

FOOD HABIT OF RHESUS MACAQUE IN URBAN AREA: A CASE STUDY OF JIND CITY, HARYANA STATE

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Abstract: *Rhesus macaque is a wild animal that adopts urban ecosystems due to rapid urbanization, expansion of agricultural land, deforestation, and encroachment of human activities in forest areas. The food sources and food items of Rhesus macaques are relatively different in urban ecosystems. In this study, an attempt has been made to know from which sources Rhesus macaques get their food in urban areas and what kind of food they get, and an attempt has also been made to know how their food habits in urban areas are different from those in forest areas. This study was conducted in Jind city, Haryana, between July and December 2023. To fulfil the objectives, two methods were used: the first was the scan sampling method with 10 minutes of observation and a 5-minute interval, and the second was the schedule method for people's perceptions about the food habits of Rhesus macaque. Findings indicate that Rhesus macaque preferred to consume provisioned food (gram, jaggery, bananas, bread, vegetables, fried food, etc.) rather than natural food (leaves, coppals, roots, etc.). Their activity budget shows that they spend 35 percent time resting, 27.81 percent moving, 23.81 percent feeding, and 13.81 percent grooming. In this study, the share of feeding time in the activity budget of Rhesus macaque is relatively less in urban areas compared to forest areas.*

Key words: Activity Budget, Food Habit, Urban Ecosystem, Rhesus Macaques

Introduction

Rhesus macaque is an old-world monkey that is very close to humans. Its geographical distribution is broad, found in 11 countries in southern and southeast Asia, namely India, Afghanistan, Pakistan, Nepal, Myanmar, Vietnam, Bangladesh, Bhutan, Thailand, and Laos (Fooden 2000). As per the IUCN, Rhesus macaque is a least concern species. It is largely vegetarian but occasionally omnivorous when they do not find natural food (Sikarwar S.L.R, 2014). Rhesus macaques have special cheek pouches in which they can store food for later consumption. The food habits of Rhesus Macaques depend on a particular region. It means, where they live, their food habit changed accordingly to those situations. A large population of Rhesus macaques eats leaves, fruits, and flowers, as well as some animals (Sikarwar S.L.R, 2021; Zhang K; Karim F; Jin Z et al., 2022). In less human-influenced areas, monkeys consume mostly natural foods such as leaves, fruits, flowers, and buds. They mainly feed twice a day, in the early morning and evening, before returning to their night sleeping site (Selvaraj I). Their dependency on supplementary and provisioned food indicates that it will be harmful for their conservation success. Understanding the feeding ecology would help in the planning and management of macaques in urban areas (Ganguly I., Chauhan S.N, 2018). For macaque's survival and health, there should be a balance between provisioned and natural food items (Gogoi S and Das N. A, 2018).

Objective

- To understand the food habits of rhesus macaques in urban areas.
- To understand the people perception for rhesus macaques in urban area.

Methodology

In this research, primary data has been collected by the schedule and scan sampling methods. To understand the food habit of rhesus macaques in urban areas, a schedule has been designed that contains some perception questions that are related to the monkey food habit. The questions in this schedule are related to the general perception of people, such as: a) What types of food items have been eaten by monkeys? b) Do you offer food items to monkeys? c) In which area does the monkey get maximum food? d) What do monkeys like to eat? The scan sampling method is also used to understand the food habits of monkeys. Total 50 hours spent during the scan sampling of monkey food behaviour. Each scan sample sheet covers 10 minutes of observation with 5 minutes of sample interval. Collected data by this method has been arranged in table form and interpreted. MS Word and MS Excel are used for the documentation of the report.

Study Area

Jind city is located in the north-middle of Haryana and about 125 kilometres away from Delhi. It spreads over 2702 square kilometres. The latitude lies between 29.03' and 29.51, and the longitude lies between 75.53' and 76.47' E. It shares boundaries with seven districts such as Kaithal, Karnal, Panipat, Sonapat, Rohtak, Hisar, and Fatehabad. And Kaithal, Karnal, Panipat, and Sonapat lie in the south-east of Jind district, Rohtak in the south, Hisar, and Fatehabad in the north-west of Jind district (Jindcity.com). The mean maximum temperature and minimum temperature of this district are 41°C (May and June) and 6°C (January). The annual rainfall is 515 mm. Sandy loam soil is found in Jind district.

Result

Table 1 shows the food items consumed by rhesus macaque. 69.40 percent of respondents say that rhesus macaques preferred to eat fruit and leaves; 7.83 percent of respondents said that they eat bread; and 22.38 percent of respondents said that they preferred to consume insects. While 0.37 percent of respondents said that rhesus macaque consumes all things like fruit, insects, bread, leaves, etc.

Table 01: Food Items Consumed by Monkey

#	Food items	No. of Respondents	Respondents Percentage
1	Fruits/leaves	138	69.40
2	Bread	16	7.83
3	Insects	45	22.38
4	All	1	0.37
5	Total	200	100

Source: Field survey, 2023

Table 2 shows the causes of why rhesus macaques are coming from urban areas to forest areas. 52.50 percent of respondents said that rhesus macaques are coming for food because they get easily artificial food items like gram, carrots, ice cream, guava, etc. While 47.49 percent of respondents said that they are coming for habitat because they are losing their natural habitat.

Table 02: Why Monkey Come into the City

#	Reasons	No. of Respondents	Respondents Percentage
1	For food	105	52.50
2	Habitat	95	47.49
3	Total	200	100.00

Source: Field survey, 2023

Table 3 shows the stealing habit of rhesus macaques in urban areas. 45.99 percent of respondents say that that monkey steals some food items from homes; evenly, they open the refrigerator's door to steal something. While 37.38 percent of respondents say that monkeys also steal clothes on the roofs of their houses. And 16.61 percent of respondents said that they steal everything from the houses and shops.

Table 03: Items Taken by Monkey

#	Items	No. of Respondents	Respondents Percentage
1	Food	92	45.99
2	Clothes	75	37.38
3	All	33	16.61
4	Total	200	100

Source: Field survey, 2023

This table shows the identified food sites where monkey gets their food. 6.40 percent of respondents say that monkeys get maximum food items from the village. 51.80 percent of respondents say that they get maximum food from the city. Respectively, 20.08 percent of respondents said that monkeys get maximum food from the temple, where many people provide some food items like gram, jaggery, bananas, etc. While 21.68 percent of respondents said that monkeys get maximum food from all places.

Table 04: Food Sites for Monkey

#	Place	No. of Respondents	Respondents Percentage
1	Village	13	6.40
2	City	104	51.80
3	Temple	40	20.08
4	All place	43	21.68
5	Total	200	100

Source: Field survey, 2023

This table shows the favorite food of monkeys in the urban area of Jind City. 34.25 percent of respondents claim that fruit is more preferable for their dietary composition. 26.50 percent of respondents say that monkey eats bread/chapatti. 2.75 percent and 28.25 percent of respondents claim to eat vegetables and grams by monkey. Respectively, 4.75 percent and 2.25 percent of respondents say that monkey eats biscuits and chips. 0.50 percent of

respondents say that monkey eats halwa whenever people offer halwa. But 0.75 percent of respondents claim to eat all types of food items by monkey.

Table 05: Favorites Food of Monkey

#	Food	No. of Respondents	Respondents Percentage
1	Fruit	68	34.25
2	Chapatti/bread	53	26.50
3	Vegetable	06	2.75
4	Gram	56	28.25
5	Biscuit	10	4.75
6	Chips	04	2.25
7	Halwa	01	0.50
8	All	02	0.75
9	Total	200	100

Source: Field survey, 2023

This table shows that which food items is maximum provide by people to monkeys in urban ecosystem. 64.35 percent of respondents say that fruits are the most provided items by people to monkey. 14.85 percent of respondents say that people offer vegetables to monkeys. 19.14 percent of respondents say that chapatti is provided by people to monkeys. But 1.60 percent of respondents say that people provide biscuits to monkeys.

Table 06: Food Items Given by People to Monkey

#	Food	No. of Respondents	Respondents Percentage
1	Fruit	129	64.35
2	Vegetable	30	14.85
3	Bread/Chapatti	38	19.14
4	Biscuit	03	1.60
5	Total	200	100

Source: Field survey, 2023

This table shows the causes of monkey's deaths. Out of total respondents, 16.49 percent of respondents say that monkeys die due to diseases. And 9.76 percent of respondents say that monkeys die due to hunger. 40.40 percent of respondents say that the monkeys die by current. 33.33 percent of respondents say that monkeys die by road accident.

Table 07: Causes of Monkey Death

#	Reason	No. of Respondents	Respondents Percentage
1	Disease	33	16.49
2	Hunger	19	9.76
3	By current	81	40.40
4	Road accident	67	33.33
5	Total	200	100

Source: Field survey, 2023

This table shows the activity budget of rhesus macaques in Rani Talab Temple of Jind City. It means in which activity rhesus macaques spend more time. Total of the 50 hours, 23.81 percent time of a day spent in feeding, 35.16 percent time of a day in resting because they easily get food in urban areas. 27.81 percent of the day is spent in moving. 13.81 percent of daytime is spent in grooming.

Table 08: Activity Budget of Rhesus Macaques in Rani Talab Temple

#	Category of activity of Rhesus Macaques	Percentage
1	Feeding	23.81
2	Resting	35.16
3	Moving	27.81
4	Grooming	13.21
5	Total	100

Source: Field survey, 2023

Observation

To know the feeding behaviour of rhesus macaques, two sites are selected. One site was Bir Bara Ban, which is situated on the periphery of the city, and the second was Rani Talab Temple, which is situated in the middle of the city. We observed that monkeys smell everything before eating. In Rani Talab Temple, we observed that Rhesus macaques feed natural food (leaves, buds, coppals, barks, roots) in the early morning (7 to 9 o'clock). Where are some plants, namely Neem, Pipal, Sahtoot, Baniyan, Jamun, Gulmohar, Singapore graveyard, Argentina mesquite, and Kikkar. They also consume provisioned food like biscuits, chapatti, and aloo ki tikki, gram, millet, bananas, coconut, bread, etc. When monkeys eat gram, they peel the cover of the gram by hand before eating, and sometimes teeth are used to remove the peel of the gram. When many types of food items are available for eating, the monkey likes bananas the most. They peel bananas before eating and mostly collect food in their cheek pouches. We also observed that an adult male is trying to peel the coconut with their hands. Alpha males show aggression towards females when they want to eat food. Before drinking the water, monkeys clean the upper layer of the water and then drink it. Man-Monkey conflict occurs when monkeys snatch food items from people.

In Bir Bara Ban, we observed that there is competition for getting food among monkeys in forest areas rather than the urban ecosystem. High-ranking individuals spend more time in feeding than the low-ranking individuals, and female monkeys also spend less time in feeding than the males. One day, we offer gram to monkey group in which around two males and six to seven females. These two males were alpha males. We observed that alpha males were eating gram fastly without the cover of gram, but female monkeys were not eating the gram because they were afraid of alpha males. When they eat guava, mostly forest monkeys eat only the inner part of it, and after this they throw it. We can say that forest Rhesus macaques mostly depend on natural food items like leaves, coppals, roots, and buds for their eating.

Discussion

A significant study on the feeding ecology of Rhesus macaques in India was carried out by Lindburg (1976); Makwana (1979); Malik (1983, 1986); Malik and Southwick (1988); Gupta and Kumar (1991); Wolfe (1992); Pirta et al. (1997). But no comprehensive study was carried out in the Jind Urban ecosystem about the food habits of Rhesus macaques. Rhesus macaques largely share human food resources (Gupta 2001) and depend on cultivated crops, plants, and garbage (Lee et al. 1986; Sangeeta tomar; R.L.S. Sikarwar 2014). Similarly, our study matches with this statement. Urban Rhesus macaques preferred to consume provisioned food like biscuits, chapatti, carrots, ice cream, gram, millet, bananas, etc., as well as natural food. In urban areas, they are highly dependent on humans for food (Southwick et al. 1976). We observed that temple rhesus macaques more depend on visitors for food. Even macaques were seen to snatch and steal anthropogenic food resources from the houses and shops. Feeding behavior is also associated with human macaques's conflict. This conflict occurs when macaques raid on crops in villages near forest areas and insufficient supply of natural food and food plants nearby temples (Air, 2015). On the contrary, forest Rhesus macaques consume natural food, namely fruits, flowers, buds, leaves, young shoots, twigs, bark, roots, pith, and resin of gymnosperms, angiosperms, and fungi (Fooden, 2000). Rhesus macaques in Bir Bara Ban preferred to consume natural food like leaves, coppals, roots, bark, flowers, shoots, etc. In troops (groups) of rhesus macaques, high-ranking individuals spend more time feeding than low-ranking individuals. Competition occurs when macaques get food. They use threats and physical attack (Sageeta Tomar; R.L.S. Sikarwar, 2014). Feeding is the most preferred activity of forest Rhesus macaques, but it was the least observed activity in urban habitats (Malik, 1986; Seth and Seth, 1986). We also observed the same phenomena

in urban ecosystems. Urban Rhesus macaque was found to spend 23.81 percent of its time in feeding.

Conclusion

This study shows the feeding behaviour of rhesus macaques in Jind city. For this purpose, it is trying to know the people's perceptions as well as field observation. A total of 200 respondents gave different opinions about the food habits of Rhesus macaques. Findings indicate that whenever there are available lots of food items like millet, jaggery, gram, bread, and bananas, so they prefer to consume bananas rather than the other items. Monkeys consumed more provisioned food than the natural food in urban areas. After consuming natural food, they prefer to drink water. We observed that monkeys spend more time on the ground rather than the trees. Activity budget of Rhesus Macaques in Rani Talab Temple shows that monkeys spend 35.16 percent in resting, 27.81 percent in moving, 23.81 percent in feeding, and 13.21 percent in grooming out one day.

Suggestions

1. People should not provide artificial food items to monkeys, as it affects their immune systems.
2. People should grow many fruit trees around the periphery of the temple so that monkeys mostly use natural food items for their eating.
3. The authority of the Jind district should place restrictions on the selling of artificial food items to monkey.
4. There should be restrictions on the cutting of trees around the periphery of the Rani Talab temple.

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