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Prevalence of *Eimeria* spp., *Cryptosporidium* spp. and *Giardia* spp. in Calves in the Van Province

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SUMMARY: This research was carried out in order to determine the prevalence of *Eimeria* spp. *Cryptosporidium* spp. oocysts and *Giardia* cysts in calves less than 6 months of age in Van province. For this purpose, fecal samples were obtained from the rectum of 182 calves. Fecal samples (n: 182) were examined with the modified acid-fast technique for *Cryptosporidium* spp. oocysts. The same samples were examined by zinc sulphate flotation technique for *Eimeria* oocysts and *Giardia* cysts. During the laboratory examination of fecal samples, *Eimeria* spp. oocysts were identified in 22.53% (41/182), *Cryptosporidium* oocysts in 13.19% (24/182) and *Giardia* cysts in 9.34 % (17/182) of the dairy calves examined. The rate of infection was 69.78% (127/182). Single infections (45.05%) and mixed infections (24.73%) were identified.

Key Words: *Eimeria* spp., *Cryptosporidium* spp., *Giardia* spp., calves, prevalence, Van.

Van Yöresi Buzağılarında *Eimeria* spp., *Cryptosporidium* spp. ve *Giardia* spp.'nin Yaygınlığı

ÖZET: Bu araştırma Van yöresindeki altı aylıktan küçük süt buzağılarında *Eimeria* spp., *Cryptosporidium* spp. ve *Giardia* spp.'nin yaygınlığını araştırmak için yapıldı. Bu amaç için, 182 buzağının rektumundan gaita alındı. Gaita örnekleri *Cryptosporidium* spp. ookistleri yönünden modifiye asit fast yöntemi ile muayene edildi. Aynı dışkı örnekleri, çinko sülfat flotasyon metodu ile *Eimeria* ookistleri ve *Giardia* kistleri yönünden araştırıldı. Dışkı örneklerinin labaratuar incelenmesinde, *Eimeria* spp. ookistleri %22,53 (41/182), *Cryptosporidium* spp. ookistleri %13,19 (24/182) ve *Giardia* spp. kistleri ise %9,34 (17/128) oranlarında tespit edilmiş olup enfeksiyon oranı ise %69,78 (127/182) olarak belirlendi. Tek tür ile enfeksiyon %45,05 miks türlerle enfeksiyon ise %24.73 olarak tespit edildi.

Anahtar Sözcükler: *Eimeria* spp., *Cryptosporidium* spp., *Giardia* spp., buzağı, yaygınlık, Van.

INTRODUCTION

Cryptosporidium, Giardia and *Eimeria* are genera of protozoon parasites. These genera are infect a with range of vertebrates including domesticated animals and humans (5, 12). *Cryptosporidum* spp. and *Giardia* spp. are caused human and animal cryptosporidiosis and giardiosis, respectively. *Cryptosporidium parvum* in the intestine and *C. andersoni* in the abomasum are caused cattle cryptosporidiosis (5).

The general morphology of all *Giardia* species is familiar, and all the transmitted by means of cysts passed out in the feces (12). In domestic animals, several species of *Giardia* are reported to be responsible for diarrhoea, but the evidence is still inconclusive (20).

Infection by *Cryptosporidium* and *Giardia* have been associated with economic losses from the occurrence of diarrhoea and more rarely, death of producing animals (4).

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Giardia and *Cryptosporidium* from cattle are potential zoonotic pathogenes and contact with animals or contamined water is believed to lead to infections in humans. Moleculer epidemiology has suggested that cattle are not as significant a reservoir for human infections as was once believed. *Cryptosporidium andersoni* does not infect humans. Howewer, moleculer tools have shown that humans can be infected with zoonotic *C. parvum* (16).

Cryptosporidium, Giardia and *Eimeria* infections have been reported from calves in many parts of the world. (8-10, 13, 17, 19). *Cryptosporidium* spp. oocyst and *Giardia* spp., cysts was detected between 17.9% and 53% (9, 12) was detected between 54.5 and 93% (9, 13, 14), respectively. Young animals are much more commonly affected from *Eimeria*. Particularly *E. bovis* and *E. zuernii* are pathogenic species in calves (12). *Eimeria* spp. oocysts were detected between 50 and 94.6% in calves in many parts of the world (3, 8, 19).

There are some studies on *Cryptosporidium* spp., *Eimeria* spp. and *Giardia* spp. infections in calves in Turkey. In these studies, *Cryptosporidium* spp. and *Eimeria* spp. was found between 13.24 and 31.4% (2, 7, 18), 86.4 and 90.8% (1, 6)

respectrively. There is only one study dealing with *Giardia* in Sivas. *Giardia* spp. cysts were detected 4.1% (7). This study were firstly conducted to determine the prevalence of *Eimeria* spp., *Cryptosporidium* spp. and *Giardia* spp. infections in calves in Van province in Turkey.

MATERIALS AND METHODS

This study performed between August 2005 and 2006. A total 182 faecal samples were collected from rectums of each calves less than 6 months of age in Van province. Faecal samples put in a steril plastic bag were taken to laboratory and they were stored at 4^0C until inspection.

Fecal samples (n:182) were examined by modified acit-fast technique for *Cryptosporidium* spp. oocysts (15) and by by zinc sulphate flotation technigue for *Giardia* spp. cyst*s and Eimeria* spp. oocysts (11, 15).

RESULTS

In this research, 69.78% out of examined 182 calves were infected with parasites. Protozoon parasites found in Van province were are given Table 1.

Table 1. Protozon parasites found in calves in Van province (n: 182)

	The number of infected calves	%
***Eimeria* spp.**	41	22.53
***Cryptosporidium* spp.**	24	13.19
***Giardia* spp.**	17	9.34
Total	82	45.05

A total of three protozoon species were identified. These parasites were *Eimeria* spp., *Cryptosporidium* spp. and *Giardia* spp. The most common species was *Eimeria* spp. (22.53%). However, *Cryptosporidium* spp. (13.19%) and *Giardia* spp. (9.34%) were least common species (Table 1).

The number of calves infected with mix infections are given Table 2.

Table 2. The number of calves infected with mix infections (n: 182).

	The number of infected calves	%
***Eimeria* spp. + *Cryptosporidium* spp.**	19	10.44
***Eimeria* spp. + *Giardia* spp.**	15	8.24
***Eimeria* spp. + *Cryptosporidium* spp. + *Giardia* spp.**	7	3.85
***Giardia* spp.+ *Cryptosporidium* spp.**	4	2.20
Total	45	24.73

24.73% out of 182 dairy calves were infected with multiple infections.

DISCUSSION

Giardia spp. is found in the small intestines of man, dogs, cats, various rodents, rabbits and other mammals (12). *Giardia duodenalis, C. parvum* and *C. andersoni* are infected cattle. These species caused diarrhoea and loss of body weight. *Giardia* and *Cryptosporidium* from cattle are potential zoonotic pathogens and contact with animals re contaminated water is believed to lead to infections in humans (14). Young animals are much more commonly affected from *Eimeria* (14). *Eimeria bovis* and *E. zuernii* are pathogenic species in calves (12).

Giardiosis in calves has been reported by some researchers in a lot of countries (4, 9, 10). But it has been only reported in Sivas in Turkey (7). In these research, *Giardia* spp. was 4.1% detected (7). In this study, *Giardia* spp. was detected 9.34%. The results of this survey indicate that infections by *Giardia* spp. are common in calves in Van province.

Many parasitological studies are carried out in calves have shown a high prevalence of *Eimeria* spp. infections in alot of countries and Turkey. In these studies, *Eimeria* spp. were between 86.4% and 9.8% in Turkey (1, 6). In different countries, *Eimeria* spp. were found between 50.0% and 94.6% in calves (3, 8, 19). In this study, *Eimeria* spp. was detected 22.53%. It was seen that subclinical infections by coccidia are common in calves in Van.

Cryptosporidium spp. infections have been reported for cattle and calves in many countries and Turkey (2, 7, 9, 13). *Cryptosporidium* spp. was detected between 13.24% and 53% (9, 18). In these study, prevalence of *Cryptosporidium* spp. was detected in 13.19%.

In this study, mix infections (*Eimeria* spp., *Cryptosporidium* spp., *Giardia* spp.) and single infections were occured 24.73% and 45.05%, respectively. Statistically significant differences in prevalence occured between single species and mix species ($P<0.05$).

The results of this survey indicates that subclinical infections by *Eimeria* spp., *Cryptosporidium* spp. and *Giardia* spp. are common in calves in Van.

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