

Estimating some reproductive traits of Sudanese Arabi camel (Darfur ecotype) reared under intensive management system

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Abstract

This study was conducted to estimate the performance of some important reproductive traits of Sudanese Arabic Camel (*Camelus dromedarius*) in Tumbool Camel Research Centre (TCRC). The information used in statistical analysis was taken from records of TCRC's herd (eight she-camels, two bull-Camels and their progenies). The herd was managed under intensive closed system during five years (2007-2011). The results showed that the mean gestation length was 387.23 ± 7.90 days, while the mean of calving interval was found to be 556.20 ± 70.35 days. The mean of the open period was recorded to be 150.10 ± 59.30 days and the mean number of services per conception was 2.4 ± 1.7 . Reproductive performances studied under intensive management system indicated significant improvement compared to those studied under traditional extensive management system.

Keywords: Reproductive traits; intensive system; dromedary

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Introduction

Since the ancient times, camels have been an important creature for those inhabiting deserts, arid and semi-arid regions for the provision of milk, meat, in-cash income, glory, adornment, racing and transport. Recently, local civilians' cultures began a stormy interest of consuming camel products not only for nourishing, but also for their belief that they are remedies for some diseases (Agrawal et al., 2003; Cecile et al., 2007; Abdulaziz et al., 2008). Camel excreted urine is also used as ethno medication to treat ascites, some abdominal diseases and as a hair shampoo (O'haj et al., 2002). These additional returns compelled to highlight more avenues upon the camels' merits to be

additional values to human kind. Numerous intrinsic and extrinsic constraints are facing Sudan camels' performance, and consequently herd growth dynamics occurring under the pastoral management system. The reproductive efficiency of camels under natural conditions (climatic factors, low quality of feed and water scarcity) is generally regarded to be low due to relatively short breeding season and longer prepubertal, gestation, lactation-related anoestrus of 8–10 months, leading to a long inter-calving interval (Skidmore, 2005; Bhakat et al., 2005; Bakheit et al., 2009; Babiker et al., 2011; Abdel- Aziz et al., 2016). The full reproductive potential of camel has not yet been achieved and research into improving reproductive characters has been lacking. However, the development

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of camel racing in the Middle East has led to an increase in the value of racing dromedary camel and thus increased interest by improving reproductive efficiency (Skidmore, 2005). Therefore, the objectives of the present study are to provide baseline information for certain important reproductive traits of Arabic ecotype under the closed intensive management system, majorly fed on sugar cane industrial by-products and urea as concentrate ration and agricultural residues to investigate the impact of good nutrition and improved management system on camel reproductive performance.

Materials and Methods

Herd

The herd structure comprised of eight females and two males of the Arabic Darfur-ecotype as mature breeders. The animals were reared in a closed system with stall-fed and housed in sheds with the daily provision of feed and water. They were distributed according to age, and maintained under fare nutritional conditions and close veterinary supervision. Female camels were normally allowed to mate the bull-camel when detected in heat. Pregnancy was determined post mating by re-introducing the female to the bull at the 2nd oestrus period to verify conception.

The concentrate feeding offered to the animals was formulated based on sugar cane by-products (molasses & bagasse) and urea salt (0.46 N). Crushed sorghum grains, ground nut cake, wheat bran, mineral lick, normal salt and bicarbonates were provided (Table 1). These allowances were at the rate between 56-58% from the total daily feed intake, while green fodders were provided in forms of Abu-70 (*Sorghum bicolor*), Pioneer (*Sorghum bicolor* x *Sorghum sudanense* hybrid), Clitoria (*Clitoria ternate*) and Berseem (*Medicago sativa*).

Data

The data was obtained from the Tumbool Camel Research Centre (TCRC) herd's records to estimate the following reproductive traits:

1. The gestation length (days) from the last service to calving.
2. Open day period (days) from calving to the next successful service

3. Calving interval (days) between two consecutive calving
4. Number of services/conception
5. Calf sex

Statistical analysis

The data were subjected to analysis of variance using Statistical Package for Social Sciences (SPSS, 10.5). Comparisons of means were made using Duncan multiple range test (1955) as described by Kramer (1957).

Table 1: Approximate analysis of feed contents

Item	Percentage
Molasses	35%
Bagasse	25%
Urea salt	2%
Sorghum grains	12%
Ground nut cakes	12%
Wheat bran	12%
NaCl/ Ca(HCO ₃) ₂	2%

Results

Table 2 shows the mean gestation length, calving intervals, open period and number of services per conception through the 1st three consecutive parities. The results were found insignificant ($P>0.05$) between parities for all mentioned traits. Data showing the mean length of the gestation period (387.23 ± 7.90) revealed no significant difference. The average length of gestation for she camels delivered male calves was observed to be 386.67 ± 2.67 days, while the mean gestation length for those delivered female calves was 382.5 ± 2.63 days.

Calving interval estimated was found to be 556.20 ± 70.35 days (18.3 months or 1.52 years). Although calving interval trait was found insignificant between parity groups, higher record (562.00 ± 55.40) was found in the 3rd group. Open period in this study revealed an overall mean of 150.10 ± 59.3 days. Higher open period (189.50 ± 77.07 days) was recorded in the 3rd parity group compared to the 1st parity group (99.00 ± 00.00 days) although the difference was not significant. Mean number of services per conception achieved with the 1st parity group (1.00 ± 0.00) was lower than that with the 2nd and the 3rd parity groups.

Table 2: Influence of Parity on gestation length, calving interval, open period and number of services per conception

Parity	*Gestation length (days)	*Calving intervals (days)	*Open period (days)	*No. of services per conception
1 st - 2 nd (n=1)	382.00±0.00	656.00±00	99.00±00.00	1.00±0.00
2 nd - 3 rd (n=6)	388.67±8.29	531.00±74.30	128.80±26.40	2.83±2.13
3 rd - 4 th (n=6)	386.76±8.52	562.00±55.40	189.50±77.07	2.60±1.81
Overall means (n= 13)	387.23±7.90	556.20±70.35	150.10±59.30	2.40±1.70

* Not significant

Discussion

The overall mean of gestation length observed in this study (387.23 ± 7.90 days) is comparable to the findings of Musa et al. (2000) and Mohamed et al. (2001) working on Omani (384.20 days) and Tunisian Maghrebi (384.80 ± 14.00 days), respectively. Lower gestation length (371.25 ± 2.43 days) was recorded by El-Azab et al. (1997) in Libyan Maghrebi. The difference could be attributed to breed variations.

Average calving interval reported in the current study fell within the range of 18.5 months reported by Kedija (2007) in Ethiopian camels, Bakheit et al. (2008) in Arabic Kurdoan camels and Nagy and Juhasz (2009) in Emirate dromedary camels. Longer calving interval (40.8 months) was observed by Abbas et al. (1992) and 30.5 months by Babiker et al. (2011) for the same camel breed in the Butana area under traditional extensive management system. The difference could be attributed to good management, good nutrition and improved environment in the current study. Fertility rate determined in Sudanese camels under natural grazing habitat is very low due to un-planned breeding, poor management, malnutrition and short breeding season (Babiker et al., 2011). Improving feed and management conditions are very likely to increase the fertility rate in camels (Hammadi et al., 2009; Marai et al., 2009). In our previous studies, Husna et al. (2015) and Abdel-Aziz et al. (2016) found that productive traits of camel were highly improved by improving the nutritional, environmental and management system under semi-closed system.

Open periods in this study revealed an overall mean of 150.10 ± 59.3 days. The open period in the present study was shorter (118.00 ± 36.82 days) in the 1st parity group and tended to be longer during the 2nd and 3rd groups. However, the difference was not significant ($P > 0.05$). These results are lower than the findings of El-Azab et al. (1997) working on Libyan Maghrebi camels who recorded an open period of 288.98 days. The difference could be attributed to the variation in environmental conditions and management levels under which camels were raised. In the tropics and during summer, high environmental temperature and nutritional deficiencies cause camels to lose weight resulting in postpartum anoestrus and delayed re-conception. Probably improved nutritional and environmental conditions played an important role in shortening the open period. However, the mean number of services /conception (2.40 ± 1.70) in this study with a less number (1.0 ± 0.00) recorded in the 1st parity, was found to be lower than the findings of El-Azab et al. (1997) and Musa et al. (2000) who reported 3.78 and 5.36 services/conception respectively. Poor heat detection, lack of fertility control and seasonal availability of feed could be more important than any

other factor in prolonging the service period and thus increase the number of services per conception.

Conclusions

Reproductive performances studied under intensive management system indicated significant improvement compared to those studied under traditional extensive management system.

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