# HERD COMPOSITION AND POPULATION DYNAMICS OF *GAZELLA BENNETTI* (SYKES, 1831) IN GOGELAO ENCLOSURE (NAGAUR), RAJASTHAN

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## Abstract

A population study of the Indian Gazelle (*Gazella bennetti*) was carried out during June and December 2000 in an enclosed area named Gogelao Enclosure at Nagaur District, Rajasthan. In all, 51 herds containing 242 individuals and four solitary males were counted in June and 45 herds with 248 individuals and one solitary male were recorded in December. Mean herd size was 5.06 and 5.61 individuals in June and December respectively. Density was 48.4 animals ($km^{-1}$) in June and 49.6 animals in December.

## Key words

*Population dynamics, Indian Gazelle, captivity, Gogelao Enclosure,*

## Introduction

The Indian Gazelle or Chinkara, *Gazella bennetti* (Sykes, 1831), is a common antelope in the plains to low hills of northwestern and central India, through the open lands of the Krishna River (Prater, 1971). It was found in high abundance in the desert region 30-40 years back. Presently, however, the numbers have declined to a great extent (Kankane, 1995). The objective of the present study was to find out the actual number of Indian Gazelle and other sympatric animals of Gogelao Enclosure.

## Study area and Methods

Gogelao Enclosure ($27^0$12'N & $73^0$43'E) is a plain scrubland on the northwestern side of Nagaur City, Rajasthan, with an area of about $5km^2$. It is well protected by fencing and is monitored by the State Forest Department. The enclosure is on the southwestern side of Bikaner-Nagaur-Ajmer Highway No. 89.

It has a very typical semi-desert ecosystem. On the basis of distribution of plant species the enclosure was divided into three subareas, namely, A, B and C, for observation. The plant species in subarea A are mainly *Prosopis cineraria*, *Capparis decidua*, *Lycium barbarum*, *Crotalaria burhia*, *Tephrosia purpurea* and *Zizyphus nummularia*. Apart from these species, *Zizyphus mauritiana* is present in subarea B and *Acacia tortolis* in C. The State Forest Department has planted *Acacia tortolis* surrounding the whole enclosure.

Large and medium-sized mammals e.g. Chinkara (*Gazella bennetti*), Nilgai (*Boselaphus tragocamelus*), Fox (*Vulpes* sp.,) Feral Dog (*Canis familiaris*) and Desert Cat (*Felis lybica*) were observed during the study.

No detailed study has been conducted about the composition and abundance of flora and fauna of this enclosure. A census was conducted twice in this enclosure from 3-5 June and 10-12 December 2000. Direct visual counting was done using line transect method (Anon, 1987; Sutherland, 1996) between 0600 and 1000hr in June, and 0700 and 1100hr in December. Herds were approached without disturbing the animals and counted with age-sex identification, using binoculars (8 x 50 and 10 x 50). Two transects were sampled, which were 70m to 150m apart depending on the density of big *Capparis* bushes (Rodgers, 1991). Earlier this enclosure had a wire fence, which is presently damaged at many places.

## Results

In June, a total of 47 herds of gazelles were noticed out of which 10 were all male herds, rest were mixed herds. Beside these herds four solitary males were noticed (Table 1). Of the 44 herds noticed during the December census, nine were all male herds, and 35 were mixed herds. One solitary male was observed (Table 2).

## Discussion

This was the first scientific population census of gazelle from this forest enclosure. According to the forest department, the

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***Table 1. The composition of Indian Gazelle (*Gazella bennetti*) herds in Gogelao Enclosure in June 2000.***

| Date of census | Subarea | No. of herds | Type of herd | Number | Male | Female | Fawn |
|---|---|---|---|---|---|---|---|
| 3.vi.2000 | A | 13 | Mix herd | 10 | 10 | 49 | 14 |
| | | | All male | 3 | 14 | - | - |
| | | | Solitary | - | - | - | - |
| 4.vi.2000 | B | 20 | Mix herd | 14 | 15 | 33 | 20 |
| | | | All male | 5 | 17 | - | - |
| | | | Solitary | 1 | 1 | - | - |
| 5.vi.2000 | C | 18 | Mix herd | 13 | 14 | 32 | 13 |
| | | | All male | 2 | 7 | - | - |
| | | | Solitary | 3 | 3 | - | - |
| Total | | 51 | | 51 | 81 | 114 | 47 |

Total = 242 gazelle in 5km$^2$ = 48.4 gazelle km$^{-2}$.

gazelles have been occupying this area since 15 years.

Although the study area of the enclosure was very small (5km$^2$), the population of gazelle was good i.e. 48.4 gazelle km$^{-2}$ in June and 49.6 gazelle km$^{-2}$ in December. Rahmani (1997) reported that the overall density of Chinkara in the Thar Desert was 0.88km$^{-2}$. This density varied from nil or as low as 0.01km$^{-2}$ to 31.60km$^{-2}$ (Lohawat area in Jodhpur). In another Bishnoi populated area Phitkasani-Guda, he observed 24.40 Chinkara km$^{-2}$.

Distribution of individuals in each herd was different and varied from one gazelle to 12 and mean herd size was 5.06 individuals per herd in June (summer) but during December (winter) census individuals in each herd were slightly higher than summer and varied from two gazelles to 14 and mean herd size increased to 5.61 individuals per herd. According to Sharma (1977) the Indian Gazelle lives in herds of five, eight or 11 and up to 25 animals. According to Stockley (1936), mostly herd size in Chinkara ranged from two to about 10 but largest was of 23 individuals. Jakher and Dookia (2000) also reported a 24-member herd in Alai, Nagaur. In the study during June, the largest herd comprised of 12 individuals, located in subarea A and smallest herd (mixed

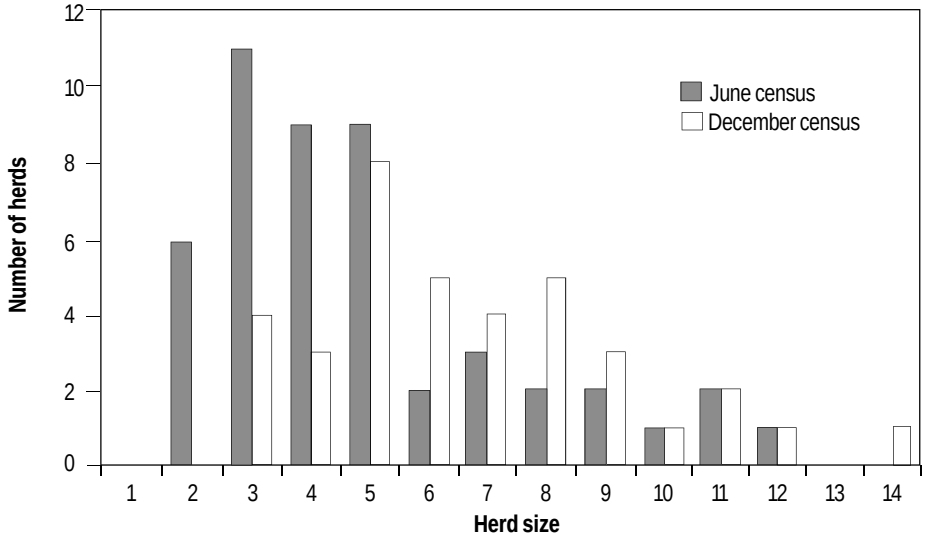


***Figure 1. Comparison of herd size in June and December, 2000.***

***Table 2. The composition of Indian Gazelle (*Gazella bennetti*) herds in Gogelao Enclosure in December 2000.***

| Date of census | Subarea | No. of herd | Type of herd | Number | Male | Female | Fawn |
|---|---|---|---|---|---|---|---|
| 10.xii.2000 | A | 11 | Mix herd | 8 | 9 | 52 | 26 |
| | | | All male | 3 | 11 | | |
| | | | Solitary | - | - | - | - |
| 11.xii.2000 | B | 17 | Mix herd | 13 | 21 | 35 | 12 |
| | | | All male | 4 | 19 | - | - |
| | | | Solitary | - | - | - | - |
| 12.xii.2000 | C | 17 | Mix herd | 14 | 14 | 34 | 10 |
| | | | All male | 2 | 5 | - | - |
| | | | Solitary | 1 | 1 | - | - |
| Total | | 45 | | 45 | 79 | 121 | 48 |

Total = 248 gazelle in 5km$^2$ = 49.6 gazelle km$^{-2.}$

herd) of two members (1 male and 1 female) were sighted six times in different localities of the enclosure. But in winter the largest herd comprised of 14 individuals also noticed in subarea A and smallest herd (mixed herd) had four individuals (1 male, 2 females and 1 fawn) sighted three times. No solitary female was sighted. As the herd size increased the number of herd decreased (Fig. 1).

The individuals were few in various herds during June whereas number increased in various herds in winter season. In summer, scarcity of food probably caused competition and restricted the herd size.

Sex ratio in adults was 1 male: 1.41 females in summer and 1 male: 1.53 females in winter. Rahmani (1990) reported a ratio of 1 male: 1.3 females in Sudasari Enclosure (Desert National Park, Jaisalmer).

Forty-seven fawns were observed in summer and 48 in winter. The hornless small individuals were considered as fawns. The presence of different sized fawns indicated that this animal breeds throughout the year. However, more young fawns were recorded during December.

Other sympatric species of animals were also recorded, including two Desert Foxes (*Vulpes v. pusilla*), six Common Foxes (*V. bengalensis*), one Desert Cat (*Felis lybica*) and seven Village Dogs (*Canis familiaris*) which probably are the main predators in this enclosure; 21 Blue Bulls (*Boselaphus tragocamelus*) (8 males, 9 females and 4 young ones), 14 Grey-naped Hares (*Lepus nigricollis*) and many gerbills were also sighted.

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