

A Preliminary Survey of the Flora and Fauna of Chinkara Breeding Centre, Kairu: A Protected Area in District Bhiwani, Haryana, India

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Abstract Chinkara Breeding Centre, Kairu is a protected area under the Schedule of Wildlife (Protection) Act, 1972 under the wildlife wing of the Haryana state forest department located in the district of Bhiwani. It was visited during the month of August 2019 by a team of Zoologists, Geographers, and Botanists to study the eco-geography, flora and fauna of the breeding centre. The present study presents the results of first such short term survey of this important wildlife area lying in the centre of the state of Haryana. A total of 18 plant species and 79 animal species were documented during this survey. The total number of Chinkara (*Gazella bennettii*) were 106 (53 bucks, 51 does and 2 fawns) in this breeding centre. The paper further discusses the importance of such studies for the betterment of biodiversity conservation efforts in case of an ecologically fragile state of Haryana where majority of the wildlife is under constant threat from urbanization and industrialization.

Keywords: Avifauna, Chinkara, diversity, point count method, Haryana

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1. Introduction

India has rich diversity of plants and animals in variety of habitats and ecosystem [1]. India is a mega biodiversity nation with different types of habitats ranging from rain forests on northeast to hot deserts of Rajasthan. India has three of the world's 34 biodiversity hotspots located in Western Ghats, Indo-Burma and in the eastern Himalayas [2]. According to MoEF & CC, GoI environment and forest report [3], the country is estimated to have over 45000 plants species and 81000 animal species representing about 7.0% of the world flora and 6.5% of its fauna. The forests play a key role in maintaining a wide range of delicate relationship with nature and its ecosystem [4]. The Indian subcontinent is very rich in biodiversity as well as in forest cover and forms a large area of Oriental bio-geographic region.

Haryana occupies an important position (latitude 27°39' to 30°55' N and longitude 74°27.8' to 77°36.5' E) in northern India. Diversified habitats available in different districts of state of Haryana make this region extremely rich in biodiversity. This northern state of India has number of protected areas viz. 2 National Parks, 8 Wildlife Sanctuaries, 2 Wildlife Conservation Reserves, 5 Animal

& Bird Breeding Centres etc. Chinkara Breeding Centre, Kairu is situated on Bhiwani-Behal Road at Kairu, Distt. Bhiwani & lies between 28° 40'N latitude and 75° 56'E longitude. It is a protected Chinkara breeding centre in Kairu village, Tosham tehsil, Bhiwani district, Haryana, India. The centre started in 1985 Initially, 10 chinkaras from the natural habitat were released with in the 60 acre fenced area to provide assured protection to them, and as of 31st March 2019 had 106 animals (53 bucks, 51 does and 2 fawn) [5].

2. Materials and Methods

Chinkara Breeding Centre, Kairu is situated on Bhiwani-Behal Road at Kairu, Distt. Bhiwani & lies between 28° 40'N latitude and 75° 56'E longitude. C.B.C. Kairu is 1 Km. away from the Kairu bus stand and 35 Km. away from the Bhiwani railway station (Figure 1). The Breeding Centre is well connected by road with Delhi, Chandigarh, Jaipur, and other important cities. There is a good network of approach roads all along the periphery of the Breeding Centre. Nearest Airport is Delhi which is 150 Km. away from the Breeding Centre. Chinkara breeding Centre, Kairu was visited during the month of August 2019 during a photography workshop by a team of

Botanists, Geographers and Zoologists to study the eco-geography, flora and fauna of the breeding centre under the leadership of the faculty of Chaudhry Bansi Lal University, Bhiwani.

To fulfil the objectives of this visits various plant and animal species were recorded in selected transects and habitats/roads in this breeding centre from morning (06:00 to 10:00 hrs) and later in the evening from (15:00 to 18:00 hrs). Avian species were observed using roadside count/line transects and point count method [6]. As compared to line transect method, point count method provides required information in a short duration of time [7]. The birds and other animal species as well as plant species were observed with 8x42 Nikon binoculars and for photography digital and DSLR camera were used. During the present study of first such short-term survey of this important wildlife area lying in the centre of the state of Haryana different plant and animal species were catalogued and some of them documented photographically. The eco-geographical conditions were also noted. Further the status of Chinkara population and breeding were also analysed and the problems faced by the wildlife officials in day to day upkeep of the breeding centre were discussed.

Table 1. Eco-geographical conditions of the Chinkara Breeding Centre, Kairu

Eco-Geographical parameter	Details
Longitude	28° 40'N
Latitude	75° 56'E
Altitude above mean sea level	207 metres
Slope	South to North
Type of Climate	Local arid to semi-arid steppe climateclassified as BSh by the Köppen-Geiger system.
Type of soil	Sandy to Sandy Loam
Average temperature (Range)	Average 25.2°C (14.1°C to 34.3°C)
Average precipitation	410 mm
Type of Vegetation	Tropical thorn scrubs and succulent type



Figure 1. Map showing the location of Chinkara Breeding Centre, Kairu (Bhiwani, Haryana)

3. Results and Discussion

During the present survey, several species of plants and animals were observed. This chinkara breeding centre has rich plant biodiversity (Table 1) which supports large number of animal species present there. These plant species belong to trees, shrubs, and herbs. As far as animal species are concerned, these belong to class Insecta, Amphibia, Reptilia, Aves and Mammalia. The various species observed in these classes are shown Table 2 to Table 3. During this visit a total of 18 plant species were observed belonging to twelve different families viz. Fabaceae, Meliaceae, Amaranthaceae, Asclepiadaceae, Rhamnaceae, Mimosaceae, Solanaceae, Chenopodiaceae, Cannabinacea, Papaveraceae, Poaceae and Malvaceae (Table 2) [8,9]. A total of twelve insects were observed in this breeding centre which belongs to eight different families shown in Table 3 [10,11,12,13]. Only one species of spider i.e. *Argiop eamula* [13], three lizard species, two snake species, fifty four avian species and seven mammalian species were also reported from this site (Table 3) [1,14]. During present survey maximum number of species were observed in class Aves and these 54 bird species belongs to 31 families (Table 3) [1].

Table 2. List of Flora observed and catalogued of the Chinkara Breeding Centre, Kairu (Bhiwani, Haryana)

S. No.	Common name	Scientific Name	Family
1	Babool	<i>Acacia arabica</i>	Fabaceae
2	Kher	<i>Acacia senegal</i>	Fabaceae
3	True Indigo	<i>Indigofera tinctoria</i>	Fabaceae
4	Kuteera gum	<i>Acacia leucophloea</i>	Fabaceae
5	Neem	<i>Azadirchata indica</i>	Meliaceae
6	Ola Kanta	<i>Achyranthes aspera</i>	Amaranthaceae
7	Seablight	<i>Suaeda fruticosa</i>	Amaranthaceae
8	Khakhi	<i>Alternanthera pungens</i>	Amaranthaceae
9	Aak	<i>Calotropis procera</i>	Asclepiadaceae
10	Ber	<i>Zizypus jujuba</i>	Rhamnaceae
11	Beri	<i>Zizypus numularia</i>	Rhamnaceae
12	Khejri	<i>Prosopis cineraria</i>	Mimosaceae
13	Dhatura	<i>Datura innoxia</i>	Solanaceae
14	Bathu	<i>Chenopodium album</i>	Chenopodiaceae
15	Bhang	<i>Cannabis sativa</i>	Cannabinacea
16	Kateli	<i>Argemon maxicana</i>	Papaveraceae
17	Dub ghass	<i>Cynodon dactylon</i>	Poaceae
18	Pillibuti	<i>Abutilon indicum</i>	Malvaceae

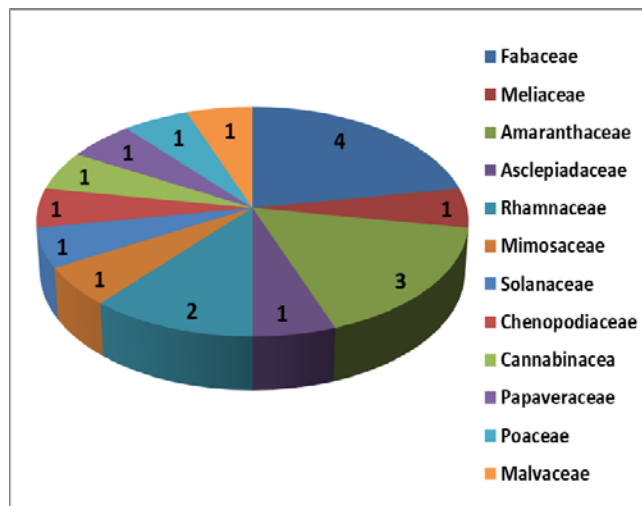


Figure 2. Number of plant species in different families at Chinkara Breeding Centre, Kairu (Bhiwani, Haryana)

Table 3. List of Fauna observed and catalogued of the Chinkara Breeding Centre, Kairu (Bhiwani, Haryana)

Class	Common Name	Scientific Name	Family
Insecta	Grass hopper	<i>Phlaeobain fumata</i> Brunner von Wattenwyl, 1893	Acrididae
Insecta	Coral-tailed cloudwing Dragon fly	<i>Tholymis tillarga</i> Fabricius 1798	Libellulidae
Insecta	Indian Common Silverline	<i>Cigaritis vulcanus</i> Fabricius, 1775	Lycaenidae
Insecta	Common Tiger Butterfly	<i>Danaus genutia</i> Cramer 1779	Nymphalidae
Insecta	House fly	<i>Musca domestica</i> Linnaeus 1758	Muscidae
Insecta	Red Ant	<i>Lepisiota frauenfeldi</i> (Mayr 1855)	Formicidae
Insecta	Weaver ant	<i>Oecophylla smaragdina</i> Fabricius 1775	Formicidae
Insecta	Dung Beetle	<i>Onitis virens</i> Lansberg 1875	Scarabaeidae
Insecta	Dung Beetle	<i>Onitis philemon</i> Fabricius 1801	Scarabaeidae
Insecta	Dung Beetle	<i>Onthophagus catta</i> (Fabricius 1787)	Scarabaeidae
Insecta	Dung Beetle	<i>Onthophagus mopsus</i> (Fabricius 1792)	Scarabaeidae
Insecta	Parthenium beetle	<i>Zygogramma bicolorata</i> Pallister 1953	Chrysomelidae
Arachnida	Signature spider	<i>Argiope aemula</i> (Walckenaer 1841)	Araneidae
Reptilia	Wall Lizard	<i>Hemidactylus frenatus</i> Schlegel 1836	Gekkonidae
Reptilia	Garden Lizard	<i>Calotes versicolor</i> (Daudin 1802)	Agamidae
Reptilia	Varanus	<i>Varanus bengalensis</i> (Daudin 1802)	Varanidae
Reptilia	Rat Snake	<i>Ptyas mucosa</i> (Linnaeus 1758)	Colubridae
Reptilia	Krait	<i>Bungarus caeruleus</i> (Schneider 1801)	Elapidae
Aves	Pied Bushchat	<i>Saxicola caprata</i> (Linnaeus 1766)	Muscicapidae
Aves	Common Stone Chat	<i>Saxicola torquata</i> (Pallas 1773)	Muscicapidae
Aves	White-browed Wagtail	<i>Motacilla maderaspatensis</i> J.F.Gmelin 1789	Motacillidae
Aves	White Wagtail	<i>Motacilla alba</i> Linnaeus 1758	Motacillidae
Aves	Common Myna	<i>Acridotheres tristis</i> (Linnaeus 1766)	Sturnidae
Aves	Bank Myna	<i>Acridotheres ginginianus</i> (Latham 1790)	Sturnidae
Aves	Brahminy Starling	<i>Sturnia pagodarum</i> (J.F.Gmelin 1789)	Sturnidae
Aves	Asian Pied Starling	<i>Gracupica contra</i> (Linnaeus 1758)	Sturnidae
Aves	Common Tailorbird	<i>Orthotomus sutorius</i> (Pennant 1769)	Cisticolidae
Aves	Ashy Prinia	<i>Prinia socialis</i> Sykes 1832	Cisticolidae
Aves	Graceful Prinia	<i>Prinia gracilis</i> (M.H.C. Lichtenstein 1823)	Cisticolidae
Aves	Jungle Prinia	<i>Prinia sylvatica</i> Jerdon 1840	Cisticolidae
Aves	Indian Silverbill	<i>Euodice malabarica</i> (Linnaeus 1758)	Estrildidae
Aves	Scaly-breasted Munia	<i>Lonchura punctulata</i> (Linnaeus 1758)	Estrildidae
Aves	House Crow	<i>Corvus splendens</i> Viellot 1817	Corvidae
Aves	Rufous Treepie	<i>Dendrocitta vagumbunda</i> (Latham 1790)	Corvidae
Aves	Spangled Drongo	<i>Dicrurus paradiseus</i> (Linnaeus 1758)	Dicruridae
Aves	Long-tailed Shrike	<i>Lanius schach</i> Linnaeus 1758	Laniidae
Aves	Large Grey Babbler	<i>Turdoides malcolmi</i> (Sykes 1832)	Leiothrichidae

Class	Common Name	Scientific Name	Family
Aves	Purple Sunbird	<i>Cinnyris asiaticus</i> (Latham 1790)	Nectariniidae
Aves	House sparrow	<i>Passer domesticus</i> (Linnaeus 1758)	Passeridae
Aves	Wire-tailed Swallow	<i>Hirundo smithii</i> Leach 1818	Hirundinidae
Aves	Black-breasted Weaver	<i>Ploceus benghalensis</i> (Linnaeus 1758)	Ploceidae
Aves	White-throated Fantail	<i>Rhipidura albicollis</i> (Vieillot 1818)	Rhipiduridae
Aves	Grey Heron	<i>Ardea cinerea</i> Linnaeus 1758	Ardeidae
Aves	Indian Pond Heron	<i>Ardea grayii</i> (Sykes, 1832)	Ardeidae
Aves	Cattle Egret	<i>Bubulcus ibis</i> (Linnaeus 1758)	Ardeidae
Aves	Little Cormorant	<i>Microcarbo niger</i> (Vieillot 1817)	Phalacrocoracidae
Aves	Black Kite	<i>Milvus migrans</i> (Boddaert 1783)	Accipitridae
Aves	Brahminy Kite	<i>Haliastur indus</i> (Boddaert 1783)	Accipitridae
Aves	Black-winged Kite	<i>Elanus caeruleus</i> (Desfontaines 1789)	Accipitridae
Aves	Shikra	<i>Accipiter badius</i> (J.F. Gmelin 1788)	Accipitridae
Aves	Green Bee-eater	<i>Merops orientalis</i> Latham 1801	Meropidae
Aves	White-throated Kingfisher	<i>Halcyon smyrnensis</i> (Linnaeus 1758)	Alcedinidae
Aves	Indian Roller	<i>Coracias benghalensis</i> (Linnaeus 1758)	Coraciidae
Aves	Rock Pigeon	<i>Columba livia</i> J.F. Gmelin 1789	Columbidae
Aves	Spotted Dove	<i>Streptopelia chinensis</i> (Scopoli 1786)	Columbidae
Aves	Eurasian Collared Dove	<i>Streptopelia decaocto</i> (Fridvaldszky 1838)	Columbidae
Aves	Laughing Dove	<i>Streptopelia senegalensis</i> (Linnaeus 1766)	Columbidae
Aves	Red-wattled Lapwing	<i>Vanellus indicus</i> (Boddaert 1783)	Charadriidae
Aves	Eurasian Thick-knee	<i>Burhinus oedicnemus</i> (Linnaeus 1758)	Charadriidae
Aves	Black-winged Stilt	<i>Himantopus himantopus</i> (Linnaeus 1758)	Recurvirostridae
Aves	Brown-headed Barbet	<i>Psilopogon zeylanica</i> (J.F. Gmelin 1758)	Ramphastidae
Aves	Asian Koel	<i>Eudynamis scolopaceus</i> (Linnaeus 1758)	Cuculidae
Aves	Greater Coucal	<i>Centropus sinensis</i> (Stephens 1815)	Cuculidae
Aves	Rose-ringed Parakeet	<i>Psittacula krameri</i> (Scopoli 1769)	Psittaculidae
Aves	Alexandrine Parakeet	<i>Psittacula eupatria</i> (Linnaeus 1766)	Psittaculidae
Aves	Indian Grey Hornbill	<i>Ocyrceros birostris</i> (Scopoli 1786)	Bucerotidae
Aves	Common Hoopoe	<i>Upupa epops</i> Linnaeus 1758	Upupidae
Aves	Grey Francolin	<i>Francolinus pondicerianus</i> (J.F. Gmelin 1789)	Phasianidae
Aves	Black Francolin	<i>Francolinus francolinus</i> (Linnaeus 1766)	Phasianidae
Aves	Indian Peafowl	<i>Pavo cristatus</i> Linnaeus 1758	Phasianidae
Aves	Spotted Owlet	<i>Athene brama</i> (Temminck 1821)	Strigidae
Aves	Barn Owl	<i>Tyto alba</i> (Scopoli 1769)	Strigidae
Mammalia	Monkey	<i>Macaca mulatta</i> (Zimmermann 1780)	Cercopithecidae
Mammalia	Northern Palm Squirrel	<i>Funambulus pennanti</i> Wroughton 1905	Sciuridae
Mammalia	Brown Rat	<i>Rattus norvegicus</i>	Muridae

Class	Common Name	Scientific Name (Berkenhout 1769)	Family
Mammalia	Mouse	<i>Mus musculus</i> Linnaeus 1758	Muridae
Mammalia	Shrew	<i>Suncus murinus</i> (Linnaeus 1766)	Soricidae
Mammalia	Mongoose	<i>Herpestes edwardsi</i> É. Geoffroy Saint-Hilaire 1818	Herpestidae
Mammalia	Chinkara	<i>Gazella bennettii</i> (Sykes 1831)	Bovidae

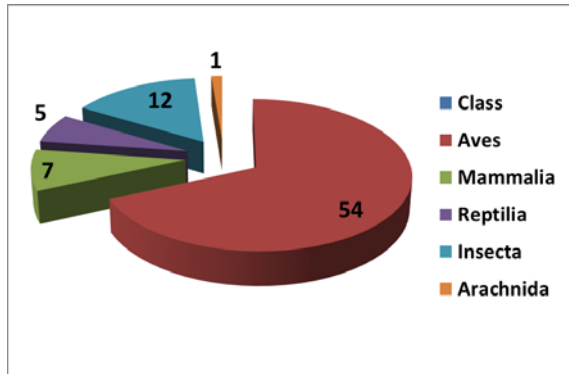


Figure 3. Contribution of various classes towards total fauna observed at Chinkara Breeding Centre, Kairu (Bhiwani, Haryana)



White-throated Fantail
Rhipidura albicollis
(Vieillot, 1818)



Wire-tailed Swallow
Hirundo smithii
Leach, 1818



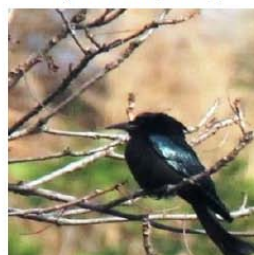
Red-wattled Lapwing
Vanellus indicus
(Boddaert, 1783)



Cattle Egret
Bubulcus ibis
(Linnaeus, 1758)



Indian Peafowl
Pavo cristatus
Linnaeus, 1758



Spangled Drongo
Dicrurus paradiseus
(Linnaeus, 1766)

Plate I. Some important avian species observed at Chinkara Breeding Centre, Kairu

4. Conclusion and Recommendations

Chinkara breeding centre, Kairu was established for the conservation and to protect Chinkara (*Gazella bennettii*) species from immediate and impending danger to their lives. It also helps to maintain gene pool of the threatened Chinkara species of this region. It also provides platform for research on the various aspects of ecology and behaviour of Chinkara (*Gazella bennettii*) species.

There should be a permanent zoologist for better understanding of Chinkara breeding conditions including understanding of behavior. Further a permanent botanist is also required to understand food plants, cover plants and open grassland for better growth conditions for Chinkara (*Gazella bennettii*). Services must be taken from geographer/geologist for fine tuning the eco-geographic conditions of slope, rainwater pool management for drinking etc.

This breeding centre should get technological support in form of video surveillance, motion sensor photo documentation especially of the newly born young fawns and gestating does.

In last we suggest that there should be permanent veterinary surgeons for surveillance and treatment of pathogens, treatment of diseased Chinkara.

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