



A field survey of some camel productive and reproductive traits in the Butana area, Sudan

Babiker E. A¹, Abdel-Aziz B. E², Husna M. Elbashir² and Ahmed A. I¹

¹Faculty of Veterinary Medicine, University of Al-Butana, Tamboul, Sudan; ²Tamboul Camel Research Centre, Ministry of Animal Resources, Sudan

Abstract

This field survey study was conducted to investigate major constraints facing camel herd growth and reproduction in the Butana area. Data were collected during the study period from July 2009 to June 2010. Forms of questionnaires distributed, included different productive and reproductive characters, where a total of 321 camels were surveyed. The results showed that the number of pregnant she-camels was found positively correlated with age. Seventy percent of delivered females were recorded during August. General reproductive traits recorded during the survey period revealed that mean age at puberty was 40.5 months, while full reproductive potential was reached at a mean of 60 months. Age at first calving was recorded to be 72 months, while calving interval was observed at a mean of 30.5 months. Daily milk yield surveyed was higher ($P < 0.05$) during winter and autumn (3.16 ± 2.41 and 2.88 ± 2.41 L, respectively), while lower daily milk production was recorded during summer (1.23 ± 1.22 L). Milk production was found positively correlated with age.

Key words: Butana, Dromedary camel, Herd structure, Reproduction

Introduction

For centuries, camel has been a very important animal in the desert regions as it provides milk, meat and transport. In dromedary camels, several reproductive characteristics such as restricted breeding season, long gestation period and high calf mortality appear to be the major constraints to increased productivity and herd growth (Hammadi et al., 2001; Sumant Vyas et al., 2001; Marai et al., 2009). Full reproductive potential of camel has not yet been achieved and research into improving reproductive characters has been lacking. However, the development of camel racing in the Middle East has led to an increase in the value of racing dromedary camel and thus increased interest in improving reproductive efficiency (Skidmore, 2005). Therefore, the objectives of the present study are to identify major constraints facing herd growth in the Butana area and to provide baseline information for certain productive and reproductive characters of dromedary camels under traditional management system.

Materials and Methods

This study was carried out at the Butana area, northeastern Sudan. The area lies between Latitude 13°

$40'$ and $17^{\circ} 50'$ North and Longitude $32^{\circ} 40'$ and $36^{\circ} 00'$ East. It is bounded by the Main River Nile on its northwestern border, the Blue Nile on its southwestern edge, the Atbara River in the northeast and by the railway connecting Kassala and Sennar on the south. The area is inhabited by transhumant camel owning tribes in its northern part, while the southern part is populated by agro-pastoralists who practice mainly mechanized rain-fed agricultural activities. Most of the Butana land lies within the low rainfall Savannah. During the rainy season, camels move over a large area for grazing and depend mainly on trees, grasses and herbages, while during the dry season camels are fed on crop residues from rain-fed and from irrigated schemes.

Data were collected from selected 7 camel herds in the area using group discussions and questionnaires that were adopted to the requirements of the study. The questionnaires included milk production, calf mortality and some reproductive traits. The study period covered the whole months of the year (July 2009 – June 2010). A total of 321 camels belonging to private herds were surveyed and were visited monthly.

Statistical analysis

The data were subjected to analysis of variance using Statistical Package for Social Sciences (SPSS,

10.5). Comparison of means were made using Duncan multiple range test.

Results

Data showing pregnancy (%) in different age group is shown in Figure 1. A higher number (60%) of pregnant camels was found in group 3 (10 years – up), while moderate values (36.4% - 37.5%) were observed in groups 1 (4 – 6 years) and group 2 (7 – 9 years), respectively. Fertility as determined by the mean conception rate was 44.63%, while the delivery rate throughout the year revealed higher number (70%) of cases during August.

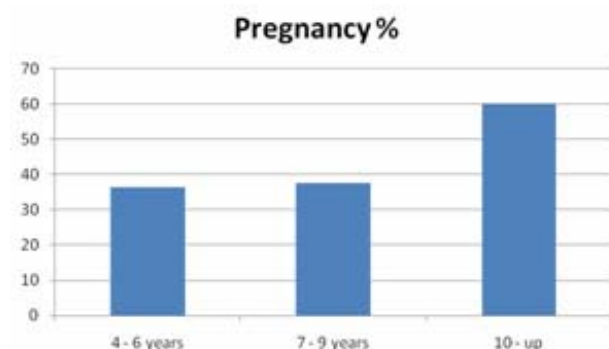


Fig 1: Conception rate in different age group of dromedary she- camels in the Butana area

General reproductive traits of dromedary camels in the Butana area are shown in Table 1. Age at puberty in male and female camels was reached at a mean of 40.5 months, while full reproductive potential was observed at a mean of 60 months. Mean age at first calving recorded in the three herds was 72 months, while calving interval was found to be 30.5 months. Calf mortality rate in the present study was observed to be 20%, and the aborted she-camels were found to be 11.1%.

Results showing the effect of season and age on milk production in dromedary she-camels in the Butana area are shown in Table 2. Season and age significantly ($P < 0.05$) affected the level of milk production in a lactation period of 11 months. Higher mean of daily milk production (3.16 ± 2.41 and 2.88 ± 2.41 L) was recorded during winter and autumn, respectively, while lower daily milk production (1.23 ± 1.22 L) was observed in summer. Milk yield was positively correlated with age. The higher daily milk production (4.36 ± 1.27 and 3.88 ± 1.60 L) was observed in groups 3 (10 years – up) and 2 (7 – 9 years), respectively, while low daily milk yield (1.62 ± 1.60 L) was recorded in group 1 (4 – 6 years).

Table 1: General reproductive traits in dromedary camel in the Butana area

Parameter	Mean \pm SD
Age at puberty month)	40.5 \pm 3.70
Age at maturity (month)	60 \pm 5.26
Age at first calving (month)	72 \pm 6.35
Calving interval (month)	30.5 \pm 5.80
Calf mortality (%)	20
Abortion (%)	11.1

SD = Standard Deviation

Table 2: Influence of season and age on milk production in dromedary camel in the Butana area

Season	Milk yield (L/day)	Age group (years)	Milk yield (L/day)
	Mean \pm SD		Mean \pm SD
Summer	1.23 \pm 1.22 ^b	4 – 6	1.62 \pm 1.60 ^b
Autumn	2.88 \pm 2.53 ^a	7 – 9	3.88 \pm 1.60 ^a
Winter	3.16 \pm 2.41 ^a	10 – up	4.36 \pm 1.27 ^a
Overall mean	2.41 \pm 2.28		2.41 \pm 1.49

^{a,b} Letters on the same column bearing differ superscripts differ significantly ($P < 0.05$)

Discussion

Fertility rate determined by the conception rate in the current study was very low (44.63%). Lower fertility rate (39.1%) was reported by El-Azab et al. (1997) in Libyan camels. Low fertility of camels in the Butana area may be attributed to un-planned breeding, poor management and malnutrition, where most of the palatable forage plants and trees in the area had disappeared and were replaced by non-palatable ones (Darosa and Agab 2008). Improving feed and management conditions are very likely to increase the fertility rate in camels above 50% (Hammadi et al., 2001; Marai et al., 2009). On the other hand, rutting in males is an important factor causing low fertility in camels, where only one camel in a herd ruts at a particular time, and in most cases, this single male continues its dominance over other males through the breeding season (Tingari et al., 1984). In the present study, higher (70%) delivery cases were recorded in August. These results are in agreement with the findings of Babiker et al. (2011). The breeding season in dromedary camel in Sudan was observed to be between March and August (Musa and Abusineina 1987).

Average age at puberty and age at maturity reported in the current study fell within the ranges given by previous authors (Kedija, 2007; Marai et al., 2009). The female camel reaches puberty at about three years, but breeding is usually not allowed until four years (Ismail et al., 1998). Overall mean of age at first

calving and calving interval observed in the present study were longer than 63.37 months for age at first calving and 18.5 months for calving interval reported by Kedija (2007) in Ethiopian camels. Longer calving interval (40.8 months) was observed by Abbas et al. (1992) in Sudanese herds. Inadequate body weight resulting from low plane of nutrition in the area could be a possible cause of delayed age at first calving, while prolonged calving interval could be due to seasonal breeding. Calf mortality rate observed in the present study was 20% and aborted cases were 11.1%. Higher mortality rate (35.3%) and lower aborted cases (8.3%) were recorded in Ethiopian camels (Kedija, 2007). The main causes of calf mortality and abortions are diseases and malnutrition.

Comparable results of daily milk yield were observed by Kedija (2007) in Ethiopian herds, while higher daily milk yield (16 L/day) was reported by Khan and Igbal (2001) in Bactrian camels. Higher mean of daily milk production in the present study was recorded during winter and autumn, while lower milk production was observed in summer. Variation in milk production is due to poor nutrition. Under range conditions, dietary supplementation of dromedary improves productive traits (Hammadi et al., 2001). Milk yield was positively correlated with age; it could be due to the fact that more alveolar cells (secretory cells) would be added at each successive pregnancy after the first lactation to reach their maximum at about the fifth calving (Badri et al., 2011).

From the present study, it could be concluded that:

1. Late age at puberty and maturity, late age at first calving, long calving interval, seasonal breeding and diseases causing abortion and calf mortality, seem to be the major constraints facing camel production in the Butana area in Sudan.
2. Improvement of productive and reproductive traits of dromedary camels in Sudan can be achieved by improving nutritional and environmental conditions.

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