A COMPARATIVE STUDY ON SEXUAL AND MATERNAL BEHAVIOUR OF BACTRIAN AND DROMEDARY CAMEL

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ABSTRACT

The present study aimed to document the sexual and maternal behaviour of Bactrian camel and compare them with Dromedary camel. The sexual behaviour of male camel was comparable in both species except for absence of extrusion of soft pallet, absence of poll gland secretions and less vocalization and grinding of teeth in Bactrian males. The body weight loss during breeding season was more prominent in Bactrian, though poor availability of vegetation for grazing may be another contributing factor behind this observation. The copulation time in Bactrian is lesser than Dromedary camel. Estrous signs in both species were obscure. Maternal protective guarding behaviour appeared more prominent in Bactrian camel. In brief, the intensity and frequency of certain sexual and maternal behaviour vary in Bactrian and Dromedary camel though the basic features remains identical.

Keywords: Bactrian, Behaviour, Camel, Dromedary, Sexual

INTRODUCTION

Genus Camelus has two species, namely *Camelus dromedaries* or one-humped camel (Dromedary) and *Camalus bactrianus* or two-humped camel (Bactrian). The Dromedary camel thrives in hot dry climates of North Africa, Arabia and Southern Asia, whereas, the Bactrian camels are found in cold mountainous regions of Southern Russia, China, Mongolia and remote regions of the Gobi and Taklimakan deserts of Mongolia and Xinjiang (Grubb, 2005). In India, the population of *C. bactrianus* is restricted to the Nubra valley of Ladakh (a high-altitude, arid desert in the Trans-Himalayan region (Ranjan *et al.,* 2015). Both Dromedary and Bactrian camels are considered as seasonal breeders with a relatively short breeding season during the cooler months (Chen and Yuen, 1984). Dromedary camels exhibit unique sexual behaviour that includes loud vocal grunting and gargling sound, protrusion of a mobile soft palate from mouth, copious poll gland secretions and flehmen posture. However, sexual and maternal behaviour of Bactrian camel is not widely studied and reported. Hence, the present study aimed to evaluate the sexual and maternal behaviour of Bactrian camel and compare them with Dromedary camel.

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MATERIALS AND METHODS

During the breeding season, the sexual and maternal behaviour of Bactrian camel (n=54) maintained at camel farm, Chuchut, Leh and Bactrian camel herds of Nubra valley, Ladakh was recorded carefully after direct observation by scientists and camel farmers. Certain male sexual behavioural patterns like aggression, grinding of teeth, frothing from mouth, poll gland secretion and loss of body weight were categorized as mild (+), moderate (++) and severe (+++). Observations on sexual and maternal behaviour of Dromedary camels were recorded by scientists in camel herd of ICAR-National Research Centre on Camel, Bikaner, where around 300 Dromedary camels are maintained. The sexual and maternal behaviour of both Bactrian and Dromedary camel was compared.

RESULTS AND DISCUSSION

Both Dromedary and Bactrian camels are sexually active for only few months of the year, which is often referred as breeding or rutting season. In present study, the breeding season for dromedaries extended

from December to March, whereas, for Bactrian camels the breeding season extended from October to March. Similar observations in Bactrian camels were reported in a previous study from our centre (Vyas *et al.,* 2015). In China, the breeding season in Bactrian camel is reported from mid January to mid April (Chen and Yuen, 1984). The variation in breeding months for camels across the globe might be due to difference in meteorological parameters such as temperature and relative humidity (Al-Qarawi, 2005). The appetite of both Bactrian and Dromedary male camel during the breeding season declines drastically, resulting into the loss of body condition. In present study, loss of body condition was more prominent in Bactrian males (Table 1). The poor pasture availability for camels in Trans-Himalyan region during their breeding season, might be responsible, at least partially for this observation. The age at puberty in male Dromedary and Bactrian camel was observed at 3 to4 year and >4 year, respectively. In female Dromedary and Bacterian camel, age at puberty is achieved at 4 years and 3 year, respectively (Table 1). Similar observations were recorded earlier inDromedary (Musa *et al*., 1993) and Bactrian camels (Chen *et al.,* 1985).

During rutting season, aggression, moderate to high degree of pacing and anxiety are common in male. The intensity of aggression and the degree of pacing and anxiety was almost equal in both Bactrian and Dromedary camels. The grinding of teeth and making a whistling sound during the rut season are common in excited males of both Bactrian and Dromedary camel. The male camel moves the lower jaw on left and right side with both jaws closed together, grinds the teeth

Table 1: The sexual and maternal behaviour of Bactrian (n=54) **and Dromedary camel** (n=71) (+ Mild, ++ Moderate, +++ Significant)

Signs	**Bactrian camel**	**Dromedary camel**
	Male	
Rut signs in male	Quite prominent	Quite prominent
Extrusion of soft palate	Absent	Present
Aggression	+++	+++
Grinding of teeth	++	+++
Frothing from mouth	+++	+++
Poll gland secretion	+	+++
Loss of body weight	+++	++
Splaying of hind legs	Present	Present
Frequent urination	Present	Present
Yawning	Present	Present
Intromission of penis in vagina	Without assistance	With assistance
Copulation time	2 to 10 minutes	3 to 25 minutes
Thrusts	Intermittent	Intermittent
	Female	
Oestrous signs	Obscure	Obscure
Age of female at fist mating	2 - 3 yr	4 yr
Breeding season	October - March	December - March
Licking and inducing newborn for sucking milk	Almost absent	Almost absent
Protective guarding of calf	More prominent	Les prominent

A) Copious frothy salivation and extrusion of soft pallet (dulla) in male sexually excited Dromedary camel

B) Crouched urination posture with frequent urination in male Bactrian camel during the breeding season

C) Copulation in Bactrian camel

D) Copulation in Dromedary camel

E) Maternal protective guarding behaviour in Bactrian camel

F) Maternal protective guarding behaviour in Dromedary camel

Figure 1: Thesexual and maternal behaviour of bactrian and dromedary camel

and produces a typical squeaking whistling sound. The intensity of grinding and whistling sound was higher in Dromedary camel.

An excessive frothing from mouth was observed in both the species but the amount of froth was very less in Bactrian as compared to Dromedary camel. The froth is generally attributed to increased salivary gland secretions due to continuous grinding of teeth and frequent extrusion of the soft palate. The extrusion of soft palate (dulla) was observed only in Dromedary males (Figure 1A). The extrusion of the soft palate occurs all day long at an interval of 15 to 30 min and is accompanied by loud gurgling and grunting sounds. The extrusions become more frequent during excitement induced by presence of female. The dulla arises from the oroventral portion of the soft palate and is filled with air from the trachea. Bactrian camels do not extrude dulla which may be due to difference in anatomy of oral cavity between two species.

A frequent micturition was common in both species during rut. The male camel in rut assumes crouched urination position with hind leg spread apart and repeatedly emits small quantity of urine towards back. The frequency of micturition was higher in Dromedary males. Before, during, and after urination, opened hind leg posture was observed in both species (Figure 1B).The Tail flapping was also observed in both the species with frequency greater in Dromedary. During sexual excitement, the tail is held under the prepuce opening for a few seconds, the penis is stricken

rhythmically with up and down movement of tail and urine is splashed over the croup and surrounding area.

A copious poll gland secretion was observed at the time of copulation in Dromedary camels (Figure 1D). Male Dromedary have two tubulo-alveolar glands (poll glands) in the occipital region. During the period of rut or high testosterone levels, the gland enlarges and secretes a tarry dark secretion that colours the occipital area and anterior of the neck. The androgen concentration in secretion of poll gland is equal to that in blood (Yagil and Etzion, 1980). In Bactrian camel, poll gland secretion was not observed during rut season or even during copulation as the presence of functional poll gland in Bactrian camel is not well established. Another reason behind this observation may be presence of long hairs in the neck region hiding secretions of poll glands, if any (Figure 1C). The female seeking, sniffing and flehmen reaction was noted in males of both species. However, the frequency of occurrence was greater in Dromedary.

In both the species,mating takes place in sternal recumbency, the male squatting behind the female with hind legs flexed and forelegs extended on either side of the female (Figure 1C, 1D). The penis is rotated until the tip enters into vulva and then is inserted deep into the vagina. In Dromedary, occasional assistance by camel keeper was required at this stage, but in Bactrian camel no assistance was required. Several pushing movements with intermittent resting phases during copulation were observed in both species. The time duration of copulation varied in both species. In Dromedary, the average mating time was 5.5 minutes, but it can vary from 3 to 25 minutes. However, in Bactrian camels the average mating time was 3 minutes, but in some camels it can last as long as 10 minutes.

The behavioural changes observed in female camels of both species during breeding season were minimal. Some authors have reported the signs of estrous behaviour in Dromedary as restlessness, swelling of vulva, straddling hind legs and urination, vaginal mucus discharge, up and down movement of tail in rapid succession on the approach of the male or after hearing grunting and gurgling voice of male, receptivity to the male and mounting over other females (Vyas *et al.,* 2015). But in present study, signs of estrus were not conspicuous in both the species. In some Dromedary female, only restlessness, receptivity to the male and mounting over the other female was recorded. In Bactrian female, the estrous signs were more obscure and rather never observed.

The maternal instinct was very high in both species and mother was very possessive and protective for her calf in both Dromedary and Bactrian camel (Figure 1E, 1F). However, intensity of protective aggression was higher in Bactrian camel. In one case, it was observed that the mother Bactrian camel refused taking feed even after 48 h of parturition because the calf was not able to walk and suck the milk (Figure 1E). Calf licking was not observed, but the mother allows her calf to suck milk any time of the day in both the species.

From the present study, it can be concluded that sexual and maternal behaviour in Bactrian and Dromedary camel are unique for each species. The intensity and frequency of different behavioural patterns differ slightly, though the basic feature remains identical in both species.

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