

## The Spreading of Pyroplasmosis in Pigs

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### **Abstract**

The article concerns determining the dynamics of infection with pyroplasmosis of animals kept in pig-breeding farms located in the Khachmaz district. As a result of the conducted surveys, the epizootological situation was studied based on positive results obtained during surveys to detect the spreading of parasitic blood diseases in the territory of the Khachmaz district. In the course of the conducted studies, the causative agent of piroplasmosis *P.trautmani* was studied for their pear-shaped, amoeboid, round, oval shape. Thus, the sizes of pear - shaped parasites are 2.4-2.9x1.3-1.7 microns in peripheral blood and 0.9-1.6x0.8-1.2 microns in internal organs; amoeboid parasites were not found in peripheral blood, and 1.3-1.7x1.1-1.3 microns in internal organs; the sizes of parasites round shape in peripheral blood 0.8-1.2x2.3-2.7 microns, in internal organs - 0.6-0.7x1.7-1.9 microns; as a result of microscopy, it was found that the sizes of oval-shaped parasites range from 1.1-2.8x0.6-1.9 microns in peripheral blood and 0.8-2.3x1.0-1.3 microns in internal organs. In the internal organs of animals infected with piroplasmosis, the parasites were oval, round, single pear-shaped and amoeboid. Reproduction of pyroplasmas occurs in the internal organs of pigs (liver, lungs, heart).

**Key words:** pig, causative agent of piroplasmosis, blood smear, peripheral blood, internal organs

### **Introduction**

Almost all pig-breeding farms operating in Azerbaijan are individual farms. Pork is used in the production of meat products, and a small part of it is consumed by the population as meat.

Pigs also develop blood parasitic diseases, including pyroplasmosis. In pigs, pyroplasmas first multiply in the internal organs, and then affect red blood cells in

the peripheral blood. They multiply by simple division in red blood cells. Also, the reproduction of pyroplasmas occurs in the body of ticks. Transmission of pyroplasmas by ticks occurs transovarially. The source of invasion is sick animals and carriers of pyroplasm, as well as ixod mites. The vector of the parasite is the tick *Rhipicephalus turanicus*. Pathogens are transmitted from a sick animal to a healthy one through ixodic (pasture) ticks. Pathogens of pyroplasmosis, localized in the internal organs of a sick animal, destroy, or demolish the tissues of these organs (Yengashev et al., 2022; Karimov and Timofeyev, 1986; Mamukayev, 2012).

Scientists of Azerbaijan and foreign countries have conducted several studies on the spreading of pyroplasmosis among farm animals, including pigs, on the study of ticks carrying them, on the treatment of hematopoietic parasitic diseases, etc. (Mehraliyeva, 2016; Seyidov, 2017; Abdulmagomedov et al., 2022; Belimenko, 2018; Safiullin et al., 2015; Sidorkin, 2002; Shevkoplyas and Lopatin, 2008).

Pig pyroplasmosis has also been registered in Azerbaijan. The causative agent of the disease is *P. trautmanni*. In the treatment of pyroplasmosis, with flavacridine and piroplasmin give a positive result. As a preventive measure, it is necessary to bathe animals with solutions of acaricides (Mehraliyeva, 2019; Mirzabekov, 1977; Mirzabekov et al., 1949). In this research the main goal was set to study the spreading of pyroplasmosis in pigs in Azerbaijan.

## Materials and methods

The research work was carried out in 2023 on the basis of pathological material collected from the pig-breeding farm of the Khachmaz district in the Guba-Khachmaz economic district. Conducting clinical studies among animals (pigs), smears were prepared from peripheral blood drops taken from sick animals, as well as from animals with suspicion for disease. In order to make smears, the animal's auricle was first cleaned of wool, then the ear drops were pierced with a razor and the first drop of blood was applied to the slide with a thin layer using a polishing glass. After drying, the smears were fixed in methyl alcohol under laboratory conditions and stained by the Romanovsky-Gimza method (3 drops of Romanovsky-Gimza dye were added to 1 ml of distilled water) (15). *The types of pathogens detected by smear microscopy were determined by the method of Kapustin (1949).*

Thus, in order to study the dynamics of infection with pyroplasmosis, blood smears of pigs of various ages kept in pig-breeding farms were prepared and examined in the laboratory of the Department of Parasitology of the Veterinary Scientific Research Institute.

The study of the dynamics of infection with pyroplasmiasis of the internal organs of an animal (pig) (liver, lungs, heart) was carried out by the following methods:

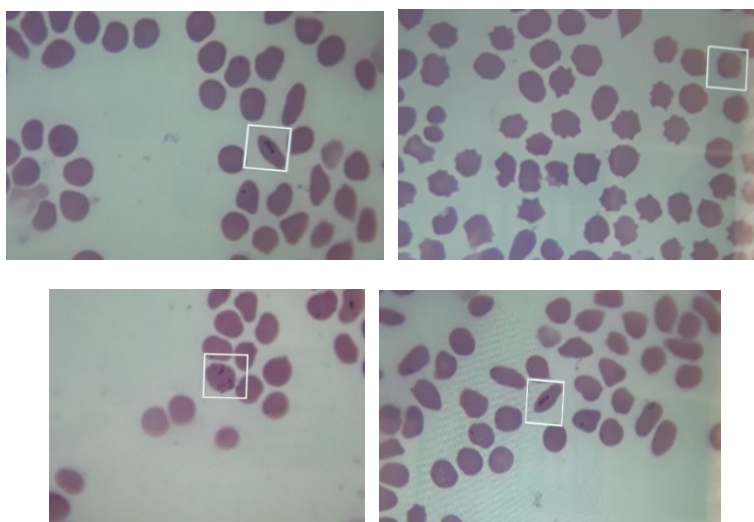
Smears were prepared from the internal organs of deceased or forcibly slaughtered pigs. Fixation and staining of smears from internal organs by pressing takes longer than blood smears, since the smears made by this method are thick. The smears were fixed with methyl alcohol for 10 minutes, with a mixture of ethyl ether for 15 minutes, staining took 10-15 minutes longer than a peripheral blood smear. It was painted by the Romanovsky-Gimza method for 60-70 minutes (*Yakubovsky, 2001*).

In order to determine the size and photograph blood parasites during examinations a BEL Solaris microscope, an HD- CAM camera and ImageScope software were used.

## Results and discussions

Microscopy of blood smears obtained from pig-breeding farms located in the Khachmaz district was carried out in the Guba-Khachmaz economic district, and the dynamics of infection of animals with pyroplasmiasis was determined.

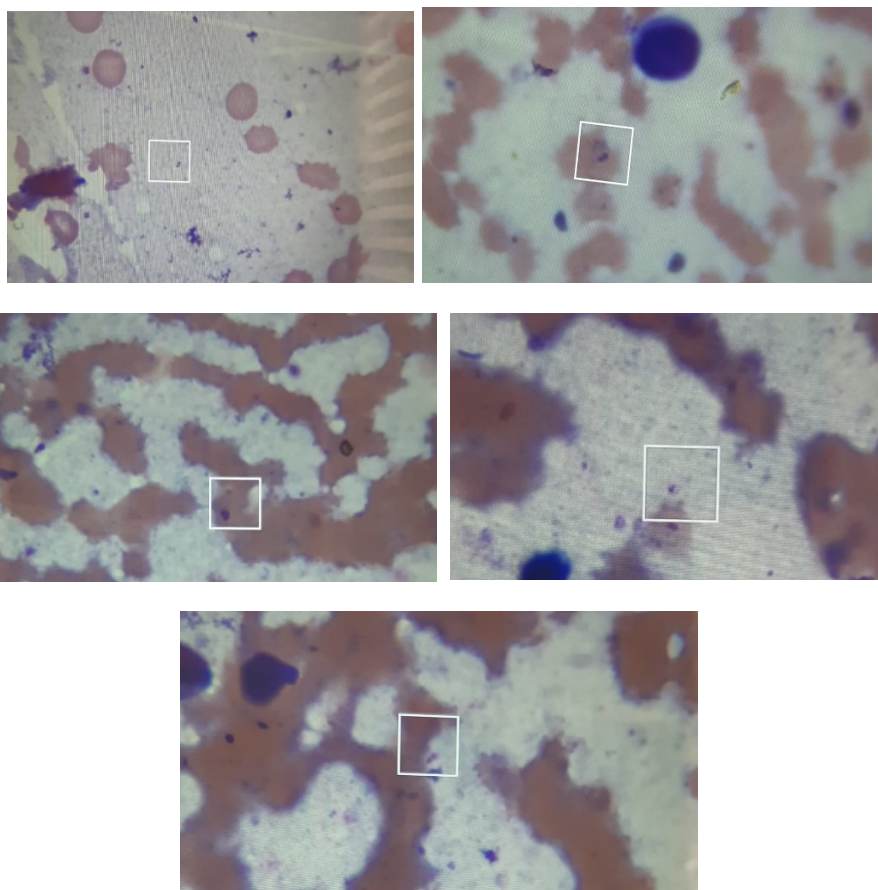
As a result of the conducted surveys, the epizootological situation was studied based on positive results obtained during surveys to detect the spreading of parasitic blood diseases in the territory of the Khachmaz district. For this purpose, microscopic examination of blood smears taken from sick and clinically healthy animals was carried out, epizootological features of pyroplasmiasis in Khachmaz district were studied.



**Figure 1.** Pyroplasmas in the peripheral blood of pigs

The number of parasites in the peripheral blood of animals was 15-25 spc. (in 100 fields of the microscope). And, the number of pyroplasmas in erythrocytes was 1-2 specimens. It has been observed that parasites are mostly 1-nuclear, and in some cases 2-nuclear. The nuclei were clearly visible during microscopy, where they were localized mainly on the blunt side of the parasite edge (Figure 1).

Reproduction of pyroplasmas occurs in the internal organs of pigs (liver, lungs, heart) (Figure 2).

**Figure 2.** Pyroplasmas in the internal organs of pigs

Morphological differences of parasites (their shapes, sizes) both in the blood and in the internal organs of the studied animals were detected using a microscope. Parasites of pear-shaped, amoeboid, round, oval shape have been studied. The size

of parasites in the peripheral blood of pigs is larger than the size of parasites in their internal organs. Thus, the sizes of pear-shaped parasites are 2.4-2.9x1.3-1.7 microns in peripheral blood and 0.9-1.6x0.8-1.2 microns in internal organs; amoeboid parasites were not found in peripheral blood, and 1.3-1.7x1.1-1.3 microns in internal organs; the sizes of parasites round shape in peripheral blood 0.8-1.2x2.3-2.7 microns, in internal organs 0.6-0.7x1.7-1.9 microns; as a result of microscopy, it was found that the sizes of oval-shaped parasites range from 1.1-2.8x0.6-1.9 microns in peripheral blood and 0.8-2.3x1.0-1.3 microns in internal organs (Table 1).

**Table 1. Morphological differences of *P.trautmanni* in peripheral blood and internal organs of pigs**

Forms of development of causative agent	The size of parasites in the peripheral blood of pigs (microns)	The size of the parasite (microns) in the internal organs of pigs
Pear-shaped	2.4-2.9x1.3-1.7	0.9-1.6x0.8-1.2
Amoeboid	-----	1.3-1.7x1.1-1.3
Round shape	0.8-1.2x2.3-2.7	0.6-0.7x1.7-1.9
Oval-shaped	1.1-2.8x0.6-1.9	0.8-2.3x1.0-1.3

It should be noted that in blood smears it was found that the nuclei of pyroplasmas are small and cover the volume of parasites with protoplasm. And in the internal organs, the presence of large-sized pyroplasm nuclei has been studied. Thus, in pyroplasmas, the nucleus is the main volume of the parasite, and the protoplasm is the smaller part.

In the internal organs of animals infected with piroplasmosis, the parasites were oval, round, single pear-shaped and amoeboid.

During studies conducted by our and foreign researchers on pig-breeding farms, it became clear that among pigs, as in other animals, parasitic blood diseases occur. When pigs are infected in pig-breeding farms, the productivity and quality of meat in animals decreases. From this point of view, the unhealthy state of the pig-breeding farm due to blood parasitic (pyroplasmosis) diseases leads to a decrease in meat production, which negatively affects the profitability of the farm.

In pigs, one of the important conditions is also a preventive method of combating pyroplasmosis - breaking the biological "chain" (tick-carrier, a parasitic animal, an animal susceptible to diseases). Without one of these factors, the likelihood of the

disease is also unlikely. The Fight against ticks should be carried out with acaricidal drugs so that parasitic blood diseases do not occur.

## Conclusion

In the course of the conducted research, *P.trautmanni* was studied for its pear-shaped, amoeboid, round shape, oval-shaped forms. Thus, the sizes of pear-shaped parasites are 2.4-2.9x1.3-1.7 microns in peripheral blood and 0.9-1.6x0.8-1.2 microns in internal organs; amoeboid parasites were not found in peripheral blood, and 1,3-1.7x1.1-1,3 microns in internal organs; the sizes of parasites round shape in peripheral blood 0.8-1.2x2.3-2.7 microns, in internal organs-0.6-0.7x1.7-1.9 microns; it was found that the sizes of oval-shaped parasites range from 1.1-2.8x0.6-1.9 microns in peripheral blood and 0.8-2.3x1.0-1.3 microns in internal organs.

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