

A NOTE ON VITAMIN A, C AND E STATUS IN HEALTHY AND INFECTED CAMEL CALVES

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A major problem in camel productivity in Sudan is the high mortality rate of camel calves during the first 3 months. The causes for mortality are mainly poor managerial practices and infectious diseases but deficiency of vitamins also be a predisposition. The objectives of this research were to determine the major causative agents of calf morbidity in Butana area and plasma levels of retinol, α -tocopherol and L-ascorbate in relation to health status.

The study was conducted in Butana, central Sudan. A field survey was conducted during the period January - December 2000 using 594 Arabi camel calves (*Camelus dromedarius*) belonging to Lahawiyin tribe. The calves were aged 1 month to 1.5 years. Camels were inspected grossly for diseases, and blood and faecal samples were taken for confirmatory tests.

Direct microscopic examination for the presence of *Trypanosoma evansi* was done as described in Manual of Veterinary and Advisory Service (MVAS), 1977. Animals were considered helminthiasis positive when ova were detected in grab samples of faeces.

Blood samples were taken from the jugular vein. Plasma was separated and 2.55% (v/v) metaphosphoric acid was added in a ratio to plasma (2:1). Supernatant was assayed for vitamin C as described by Lykkesfeldt (2000). Vitamin A and E are fat-soluble antioxidants, and were measured by isocratic high-performance liquid chromatography with fluorescent detection as described previously (Miller *et al*, 1984).

Data are presented as means \pm SE. An Analysis of Variance was conducted, and significance was detected at $P < 0.05$.

Results

As shown in table 1, out of the 594 camel calves used, 283 calves were healthy, 311 were

diseased (69.19%). The prevalence of haemonchosis, Trichostrongylosis, pneumonia and trypanosomiasis were 32.0, 20.8, 7.8 and 5.7%, respectively.

Table 2 shows the plasma antioxidant status in relation to diseases. The data for both sexes were pooled, as no effect of sex on infection was observed. All types of infected camels showed reduced plasma antioxidant levels. Trypanosomiasis produces the highest degree of reduction in plasma antioxidant status.

Discussion

High calf mortality is an important constraint to productivity in Sudanese camels (*Camelus dromedarius*). The primary care for the newborn is essential for the reduction of neonatal mortality. Failure of passive transfer of colostral immunoglobulin is the major factor in neonatal

Table 1. Common disorders affecting camel (n = 594) calves in Butana area.

Condition	No. affected	% Prevalence
Haemonchosis	190	32.00
Trichostrongylosis	50	20.80
Pneumonia	46	7.80
Trypanosomiasis	25	4.20

Table 2. Plasma levels* of Vitamin A, C, and E in healthy and infected camel calves.

Condition	Vitamin A (ng/L)	Vitamin C (mg/L)	Vitamin E (mg/L)
Healthy	446 \pm 54 ^a	5.78 \pm 1.1 ^a	2.01 \pm 0.18 ^a
Haemonchosis	359 \pm 49 ^b	4.34 \pm 1.0 ^b	1.62 \pm 0.29 ^b
Trichostrongylosis	312 \pm 38 ^b	3.29 \pm 0.91 ^b	1.33 \pm 0.23 ^b
Pneumonia	292 \pm 39 ^c	2.74 \pm 0.9 ^c	1.24 \pm 0.31 ^c
Trypanosomiasis	281 \pm 40 ^c	2.18 \pm 0.88 ^c	1.09 \pm 0.19 ^c

Means on the same column having different superscripts are significantly different at $P < 0.05$. *Values are expressed as Mean \pm SE.

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mortality in alpacas and probably also in other camelidae (Paul Murphy, 1989).

Trypanosomiasis ranked first in economic importance, followed by mange and helminthiasis in morbidity and mortality (Pegram and Higgins, 1992). However, camel calf diarrhoea is regarded as the most common cause of calf mortality in their first months of life. These findings are in line with data of Saudi's camels (Abbas *et al*, 2000). Khanna *et al* (1992) found diseases of digestive and respiratory systems as the main cause of calf mortality in India which is in consonance to the findings of present study. The incidence of diarrhoea (32.8%) in the present study was higher than (21.9%) reported by Agab and Abbas (1995) in Butana area. The disease prevalence in Indian calves was 16.75% (Nagpal and Purohit, 2001).

In Butana area, diarrhoea was found to be the most prevalent symptom followed by pneumonia and pox (Abbas and Musa, 1988). Mohamed and Beynen (2002) studied the prevalence of disease and vitamin C status in adult Sudanese camel and found that trypanosomiasis caused marked reduction in ascorbate status compared with mange and helminthiasis. In line with our findings, trypanosomiasis caused marked reduction in blood antioxidant status. The decrease in antioxidant associated with infections may be attributed with increased utilisation.

In conclusion, lowered plasma antioxidant status as seen in animals of present study may further have reduced the immune response, and thus aggravated the conditions in calves. Calf diarrhoea constitutes a real threatening to camel productivity in Butana area. Managemental practices are to be established to lower the incidence of calf diarrhoea; the causative agents are to be determined.

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