

Assessment of Faunal Diversity in Tal Chhappar Wildlife Sanctuary of Churu District in Rajasthan

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Abstract

The studies of faunal diversity in Tal Chhappar wildlife sanctuary were undertaken from May 2013 to June 2016. During the study 82 species belonging to 42 families of insects, 65 species belonging to 31 families of birds, 9 species belonging to 6 families of reptiles and 14 species belonging to 10 families of mammals were identified in the Tal Chhappar sanctuary and surrounding area. The antelope species Black buck, *Antelope cervicapra* is very common and abundant in the area, whereas other mammalian species are occasionally seen. The reptile species were mostly seen during the summer and rainy seasons. The results indicates that insects and Aves diversity are enough here but other faunal species of mammals, reptiles are moderate. Blackbuck, Uromastix and Demoiselle Crane are found in large number and these species along with other desert adapted mammals and birds exhibits a vivid and spectacular biodiversity which attract to visitors here. Insect diversity reveals that Lepidopteran and Coleopteran species are abundant and dominant in this area. According to the avian diversity index, the Accipitridae were the dominant family in the study area, followed by the Columbidae, Alaudidae, and Phasianidae. There were 52 resident species, 4 winter visitors, and remaining are occasional and migratory species surviving here. Five Accipitridae species are listed as endangered Vultures (*Gyps bengalensis* and *Neophron Pecoferis*) and a few other bird species are among those at risk. The study provides basic information on faunal diversity in the Tal Chhappar wildlife sanctuary of Churu district in Thar Desert.

Keywords: faunal diversity, assesment Tal, mothiya, insects, birds, reptiles, mammals, desert, endangered species.

Introduction

Faunal diversity is one of the most important components of global biodiversity. India is home to 7.6% of mammalian, 12.6% of avian, 6.2% of reptilian, 4.4% of amphibians and 11.7% of fish at global scale respectively. Sibley and Monroe (1990) reported 9702 species of birds belonging to more than 1800 genera surviving in the world. Out of which, the Indian subcontinent has near about 1250 species (Grimett et al., 1999). Out of 5416 mammalian species of globe, only 428 reported from India. The Thar desert are characterized by hot summer with heat wave (loo), cold winter, low and irregular rain fall, arid land, sand dunes, often occurs sand storms, salty rocks, largely barren area except for very sparse or seasonal vegetation. Besides this, the faunal diversity of Thar is distinctive and spectacular. Roonwal (1983) compiled the faunal diversity of the Indian desert and reported nearly 1,100 species from the arid districts of Rajasthan. Ghosh, Baqri and Prakash (1996) reports about 2,043 species from Protozoa to Mammalia surviving in the Thar Desert. Consequently, different workers have been studied the faunal ecology of the Great Indian Desert (Roonwal, 1970; Blanford, 1901; Pocock, 1939; Prakash, 1963; Roonwal, 1983; Rathore, 1984; Rahmani, 1989, Prakash et al., 1992; Rathore and Bhattacharya 2004; Tyagi and Baqri, 2005 and Sivaperuman et al., 2005 and 2008). A lot of work has been carried out on mammals by I. Praksh (1960) in western Rajasthan of Thar Desert. Much work has been carried out on bird species of Rajasthan by Saxena (2003), Sharma (1998), Changani (2002, 2009), Bhatnagar *et .al* (2011) and Koli *et. Al.* (2011), Sankar et al. (1993), Shahabuddin (2006) and Sultana (2013).

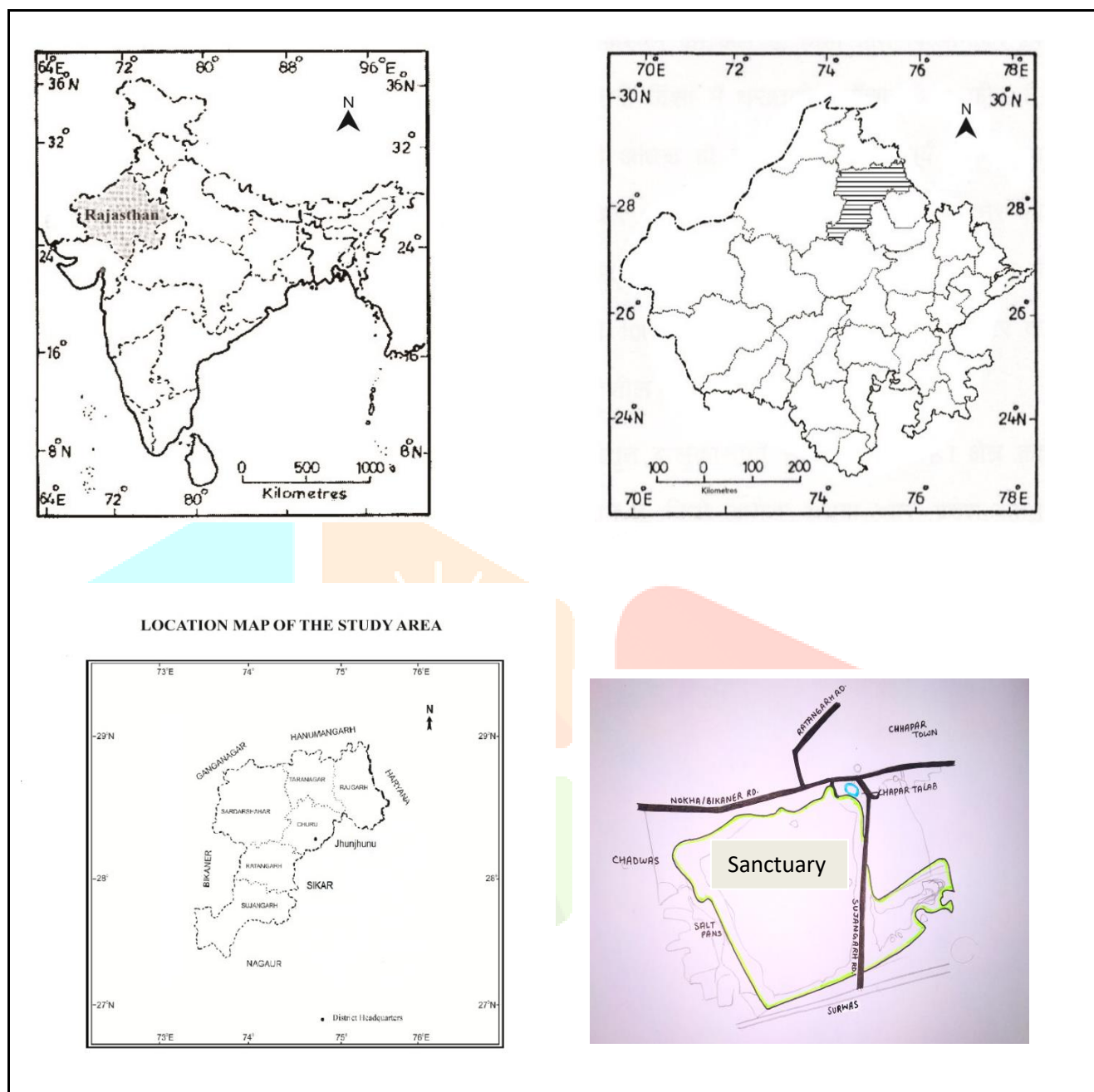
Tal chhappar wildlife sanctuary area is also part of Indian thar desert and enough work has been carried out on the fauna of the sanctuary by various researchers, scientists (Sharma and Singh 1989; Bohra, 2009; Dev, 2010; Das et al. 2013, Sharma & Sharma 2013). The sanctuary is a well-known place and natural home for Black buck, Demoiselle crane, Sara hardwickii and also for a variety of bird species. Earlier, the area was a private hunting spot for Maharaja of Bikaner and declared as a wildlife sanctuary in 1962. Champion & Seth (1968) classify the forest area of the region under the category of "Topical Forest". The area of sanctuary falls under the sub category "Desert Thorn Forests". The entire area of the sanctuary is essentially plain and is mostly covered by grasses known as Mothiya (*Cyperus rotundes*) with a very few scattered plant species of *Acacia nilotica*, *Prosopis juliflora* and *Capparis decidua*. Mothiya is favourite food for Black buck, Demoiselle crane and other bird species. There is no perennial river in or the surrounding area of the sanctuary. The water quality of the reserve is brackish saline, so many small water bodies have been artificially created in all over the Sanctuary which collect rain water during monsoon. These ponds are main source of drinking water in sanctuary for wild fauna.

The animal diversity of the sanctuary is moderate type but abundance of some species like *Antelope cervicapra*, Demoiselle Crane, Uromastix along with few other birds and desert adapted mammalian species has made the area unique and spectacular. The goal of present study is to learn about the current state of animal diversity in the area and to suggest a recovery plan to protect the natural habitats and faunal diversity found here.

Study Area

Tal Chhappar Sanctuary is located in Chhappar town of Sujangarh tehsil in Churu District of Northern Rajasthan. Geographically the area is situated between 27°47'53" N and 74° 26'06" with height of 302 meters above sea level. It lies in the semi-arid zone and covers an area of 7.19 hectare. The area of sanctuary is flat saline terrain. In the western side and nearby villages of the sanctuary, some salts mining, rocks of slate, quartzite and small hillocks are found. The climatic condition in the sanctuary area is extreme, with very hot summers and very cool winters. Temperatures vary greatly throughout the year and between day and night. Temperatures drop below zero degree in the winter and occasionally exceed fifty degrees in the summer. Rainfall in area is highly erratic with a large variation in mean annual rainfall. Because of the infrequent and irregular rainfall, the floral diversity is not as diverse. During the summer, wind velocity in the study area is quite high, and sand storms are a common occurrence. The ground water is extremely saline, with a high salt concentration and not suitable for drinking purpose. Despite all these hostile environmental conditions, the sanctuary area exhibits varieties of floral and faunal diversity. Some desert adapted plants like *Prosopis cineraria*, *Acacia leucophloea*, *A. nilotica*, *Salvador aoleodes*, *Salvadora persica*, *Capparis decidua*, *Opuntia sp.*, *Tephrosiapurpuria*, *Cenchrusciliarietc*, *Ziziphus mauritiana* (ber), *Prosopis juliflora* (vilayati babul), *Azadirachta indica* (neem), *Ficus religiosa* (peepal) are very common and dominant vegetation found in and around study area. Besides from the harsh climatic conditions of Thar, some of the desert adapted faunal species viz. insects, bird, reptilian, and mammalian species thrive here.

Figure 1. LOCATION MAP OF STUDY AREA



Material and Method

Studies on assessment of faunal diversity in Tal Chhapar wildlife Sanctuary were undertaken at regular intervals from May 2013 to June 2016. The sites were visited every Sunday and on government holidays at various times of the day, such as morning, noon, and evening. Hand picking, forceps, nets, light and pitfall traps, jars, and bags were used to capture and collect insects. All collected specimens were identified in the Departmental Laboratory, Churu using a Stereo Zoom Binocular Microscope and taxonomic keys provided by Essig (1947), Andrew (1935), Habu (1978), Kwon and Lee (1984) and Trigunayat (2016). For bird species identification, Olympus binoculars (8x40 DPS I) and relevant field guides (Ali & Ripley 1983; Grimmett *et al.*, 2001) were used. Photography of insects, reptile, birds and mammalian species were taken by Nikon camera to aid with further identification. A wide range of insect, reptile, bird, and mammal species observed in the sanctuary. Most of reptiles and mammals except *Antelope cervicapra* are nocturnal because they

spend the day inside their burrows. The birds were classified as winter visitors, residents, summer visitors, or occasional visitors. Birds seen only during the winter season were classified as winter visitors, while birds seen on a regular basis in the study area were classified as residential birds. Birds seen only during the summer months were classified as summer visitors, while bird species seen only once or twice during the study period were classified as occasional visitors. Their feeding habits were also noted for behavioral study. The majority of the insect species were observed at the start of the summer and rainy season.

Results and discussion

During the study, a variety of animal species of insects, reptiles, birds, and mammals were observed in the sanctuary area (Tables 1 and 2). During observation total 82 species of insects belonging to 42 families and 8 orders were observed. Lepidoptera was the most diverged group with having 13 families and 32 species; Coleoptera was the second largest insect group with 10 families and 18 species; Odonata belongs to 3 families and 6 species; Hymenoptera belongs to 3 families and 8 species; Orthoptera with 4 families and 7 species; Hemiptera with 4 families and 6 species; Dictyopteran with 3 families having one species each; Diptera with 2 families having one species each. Out of total 14 mammalian species, belonging to 10 families found here. Total 9 species of reptiles belonging to 6 families were seen during study period. The sanctuary is rich in avifauna, total 65 bird species belonging to 31 families were observed here. In the group of avian fauna, members of family Accipitridae are dominated in the study area represented by total 10 species, family Alaudidae, Anatidae and Columbidae comprising 5 species each and Phasianidae, Coracidae, Sturnidae, Corvidae having 3 species each, while other families Meropidae, Pycnonotidae, Picidae, Psittacidae, Muscicapidae were followed by 2 species each and remaining families have one species each. Feeding habits of bird species were also noted. All the bird species belonging family Accipitridae were carnivorous in nature. Other bird species were insectivorous, granivorous, Omnivorous, frugivorous, nectivorous, herbivorous in feeding nature. On the basis of locally availability, 12 species of mammals observed here are residential. Insect species were collected through hand picking or using forceps, cage net and light trap. All the 65 species of birds can be categorized as, 52 were resident, and 4 were winter migrant, while remaining were winter and occasionally migrant were represented by one species each respectively. It has been noticed that most of the observed bird species are of Least Concerned (LC) category of IUCN (2012) Red data List but some of the insects, reptiles, mammalian along with few bird species specially members of family Accipitridae are including in risk category of IUCN.

Although a lot of work has been done on the faunistic diversity of Tal Chhappar wildlife Sanctuary by various scholars and researchers, then even some attempts have been made to assess major invertebrate and vertebrate diversity. The current work is pioneer study in terms of providing foundation data and further investigation in the study area.

Table 1. Checklist of insect fauna in Tal Chhappar wildlife Sanctuary

Order	Family	Scientific name
1. Coleoptera	1. Scarabaeidae	1. <i>Scarabaeus satyrus</i>
		2. <i>Anomala bengalensis</i>
		3. <i>Onthophagus bonasus</i>
		4. <i>Onthophagus bonasus</i>
		5. <i>Scarabaeus cristatus</i>
		6. <i>Copris furciceps</i>
	2. Curculionidae	1. <i>Myllocerus sp.</i>
	3. Coccinellidae	1. <i>Coccinella septempunctata</i>
		2. <i>Menochilus sexmaculataus</i>
	4. Cicindelidae	1. <i>Cicindella sp.</i>
		2. <i>Cicindela minuta oliver</i>
	5. Carabidae	1. <i>Chlaenius laticollis</i>

	6. Meloidae	1. <i>Cylindrothorax pictus</i>		
	7. Tenebrionidae	1. <i>Pimelia indica</i> 2. <i>Oxycara tharensis</i>		
	8. Chrysomelidae	1. <i>Clytra succineta</i>		
	9. Buprestidae	1. <i>Sternocera chrysis</i>		
	10. Elateridae	2. <i>Silensis inficetus candze</i>		
2. Lepidoptera	1. Pieridae	1. <i>Belenois aurota</i> 2. <i>Colotis amata</i> 3. <i>Eurema hecabe</i> 4. <i>Colotis etrida</i> 5. <i>Colotis fausta</i> 6. <i>Pieris canidia</i> 7. <i>Catopsila pomona</i> 8. <i>Colotis danae</i>		
		2. Pyralidae	1. <i>Sphenarches caffer</i> 2. <i>Etiella zinckenella</i>	
			3. Erebidae	1. <i>Utetheisa pulchella</i>
		4. Sphingidae		1. <i>Agrius convolvuli</i> 2. <i>Helicoverpa armigera</i>
			5. Noctuidae	1. <i>Pericallia ricini</i> 2. <i>Heliothis peltigera</i> 3. <i>Mythimna loreyi</i>
		6. Crambidae		1. <i>Leucinodes orbonalis</i> 2. <i>Hymenia recurvalis</i>
				7. Danaidae
		8. Papilionidae		
	9. Hesperidae		1. <i>Spialia galba</i> 2. <i>Hesperilla ornate</i>	
		10. Lycaenidae	1. <i>Chilades pandava</i> 2. <i>Tarucus callinara</i> 3. <i>Tarucus nara</i>	
	11. Sphingidae		1. <i>Agrius convolvuli</i> 2. <i>Utethesia pulchella</i>	
		12. Arctidae	1. <i>Amsacta moorie</i> 2. <i>Cretonotos gangis</i>	
	13. Nymphalidae		1. <i>Junonia orithya</i> 2. <i>Danaus chrysippus</i>	
3. Odonata		1. Libellulidae	1. <i>Bradinopyga geminata</i> 2. <i>Orthetrum glaucum</i> 3. <i>Pantala flavescens</i>	
	2. Aeshnidae		1. <i>Anax guttatus</i>	
			3. Coenagrionidae	1. <i>Ischnura senegalensis</i> 2. <i>Ischnura aurora</i>
4. Hemiptera	1. Pentatomidae	1. <i>Nezara viridula</i> 2. <i>Bagrada hilaris</i> 3. <i>Aspongopus Janus</i>		
		2. Pyrrhocoridae	1. <i>Dysderscus cingulatus</i>	
			3. Coreidae	1. <i>Clavigrella sp.</i>
	4. Aphididae	1. <i>Lipaphis erysimi</i>		
5. Hymenoptera	1. Apidae	1. <i>Xylocopa fenestrata</i> 2. <i>Xylocopa iridipennis</i> 3. <i>Apis dorsata</i> 4. <i>Apis florea</i> 5. <i>Apis mellifera</i>		
		2. Vespidae	1. <i>Polistes flavus</i> 2. <i>Eumenes farternus</i>	
			3. Formicidae	1. <i>Dolichoderus affinis</i>
		6. Diptera		1. Culicidae
			2. Muscidae	
	7. Dictyoptera	1. Mantidae	1. <i>Mantis religiosa</i>	

8. Orthoptera	2. Blattidae	1. <i>Periplaneta Americana</i>
	3. Termitidae	1. <i>Odontotermis sp.</i>
	1. Pyrgomorphidae	1. <i>Poecilocus pictus</i>
	2. Acrididae	1. <i>Schistocerca gregaria</i>
		2. <i>Chrotogonus sp.</i>
	3. Tettigonidae	1. <i>Eucenocephalus sp</i>
	4. Gryllidae	1. <i>Gryllus assimilis</i>
		2. <i>Gryllus domesticus</i>
3. <i>Grylloides sigillatus</i>		

Table 2. Checklist of vertebrate fauna in Tal Chhapar wildlife Sanctuary

Mammals					
S. No.	Family	Common Name	Scientific name	Status	Feeding Habit
1	Bovidae	Black buck	<i>Antelope cervicapra</i>	R	Herbivorous
2	Bovidae	Chinkara	<i>Gazella banettii</i>	OV	Herbivorous
3	Bovidae	Blue bull	<i>Boselaphus tragocamelus</i>	R	Herbivorous
4	Canidae	Desert fox	<i>Vulpes vulpes pusilla</i>	R	Carnivorous
5	Canidae	Indian fox	<i>Vulpes bengalensis</i>	R	Carnivorous
6	Canidae	Golden Jackal	<i>Canis aureus</i>	OV	Carnivorous
7	Erinacidae	Hedgehog	<i>Erinaceus europaeus</i>	R	Insectivorous
8	Felidae	Jungle cat	<i>Felis chaus</i>	R	Carnivorous
9	Herpestidae	Mongoose	<i>Herpestes edwardsi</i>	R	Omnivorous
10	Leporidae	Desert hare	<i>Lepus nigricollis dayalus</i>	R	Herbivorous
11	Muridae	Desert gerbil	<i>Meriones hurrianae</i>	R	Omnivorous
12	Pteropodidae	Bat	<i>Chiroptera sp.</i>	R	Insectivorous
13	Sciuridae	Striped Palm Squirrel	<i>Funambus pennanti</i>	R	Omnivorous
14	Talpidae	Shrew	<i>Suncus murinus</i>	R	Omnivorous
Reptiles					
S. N.	Family	Common Name	Scientific name	Status	Feeding Habit
1	Agamidae	Oriental garden lizard	<i>Calotes versicolor</i>	R	Insectivorous
2	Agamidae	Sanda (Spiny tailed lizard)	<i>Uromastix hardwickii</i>	R	Herbivorous
3	Chamaeleonidae	Chameleon	<i>Chameleon chameleon</i>	R	Insectivorous
4	Elapidae	Cobra	<i>Naja naja</i>	R	Insectivorous
5	Elapidae	Bungarus	<i>Bungarus caeruleus</i>	R	Insectivorous
6	Scincidae	Skink	<i>Moboui carinata</i>	R	Insectivorous
7	Varanidae	Monitor lizard	<i>Varanus bengalensis</i>	R	Insectivorous
8	Viperidae	Indian Saw-scaled Viper	<i>Echis carinatus</i>	R	Insectivorous
9	Viperidae	Daboia	<i>Viper russelii</i>	R	Insectivorous
Birds					
S.No.	Family	Common Name	Scientific name	Status	Feeding Habit
1	Accipitridae	Shikra	<i>Accipiter badius</i>	R	Carnivorous
2	Accipitridae	Imperial Eagle	<i>Aquila heliaca</i>	R	Carnivorous
3	Accipitridae	Marsh Harrier	<i>Circus aeruginosus</i>	OV	Carnivorous
4	Accipitridae	Pallid Harrier	<i>Circus macrourus</i>	R	Carnivorous
5	Accipitridae	Short toed Snake Eagle	<i>Circaetus gallicus</i>	R	Carnivorous
6	Accipitridae	Black shouldered kite	<i>Elanus caeruleus</i>	R	Omnivorous
7	Accipitridae	White Rumped vulture	<i>Gyps bengalensis</i>	R	Carnivorous
8	Accipitridae	Black kite	<i>Milvus migrans</i>	R	Carnivorous
9	Accipitridae	Egyptian vulture	<i>Neophron percnopterus</i>	R	Carnivorous
10	Accipitridae	Cinereous Vulture	<i>Aegypius monachus</i>	R	Carnivorous
11	Alaudidae	Rufous tailed lark	<i>Ammomanes phoenicurus</i>	WV	Omnivorous
12	Alaudidae	Greater short toed lark	<i>Calandrella brachydactyla</i>	WV	Omnivorous
13	Alaudidae	Ashy crowned sparrow lark	<i>Eremopterix grisea</i>	OV	Omnivorous
14	Alaudidae	Indian bush lark	<i>Mirafrae erythroptera</i>	R	Omnivorous
15	Alaudidae	Oriental Sky lark	<i>Alauda gulgula</i>	R	Insectivorous
16	Alcedinidae	White throated kingfisher	<i>Halcyon smyrnensis</i>	R	Carnivorous
17	Anatidae	Northern shoveler	<i>Aclypeata Linn</i>	R	Insectivorous
18	Anatidae	Common Teal	<i>Anas crecca Linn</i>	R	Insectivorous

19	Anatidae	Gadwall	<i>Anas strepera</i> Linn	M	Insectivorous
20	Anatidae	Bar headed goose	<i>Anser indicus</i>	OV	Herbivorous
21	Anatidae	Common pochard	<i>Aythya ferina</i> Linn.	R	Insectivorous
22	Charadriidae	Red wattled lapwing	<i>Vanellus indicus</i>	R	Insectivorous
22	Cisticolidae	Common tailor bird	<i>Orthotomus sutorius</i>	R	Insectivorous
23	Columbidae	Rock pigeon	<i>Columba livia</i>	R	Granivorous
24	Columbidae	Indian Ring Dove	<i>Streptopelia decaocto</i>	R	Granivorous
25	Columbidae	Laughing dove	<i>Streptopelia senegalensis</i>	R	Granivorous
26	Columbidae	Eurasian collared dove	<i>Streptopelia decaocto</i>	R	Granivorous
27	Columbidae	Red collared dove	<i>Streptopelia tranquebarice</i>	R	Granivorous
28	Coraciidae	Indian Roller	<i>Coracias bengalensis</i>	R	Carnivorous
29	Coraciidae	European Roller	<i>Coracias garrulus</i>	M	Carnivorous
30	Coraciidae	Indian roller	<i>Coracias benghalensis</i>	R	Carnivorous
31	Corvidae	Indian jungle crow	<i>Corvus culminatus</i>	R	Carnivorous
32	Corvidae	House crow	<i>Corvus splendens</i>	R	Carnivorous
33	Corvidae	Rufous treepie	<i>Dendrocittavagabunda</i>	R	Frugivorous
34	Cuculidae	Asian koel	<i>Eudynamys scolopacea</i>	R	Omnivorous
35	Dicruridae	Black drongo	<i>Dicrurus macrocerus</i>	R	Insectivorous
36	Gruidae	Demoiselle crane /Kurja	<i>Grus vigro</i>	M	Omnivorous
37	Lanidae	Grey shrike	<i>Lanius schach</i>	R	Insectivorous
38	Meropidae	Green Bee-eater	<i>Merops orientalis</i>	R	Insectivorous
39	Meropidae	Blue tailed Bee eater	<i>Merops philippinus</i>	R	Insectivorous
40	Motacillidae	Wagtail	<i>Motacilla alba</i> Linn	R	Insectivorous
41	Muscicapidae	Blue throat	<i>Luscinia svecica</i>	WV	Insectivorous
42	Muscicapidae	Indian robin	<i>Saxicoloides fulicata</i>	R	Insectivorous
43	Nectariniidae	Purple sunbird	<i>Cinnyrus asiaticus</i>	R	Nectarivorous
44	Passeridae	House sparrow	<i>Passer domesticus</i>	R	Granivorous
45	Phasianidae	Black francolin	<i>Francolinus francolinus</i>	R	Omnivorous
46	Phasianidae	Grey francolin	<i>Francolinus podicerianus</i>	R	Omnivorous
47	Phasianidae	Indian peafowl	<i>Pavo cristatus</i>	R	Omnivorous
48	Picidae	Yellow crowned woodpecker	<i>Dendrocopus mahrattensis</i>	R	Insectivorous
49	Picidae	Lesser golden back	<i>Dinopium benghalense</i>	R	Insectivorous
50	Ploceidae	Baya weaver	<i>Ploceus philippinus</i>	R	Omnivorous
51	Psittacidae	Plum headed parakeet	<i>Psittacula cyanocephala</i>	R	Granivorous & Frugivorous
52	Psittacidae	Alexandrine parakeet	<i>Psittacula eupateria</i>	R	Granivorous & Frugivorous
53	Psittacidae	Rose ringed parakeet	<i>Psittacula krameri</i>	R	Granivorous & Frugivorous
54	Pycnonotidae	Red vented bulbul	<i>Pycnonotus cafer</i>	R	Frugivorous
55	Pycnonotidae	White eared bulbul	<i>Pycnonotus leucotis</i>	R	Frugivorous
56	Rallidae	Common Coot	<i>Fulica atra</i> Linn.	WV	Insectivorous
57	Scolopacidae	Comb Duck	<i>Sarkidionis melenotos</i> Penn	R	Insectivorous
58	Strigidae	Spotted owl	<i>Athene brama</i>	R	Insectivorous
59	Sturnidae	Common Myna	<i>Acridotheres tristis</i>	R	Granivorous
60	Sturnidae	Bank myna	<i>Acridotheres ginginianus</i>	R	Granivorous
61	Sturnidae	Asian pied starling	<i>Sturnus contra</i>	R	Granivorous
62	Sylviidae	Lesser white throat	<i>Sylvia curruca</i>	WV	Insectivorous
63	Threskiornithidae	Black Ibis	<i>Pseudibis papillosa</i>	R	Insectivorous
64	Timaliidae	Jungle babbler	<i>Turdoides striata</i>	R	Insectivorous
65	Upupidae	Common hoopae	<i>Upupa epops</i>	R	Insectivorous

R= resident, WV= winter visitor, OV= occasionally visitor, M= Migrator



Figure 2. View of Blackbuck sanctuary

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