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Age and Season Dynamic Dependence of Eimeria Infection of Calves in Azerbaijan

Mahir N. Nasibov

Veterinary Scientific Research Institute of the Ministry of Agriculture of the Republic of Azerbaijan, c.Baku, Azerbaijan

Abstract

The article talks about the conducted research on the infection of calves with eimeriosis depending on the age and seasons of the year in livestock farms located in Khachmaz and Shabran regions of Guba-Khachmaz economic region, also Bilasuvar and Hajigabul regions of Shirvan-Salyan economic regions. During the researches were studied spread of eimeria parasitizing on calves in farms depending on the seasons and the age of the animals.

Depending on the age eymeriosis infection were determined 33.3% in Khachmaz region, 25.0% in Shabran region, 15.2% in Bilasuvar region, and 21.2% in Hajigabul region.

As a result of examinations carried out in calves according to the seasons of the year was found infection eimeria: 38.1% in spring, 9.5% in summer, 28.6% in autumn, 14.3% in winter in Khachmaz region; 27.8% in spring, 5.6% in summer, 16.7% in autumn, 11.1% in winter in Shabran region; 30.4% in spring, 4.3% in summer, 17.4% in autumn, 8.7% in winter in Bilasuvar region; 21.1% in spring, no infection in summer, 15.8% in autumn, 5.3% in winter in Hajigabul region. The presence of factors (temperature, moisture, oxygen) necessary to the development of Eimeria oocysts in spring and autumn has a positive, and the decrease in air temperaturse in winter has a negative effect on the development of Eimeria oocysts.

Keywords: calf, farm, age, seasons, eimeriosis, infection, examination.

Introduction

Coccidia (*Coccidia*, *Sporozoa*, *Apicomplexa*) are intracellular parasites, and they parasitize in cattle as well as other animals. Eimeria are primitive intestinal

parasites that they parasitize the mucous membrane, and epithelial cells of the intestine in vertebrates. The causative agents of Eimeriosis are spore-forming primitive parasites belonging to the Eimeria genus of the Eimeriidae family. In unsporulated oocysts, the process of sporulation takes place in the external environment [3]. In the 1960 years, researchers under the leadership of academician M. A. Musayev was detected eimeriosis in the agricultural animals in the territory of the Republic of Azerbaijan [1, 2, 4].

The epizootology, bio-ecological features, dynamics of spread and other aspects of large horned animal eimeriosis have been studied by researchers foreign countries. [5, 6, 7]. The aim of our personal research was to determine the age and season dependence of *Eimeria parasitism* in calves.

Material and methods

The research were carried out in the Department of Parasitology of the Veterinary Science Research Institute on faeces samples of calves kept in private livestock farms located in Khachmaz and Shabran regions of Guba-Khachmaz economic region, also Bilasuvar and Hajigabul regions of Shirvan-Salyan economic region, in 2020-2021.

In order to study the dynamics of Eymeria infection of calves, which are intestinal parasites, depending on age and seasons was taken pathological material from calves in the age groups of 10-30 days, 1-3 months, and 4-6 months from the farms, and coprological examination was carried out by the Darling-Fülleborn method. Based on the study of Eimeria oocysts brought to the laboratory was detected the infection of the calves.

Results and their dıscussion

As a result of examinations carried out in livestock farms in the Khachmaz and Shabran regions of Guba-Khachmaz economic region, Bilasuvar and Hajigabul regions of Shirvan-Salyan economic region were found the causative agents of eimeriosis (image 1). Thus, as a result of coprological examination was determined

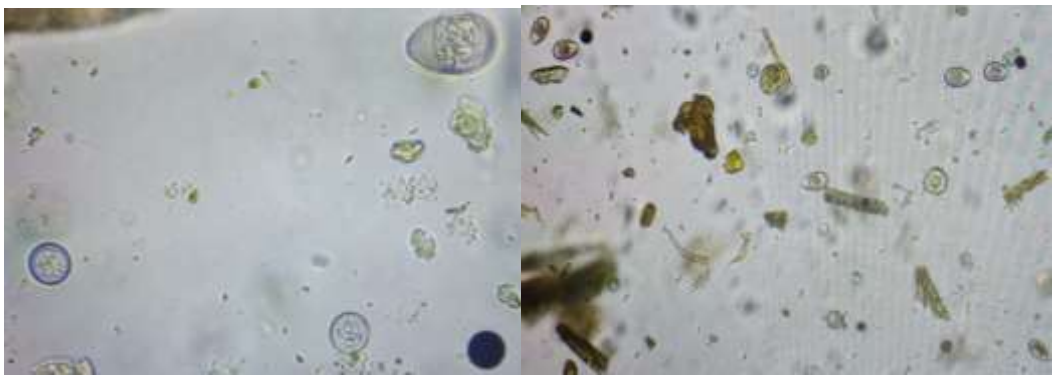

Image 1. Causative agents of eimeria in calves

infection with eimeria: for Khachmaz region of Guba-Khachmaz economic region: 33.3% in 10-30-day-old calves, 45.5% in 1-3-month-old calves, 23.1% in 4-6-month-old calves; for Shabran region: 25.0% in 10-30-day-old calves, 36.4% in 1-3-month-old calves, 15.4% in 4-6-month-old calves (table 1).

Table 1. Infection of calves by age groups in Guba-Khachmaz economic district (%)

Age	Checked	Khachmaz region		Shabran region	
		Infected	Infection rate	Infected	Infection rate
10-30-day-old	12	4	33,3	3	25,0
1-3-month-old	11	5	45,5	4	36,4
4-6-month-old	13	3	23,1	2	15,4
Total	36	12	33,3	9	25,0

In the Shirvan-Salyan economic region, infection with eimeria was studied: for Bilasuvar region: 20.0% in 10-30-day-old calves, 18.2% in 1-3-month-old calves, 10.0% in 4-6-month-old calves; for Hajigabul region: 20.0% in 10-30-day-old calves, 27.3% in 1-3-month-old calves, 20.0% in 4-6-month-old calves (tab. 2).

Table 2. Infection of calves by age groups in Shirvan-Salyan economic region (%)

Age	Checked	Bilasuvar region		Hajigabul region	
		Infected	Infection rate	Infected	Infection rate
10-30-day-old	10	2	20,0	2	20,0
1-3-month-old	11	2	18,2	3	27,3
4-6-month-old	10	1	10,0	2	20,0
Total	33	5	15,2	7	21,2

Summarizing the results of examinations depending on age, it was found that infection with eimeria was: 33.3% in Khachmaz region, 25.0% in Shabran region, 15.2% in Bilasuvar region, 21.2% in Hajigabul region (Diagram 1).

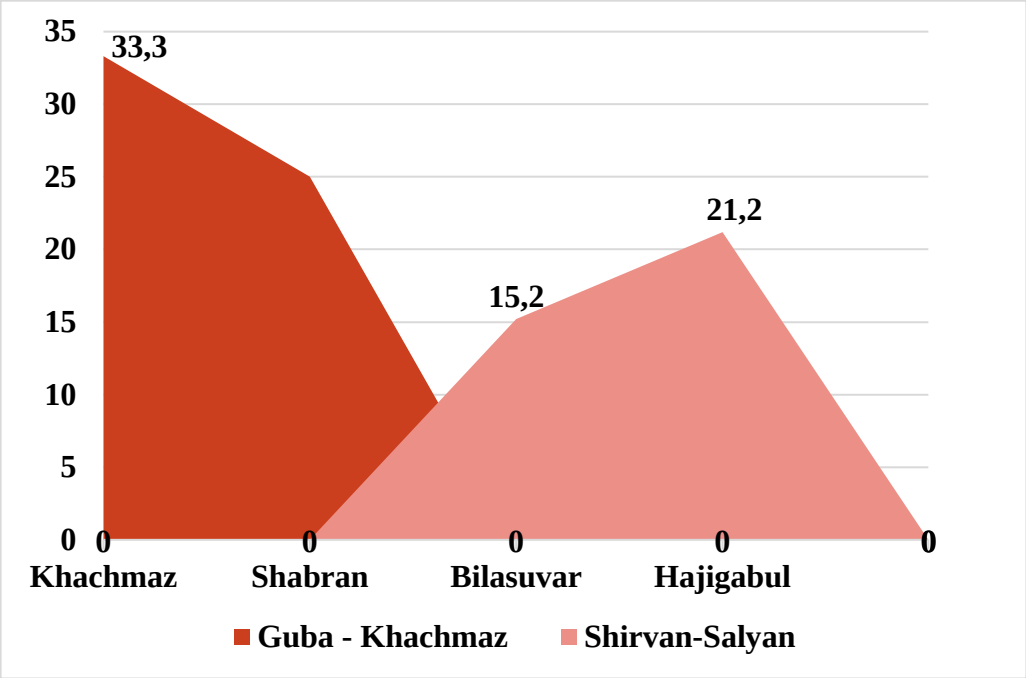

Diagram 1. Infection of calves with eimeria (%).

Also, the seasonal dependence of eimeria infection of calves kept in private livestock farms of Khachmaz and Shabran regions of Guba-Khachmaz economic region was studied during coprological examinations. The infection in calves in Khachmaz region farms were studied as follows: in spring, 42.9% in 10-30-day-old, 50.0% in 1-3-month-old, 25.0% in 4-6-month-old; in summer, no infection was detected in 10-30-day-old calves, 16.7% in 1-3-month-old, 12.5% in 4-6-month-old ; in autumn, 28.6% in 10-30-day-old, 33.3% in 1-3-month-old, 25.0% in 4-6-month-old; in winter 14.3% in 10-30-day-old, 33.3% in 1-3-month-old calves but infection was not detected in 4-6 month olds. The infection in calves in Shabran region farms were studied as follows: in spring, 33.3% in 10-30-day-old, 40.0% in 1-3-month-old, 14.3% in 4-6-month-old; in summer, no infection was detected in 10-30-day-old calves, 20.0% in 1-3-month-old, and no infection was detected in 4-6-month-old; in autumn, 16.7% in 10-30-day-old, 20.0% in 1-3-month-old, 14.3% in 4-6-month-old; in winter, 16.7% of 10-30-day-old, 20.0% of 1-3-month-old, and no infection was found in 4-6-month-old calves(table 3).

Analogous studies were also conducted in livestock farms of Bilasuvar and Hajigabul regions of Shirvan-Salyan economic region. Thus, infection was studied in farms of Bilasuvar district as follows: in spring, 28.6% in 10-30-day-old calves, 37.5% in 1-3-month-old, 25.0% in 4-6-month-old; in summer, no infection was detected in 10-30-day-old, 12.5% in 1-3-month-old, no infection

was detected in 4-6-month-old; in autumn, 14.3% in 10-30-day-old, 25.0% in 1-3-month-old, 12.5% in 4-6-month-old; in winter, 14.3% of 10-30-day-old, 12.5% of 1-3-month-old, and no infection was found in 4-6-month-old. In the farms of Hajigabul district, infection was studied: in spring: 16.7% in 10-30-day-old calves, 28.6% in 1-3-month-old, 16.7% in 4-6-month-old, was not detected infection in the calves checked in the summer; in autumn: 16.7% in 10-30-day-old, 14.3% in 1-3-month-old, 16.7% in 4-6-month-old; in winter, no infection was detected in 10-30-day-old calves, 14.3% in 1-3-month-old, but no infection was detected in 4-6-month-old(table 4).

Table 3. Eimeria infection of calves in the Guba-Khachmaz economic region by seasons (%)

Age	Chec-ked	Spring		Summer		Autumn		Winter	
		Infec-ted	İR* (%)	Inf ec-ted	İR (%)	Infec-ted	İR (%)	Infe-cted	İR (%)
Khachmaz region									
10-30-day-old	7	3	42,9	-	-	2	28,6	1	14,3
1-3-month-old	6	3	50,0	1	16,7	2	33,3	2	33,3
4-6-month-old	8	2	25,0	1	12,5	2	25,0	-	-
Total	21	8	38,1	2	9,5	6	28,6	3	14,3
Shabran region									
10-30-day-old	6	2	33,3	-	-	1	16,7	1	16,7
1-3-month-old	5	2	40,0	1	20,0	1	20,0	1	20,0
4-6-month-old	7	1	14,3	-	-	1	14,3	-	-
Total	18	5	27,8	1	5,6	3	16,7	2	11,1

Note: IR*- infection rate

In general, as a result of examinations, infection with eimeria was revealed: in Khachmaz region: in spring 38.1%, 9.5% in summer, 28.6% in autumn, 14.3% in winter; Shabran region: 27.8% in spring, 5.6% in summer, 16.7% in autumn, 11.1% in winter; in Bilasuvar region: 30.4% in spring, 4.3% in summer, 17.4% in autumn, 8.7% in winter; in Hajigabul district: 21.1% in spring, no infection detected in summer, 15.8% in autumn, 5.3% in winter (Diagram 2).

Table 4. Eimeria infection of calves in the Shirvan-Salyan economic region (%)

Age	Chec-ked	Spring		Summer		Autumn		Winter	
		Infec-ted	İR* (%)	Infec-ted	İR (%)	Infec-ted	İR (%)	Infec-ted	İR (%)
Bilasuvar region									
10-30-day-old	7	2	28,6	-	-	1	14,3	1	14,3
1-3-month-old	8	3	37,5	1	12,5	2	25,0	1	12,5
4-6-month-old	8	2	25,0	-	-	1	12,5	-	-
Total	23	7	30,4	1	4,3	4	17,4	2	8,7
Hajigabul region									
10-30-day-old	6	1	16,7	-	-	1	16,7	-	-
1-3-month-old	7	2	28,6	-	-	1	14,3	1	14,3
4-6-month-old	6	1	16,7	-	-	1	16,7	-	-
Total	19	4	21,1	0	0	3	15,8	1	5,3

Note: İR*- infection rate

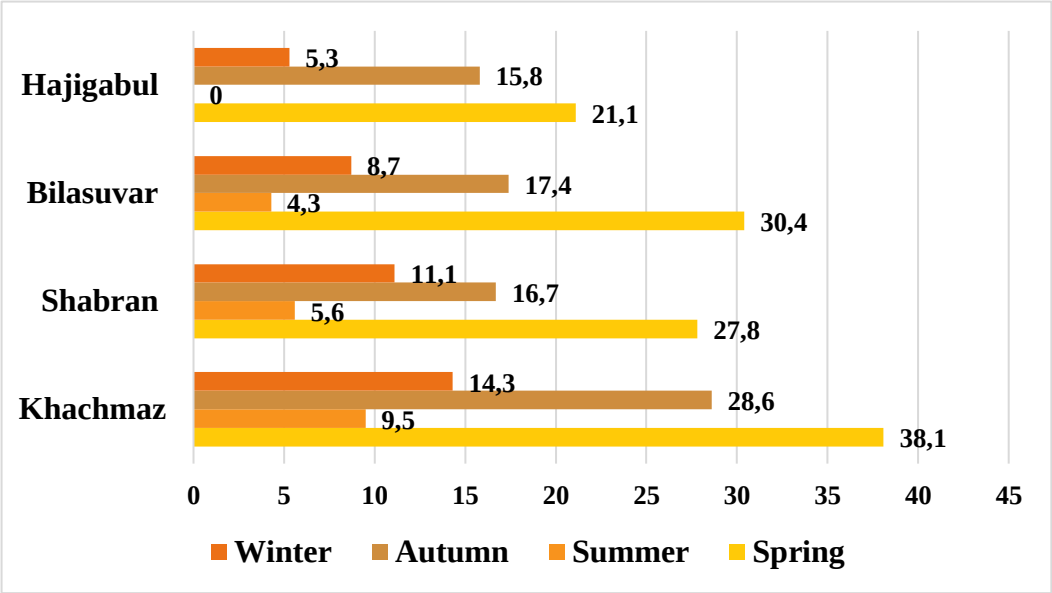

Diagram 2. Seasonal infection of calves with eimeria (%)

As a result of the research, it was determined that the infection of calves with eimeria depends on both their age and the seasons of the year. The presence of factors (temperature, moisture, oxygen) necessary to the development of Eimeria oocysts in spring and autumn has a positive, and the decrease in air temperaturse in winter has a negative effect on the development of Eimeria oocysts.

Results

1. Infection with eimeriosis was studied depending on age: 33.3% in Khachmaz region, 25.0% in Shabran region, 15.2% in Bilasuvar region, 21.2% in Hajigabul region.
2. As a result of examinations of calves infected with Eymeriosis, it was found: in the Khachmaz region in spring 38.1%, in summer 9.5%, in autumn 28.6%, winter in 14.3%; in the Bilasuvar region in spring 30.4%, in summer 4.3%, in autumn 17.4%, in winter 8.7%; in the Hajigabul region in spring 21.1% , no infection in summer, in autumn 15.8%, and 5.3% in winter.

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