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POPULATION STRUCTURE OF NILGAI (BOSELAPHUS TRAGOCAMELUS) IN THE SEMI ARID REGION OF THE THAR DESERT

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ABSTRACT

The Thar Desert is spread over twelve districts of Rajasthan. It has divided into arid and semi arid region. Study of population structure of Nilgai (*Boselaphus tragocamelus*) was conducted in semi arid region near Jodhpur city by using the line transects and direct count methods. The nilgai adapt in dry and hot environmental condition of desert. Population of nilgai lives in small herd (group). The grouping behaviour minimize the threats and provides the safe environment for survive. Two types herd such as bisexual herd and all male herds were observed in the nilgai population. Bisexual herds were comprised of adult dominant male, recessive males, adult females, calves, sub adult males and sub adult females while all male herds were composed of males of different age groups. Mixed (bisexual) herd size generally varied from 2 to 7 individual in the study area. The sub adult males of mixed groups were discarded by the dominant male of mixed herd. The herd size was influenced by different factors such as human activities, availability of water and food sources. The largest herd size was observed in monsoon while smallest herd size in summer season. Density of nilgai population in study area was 0.54 individuals /sq km. The adult male to adult female sex ratio (1: 1.24) tilted towards the adult female while adult female to sub adult sex ratio (1: 1.16) bent in favour of sub adult. The nilgai is yearlong breeder but maximum calves were observed in monsoon season and natality rate was recorded 0.51 calves / female.

Key words: Nilgai, Herd, Density, Sex ratio, Season

INTRODUCTION

Nilgai (*Boselaphus tragocamelus*) are distributed throughout the Thar Desert. Blue bull (nilgai) is native to India, foot hills of Himalaya in Nepal and north-eastern Pakistan (Mirza and Khan,1975; Dinerstein, 1980).It is also found in some region of southern north America whose climatic condition and habitat are similar to India (Ables and Ramsey1972; Sheffield et al.1983) and in south Africa (Lever,1985). It exists in different types of habitats but prefers the area of bushes with scattered tree and grass having open plain ground. Generally it avoids the thick forest (Frank, 1929; Prakash, 1956; Prater, 1980 and Majupuria, 1982). It is larger antelope and shoulder level height about up to 150 cm in male. The fore limbs are longer than the hind limbs. Its body length is 180- 230 cm. Tail length is about 50 cm with white colour tip. Adult male is blackish grey to bluish grey in colour with horns. White spots are found on different parts of the body bellow the chin, both sides of cheek and inside the ears. Lower surface from chest to tail are also white. The colour of adult female, calf, sub adult male and sub adult female are brown but white spots are similar to adult male (Schaller, 1967 and Blanford, 1888). The strong gregarious habit is not found in nilgai but they live in small groups. The size of groups changes according to season and availability of basic resources. Sometimes sub adult males are discarded from the herd by the dominant male (Jaipal, 2012). Nilgai is polygamous and dominant male remain with small group of females (Schaller, 1967). Mortality rate remains similar both in male and female but it is found higher up to age of 3 years (Brown, 1976).

MATERIAL AND METHODS

The study area is situated near Jodhpur city in semi arid region of the Thar Desert at 26.1130º N to 26.1950º N and 73.10º E to 73.14º E. The area is semi arid and variations were observed in diurnal and seasonal temperature. The January and February are coldest month and temperature falls down to 2º in night in these month while May and June are very hot and temperature rises up to 46º in day time. Average rain fall is scanty and varies from 100 to 500 mm. The Vegetations are xerophytes and consist of drought resistant thorny bushes and scanty scattered trees. Grasses and herbs are found only in monsoon season. Main plant species are *Acacia jacquemontii, Maytenus emarginata, Capparis deciduas, Calotropis procera, Prosopis cineraria, Ziziphus sp., Arva javanica, Prosopis juliflora, Salvadora sp., Aristida sp.* The *Gazella bennetti, Vulpes vulpes pusilla, Vulpes bengalensis, Varanus sp., Herpestes edwardsii, Funambulus pennanti*, *Tatera indica* faunal species are found here. The study was carried out from January 2017 to December 2019. The 8A X 40 prismatic binocular was used throughout the study period to count and identify the sex and age of the member of each herd of nilgai. The data related to herd composition, sex ratio, density, natality and mortality were collected throughout study period by direct observation method. The age and sex of each member of herd were identified for the composition of population of nilgai in study area. Density of the nilgai was calculated by using the line transects method. Total 30 transect were laid randomly in the study area. The length of each transect was 7 km and width was 1km. Total 210 km distance was travelled on the feet and data were collected in different seasons by direct count method of Rodgers (1991). The density was measured through analysis of collected data.

RESULTS AND DISCUSSION

HERD SIZE AND COMPOSITION

During study period 93 mixed (bisexual) herds and 11 all male herds were noticed. Besides these herds the 14 solitary males were seen. In summer season 40 herds were observed of which maximum herds (18) were composed of two individuals. During winter season 33 herds were noticed and changes were seen in herd size and numbers of herd. In monsoon season numbers of herds were decreasing but size was increasing. Maximum (9) solitary male were noticed in summer and minimum (2) in winter season (Table 1). The largest size mixed herd was composed of **7** individual**.** Mixed herd size varied from 2 to 7 individual in the study area in different season. The mean herd size was 3.1 individuals. Herds size were changing from season to season. The herd size

increased in monsoon season and it was gradually decreased in winter season and in summer it became so shorter. Maximum numbers of large herds were seen in monsoon season while maximum numbers of small herds were observed in summer season (Figure 1). The herd size was influenced by human activities, availability of water and food sources and behavior of dominant male. In summer the nilgai face the scarcity of food and they scattered in field in small groups to find the food. The herd size also changed due to human activities. In monsoon food availability were high hence member of the herd did not leave the herd. During monsoon season the nilgai were seen in agricultural field in morning and night. The composition of this population was carried out in study area. The mixed herd was comprised of adult males; adult females sub adult males, sub adult females and calves while all male herds were composed of males of different age groups. The adult male was observed in and around the mixed herd. Sometimes the mixed herds were seen without adult male. The composition of the population was as of 23.16 % adult male, 28.73% adult females, 33.43% sub adults and 14.66 % calves (Table 1). Goyal and Rajpurohit (1998) reported bisexual group of 8-20 individual in winter season. Chhangani and Robbins (2008) recorded the herd size of bisexual herd from 4- 15 individual (mean herd size 6 animals) in Kumbhalgarh wild life sanctuary. Chopra (2010) reported mixed herd size comprised of 3- 6 individual in Saraswati wild life sanctuary, Haryana. Jaipal (2012) noted small size mixed herds those were composed of 2-6 individual in Desert National Park, Jaisalmer.

Density

Density of nilgai population in study area was 0.54 individuals /sq km. Jaipal (2012) reported 0.25 animal/sq km in Desert National Park in Jaisalmer. The density of present study is higher because study area is semi arid and situated near wild life lover (Bishnoi) dominated villages so population were higher in the area. However Goyal,(1999) reported 1.09 animal/sq km in Nagour, 1.06 animal/sq km in Pali and 0.50animal/sq km in Jodhpur.

Sex ratio

Sex ratio was 1 adult male: 1.24 adult female, 1 adult female: 1.16 sub adult, 1 adult female: 0.51calf. The sex ratio show that the percentages of adult female was more than the adult male and the numbers of sub adult were higher than the adult female. These ratios indicates higher reproductive potential and fast growth rate in the nilgai population. Jaipal (2012) obtained the adult female to calf ratio (1:0.50) in desert national park and Goyal (1999) also found 1:0.51 female and calf ratio around Jodhpur the both ratio are similar to present finding. Goyal, (1999) and Jaipal (2012) noted the male to female ratio (0.84: 1) and (1:2) respectively in their studies.

Natality and mortality

During present study breeding activity were seen throughout year but maximum calves were noted in monsoon season especially in month

Table 1. Composition of Nilgai population in study area

Seasons	Total no. of herd	Type of herd	Total no. of individuals	Adult males	Adult females	Sub adults	Calves
Summer	40	Mixed	105	15	36	42	12
		All male	13	9	-	4	-
		Solitary	9	9	-	-	-
Winter	33	Mixed	101	19	32	34	16
		All male	4	2	-	2	-
		Solitary	2	2	-	-	-
Monsoon	31	Mixed	98	16	30	30	22
		All male	6	4	-	2	-
		Solitary	3	3	-	-	-
Total	104	-	341	79	98	114	50

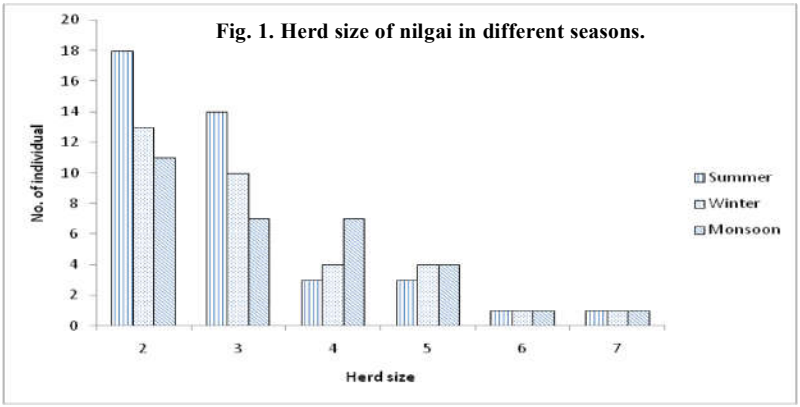

Fig. 1. Herd size of nilgai in different seasons.

of September. The natality rate was obtained 0.51 calves / female. Total five dead bodies of nilgai were seen of which 3 were calves and 2 adult. Goyal (1999) noted the breeding activity throughout year in nilgai and calves were seen round the year. Jaipal (2012) recorded more young calves in monsoon season and obtained the first year natality rate 0 .40 calves / female and in second year 0 .50 calves / female

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