

## Ecological Studies on Feeding Habits of Rhesus Monkey at BBBCRF in District Jind (Haryana), India

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(Received : November 3, 2022; Accepted : December 8, 2022)

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### ABSTRACT

Point count, scan sampling and direct contact methods were used to observe the food and feeding habits of Rhesus Monkey in Bir Bara Ban Conservation Reserve Forest in district Jind of Haryana (India). Rhesus macaques were found to feed on 22 species of trees, namely, *Acacia nilotica*, *Acacia leucopholia*, *Albizia lebbek*, *Bauhinia variegata*, *Butea monosperma*, *Parkinsonia aculeata*, *Prosopis cineraria*, *Prosopis juliflora*, *Dalbergia sissoo*, *Eukalyptus hybrid*, *Ficus bengalensis*, *Ficus glomerata*, *Ficus religiosa*, *Morus alba*, *Ficus rumphi*, *Ziziphus mauritina*, *Syzygium cumini*, *Tamarise cumini*, *Crataeva nurvala*, *Salvador apersica*, *Azadirachata indica* and *Cordea dichroma* in the study area. There were also found to feed on 9 species of herbs, shrubs and grasses, namely, *Ziziphus nummularia*, *Capparis separia*, *Brassica compestris*, *Oryza sativa*, *Triticum aestivum*, *Saccharum officinarum*, *Trifolium alexandrium*, *Cheanopodium album* and *Cynodon dactylon* in the study area. Rhesus macaques preferred plant species/parts as food items in maximum amount in the form of pod/fruit (27%) and inflorescences (24%) followed by seed (18%), gum (15%), leaf (7%), bark (7%) and least amount of stem (2%). Similarly, rhesus macaques preferred from herbs/shrubs as food items in maximum amount of leaf (32%) followed by pod/fruit (18%), seed (18%), stem (18%) and least amount of inflorescences (14%).

**Key words:** Food items, herbs, rhesus monkey, shrubs, tree

### INTRODUCTION

Rhesus monkey (*Macaca mulatta*) is the well known species among the old world monkeys. The mega-biodiversity country, India supports eight species of macaques (out of the total 10 species) found in South-Asia part of continent earth. Rhesus macaques are found throughout mainland of Asia; from Afghanistan to India and Thailand to southern China. In India, the sub-species of Rhesus macaques are *Macaca mulatta villosa* and *Macaca mulatta mulatta*. The *Macaca mullatta villosa* is found in the Kashmir and Punjab region of India (the northern part of the country), Pakistan and Afghanistan. However, *Macaca mulatta mulatta* is found in India, Bhutan, Burma, Nepal, Bangladesh, Thailand, Laos and Vietnam (Kumar, 2015).

The endangered and 22 charismatic primate species of the region like Hoolock gibbon (*Hoolock hoolock* and *Hoolock leuconedys*) and Golden langur (*Trachypithecus geei*) have got maximum attention in all the recent distributional and demographic studies. Yet,

there is very few information available about the status of the Rhesus macaques in various protected areas of India. The Rhesus macaque which is a "least concern" species has been put in the Schedule-II category by the Wildlife Protection Act of India, 1972 (amended in 2002). Food availability is influenced by the kind of forest, the variety of plant species, and the distribution and seasonality of food supplies (Neha *et al.*, 2020). Their nutrition is governed by a variety of environmental conditions, such as the state of their habitat and the quantity, calibre and distribution of available resources accessible to them (Khan *et al.*, 2022). It is yet uncertain how plateau macaques adapt to high-altitude habitats in terms of their food and foraging habits (Garber, 2018). Less and scanty information is available on various aspects on feeding habits of rhesus monkey. Hence, the present study was planned to record the ecological studies on food items preferred for feeding by Rhesus Monkey, *Macaca mulatta* (Zimmermann, 1780) in Bir Bara Ban Conservation Reserve Forest in district Jind, Haryana (India).

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**MATERIALS AND METHODS**

Bir Bara Ban Conservation Reserve Forest (29°17' N latitude and 76°16' E longitude) is located on 5 Km away from Jind city on Jind-Hansi road in the district Jind of Haryana (India). It is also known as Bihad which is spread over an area of 419.26 hectares. "Haryana government notified this area as conservation reserve forest on dated October, 2007. Dominant animal species, namely, Neelgai or Blue bull (*Boselaphus tragocamelus*), Jackel (*Canis aureus*), Hanuman Langur (*Presbytis entelles*) and Rhesus Monkey (*Macaca mullata*); dominant birds species, namely, Blue peafowl (*Pavo cristatus*), Rufous treepie (*Dendrocitta vagabunda*), Greater coucal (*Centropus sinensis*), Indian grey hornbill (*Ocyrceros birostris*) and Jungle babbler (*Turdoides striata*); dominant tree species, namely, Kikar (*Acasia nilotica*), Neem (*Azadirachata indica*), Shisham (*Dalbergia sissoo*) and Safeda (*Eucalyptus hybrid*), and

dominant herbs and shrubs species, namely, Bansa (*Adhatoda vasica*), Kandai (*Aegemone maxicana*), Kair (*Capparis desidua*) and Bathua (*Chenopodium album*) are major supported in Bir Bara Ban Conservation Reserve Forest in district Jind (Haryana), India (Fig. 1). Scan sampling method (Kumar, 2014) and direct contact method (Sharma *et al.*, 2018) were used to record the food and feeding habits of Rhesus Monkey. Whenever, individual or troops of Rhesus Monkey were encountered feeding, it was photographed by 3300 D Nikon camera. Those sites where the individual or troops of Rhesus Macaques were observed feeding on particular part of the plant such as seeds/flowers/leaves/bark/gum/stem of tree species, herbs and shrubs were visually scanned and these plants materials were photographed or collected and later identified in the laboratory. Food preference(s) by Rhesus Monkeys were recorded on the basis of the number of instances during which the individuals or troops were found feeding on the

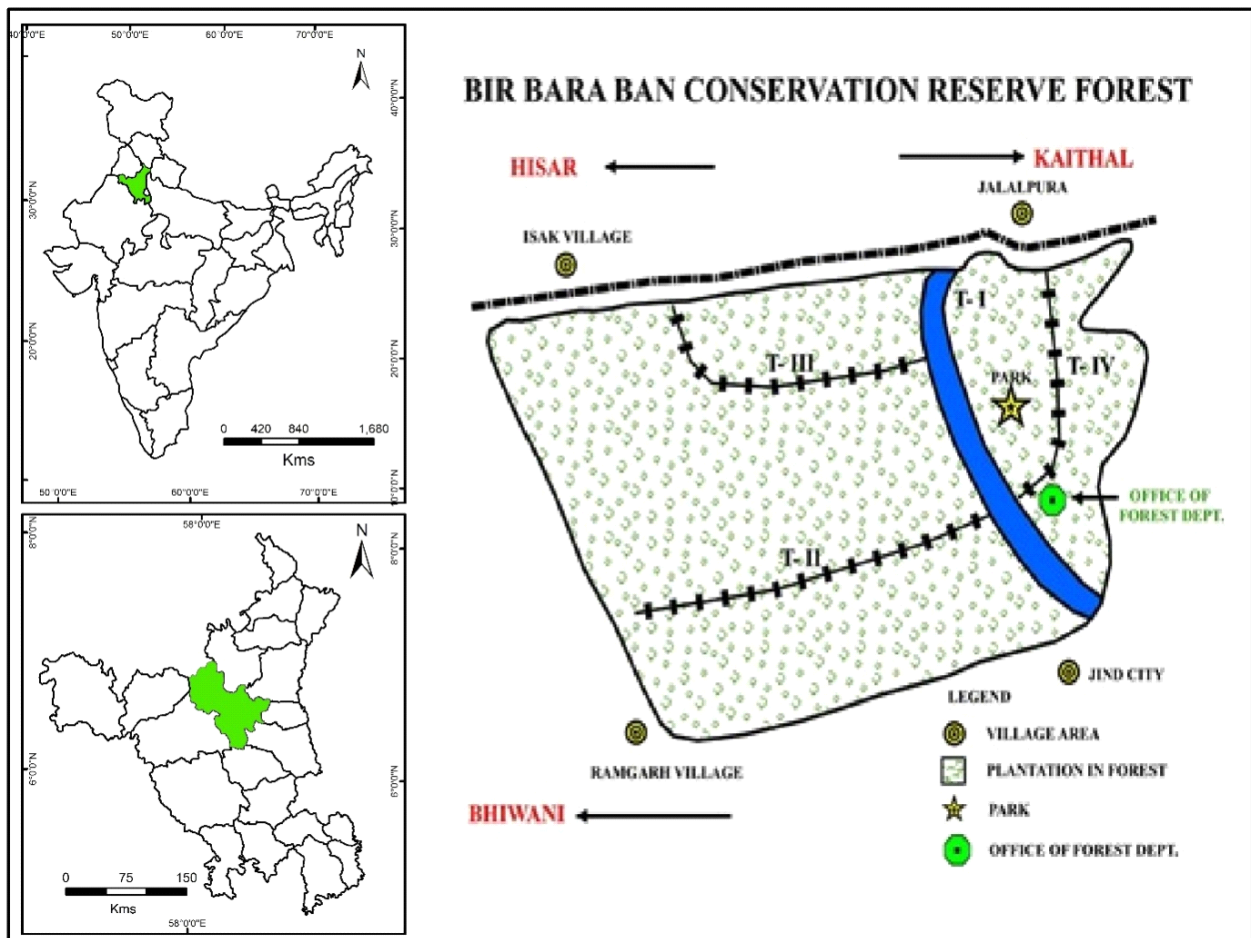


Fig. 1. Bir Bara Ban Conservation Reserve Forest in district Jind (Haryana), India.

particular food items. Food offered by the local people in the study area as well as its nearby areas was also observed.

## RESULTS AND DISCUSSION

The use of a variable foraging strategy is a key mechanism by which monkeys are able to adapt to various habitats, and diet has a significant impact on primate fitness (Cui *et al.*, 2019; Green *et al.*, 2020). Some of the most common food is given to the rhesus macaques in temples include bread, bananas, peanuts, seeds, fruits, vegetables, assorted miscellaneous foods like ice creams and fried bread (Gogoi and Das, 2018). In less human influenced areas, they focus on fruits, flowers, leaves, seeds, gums, buds, clover, roots, bark and they supplement their food diet with termites, grasshopper, ants, beetles and mushrooms and they also eat birds eggs, shellfish and fish (Guan *et al.*, 2018). The seasonal variations in food resources have an impact on macaques, who favour fruits and young leaves (Tang *et al.*, 2016).

Similarly, in the present study, rhesus macaques were found to feed on 22 species of trees, namely, *Acacia nilotica*, *Acacia leucopholia*, *Albizza lebbek*, *Bauhinia variegata*,

*Butea monosperma*, *Parkinsonia aculeata*, *Prosopis cineraria*, *Prosopis juliflora*, *Dalbergia sissoo*, *Eukalyptus hybrid*, *Ficus bengalensis*, *Ficus glomerata*, *Ficus religiosa*, *Morus alba*, *Ficus rumphi*, *Ziziphus mauritina*, *Syzygium cumini*, *Tamarise cumini*, *Crataeva nurvala*, *Salvador apersica*, *Azadirachata indica* and *Cordea dichtomain* in Bir Bara Ban Conservation Reserve Forest (BBBCRF) of district Jind. In present study, rhesus monkey was also found to feed on nine species of herbs, shrubs and grasses, namely, *Ziziphus nummularia*, *Capparis seiparia*, *Brassica compestris*, *Oryza sativa*, *Triticum aestivumv*, *Saccharum officinarum*, *Trifolium alexandrium*, *Cheanopodium album* and *Cynodon dactylon* in the study area (Tables 1 and 2).

In the present study, rhesus macaques preferred plants parts as food items in maximum amount of pod/fruit (27%) and inflorescences (24%) followed by seed (18%), gum (15%), leaf (7%), bark (7%) and least amount of stem (2%) in Bir Bara Ban Conservation Reserve Forest (BBBCRF) (Fig. 2). Also, rhesus macaques preferred herbs/shrubs parts as food items in maximum amount of leaf (32%) followed by pod/fruit (18%), seed (18%), stem (18%) and least amount of inflorescences (14%) in Bir Bara Ban Conservation Reserve Forest (Fig. 3).

**Table 1.** Tree species used for feeding by rhesus monkey, *Macaca mulatta* in Bir Bara Ban Conservation Reserve Forest (BBBCRF) of district Jind

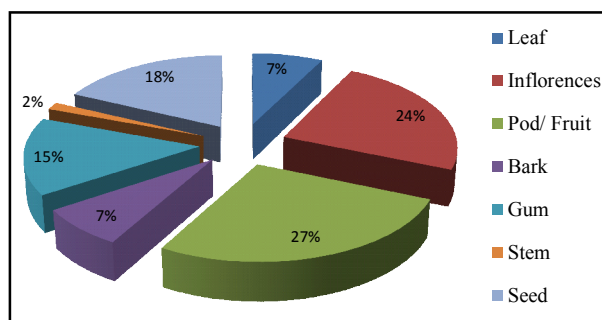
S. No.	Common name	Scientific name	Order	Plant parts						
				L	I	P/F	B	G	SM	S
1.	Kikar	<i>Acacia nilotica</i>	Fabales	+	+	+	+	+	-	+
2.	Nimber	<i>Acacia leucopholia</i>		+	-	-	+	-	-	+
3.	Siris	<i>Albizza lebbek</i>		-	+	+	-	+	-	+
4.	Kachnar	<i>Bauhinia variegata</i>		-	+	+	+	+	-	-
5.	Dhak	<i>Butea monosperma</i>		-	+	+	-	+	-	-
6.	Parkinsonia	<i>Parkinsonia aculeata</i>		-	+	-	-	-	-	-
7.	Jand	<i>Prosopis cineraria</i>		-	+	+	-	+	-	+
8.	Walajtijand	<i>Prosopis juliflora</i>		-	+	+	-	+	-	+
9.	Shisham	<i>Dalbergia sissoo</i>		+	+	+	-	+	-	+
10.	Safeda	<i>Eukalyptus hybrid</i>	Rosales	-	+	-	-	-	-	-
11.	Bargad	<i>Ficus bengalensis</i>		-	-	+	-	-	-	-
12.	Gular	<i>Ficus glomerata</i>		-	+	+	+	-	-	+
13.	Peepal	<i>Ficus religiosa</i>		+	+	+	-	+	-	+
14.	Shahtut	<i>Morus alba</i>		-	+	+	-	-	-	+
15.	Pilkhan	<i>Ficus rumphi</i>		-	+	+	-	-	-	+
16.	Beri	<i>Ziziphus mauritina</i>	Myrtales	-	+	+	-	-	-	+
17.	Jamun	<i>Syzygium cumini</i>		-	-	+	-	-	-	-
18.	Frash	<i>Tamarise cumini</i>		-	-	+	-	-	-	-
19.	Barna	<i>Crataeva nurvala</i>	Brassicales	+	+	+	-	-	+	+
20.	Jaal	<i>Salvador apersica</i>		-	-	-	+	-	-	-
21.	Neem	<i>Azadirachata indica</i>	Spindales	-	-	+	-	+	-	-
22.	Lasura	<i>Cordea dichtoma</i>	Boraginales	-	+	+	-	+	-	-

L-Leaves, I-Inflorescences, P/F-Pod/fruit, B-Bark, G-Gum, SM-Stem, S-Seed, + -Present and - Absent.

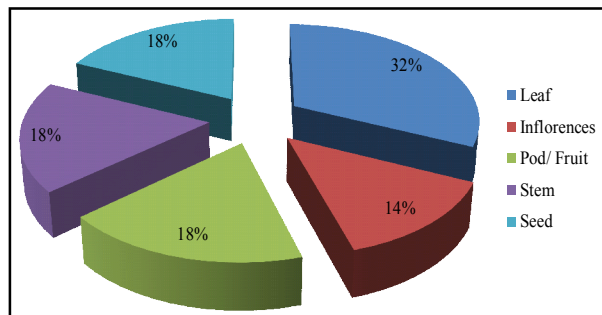
**Table 2.** Herb, shrub and grasses species used for feeding by rhesus monkey, *Macaca mulatta* (Zimmermann, 1780) in Bir Bara Ban Conservation Reserve Forest (BBBCRF) of district Jind

S. No.	Common name	Scientific name	Order	Plant parts				
				L	I	P/F	SM	S
1.	Jhar ber	<i>Ziziphus nummularia</i>	Rosales	-	-	+	-	+
2.	Caper bushes	<i>Capparis seiparia</i>	Brassicales	+	-	-	-	-
3.	Mustered	<i>Brassica campestris</i>	Brassicales	+	+	+	+	+
4.	Paddy	<i>Oryza sativa</i>	Poales	+	+	+	-	+
5.	Wheat	<i>Triticum aestivumv</i>	Poales	+	+	+	+	+
6.	Sugarcane	<i>Saccharum officinarum</i>	Poales	-	-	-	+	-
7.	Barseem	<i>Trifolium alexandrium</i>	Fabales	+	-	-	+	-
8.	Amaranths	<i>Cheanopodium album</i>	Caryaphyllalles	+	-	-	-	-
9.	Grass	<i>Cynodon dactylon</i>	Poales	+	-	-	-	-

L-Leaves, I-Inflorescences, P/F-Pod/fruit, B-Bark, G-Gum, SM-Stem, S-Seed, + Present and -Absent.



**Fig. 2.** Part of tree species preferred for feeding by rhesus monkey, *Macaca mulatta* (Zimmermann, 1780) in Bir Bara Ban Conservation Reserve Forest (BBBCRF) of district Jind.



**Fig. 3.** Herb, shrub and grass species part preferred for feeding by rhesus monkey, *Macaca mulatta* (Zimmermann, 1780) in Bir Bara Ban Conservation Reserve Forest (BBBCRF) of district Jind.

Earlier coworkers observed that rhesus macaques were also found to feed on fruits, and they supplemented their food diet with ants, beetles, termites, grasshopper, mushrooms, birds eggs, shellfish and fish (Tomar and Sikarwar, 2014). Similarly, in the present study, rhesus macaques were also found to feed on insect species, namely, termites (*Microtermes* sp.), leaf hopper

(*Graphocephala* sp.), spotted bollworm (*Earias* sp.), dung beetle (*Sisyphus* sp.) and ant (*Anoplolepis* sp.) in study area (Table 3). Rhesus macaques were also found to feed on various food items (mainly fruits) such as gram (*Cicer arientinum*), banana (*Musa* sp.), watermelon (*Citrullus lanatus*), groundnut (*Arachis hypogaea*), apple (*Malus* sp.), orange (*Citrus reticulata*), roti/chapatti and gurh provided by human in the study area (Table 4).

**Table 3.** Insects species used as food by rhesus monkey, *Macaca mulatta* (Zimmermann, 1780) in Bir Bara Ban Conservation Reserve Forest (BBBCRF) of district Jind

S. No.	Insects species		
	Common name	Scientific name	Order
1.	Termites	<i>Microtermes</i> species	Blattodea
2.	Leaf hopper	<i>Graphocephala</i> species	Hemiptera
3.	Spotted bollworm	<i>Earias</i> specis.	Lepidoptera
4.	Dung beetle	<i>Sisyphus</i> species	Coleoptera
5.	Ant	<i>Anoplolepis</i> species	Hymenoptera

**Table 4.** Food items offered by human being used by rhesus monkey, *Macaca mulatta* (Zimmermann, 1780) in Bir Bara Ban Conservation Reserve Forest (BBBCRF) of district Jind

Food items offered by human being	
Food items	Scientific name
Gram	<i>Cicer arientinum</i>
Banana	<i>Musa</i> species
Watermelon	<i>Citrullus lanatus</i>
Groundnut	<i>Arachis hypogaea</i>
Apple	<i>Malus</i> species
Orange	<i>Citrus reticulata</i>
Roti/chapati	-
Gurh	-

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