

The Prevalence of Eimeria Species in Goats in Van

Serdar DEĞER, Abdurrahman GÜL, Erol AYAZ, Kamile BİÇEK
Yüzüncü Yıl University, Faculty of Veterinary Medicine, Department of Parasitology, Van - TURKEY

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Abstract: This study was carried out to determine Eimeria infection in goats in nine different districts in Van province in Turkey.

Faecal samples (approximately 3-5 g) were obtained from the rectums of 242 goats. The samples were examined by Sheather's sugar flotation technique and determined microscopically for the presence of oocysts. Eimeria species were identified following sporulation of faeces in a thin layer of 2.5% potassium dichromate for one or two weeks at 25 °C. All samples were later examined for identification of Eimeria species.

Nine different species of Eimeria oocysts were detected in 73.6% of the goats. These species were *E. arloingi* (40.9%), *E. christensini* (34.3%), *E. alijeji* (32.6%), *E. pallida* (31.0%), *E. hirci* (30.2%), *E. ninakohliyakimovae* (29.8%), *E. jolchijeji* (26.0%), *E. apsheronica* (5.8%), and *E. punctata* (0.8%). Mixed infections were widespread (66.9%). Clinical eimeriosis was not observed.

Key Words: Goat, Eimeria spp., Van, Turkey

Van'da Keçilerde Eimeria Türlerinin Yaygınlığı

Özet: Bu çalışma Türkiye'de Van ilinin 9 farklı bölgesinde yetiştirilen keçilerde bulunan Eimeria oosistlerini tespit etmek amacıyla yapıldı.

Bunun için 242 keçinin rektumundan dışkı örnekleri alındı. Alınan örnekler Sheather'in şeker flotasyon tekniği ile yoğunlaştırıldıktan sonra mikroskopik olarak muayene edildi.

Muayene edilen dışkı örnekleri % 2,5 potasyum dikromat içeren petri kutularının içine ince bir tabaka halinde yayıldıktan sonra sporlandırıldı ve tür tayinleri yapılarak teşhis edildi.

Muayene edilen 242 keçi'nin % 73,6'sında 9 farklı Eimeria oosisti tespit edildi. Bu türlerin *E. arloingi* (% 40,9), *E. christensini* (% 34,6), *E. alijeji* (% 32,6), *E. pallida* (% 31,0), *E. hirci* (% 30,2), *E. ninakohliyakimovae* (% 29,8), *E. jolchijeji* (% 26,0), *E. apsheronica* (% 5,8) ve *E. punctata* (% 0,8) olduğu görüldü. Ayrıca miks enfeksiyonların (% 66,9) yaygın olduğu görüldü. Hayvanlarda klinik belirti görülmedi.

Anahtar Sözcükler: Keçi, Eimeria spp., Van, Türkiye

Introduction

Eimeriosis is the most important parasitic infection in poultry worldwide and it also causes problems in cattle, sheep, goats, pigs, horses and rabbits (1,2).

Clinical coccidiosis of goats occurs mainly in young goats and has higher prevalence under conditions of intensive husbandry (3). The disease may occur under stress factors such as weaning, dietary changes, inclement weather or travel and regrouping (4). Clinical coccidiosis in goats is most frequently caused by *E. arloingi* (5), *E. ninakohliyakimovae* (6), and *E. caprina* (7).

Several species of Eimeria occur commonly in domestic goats (7-10). For example, Eimerian oocysts

have been found in the faeces of 98.0% of 422 goats in England (7), 71.0% of 110 goats in Poland (8), 97.0% of 497 goats in South Australia (9), 98.2% of 108 goats in South Africa (10), 95.0% of 50 goats in Kenya (11), 89.9% of 1092 goats in Zimbabwe (12) and 92.2% of 2897 goats in the Czech Republic (13).

There have been some studies on caprine coccidiosis in Turkey. In these studies the Eimerian oocysts have been found in the faeces of 94.8% of 147 goats (14), 84.0% of 100 goats (15), 88.0% of 900 goats (16), and 53.3% of 353 goats (17). Based on our knowledge regarding the literature, there is no study on caprine coccidiosis in the eastern region of Turkey, which has very different climatic and geographic conditions when compared to other regions.

The purpose of this study was to investigate the prevalence and intensity of infection with Eimeria species specific to goats in Van province in Turkey.

Materials and Methods

This study was performed between November 2000 and May 2001. Faecal samples were collected from nine different districts in Van province: Van-center, Atmaca, Mollakasim, Alaköy, Değirmendere, Zeve, Bardakci, Muradiye and Çaldıran. Animals were chosen randomly from each sheepfold.

Faecal samples of approximately 3-5 g were collected from the rectums of 242 domestic goats and were stored at 4 °C until inspection. A total of 242 faecal samples were concentrated by Sheather’s sugar flotation technique and examined microscopically for the presence of oocysts. Eimeria species were identified following sporulation of (2-3 days, 25 °C) faeces in a thin layer of 2.5% potassium dichromate (18,19).

Then the oocysts were identified on the basis of the morphological characteristics of oocysts and sporocysts (18-22).

Results

The number of examined and infected goats from the nine districts are given in Table 1. The highest prevalence rate of oocysts (100%) in infected goats was observed in goats in Muradiye village. The lowest prevalence rate of oocysts (30.8%) was observed in goats in Mollakasim village.

Eimeria oocysts were found in 178 (73.6%) of the 242 goats (Table 1).

A total of nine Eimeria species were found in nine different regions in Van province. The most common species were *E. arloingi* (40.9%), *E. christensini* (34.3%), and *E. alijeve* (32.6%). Other species present were *E. pallida* (31.0%), *E. hirci* (30.2%), *E. ninakohliyakovae* (29.8%), *E. jolchijevi* (26.0%), *E. apsheronica* (5.8%), and *E. punctata* (0.8%) (Table 1).

Almost 75.5% of the 242 goats were infected with one or more Eimeria species. Multiple infections with three (19.4%) or four (17.4%) species were common while infections with one, two, five and six species were less common. Mixed infections were detected in 66.9% of all the samples (Table 2).

Table 1. Identified Eimeria species on the basis of morphological characteristics exhibited by oocysts and sporocysts.

Location	Species										
	Infected	%	<i>E. arloingi</i>	<i>E. christensini</i>	<i>E. alijeve</i>	<i>E. pallida</i>	<i>E. hirci</i>	<i>E. ninakohliyakovae</i>	<i>E. jolchicevi</i>	<i>E. apsheronica</i>	<i>E. punctata</i>
Muradiye n = 22	22	100	15	7	15	12	12	6	3	3	-
Atmaca n = 22	20	90.9	12	19	8	9	11	10	12	-	2
Değirmendere n = 20	17	85.0	14	15	12	8	11	14	8	3	-
Zeve n = 28	23	82.1	12	8	12	9	5	14	9	3	-
Alaköy n = 21	17	81.0	8	4	8	6	5	4	3	3	-
Çaldıran n = 27	21	77.8	8	9	4	5	12	10	13	2	-
Van n = 23	18	78.3	9	12	6	6	6	6	7	-	-
Bardakçı n = 40	28	70.0	5	8	7	8	7	4	4	-	-
Mollakasım n = 39	12	30.8	16	1	7	12	4	4	4	-	-
Total n=242	178	73.6	Total 99 % 40.9	Total 83 % 34.3	Total 79 % 32.6	Total 75 % 31.0	Total 73 % 30.2	Total 72 % 29.8	Total 63 % 26.0	Total 14 % 5.8	Total 2 % 0.8

n: Number of animals examined

	No. of Eimeria spp. present							
	0	1	2	3	4	5	6	7
No. of infected goats	64	16	30	48	42	26	14	2
Percentage (%)	26.5	6.6	12.4	19.8	17.6	10.7	5.8	0.8

Table 2. Number of goats with single or mixed infections of different Eimeria spp.

Species of Eimeria in 26.5% of the 242 goats were determined to be negative for Eimeria infestation (Table 2).

Discussion

Coccidiosis in goats has been reported by some researchers in Turkey and in some other countries (7-17). Identified species of Eimeria are *E. arloingi*, *E. christensini*, *E. alijevi*, *E. pallida*, *E. hirci*, *E. ninakohliyakimova*, *E. jolchijevi*, *E. apsheronica*, *E. punctata*, *E. caprina*, *E. caprovina* and *E. intricata*.

The prevalence and identification of coccidia in goats in Van province has not been reported previously. Infections by coccidia were detected in 75.5% of the 242 goats. In previous studies nine Eimeria spp. (15-17) in goats have been identified in different regions of Turkey. A total of nine species were also identified in the faecal samples in this study: *E. arloingi*, *E. christensini*, *E. alijevi*, *E. pallida*, *E. hirci*, *E. ninakohliyakimova*, *E. jolchijevi*, *E. apsheronica* and *E. punctata*.

Previous studies have shown that *E. caprina* and *E. caprovina* were identified in the faecal samples of goats in Poland (8), South Australia (9), South Africa (10), Kenya (11), Zimbabwe (12) and the Czech Republic (13). However, *E. caprina* and *E. caprovina* were not identified in our study.

In previous studies, *E. punctata* was not identified in Poland (8), South Australia (9), South Africa (10), Kenya (11), or the Czech Republic (13). However, *E. punctata* was only identified in goats in (in this study and in Ankara Turkey (16) and Zimbabwe (12)).

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Many parasitological studies carried out in goats have shown a high prevalence of Eimeria spp. infections. *E. arloingi*, *E. ninakohliyakimova* and *E. christensini* are considered to be the most pathogenic species (4). *E. arloingi*, *E. alijevi*, *E. hirci* and *E. ninakohliyakimovae* were the commonest species in Poland (8), South Australia (9), South Africa (10), Kenya (11), and the Czech Republic (13). In our study, *E. arloingi*, *E. christensini* and *E. alijevi* were the most prevalent species.

Eimeria apsheronica in both South Australia (9) and Kenya (11), *E. hirci* in Poland (8) and *E. pallida* in South Africa (9) are reported to be rarely found species of Eimeria. *E. punctata* is the least common species in Zimbabwe, as it has not been reported in Poland (8), South Australia (9), South Africa (10), Kenya (11), or the Czech Republic (13).

Mixed infections have been reported in studies by Chhabra and Pandey (12) and Sayin (16). In this study we detected the presence of two or more Eimeria species in 66.9% of the faecal samples. However, there was only one species of Eimeria in 6.6% of the samples and Eimeria species was not detected in 26.6% of the samples.

In conclusion, 75.5% of the goats were found to be infected with different species of Eimeria.

The species of Eimeria found in the faeces of infested goats were *E. arloingi* (40.9%), *E. christensini* (34.3%), *E. alijevi* (32.6%), *E. pallida* (31.0%), *E. hirci* (30.2%), *E. ninakohliyakimovae* (29.8%), *E. jolchijevi* (26.0%), *E. apsheronica* (5.8%) and *E. punctata* (0.8%).

The results of this survey indicate that subclinical infections by coccidia are common in goats in nine different districts in Van.

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