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Group composition and habitat use by Blackbuck (*Antilope cervicapra*) in the Agricultural landscape of Telangana State

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ABSTRACT

In recent years, an increasing number of Blackbuck (Antilope cervicapra) populations have been observed in the Nagarkurnool, Jayashankar Bhupalpally, Sangareddy, Mulugu, Jogulamba Gadwal, Narayanpet, Wanaparthy, Nizamabad, Mahbubnagar, and Nalgonda districts of Telangana, particularly in farmers' fields. These animals have been causing significant damage to agricultural and horticultural crops at various stages, likely due to the depletion of natural habitats, food scarcity, and the unavailability of preferred dietary items. Furthermore, complaints from farmers in surrounding districts, especially those adjacent to the aforementioned areas and nearby villages, have exacerbated the issue, leading to severe man-animal conflict. In view of that, the study was conducted between June 2020 and March 2021, examined the mean herd size, demographic classes, sex ratio, percent occurrence, and habitat utilization of Blackbucks across seven districts of Telangana State. The findings revealed an average herd size of 8.4 animals, with herd sizes ranging from 6 to 12. Most herd size classes fell within the ranges of 2-7, 8-13, and 14-19, while fewer were observed in the 20-25 and more than 26 categories. The sex ratio ranged from 1:1.7 to 1:1.29, with females comprising the majority of herds. Various social groups were identified, with bachelor groups being the most prevalent, followed by pseudo harem, territorial males, females, and mixed herds. Habitat utilization analysis indicated a preference for open fields, followed by crop fields, thorny scrub, and rocky outcrops. These findings offer valuable insights into Blackbuck behavior and their interaction with agricultural activities in Telangana, facilitating better management strategies to mitigate human-wildlife conflict.

Keywords: *Blackbuck, Demographic Classes, Habitat Use, Herd Size, Sex Ratio, Percent occurrence, Telangana State*

INTRODUCTION

Blackbuck (*Antilope cervicapra*), a captivating gazelle-like antelope, belongs to the Bovidae family and subfamily Antilopinae. Native to India [7], it also inhabits regions in Pakistan, Nepal, and occasionally the United Arab Emirates [2, 6]. Known as krishnamriga or Oklahoma, it thrives in 80-100 isolated pockets within plains and semi-natural habitats [10]. Once common throughout the Indian subcontinent, its population dwindled due to various factors like excessive hunting, urbanization, and habitat loss, leading to human-wildlife conflict [3[.Currently listed as least concern (LC) by the IUCN, Blackbuck was previously categorized as near threatened (NT). It received the highest protection level in India under the Wildlife Protection Act, of 1972, and is listed in Appendix III of CITES. Several studies have explored Blackbuck's ecological and behavioral aspects, primarily in protected areas, with limited research outside these zones. [1, 4, 5, 8, 11]. Particularly in Haryana, notably in district Hisar, ecological studies on Blackbuck are scarce [13].

Recent studies conducted in Telangana and Haryana aimed to understand Blackbuck behavior in agricultural landscapes, shedding light on herd dynamics, sex ratios, and social behaviors. These studies provide valuable insights into Blackbuck ecology and aid in conservation efforts.

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MATERIAL AND METHODS

Study Area: The study of the blackbuck population was conducted across seven districts of Telangana State from June 2020 to March 2021. Observations were made in Nagarkurnool, Narayanpet, Jayashankar Bhupalpally, Jogulamba Gadwal, Sangareddy, Mulugu, and Nizamabad districts using a motor car for one day each month. The Khanal method was followed for population assessment. The study area experiences a tropical monsoon climate with three distinct seasons: hot (mid-February to mid-June), monsoon (mid-June to late September), and cool, dry (early October to mid-February). The average annual rainfall recorded was 750 mm, with almost 80% occurring from June to September. Temperatures ranged from 8°C to 45°C. Other ungulate species in the area include spotted deer (*Cervus axis*). The flora diversity includes species like Kiker (*Acacia nilotica*), Neem (*Azadirachta indica*), Shisham (*Dalbergia sisso*), Safeda (*Eucalyptus sp.*), Peepal (*Ficus religiosa*), and Prosopis (*Prosopis cineraria*), along with various herbs, shrubs, and trees. The study area comprises crop fields, open fields, thorny scrub areas, and rocky outcrops, with scrubby forests covering a significant portion, interspersed with fallow land and surrounded by crop fields.

Method: The study area was visited by motor car monthly from June 2020 to March 2021. Information about Blackbuck's presence was gathered through interviews and discussions with villagers, farmers, government officials, and scientists at the district level. Actual blackbuck sightings were confirmed by revisiting locations in different months and seasons. Population estimation is considered the highest count during the study period.

Population census involved direct observations using binoculars, including total population, herd size, sex ratio, social groups, and habitat use. Blackbucks were differentiated by age and sex classes, with age classes categorized into fawn (below six months), females, mixed herds (six months to one year), bachelors (two years and older), pseudo harem (energetic males), and territorial males. Herd size was estimated by dividing the total number of blackbucks counted by the total number of observed herds. Habitat use by different social groups was analyzed, with a preference observed for crop fields and open fields, followed by thorny scrub and rocky outcrop areas.

RESULTS AND DISCUSSION

The study encompassed seven districts (Fig. 1) across 18 villages, totaling 87 observations, with an average herd size of 8.4 animals. Herd sizes ranged from 6 to 12, with variations observed across districts, ranging from 1 to 31 (Table 1, Fig. 2). The majority of districts recorded herd sizes in the 2-7 and 8-13 range, with fewer instances of sizes exceeding 14 (Table 2). The same results were reported as the average herd size of 6 individuals counted during the study period of [9], around Jodhpur, Rajasthan.

Sex ratios across districts ranged from 1:1.7 to 1:2.9 (Table 3), with herds primarily composed of females (138) followed by males (79). This aligns with findings by [4] in Odisha, reporting a higher number of females.

Different social groups exhibited varying occurrences, with bachelor groups (23.0%) and pseudo harems (21.8%) being the most prevalent, followed by territorial males (18.4%), females (17.2%), and mixed herds (16.1%). Fawns with mothers constituted 3.4% of observations (Fig. 3). This is in accordance with a study by [12], who hassighted blackbucks more in groups than as solitary animals which reflects their partial social organization.

Habitat preference analysis (N= 870 blackbucks) indicated a preference for open fields (40.2%), followed by crop fields (36.8%), with lower percentages observed in thorny scrub (17.2%) and rocky outcrops (5.8%) (Table 4). These findings corroborate with [2] research in Udaipur, which reported blackbucks favoring open fields, agricultural lands, and cultivated areas.

Conclusion

The study on the blackbuck population distribution was successfully conducted across seven districts in Telangana state. The state's favorable climate for biodiversity has led to a healthy population of blackbucks in these districts, particularly thriving in agricultural areas. However, this has posed challenges for farmers as blackbucks frequently graze on their crops, leading to significant losses. Despite the suitability of the land for blackbucks, the absence of national parks, wildlife sanctuaries, and reservoirs in these districts has resulted in their random distribution and migration patterns. Urgent measures, such as establishing blackbuck reserves, are necessary to address this issue and protect both the blackbuck population and farmers' crops.

Future scope of the study

The blackbuck population, distribution and their habitat use, helps in planning the mitigation measures to avoid significant yield losses due to blackbuck in agricultural landscape.

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Competing interests

Authors have declared that no competing interests exist

Table: 1 Blackbuck population total observations, mean herd size, and range in the study area in seven districts during the period from June 2020 to March 2021

Name of the district	Total observations	Mean herd size	Range
Nagarkurnool (1)	6	6.5	2-18
Narayanpet (10)	41	10.4	1-31
JayashankarBhupalpally (1)	3	12.0	7-14
JogulambaGadwal (3)	8	9.0	2-15
Sangareddy (1)	5	6.8	3-11
Mulugu (1)	6	6.0	2-12
Nizamabad (1)	18	8.2	2-14
Total	**87**	**8.4**	**2-16**

Table: 2 Blackbuck herd size classes in seven districts

Name of the district	Herd Size					
	1	**2-7**	**8-13**	**14-19**	**20-25**	**>26**
Nagarkurnool (1)	-	5	-	1	-	-
Narayanpet (10)	1	17	9	7	4	3
JayashankarBhupalpally (1)	-	2	1	-	-	-
JogulambaGadwal (3)	-	3	4	1	-	-
Sangareddy (1)	-	3	3	-	-	-
Mulugu (1)	-	5	1	-	-	-
Nizamabad (1)	-	4	6	7	-	-

Table: 3 Sex ratio of Blackbuck population in seven districts from June 2020 to March 2021

Name of the district	Total males	Total females	Sex ratio
Nagarkurnool (n=6)	10	29	1:2.9
Narayanpet (n=41)	156	345	1:2.1
JayashankarBhupalpally (n=3)	11	25	1:2.7
JogulambaGadwal (n=8)	23	49	1:2.1
Sangareddy (n=5)	11	23	1:2.1
Mulugu (n=6)	14	22	1:1.7
Nizamabad (n=18)	79	138	1:1.9
Total	**304**	**631**	**1:2.1**

Table: 4 Variation in sightings of different types of herds of blackbuck in different districts from June 2020 to March 2021

Social Group	Crop fields	Open fields	Thorny scrub	Rocky out crops
Territorial male	5 (5.7)	7 (8.0)	3 (3.4)	1 (1.1)
Bachelors	6 (6.9)	12 (13.8)	2 (2.3)	-
Pseudoharem	11 (12..6)	6 (6.9)	2 (2.3)	-
Mixed herds	1 (1.1)	8 (9.2)	3 (3.4)	2 (2.3)
Females	9 (10.3)	2 (2.3)	2 (2.3)	2 (2.3)
Mother with fawn	-	-	3 (3.4)	-
Total	36.8	40.2	17.2	5.8

Fig: 1 The study area of blackbuck population with no. of sightings in seven districts in Telangana State

Image 1: Territory male
Image 2: A social group of female blackbucks

Fig 2: Blackbuck mean herd size in the study area

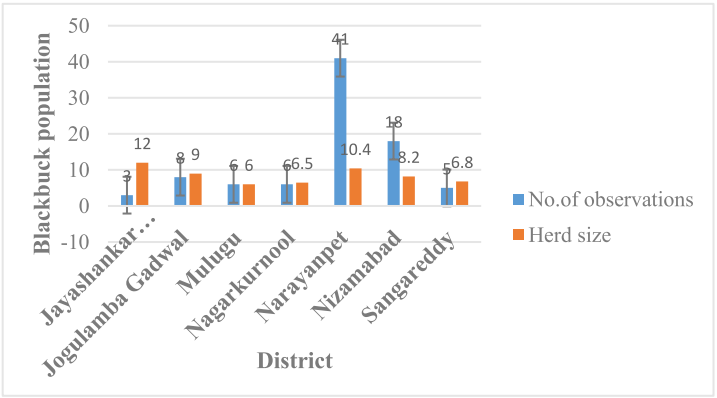

Fig: 3 Percentage occurrence of different age structure of blackbuck in seven districts from June 2020 to March 2021

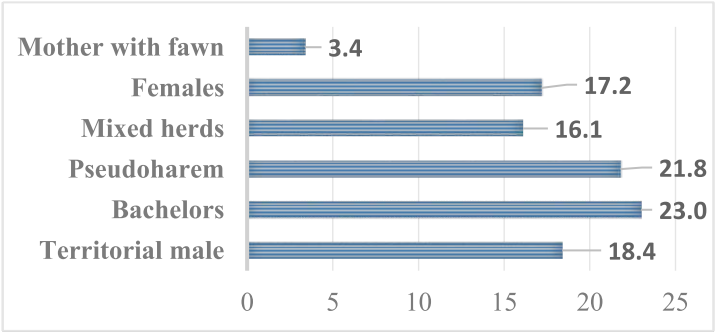

Image 3: A Mixed Herd of Blackbucks

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