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BLOOD PARASITIC DISEASES OF DOMESTIC FARM ANIMALS IN THE TERRITORY OF THE NAKHCHIVAN (AZERBAIJAN)

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КРОВЕПАРАЗИТАРНЫЕ ЗАБОЛЕВАНИЯ ДОМАШНИХ СЕЛЬСКОХОЗЯЙСТВЕННЫХ ЖИВОТНЫХ НА ТЕРРИТОРИИ НАХИЧЕВАНИ (АЗЕРБАЙДЖАН)

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Abstract. Analysis of the epidemiological situation on protozoal blood parasitic diseases of domestic animals in the Nakhchivan. Veterinary reporting, literature sources and personal research. The article summarizes and analyzes data on the epizootic situation of protozoal blood parasitic diseases of animal in the Nakhchivan districts. It was shown that for a reliable assessment of the epizootic situation, it is necessary to combine the research work of scientists and the veterinary service in order to develop a monitoring system, taking into consideration the recommendations of the OIE (International Office of Epizootics).

Аннотация. Выполнен анализ эпидемиологической ситуации по протозойным кровепаразитарным заболеваниям домашних животных. Ветеринарные отчеты, литературные источники и личные исследования. В статье обобщены и проанализированы данные об эпизоотической ситуации по протозойным кровепаразитарным заболеваниям животных в Нахичеванских районах. Показано, что для достоверной оценки эпизоотической ситуации необходимо объединение научно-исследовательской работы ученых и ветеринарной службы с целью разработки системы мониторинга с учетом рекомендаций МЭБ (Международного эпизоотического бюро).

Keywords: piroplasmosis, babesiosis, protozoal infections, cattle, sheep.

Ключевые слова: пироплазмоз, бабезиоз, протозоозы, крупный рогатый скот, овцы.

Introduction

Animal blood parasitic diseases, a group of widespread diseases of domestic and wild mammals, birds, fish and amphibians (infections of humans are also known), are caused by unicellular organisms — piroplasmids. The economic damage is manifested by the death of animals (mortality rate of 30-60%), reduced productivity, and significant costs for preventive and therapeutic measures. The pathogens of piroplasmosis parasitize intra erythrocytes or other cells of the hematopoietic system of animals. In stained preparations, they have round, pear-shaped, double-pear-shaped, amoeboid and other forms [6, 8].

Each type of animal has its own pathogens. For these diseases, the characteristic clinical symptoms are high fever, anemia, yellowness of the mucous membranes, frequent heartbeat and respiration, dysfunction of the gastrointestinal tract. In all animals, hemoglobinuria is observed.

This group of diseases includes anaplasmosis, babesiosis, etc.

Blood parasitic diseases of animals are widespread in almost all countries of the world and cause enormous damage to agriculture. Practically all diseases from this group are categorized by the OIE as dangerous [1, 7]. Cattle babesiosis causes significant damage to animal husbandry in all countries of the world, which is determined not only by the death of animals but also by a decrease in productivity. For example, 8-15 days after infection, milk yields sharply decrease in cows. Significant difficulties arise due to parasitism when completing farms with imported livestock in order to improve the breed composition.

Results and Discussion

Theileriosis of cattle (pathogens: *Theileria annulata* Dschunkowsky et Luhs, 1904, *ed. note*: determination of the species to which the specific name *annulatum* Dschunkowsky & Luhs, [1906], as published in the combination *Piroplasma annulatum* (Class Sporozoa, Order Coccidiida) shall be held to apply: <https://www.biodiversitylibrary.org/page/34655168#page/389/mode/1up>) is most common in the lowlands and foothills of the Nakhchivan, and to a lesser extent in the mountainous zones of Sherur, Babek, Kengerli and other areas. This disease occurs in the warm season, due to the active phase of development of the tick vector [4, 5]. Animals become infected mainly on pastures, through the ticks *Hyalomma anatolicum*, *H. detritum*, and less often *H. scupense*. The territory of Nakhchivan is traditionally considered unfavorable for theileriosis. Outbreaks of the disease are recorded annually in the plain and foothill settlements. However, in 2021, 1578 cattle were infected with theileriosis in the lowland zone, among which the mortality rate was 24%.

Piroplasmiasis are more common in the lowland and foothill districts of Nakhchivan, mainly in the Shahbuz, Julfa, and Ordubad. These diseases occur from May to the end of the first half of September, in accordance with the phase of active development of tick carriers [9].

Babesiosis of cattle (pathogens: *Babesia bigemina* Smith et Kilborne, 1889 (*Piroplasma bigeminum*)) is widespread in the lowland and foothill regions of the Nakhchivan. Animals are also predominantly infected with ticks — *Rhipicephalus bursa*, *Haemaphysalis punctata*, *Dermacentor marginatus* on pastures [2, 3]. Depending on the carrier, the disease can manifest itself in spring, summer and autumn. During the study period, piroplasmiasis stable foci of piroplasmiasis in cattle were recorded on the territory of the Araz lowland, mainly in the settlements of Negram, Karachug, Karakhanbeyli, Boyukduz, etc.

In mountainous areas, babesiosis of cattle is common in the northwestern regions of the foothills, southern and central regions of mountain belts. Carriers are ticks: *Hyalomma anatolicum*, *H. asiaticum*, *H. marginatum*, *Dermacentor marginatus*. The disease is recorded mainly in summer and autumn. Non-fatal diseases of animals were recorded only in the central parts of the mountain zone in 2018-2021. Often the disease proceeds in the form of an invasion mixed with piroplasmiasis and anaplasmosis. The first outbreak occurs in summer and the second in autumn. According to the veterinary records, babesiosis of cattle in Nakhchivan has not caused serious economic damage to livestock in recent years. The only foci of the disease were registered in the south of the Shahbuz region and in the central part of the Ordubad and Julfa regions. Most of the diseased animals (347 animals) were observed in 2021, and cases of infection were also registered in the Sharur and Kankarli districts. Death amounted to 15% of all sick animals.

Bovine anaplasmosis is a febrile disease caused by intraerythrocytic parasites of the *Anaplasma marginale* Theiler, 1910 genus with symptoms of anemia and malnutrition. The pathogen is *Anaplasma marginale*. These are round, 0.2-1.2 μm inclusions in erythrocytes.

Anaplasma vectors are blood-sucking arthropods and insects. Cattle, zebu, and buffalo are also susceptible to *A. marginale*. *Anaplasma* can be transmitted from sick animals to healthy ones in violation of veterinary and sanitary standards during veterinary and zootechnical procedures (blood sampling with a needle, labeling, etc.). During the study period, the districts of all geographical zones of the Nakhchivan were unfavorable for anaplasmosis.

Blood parasitic diseases (anaplasmosis, babesiosis, and piroplasmiasis) in cattle are recorded mainly in the lowlands and most in the foothill zone of the Nakhchivan.

In 2018, according to the Nakhchivan Central Veterinary Laboratory and our research, anaplasmosis was detected in 4 out of 825 blood samples during monitoring. The average percentage of cattle infected with anaplasmosis was 0.5%. As a result of research, anaplasmosis was found in the Babek, Sharur, and Kengerli districts. Babesiosis (piroplasmiasis) was registered in these areas. Infection with babesiosis averaged 4.6%. Cow death was observed from piroplasmiasis.

Anaplasmosis was detected in 4 out of 652 blood samples of cattle according to the results of monitoring studies for anaplasmosis for 5 months of 2019. The average infection rate in the regions was 0.6%. The disease was registered in the Babek, Sharur, and Kengerli districts [9].

The study of the species composition of pathogens of blood parasitic diseases has great scientific and practical significance for individual regions and republics. It is especially important when carrying out therapeutic and preventive measures against the blood parasites of sheep. However, the species composition of pathogens of sheep with blood parasitic diseases has not been studied.

To develop this issue, for 4 years (2018-2021), we examined smears from the peripheral blood of 4765 sheep and ten goats spontaneously ill with hemosporidiosis, as well as from the internal organs of 7 sheep that died from hemosporidiosis. In addition, 2 series of experiments were carried out in the laboratory on 18 sheep to study the species independence of *P. ovis*.

The results of microscopic studies of blood smears from spontaneously sick sheep showed that there are 4 types of blood parasites of small cattle in the Nakhchivan: *B. ovis*, *P. ovis*, *A. ovis*, and *Th. recondita*.

Babesiosis is the most widespread. So out of 4765 sheep studied, babesiosis was found in 4336 (91%), pure babesiosis was detected in 2831 (65.3%) and in 1504 (34.7%), a mixed form, in combination with various other blood parasites was found.

P. ovis is found in mixed form and is not widely distributed. Thus, out of the studied sick sheep, *P. ovis* was detected only in 800 (16.8%). *A. ovis* is not widely distributed in the republic. It was found in 1053 sheep or in 22.1% of sick animals, of which in pure form — in 284 (27%) and in mixed form — in 768 (72.9%).

Th. recondita is not widespread in the republic. It was found in 69 sheep or in 6.6% of sick animals, of which in pure form — in 5 (7.2%) and in mixed form — in 64 (92.8%).

The ratio of mixed forms was as follows: *B. ovis* + *P. ovis* — 42.8 (644), *B. ovis* + *A. ovis* — 33.4% (502), *B. ovis* + *P. ovis* + *A. ovis* — 5.6% (84), *B. ovis* + *P. ovis* + *Th. recondita* — 0.3% (5), *B. ovis* + *Th. recondita* — 7.5% (113), *B. ovis* + *A. ovis* + *Th. recondita* — 5.6% (84), *A. ovis* + *Th. recondita* — 4.8% (72).

Thus, as a result of our research, it was found that mixed forms of sheep blood parasites are mainly found in the association of babesiosis + piroplasmiasis (42.8%) and babesiosis + anaplasmosis (33.4%) (Table).

In all zones (lowlands, foothills and mountains), all blood parasites of small horned animals (except *P. ovis*) were noted in pure and mixed form, and *P. ovis* only in mixed form.

In the study of smears prepared from the peripheral blood of 3 sick goats, *B. ovis* and *P. ovis*

were found in only one.

The localization of pathogens in individual organs is not the same. Most often they are located in the spleen, then in the blood, heart, liver, kidneys, lymph nodes and other organs.

Piroplasmiasis of sheep and goats (Pathogen: *Piroplasma ovis* Lestoquard, 1925) was recorded from spring to autumn. The main carrier was *Rh. bursa*. Babesiosis of sheep and goats (Pathogen: *Babesia ovis* Babes, 1892) was recorded in spring and summer, usually together with piroplasmiasis. The main carrier is the mite *Rh. bursa*. It also affects wild animals such as argali, mouflon, and ibex, which can be a source of pathogens in the natural environment. Outbreaks of piroplasmids in sheep and goats are annually registered in all territories and geographical zones of the Nakhchivan. The vast majority of sick animals are in the lowlands and foothills.

Table

ANALYSIS OF THE EPIZOOTIC SITUATION ON PROTOZOAL BLOOD
 PARASITIC DISEASES OF SHEEP AND GOATS

№	District	Studied smears for blood parasitic diseases within 4 years	2018	2019	2020	2021
1.	Babek					
	Total	1140/1132	240/239	285/283	270/268	345/342
	pure form	643	136	161	152	194
	mixed form	489	103	122	116	148
2.	Sharur					
	Total	1520/1495	410/402	330/326	376/365	404/402
	pure form	1183	318	258	289	318
	mixed form	312	84	68	76	84
3.	Julfa					
	Total	1210/1024	260/238	380/336	305/253	265/197
	pure form	570	132	187	141	110
	mixed form	454	106	149	112	87
4.	Kangarli					
	Total	895/685	195/165	230/186	218/145	252/189
	pure form	436	106	118	92	120
	mixed form	249	59	68	53	69
5.	Results in all districts					
	Total	4765/4336	1105/1044	1225/1131	1169/1031	1266/1130
	pure form	2832	692	724	674	742
	mixed form	1504	352	407	357	388

Conclusion

Analyzing the data of the veterinary records on blood parasitic diseases of agricultural animals in the districts of the Nakhchivan and our studies conducted for 2017-2022, we can conclude that a lot of work is being done to collect the results of a diagnostic study. However, the data from the veterinary services of the districts of the Nakhchivan do not fully reflect the real epizootic situation. In the monitoring system, 4 blood parasitic diseases are subject to control, but this list does not include piroplasmiasis of pigs and dogs, as well as piroplasmiasis and nuttalliosis of horses. While these diseases periodically cause significant damage to imported animals from foreign countries. Under the current economic conditions, with a variety of forms of ownership and

farming methods, the main direction is to predict the occurrence of diseases, and only on the basis of reliable veterinary information, it is possible to develop preventive measures. In the future, epidemiological monitoring should be the basis for rational planning and effective implementation of measures to combat blood parasitic diseases, which will ensure the timely adjustment of anti-epizootic measures. For a more reliable assessment of the epizootic situation and effective management of the epizootic process, it is necessary to combine science, practice, and veterinary services and improve the monitoring system, taking into account the recommendations of the OIE.

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