

Food, Feeding Habits And Habitat Use Of Hard Ground Barasingha (*Rucervus Duvauceli Branderi*) In Kanha National Park, Madhya Pradesh, India

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Abstract: The Barasingha is one of the large size deer belonging to the family Cervidae and it is an endangered species listed in schedule I of the Indian Wildlife (Protection) Act 1972 and Appendix I of the convention on the International Trade of Endangered Species (CITES). The current distribution pattern of this low density species is restricted to Kanha only. My study was carried out by Direct observation of the food, feeding habits and Habitat use of this species in Kanha National park M.P. India. In the protected areas earlier studies on the swamp deer habitat was dominated by observations on feeding on grasses and hence the species was reported to be predominantly grazer who occasionally fed on aquatic plants (Schaller, 1967). GPS locations were plotted on a habitat map of Kanha National Park to evaluate the habitat use and availability in each season. In summer Barasingha largely preferred swampy areas and in the monsoon, winter preferred grassland. The result will be very useful to the park administration for future conservation of this endangered species and for habitat invention.

Keywords: Barasingha, Food, Feeding Habits, Habitat use, Kanha National Park.

I. INTRODUCTION

The swamp deer also known as the Barasingha, lives in the swampy grassland and floodplains of Indian subcontinent (Tiwari and Rawat, 2013). It is regarded as one of the world's endangered large mammals and is listed in Schedule I (part -I: Mammals) of the Indian Wildlife (Protection) Act 1972 (amended subsequently). Barasingha have also been categorized as vulnerable as per the IUCN Red list of Threatened Species Version 2010.2. (Chauhan and Sukla, 2017). There are three sub species of the deer in India. While the North and Eastern sub species occur in the Dudhwa Tiger Reserve and Manas Tiger Reserve and there surrounding respectively, the Southern or hard ground Barasingha (*Rucervus duvaucelii branderi*) is restricted to the Kanha Tiger Reserve. The resurrection of the central Indian or Hard ground Barasingha at Kanha is by far one of the most inspiring successes in the history of wildlife conservation in the country. Though the species has adapted to hard ground condition of central India over a very long period of time,

cervid still shows ontogenic affinity for water and swampy areas.

The past onslaught on the hard ground Barasingha and its habitat in and around the Kanha National Park had caused a serious progressive decline in its population and by 1970 only 66 animals survived in the wild. Fortunately, this small population was restricted to the central meadow of Kanha National Park, and a wide range of conservation initiatives since then has ensured gradual strengthening of this population. The deer is regarded as a food specialist depending solely on grasslands for its survival. Besides the female is monoestrous, with a relatively long gestation period of around 9 months resulting in a low growth rate in the population. Consequently, after 47 years of sustained conservation, there are now around 800 animals in the Kanha core zone (Chauhan and Sukla, 2017).

The present study was undertaken with an aim to identify the plant species consumed by Barasingha and Habitat use in different seasons. The result has become very important for the management of this majestic species.

II. MATERIALS AND METHODS

III. RESULTS AND DISCUSSION

STUDY AREA

Kanha National Park, part of Deccan peninsula – Central High land Biogeographic Zone (Rodgers and Panwar 1988; Negi and Sukla 2011), is spread across Mandla and Balaghat districts of Madhya Pradesh (MP)-covers an area of around 940 sq. Km., spread across The park area comprises mosaic of meadow and forest in the plain extensive grasslands on the plateaus and forest in the rolling hills (Kanoje, 2006). According to Campion and Seth (1968), the forest type of Kanha National Park mainly consists of moist peninsular Sal forest:(forest type 3C/C2a), Southern tropical moist deciduous forest:(forest type 3A/C2a) and Southern tropical dry mixed deciduous forest (forest type 5A/C3). The forest is typical represent and dominated by *Shorea robusta*, *Terminalia chebula*, *Terminalia tomentosa* and Bamboo mixed forest etc.

The study on the activities of food, feeding habits and habitat use of Barasingha was conducted in Bhaisanghat range (Kanha National Park, Fig-1). Direct observation method was used for food, feeding habits and habitat use.

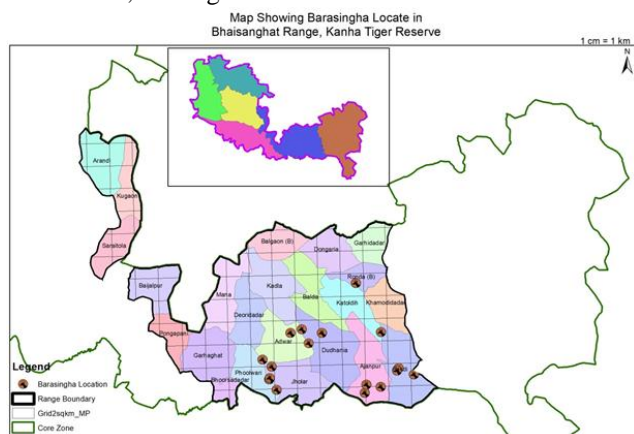


Figure 1: Map Showing Barasingha Locate in Bhaisanghat Range Kanha Tiger Reserve Mandla

DIRECT OBSERVATION

Data on activity pattern, food plant species and habitat use of Barasingha were recorded by direct sighting with the help of a pair of Bushnell 10X50 binocular and Nikon 750 DSLR with 250-500 mm lance using focal Animal sampling method (Altmann, 1974). After direct observation of feeding of animals, on-site inspection of food plant species was identified as per Flora of Kanha (Pandey, 2009). Most of the data gathered during morning and afternoon time when visibility was good. During the study period all major type of habitat covered by the team of staff Forest Department (Kanha National Park) have all the grassland surrounded by rivers and open grassy patches inside the Sal forests. The total time spent for recording food habits and habitat use divided in to three seasons –summer, monsoon and winter.

Each ungulates species adopts a different strategy to exploit a given set of resources, depending upon its body size, anatomy and physiology. Food habits of the barasingha, or for that matter any ungulates, are those foods that the animal actually feed on depending upon availability and preference. Observation of food habits of the cervid are an important tool to understanding welfare and limiting factors relating to actual forage quantity and quality. From the management standpoint, food habits of species under consideration need to be interpreted in terms of local condition to strengthen conservation.

Age and sex categories as a whole and across seasons showed no significant variation in feeding habits. Barasingha in Kanha National Park was observed to feed on 45 species of plants belonging to 19 families. More than 75% of the food species were of the families Poaceae (17 species), Hydrocharitaceae (7species), Fabaceae (5species) etc. (Table-1). Aerial parts, chiefly comprising leaves, were fed. Percentage contribution of the food types, namely, grasses, aquatic flora, sedges, herbs and tress, to the overall diet and in individual seasons is presented in Table-1.

Food plant species	Family	Habitat category	Summer	Winter	Monsoon and growing season
Grass					
<i>Apluda mutica</i>	Poaceae	Dry grassland	+	++	++
<i>Bothriochloa pertusa</i>	Poaceae	grassland	++	+++	+++
<i>Bothriochloa odorata</i>	Poaceae	grassland	++	+++	+++
<i>Coix lachryma</i>	Poaceae	Wet grassland	+	+++	++
<i>Cynodon dactylon</i>	Poaceae	Wet grassland	++	+++	++
<i>Dichanthium sp.</i>	Poaceae	Dry grassland	+	+	+++
<i>Heteropogon contortus</i>	Poaceae	Dry grassland	++	++	++
<i>Imperata cylindrica</i>	Poaceae	Dry grassland	+++	+++	++
<i>Iseilema protstratum</i>	Poaceae	Dry grassland	+	+	+++
<i>Ischaemum indicum</i>	Poaceae	Dry grassland	++	++	++
<i>Naranga porphyrocoma</i>	Poaceae	Wet grassland	-	+(gl)	+
<i>Phragmites kakra</i>	Poaceae	Wet grassland	+(g)	+	++
<i>Saccharum spontaneum</i>	Poaceae	Dry grassland	+++	+++	+
<i>Sorghum halepense</i>	Poaceae	Wet grassland	-	+(g)	++
<i>Themeda quadrivalvis</i>	Poaceae	Dry grassland	+(g)	++	+++
<i>Themeda triandra</i>	Poaceae	Dry grassland	+(g)	++	+++
<i>Veiveria zizaniodes</i>	Poaceae	Dry grassland	++	++	+
Aquatic plant					
<i>Aponogeton undulatus</i>	Aponogetonaceae	Swamp	++	+	-
<i>Blyxa echinosperma</i>	Hydrocharitaceae	Swamp	+	+	-
<i>Blyxa octandra</i>	Hydrocharitaceae	Swamp			
<i>Cyretophyllum demersum</i>	Ceratophyllaceae	Swamp	++	++	+

<i>Eleocharis dulcis</i>	Cyperaceae	Swamp	+++	+	+
<i>Hydrilla verticillata</i>	Hydrocharitaceae	Swamp	+++	++	+
<i>Linnophila indica</i>	Plantaginaceae	Swamp	++	++	+
<i>Najas graminea</i>	Hydrocharitaceae	Swamp	++	++	
<i>Nitella sp.</i>	Characeae	Swamp	+++	++	+
<i>Nyphiodes indicum</i>	Menyanthaceae	Swamp	++	++	-
<i>Ottelia alsinoides</i>	Hydrocharitaceae	Swamp	+	+	-
<i>Potamogeton crispus</i>	potamogetonaceae	swamp	++	+	-
<i>Utricularia exoleta</i>	Lentibulariaceae	Swamp	+++	++	-
<i>Vallisneria spiralis</i>	Hydrocharitaceae	Swamp	++	+	-
<i>Vallisneria nutans</i>	Hydrocharitaceae	Swamp	++	+	-
Herbs/Shrubs					
<i>Acrocephalus indicus</i>	Lamiaceae	Secondary scrub	++	+	+
<i>Alysicarpus monolifer</i>	Fabaceae	Secondary scrub	-	++	+
<i>Barleria cristata</i>	Acanthaceae	Sal forest	+	+	-
<i>Desmodium triflorum</i>	Fabaceae	Secondary scrub	-	++	+
<i>Flemingia bracteata</i>	Fabaceae	Sal forest	++	++	+
<i>Flemingia semialata</i>	Fabaceae	Sal forest	++	++	+
<i>Elephantopus scaber</i>	Asteraceae	Secondary scrub	-	++	-
<i>Evolvulus alsinoides</i>	Convolvulaceae	Secondary scrub	+	+	-
<i>Phoenix acaulis</i>	Arecaceae	Secondary scrub	+	+	-
<i>Jussiaea suffruticosa</i>	Onagraceae	Secondary scrub	+	+	+
Trees					
<i>Bauhinia vahlii</i>	Fabaceae	Moist deciduous forest	++	+	++
<i>Emblica officinalis</i>	Phyllanthaceae	Moist deciduous forest	++	++	+
<i>Terminalia tomentosa</i>	Combretaceae	Moist deciduous forest	+	+	+

Intake: (1) high: +++, (2) medium: ++, (3) low: +, (4) very low or none: - (g): fed upon only when green.

Table 1: The Principal food plant species, in which habitat it occurs, and major categories of food plants of Hard ground Barasingha in Kanha National Park

We have observed that Barasingha have proportionally more of grasses and aquatic plants in their diet (Table-1, Fig-2). These observations are in agreement with the reports of Schaller (1967), Martin (1977), Schaff (1978), Singh (1984), Moe (1994), Qureshi *et al.* (1995), Pokharel (1996), Khan *et al.* (2004), and Batta (2004), Tiwari (2013) who reported that Barasingha is primarily a grazer who largely fed on grasses and aquatic plants. In contrast, a study on summer seasons diet of Barasingha in Nepal (Weggeet *al.*, 2006) showed that Barasingha diet had proportion of woody plants as well. However, dominance of forage species and its distribution pattern in a certain locality have a great deal to do with its proportionate consumption (Martin, 1977 and Tiwari *et al.*, 2013). Barasingha commonly concentrated on grasses during high rainfall periods and high rate of grass growth. The

proportion of terrestrial and aquatic plants in diet increased gradually in winter and summer.

In the summer season most animal was seen near water bodies and stream/brooks (Fig-6). This type of habitat where, the Barasingha entered to drink water and fed upon aquatic plants (Fig.-3). The animal dipped the muzzle into the water, took a mouthful and took the muzzle out of water to swallow the feed. Not all the animals, however, entered the water body, smaller animals of both the sexes stayed back on the banks. Past several workers (Schaller, 1967; Martin, 1978; Kotwal, 1987; Nayak, 2007) have also studied habitat uses by the cervid. Our observation is in broad conformity with theirs. In the monsoon season of the year, the Barasingha habitat condition in the National Park remaining at its most favorable (Martin 1987; Kotwal, 1987; and Gopal, 1995). In this season lush green vegetation, well distributed water, and overall watery and slushy condition in Barasingha habitats, it was difficult to make clear distinction between different habitat types.

We have come to the conclusion that the Barasingha activity is largely confined to open grassland throughout the seasons. Grazing ground during the cool and dry seasons are distinguished by the presence of water and unburnt grassland. I assumed that almost every grass species would be eaten by Barasingha on certain occasions. However, the dominance of a species and its distribution pattern in a certain locality has a great deal to do with its preference rating. The quantity fed from a certain species may therefore have only local application. Standardized observations in a heterogeneous grassland habitat are almost impossible. Earlier authors have reported on this central problem of food habit studies. Therefore, I will only describe more qualitative differences of Barasingha forage in different seasons (Table-1 and 2).

The entire population of the cervid in the protected area has to use these habitat type (grassland and wetland) against their availability, to perform a wide range of major special activities, including feeding, resting and ruminating etc. in this way, Barasingha use the physical and biological resources in its habitat. It is important, managerially, to study seasonal habitat use by Barasingha for its effective conservation.

Schaller (1967), Qureshi <i>et al.</i> , (2004)	Singh (1984)	Khan and Ahmed (2004)	Martin (1977)	Schaaf (1978), Moe (1994), Pokharel (1996), Bhatta (2004)	Weggeet <i>al.</i> , (2006)	Tewari, (2013)
<i>Hydrilla spp.</i>	<i>Arundo donax</i>	<i>Imperata cylindrica</i>	Grasses	<i>Brachiaria spp.</i>	<i>A. Donax</i>	<i>Typha sp.</i>
<i>Hygroryza spp.</i>	<i>Imperata cylindrica</i>			<i>Corchorus capsularis</i>	<i>Colebrookea oppositifolia</i>	Grasses
<i>Imperata cylindrica</i>	<i>Narenga porphyrocoma</i>			<i>Cynodon dactylon</i>	<i>Cymbopogon spp.</i>	Sedges
<i>Narenga porphyrocoma</i>	<i>Themeda spp.</i>			<i>Cyperus rotundus</i>	<i>Dalbergia sissoo</i>	
<i>Oryza rufipogon</i>	<i>Ziziphus mauritiana</i>			<i>Desmostachya bipinata</i>	<i>Imperata Cylindrica</i>	

<i>Phragmites kakra</i>				<i>Grewia sapida</i>	<i>N. porphyrocoma</i>	
<i>Saccharum spontaneum</i>				<i>Imperata cylindrica</i>	<i>P.kakra</i>	
				<i>Phragmites kakra</i>	<i>Phoenix humilis</i>	
				<i>Saccharum munja</i>	<i>S.spontaneum</i>	
				<i>Saccharum spontaneum</i>	<i>Themeda spp.</i>	
					<i>Vitiveria zizanioides</i>	
					<i>Z.mauritiana</i>	

Table 2: Food plants of Barasingha reported in previous study



Figure 5: Barasingha feeds of aquatic florae during summer season



Figure 2: Barasingha feeds of grasses during monsoon season



Figure 6: Barasingha standing near the water bodies during summer season



Figure 3: Barasingha feeds of aquatic plant species



Figure 4: Barasingha feeds of grasses during monsoon season

IV. CONCLUSION

The Barasingha is regarded as a food specialist and graminivore, depending solely on grassland for its survival, and diet composition may vary according to season and food availability. They are selective only in monsoon, the time of abundant food supply, and are non-selective or opportunistic feeders in summer when food is limited. Long term survival and conservation of herbivores depend on the availability of suitable habitats; hence, protection of the plant species utilized by herbivores is a significant factor in conservation biology.

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