

Prevalence of Bovine Eimeridosis in Thracia, Turkey¹

M. Özkan ARSLAN

Kafkas Üniv. Veteriner Fak. Parazitoloji Anabilim Dalı, 36040, Kars-TURKEY

Erkut TÜZER

Istanbul Üniv. Veteriner Fak. Parazitoloji A.B.D., 34851 Avcılar, Istanbul-TURKEY

Received: 19.12.1996

Abstract: In this study, 768 faecal samples were examined between June 1993-May 1994 to determine the species and the prevalence rates of *Eimeriidae* in the cattle of Thracia area (The European part of Turkey).

The prevalence rate of eimeridosis was found to be 68%. The species determined and their prevalence rates were as follows: *Eimeria bovis* (34%), *E.auburnensis* (27%), *E.zuernii* (26%), *E.ellipsoidalis* (14%), *E.canadensis* (12%), *E.cylindrica* (7.9%), *E.subspherica* (7.2%), *E.alabamensis* (4.9%), *E.bukidnonensis* (2.2%), *E.brasiliensis* (0.8%) and *Isospora sp.* (1.2%). Of 768 animals, 29% were found to be infected with single species, 39% with mixed ones and 32% were non-infected. During the study, two calves showed bloody diarrhoea. From these calves, *E.ellipsoidalis* and *E.zuernii* were identified. Their OPG values were 37200 and 47000 respectively. A positive correlation ($r=0.96$) was found between OPG values and the percentages of animals with not-formed faeces (from soft faeces to bloody diarrhoea) and it is considered that a value of OPG over 5 000 may be pointed out a clinical case.

Key Words: Eimeridae, coccidiosis, prevalence, cattle, Turkey

Trakya'da Sığırlarda Eimeridosis'in Yaygınlığı

Özet: Haziran 1993-Mayıs 1994 ayları arasında Trakya'dan 768 sığırın dışkıları, *Eimeriidae* türlerinin varlığı ve bunların sığırlardaki yaygınlığı yönünden incelendi.

Eimeridosis'in yaygınlığı %68 olarak bulundu. Saptanan türler ve bunların yaygınlık oranları ise şöyledir: *Eimeria bovis* (34%), *E.auburnensis* (27%), *E.zuernii* (26%), *E.ellipsoidalis* (14%), *E.canadensis* (12%), *E.cylindrica* (7.9%), *E.subspherica* (7.2%), *E.alabamensis* (4.9%), *E.bukidnonensis* (2.2%), *E.brasiliensis* (0.8%) ve *Isospora sp.* (1.2%). 768 hayvandan %29'unda tek türle, %39'unda birden fazla türle karışık enfeksiyon görülürken %32'si enfekte bulunmadı. Çalışmada iki danada kanlı ishal görüldü ve bu danalarda *E.ellipsoidalis* ve *E.zuernii* türleri saptandı. Bu hayvanlarda sırasıyla 37 200 ve 47 000 OPG değerleri bulundu. Çalışmada OPG değerleri ile şekillenmemiş (yumuşak dışkı ile kanlı ishal arası) dışkıları hayvanların oranları arasında pozitif korrelasyon ($r=0.96$) bulundu. 5 000'in üzerindeki OPG değerinin bir klinik olaya işaret edebileceği düşünüldü.

Anahtar Sözcükler: Eimeridae, coccidiosis, yaygınlık, sığır, Turkey.

Introduction

Bovine coccidiosis has a world-wide distribution and results in economical losses. The most pathogenic species are *Eimeria bovis* and *E.zuernii*. These species cause haemorrhagic diarrhoea mainly in calves (1-3).

A few studies (4-6) concerning with bovine coccidiosis were conducted in Turkey. The prevalence rates of the infection were found to be 16% in Ankara province and its surroundings (5), 93.3% in various provinces of Turkey (6) and 51.4% in Elazığ province (4). In these

studies, the species of *Eimeria zuernii*, *E.bovis*, *E.bukidnonensis*, *E.canadensis*, *E.auburnensis*, *E.ellipsoidalis*, *E.subspherica* (4-6), *E.brasiliensis*, *E.cylindrica*, *E.illinoisensis* (4, 6), *E.alabamensis* (5, 6) and *Isospora sp.* (4) were determined. The species having the prevalence rate of 10% and over were *E.bovis* (58.5%), *E.auburnensis* (57.8%), *E.ellipsoidalis* (50%), *E.zuernii* (30.7), *E.canadensis* (26.1%) (6) and *E.auburnensis* (54.8%), *E.bovis* (39.4%), *E.zuernii* (33.7%), *E.canadensis* (27.9%), *E.cylindrica* (14.4%) (4).

¹ Prepared from the doctorate thesis of the first author.

Table 1. The prevalence rates (%) of the species in the locations

Location	Exa ¹	ala	aub	bov	bra	buk	can	cyl	ell	sub	zue	l.sp	Tot ²
Edirne	70	4.3	39	37	1.4	0	13	8.6	23	10	33	1.4	70
Enez	56	7.1	23	45	0	3.6	18	8.9	11	7.1	36	1.8	64
Saray	66	3	26	39	0	1.5	12	7.6	12	7.6	27	0	68
Şarköy	67	3	24	36	0	6	10	9	9	7.5	18	0	69
Kırklareli	64	6.3	36	39	4.7	4.7	14	6.3	11	3.1	39	7.8	84
Malkara	61	0	25	30	0	0	8.2	8.2	18	4.9	23	0	66
Hayrabolu	65	0	23	17	0	0	4.6	1.5	11	4.6	20	0	51
Lüleburgaz	59	15	27	37	1.7	3.4	17	12	15	12	24	1.7	75
Çatalca	63	1.6	41	46	1.6	4.8	24	9.5	14	17	40	1.6	90
Tekirdağ	66	4.5	18	23	0	0	6.1	9.1	14	3	17	0	48
Çorlu	74	14	30	41	0	2.7	15	9.5	15	5.4	23	0	77
Avclar	57	0	11	21	0	0	1.8	5.3	18	3.5	12	0	53
Total	768	4.9	27	34	0.8	2.2	12	7.9	14	7.2	26	1.2	68

¹The number of examined animals ²with any one or ones of these species. Abbreviations based on the first three letters of species

Table 2. The number of infected animals according to the species found and their OPG groups

OPG value	ala	aub	bov	bra	buk	can	cyl	ell	sub	zue	l.sp	Tot ¹
<201	14	106	136	3	4	41	28	54	14	89	4	301
201-1000	15	71	80	3	10	36	21	28	19	65	2	141
1001-5000	8	23	36	0	3	12	11	16	13	30	3	57
5001-10000	0	3	5	0	0	1	1	2	4	5	0	8
10001-20000	0	2	2	0	0	0	0	4	4	4	0	8
20001-52000	1	3	4	0	0	2	0	5	1	6	0	8
Total	38	208	263	6	17	92	61	109	55	199	9	523

¹with any one or ones of these species

Some authors (7, 8) recorded that OPG values over 5 000 might pointed out a clinical case.

There is no study on bovine coccidiosis in Thracian cattle in Turkey. The aim of this study was to determine the species of Eimeridae in cattle in this area and their prevalence rates.

Material and Method

This study was performed between June 1993 and May 1994 in Thracia. Faecal samples were collected from the recta of 768 cattle.

MacMaster method (9) was used to determine the OPG values. The negative samples found by this method were re-examined by using Fulleborne flotation method.

The positive samples were kept in petri dishes at 29°C for sporulation (10). The identification of the species was done according to the literature (2, 3, 11-15).

Results

In this study, the prevalence rate of bovine eimeridosis was found to be 68%. The species and their prevalence rates were as follows: *Eimeria bovis* (34%), *E.auburnensis* (27%), *E.zuernii* (26%), *E.ellipsoidalis* (14%), *E.canadensis* (12%), *E.cylindrica* (7.9%), *E.subspherica* (7.2%), *E.alabamensis* (4.9%), *E.bukidnonensis* (2.2%), *E.brasiliensis* (0.8%) and *Isospora sp.* (1.2%) (Table 1).

The number of infected animals according to the species, the age and OPG groups were given in Table 2

Table 3. The number of infected cattle according to the age and OPG groups

Age (Month)	Exa ¹	Infected animals with various OPG values						Total Positive		Total Negative	
		<201	201- 1000	1001- 5000	5001- 10000	10001 25000	>25000	No	%	No	%
<1	9	1	2	0	1	1	0	5	56	4	44
1-2	63	15	5	12	0	3	3	38	60	25	40
3-4	142	47	28	16	1	3	0	95	67	47	33
5-6	111	40	33	15	1	1	3	93	84	18	16
7-8	66	27	17	10	1	0	0	55	83	11	17
9-12	104	54	36	2	1	1	0	94	90	10	10
13-24	69	39	12	2	2	1	0	56	81	13	19
25-48	129	52	6	0	1	0	0	59	46	70	54
>48	75	26	2	0	0	0	0	28	37	47	63
Total	768	301	141	57	8	10	6	523	68	245	32
%	-	39	18	7.4	1	1.3	0.8	68	-	32	-

¹No of examined animals

Faecal forms	Exa ²	(-) ³	201-	1001-	5001-	10001-	25000	>25000	Total ⁴
			<201	1000	5000	10000			
Normal	724	236	286	135	51	6	8	2	488
not-formed ¹	44	9	15	6	6	2	2	4	88
" %	5.7	3.7	5	4.3	11	25	20	67	6.7
Total	768	245	301	141	57	8	10	6	523

Table 4. The number of animals according to faecal forms and OPG values

¹ from soft faeces to bloody diarrhoea, ² examined, ³ negative, ⁴ total positive

and 3.

Of 768 animals, 222 (29%) were found to be infected with single, 145 (19%), with two, 97 (13%) with three, 43 (5.6%) with four, 14 (1.8%) with five and 2 (0.3%) with six species, and 245 (32%) animals were found to be non-infected. In total 301 (39%) animals had mixed infections.

A total of 20611 oocysts were identified. Of these oocysts, 5932 (29%) were *E.bovis*, 3406 (17%) *E.zuernii*, 3261 (16%) *E.auburnensis*, 2373 (12%) *E.canadensis*, 2177 (11%) *E.ellipsoidalis*, 1592 (7.7%) *E.subspherica*, 942 (4.6%) *E.cylindrica*, 676 (3.3%) *E.alabamensis*, 155 (0.7%) *E.bukidnonensis*, 59 (0.3%) *E.brasiliensis* and 38 (0.2%) *Isopora sp.*

The arithmetic and geometric means of OPG's of infected animals were 1280 and 149 respectively.

The maximal OPG value, which belonged to a one month old male calf, was 52000. In this calf, a mixed infection of *E.bovis* (predominant), *E.ellipsoidalis* and

E.zuernii was encountered.

During this study, two calves had bloody diarrhoea. One of these was one month old and infected with *E.ellipsoidalis* whereas the other was 6 months old and infected with *E.zuernii*. The OPG values of these animals were 37200 and 47000 respectively.

A positive correlation ($r=0.96$) was found between OPG values and the proportion of animals with not-formed faeces (from soft faeces to bloody diarrhoea). The proportion has risen particularly from the OPG value of 5 000 - 10 000 (Table 4 and Fig. 1).

The oocysts of *Isopora sp.* seen in this study had spherical shape and smooth wall. Their dimensions were 27.4 ± 1.1 (21-31) X 25.8 ± 0.9 (20-28.4) μm . Its sporocysts were lemon-like in shape and had a stidai body.

Discussion

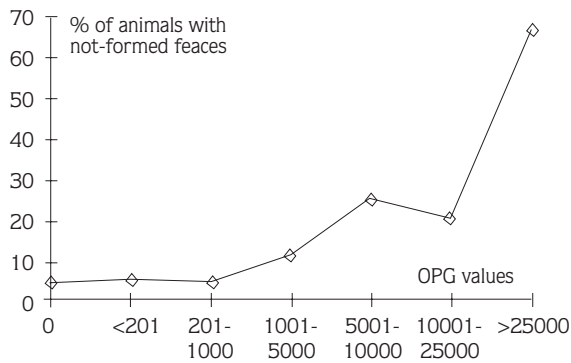


Figure 1. The relationship between OPG values and proportion of animals with not-formed faeces

In the previous studies (4-6) in Turkey, the prevalence rates of bovine eimeridosis ranged between 16% and

93.3% and 11 *Eimeria* and one *Isospora* species (mentioned in the Introduction) were recorded. The most prevalent four species recorded in two studies were *E.bovis*, *E.auburnensis*, *E.ellipsoidalis*, *E.zuernii* (6) and *E.auburnensis*, *E.bovis*, *E.zuernii*, *E.canadensis* (4).

In the present study, the prevalence rate was found to be 68%. All species, except *E.illinoisensis*, determined in Turkey (4-6) occurred in Thracia. *E.illinoisensis* was not seen in this area during the study. The most prevalent four species were *E.bovis*, *E.auburnensis*, *E.zuernii*, *E.ellipsoidalis*.

As shown in Table 4 and Fig.1, the proportion of the animals with not-formed faeces has started increasing from the group of values of 5000-10000 OPG. This result confirms those of Horton-Smith (7) and Boughton (8). Therefore, if such animals in a herd are in a great number, then it is suggested that the whole herd should

References

1. Fox, J.E.: Coccidiosis in Cattle. Mod. vet. Pract., 1985; 66, 113-116.
2. Pellerdy, L.P.: Coccidia and Coccidiosis (2nd Edition). Verlag Paul Parey, Berlin and Hamburg, pp 723-761; 1974.
3. Soulsby, E.J.L.: Helminths, Arthropods and Protozoa of Domesticated Animals. (7th Ed.). Bailliere-Tindall, London, pp 607-614; 1986.
4. Dumanlı, N., Güler, S., Erdoğan, Z., Köroğlu, E., Yılmaz, H., ve Küçükkerden, N.: Elazığ Yöresinde Sığırlarda Bulunan Coccidia Etkenleri ve Bunların Yayılışı. Doğa Türk Vet. Hay. Derg., 1993; 17, 223-227.
5. Mimioğlu, M., Göksu, K. ve Sayın, F.: Ankara ve Civarı Sığırlarında Coccidiosis Olayları Üzerinde Araştırmalar. Ankara Üniv. Vet. Fak. Derg., 1956; 3, 136-158.
6. Sayın, F.: The Species of Eimeria Occuring in Cattle in Turkey. Ankara Üniv. Vet. Fak. Derg., 1970; 17, 311-326.
7. Horton-Smith, C.: Coccidiosis in domestic mammals. Vet. Rec., 1958; 70(12), 256-261.
8. Boughton, D.C.: Bovine coccidiosis: from carrier to clinical cases. N. Am. Vet., 1945, 26, 147-153. (Ref.: Soulsby, E.J.L.: Helminths, Arthropods and Protozoa of Domesticated Animals. Bailliere Tindall, London, p 613; 1982.)
9. Weinandy, H.: A Long Term Study on the Epizootiology of Coccidian Infections of Housed Calves and Young Cattle. GieBen, Juctus-Liebig-Univ., Diss. 1989.
10. Ministry of Agriculture, Fisheries and Food (MAFF): Manual of Veterinary Parasitological Laboratory Techniques. Reference Book: 418., Her Majesty's Stationery Office, London. 1986.
11. Boch, J. und Supperer, R.: Veterinarmedizinische Parasitologie (3.Aufl.). Verlag Paul Parey, Berlin und Hamburg, pp 63-68; 1983.
12. Davies, S.F.M., Joyner, L.P. and Kendall, S.B.: Coccidiosis. Oliver and Boyd, Edinburg and London, pp 46-49; 1963.
13. Hiepe, T. (Hrsg.): Lehrbuch der Parasitologie. Bd. 2, Veterinarmedizinische Protozoologie (T.Hiepe und R.Jungmann, ed.'s). Fischer Verlag, Jena, pp 101-110; 1983.
14. Levine, N.D.: Veterinary Protozoology (2nd Ed.). Iowa State University Press. Ames-Iowa, pp 130-218; 1985.
15. Levine, N.D. and Ivens, V.: The Coccidian Parasites (Protozoa, Apicomplexa) of Artiodactyla. Illinois Biol. Monogr. 55, University of Illinois Press, Urbana and Chicago. 1986.