PREVALENCE OF COCCIDIA IN DOMESTIC SHEEP IN CENTRAL ALBERTA

J. J. Mahrt*

Introduction

Although coccidia are common in domestic sheep there are only a few reports on the prevalence of the various species of ovine coccidia. Surveys have been reported from Tunisia (1), United States (2, 5, 9), Germany (3), Kazakhstan (10), and England (4). There are ten known valid species of *Eimeria* in domestic sheep (6). Some of these species can be pathogenic causing morbidity and mortality especially in lambs confined in feedlots (6, 8). The differences in pathogenicity make it essential to be able to differentiate between and identify the species of ovine coccidia.

The objective of this study was to determine the species of coccidia present in domestic sheep in central Alberta. Thus, in this initial survey information was to be obtained on the prevalence and species distribution of the ovine coccidia. Such data have not been previously reported from Alberta, or from other areas in Canada.

Materials and Methods

Fecal samples were collected directly from the rectum of 211 sheep on four farms near Edmonton, Alberta from May to July 1967. Each sample was examined microscopically for the presence of coccidial oocysts by a coverslip flotation method (6) using Sheather's sugar solution. The following method was used to sporulate the oocysts: Feces were broken up in a 2.5% potassium dichromate solution, poured into petri dishes to a depth of 5 mm or less, and then incubated at 25° C. for one week. The sporulated oocysts were then floated on a coverslip and identified. The number of oocysts per gram of feces was not determined.

A strict morphological criterium was used in the identification of oocysts. Sporulated oocysts were compared with existing descriptions of all ten coccidial species. The most accurate and detailed descriptions have been made by Levine (7), Shah (9), and Joyner *et al* (4). Consultation of these references will acquaint investigators with species identification. With sufficient experience and familiarity the various ovine coccidial species can be identified.

Results and Discussion

The prevalence of each coccidial species in sheep from four flocks has been summarized in Table I. One hundred per cent of the sheep were positive for coccidia. In decreasing order of prevalence *Eimeria crandallis* was found in 88% of the sheep; *E. ahsata* in 86%; E. *arloingi* in 82%; *E. ninakohlyakimovae* in 69%; *E. parva* in 53%; *E. faurei* in 52%; *E. intricata* in 14%; *E. granulosa* in 7%; *E. pallida* in 6%; and *E. punctata* in 4%.

The number of coccidial species which were identified in individual samples has been summarized in Table II. Four or more species were found in 85.3% of the fecal samples. None of the samples had only a single species.

The prevalence of coccidial species in domestic sheep in Alberta is compared with the prevalence reported from other geographical areas (Table III). The presence of all ten species of ovine *Eimeria* in Alberta extends our knowledge of the geographical range of the ovine coccidia. From an epidemiological viewpoint it is important to note that even though the climate at Edmonton, Alberta, is quite severe in winter (mean minimum January temperature, −19° C) coccidial oocysts are able to survive and initiate new infections.

In this limited survey no attempt was made to assess the pathogenic effect of the coccidia on those sheep which were examined for oocysts. However, since the potentially pathogenic species (*E. ahsata, E. ninakohlyakimo-*

*Department of Zoology, University of Alberta, Edmonton, Alberta. Supported in part by grant A-3908 from the National Research Council of Canada.

TABLE II

The Number of Species of *Eimeria* Present in Individual Fecal Samples

No. of species in sample	1	2	3	4	5	6	7	8	9	10
Percentage of 211 samples	0	3.3	11.4	28.4	36.1	17.5	3.3	0	0	0

TABLE I

COCCIDIAL SPECIES IN SHEEP ON FOUR FARMS IN ALBERTA

Flock	Date	No. of Sheep	Age	No. of sheep infected with coccidia										
				Any species	*E. ahsata*	*E. arloingi*	*E. crandallis*	*E. faurei*	*E. granulosa*	*E. intricata*	*E. ninakohl-yakimovae*	*E. pallida*	*E. parva*	*E. punctata*
A	5–6/67	102	3–4 mo.	102	88	87	89	53	2	12	68	7	60	0
B	5/67	29	3–5 mo.	29	26	28	21	13	3	2	27	6	19	0
C	6/67	15	3–4 mo.	15	12	11	14	14	1	1	9	0	9	0
	6/67	25	Adult	25	17	14	22	6	10	2	17	1	6	0
D	7/67	40	3–4 mo.	40	39	33	39	24	0	12	25	0	18	9
Total		211		211	182	173	185	110	16	29	146	14	112	9
Percentage				100	86	82	88	52	7	14	69	6	53	4

TABLE III

REPORTED PREVALENCE OF COCCIDIAL SPECIES IN SHEEP

Locality	Number Sheep Examined	Percentage of sheep infected with coccidia											Investigators
		Any species	*E. ahsata*	*E. arloingi*	*E. crandallis*	*E. faurei*	*E. granulosa*	*E. intricata*	*E. ninakohl-yakimovae*	*E. pallida*	*E. parva*	*E. punctata*	
Tunisia	63		0	52	0	21	0	3	35	0	21	0	Balozet (1)
United States	100	96	0	90	0	11	10	14	3	10	50	0	Christensen (2)
	9		22*	22	22	11	0	11	22	0	22	22	Landers (5)
	153	69	24	53	24	6	4	7	1	6	5	1	Shah (9)
Germany	100		0	58	0	40	1	13	5	0	52	0	Jacob (3)
Kazakhstan	302		0	52	0	43	0	4	52	0	9	0	Svanbaev (10)
England	198		62**	95	90	72	9	29	88	37	55	0	Joyner et al (4)
Alberta	211	100	86	82	88	52	7	14	69	6	53	4	Present Study

*Percentages reported here represent only the species found in the two sheep which were positive for *E. punctata*.
**Percentages in Joyner's report are rounded off to the nearest whole number.

vae) were usually present (Table I), further studies are needed to determine the economic importance of coccidia in Alberta sheep.

Summary

A survey on the prevalence of coccidia in domestic sheep in central Alberta was conducted. Fecal examination of 211 sheep from four farms showed that 100% of these sheep were infected with two or more species of coccidia. All ten species of ovine coccidia were found in this survey.

Some of these species are pathogenic and can cause coccidiosis in lambs under feedlot conditions.

Résumé

On a déterminé que les coccidies sont extrêmement fréquentes chez les moutons de l'Alberta central. Un examen des féces de 211 moutons a prouvé que tous ces animaux étaient infestés par deux ou plusieurs espèces de coccidies. Au cours de cette enquête, on retrouve les dix espèces reconnues de coccidies du mouton.

Certaines de ces espèces sont pathogènes et susceptibles de produire des symptômes de coccidiose chez des agneaux élevés dans des parcs d'engrais où ils sont entassés.

Acknowledgments

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ABSTRACTS

Getty, S. M. & Ellis, D. J. (1967) The experimental use of bull semen contaminated with Pseudomonas aeruginosa organisms—J. Am. vet. med. Ass. 151, 1688–1691 (Coll. Vet. Med., State Univ., East Lansing, Mich. 48823)

Semen containing *Ps. aeruginosa* produced genital abnormalities in virgin Holstein–Friesian heifers. All experimental heifers inseminated with semen containing this pathogen developed various degrees of a syndrome which included metritis, cervicitis, and vaginitis. The organism was recovered from four of the eight experimental animals at slaughter (44 days after terminal insemination). Histological changes were observed in the uteri.

Waterson, A. P. (1968) Introduction to animal virology.—pp. x + 176 London: Cambridge University Press 2nd Edit. 35s.

The second edition, published seven years after the first (see V. B. 32, abst. 2495) has been re-written, and new information about viruses, particularly their structure and composition, biochemistry of growth, and malignant transformation of cells, has been incorporated. Many new illustrations have been added, including electron micrographs of viruses prepared by negative staining. The book continues to be a useful and well written introduction to animal virology.

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