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Research Article

STATUS AND DISTRIBUTION OF WILD GAUR (BOS GAURUS) IN NILGIRI NORTH DIVISION, NILGIRIS, INDIA

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ABSTRACT

The Gaur *(Bos gaurus)* is vulnerable category on Red list and Schedule I species as per Wildlife Protection Act (1972) in India, distribution extends eastward from India to the indo Chinese region. Gaur population status and distribution was studied In Nilgiri North Division (NND) especially in Coonoor Range from February 2014 to March 2015.Secondary sources i.e. Gaur conflict data's collected from forest department since 2011 to 2014. The study carried out in 10 villages in and around Coonoor Range.i.e. BIkkatty-Ammakal Village, Kokkalada Village, Chambray estate, Mellur Village, Kolakombai Estate, Thoormattam estate, Katteri Village, Gregmore Estate, Trooke Estate, Archadin Estate etc. From the present study 73 Direct sighting consists of Adult females Gaurs 37% followed by 20% adult males,15% sub adult female,11% sub adult male,10% juveniles and 7% calf's were recorded during the study period. 14 Black bulls Gaurs (+5 years) were solitary males consisting of 4.4%. Group size of Gaur consist of Medium mixed herd (n=38), mean group size 6.50 followed by Small herd mixed (n=23), group size 2.91 and Big herd (n=22), 8.14 were recorded. Regarding Male herd, Single individual consist of 22% and More than two herds together 72% was recorded. This area I consist of 38%, Area II 40% of gaurs and area III includes 22% of gaurs occupying this area. As a result of habitat thrashing, absence of predation and easy accessibility of food, climate change influence of Gaur interested in countryside villages.

INTRODUCTION

India has the largest population of gaur in the world and with its large network of protected areas (PA) is poised to play a significant role in the conservation of this large bovid. (Wilson and Reader, 1993). The gaur is listed as vulnerable species according to the 2002 international union for conservation of nature and natural resources (IUCN) Red Data list. The true home of the gaur is the chain of undulating hills dominated by dry deciduous forests in western Ghats (Krishnan, 1972). It is distributed in south and south-east Asia, from India to peninsular Malaysia, occurring in India, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, China, Laos, Cambodia, Vietnam and Malaysia (Corbet & Hill, 1992). A bull Gaur may attain 6 foot 4 inches (195 cm) at the shoulder and may weigh up to 900 kg (Prater, 1980). Within India the western ghats are a major stronghold for gaur species In western Ghats including Nilgiris, Anamalais and cardamom hills and adjacent plateau. On the eastern sides its is found in the palani and dindugal hills, shandamangalam range, vellore border of Karnataka. The important gaur areas are Mudumalai and Anamalais in TamilNadu, Periyar and Parambikulam in Kerala, Bandipur, Nagarhole and Bhadra in Karnataka, Molem in Goa and Radhanagari in Maharastra. The review of literature clearly indicated lack of information of many aspects of the ecology of gaur (*Bos gaurus)* in Nilgiris. Hence the present study was conducted in Nilgiris with the primary objectives includes Gaur status countryside villages and their conflict issues, with special reference to Coonoor range, Nilgiri North Division, India.

Study Area

The Nilgiri Hills, located between 11010'-11030'N & 76025'-77000'E, are an off-shoot of the Western Ghats where the Eastern Ghats terminate. Human population consists of 37,983 covering of 88.7 Square kilometer are rural areas The geographical area of the Nilgiri District is 2,452km2, and the area covered by this report including forests in Kerala and the Coimbatore District in Tamil Nadu, is 3,000km2

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approximately. The Niligiris North Forest Division is located between the latitudes 11° 14' North and 11° 36' North and the longitudes 76° 31' East and 77° 1' East. The geographical area of this division is situated in Udhagamandalam, Coonoor, Gudalur and Kotagiri taluks of Nilgiris revenue district. Nilgiris North Forest Division falls under the Coimbatore Circle. The headquarters of this division is Udhagamandalam. The total forest area of this division is 54,722.806 ha with forest boundary of 138 kilometers. This region encompasses several forest types, which are mostly tropical wet evergreen, tropical semi evergreen, tropical moist deciduous and montane wet temperate types of forests (Champion & Seth 1968). This region is served by both the south-west and north- east monsoons, but there is considerable variability in rainfall and temperature in the different areas since elevation ranges between 200 and 2,600 m. The forest types occurring in the Nilgiris North Forest Division generally falls within the following groups like Southern moist deciduous forest subgroup (3B), Southern tropical dry deciduous forest subgroup (5A), Southern tropical thorn forest subgroup (6A). Champion and Seth have classified two more forest types under the sub group 11A (Southern montane wet temperate forest). They are i. Degraded stage of sholas (i.e. Southern montane wet scrub-type 11A/DS1) and ii. Degraded stage of grasslands (i.e. Southern Montane wet grasslands-type 11A/DS2.

METHODS

The present study was conducted by means of a questionnaire modified from Newmark *et al*. (1994) and Maddox (2003). The study was assessed the impacts of human-wildlife conflict in Nilgiri north division, from 2014 to June 2015. Before the start of the actual data collection, preliminary survey was conducted during mid-September in 2014. 10 villages were selected from the three represented BIkkatty-Ammakal Village, Kokkalada Village , Chambraj estate, Mellur Village, Kolakombai Estate, Thoormattam estate, Katteri Village, Gregmore Estate, Trooke Estate, Archadin Estate.. The questionnaire was designed to understand the situation of human herbivore conflict towards the conservation challenges in the area. The questionnaire consisted of a series of structured questions focusing on the following 1) village distance from the forest, 2) trends in problematic animals and their effect in consecutive years 3) level of awareness about the value of wildlife.

During field studies, the presence or absence of Gaur was ascertained by direct observation, indirect evidence such as footprints and dung, and damage signs were also considered by interviewing local forest department staff, villagers. For direct observation and indirect evidence, foot transects along existing and newly cut paths and trails, vehicle transects along roads and accessible tracks used.

A pair of binoculars and 10 X 50 and 10 X 46 telescopes aided observations with the Photographic evidences. The lines transect method developed by Burnham *et al* (1980) was used to estimate the Gaur population. This method has been widely used to estimate the herbivore population in south India (Baskaran and Desai, 2000). Depending on the number of individuals the herd size was categorized as: (1) Mixed Small herd: (1-4 individuals) (2) Mixed Medium herd: (5-9 individuals) (3) Mixed Big herd: (>10 individuals)and (4) Single male individual; Mixed male herd: (More than two herds together) Data on group size, age and sex composition were gathered during the density estimation study and gaur was classified into four major age classes i.e. calf, juvenile, sub-adults and adults based on coat color and height of the animal (Schaller, 1967).

Adult male: Sooty black in colour, enlarged dewlap. well diverged and converged tip of horn and prominent dorsal ridge, Adult female: Dark brown in colour, non prominent dewlap, less diverged but fully converged tip of horn, Sub Adult male: Black or brownish in colour, prominent dewlap, the diverged horn about to converge, Sub Adult female: Brownish black in colour (more black in thoracic portion and more brownish colour in the rump portion, dewlap absent, Juveniles: Brownish in colour with spike horn Calf: Golden brownish and can pass through between legs of its mother.

Official collection of information: Data on human-gaur conflict in previous years from 2012 to 2015 were collected from the local Divisional Forest Offices to make comparative study on gaur-human conflict in Nilgiri North Division.

Data analysis

The data were analyzed using SPSS version computer software program.

RESULTS

From the present study (n=73) direct sighting consists of 318 Gaurs in 10 different villages were recorded. Based on Gaur groups classification, 119 Adult females (n=54) consist of 37% followed by 20% adult males(n=46),15% sub adult female,11% sub adult male, 10% calfs, 7% juveniles, 14 Black bulls represent 4.4% gaurs recorded during the study period. Male female sex ratio of adult gaur consists of 1:2. The grouping structure for males contain one to four and females were one to seven.

Gaur group size classified as Medium herd mixed (n=38), mean group size (6.50±1.35) followed by Small herd mixed (n=23), (2.91±1.27) and Big herd (n=22), (8.14±3.69) recorded. Male herd sub classified as Single individual consist of 22% and More than two herds together constitutes of 72% were recorded. Maximum 16 gaur herds were recorded. Group II (5-9) constitute of 77.6% followed by 56% in Group III (>10) and 21% of Group I (1-4) were recorded.

Table 1 Area wise Gaur's mean proportion in NND

	Adult Male	Adult Female	Sub Adult Female	Sub adult Male	Juveniles	Calfs
OVERALL MEAN	1.37±0.74	2.20±1.29	1.10±0.30	1.20±0.49	1.10±0.30	1.15±0.45
AREA1	-	2.31±1.70	1.21±0.42	-	-	-
AREAII	1.43±0.87	-	-		1.13±0.35	1.18±0.60
AREA III	-	-	-	1.43±0.78	-	-

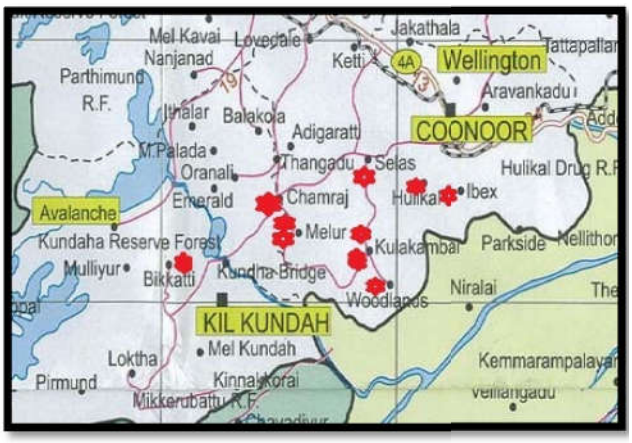

Figure 1 Study area in Nilgiri North Division, Coonoor Range

Small and medium group sizes were frequent but male groups very unusual under this area.

This area I includes BIkkatty-Ammakal, Kokkalada Village, Chambraj estate, Mellur Village constitute of 38% with the mean proportion of (16.00±8.86) were recorded. Bikatty-Ammakal village adjoining with reserved forest. Other animals include tiger (*Panthere tigris*) and leopards (*Panthera pardus*) signs were also recorded during the survey. This area II includes Kolakombai Estate, Thoormattam estate, Gregmore Estate surrounded by tea plantation owned by private owners. Mean group size (17.43±13.10) and constitute of 40% of gaurs occupying this area. Higher incidence of gaur conflict was recorded in Kolakombai Estate. Area III includes Katteri Village, Trooke Estate, Archadin Estate consist of mean group size (8.43±9.6) constitutes of 22% of gaurs occupying this area

DISCUSSION

The present study indicates that adult female number were more in comparison to adult male, Calf and Juvenile. Adult females had maximum influence on the group size. The adult male gaurs were found to influence the group only through adult females. This follows the same pattern as in the case of American bison (Meagher, 1973) and European bison (Krasinski, 1978), where the bulls neither dominate nor lead the group even during the rutting period. According to Spillett (1966) a population with more females than males generally has higher reproductive potential than the one that is predominantly composed of male. Our study also revealed same manners that population of female is almost double of the male gaur, so it indicates that the populations of gaur at Nilgiri Norht have a higher productive potential.

Also the behavioural nature of gaur, where adult bulls are seen wandering alone, separated from the herd have also been observed. Formation of bull groups in gaur seemed to be opportunistic when two bull gaurs met and they remained together only for a few hours to a few days. This factor would cause difficulty in identifying which exact individual it is, and which herd he is usually associated with. The extensive home range of adult bull's makes constantly following and monitoring them very difficult.

Present study showed that female mixed herds were common. According to Sankar, (2001) Gaur is a group living animal. Group formation and sizes can be influenced by foraging behaviour (Jarman 1974) and predation (Geist 1998). So breaking up into smaller groups during foraging would be a good strategy to avoid competition, especially when food resources are highly patchy or foraging conditions are not optimal.

Gaurs are one of many prey species for large predators, especially tigers Panthera tigris, leopards Panthera pardus, and dholes Cuon alpinus (Ngoprasert *et al*. Schaller 1967) reported that 50% of Gaur calf mortality was due to predation. Absence of predation leads population structure increasing in rural villages.

According to Datiko and Bekele (2011) and Mwamidi *et al*. (2012), the number and type of damage caused by wildlife vary based on the species, the time of year, and the availability of natural prey and crop raiding species. For instance, the distance between the farm and the forest boundaries and the neighboring farms are highly likely to affect vulnerability to crop-raiding by wildlife (Hill 2000). Our present study supports that wildlife conflict increasing in NND due to forest land converted to plantation over the entire landscape.

In areas with a high density of Gaur such as Indian subcontinents, crop raiding by Gaur is intense and some reports exist on human injury or death by Gaur attacks (Prashanth *et al*. 2013). Raiding frequency may be influenced by the relative abundance of preferred foods in the gardens or absence of adequate foods in the forest (Baranga, 2007). Gaurs conflict issues were predominant in entire landscape in Nilgiri North Division. Some of habituated Gaur group found in Kolakambai, Glendale, Trooke, Bengal, Bikkatty, Jakkanarai, Aravenu, Black bridge which is occupying in and around villages. Gaurs travell between the villages for searching food were common during dry season.

The present study showed that Gaurs were occupied in tea estates causing conflicts in the form of crop damages, human attack etc. While there are instances of people being injured and killed by gaurs. In the past four years from 2011 to 2014 the data shows that out of 53 gaurs human conflict recorded in NND alone including 3 human deaths. Gaurs causing road traffic and keeping awareness board should avoid unwanted accidents both for Gaurs and humans at Chambraj, Kolakombai and Kattry Villages. Area 1 and II, Gaurs are mostly habituated and occupyed in and around villages. Creating awareness and indentify the conflict gaurs would be useful for conservation of Gaurs species in rural areas.

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