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Spread of anoplocephales pathogens in buffaloes in the conditions of Nakhchivan autonomous republic

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Abstract
In the conditions of the Nakhchivan Autonomous republic there were presented results of research into determination of the species composition of pathogens and explore epizootological features of buffaloes anoplocephales.We have examined species composition of infectious agents and epizootological peculiarities of anoplocephales of buffaloes. On the territory of the Nakhchivan Autonomous republic there were marked the following pathogens of buffaloes anoplocephales: *Moniezia expanza* (Rudolphi, 1810), *Moniezia benedeni* (Moniez, 1879), *Thysaniezia giardi* (Moniez, 1879) and *Avitellina sentripunctata* (Rivolta, 1874). The average rate of anoplocephales invasions of buffaloes in the farms of the Autonomous republic was 17.2%. When studying the species affiliation of cestodes, 28 samples of M. benedeni (54.9%), 11 samples of Th. giardi (21.5%), 7 samples of M. expansa (13.7%) and 3 samples of A. Centripunctata (5.9%)) were found.

Keywords: Azerbaijan, Nakhchivan, buffalo, anoplocephales, cestode, invasion, helminth parasite

Introduction
Buffalo is one of the potential animals that can boost meat production in Nakhchivan Autonomous republic. Buffalo meat is the healthiest meat among red meats known for human consumption since it is low in calories and cholesterol. Buffalo meat and milk are well comparable to cattle in many of the physicochemical, nutritional, functional properties and palatability attributes.
As the pathologies caused by helminths, which are always considered dangerous to animal health, are observed more intensively, the study of their development and spread characteristics, the development of effective control measures that meet modern requirements is one of the most pressing issues.
Among all parasitic infections, mainly those caused by gastrointestinal helminthes are the major problems of our livestock and causes great economic loss to dairy industry by way of retarded growth, low productivity and increased susceptibility of animals to other infections.
There are very few studies on the prevalence of anoplocephalatosis in buffaloes in Azerbaijan [3, 4]. In the Nakhchivan Autonomous republic, studies on the spreading of these cestodes in buffaloes have been conducted by us in recent years [1, 2, 5].

Materials and Methods
In 2017-2020, fecal samples were taken from 436 heads of buffaloes on private and farm livestock farms in different parts of the Nakhchivan Autonomous republic and coprologically examined using Fulleborn's floating method. During the research years, to study the prevalence of anoplocephalatosis in buffaloes of different age groups, fecal samples were taken from the rectum of animals during all months of the year, with regular visits to predetermined farms.
To determine the extent of anoplocephales invasions, the number of cestode eggs per a gram of animal fecal was determined. These examinations, carried out using a special counting chamber, as well as the methods proposed by L.D. Migacheva and G.A. Kotelnikov, allowed to determine the degree of helminth infection in animals [6].
In the course of the research, 46 buffaloes of different age groups on individual farms were examined by incomplete helminthological method. During the examination, the small intestine of the animal was taken and its internal contents were cleaned with water. The age of each animal, place of keeping and conditions before slaughter were recorded separately. Taking into account the different keeping condition and feeding of buffaloes, the results of the helminthological examination carried out on them were noted separately.
The various segments of the cestodes collected during the examinations were separated with the help of a microscope after proper processing. Thus, 4-5 cm in length was taken from different areas of the cestodes (scolex, collar, adult and hermaphrodite joints) and placed between two glass bodies. Then the both ends of them were tightly tied with thread, they were immersed in 5% ethyl alcohol solution and kept for 2-3 hours. The materials were then purified by keeping them in a lactophenol solution for 10 hours.
The species composition of the collected 51 copies of cestodes was determined on the basis of helminth determiners compiled by V.M.Ivashkin and G.S.Mukhamadiyev, as well as punch card determiner “Helminths of Ungulates” prepared by E.I.Pryadko, A.A.Kazkenov and N.A.Gubaydulin [7]

Results and Discussion
The timing of prophylactic deworming in animals was taken into account during sampling, and coprological examinations were performed 2-3 months before or after the measures. The results of helminthological examinations are

given in Table 1. As can be seen from the table, the incidence of anoplosephalyatosis in buffaloes in the farms of the Nakhchivan Autonomous republic is not so high (IE-17.2%). The fact that buffaloes have a slightly different lifestyle and nutritional characteristics makes them less susceptible to anoplosephaly.

Table 1: Spreading of anoplocephalatosis of buffaloes of different age groups by regions (according to helminthoovoscopic examinations) for 2017-2020

№	Regions	Number of examined animals	Number of infected animals	Extensiveness of the invasion (İE %)	The average number of anoplocephales eggs per a gram of fecal
1.	Sadarak	71	14	19,7	98,2±2,1
2.	Sharur	99	21	21,2	102,5±3,1
3.	Kangarli	24	5	20,8	99,4±2,5
4.	Babek	55	8	14,5	86,1±3,4
5.	Julfa	82	16	19,5	88,2±5,1
6.	Shahbuz	59	7	11,9	75,9±3,2
7.	Ordubad	46	6	13,0	82,9±2,3
Total:		436	77		
Average indigator:				17,2	90,5±3,1

Analyzing the results of helminthoscopic examinations, the extent of anoplocephalatosis invasions in buffaloes was determined. The highest degree of invasiveness (IE-21.2%, number of cestode eggs per gram of fecal 102.5 ± 3.1) is highest in Sharur district, and the lowest in Shahbuz district (IE-11.9%, the number of cestode eggs per gram of fecal 75.9 ± 3, 2) were in samples taken from farms.

When analyzing the results of helminthoovoscopic examinations conducted in other regions, the intensity of invasion in Sadarak region was IE-19.7%, the number of cestode eggs per a gram of fecal was 98.2 ± 2.1; IE-20.8% in Kangarli region, the number of cestode eggs per a gram of fecal 99.4 ± 2.5); IE-14.5% in Babek district, the number of cestode eggs per a gram of fecal 86.1 ± 3.4; IE-19.5% in Julfa district, the number of cestode eggs per a gram of fecal was 88.2 ± 5.1; in Ordubad region, IE was 13.0%, the number of cestode eggs per a gram of fecal was 82.9 ± 2.3.

Helminthological examinations were carried out in the small intestines of 46 buffaloes in different regions of the Nakhchivan Autonomous republic. As a result of the research, 51 samples of cestodes were found in 12 infected intestines (26.1%). The mean intensity of invasion was 4.2 ± 0.5 helminths / animal. Examination of anoplocephales samples revealed that 4 types of cestodes in buffaloes: Moniezia expansa, M.benedeni, Avitellina centripunctata and Thysaniezia giardi were parasitic on animals in the area. The results of helminthological examinations are given in Table 2.

Table 2: Spread of parasitic anoplocephales in buffaloes by species (According to helminthological examinations)

№	Regions	Sestod number (samples)	M. benedeni	%	M. expansa	%	A.centripunctata	%	Th.giardi	%	not identified	%
1.	Sadarak	14	6	42,9	-	-	2	14,3	5	35,7	1	7,1
2.	Sharur	18	12	66,7	5	27,8	-	-	-	-	1	5,5
3.	Kangarli	9	5	55,5	-	-	1	11,2	3	33,3	-	-
4.	Babek	4	2	50,0	2	50,0	-	-	-	-	-	-
5.	Julfa	3	3	100,0	-	-	-	-	-	-	-	-
6.	Shahbuz	-	-	-	-	-	-	-	-	-	-	
7.	Ordubad	3	-	-	-	-	-	-	3	100,0	-	-
	Total:	51	28		7		3		11		2	
Average indigator:				54,9		13,7		5,9		21,5		3,9

The minimum length of 14 samples of anoplocephales found during helminthological examination of 9 intestinal samples of buffaloes in Sadarak region was 9.8 cm, and the maximum length was 4.65 m. When examining the species composition of anoplocephales, it was determined that there were 6 samples of M. benedeni, 5 samples of Th.giardi and 2 samples of A. centripunctata cestodes. In helminthological examinations, strobila, adult and hermaphrodite joints were not formed, as a cestode is in the early stages of development. Therefore, it was not possible to determine its species affiliation.

During the helminthological examinations carried out in Sharur region, 18 cestodes were found from 11 intestinal samples, the minimum length of which was 11.5 cm, and the maximum length was 5.63 m. Examinations revealed only two types of anoplosefalyat in the intestines. Of these, 12 samples were M.benedeni and 5 samples were M.expansa. The species affiliation of a cestode has not been determined.

During the examination of 8 small intestine samples taken from the Kangarli region, 9 samples of cestodes were found, the minimum length of which was 1.25 m, and the maximum length was 4.36 m. When examining the species composition of anoplosephalyates, it was found that there were 5 samples of M. benedeni, 3 samples of Th.giardi and one copy of A. cestripunctata cestodes.

During helminthological examinations in Babek region, 4 cestodes were found in 6 small intestines, the minimum length of which was 3.97 m, and the maximum length was 4.78 m. Of these helminths, 2 samples belonged to M.benedeni and 2 samples to M.expansa.

During helminthological examinations in Julfa region, 3 cestodes were found in one intestinal sample, the minimum length of which was 3.66 m, and the maximum length was 4.83 m. During the examinations, it was determined that the 3 samples of the cestode were M.benedeni.

Only 3 samples of cestodes were found in one of the 5

intestinal samples examined by helminthology in Ordubad district. The minimum length of cestodes was 2.45 m and the maximum length was 3.86 m. When examining the species affiliation of the cestodes found, it was determined that all 3 samples of the helminth were Th. giardi.

Anoplocephales were not found in any of the 3 intestinal samples examined by helminthological way in Shahbuz district. Conclusion the average rate of anoplocephales invasions of buffaloes in the farms of the Autonomous republic was 17.2%. When studying the species affiliation of cestodes, 28 samples of M. benedeni (54.9%), 11 samples of Th. giardi (21.5%), 7 samples of M. expansa (13.7%) and 3 samples of A. centripunctata (5.9%)) were found. The 2 cestodes found in the intestines (3.9%) were not identified because they did not develop characteristic symptoms.

The minimum and maximum lengths of cestodes found in the studies, as well as the maturation phases of cestode development were determined. The length of the smallest cestode found in the intestines of buffaloes reached to 9.8 cm, and the length of the largest reached to 5.63 m. Among the types of anoplocephales that parasitize in the intestines of buffaloes, M. benedeni was more common. Intensive infection of animals with anoplocephales is directly related to the prevalence of helminths in the pastures of intermediate hosts. Intestinal cestodes, which are biohelminths, spend the larval stage of development in the bodies of various soil insects (oribatid ticks, collenbolas, etc.).

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