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# Prevalence of the Viral Infections Among Calves in Livestock Farms Located in the Samarkand Region of Uzbekistan

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***Abstract:*** *The article presents the information of serological studies utilizing the RNGA strategy for the presence of antibodies to the infections of infectious rhinotracheitis, viral diarrhea, rota- and coronavirus infection and parainfluenza-3 in cattle. 473 blood sera from unvaccinated cows and calves under 1 year old from 25 farms within the Samarkand region of the Republic of Uzbekistan were considered. The results of the study showed that there was a wide range of virus positivity among animals, with antibody titers falling between 1.6-53 log2 The most common infections observed in animals are caused by rotavirus, resulting in diarrhea, as well as infectious rhinotracheitis. To a lesser extent, animals may also contract coronavirus and parainfluenza-3, with respiratory syncytial infection virus being the least frequent.*

***Keywords:*** respiratory, gastrointestinal diseases, calves, cows, blood, serum, antibody titer, IHT.

**Introduction**. The wide spread of gastrointestinal and respiratory diseases in young animals causes great damage to agricultural production, hinders the development of animal husbandry, is one of the reasons for the decrease in productivity and breeding qualities of animals, a high percentage of forced slaughter and death, and high costs for treatment and prevention. Gains in sick and recovered animals are reduced by 2-3 times. With further exploitation, recovered animals do not always fully develop the functional activity of the reproductive organs and the mammary gland. Mortality and forced slaughter is from 5 to 50 - 70% of the number of diseased calves [1,2,3,4,5,6].

Diseases of the respiratory tract and gastrointestinal tract of cattle have a large proportion among other diseases - up to 90%. The main percentage of diseases occurs in young animals. The presence of antibodies to the viruses of infectious rhinotracheitis, viral diarrhea, rota- and coronavirus, respiratory syncytial infection and parainfluenza-3 of cattle in the blood sera of adult cattle indicates that the animals had contact with these pathogens during postnatal development. By the presence of antibodies, one can judge the infection of animals in the herd or the circulation of viruses among them [7,8,9,10,11].

**Materials and methods**. To study the presence of antibodies to the viruses of infectious rhinotracheitis, viral diarrhea, parainfluenza-3 rota-, coronavirus and respiratory syncytial infection of cattle, 473 blood serum samples from unvaccinated cows and calves under the age of 1 year from 25 farms of the Samarkand region of the Republic of Uzbekistan were examined.

The work was carried out in the conditions of the Department of Microbiology, Virology and Immunology of the Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology, as well as in the farms of the Samarkand region of the Republic of Uzbekistan. To study the role of viruses and bacteria in the etiological structure of calf enteritis on the territory of the Republic of Uzbekistan, serological studies of blood sera in the IHT and bacteriological studies of the biomaterial were carried out.

The presence of antibodies was determined in the reaction of indirect hemagglutination (IHT) using erythrocyte diagnosticums, which are bovine erythrocytes sensitized with antigens of the infectious

virus rhinotracheitis, viral diarrhea, rota- and coronavirus infection and parainfluenza-3 with the help of conjugating substances - 0.1% chromium chloride with trypan blue. Diagnosticums were stored in a preservative, which is a 0.3% phenolized isotonic sodium chloride solution with 1% normal rabbit serum for 1 year from the date of manufacture.

IHT is set by diluting the studied blood sera in a Takachi microtiter solvent in a volume of 0.025 ml in dilutions from 1:2 to 1:256.

**Results and discussions**. Table 1 presents data on the determination of antibodies to the viruses of infectious rhinotracheitis, viral diarrhea, rota- and coronavirus infection and parainfluenza-3 in cattle in cows and unvaccinated calves under the age of 1 year.

Tables 1-2 present data on the assessment of seropositivity and the determination of antibodies to the viruses of infectious rhinotracheitis, diarrhea, parainfluenza-3, respiratory syncytial, rota- and coronavirus infection of cattle in cattle.

**Table 1.** Results of determining the seropositivity of animals during monitoring studies of blood sera of cattle from farms in the Samarkand region of the Republic of Uzbekistan

| **The names of the farms** | Number of samples tested | Infectious rhinotracheitis | | Viral diarrhea | | Parainfluenza -3 | |
|---|---|---|---|---|---|---|---|
| | | Number of seropositive calves | % | Number of seropositive calves | % | Number of seropositive calves | % |
| «Mingtepa zamini» | 8 | 7 | 87,5 | 8 | 100 | 6 | 75 |
| .«Omonboy hosili» | 20 | 14 | 70 | 15 | 75 | 13 | 65 |
| “.Tojnor momo” | 20 | 15 | 75 | 18 | 90 | 13 | 65 |
| “AGRO GOLD SPRING” | 20 | 16 | 80 | 17 | 85 | 14 | 70 |
| “.Olazot” | 20 | 18 | 90 | 20 | 100 | 17 | 85 |
| “Nurbuloq musaffo diyor” | 20 | 16 | 80 | 17 | 85 | 14 | 70 |
| “Kelajak” | 20 | 14 | 70 | 15 | 75 | 13 | 65 |
| “Loish Nurli Kelejak” | 20 | 15 | 75 | 18 | 90 | 16 | 80 |
| “Khushvakt Abdullaev” | 20 | 13 | 65 | 14 | 70 | 12 | 60 |
| “Markayev Mamur Zamini” | 20 | 14 | 70 | 14 | 70 | 15 | 75 |
| “Saypullayev Olimjon Nurli Zamon” | 20 | 11 | 55 | 10 | 50 | 9 | 45 |
| “Urgut Nasl Chorva” | 20 | 13 | 65 | 11 | 55 | 12 | 60 |
| “Utkir Bodomlari” | 11 | 7 | 63,6 | 8 | 72,7 | 6 | 54,5 |
| “Nurli Zamin Qushxona” | 20 | 9 | 45 | 8 | 40 | 5 | 40 |
| “Jakbar Mamasoliyev Chorvasi” | 10 | 6 | 60 | 6 | 60 | 5 | 50 |
| “Abdurahmon Mardonov chorvasi” | 10 | 4 | 40 | 4 | 40 | 5 | 50 |
| “Dutorchi” | 20 | 14 | 70 | 13 | 65 | 14 | 70 |
| “Kahramon” | 22 | 9 | 40,9 | 8 | 36,4 | 7 | 31,8 |
| “Askar Bakhtiyorovich” | 20 | 14 | 70 | 14 | 70 | 15 | 75 |
| “Utkir chorva invest” | 20 | 15 | 75 | 18 | 90 | 13 | 65 |
| “K.Eldor” | 20 | 8 | 40 | 9 | 45 | 7 | 35 |
| “Obodonchilik” | 20 | 11 | 55 | 10 | 50 | 9 | 45 |
| “Azam Azamar Agro” | 20 | 18 | 90 | 20 | 100 | 17 | 85 |
| “Akmal Toshpulatovich” | 20 | 6 | 30 | 6 | 30 | 5 | 25 |
| “Siyob Shavkat Orzu” | 22 | 11 | 50 | 11 | 50 | 9 | 40,9 |
| “Nortoy Shodiyev Baraka chorvasi” | 10 | 5 | 50 | 4 | 40 | 4 | 40 |
| Total: | 473 | 303 | 63,9 ± | 316 | 66,7 ± | 275 | 58,6 ± |
| | | | 3,2 | | 4,2 | | 3,3 |

**Table cont'd**

| The names of the farms | Number of samples tested | Respiratory syncytial infection | | Rotavirus infection | | Coronavirus infection | |
|---|---|---|---|---|---|---|---|
| | | Number of seropositive calves | % | Number of seropositive calves | % | Number of seropositive calves | % |
| «Mingtepa zamini» | 8 | 5 | 62,5 | 8 | 100 | 7 | 87,5 |
| «Omonboy hosili» | 20 | 11 | 55 | 17 | 85 | 14 | 70 |
| "Tojnor momo" | 20 | 10 | 50 | 18 | 90 | 15 | 75 |
| "AGRO GOLD SPRING" | 20 | 12 | 60 | 17 | 85 | 14 | 70 |
| "Olazot" | 20 | 16 | 80 | 19 | 95 | 17 | 85 |
| "Nurbuloq musaffo diyor" | 20 | 12 | 60 | 18 | 90 | 15 | 75 |
| "Kelajak" | 20 | 11 | 55 | 16 | 75 | 12 | 60 |
| "Loish nurli kelajak" | 20 | 14 | 70 | 17 | 85 | 14 | 70 |
| "Khushvakt Abdullaev" | 20 | 11 | 55 | 16 | 75 | 14 | 70 |
| "Markaev Mamur zamini" | 20 | 10 | 50 | 14 | 70 | 13 | 65 |
| "Saypullaev Olimjon nurli zamon" | 20 | 8 | 40 | 11 | 55 | 10 | 50 |
| "Urgut nasl chorva" | 20 | 9 | 45 | 12 | 60 | 11 | 55 |
| "Utkir bodomlari" | 11 | 4 | 36,4 | 7 | 63,6 | 5 | 45,5 |
| "Nurli zamin qushxona" | 20 | 5 | 25 | 11 | 55 | 10 | 50 |
| "Jakbar Mamasoliev chorvasi" | 10 | 4 | 40 | 6 | 60 | 4 | 40 |
| "Abdurahmon Mardonov chorvasi" | 10 | 3 | 30 | 5 | 50 | 4 | 40 |
| "Dutorchi" | 20 | 11 | 55 | 13 | 65 | 12 | 60 |
| "Kakhramon" | 22 | 8 | 36,4 | 11 | 50 | 11 | 50 |
| "Askar Bakhtiyorovich" | 20 | 10 | 50 | 14 | 70 | 13 | 65 |
| "Utkir chorva invest" | 20 | 10 | 50 | 18 | 90 | 15 | 75 |
| "K.Eldor" | 20 | 6 | 30 | 9 | 45 | 9 | 45 |
| "Obodonchilik" | 20 | 8 | 40 | 11 | 55 | 10 | 50 |
| "Azam Azamar Agro" | 20 | 16 | 80 | 19 | 95 | 17 | 85 |
| "Akmal Toshpulatovich" | 20 | 4 | 20 | 6 | 30 | 4 | 20 |
| "Siyob Shavkat orzu" | 22 | 8 | 36,4 | 10 | 50 | 9 | 40,9 |
| "Nortoy Shodiyev Baraka chorvasi" | 10 | 2 | 20 | 7 | 70 | 3 | 30 |
| Total: | 473 | 228 | 47,4± | 330 | 69,8± | 282 | 58,8± |
| | | | 3,2 | | 3,6 | | 3,4 |

Table 1 shows that in the farms ".Olazot", "Azam Azamar Agro" 90% of the animals were seropositive for infectious rhinotracheitis virus and 87.5% of "Mingtepa zamini". 80% AGRO GOLD SPRING, Nurbulok Musaffo Diyor, 75% Tojnor Momo, Loish Nurli Kelajak, Utkir Chorva Invest, 70% Omonboy Khosili, Markaev Mamur Zamini, Dutorchi, Askar Bakhtierovich. In other farms, 30-65% of animals were seropositive for RTI.

100% of animals, Tojnor momo, Loish Nurli Kelajak, Utkir Chorva Invest, 90% of animals, AGRO GOLD SPRING, "Nurbulok Musaffo Diyor" 85%, "Omonboy Khosili", "Kelajak", "Khushvakt Abdullayev", "Markaev Mamur Zamini", "Utkir Bodomlari", "Askar Bakhtiyerovich" 70-75%, and in other farms 30-65% animals.

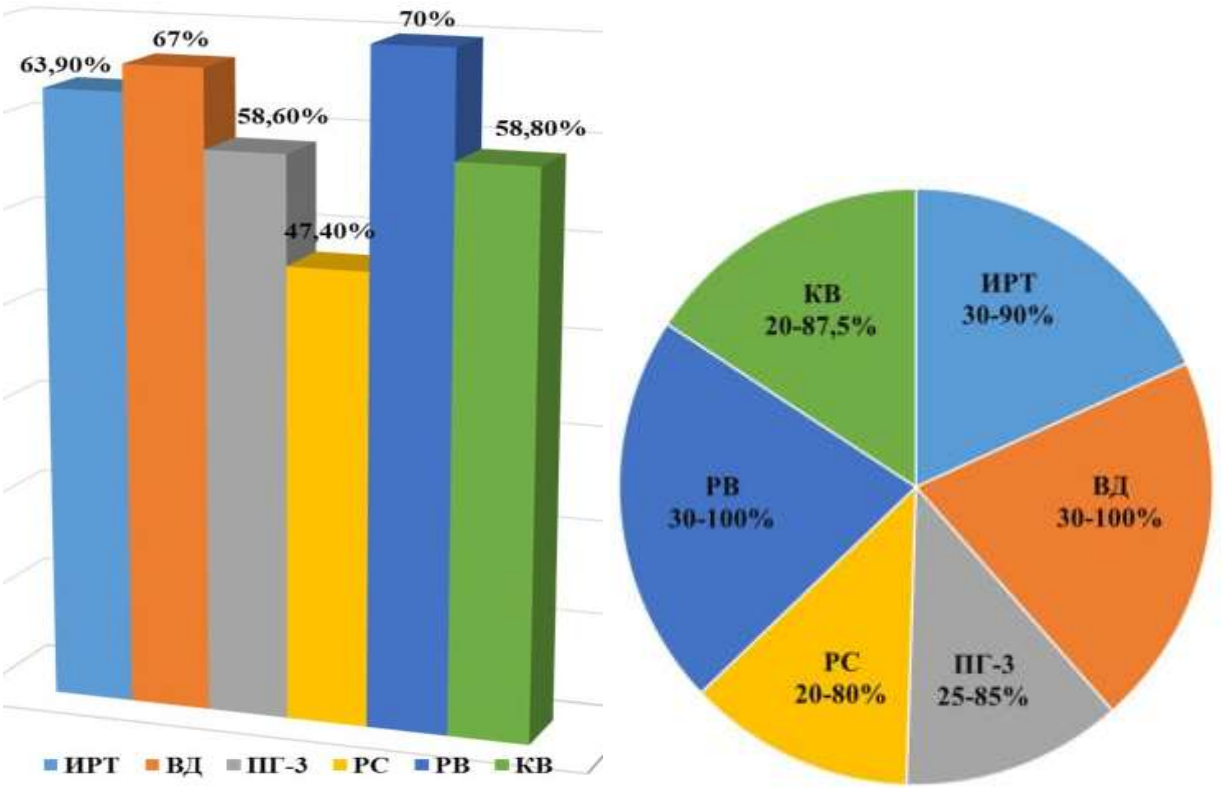


**Diagram 1-2**. The etiological structure of viral pathogens pneumoenteritis in the Samarkand region of the Republic of Uzbekistan

To the parainfluenza-3 virus, 75-85% of the animals were seropositive in the farms "Mingtepa Zamini", "Olazot", "Loish Nurli Kelajak", "Markaev Mamur Zamini", "Askar Bakhtiyerovich", "Azam Azamar Agro". 60-70% of animals in the farms "Omonboy Khosili", "Tozhnor Momo", "AGRO GOLD SPRING", "Nurbulok Musaffo Diyor", "Kelazhak", "Khushvakt Abdullayev", "Urgut Nasil Chorva", "Dutorchi", " Utkir Chorva Invest". In other farms, 25-54.5% of animals were seropositive.

100% of animals were seropositive to the respiratory syncytial infection virus in the farms "Olazot", "Azam Azamar Agro", "Loish Nurli Kelajak", "Omonboy Khosili", "Tozhnor Momo", "AGRO GOLD SPRING", "Nurbulok Musaffo Diyor ", "Kelazhak", "Khushvakt Abdullaev", "Markaev Mamur Zamini", "Dutorchi", "Utkir Chorva Invest" 50-62.5% of animals. In other farms, 20-40% of animals were seropositive.

To the rotavirus infection, 100% of the animals were seropositive in the farm "Mingtepa Zamini", 85-95% of the animals in the farms Olazot", "Azam Azamar Agro", "Loish Nurli Kelajak", "Omonboy Khosili", "Tozhnor Momo", "AGRO GOLD SPRING", "Nurbulok Musaffo Diyor", "Utkir Chorva Invest", 50-75% of animals in farms "Kelajak", "Khushvakt Abdullayev", "Markaev Mamur Zamini", "Dutorchi", "Kakhramon", "Askar Bakhtiyerovich", "Utkir chorva invest", "Saipullaev Olimjon nurli zamon", "Urgut nasil chorva",

Table 2. The level of average antibody titers during monitoring studies of blood sera of cattle from farms in the Samarkand region of the Republic of Uzbekistan (log2)

| **The names of the farms** | Number of samples tested | Infectious rhinotracheitis | Viral diarrhea | Parainfluenza -3 |
|---|---|---|---|---|
| ««Mingtepa zamini» | 8 | 4,3 | 5,3 | 4,5 |
| «Omonboy hosili» | 20 | 4,8 | 5,0 | 4,2 |
| "Tojnor momo" | 20 | 4,6 | 5,2 | 4,4 |

| | | | | |
|---|---|---|---|---|
| “AGRO GOLD SPRING” | 20 | 3,8 | 4,2 | 4,0 |
| “Olazot” | 20 | 4,0 | 4,4 | 4,2 |
| “Nurbuloq musaffo diyor” | 20 | 3,8 | 4,0 | 3,6 |
| “Kelajak” | 20 | 3,8 | 4,0 | 3,6 |
| “Loish nurli kelajak” | 20 | 4,2 | 4,2 | 3,8 |
| “Khushvakt Abdullaev” | 20 | 4,4 | 4,6 | 4,0 |
| “Markaev Mamur zamini” | 20 | 3,8 | 4,0 | 3,6 |
| “Saypullayev Olimjon nurli zamon” | 20 | 4,2 | 4,4 | 4,0 |
| “Urgut Nasl chorva” | 20 | 3,6 | 4,0 | 4,0 |
| “Utkir bodomlari” | 11 | 3,8 | 3,8 | 3,6 |
| “Nurli zamin Qushxona” | 20 | 4,4 | 4,2 | 4,0 |
| “Jakbar Mamasoliev chorvasi” | 10 | 4,0 | 4,0 | 3,8 |
| “Abdurahmon Mardonov chorvasi” | 10 | 4,2 | 4,2 | 3,8 |
| “Dutorchi” | 20 | 3,8 | 3,8 | 3,4 |
| “Kakhramon” | 22 | 2,8 | 3,0 | 2,8 |
| “Askar Bakhtiyorovich” | 20 | 3,8 | 3,6 | 3,2 |
| “Utkir chorva invest” | 20 | 4,4 | 4,8 | 4,0 |
| “K.Eldor” | 20 | 3,2 | 3,4 | 2,8 |
| “Obodonchilik” | 20 | 4,4 | 4,6 | 4,0 |
| “Azam Azamar Agro” | 20 | 4,6 | 4,6 | 4,0 |
| “Akmal Toshpulatovich” | 20 | 2,8 | 2,6 | 2,4 |
| “Siyob Shavkat Orzu” | 22 | 4,0 | 3,8 | 3,2 |
| “Nortoy Shodiyev Baraka” | 10 | 2,8 | 2,8 | 2,4 |
| Total: | 473 | 3,9±0,11 | 4,1±0,13 | 3,7±0,11 |

**Table cont’d**

| **The names of the farms** | Number of samples tested | Respiratory syncytial infection | Rotavirus infection | Coronavirus infection |
|---|---|---|---|---|
| «Mingtepa zamini» | 8 | 3,3 | 4,7 | 4,3 |
| «Omonboy hosili» | 20 | 3,6 | 4,2 | 4,0 |
| “Tojnor momo” | 20 | 4,0 | 5,2 | 4,4 |
| “AGRO GOLD SPRING” | 20 | 3,6 | 4,6 | 4,0 |
| “Olazot” | 20 | 3,8 | 5,0 | 4,6 |
| “Nurbuloq musaffo diyor” | 20 | 3,2 | 4,2 | 4,2 |
| “Kelajak” | 20 | 3,2 | 4,0 | 4,0 |
| “Loish nurli kelajak” | 20 | 3,4 | 4,8 | 4,4 |
| “Khushvakt Abdullaev” | 20 | 3,4 | 4,6 | 4,4 |
| “Markaev Mamur zamini” | 20 | 3,2 | 4,2 | 4,0 |
| “Saypullaev Olimjon nurli zamon” | 20 | 3,8 | 4,4 | 4,4 |
| “Urgut nasl chorva” | 20 | 3,2 | 4,6 | 4,6 |
| “Utkir bodomlari” | 11 | 3,4 | 4,0 | 4,0 |
| “Nurli zamin qushxona” | 20 | 4,0 | 4,6 | 4,2 |
| “Jakbar Mamasoliev chorvasi” | 10 | 3,0 | 4,4 | 4,2 |
| “Abdurahmon Mardonov chorvasi” | 10 | 3,2 | 4,6 | 4,0 |
| “Dutorchi” | 20 | 3,2 | 4,6 | 4,6 |
| “Kakhramon” | 22 | 1,6 | 3,8 | 3,6 |
| “Askar Bakhtiyorovich” | 20 | 2,8 | 3,8 | 3,6 |
| “Utkir chorva invest” | 20 | 3,6 | 4,2 | 4,2 |
| “K.Eldor” | 20 | 2,4 | 3,8 | 3,2 |
| “Obodonchilik” | 20 | 3,8 | 4,8 | 4,4 |
| “Azam Azamar Agro” | 20 | 3,2 | 5,0 | 4,8 |
| “Akmal Toshpulatovich” | 20 | 1,8 | 3,2 | 3,0 |
| “Siyob Shavkat Orzu” | 22 | 2,8 | 4,0 | 3,8 |
| “Nortoy Shodiyev Baraka chorva” | 10 | 1,6 | 3,6 | 3,2 |
| Total: | 473 | 3,2±0,13 | 4,3±0,09 | 4,1±0,09 |

"Utkir bodomlari", "Nurli zamin kushkhona", "Jakbar Mamasoliev chorvasi", "Abdurakhmon Mardonov chorvasi", "Obodonchilik", "Siyob Shavkat Orzu "Northoy Shodiev baraka chorvasi". 45% of animals in the farm "K. Eldor" and 30% "Akmal Toshpulatovich".

To the coronavirus infection virus from 25 farms in Samarkand region in 10 farms - "Mingtepa Zamini", "Omonboy Khosili", "Tozhnor Momo", "AGRO GOLD SPRING", "Olazot", "Nurbulok Musaffo Diyor", "Khushvakt Abdullaev", "Markaev Mamur Zamini", "Askar Bakhtiyerovich", "Utkir Chorva Invest" 70-87.5% of animals were seropositive, in 8 farms - "Kelazhak", "Markaev Mamur zamini", "Saipullaev Olimjon nurli zamon", "Urgut nasil chorva", "Nurli zamin kushkhona", "Dutorchi", "Kahramon", "Askar Bakhtiyerovich", "Obodonchilik" 50 -65% of animals, in 7 farms - "Utkir Bodomlari", "Zhakbar Mamasoliyev Chorvasi", "Abdurahmon Mardonov Chorvasi", "K.Eldor", "Akmal Toshpulatovich", "Siyob Shavkat Orzu", "Nortoy Shodiev baraka Chorvasi" 20 - 45.5% of animals.

When analyzing the results of Table 1, it can be seen that out of 473 studied blood sera of cows of calves under one year old with erythrocyte diagnosticums, antibodies to the infectious rhinotracheitis virus were detected in 63.9% of the examined animals, to the diarrhea virus - 66.7%, parainfluenza-3 - 58.6 %, respiratory syncytial virus - 47.4%, rotaviruses - 69.8%, coronaviruses - 58.8% (diagram 1).

Analysis of the study of the etiological structure of pathogens of viral pneumoenteritis in cattle in the farms of the Samarkand region shows that infectious rhinotracheitis in cows and calves was recorded from 30% to 90% of the examined animals, viral diarrhea - from 30% to 100%, pararipp-3 - from 25 % to 85%, respiratory syncytial infection - from 20% to 80%, rotavirus infection - from 30% to 100%, coronavirus infection - 20% to 87.5% of the examined animals (diagram 2).

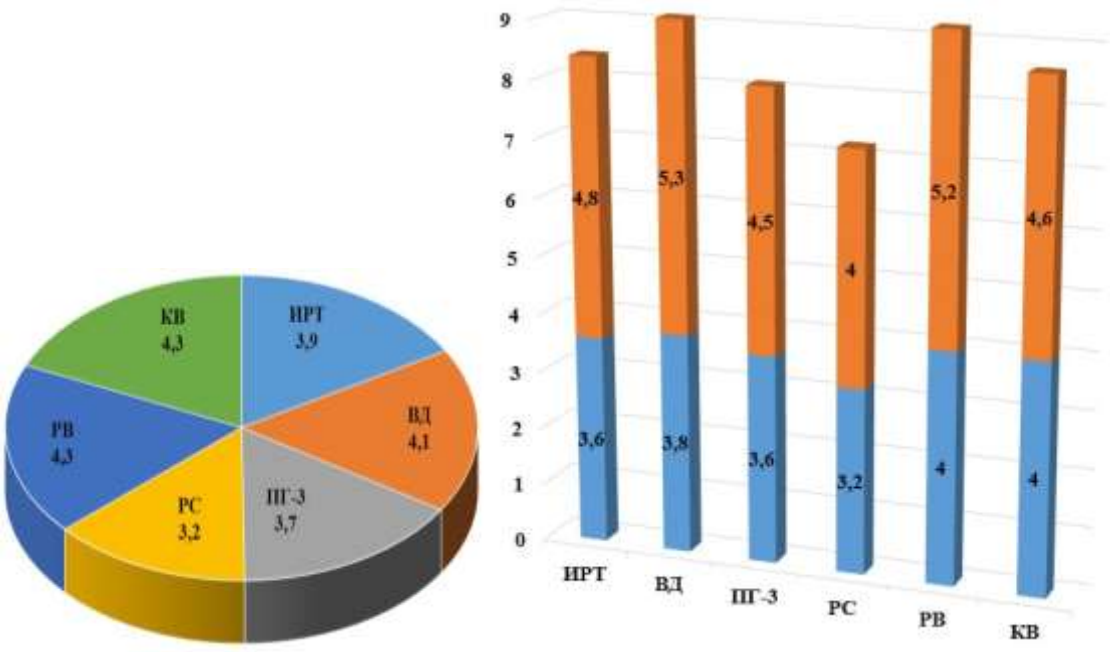


**Diagram 3-4**. The level of average antibody titers during monitoring studies of blood sera of cattle from farms in the Samarkand region of the Republic of Uzbekistan (log2)

In 25 farms, antibody titers (table 2) to infectious rhinotracheitis virus were at the level of 2.8-4.8 log2.; diarrhea 2.8-5.3 log2.; parainfluenza-3 2.4-4.5 log2.; respiratory syncytial infection -1.6-4.5 log2; rotavirus infection 3.2-5.0 log2.; coronavirus infection 3.0-4.8 log2.

According to the results of studies of 473 blood serum samples from animals from 25 farms of the Samarkand region of the Republic of Uzbekistan, the average titer for infectious rhinotracheitis virus was - 3.9 log2, for viral diarrhea 4.1 log2, for parainfluenza-3 - 3.7 log2, respiratory syncytial infections -3.2 log2, rotaviruses - 4.3 log2, coronaviruses - 4.1 log2.

**Conclusion**. The results of a survey of livestock farms in the Samarkand region indicate that all animals are infected with infectious rhinotracheitis, parainfluenza-3, diarrhea, rota-, corona-, respiratory syncytial viruses of cattle, calves have been ill with pneumoenteritis, in the etiological structure of which infectious rhinotracheitis viruses play a large role, parainfluenza-3, diarrhea, rota-, corona-, respiratory syncytial viruses.

Animals are predominantly infected with rotavirus infection, diarrhea, infectious rhinotracheitis, to a lesser extent - with coronavirus, parainfluenza-3 virus, and slightly - with respiratory syncytial infection.

Such a wide distribution of pathogens of these diseases indicates the re-infection of newborn calves even in the early prenatal period of development. This leads to massive outbreaks of pneumoenteritis in calves.

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