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Anthropogenic Influences on Feeding Behaviour of Fruit Bats

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Abstract

Fruit bats are ecologically important mammals that contribute significantly to seed dispersal, pollination, and maintenance of biodiversity in tropical ecosystems. However, increasing anthropogenic activities such as urbanization, deforestation, agricultural expansion, pesticide application, and artificial lighting have considerably altered their natural feeding behaviour and habitat utilization. The present study investigates the impact of anthropogenic influences on the feeding behaviour of fruit bats in semi-urban and fragmented ecosystems. Field observations were conducted in orchards, agricultural landscapes, urban green spaces, and disturbed forest habitats to evaluate feeding preferences, habitat selection, seasonal feeding activity, and behavioural adaptation of fruit bats under human-induced environmental changes.

The results revealed that fruit bats increasingly depend on cultivated fruit crops such as mango, banana, guava, and papaya due to reduction of natural forest resources. Urban green spaces and orchards served as major feeding grounds, while fragmented forests provided limited foraging opportunities. Anthropogenic disturbances significantly influenced feeding patterns, with artificial lighting and habitat destruction causing reduced nocturnal activity and altered foraging routes. Pesticide exposure also affected food resource quality and feeding frequency.

Seasonal variations in feeding activity were observed, with higher dependence on cultivated fruits during periods of natural food scarcity. Fruit bats exhibited adaptive feeding strategies by utilizing alternative food resources in urbanized landscapes. Despite such adaptability, continuous habitat degradation negatively affects nutritional balance, reproductive success, and ecological functions of bats.

The study highlights the ecological consequences of anthropogenic disturbances on bat feeding ecology and emphasizes the need for conservation-oriented habitat management. Preservation of

native fruit-bearing vegetation, reduction of pesticide usage, and establishment of urban green corridors are essential for sustaining healthy fruit bat populations and maintaining ecosystem stability. The findings underscore the importance of integrating wildlife conservation with sustainable urban planning to ensure long-term ecological resilience.

Keywords: Anthropogenic impacts, Feeding behaviour, Urbanization, Habitat fragmentation, Seed dispersal.

1. Introduction

Fruit bats are among the most ecologically significant mammals in tropical and subtropical ecosystems due to their important roles in pollination, seed dispersal, and forest regeneration. These nocturnal mammals, mainly belonging to the family Pteropodidae, depend heavily on fruit-bearing vegetation for their nutritional requirements. Through their feeding activities, fruit bats contribute to maintenance of plant diversity and ecological stability. However, increasing anthropogenic disturbances have substantially altered their feeding ecology and habitat utilization patterns.

Anthropogenic activities such as urbanization, deforestation, agricultural intensification, industrialization, and infrastructure development are major causes of habitat degradation worldwide. Natural forests are increasingly fragmented into isolated patches, reducing availability of native fruiting trees and roosting habitats for bats. As a result, many fruit bat species have adapted to human-modified landscapes such as orchards, urban gardens, agricultural fields, and roadside vegetation.

Feeding behaviour of fruit bats is strongly influenced by food availability, habitat quality, and environmental conditions. In natural ecosystems, bats primarily consume fruits rich in sugars, water, and nutrients. However, habitat loss forces bats to exploit cultivated fruit crops including mango, banana, guava, and papaya. Such behavioural adaptation enables survival in disturbed environments but also increases human–bat conflict due to crop damage.

Artificial lighting is another major anthropogenic factor affecting bat behaviour. Excessive illumination in urban areas may disrupt nocturnal movement patterns, feeding efficiency, and predator avoidance strategies. Similarly, pesticide application in agricultural lands reduces food quality and may expose bats to toxic substances through contaminated fruits and nectar.

Urbanization also alters plant diversity and seasonal food availability. Native fruiting plants are often replaced by ornamental species with limited ecological value, thereby reducing feeding opportunities for bats. Habitat fragmentation can increase foraging distance and energy expenditure, negatively affecting reproductive success and survival.

Despite these challenges, fruit bats exhibit remarkable ecological adaptability. Their ability to exploit alternative food resources and modified habitats demonstrates behavioural flexibility under environmental stress. Nevertheless, long-term anthropogenic disturbances may threaten population stability and reduce ecological functions such as seed dispersal and pollination.

Understanding the influence of human activities on fruit bat feeding behaviour is therefore essential for biodiversity conservation and ecosystem management. Studies on feeding ecology, habitat utilization, and behavioural adaptation provide valuable insights into the ecological responses of bats to environmental change.

The present study aims to investigate anthropogenic influences on the feeding behaviour of fruit bats with emphasis on habitat alteration, food resource utilization, seasonal feeding patterns, and ecological consequences in disturbed ecosystems.

2. Objectives of the Study

1. To study the feeding behaviour of fruit bats in human-modified landscapes.
2. To identify anthropogenic factors affecting bat feeding ecology.
3. To analyze habitat utilization patterns of fruit bats.
4. To evaluate seasonal changes in feeding activity.
5. To assess ecological consequences of anthropogenic disturbances on fruit bats.

3. Methodology

3.1 Study Area

The study was conducted in semi-urban landscapes, orchards, agricultural lands, urban green spaces, and fragmented forest habitats.

3.2 Study Species

The major fruit bat species observed during the study included:

- *Pteropus giganteus*
- *Cynopterus sphinx*
- *Rousettus leschenaultii*

3.3 Data Collection

Field observations were conducted during evening and night hours for six months. Feeding activity, habitat utilization, fruit preference, and behavioural responses to anthropogenic disturbances were recorded using direct observation and photographic documentation.

3.4 Sampling Techniques

- Transect observation method
- Habitat assessment survey
- Fruit debris analysis
- Roost monitoring
- Seasonal vegetation survey

3.5 Data Analysis

Collected data were analyzed using percentage analysis and graphical representation to evaluate feeding preference, habitat utilization, and anthropogenic impacts.

4. Results and Discussion

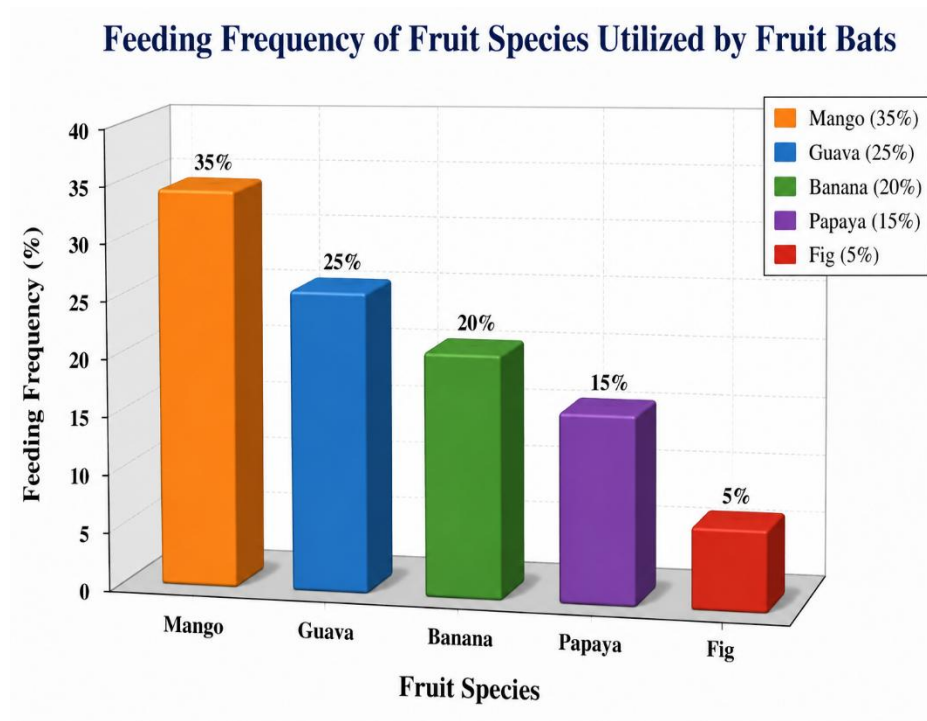
4.1 Preferred Food Resources in Human-Modified Habitats

Fruit bats increasingly utilized cultivated fruit crops in semi-urban landscapes.

Table 1. Preferred Food Resources of Fruit Bats

Fruit Species	Feeding Frequency (%)
Mango	35
Guava	25
Banana	20
Papaya	15
Fig	5

Figure 1: Preferred Food Resources of Fruit Bats in Human-Modified Habitats



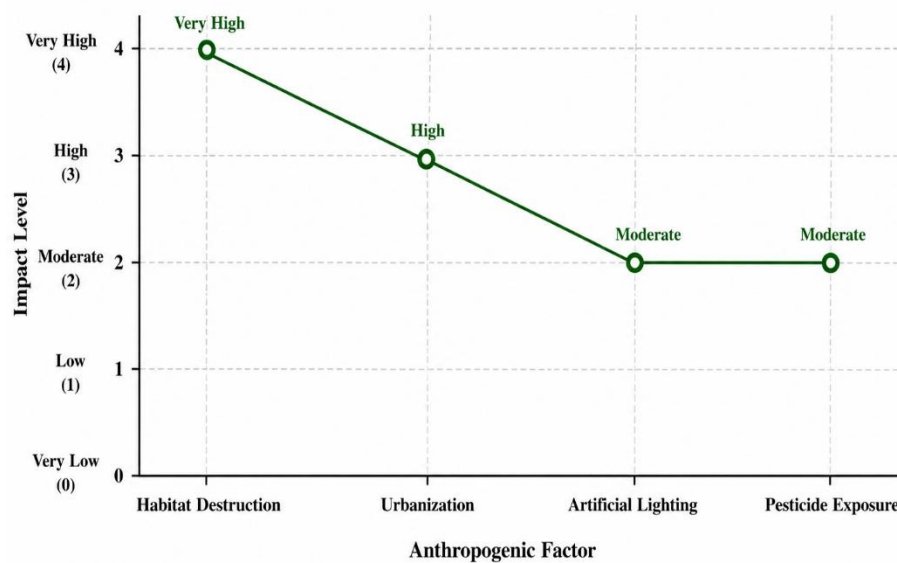
Mango and guava were the most preferred food resources due to their abundance in cultivated landscapes. Reduced dependence on wild figs indicates habitat alteration and limited natural food availability.

4.2 Anthropogenic Factors Affecting Feeding Behaviour

Several human-induced factors significantly influenced feeding activity.

Table 2. Anthropogenic Factors Affecting Fruit Bats

Anthropogenic Factor	Impact Level
Habitat Destruction	Very High
Urbanization	High
Artificial Lighting	Moderate
Pesticide Exposure	Moderate

Figure 2: Anthropogenic Factors Affecting Feeding Behaviour**Impact of Anthropogenic Factors on Feeding Behaviour of Fruit Bats**

Habitat destruction represented the greatest threat affecting feeding ecology of bats. Urbanization and artificial lighting altered natural foraging routes and feeding efficiency.

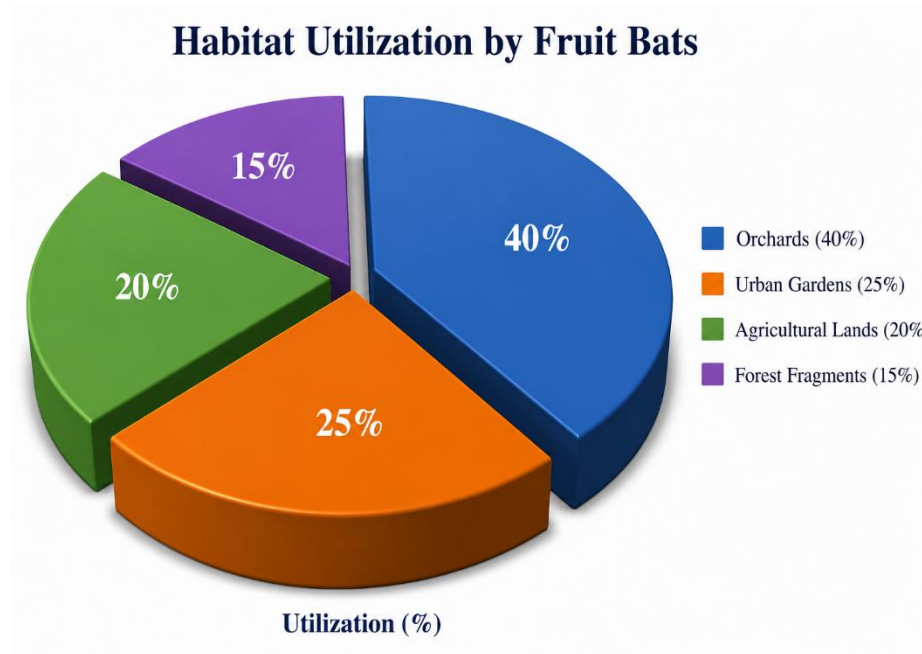
4.3 Habitat Utilization Patterns

Fruit bats utilized multiple habitats depending on food resource availability.

Table 3. Habitat Utilization by Fruit Bats

Habitat Type	Utilization (%)
Orchards	40
Urban Gardens	25
Agricultural Lands	20
Forest Fragments	15

Figure 3 :Habitat Utilization Patterns of Fruit Bats



Orchards served as the primary feeding habitats because of abundant fruit availability. Forest fragments provided limited feeding opportunities due to habitat degradation.

4.4 Seasonal Feeding Activity

Seasonal food availability influenced feeding intensity and habitat preference.

Table 4. Seasonal Feeding Activity of Fruit Bats

Season	Feeding Activity (%)
Summer	45
Monsoon	35
Winter	20

Maximum feeding activity occurred during summer due to abundance of cultivated fruits. Lower activity during winter may be associated with reduced fruit availability.

5. Discussion

The present study demonstrates that anthropogenic activities significantly influence feeding behaviour and habitat utilization patterns of fruit bats. Habitat destruction and urbanization reduce natural feeding resources, forcing bats to increasingly depend on cultivated fruit crops. Similar behavioural adaptation has been reported in several tropical urban ecosystems.

The preference for mango, guava, and banana reflects the abundance of cultivated fruits in disturbed landscapes. Artificial lighting and pesticide exposure negatively affected nocturnal feeding activity and food quality. Habitat fragmentation also increased dependency on orchards and urban green spaces.

Despite environmental disturbances, fruit bats exhibit considerable ecological adaptability by utilizing alternative food resources and modified habitats. However, long-term habitat degradation may reduce ecological functions such as seed dispersal and pollination, ultimately affecting ecosystem sustainability.

Conservation of native fruit-bearing vegetation, ecological corridors, and roosting habitats is therefore essential for maintaining healthy fruit bat populations and reducing human–bat conflicts.

6. Summary and Conclusion

The study highlights the strong influence of anthropogenic activities on feeding behaviour and habitat utilization of fruit bats. Habitat destruction, urbanization, artificial lighting, and pesticide exposure significantly alter feeding ecology and reduce natural food availability.

Fruit bats adapt to disturbed environments by utilizing cultivated fruits and urban green spaces. However, continuous habitat degradation threatens ecological stability and biodiversity conservation. Preservation of native vegetation, sustainable agricultural practices, and urban habitat management are necessary for long-term conservation of fruit bats.

Future research may focus on behavioural adaptation, nutritional stress, and ecological consequences of urbanization on bat populations.

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