THE PREVALENCE AND INTENSITY OF INFECTION WITH EIMERIA SPECIES IN SHEEP IN NYANDARUA DISTRICT OF KENYA

N. MAINGI AND W.K. MUNYUA
Department of Veterinary Pathology and Microbiology, Faculty of Veterinary Medicine, University of Nairobi, P.O. Box 29053, Nairobi, Kenya

ABSTRACT

The prevalence and numbers of coccidian oocysts in faecal samples from young (less than 6 months old), immature (6-12 months old) and adult (over 12 months old) sheep on 15 farms in Nyandarua district were studied during the dry and wet seasons. The species of Eimeria occurring in these sheep were also identified. The proportion of animals shedding coccidian oocysts did not vary significantly with season. The prevalence of the oocysts was significantly higher ($p<0.05$) in young sheep (mean 85.3%) compared to immature (mean 40.2%) and adult sheep (mean 32.15%). OPG counts (oocysts per gram of faeces) were significantly higher ($p<0.01$) in the young sheep compared to immature and adult sheep during both seasons. Prevalence and OPG did not differ between immature and adult sheep. There was no significant difference in OPG during the wet season (mean 328 ± 997) compared to the dry season (mean 219 ± 773). The sex of the sheep had no significant effect on prevalence or OPG. Eight species of Eimeria were recognized. They (and their prevalence) were E. bakuensis (ovina) (43.6%), E. ovinoidalis (23.6%), E. ahsata (15.2%), E. intricata (8.27%), E. granulosa (4.8%), E. faurei (2.8%), E. parva (1.06%) and E. pallida (0.67%).

Keywords: coccidia, Kenya, intensity, oocyst, sheep, prevalence

Abbreviations: OPG, oocysts per gram of faeces

INTRODUCTION
Coccidia are generally regarded as ubiquitous parasites of animals and continue to be a serious cause of lowered productivity and ill-health (Soulsby, 1982). Surveys based on the examination of ruminant faeces have shown that most animals are infected with a wide variety of Eimeria species from an early age (Vercruysse, 1982; O'Callaghan et al., 1987; Amarante and Barbosa, 1992). Although climatic conditions over most parts of Kenya are conducive for the sporulation and survival of coccidian oocysts throughout most of the year, information on the prevalence of coccidia in sheep in Kenya is limited to a report by Kanyari (1990). That report compared the prevalence and infection levels of coccidian oocysts in sheep and goat faecal samples submitted for diagnosis to the Faculty of Veterinary Medicine, University of Nairobi between 1969 and 1986. The species of Eimeria in the samples were not identified. Identification of Eimeria species may be important because of differences in pathogenicity. The first objective of this study was to determine the prevalence and intensity of infection with coccidia in various age groups of sheep during the dry and wet seasons in Nyandarua district, while the second objective was to identify the species of Eimeria occurring in these sheep.
MATERIALS AND METHODS

The survey was conducted on eight large (more than 50 sheep) and seven small (fewer than 20 sheep) farms randomly distributed within four divisions of the district. All the farms had Corriedale or Corriedale × Merino sheep that grazed on pastures. Rotational grazing was practised on all farms with stocking rates of between 2 and 5 animals per acre. The pastures had mainly Kikuyu grass (*Pennisetum clandestinum*). Samples were collected during the months of March (dry season) and May (wet season). Three age groups of sheep (young, less than 6 months of age; immature, 6–12 months old; and adults, over 12 months old) were selected on each farm and sampled. On the larger farms, 10–20 animals, chosen at random, were sampled per age group while all the sheep on the smaller farms were sampled. Faeces (3–5 g) were collected directly from the rectum of each sheep, placed in labelled plastic containers and stored at 4°C until examined. The number of coccidian oocysts per gram (OPG) of faeces was determined for each sample by a modified McMaster technique (Whitlock, 1948) using magnesium sulphate solution (specific gravity 1.14).

Samples from the three age groups of sheep were pooled together for each farm and the coccidian oocysts were isolated using a flotation technique. The faecal samples were crushed and magnesium sulphate solution was added, causing the oocysts to float. The sample was allowed to stand for 30 min and the supernatant was decanted. The magnesium sulphate solution was removed from the supernatant by dilution and repeated centrifugation to give a clean oocyst sediment. This sediment was suspended in a solution of potassium dichromate (2.5% w/v) and transferred into clean covered petri dishes, which were incubated at room temperature with constant aeration until the oocysts had sporulated. The oocysts were then identified on the basis of the morphological characteristics of the oocysts and sporocysts (Joyner et al., 1966; Levine, 1973). A total of 50 oocysts were examined for each farm.

Statistical analysis

OPG counts were logarithmically transformed and analysed by analysis of variance and a paired t-test. A value of \( p < 0.05 \) was considered significant. The prevalence was defined as the percentage of faecal samples containing coccidian oocysts (Margolis et al., 1982). The proportions of infected animals were compared using the \( \chi^2 \) test in the EPI INFO statistical program.

RESULTS

The prevalence rates are presented in Table I. Of the 274 and 301 faecal samples examined during the dry and wet seasons, respectively, 117 (42.7%) and 136 (45.2%), respectively, were positive for coccidia. The prevalence of coccidian oocysts was significantly higher \( (p < 0.05) \) in the young sheep compared with either the immature or adult sheep in both seasons. There was no significant difference in the prevalence of coccidian oocysts between immature (40.2%) and adult sheep (32.1%) nor were there any significant differences between the seasons in the proportions of animals infected within each age group. Overall, the proportions of males (43.9%) and females (45.1%) shedding coccidian oocysts were more or less similar.