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Report of an elegant species *Antilope cervicapra* (Linn.) in non-protected area of Shahabad, Bihar, India

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ABSTRACT

Indian Blackbuck (*Antilope cervicapra*) is an endangered species of antelope belonging to family Bovidae and class Mammalia. A preliminary survey was conducted and consequently reported the availability, distribution and conservation issues. Blackbuck is the most elegant, meagerly keen-sighted in major areas of Dumraon in Buxar district and shifted pattern part in southern in unfavorable condition to adjacent non-protected areas of Shahabad (Buxar, Bhojpur, Rohtas & Kaimur) districts in the outskirts of Bihar. Females and young once have a uniformed light brown coat with white patches on the face and underside. The female blackbucks lack horns. Males one having a pair of striking spiral horns that marked with rings and sweep backwards from the head look like V shaped. Adult male develops dark brown black shade on upper part and outside of the legs. Both sexes, possess a short tail which is compressed. Blackbucks are mainly grazer and prefer open areas such as grassland, wasteland and also found in marginal agricultural field. It feed on fresh tender leaves, grass, crops, cereals, vegetable & leaves of shrubs and trees. Poaching/ hunting and predation by human & stray dogs have been the major threats of Blackbuck in Shahabad. The Blackbuck habitat was also felt the threat due to the disastrous flood of the Ganga river. This study will be useful for academicians, wildlife professionals and as a matter of fact these areas may be develop as wildlife ecotourism center.

Key words: Blackbuck; Antelope; Wildlife; Status; Conservation; Threats; Kalahiran.

INTRODUCTION

India has a rich inheritance of mammalian wildlife and homebased to a large number of deer species, antelopes, goat-antelope with Bovid family and traditionally needs its protection (Prasad and Prabhakar 2020). The savanna and grasslands ecoregion of Indian Subcontinent are one of the preceding residual environments in Asia for many herbivores (Rahmani 2001). Six species of antelopes are found in India (Menon 2000). Blackbuck is a medium-sized ungulate went gradually extinct and usually live on exposed plain and open forests areas of India (Parter 1980). This extinction endemic species falls in the category of near

threatened, (Jhala 2016). The blackbuck has very old links with the Indian culture previously though its residence found disseminated throughout the whole Indian subcontinent but during 20th century its population got declined rudely and they are now nearly vanished in Bangladesh, Nepal, and Pakistan (Bashista et al. 2012). And, an attempt of their restoration has been taken in Pakistan and Nepal, IUCN SSC, (Meena et al. 2017). Blackbuck male have the dark brown to black colour on the dorsal (upper) part. Common name of the blackbuck is considered as Indian antelope (in English); Kadiyal, kala hiran, Krishna mirg and krishnasaar (in Hindi); Krishna jinka (in Telugu); and iralai maan, velimaan (in Tamil); Kaliyar, Redi (in

Gujarat) and Kalweet (in Marathi), Vats and Bhardwaj (2009); Krishna, 2010; Meena and Saran (2018). The outside unprotected southwestern areas of Bihar state specially the Buxar district is the best potential habitat for many stylish species of antelopes (Prasad et al. 2020). The Indian blackbuck is one of them and most endangered mammals reported by (Gehlot and Jhakar 2007).

Many investigations have been conducted and reported on population, distribution and conservation status of Indian antelopes in different part of our country (Bohra et al. 1992; Hundal, 2004; Meena et al. 2017). Although, blackbuck has disappeared from numerus areas due to its habitat destruction for anthropogenic development in India (Meena and Saran 2018). In the last century, there is great changes having taken place in the landscape area of Bihar specially in Shahabad (Bhojpur, Rohtas, Kaimur and Buxar) ecoregions. This South Western region is characterized by extreme hot during summer (water table go-down) and heavy rains reported during rainy season causing a fast decline in the population of wild mammalian species in this region and due to indiscriminate poaching and habitat loss as well, (Prasad et al. 2018). Moreover, Bihar has been receiving very little attention of the biologist due to severe cold & hot climate, in accessible habitat and lack of conscious awareness and local expertise. The blackbuck is really a significantly important fauna in India. No attempts have been made to document the availability along with their distribution of this stylish antelope over the non-protected area of Bihar especially in these species-rich areas of this region (Shahabad).

In this context of background, we assessed for the first time in making an effort to report the residential habitat, distribution and conservation of

blackbuck (*Antilope cervicapra*) who in turn successfully adapted in such type of extreme climate in an open unprotected area of Bihar.

MATERIALS AND METHODS

The number of Kishan Chaupals were attained in different blocks of the district Buxar. During the tenure of this visit's blackbuck were noticed and encountered many times and subsequently discussed with farmers regarding availability of blackbuck in this region. Many surveys were executed in the morning and evening time and in between consequently by motorcycle and walking around possible sites of their presence. The observation of these animals was made very carefully from a close distance and behavior of the animal were also observed according to Sale and Borkmullar (1988); Rodgers (1991) (Baranidharan et al. 2019). Some photographs were also taken and some necessary information's were also collected through the past history and attitudes of the people towards the antelope from the villagers those living near in the fringe area of Shahabad region.

Study area

Present study area of research work is Shahabad region with special reference to Dumraon, it is a sub-division of district Buxar of Bihar state having considerable population of wild mammalians. Among all municipalities of India, it has been one of the oldest princely states that lies between 25.55° N Latitude and 84.15° E Longitude at the average elevation of 61 meters (200 feet's). It is located 1.5 km South of National High way (NH-44; Ara-Buxar Highway). (Fig.1).

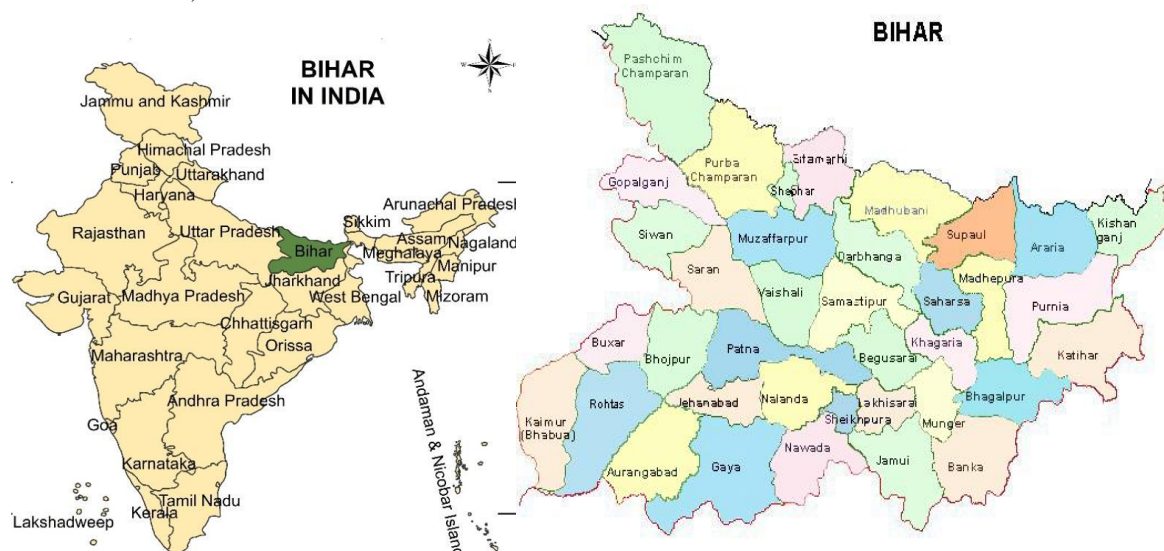


Fig.1. Map of study area in District Buxar, Bihar, India (source: Sathi, Planners, 2018)

The present investigation was carried out on Dumraon, district Buxar from January 2017 to December 2018. Four different sites were noted and

each site supporting blackbucks' populations. Out of the four, two sites namely Dumraon and Nawanager block areas of district Buxar were identified for detailed study of Blackbuck. The climatic condition of the intensive study areas of Buxar district are typically hot and heavy rain and also characterized by extreme high and low temperature during summer and winter respectively. The study area falls under the agroclimatic Zone III B, where the annual rain fall varies between 200 to 400 mm and maximum occurs during the months of July to September.

Study Animal

Blackbuck is the most elegant member and it is only living species of the antelope family (Blanford 1988). Indian antelope is characterized to order Artiodactyla, fall in to family Bovidae and subfamily antelopinae of class mammals along with goat, sheep and cattle. The generic name of *Antelope cervicapra* is derived from the Latin words' antalopus ("horned animal"). The specific name cervicapra is serene of the Latin words cervus ("deer") and capra ("she goat"), Palmer and Merriam (1904); Meena and Chourasia (2017). The systematic position in the animal kingdom of blackbuck is: Kingdom: Animalia, Phylum: Chordata, Sub-phylum: Vertebrata, Class: Mammalia, Subclass: Theria, Infraclass: Eutheria, Order: Artiodactyla, Family: Bovidae, Subfamily: Antelopinae, Genus: Antelope, Species: *Antelope cervicapra*. Ecologically blackbucks are grazer and generally favor uncluttered areas such as grassland. It also displays extraordinary kind of social organization and behavior. Blackbucks are slender with a head-to-body length of about 100-150 cm and they are around 70 to 80 cm height at the shoulder Nowak (1999). In fact, that the blackbuck differs from deer, though the blackbuck is an ideal species of antelope and possess a pair of permanent horns. But in case of the deer is an antler and their horns are deciduous, not permanent that is they fall off once a year to grow again.

RESULTS AND DISCUSSION

Wildlife possessions create a vibrant association in the persistence of the human species and have been a subject of considerable attraction, attention and researchable issues all over the world. In the present scenario of climate changes, the agroclimatic condition kept on uncongenial and forest became very thin. Over these areas the ambient temperature rises up to 45 °C during summer (May-June) & winter starts towards the middle of October and during January-February, temperature drip down to 4 °C. The average annual rainfall is 1021 mm reported by Sathi (2018). The wild animals and plants are important constituent of ecosystem and are essential to maintain equilibrium of various natural process like temperature, rainfall, soil fertility etc. (Harne et al. 2019). The cropping pattern of this region reveal the predominance of paddy, maize and wheat and pulses. The Shahabad areas supports moderate numbers of common trees like Mango, Seesum, Mahua, Bamboo and shrubs type of long grasses (Jhalas) are found near diara areas of river Ganga. Some wild ungulates like Blackbuck, (*Antelope cervicapra*), Blue Bull, (*Boselephus tragocamelus*), wild boar (*Sus scrofa*) species of mammals are found in fringe area of this region. Apart from ungulates other wild mammalians in these areas including Indian fox (*Vulpes bengalensis*), Jackal (*Canis aureus*), Forest cat (*Felis chaus*), non-human Primates like monkey (*Macaca mulatta*), Hanuman (*Presbytis entellus*), Rodents like porcupine (*Hystrix indica*) etc. were also found. The different types of Birds like Parrot, Partridges, Quails are also seen in this area, Male and females\ blackbucks have well marked and sharp sexual dimorphism. Body colour of adult males are dark with long spiral horns, while female and fawn are found yellowish brown. While the male is dark brown or almost black on its upper parts sparkly contrasting with white around the eye and on its underside, the female is light fawn above and white below. Male and Female have short and fine hair, details of which are presented in the (Table 1, Figs.2 & 3).

Table 1. Distinguished characters between male and female blackbuck (*Antelope cervicapra*)

Sl. No	Male	Female
1	Adult male bucks are blackish on the back, (dorsal sides), dark head along the front of the neck and lower belly (ventral) parts are white.	Adults' females are yellowish brown -pelage colored on the back (dorsal sides) along the outside of the limbs and lower belly (ventral) parts are white.
2	Males are slightly larger than females in size and weight	Females are smaller than males, in size and weight
3	Adult males' ranges in weight from 35 to 55kg (Meena & Saran, 2018)	While adult females' weight 30 to 40 kg (Meena & Saran, 2018)
4	Males possess a well-developed pair of horns diverging with spiral throughout, ringed and equally spread between the tip.	Female generally do not have horn. Even the few females that have horns lack the rings and spirals.
5	Males have 31 to 33 chromosomes (Effron, et al. 1976)	females have 30 to 32 chromosomes (Effron, et al. 1976)

Availability and Distribution

The increasing trend of uncontrollable human population, anthropogenic activities like industrialization and urbanization have been rapidly replacing natural resources and affecting the antelope numbers and dispersal, mostly concluded the steady shrinkage of their grazing and foraging (Prasad et al. 2021). Dumraon (Buxar) area sustain more wild mammals than other type of land habitat because these areas are found irrigated by the rivers, man-made canals that originated from some river (Indrapuri dam) in district Rohtas, and these areas especially Dumraon looks like grassland. These grasslands areas sustain a wide variety of wild mammals mainly herbivores which in turn support a population of carnivores, while scavengers such as jackal and vultures dispose of their remains. In this way the various species of herbivores can share the same habituated niche without competing to others for food and shelter for example, *Nilgai*, having both characters that is grazers and browser in nature they eat & prefer tops and the middle layers of the grasses. While blackbuck graze close to the ground. Tall grasses and shrubs are also found in open areas of Haryana Cattle breeding Farm (HCBF) Dumraon, non-cultivated areas between Raghunathpur railway station to Dumraon and some area of Navanagar. Tall grasses provide shelter for birth and new born fawn of antelopes and also a refuge for small animals such as birds and rodents. Many of which live in burrows due

to the lack of shelter from trees. Blackbuck population has been also reported in Maharashtra, Odisha, West Bengal, Uttar Pradesh, Punjab, Andhra Pradesh, Tamil Nadu and Karnataka with a few small pockets in central India, Hundal (2004); Meena and Saran (2018).

Important sites of Blackbuck

Blackbuck has been seen frequently during many in occasions different blocks in districts Buxar and boarders' areas of the other adjoining districts like (Bhojpur, Rohtas and Kaimur) of Bihar were considered as blackbuck important site. List of important sites for each block were provided below along with the village detail presented in (Table 2, and Fig-4).

The blackbuck has been largely sighted and it has also been observed southern shifting pattern distribution mainly in rainy season during survey period. Blackbucks were sighted and restricted to limited pockets within a range of 30 km in different block like Simri, Chakki, Barhampur, Dumraon, Buxar, Chausa, Rajpur, Itarhi, Nawanager, Caugai, Keshat etc in Buxar district, Bihar, However, most of the sightings were made very close to the field, village, Basoli side in Dumraon and Navanager block area. However, small numbers were also sighted in the adjoining boarder areas of Rohtas, Bhojpur and Kaimur districts.

Table 2. Blackbuck frequently sighting location

S. N.	District	Block	Location	Sighting
1	Buxar	Simri, Chakki, Brahampur, Dumraon, Keshat, Nawanager, Itrasi, Rajpur	Simri, Barkasidhanpur, Chakki, Parasia Arak, Gaighat, Nimaj, Twiniganj, Raghunathpur, Kaithi, Nandan, HCBF, Ariaon, Kuransarai, Nawanager, Nenua, Basoli. Baruna, Chunnila, Hakimpur, Rosen etc	Simri, Chakki and Brahampur (sighting mostly during summer season, stream hot) Dumraon area found in all season
2	Bhojpur	Shahpur	Banahi, Dalippur etc,	Rainy and winter season
3	Rohtas	Dawat	Koath etc	Rainy and winter season
4	Kaimur	Boarder areas	Adjoining areas of the district	Rainy and winter season

Our recent study reported the reports of residential population structure of nilgai antelope (*Boselaphus tragocamelus*) in Dumraon, its importance, utility of nilgai and the value of its products it may be succeeding economic contender of India. In the present study to determine the present distribution and abundance of blackbuck in these four districts of South Western in Shahabad region of Bihar and in selected study sites, several visits were made. Since the availability and spreading of blackbuck is restricted to around definite areas, the district wise population density was not assessed in present study. Blackbucks were reported in wide range of habitat, and graceful

gazelle attains greatest densities in semi-arid grasslands, Jarman (1974); Isvaran 2007; Meena and Chourasia (2017). The population of blackbuck in Nepal, the last surviving reported (184 individuals) in the blackbuck Conservation Area south of the Bardia National Park, (Bhatta 2008; Bashistha, et al. 2017). In Pakistan, blackbucks are very rarely been sighted along the border areas with India. They are kept in enclosures in the Las Suhana National Park for possible re-introduction, Mallon et al. (2001). It has been introduced to grasslands of the United States of America (USA) (Texas) and Argentina, (IUCN 2017).

In India, although blackbuck has disappeared from numerous areas due to habitat destruction for anthropocentric development, still they are increasing in many protected areas and areas specially dominated by Vishnoi communities in Rajasthan, Gujarat and Haryana, Gehlot and Jakhar (2007); Meena et al. (2017); Rahmani, (2001). The author encountered

many times *Nilgai* and Blackbucks near the Bhagar oxbow lake areas in Simri, Chakki, Gaighat and Brahampur, Dumraon during the survey period of research project during the summer season; these areas was found harbor of wild animals' species like *nilgai*, blackbuck, wild boars etc.



Fig. 2. Male



Fig. 3 Female



Fig. 4. Blackbucks heard standing near the paddy field Dumraon

Conservation measures

In the Dumraon, Buxar areas, the blackbuck is considered as an endangered condition because open non-protected areas are a primary requirement for the growth of the blackbuck population as the mothers' prerequisite space providing and protection to give birth and nurse the young one's till, they became neck strong enough. Another reason when native grass, herbs and plants are destroyed or annually cleared, the animal species depending on these floras and spraying with pesticides are also a big bottle problem and should be restricted. Construction work creates massive ruckus in habitable zone of the blackbuck which disturbs the ecosystem for animal population. Due to the predation by stray dogs killing off young fawns that need to hide among tall grass till they are nursed to get strengthened. Keeping these in minds population of dogs need in check and it is a necessity to protect blackbucks. It has been observed that during the rainy season female and fawns stuck into mud and they easily preceded by such type of dogs and wild jacal etc. because they have not horned, so protect or defense at their own, male blackbucks have been killed by human

/ poachers due to beautiful horns and other important part for smuggling etc. Grassland has to managed accordingly in rainy season to provide blackbuck with favored short grass and focus on decrease predation. At present, due to combined efforts of communities and forest department of different state, the population trend is towards positive side in various blackbuck habitats (Meena et al. 2017). In the present investigation it has been observed that due to its regular need of water, it prefers areas where the availability of water is perennial. (Prasad et al. 2020a) reported the availability of wild antelopes in Bhagar oxbow lake in Dumraon. In summer, upper areas like Rajpur, Nawanagar, Itarhi, Dumraon etc, most of the water and food resources gone dry up. Due to this unfavorable condition Blackbuck migrated towards human habitation and also from high-laying southern plain area of Dumraon to the low-laying Northern plain areas. The seasonal variation also causes a change in their diet and prey patterns, so these wild animals move from one place to other in search of prey which exposes them to different adverse conditions (Patterson et al. 2004). Plundering / shooting and habitat destruction

has seriously been affected the population of the blackbuck. It is usually hunted for its skin, flesh, meat and also for sports. Schallar (1976), reported that the blackbucks decline was caused by habitat destruction and hunting as well.

CONCLUSION

It is concluded that, blackbucks have hardly any natural predators of significance but feral/ pariah dogs probably account for more deaths of blackbucks than any other creature after man. So, a proper action plan is needed to control the increasing numbers of feral dogs near habitats of this elegant species. If appropriate steps for conservation are not immediately taken care of the blackbucks' depletion become likely to soon extinct from the open non-protected areas of Shahabad. Blackbuck have some unique and ecological function and they may be benefited for in many ways. In this area restoration and conservation of this species may be potential for development of ecotourism, it needs further to futuristic detail exhaustive study like behavioral ecology, density, characteristics of heard and reproduction etc. for making this planet a heaven.

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