

THE AFRICAN BUFFALO (*SYNCERUS CAFFER*): GASTRO-INTESTINAL PARASITES WITH SPECIAL REFERENCE TO *TOXOCARA SP.* IN KENYA.

Kanyari, P. W. N, Munyua, W. K. and Nganga, J. C. Department of Veterinary Pathology and Microbiology, University of Nairobi, P.O Box 29053, Nairobi, Kenya.

SUMMARY

A six-month study was carried out among African buffaloes occupying the Ngong Hills Forest of Kajiado District, Kenya. The area is cool and humid compared to the rest of the district which is classified as semi-arid. The aim of the study was to determine the types and levels of gastro-intestinal (GI) parasites present in faeces of both calves and adult buffaloes. Samples of faeces were obtained monthly and analysed quantitatively for strongyloid nematode eggs (EPG) and qualitatively for coccidian oocysts, *Toxocara* and trematode (flake) eggs. The EPG means were significantly higher in calves ($p < 0.05$) than in adults but the monthly means were never above 100, the reason for these low levels are discussed. The prevalence rates were also higher in calves with regard to both nematodes and coccidian oocysts. Calf samples exclusively yielded both *Toxocara* and fluke eggs at 5.4 and 10.4% prevalence rates respectively. The presence of these latter parasites is attributed to the cool and humid environment and the presence of water sources in this area. It is suggested that, the GI nematodes and flukes may be transmitted to cattle sharing common grazing area and/or their infective stages may be carried downstream to infect animals grazing in ranches watered by the streams originating from the Ngong Hills Forest.

INTRODUCTION

Knowledge of gastro-intestinal helminthes in African buffaloes (*Syncerus caffer*) is limited as very few studies have been in this aspect. The situation is slightly different with the Asian buffalo (*Bubalus bubalis*) where some work has been documented (Chauhan *et. al.*, 1973, Bryan *et. al.*, 1976). As regards the ascaroid nematode *Toxocara vitulorum*, quite a lot of work has been carried out with the latter host.

The African buffalo in some parts of Kenya shares common grazing grounds with cattle and other domestic ruminants. The occurrence of *T. vitulorum* was documented in a preliminary report among *S. caffer* occupying Ngong Hills Forest in Kajiado District of Kenya (Kanyari *et. al.*, 1998) The current study confirms this preliminary observation and in addition covers other gastro-intestinal parasites and flukes.

Parasitic nematode species of buffalo (*Bubalus bubalis*) are essentially those of cattle (Bryan et. al., 1976). Further, Grootenhius (1999) notes that, in Kenya the round-worm fauna inhabiting domestic ruminants share approximately 20 – 40% of their species. It is then important to establish the gastro-intestinal parasites prevalent in the wild African buffalo. The parasites especially the nematodes can easily be passed from domestic ruminants to the wild one and *vice versa*.

MATERIALS AND METHODS

Study area

The study was conducted in Ngong Hills Forest, which is about 30 kilometers to the southwest of Nairobi. It is the wettest and coolest region of Kajiado District of Kenya. The forest is surrounded by a semi-arid area which suffered a severe drought after the 1997/98 *El nino* rains. The community occupying this district is mainly pastoralistic but some newcomers to the area have introduced subsistence farming.

Sampling

Local herdsmen mainly of Maasai origin around the Ngong Hill Forest were recruited and supplied with faecal sample bottles. They were asked to collect individual buffalo faecal droppings and put into the sample bottles indicating on the label the age category of the source buffalo i.e. adult or calf. At any one time a different herd was visited for sampling, this was carried out

monthly between October 1998 and May 1999. The samples were analysed in the laboratory using standard parasitological techniques for nematode eggs per gram (EPG) and identification. The McMaster egg counting technique was used as described by Hansen and Perry (1990). Briefly, 4 g of faeces were mixed with 56mls of floatation fluid (saturated sodium chloride). The mixture was stirred thoroughly and filtered through a double layer of cheese cloth into a second container. While stirring, a sub-sample was obtained with a Pasteur pipette and used to fill both sides of the McMaster counting chamber. The preparation was allowed to stand for 5 min. and then examined under a microscope at 10 x 10 magnification. The total number of eggs from both chambers was multiplied by a factor of 50 to obtain the eggs per gram (EPG) per sample. The samples were qualitatively checked for coccidian oocysts and trematode eggs. Faeces were routinely cultured and processed for nematode larval isolation and identification by the methods described by Hansen and Perry (1990).

RESULTS

The levels of stronglylid eggs per gram (EPG) of faeces were never very high and at any one sampling (Table 1). The highest monthly average was 67 in adults compared to 100 among calves. Similarly, the point prevalence rates (PPR) with nematodes were always higher among the calves which had a maximum of 75% in October compared to 44% among adults in

December. This trend was also observed with coccidian oocysts but the prevalence rates were much lower. The calves had a maximum value of 64% in December compared to 17% among adults in October. From Table 2, the overall, the mean EPG for calves and adults was 99 and 39 respectively. This difference when compared statistically was found to be significant ($P < 0.05$). The PPR for nematodes and coccidian in calves was 52% and 46%

respectively compared to 28% and 7.5% respectively among adults.

On culturing, the main nematode parasites identified were *Haemonchus* (55%), *Trichostrongylus* (27%) and *Oesophagostomum* (18%). Among faecal samples from calves, *Toxocara* eggs and trematode (flake) eggs were encountered at the overall rate of 5.4% and 10.4% respectively.

Table 1: Results of Faecal Analysis from Buffaloes for Nematode and Coccidian Parasites. – Adults:

| Sampling Period | Sample size (n) | Mean EPG | Strongloids PPR% | Coccidia PPR% |
|-----------------|-----------------|----------|------------------|---------------|
| 1 Oct '98 | 12 | 8 | 8 | 17 |
| 2. Nov. '98 | 20 | 59 | 31 | 7.1 |
| 3 Dec '98 | 9 | 67 | 44 | 11.1 |
| 4 Mar '99 | 10 | 50 | 40 | 10 |
| 5 Apr '99 | 19 | 32 | 28 | 0.0 |
| 6 May '99 | 12 | 16 | 17 | 0.0 |

Calves:

| Sampling Period | Sample size (n) | Mean EPG | Nematodes PPR% | Coccidia PPR% | Toxocara PPR% | Flukes PPR% |
|-----------------|-----------------|----------|----------------|---------------|---------------|-------------|
| 1 Oct '98 | 4 | 150 | 75 | 25 | 0 | 0 |
| 2 Nov '98 | 27 | 76 | 56 | 48 | 0 | 0 |
| 3 Dec '98 | 14 | 71 | 29 | 64 | 7 | 7 |
| 4 Mar '98 | 10 | 100 | 50 | 60 | 20 | 45 |
| 5 Apr '98 | 11 | 10 | 50 | 31.3 | 0 | 0 |

Table 2 Comparative Summary of Parasitological Data Point Prevalence Rates %

| Group | Mean EPG | Nematodes | Coccidia | Toxocara | Trematodes |
|---------------|----------|-----------|----------|----------|------------|
| Calves (n=66) | 99.0 | 52 | 46 | 5.4 | 10.4 |
| Adults (n=71) | 39.0 | 28 | 7.5 | 0.0 | 0.0 |

DISCUSSION

The higher prevalence rates of nematodes and coccidian oocysts among calves compared to the adults can be explained by the gradual development of immunity as the animals age advances. Assuming the relationship between buffaloes (*Bubalus bubalis*) and cattle as observed in Australia (Bryan et. al., 1976) is applicable to Kenya with the African buffalo, then nematode parasites may be shared among the two species of ruminants. This may especially apply during the dry seasons when cattle are grazed in the forest areas normally occupied by buffaloes. The observation of low EPG

counts among buffaloes in this work is in tandem with a report by Roberts and Fernando (1990) with the swamp buffalo in Sri-Lanka. The possible explanation is that buffaloes have defined toilet areas or a higher level of innate resistance. A further possibility as observed from Kruger National Park in S. Africa is that, alternation of animals of different species may contribute to parasite control (Malan et. al., 1997). The range of strongloid nematodes identified in the present work have all been recorded from the swamp buffaloes (Bryan et. al., 1976) and which have a wider range. It is possible that the African buffalo harbours more of the nematodes

than presently reported and more work is therefore required.

Coccidian parasites are very host specific to an extent that, even small ruminants do not share common *Eimeria* species. By extension, it can be argued that, cattle and wild buffaloes do not share their coccidian parasites either.

Some interesting observations related to the ascaroid nematode *Toxocara*. This nematode has been recorded as a cause of disease and even mortalities among Asian buffalo (Dewan et. al., 1979) among other workers. In Africa, limited information has not elucidated the extent to which the ascaroid parasite occurs among wild buffaloes *S. caffer*. A preliminary report by Kanyari et. al. (1998) showed that the parasite does occur in African buffaloes. The prevalence rate reported then was 13% as opposed to the current 5.4%. The difference can be explained by the very dry weather conditions prevailing during the period of sampling October 1998 to May 1999. The district covered in this work lies in a semi-arid region of Kenya and was severely affected by the *La nina* phenomenon. The life cycle pattern of *T. vitulorum* is greatly affected by humidity and so in cases of severe dry weather, the survival rate of the exogenous stages in the environment is greatly reduced.

Another factor to consider is that, due to the inherent difficulties of handling the wild buffalo, chances of covering a good proportion of the target age group (2 – 6 months) are limited. Hence, there is the dilution effect of a wide host age which possibly explains why the rates are lower than that reported from cow calves. The reports from cattle in this region Kajiado district show a prevalence rate of 10.7% with drier areas having lower prevalence rates (Kanyari et. al., 1995, 1996).

The observation of trematode eggs in calf faecal samples does show that, flukes are prevalent in the African buffalo as has been reported also from the Asian buffalo (Bryan et. al. 1976; Mattison et. al. 1992). *Fasciola* species were not encountered among the swamp buffaloes in Sri-Lanka by Roberts and Fernando (1990) but they stated that, the trematode could be important in buffalo. It was not possible to state the genera of the trematode involved but there is a possibility that, both liver and stomach flukes are prevalent in the African buffaloes. The prevalence of trematodes among calves as opposed to adults parallels the case in cattle even with *Schistosoma bovis* (Makundi, et. al. 1998). Both stomach and blood flukes have similar epidemiological patterns as they utilize water snails for intermediate hosts. In Kenya fasciolosis has been reported from the cooler highlands (Maingi and Mathenge, 1995). There are no previous reports of fasciolosis from dry districts like Kajiado among

domestic ruminants leave alone the wild buffalo. The area occupied by the wild buffaloes sampled in this work is higher in altitude and cooler than all other parts of the district. It is the cradle of streams that flow east towards the Indian Ocean. This could be a source of infections for ruminants grazing down stream from Ngong Hills. Information gathered in some ranches bordering the streams agrees with the above hypothesis. This calls for more research to establish to what extent fasciolosis occurs in domestic ruminants whose source of water are the streams originating from Ngong Hills Forest.

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