



Reproductive behaviour and Natality of Chinkara (*Gazella bennetti*) in the Thar Desert, Rajasthan, India

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ABSTRACT

Chinkara is also known as Indian gazelle and is well adapted to harsh climatic conditions of Thar Desert. The adverse conditions influenced the activities and behaviour of Chinkara. Due to the warm climate, chinkara achieved sexual maturity early than the individuals of cold areas. Breeding activities were observed throughout the year but monsoon and winter were more favourable because of the availability of sufficient and nutritive food materials. Maximum mating episodes were observed in the Sudasari study site. Dominant male guarded the oestrous female and do not allow them to leave the territory till mating. The male tested the mating wish of the female by licking or sniffing of urine of the female. Maximum mating episodes were seen in the monsoon season. The Chinkara is a yearlong breeder but the highest natality was observed in monsoon and lowest in the summer season. The overall natality rate of a mixed herd of chinkara was 0.55 fawns/female. The study was conducted in Desert National Park on the reproductive behaviour of chinkara by using Questionnaires, interviews, and direct observation methods.

Keywords: *Chinkara, Reproductive behaviour, Natality, Thar Desert*

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INTRODUCTION

There are four subspecies of *Gazella bennetti* are distributed in the different parts of India of which three subspecies are found in the Thar Desert. According to Mallon (1) Indian gazelle is native to Afghanistan, India, Iran and Pakistan. They live in arid plain, hills, deserts, dry scrub and thin forest. In 2001, the population of Indian gazelle was estimated at 100,000 with 80,000 living in the Thar Desert. In Iran and Pakistan, the population of chinkara is scattered. Chinkara is probably, very rare in Afghanistan (2). Body weight, horn size and shapes are the characteristics of sexual dimorphism. Horns of Male are larger with circular rings, while in females these are thin and without rings (3). Indian gazelle is polygamous and competitions are seen among the male during mating season. Mounting frequency in the wild chinkara is higher than the captive. Mating process begins by touching the under parts of the female (4, 5). Indian gazelles are completed their gestation period within 5 to 5.5 months. Maximum births occur in April and sometimes twins are born (1, 6). Captive gazelle faces more stress than wild because of some unnatural sounds, limited space, artificial light, abnormal social groups, arousing odours, restricted movement etc. (7). Lattin et al. (8) reported that captive condition increased the stress and behavioural abnormality. Due to captivity, the level of stress-related corticosterone hormone is increased (9). Jaipal (10) noted fighting between adult males to find out the oestrous female for mating and during territory encroachment. Home range and territory is defended by the dominant male. It is mostly occupied to protect the necessary resources and minimize the interference of the other animals. The dominant male also demarks the boundary of territory by the visual and scent marking activities like thrusting the branches, gland rubbing, fecal plates and bed site path fixation. The odour of urine and semi-liquid substances of the gland may warn the other males and stop them from invade the territory (11). The poaching, hunting, perdition, availability of food sources and habitat disturbance influence the density of chinkara. The maximum motility of chinkara recorded during month of June (12). Chinkara wake up before sunrise and remain indulged in daily activities throughout the day but in winter it starts daily activity after sunrise. In summer they took rest from 9.00 am to 5.00 pm. The peak resting period was 10.00 am to 4.00 pm. The activity pattern and duration changes with changing climatic conditions (10).

MATERIAL AND METHODS

The study was conducted in Desert National Park which is situated in the Thar Desert of Rajasthan. It was established in 1980 as a sanctuary for the conservation of wild animals of the desert region especially (*Ardotisnegriceps*) Great Indian Bustard. Three specific sites i.e. Sudasari, Khuri and Kanoi were selected for the study of natality and behaviour of Chinkara (*Gazella bennetti*) in Desert National Park (DNP).

The climatic conditions of this region are very hot, with low humidity and low rainfall. Vegetations are xerophytic bushes, grasses and thorny forests. Questionnaires, interviews and direct observation methods were applied for this study. The mounting, numbers of mounting and different behaviours were observed with the help of the prismatic binocular 8A X 40 during the study period. The data on behavioural activities were collected from dawn to evening twilight according to Altman (13) sampling method.

RESULTS AND DISCUSSION

In the present study, it was found that females became sexually mature at the age of 16 months and males achieved this ability at the age of about 2.5 years. Schaller (14) reported that the young female of Chinkara conceived sexual maturity at the age of about 18 months. However, Dunham (15) studied the behaviour of chinkara in captivity and found that a female achieved it at the age of 15 months. We observed breeding activities throughout the year in the Sudasari study site in the Chinkara population. Breeding peaks were observed in monsoon and winter seasons due to availability of sufficient and nutritive food materials in that period. In monsoon, it was seen from July to September and in winter it was observed from January to March. In the Sudasari study site, mating activities were observed from the start of monsoon while in Kanoi and Khuri sites it was observed after July. The Sudasari is an enclosure where plenty of food materials and water were available throughout the year due to it all group members of the chinkara were healthy. Healthiness triggered the male and female Chinkara to mating. In this study site mating activity were seen throughout the year. In contrast to Sudasari, the Chinkara of Kanoi and Khuri sites obtained sufficient and nutritive food materials only in monsoon after the rain and it remained available till December due to which breeding activities started after July in these sites. Seasonal variation and availability of food material affect the reproductive behaviour of Chinkara. The breeding process was passed from different phases those are following.

Pre-testing phase – In the oestrous period the behaviour of female chinkara was observed to differ from other members of the herd. In this phase, the female was more active and moved towards the periphery of the territory. At that time, the dominant male followed them fast and guarded female toward the core point of the territory (Fig. 1). The dominant male remained with the oestrous female and did not allow them to leave the territory till mating. Some incidents of fighting were seen between the males to find out the female for mating.

Testing phase – After guarding, the male touched the vaginal region of the oestrous female with the help of the nose to test the mating wish of the female, at that time, the female released the urine and walked slowly in front of the male (Fig. 2). The male licked the urine and also sniffed urine and urine having ground. After sniffing urine, the male lifted up his head with half mouth open and remained motionless for some time (Fig. 3). Testing episodes were observed during the study period. This action was repeated many times by the male before mating.

Pre-mounting phase– The male raises the forelegs as a kick and hits a kick on the back portion or rear region and on the hind legs of the female to prepare the female for mating (Fig. 4). These actions were repeated many times by the male before mating. In this phase, more time was taken by the young bachelor female or female who passing from oestrous period in the first time.

Mounting and mating phase– The male rose up on its hind legs and mounted upon the female for mating but many times it did not succeed in mating. Incomplete and complete mounting episodes were observed (Fig. 5). The copulation ritual was completed within a few seconds with the final push drive. In some cases, satisfactory copulation was not completed in a single chance so two to three chances were taken by the male. The female was seen shrank (arched back portion) after successful mating and she walked slowly and kept her tail erect. Maximum mating episodes were observed in July and August during the monsoon season and in January and February during the winter season. It was not seen during the summer season. Aziz et al. (5) reported more mounting numbers in the wild chinkara population than in captives.

Post-mating phase– After mating, the female became normal and indulged in their daily activities. After completion of the gestation period, the pregnant female lived alone near the herd till delivery. The fawned female kept herself near the fawn for about 2-4 days. After 3- 4 days, the female rejoined the herd but visited the bed site of the fawn in intervals to feed the fawn. The duration of suckling was decreasing with the growing fawn.

Nativity- We selected the 7 mixed herd for the natality out of them three from Sudasari and 2-2 from Kanoi and Khuri study sites. Chinkara is a yearlong breeder but newly born fawns were mainly reported in July to September and December to February. During monsoon natality was 56.25%, in winter it was 37.50% and during summer it was 6.25%. The overall natality rate of Chinkara was 0.55fawns/female (Table 1). Rahmani (16) also observed a similar fawning period in the Chinkara population.



(1)

(2)



(3)

(4)



(5)

- Fig. 1. Male guarded the female
- Fig. 2. Male touches the vaginal portion of the female
- Fig. 3. Testing phase
- Fig. 4. Pre-mounting phase
- Fig. 5 Mounting phase

Table 1. Natality of Chinkara in selected study sites.

S.N.	MONTH	STUDY SITES			
		Sudasari	Khuri	Kanoi	TOTAL
1.	January	-	02	-	2
2.	February	01	01	01	03
3.	March	-	01	-	01
4.	April	-	-	-	-
5.	May	-	-	-	-
6.	June	-	-	-	-
7.	July	-	-	01	01
8.	August	03	01	02	06
9.	September	02	-	-	02
10.	October	-	-	-	-
11.	November	-	-	-	-
12.	December	01	-	-	01
	Total	07	05	04	16

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