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Crop Damage by the Blackbuck *Antelope cervicapra* in and around Chitta Reserve Forest of Bidar, Karnataka

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Received: 16 May 2016/Revised: 12 June 2016/Accepted: 29 June 2016

ABSTRACT- The Blackbuck *Antelope cervicapra* is an herbivore, feeding on a wide range of food plants, preferably of the grass family. They are the animals of open grassland, but frequently raid agricultural fields for food and water. The study was carried out on land use, crop damage and food of Blackbuck at Chitta Reserve Forest of Bidar district in Karnataka. These animals prefer open grassland with patches of forest surrounded by agricultural fields. Direct visual observations were made on the food of the Blackbuck and 46 species of food plants were recorded. The Blackbuck frequently raid the agricultural fields and causes extensive damage. The most affected crops are sugarcane, pigeon pea and vegetables; particularly in summer months.

The farmers in the area are facing loss of cash crops. To prevent the crop raid, fencing the forest area adjacent to the fields, planting greater number of wild food plants and creation of water bodies in the reserve forest is the need of the hour.

Key-words- Blackbuck, land use, crop damage, food plants

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INTRODUCTION

The Blackbuck Indian antelope, *Antelope cervicapra* is exclusive to the Indian subcontinent, and is one of the most elegant antelope species in India. It's striking sandy colour and beautiful spiralled horns make it unquestionably the most splendid specimen of antelopes. The Blackbuck was once very abundant, but constant persecution by humans has suddenly reduced its number and it is now considered to be a near threatened species. Since the inception of Wildlife Protection Act (1972) and through various management strategies, several of the Wildlife species, both in protected area, reserved forests and surrounding area, are recovering from a general overall decline, while a few have apparently become locally over-abundant and these are simply ecologically dislocated and are posing problems of various degree due to incompatible land use practices. [1]

The Blackbuck is essentially an animal of open, flat, or slightly undulating terrain and reaches its greatest abundance in areas covered with thorn and dry deciduous forests. With the destruction of forests, however, the animal has adapted to wasteland and agricultural fields. One of the serious hurdles faced by the farmers is the crop damage by the Blackbuck.

These animals regularly raid on crops, such as Peanut, Wheat, Barley, Millet and Black gram [2-4] In Bhetanoi village of Rajasthan, the average amount of agricultural land left uncultivated in fear of the Bucks is approximately 25% of the total land [5]. Some amount of crop damage was caused by the Blackbuck but it is meagre in comparison with damage caused by cattle, insect pests and poor harvest due to crop diseases [6]. With increased population in some districts, especially in Mehsana, Amreli and Bhavnagar, Blackbuck started damaging agriculture crops. Some villages in these districts have serious problem due to concentrated number [7]. Crop damage by Deer, Nilgai, Blackbuck, Wild Boar and Porcupine has been widely reported from almost all corners of India [8]. In Karera Wildlife Sanctuary, cultivation is done in small patches, separated by waste lands. Most of the crops grown in the segregated fields are damaged by Blackbuck [1]. Crop damage by Blackbuck is one of the major causes of conflict in West Nepal. Each year some people have to bear significant loss caused by these animals. Some 55% of the

Access this article online

Quick Response Code:



ISSN 2455-1716

Website:

www.ijlssr.com

DOI:

10.21276/ijlssr.2016.2.4.29

people of adjoining villages (Salapur, Pataha, Bhariya Gown and Kamaiyamukti Nepal area) reported crop damage by Blackbuck in the surroundings [9].

Blackbuck exists in Bidar, since its hunting was not a crime in India. It is found in good number with second highest population in Karnataka. In the district, the highest population was recorded in Bidar Taluka particularly in Bellur, Zamistanpur, Chitta and Backchowdi villages under Chitta Reserve Forest [10].

The present study mainly evaluates the land use and extent of crop damage, and enumerates the food plants of Blackbuck in the study area.

STUDY AREA

The study on crop damage and feeding activity was conducted in Chitta Reserve Forest and its surrounding areas which has the highest number of Blackbuck population in Bidar District.

The study area is the Chitta Reserve Forest and its surrounding grassland and farmland in Bidar district of Karnataka. It is located on the Deccan plateau between 17° 91' North latitude and 77° 50 ' East longitude at 669 metre above mean sea level. The climate of the district is generally dry throughout the year, except during the southwest monsoon which continues till the end of September. The month of October and November constitute the post-monsoon or retreating monsoon season. The winter season is from October to January and the temperature begins to fall from the end of November, December is the coldest month with mean daily maximum temperature of 27.3° C and mean daily minimum temperature of 16.4° C. From the middle of February both day and night temperature begins to rise rapidly. May month is the hottest with mean daily maximum temperature of 38.8° C and mean daily minimum of 25.9° C with the withdrawal of southwest monsoon in the first week of October. There is slight increase in day temperature but night temperature falls steadily after October, both day and night temperature falls progressively. The forest in Bidar division consists of dry deciduous and scrub type vegetation. The majority of existing forest of Bidar is manmade forest. The study was carried out in department of Zoology, Government First Grade College, Bidar, Karnataka, India.

MATERIALS AND METHODS

Observations were made on the crop damage and feeding activity of the Blackbuck. The study was undertaken for the first 5 days in a month for one year from January to December, 2014 and recorded the activity of the entire herd by following them from morning till evening, during one year of study the main focus was on the extent of crop damage caused by the Blackbuck in different months and season of the year as well as the identification of food plants and their feeding activity.

The crop damage and land used by the Blackbuck is calculated with the help of map and survey number provided by Tahsildar office of Bidar Taluka. Binoculars

(Bushnell 8X48 Magnification) are used for recording the food plants on which the Blackbuck feed. Night vision Binoculars are used for recording the movement and raid of the herd on agricultural fields during night time. Photography is done by Canon 5D Mark II and Power Shot SX 50X HS. Bicycle is used for following the movement of the herd.

RESULTS AND DISCUSSION

Observations were made on the feeding pattern, food and the extent of crop damage caused by the Blackbuck in Chitta Reserve Forest. We mainly concentrated on 3 herds with a maximum mean population of 99 animals. The variation in the number was noticed during the study period from January to December, 2014. The lowest number of Blackbuck was found in summer months and the highest number in monsoon (Table 1).

Table 1: Blackbuck population of Chitta Reserve Forest and its surrounding villages area in the year 2014

Months	Population variation (Mean SD, SE) N=5
January	84±1.12
February	69±2.02
March	56±1.42
April	66±2.8
May	67±2.13
June	77.2±1.58
July	81±1.46
August	87±2.37
September	85±1.58
October	99±2.35
November	86±1.09
December	87±2.21

The variation in number is due to split in the herd to seek food and water in summer month.

The land use by the Blackbuck is calculated and presented in Table 2.

Table 2: Open land and agricultural land used by Blackbuck in hectare during the study period 2014

Sl. No.	Name of the Village	Open land	Agriculture land	Total land used
01	Bellur	8.0	8.6	16.6
02	Backchowdi	2.4	8.2	10.6
03	Zamistanpur	1.6	4.2	5.8
04	Yedlapur	1.6	6.8	8.4
05	Amlapur	0.8	6.8	7.6
06	Mailoor	0.8	10.6	11.4
Total		15.2	45.2	60.4

They used 45.2 hectare of agricultural land and 15.2 hectare of open grassland. It is evident that the Blackbuck uses more agricultural land than grassland in the study area. As far as village-wise crop damage is concerned, the Bellur fields are the most affected (16.6 ha) followed by Mailoor (11.4 ha) and Backchowdi (10.6 ha).

The Blackbuck feeds on a wide range of food plants preferably of the grass family. They cause considerable damage to the agricultural crops adjacent to the grassland and forest [2-4]. We recorded 46 species of food plants on which the Blackbuck feeds. Among these 30 species are wild trees and grass, 6 species are agricultural crops and 10 species are vegetables. They feed on grass and leaves of wild trees, almost all types of vegetables and agricultural crops grown in the area (Table 3).

Table 3: Food plants of Blackbuck found in Chitta Reserve Forest and its surrounding villages in 2014

S. No.	Common name	Local name	Scientific name
Wild Trees			
01	Malabar nut	Adusogae	<i>Justicia adhatoda</i>
02	Benghal dayflower	Hittagani	<i>Commelina benghalensis</i> L.
03	Dill leaves	Sabbasigge	<i>Anethum graveolens</i>
04	Mauritian grass	Akku hullu	<i>Apluda mutica</i>
05	Carry cheddie	Kakegida	<i>Canthium parviflorum</i> Lam.
06	Lemon grass	Nimbe hullu	<i>Cymbopogon martini</i>
07	Dwarf morning glory	Vishnykranti	<i>Evolvulus alsinoides</i>
08	Indian chickweed	Jharasi	<i>Mollugo pentaphylla</i>
09	Potato plant	Chippulinelli	<i>Phyllanthus reticulatus</i> L.
10	False button weed	Guthari	<i>Spermacoce articularis</i>
11	Coat button	Baramasi	<i>Tridax procumbens</i> L.
12	Nut grass	Mugatisoppu	<i>Vicoa indica</i>
13	Babul	Babli mara	<i>Acacia Arabica</i>
14	Lead tree	Subabul	<i>Leucaena leucocephala</i>
15	Bermuda grass	Karki	<i>Cynodon dactylon</i>
16	Crow foot grass	Makri	<i>Dactyloctenium aegyptium</i>
17	Spiny Amaranth	Mulladantu	<i>Amaranthus spinosus</i>
18	Candle brush	Sheemigida	<i>Cassia alata</i>
19	Sickle pod	Chagate	<i>Cassia tora</i> L.
20	Jew's Mallow	Chunchalligida	<i>Corchorus olitorius</i>
21	Lilac tassel flower	Nachike mullu	<i>Emilia sonchifolia</i>
22	Cat's hair	Achchegida	<i>Euphorbia hirta</i> L.
23	Indian sarsaparilla	Sogade Beru	<i>Hemidesmus indicus</i>
24	Spear grass	Kareya shimpige	<i>Heteropogon contortus</i>
25	Asian indigo	Kennegillu	<i>Indigofera glandulosa</i>
26	Creeping launaea	Hattrakipalle	<i>Launae procumbens</i> L.
27	Common leucas	Tumbe gida	<i>Leucas aspera</i> L.
28	False mallow	Sannabindige	<i>Malvastrum coromandelianum</i>
29	Agumaki	Madras Pea Pumpkin	<i>Mukia maderaspatana</i>
30	Country mallow	Hirethutti	<i>Sida cordifolia</i>
Crops			
31	Sugarcane	Kabbu	<i>Saccharum officinarum</i> L.

32	Paddy	Bhatta	<i>Oryza sativa</i> L.
33	Soyabean	Soya	<i>Glycine max</i>
34	Jawar	Jola	<i>Sorghum vulgare</i>
35	Maize	Mekkejola	<i>Zea mays</i> L.
36	Wheat	Godhi	<i>Triticum aestivum</i> L.
Vegetables			
37	Tomato	Tamate kai	<i>Lycopersican esculentum</i>
38	Onion	Ulagadde	<i>Allium cepa</i> L.
39	Potato	Alu gadde	<i>Solanum tubersum</i>
40	Cauliflower	Hu kosu	<i>Brassica oleracea</i>
41	Pigeon pea	Togare	<i>Cajanus cajan</i>
42	Sun flower	Suryakanti	<i>Helianthus annuus</i>
43	Brinjal	Badane kai	<i>Solanum melongena</i>
44	Zinger	Alla	<i>Zinger officinale</i> L.
45	Chilli	Menasin kai	<i>Capsicum annum</i> L.
46	Cowpea	Alsandi	<i>Vigna unguiculata</i>

These animals invariably invade the fields every day either for food or water. The farmers in the study area are facing significant crop damage by the Blackbuck. The same problem is with the people of Bhetanoi village in Rajasthan where the Blackbuck raids on crop such as Peanut, Wheat, Barley, Millet and Black gram [1, 4].

The month-wise and area-wise crop damage was assessed (Table 4 & 5).

Table 4: Month and Village wise crop damage by Blackbuck in hectare during the study period 2014

Month	Crops	Bellur	Backchowdi	Zamistanpur	Yedlapur	Amlapur	Mailoor	Total
Jan	Sugar cane	00	0.4	0.6	00	00	0.4	1.4
	Vegetables	00	00	00	1.0	00	1.0	2.0
	Maize	00	00	00	00	1.0	00	1.0
Feb	Sugar cane	0.2	0.2	0.2	00	00	0.2	0.8
	Vegetables	0.2	00	00	0.2	0.2	1.0	1.6
March	Sugar cane	1.2	1.2	0.8	0.4	0.8	0.8	5.2
	Vegetables	0.2	0.2	00	00	00	0.4	0.8
	Maize	00	00	00	00	0.8	00	0.8
April	Sugar cane	1.6	1.6	0.8	1.2	0.8	1.6	7.6
	Vegetables	0.4	0.4	00	0.2	00	0.8	1.8
	Maize	00	00	0.2	00	00	00	0.2
May	Sugar cane	1.6	1.6	0.4	1.2	0.8	1.6	7.2
	Vegetables	0.4	0.4	00	0.4	00	0.4	1.6
	Maize	00	00	0.2	00	00	00	0.2
June	Sugar cane	0.2	0.4	0.2	1.0	0.8	0.4	3.0
	Vegetables	00	00	00	0.2	00	00	0.2
July	Sugar cane	0.2	0.2	0.2	00	00	00	0.6
	Vegetables	00	00	00	00	0.2	0.2	0.4
	Aug	Vegetables	00	00	0.2	0.2	00	00
Aug	Maize	00	00	00	00	00	0.2	0.2
	Pigeon pea	00	0.4	00	0.2	00	0.2	0.8
	Jowar	0.4	0.2	00	00	00	00	0.6
	Paddy	0.4	0.2	00	00	00	00	0.6
	Soyabean	00	00	0.2	00	0.2	00	0.4
	Sept	Vegetables	0.2	00	00	00	00	00
Sept	Maize	0.2	0.2	00	00	00	0.2	0.6
	Soyabean	0.2	00	00	00	00	0.2	0.4
	Pigeon pea	0.2	00	00	00	0.4	00	0.6
Oct	Vegetables	00	0.2	00	00	00	00	0.2
	Maize	0.2	0.2	00	0.2	00	0.2	0.8
	Pigeon pea	0.2	0.4	0.2	0.2	0.2	0.2	1.4
Nov	Vegetables	0.2	0.2	00	00	00	00	0.4

	Maize	00	00	00	00	00	0.2	0.2
	Pigeon pea	00	00	00	00	0.2	00	0.2
	Wheat	00	00	00	0.2	00	00	0.2
Dec	Vegetables	00	0.2	0.2	00	00	0.2	0.6
Total		8.6	8.2	4.2	6.8	6.8	10.6	45.2

Table 5: Crop damage by Blackbuck in hectare during the study period 2014

Crops	Months												Total
	J	F	M	A	M	J	J	A	S	O	N	D	
Sugar cane	1.4	0.8	5.2	7.6	7.2	3.0	0.6	00	00	00	00	00	25.8
Vegetables	2.0	1.6	0.8	1.8	1.6	0.2	0.4	0.4	0.2	0.2	0.4	0.6	10.2
Maize	1.0	00	0.8	0.2	0.2	00	00	0.2	0.6	0.8	0.2	00	4.0
Pigeon pea	00	00	00	00	00	00	00	0.8	0.6	1.4	0.2	00	3.0
Jowar	00	00	00	00	00	00	00	0.6	00	00	00	00	0.6
Paddy	00	00	00	00	00	00	00	0.6	00	00	00	00	0.6
Soyabean	00	00	00	00	00	00	00	0.4	0.4	00	00	00	0.8
Wheat	00	00	00	00	00	00	00	00	00	00	0.2	00	0.2
Total	4.4	2.4	6.8	9.6	9.0	3.2	1.0	3.0	1.8	2.4	1.0	0.6	45.2

The highest crop damage was noticed in the month of April (10.2 ha) followed by May (9.2 ha) and March (6.8 ha). The t- test showed that the crop damage is highly significant (P>0.02) in summer season than winter and monsoon (Table 6a & 6b).

Table 6 a: Season-wise crop damage (paired sample statistics) in the study area 2014

Season	Mean in hectare	N	Std. Deviation	Std. Error
Summer	7.65	4	2.85	1.42
Monsoon	1.55	4	0.62	0.31
Winter	2.10	4	1.72	0.86

Table 6 b: Paired Sample Test

Season	Paired difference							
	Mean	Std. Deviation	Std. Error	95% Confidence interval of the difference		t	df	Significant (2-tailed)
				Lower	Upper			
Summer and Monsoon	6.1000	2.70555	1.35277	1.7949	10.4051	4.509	3	.020
Monsoon and Winter	5.5500	3.27567	1.63783	.3377	10.7623	3.389	3	.043
Winter and Summer	-.5500	2.07445	1.03722	-3.8509	2.7509	-.530	3	.633

P>0.02

According to Jhala *et al.* [11] the Blackbuck occasionally needs drinking water, but our observation was shown that they need water frequently in summer season because the summer is very hot and most of the water sources are dried up in the study area. The grassland also is completely dried. Hence, the hot conditions force the Blackbuck to invade the agricultural fields for water and food. Table 5 shown that the most damaged crop in the area is sugarcane (25.8 ha)

and vegetables crop (8.4 ha). The Blackbuck prefers tender sugarcane crop which is more abundant in summer months (Fig. 1). They also cause significant damage to Maize (4.0 ha) Pigeon pea (3.0 ha) as shows in Fig. 2. They feed on these two crops right from sapling to fruiting stage. The most preferred crop of the Blackbuck is sugarcane. The reason may be that sugarcane belongs to grass family.



Fig. 1: Sugarcane crop at the early stage damaged by Blackbuck 2014

Considering the village-wise crop damage, as given in Table 4 the Mailoor fields are more affected (10.6 ha) followed by Bellur (8.6 ha) and Backchowdi (8.2 ha). In these villages the major crops grown are sugarcane and vegetables. They are in close vicinity of forest. The Blackbuck gains easy entry into these fields.

CONCLUSIONS

The present study reveals the extent of crop damage caused by the Blackbuck in different villages under Chitta Reserve Forest. Sugarcane pigeon pea and vegetables are the most affected crops. The Blackbuck raiding is common in summer months as these animals face scarcity of food and water in their natural habitat. To prevent the crop raid, fencing the area, planting the wild food plants and creation of water bodies in the reserved forest is the need of the hour.

ACKNOWLEDGMENT

I am grateful to my research supervisor Dr. Sanjeevareddy Modse, Associate Professor and Head, Department of Zoology, Government First Grade College, Bidar. Without his guidance and research knowledge, this work could not have been accomplished. My sincere thanks are due to Gulbarga University, Kalaburagi for selecting me as a research student in the department of Zoology. I thank the Principal of Govt. First Grade College, Bidar for providing me facilities for research, I also thank Karnataka Forest Department, Bangalore and Deputy Conservator of Forests, Bidar for granting me permission to conduct research work on the Blackbuck in Bidar forest. My sincere thanks are due to the Tahsildar, Bidar for providing information on survey numbers and the map of the study area. I also thank the farmers for providing input on crop damage.

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Fig. 2: Pigeon pea crop damaged by Blackbuck 2014

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