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DISEASE CONDITIONS OF CAMELS IN NON-TRADITIONAL CAMEL KEEPING AREAS OF KAJIADO DISTRICT IN KENYA : A CASE STUDY

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ABSTRACT

A cross sectional study was undertaken in a non-traditional camel keeping area of 3 divisions of Kajiado district in Kenya to identify the quantify camel diseases. Three hundred and forty seven camels were examined. Blood and faecal samples were collected from all the camels for laboratory examination for haemoparasites, anaemia and helminthes. Trypanosomiasis, helmithosis, abscesses, mange and tick infestation, were the most prevalent diseases. The point prevalence of Trypanosomiasis was 7.8%. The point prevalence of helminth infestations was 52.7%, with a mean egg count per gram faeces of 163.4. Tick infestations was observed in 186 (53.6%), abscesses in 38 (11%) and mange in 32 (9.2%) camels. Diarrhoea, eye infections, wounds, mastitis, fracture, carpal joint deformity and facial nerve paralysis were also observed. It was concluded that camel diseases in the study area were similar to those reported in traditional environment, but are complicated by the presence of tsetse-transmitted trypanosomosis. Improvement in disease surveillance, control and management by the veterinary department and farmers is recommended so as to reduce the prevalence and consequences of disease in the district for further improving camel productivity.

Key words: Camel, helminthosis, trypanosomiasis

Camels (*Camelus dromedarius*) have traditionally been kept by pastoralists in the arid and semi-arid lowlands of Northern Kenya where they account for upto 97% of an estimated population of 830,000 (FAO-STAT, 2002). Over the years, it was observed that non-camel keeping pastoral communities in Kajiado district in the south have suffered more than camel keepers in the north of the country in terms of loss of persistency of milk production during dry seasons or drought, when milk production from cattle, sheep and goats is scare. In view of this, the government of Kenya through the Arid and Semi Lands (ASAL) program introduced camels in the Kajiado district in 1989. The aim of the program was to diversify livestock herds and ensure continuity in milk production, an important food source for pastoralists.

The spread of camel population to the south may have presented new challenges to camel pastoralism from an epidemiological perspective. It is feared that the exposure of camels to diseases and parasites may be higher in their new environment than in their traditional one where they are commonly found. This could lead to increased mortality and morbidity. This study was therefore carried out to identify the quantify disease conditions in camels of the Kajiado district.

Materials and Methods

Study area : The study area was carried out in Kajiado, a district to the south of the Rift valley province of Kenya. It lies between longitudes 35°5′ and 37°5′ east and latitude 1°0′ and 3°0′ south and covers an area of 21,106 km^2. The area is influenced by 5 agro-ecological zones (AEZ) although 95% is under AEZ V and AEZ VI (Republic of Kenya, 1990). Rainfall is bimodal in pattern, with long rains occurring between March and May and the short rains from October to December. The annual rainfall range is 500-1250 mm.

Data collection : Three hundred and forty seven camels in 24 herds were randomly selected in 3 administrative divisions of the Kajiado district, namely Magadi, Central and Namanga. All animals were clinically examined and blood and faecal samples collected for further investigation.

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The blood samples were collected from the jugular vein and examined for trypanosomes using phase contrast buffy coat technique (BCT) (Murray *et al*, 1977). Anaemia was assessed by measuring the percentage packed cell volume (PCV). Blood samples from trypanosome negative, anaemic (PCV <20) animals were further tested for the presence of parasites using the mouse inoculation test (MIT) (Godfrey and Killick, 1962). Faecal samples were collected per rectum and examined by direct smear and sedimentation method (Soulsby, 1982). The egg count per gram of faeces (epg) was determined using the modified McMaster technique (Coles *et al*, 1992).

Data analysis : Data was entered and analysed using STATISTIX. The mean PCV between infected and non-infected animals and that of helminth infested and non-infested animals were analysed using analysis of variance (ANOVA). A p-value of less than 0.05 was considered significant.

Results

Blood analysis : Twenty seven trypanosome infections were recorded in all the 3 administrative divisions representing a mean prevalence of 7.8% (table 1). Magdi division had a prevalence of 29.2%, which was the highest, and was followed by Namanga division with 3.3% while the Central division had the least prevalence of 1.3%. The mean PCV (%) of all animals in the 3 divisions was 27. The mean PCV (20.7%) of infected animals was significantly ($p < 0.05$) lower than the mean PCV (27.6%) of non-infected animals. Seventeen animals had a low PCV of below 20, but had no parasites in their peripheral blood. The infections were predominantly due to *Trypanozoon* trypanosomes, which accounted for 96.3% (26) of the infections. *T. congolense* was detected in one camel in Magadi division.

Table 1. Trypanosome infections recorded in all the 3 administrative divisions.

Division	Number examined	Number positive	Prevalence (%)
Magadi	72	21	29.2
Central	152	2	1.3
Namanga	123	4	3.3
Total	347	27	33.8

Faecal analysis : Helminth infestations were recorded in 183 camels, representing a a mean prevalence of 52.7%. The mean egg count per gram (epg) of faeces infested animals in the three divisions was 163.4 with a range of 1800. The mean epg of Magadi, Central and Namanga divisions were 131.1, 171.1 and 171.5, respectively. No significant difference ($p>0.05$) was noted between the mean PCV of infested (26.9%) and non-infested (27.2%). Seven different genera of nematode eggs were identified, including *Hemonchus* spp., *Trichostrongylus* spp, *Strongyloides* spp. *Trichuris* spp., *Thelazia* spp and *Oesophagostomum* spp. These were found either as single or mixed infection. *Haemonchus* spp was the most prevalent nematode infesting 59% (108) of the camels. Of the 183 helminth-infested animals, 155 (84.7%) had mild infestation (epg 100-400), 22 had (12%) moderate (epg 400-1000), and 6 (3.3%) had heavy infestation (epg > 1000).

Clinical examination: All the 347 camels were clinically examined. Tick infestation, abscesses and mange were the most common. Ticks belonging to the genera *Boophilus*, *Rhipicephalus* and *Hyalomma* were observed in 186 (53.6%) camels. The preferred areas of attachment were the perineum, base of the udder and the scrotum. Bleeding and inflammation due to tick infestation was observed in some animals. Abscesses were recorded in 38 (11%) animals, mainly located in the cervical and sub-mandibular regions. Most of them were stable and did not appear to affect the general health of the animals. Diarrhoea was observed in 15 animals, 12 of which were calves. Mange was recorded in 32 (9.2%) animals, while eye infection sand wounds were observed in 5 and 4 animals, respectively. Mastitis was tentatively diagnosed in 4 dams while one calf had a fractured pelvic bone. Single cases of blindness, facial nerve paralysis and deformed carpal joint were also observed.

Discussion

Trypanosomiasis, gastrointestinal helminth infections, abscesses, tick infestation and mange were the most prevalent disease conditions affecting camels in their new environment. These disease conditions have been identified and documented in camels in northern Kenya (Wilson *et al*, 1981; Rutagwenda, 1982). The findings of this study are in agreement with Richard

(1979) classification that lists trypanosomosis, gastrointestinal parasitism and mange as important diseases of camels.

Trypanosomosis caused by *Trypanosoma evansi* has been identified as the most important disease of camels (Richard, 1979; Fazil, 1977) and occurs wherever camel herds are found. The distribution of the disease in Kenya varies according to the region and herd management system (Njiru *et al*, 2002). In the present study, the disease conditions were recorded in all study sites. The prevalence of trypanosomosis was high in Magadi in comparison to other division and is of concern and may present serious challenges to camel pastoralism in the division due to the huge production losses (Yagil, 1982) and mortality (Mahmoud and Gray, 1980) often associated with the disease.

Anaemia is a common characteristic of *Trypanosoma evansi* infections in camels and in this study was a significant feature in trypanosome-infected animals. However, the presence of anaemic animals that were negative for the disease could have been due to low parasitaemia or other causes such as haemonchosis. *Trypanozoon* trypanosomes are tissue invasive and cause characteristic fluctuation in parasitaemia, which may be difficult to detect using the phase contrast buffy coat and mouse inoculation techniques (Nyangao, 1993) used in the study. Most of the parasites isolated were the *Trypanozoon* trypanosomes, although tsetse fly associated *T. congolense* was also isolated from a camel in Magadi division. The presence of *T. congolense* is of importance. Tsetse flies (*Glossina pallidipes*, *G. swynertonni* and *G. longipennis*) are found in Magadi division (Brightwell *et al*, 1992) and could have been involved in the transmission of the parasite. Tsetste-transmitted trypanosomosis can cause severe disease in camels (Bennet, 1933), and as such caution must be exercised when introducing or grazing camels in tsetse infested areas. Further analysis of the isolates using Polymerase Chain Reaction (PCR) will elucidate the role of tsetse in camel trypanosomosis.

Losses due to gastrointestinal parasitism play an important role in camel rearing. Haemonchosis was the most prevalent helminth infestation in the district, as has been observed in camels elsewhere in Kenya (Wilson *et al*, 1981; Field, 1986). However, contrary to the observations of Partani *et al* (1998), animals with moderate and heavy infestation neither manifested anaemia nor other clinical signs. Furthermore, no association was established between haemonchosis and anaemia in trypanosome negative animals, suggesting that this was not the cause. Lack of clinical signs in animals that were heavily infested with helminths was probably due to the compensatory effect of nutrition. There was an abundance of pasture at the time of sampling.

The existence of a seemingly significant proportion of tick infested camels in the study area points to lack of a tick control program by most camel owners, probably because of the minor role ticks play as disease vectors. Nevertheless, ticks suck blood and can cause severe anaemia and debility, as well as tick paralysis. Abscesses were common in camels and could have resulted from traumatic skin penetration, wounds from fighting, ectoparasites, puncture by thorns and faulty or non-sterile administration of veterinary drugs. Due to the relative benign nature of abscesses, most camel owners in the study area appeared to accept their occurrence as normal and hence rarely intervene.

Sarcoptic mange caused by *Sarcoptes scabiei var. cameli* observed on camels in the study area is of importance due to the zoonotic nature and losses associated with the disease. Other disease conditions observed in camels in the district, included mastitis, eye infections, diarrhoea, wounds, blindness, facial paralysis and carpal joint deformity. The prevalence of these diseases and health conditions in the district is thought to be within what is expected in a livestock herd.

Conclusion

The present study has established that camels in Kajiado were suffering from number of disease conditions similar to those reported in traditional environments in north Kenya but is complicated by tsetse transmitted trypanosomosis. Important camel diseases in the district should be incorporated into veterinary surveillance and control programs in the district. Management of diseases by the farmers can reduce the prevalence of disease conditions in the district. Prompt treatment of sick animals would minimise the consequences of the diseases and break the transmission cycles.

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