticum* — 16%, *Rh. bursa* — 16.8%, and *D. marginatus* — 14.5%. These species are of great importance from an epidemiological and epizootological perspective. Because they are considered a reservoir and transmitter in nature of various blood-parasitic and infectious diseases to which humans and animals are susceptible.

*H. detritum*, *H. marginatum*, *H. kozlovi*, *Rh. turanicus*, *Haem. punctata* are of moderate number and have epidemiological and epizootological importance. The total number of these species varies between 2.7-6.7%, constituting 23.4% of the total collected material.

The species *H. scupense*, *Rh. sanguineus*, *D. reticulatus*, *D. nuttalli*, *D. ushakova*, and *Haem. sulcata* are very rare and therefore, have no epidemiological or epizootological significance. Their abundance ranges from 0.2% to 0.6%

**Cattle:** Twelve species of ticks belonging to the Ixodidae family were identified as parasitizing cattle in the territory of the Nakhchivan Autonomous Republic. Among them, five species belong to the *Hyalomma* genus, three to *Dermacentor*, two to *Rhipicephalus*, and two to *Haemaphysalis*.

According to our calculations, if we consider the total number of *Ixodidae* ticks parasitizing cattle as 100%, then 41.6% belong to the *Hyalomma* genus, 25% to *Dermacentor*, 16.7% to *Rhipicephalus*, and 16.7% to *Haemaphysalis*.

The *Hyalomma* genus was represented by 5 species: *H. anatolicum*, *H. asiaticum*, *H. detritum*, *H. marginatum*, *H. scupense*. Among them, *H. anatolicum* and *H. asiaticum* are considered numerous, *H. detritum* and *H. marginatum* are moderately abundant, while *H. scupense* is a rare species. The total number of *Hyalomma* ticks parasitizing cattle was 5,802. Of these, 47.5% were *H. anatolicum*, 29.3% *H. asiaticum*, 12.4% *H. detritum*, and 0.3% *H. scupense*.

Three species of *Dermacentor* ticks were found in cattle: *D. marginatus*, *D. reticulatus* and *D. ushakovae*. The total number of these ticks was 1578, with *D. marginatus* accounting for 97.8%, *D. reticulatus* for 0.5%, and *D. ushakovae* for 1.7%. *D. marginatus* is considered numerous, while the other two species are considered scarce.

The *Rhipicephalus* genus is represented by two species. The total number of these two species was 2,123, with *R. bursa* accounting for 84.2% and *R. turanicus* for 15.8%. Therefore, *R. bursa* is considered numerous, while *R. turanicus* is classified as moderately abundant.

The *Haemaphysalis* genus is represented by two species: *Haem. punctata* and *Haem. sulcata*. Since the total number of collected species was 400, *Haem. punctata* accounted for 70.8% of the material, while *Haem. sulcata* made up 29.2%. Therefore, *Haem. punctata* is considered numerous, whereas *Haem. sulcata* is classified as moderately abundant.

**Sheep.** In sheep, 10 tick species from the Ixodidae family were identified as parasites. These include five species from the *Hyalomma* genus: *H. anatolicum*, *H. asiaticum*, *H. detritum*, *H. kozlovi*, and *H. marginatum*, two species from the *Rhipicephalus* genus: *R. bursa* and *R. turanicus*, one species from the *Dermacentor* genus: *D. Marginatus*, two species from the *Haemaphysalis* genus: *Haem. punctata* and *Haem. sulcata*.

The total number of ticks parasitizing sheep was 10,397, including 6331 ticks from the *Hyalomma* genus, 2123 ticks from the *Rhipicephalus* genus, 1543 ticks from the *Dermacentor* genus, 400 ticks from the *Haemaphysalis* genus. Thus, *Hyalomma* ticks made up 61.0% of the total, *Rhipicephalus* 20.4%, *Dermacentor* 14.8%, and *Haemaphysalis* 3.8%.

Among them, *H. anatolicum* accounted for 26.5% and *H. asiaticum* for 16.3%, making them numerous species. The other species, with proportions ranging from 5.2% to 7.0%, were considered moderately abundant.

The *Rhipicephalus* genus was represented by two species, with *R. bursa* (17.2%) being numerous, while *R. turanicus* (3.2%) was scarce.

The *Dermacentor* genus, represented by a single species, accounted for 14.8% of the total, classifying it among the numerous species.

The *Haemaphysalis* genus is represented by two species, *Haem. punctata* (2.7%) and *Haem. sulcata* (1.1%). Both species are considered scarce.

**Goats.** Ten ixodid ticks belonging to the *Ixodidae* family were found to parasitize goats. The *Hyalomma* genus is represented by 5 species: *H. anatolicum*, *H. asiaticum*, *H. detritum*, *H. kozlovi*, *H. marginatum*; *Rhipicephalus* by 2 species: *R. bursa*, *R. turanicus*; *Dermacentor* by 2 species: *D. marginatus*, *D. Ushakovae*; *Haemaphysalis* by one species: *Haem.punctata*.

The study of the proportion of ticks feeding on goats shows that 61.4% of these ticks belong to the *Hyalomma* genus, 20.6% to *Rhipicephalus*, 15.3% to *Dermacentor*, and 2.7% to *Haemaphysalis*. Among them, *H. Anatolicum* (26.8%), *H. Asiaticum* (16.5%), *R. Bursa* (17.3%), and *D. Marginatus* (14.9%) are considered abundant, while *H. Detritum* (7%), *H. Marginatum* (5.9%), and *H. Kozlovi* (5.2%) are considered moderately abundant. Other species, with percentages ranging from 0.2% to 3.2%, are considered rare.

**Horses.** Eight species of ticks belonging to the *Ixodidae* family were identified in horses, including four species from the *Hyalomma* genus, two from *Dermacentor*, one from *Rhipicephalus*, and one from *Haemaphysalis*. A total of 9,408 ticks were collected, of which 61.3% belongs to *Hyalomma*, 18.9% to *Rhipicephalus*, 16.8% to *Dermacentor*, and 3.0% to *Haemaphysalis*.

The species composition of the *Hyalomma* genus in the material collected from horses was as follows: *H. Anatolicum* – 29.3%, *H. Asiaticum* – 18.0%, *H. Detritum* – 7.6%, and *H. Marginatum* – 6.5%. The species distribution within the *Rhipicephalus* genus was *R. Bursa* – 18.9%, while the *Dermacentor* genus included *D. Marginatus* – 16.3%, and *D. Nuttalli* – 0.4%. The *Haemaphysalis* genus accounted for 3% of the collected ticks.

As seen from the data, *H. anatolicum*, *H. asiaticum*, *R. bursa*, and *D. marginatus* are numerous species, *H. detritum* and *H. marginatum* are moderately abundant, while other species are rare.

**Donkeys.** It was found that six species of ticks from the *Ixodidae* family parasitize donkeys. These include three species from the *Hyalomma* genus (*H. anatolicum*, *H. asiaticum*, *H. marginatum*), two species from the *Rhipicephalus* genus (*R. bursa*, *R. turanicus*), and one species from the *Dermacentor* genus (*D. marginatus*).

Of the 8,735 species collected, 58% were from the genus *Hyalomma*, 24.3% from *Rhipicephalus*, and 17.7% from *Dermacentor*.

According to the species composition, 31.6% of the material was *H.anatolicum*, 19.5% *H.asiaticum*, 7% *H.marginatum*, 20.4% *R.bursa*, 3.8% *R.turanicus*, and 17.7% *D.marginatus*. As can be seen, *H.anatolicum*, *H.asiaticum*, *R.bursa*, and *D.marginatus* ticks are abundant, *H.marginatum* (7%) is moderately abundant, and *R.turanicus* (3.8%) is a rare tick species.

**Dogs.** Six species of *Ixodidae* ticks were found to parasitize dogs. These include two species from the *Hyalomma* genus (*H. anatolicum* and *H. asiaticum*), three species from the *Rhipicephalus* genus (*R. bursa*, *R. turanicus*, and *R. sanguineus*), and one species from the *Dermacentor* genus (*D. marginatus*).

Among the 8,260 collected samples, *Hyalomma* ticks accounted for 53.9%, *Rhipicephalus* for 27.4%, and *Dermacentor* for 18.7%.

In terms of species composition, the collected material consisted of *H. anatolicum* (33.4%), *H. asiaticum* (20.5%), *R. bursa* (21.6%), *R. sanguineus* (1.7%), *R. turanicus* (4.1%), and *D. marginatus* (18.7%). Among the ticks found on dogs, *H. anatolicum*, *H. asiaticum*, *R. bursa*, and *D. marginatus* were abundant, *R. turanicus* was moderately abundant, while *R. sanguineus* was rare.

*Cats.* Four species of ixodid ticks were found to parasitize cats. These included *Hyalomma anatolicum* and *Hyalomma asiaticum* from the *Hyalomma* genus, as well as *R. turanicus* and *R. sanguineus* from the *Rhipicephalus* genus. Cats accounted for 4930 of the collected material.

90.4% of ticks belonging to the Ixodidae family that parasitize cats are formed by the *Hyalomma* genus, and 9.6% by *Rhipicephalus*. The analyses of species show that *H. anatolicum* constitutes 56%, *H. asiaticum* 34.4%, *R. turanicus* 6.8%, and *R. sanguineus* 2.8%. Thus, the species of the *Hyalomma* genus are numerous, the *R. turanicus* species is moderately abundant, and *R. sanguineus* is rare.

#### Conclusion

During the study period, the tick infestation status of 5,865 domestic animals from 7 species was examined. The infestation was detected in 4,536 animals, and a total of 10,629 Ixodid ticks were collected. This corresponds to an average of 1.8 ticks per examined animal and 2.3 ticks per infested animal.

It has been found that 15 species of ticks from 4 genera of the Ixodidae family (*Hyalomma*, *Rhipicephalus*, *Dermacentor*, and *Haemaphysalis*) parasitize domestic animals in the territory of the Nakhchivan Autonomous Republic.

Of these species four (*H. anatolicum*, *H. asiaticum*, *R. bursa*, and *D. marginatus*) are numerous, five (*H. detritum*, *H. marginatum*, *H. kozlovi*, *R. turanicus*, and *Haem. punctata*) are moderately abundant, and six (*H. scupenze*, *R. sanguineus*, *D. reticulatus*, *D. ushakovae*, *D. nuttalli*, and *Haem. sulcata*) are rare.

As a result of the agro-improvement measures taken, the extensiveness and intensity of infection decreased, with 1.8 ticks per examined animal and 2.3 ticks per infested animal, which means a relative decrease in the extensiveness and intensity of ticks compared to previous years.

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