



Document heading doi: 10.1016/S2305-0500(14)60060-9

## Reproductive status of *Camelus bactrianus* during early breeding season in India

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### ARTICLE INFO

#### Article history:

Received 3 November 2014

Received in revised form 15 December 2014

Accepted 18 December 2014

Available online 20 March 2015

#### Keywords:

Rut

Ovaries

Copulation

*Camelus bactrianus*

India

### ABSTRACT

**Objective:** To study the behaviour and reproductive status of the bactrian camel (*Camelus bactrianus*). **Methods:** This study was conducted at two places, Government Bactrian Camel Farm, Chusoot, Leh and Hundar village, Nubra valley, India, situated at higher than 10000 feet above sea level during the month of October, said to be initial period of breeding season. **Results:** The uterine horns were similar to that of dromedary i.e. between T and Y shaped. The ovaries were irregular but without follicle. The male camels were not showing any symptoms of rut or breeding season but were capable of mounting and copulating the sitting female. **Conclusions:** There is a need to carry out more research on reproduction in Indian Bactrian camel as they have become major attraction of tourists in Nubra valley and has become an important source of livelihood for the people who inhabit high altitude regions.

## 1. Introduction

The Bactrian camel [*Camelus bactrianus* (*C. bactrianus*)], better known as the type of camel with two humps or double hump camel is habitat of cold desert. The word bactrianus in *C. bactrianus* comes from Bactria, a kingdom at the foot of the Hindu Kush Mountains of ancient Persia<sup>[1]</sup>. With the changing times, the importance of livestock species changes in the socio-economic life of the people. In comparison to other domestic livestock species, Bactrian camel might have lost its importance but its contribution in the past to the development of human race cannot be denied. If the Silk Road may be described as the bridge between the Eastern and Western cultures, the Bactrian camel should rightfully be considered as the principal means of locomotion across

that bridge<sup>[2]</sup>. It has promoted progress in cultural and economic development of human societies, representing a great leap forward for human civilization<sup>[3]</sup>. In addition to transport the camel provides such valuable products as wool, meat and milk and is of great value to the people who inhabit the cold arid desert regions<sup>[4]</sup>.

Estimates of Bactrian camels are scant. The FAOSTAT does not provide population of Bactrian camel and has clubbed it with dromedary camel. The world population of Bactrian camel was estimated to be 1.4 million in 2000<sup>[5]</sup> with a steep decline to 0.8 millions in 2004<sup>[6]</sup>. The Bactrians are mostly confined in high land of Central Asian countries viz. Mongolia; China, Kazakhstan, Turkmenistan, North Eastern Afghanistan and Uzbekistan. The main habitat is Gobi and Taklamakan deserts of Mangolia and Xingjiang [1, 7, 8]. Bactrian is also found in northern Afghanistan and a few animals in Northern Areas of Pakistan<sup>[9]</sup>. This species has also been reported to a lesser extent in Iran and Turkey<sup>[10]</sup>. A small population is also present in Mangystau province of south-west Kazakhstan and Nubra valley (Ladakh) in India. Bactrian camel, native to Gobi desert of Asia was introduced as a

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draught animal in Ladakh by the travellers of Yarkand in the 19th century, through the silk route and since then this animal has adapted itself in this area due to its economic viability. A number of Ladakhi families who were involved in trading business were maintaining double-humped camels. However with the closure of silk route in 1950s, camels belonging to local traders were left in Nubra valley of Ladakh situated at 10 000 to 12 000 ft MSL and has become the home tract of double humped camel (*C. bactrianus*) in India. The door to door survey conducted by the Department of Animal Husbandry, Ladakh revealed that there were only about 56 double-humped prior to 1964, which got further reduced to 32 in 1978 and in 1986, the population was 47<sup>[11]</sup>. A previous survey by our Centre during 1996 revealed population of double humped camel (*C. bactrianus*) was 76 confined to the 4–5 villages of the Nubra valley of Ladakh. According to the Chief Veterinary Officer, Leh–Ladakh the population has now increased to 191, and the main source of nutrition is Sea-buck thorn (*Hippophae rhamnoides*)<sup>[12]</sup>. The bactrian camel is generally not found in temperature over 21 °C<sup>[13]</sup>.

Unlike the dromedary, which generates a great deal of scientific interest, the bactrian camel has so far been largely neglected by scientists in the western world. Given the extreme climate and inordinate language problems (Chinese, Mongolian and Russian), only very few western scientists have been willing to conduct their research on the spot<sup>[1]</sup>. Little information is available on reproductive efficiency of the Bactrian camel<sup>[14]</sup>. Long parturition intervals, long periods to return to service and low pregnancy rates in older animals are among the main obstacles to improved camel productivity and to genetic progress<sup>[15]</sup>. Breeding season in Mangolia begins at the beginning of the winter season<sup>[6]</sup>.

The aim of the present work was to study the behaviour and reproductive status of the Bactrian camel of Ladakh region during the month of October, said to be initial period of breeding season.

## 2. Materials and methods

The present study was undertaken in Leh district (Ladakh region) of Jammu and Kashmir a Himalayan state in North India. The observations were taken at two places, which comes under high altitude region i.e. at higher than 10 000 feet above sea level,

(1) Government Bactrian Camel Farm, Chusoot, Leh– It is situated at 340 10' N, 770 40' E 3500 meters (11,562 ft) feet above sea level. This is owned and managed by Department

of Animal Husbandry, Government of Jammu and Kashmir and partly funded by Government of India. Twenty five female and one adult male Bactrian camel are maintained at the farm.

(2) Hundar village, Nubra valley– A herd of 30 adult Bactrian male camels belonging to camel farmers were examined. These camels were used for riding and camel safari in sand dunes between Hundar and Diskit villages in Nubra valley. The sand dunes are near the Shayok and Siachen river.

## 3. Results

In general there was consensus among camel farmers and camel attendants that the reproductive activity is restricted in winters with maximum activity during mid or peak winter. The winters in Ladakh extend from October to March.

(1) In Hundar village, it was observed that the male camels were used for riding purpose and hence were not kept in company of female camels. They were not showing any symptoms of rut or breeding season as described by previous researchers i.e. protrusion of soft palate, aggressive behaviour, grinding of teeth, foam from the mouth, dark, foul smelling secretion from between the ears (i.e. poll glands), loss of bodyweight signified by tucked up belly, splaying of hind legs so that the tail can strike the penis, frequent urination, sprinkling of urine across the body by movements of the tail giving rise to a smell of urine<sup>[1]</sup>.

The authors did not observe any female camel in the village or its nearby surroundings. Farmers reported that they rear female camels completely under extensive management with almost zero in-put in the forest area near the Shayok river and they bring the females to their homes (village) only after calving. As the pregnant females remain unattended during advance pregnancy, there are many reports of drowning of the newborn calves in the river.

(2) At the newly established Government Camel Farm, Chusot, Leh, the reproductive management is in infancy stage, matings are not regulated or selective. The rectal examinations are seldom done. In fact the authors taught and trained the farm attendants (women) to restrain the female camels in sternal recumbency (sitting posture) for rectal palpation (Figure 1). Two females were examined per-rectum. One was pregnant with fetus in left horn descended in abdominal cavity. The other was non-pregnant; the uterine horns were similar to that of dromedary i.e. between T and Y shaped. The ovaries were irregular but without follicle.



**Figure 1.** Recto–genital examination of female *C. bactrianus*

The male camel was not showing any symptoms of rut or breeding season. But when it was directed to a female restrained in sitting posture, it rushed towards her, mounted over it and successfully copulated (Figure 2). Copulation lasted for 7 m 40 sec. The copulation consisted of intermittent thrusts as in dromedary.



**Figure 2.** A copulating male *C. bactrianus*

It gives primary indication that males are capable of mounting and copulation in the month of October which is beginning of winter but females do not have follicles.

#### 4. Discussion

The present study was aimed to examine the behaviour and reproductive status of the Bactrian camel of Ladakh region during the month of October, said to be initial period of breeding season.

Male bactrian camels, whose temperament is described as indifferent, become unpredictable and aggressive towards humans during the rutting season. The camel's upper incisor and its canines (two diastemas), which are particularly pronounced in the bactrian camel, are exposed, so that the large hooked teeth act as dangerous weapons. The distended

soft palate, which is the size of a tennis ball, protrudes from the animal's mouth. It grinds its teeth and large quantities of foam can be seen in the oral cleft. A considerable loss of appetite is observed, and sometimes the animals stop feeding altogether. A dark, foul-smelling substance is secreted from between the ears. The hind legs are splayed so that the tail can strike the penis. The animals also urinate more frequently, and the urine is sprinkled across the body by movements of the tail, which gives rise to a smell of urine<sup>[1]</sup>. But in present study the male camels at village Hundar, Nubra valley were not observed to show any of the above symptoms.

The male camel at Government Camel Farm, Leh mounted for successful copulation the female having no follicle on ovaries but restrained in sitting posture. It indicates that the cue for male Bactrian that the female is ready for copulation is "sitting posture". This also indicates that the male camels may not show symptoms of rut but are capable of copulation in October, the early breeding season. Whereas in dromedary the male camel normally select a female and often apply force with his neck to command her in sitting position<sup>[16]</sup>.

In general there was consensus among camel farmers and camel attendants that the reproductive activity is restricted in winters with maximum activity during mid or peak winter. The winters in Ladakh extend from October to March. The breeding season of the Bactrian camel in China is reported to be from mid–December to April<sup>[14, 15]</sup>. In Mongolia breeding season is reported to begin at the beginning of the winter season. Males during this time are often violent and may bite, spit, or attempt to sit on other male camels. A humped bull camel was tame and calm in non–breeding season<sup>[6]</sup>.

The female camel examined did not have follicle on the ovaries and fetus was observed in left horn. This is in accordance with previous findings that ovarian follicles appeared between late December and mid January<sup>[14]</sup>.

Neglected crops and livestock species are more important in their contribution to biodiversity and the livelihoods of the poor in difficult areas than widely believed hitherto. They merit more public sector attention than they have received. Characterizing minor species with greater clarity also contributes to food security by making possible a more coherent understanding of diet in periods of nutritional stress and thereby informing the responses of agencies dealing with emergencies<sup>[17]</sup>. The Bactrian camels are not further developed because they are in fact of limited value,

i.e. they do not show the appropriate economic characteristics to expand onto the larger stage of international trade. There are other factors contributing to their neglect: the difficulties of maintaining research funding, the inaccessibility of the regions where these species are produced, culinary and nutritional conservatism. There is a need to carry out more research on reproduction in Indian Bactrian camel as they have become major attraction of tourists in Nubra valley in Ladakh and has become an important source of livelihood for the people who inhabit high altitude regions where the options of earning the livelihood are limited.

### Conflict of interest statement

We declare that we have no conflict of interest.

### Acknowledgement

The authors acknowledge Director, National Research Centre on Camel, Bikaner for providing facilities for the present study.

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