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Columba livia (Pigeon's) Role in Ecological Enrichment

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Abstract

The rock pigeon is the world's oldest domesticated bird. Pigeons have held historical importance to humans as food, pets, holy animals, and messengers. Due to their homing ability, pigeons have been used to deliver messages, including during the world wars. Pigeons play diverse and vital roles in ecosystems. In rural and urban ecosystems, pigeons fulfil several important ecological roles. As primary consumers, they form a significant part of the food chain, supporting substantial predation by various urban predators. While they themselves are preyed upon by birds of prey such as falcons and hawks, pigeons also serve as essential seed dispersers, aiding in the growth and spread of various plant species by consuming fruits and seeds. Additionally, their occasional consumption of nectar-rich flowers allows them to contribute to pollination, albeit to a lesser extent compared to specialized pollinators. Overall, pigeons act as urban and rural keystone species, influencing trophic levels as both primary consumers and prey for urban raptors.

Keywords: Columba livia, Ecosystem, Seed dispersal, Pollination

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Introduction

The domestic pigeon, *Columba livia*, likely descended from the rock dove, known for nesting and roosting on natural rock formations like cliffs, gorges, and caves. Feral pigeons found in urban areas are descendants of escaped domesticated birds, utilizing human-made structures' ledges akin to how rock doves use natural rock formations. These feral pigeons form groups ranging from pairs to large, loosely organized flocks for feeding and roosting. Despite their communal behavior, pigeons are territorial creatures, fiercely defending their roosting and nesting spaces. During breeding seasons, pairs are typically monogamous, with males separating females from the rest of the flock.

Primarily seed eaters, domestic pigeons also consume a variety of grains, fruits, berries, vegetation, and small invertebrates like snails. With over 200 distinct breeds, some bred for racing or exhibition purposes, certain traits in pigeons may lead to welfare concerns. Hence, careful consideration is necessary when selecting breeds for laboratory use. Throughout history, pigeons have held significance for humans as sources of food, companionship, sacred animals, and messengers. Today, they remain crucial in laboratory research, particularly in fields such as endocrinology and genetics.

Ecological role of birds

Birds indeed hold immense importance in ecosystems due to their diverse ecological roles:Many bird species, such as hummingbirds and certain songbirds, play essential roles in pollinating flowers. As they feed on nectar, pollen sticks to their bodies and is transferred from flower to flower, facilitating the reproduction of flowering plants and the production of seeds and fruits. Birds consume a variety of seeds and fruits as part of their diet. Through their movements and droppings, birds help disperse seeds to new locations, aiding in the colonization of plant species and promoting biodiversity across different habitats. Birds, particularly scavengers like vultures and crows, play vital roles in recycling nutrients within ecosystems. By consuming carrion and organic matter, these birds help break down dead organisms and return nutrients to the soil, contributing to soil fertility and ecosystem health.Some bird species, such as insect-eating birds like swallows and warblers, help control insect populations by preying on pests that can damage crops and vegetation. Their predation helps maintain ecological balance and reduce the need for chemical pesticides. Birds form mutualistic relationships with plants, particularly those that rely on bird pollination or seed dispersal. In exchange for nectar, birds assist in pollination, ensuring the reproductive success of flowering plants. Overall, birds play multifaceted roles in ecosystems, contributing to the functioning and resilience of natural systems. Understanding and conserving bird populations are crucial for maintaining biodiversity and ecosystem health.

Most common birds in Tamilnadu

Tamil Nadu has over 2,000 species of fauna, including a rich wildlife due to its favorable climate, vegetation, and diverse relief features. Tamil Nadu boasts a rich and varied landscape encompassing hills, coasts, forests, and wetlands, offering diverse habitats for a plethora of bird species. The following are most common birds found in the region, each renowned for its vibrant plumage, distinctive behaviors, and specialized adaptations to thrive in the varied environments of Tamil Nadu.

1. House crow
2. Common myna
3. Large-billed crow
4. Rose-ringed parakeet
5. Rock pigeon
6. Asian koel
7. Common tailorbird
8. Red-vented Bulbul.

Feral pigeons

From ancient times, pigeons have been emblematic of peace, love, and purity, drawing tourists to many renowned locations. Pigeons possess remarkable intelligence, often compared to the Raven, a renowned symbol of intelligence in the avian world. Their visual acuity surpasses that of humans, enabling them to perceive details that escape our notice. Pigeons demonstrate cognitive abilities such as numerical recognition, distinguishing numbers from one to nine. Moreover, they exhibit a remarkable aptitude for recognizing human faces and interpreting facial expressions, especially in individuals with whom they have developed a relationship. This cognitive prowess highlights the complexity of pigeon cognition and their remarkable capacity for social interaction with humans.

Typically found in urban areas, these pigeons, known as 'Feral pigeons,' freely roam cities, establishing nests wherever space permits.

Pigeons role in ecological enrichment

Pigeons not only add to the natural beauty but also play a crucial role in balancing the urban ecosystem. While their growing numbers may pose challenges, managing their population can help maintain environmental equilibrium.

1. Pigeons' Role in Waste Cleanup:

Pigeons aid in cleaning up urban areas by consuming seeds, nuts, vermin, and insects, which often accumulate in garbage. Their scavenging behavior contributes to swift waste disposal. Firstly, pigeons aid in waste cleanup by consuming various organic materials found in urban areas. Their diet includes seeds, grains, fruits, and insects, which are commonly found in discarded food scraps and other organic waste. By foraging on the streets and in public spaces, pigeons help prevent the accumulation of organic matter, reducing the potential for pest infestations and foul odors associated with decaying waste.

Moreover, pigeons contribute to waste cleanup through their natural behaviors, such as pecking and scratching at surfaces. This behavior helps to dislodge and break down organic debris, facilitating its decomposition and eventual assimilation into the environment. Additionally, pigeons' droppings, or guano, contain valuable nutrients such as nitrogen, phosphorus, and potassium. When deposited on surfaces, these nutrients contribute to soil fertility, promoting the growth of vegetation and facilitating the decomposition of organic matter.

2.Insect Control:

By preying on vermin and insects attracted to trash, pigeons help prevent the spread of pests and the associated mess, reducing the risk of zoonotic diseases. Although pigeons primarily feed on seeds, grains, and vegetation, they also consume small invertebrates like insects, particularly when they are readily available. In urban areas where food sources may be limited, pigeons may supplement their diet with insects found in parks, gardens, and other green spaces.

3. Pigeons Impact Habitat Formation

Pigeons play a role in shaping and altering habitats through their nesting behaviors. They construct simple nests using twigs, leaves, and various materials in diverse locations such as cliffs, ledges, buildings, bridges, and trees. As nesting materials and droppings accumulate over time, they transform the physical attributes of nesting sites, forming microhabitats that can benefit other bird species and wildlife.

4. Pigeons' Role in Nutrient Circulation within Ecosystems

Pigeons play a vital role in ecosystem nutrient cycling through their feeding and nesting activities. Their droppings, known as guano, are rich in essential nutrients like nitrogen, phosphorus, and potassium. When deposited in the environment, pigeon guano serves as a valuable fertilizer, enriching soil fertility and stimulating plant growth. In natural habitats, accumulations of pigeon guano act as significant nutrient reservoirs, benefiting soil microorganisms, plants, and various other organisms, thereby contributing to the overall health and productivity of ecosystems. When pigeons pass away and fall to the ground, they become food for various insects, including ants. They're busy creating countless tiny tunnels in the soil, which serve as pathways for water, nutrients, and oxygen to reach deeper into the earth. Interestingly, in the absence of oxygen, roots can rot and perish. So, in an unexpected twist, the carcass of the pigeon plays a role in sustaining plant life. Ants transport numerous small meat fragments into their tunnels, inadvertently aiding in the nourishment of plants above ground.

5. Seed Dispersal:

Pigeons play a vital role in ecosystem maintenance by dispersing seeds, promoting the growth of vegetation in various locations. This facilitates the proliferation of trees, contributing to biodiversity conservation efforts. Pigeons play a crucial role as seed dispersers for numerous plant species, especially those bearing fleshy fruits. As pigeons ingest these fruits, the seeds largely remain intact through their digestive

system and are subsequently excreted in their feces. This mechanism aids in the dispersal of seeds away from the parent plants, allowing them to germinate and thrive in new locations. By facilitating the establishment of new individuals, pigeon-mediated seed dispersal promotes genetic diversity within plant populations, contributing to the resilience and sustainability of ecosystems.

6. Role of Pigeon in Pollination

Though pigeons aren't specialized pollinators like bees or butterflies, they can inadvertently aid in pollination when they visit nectar-producing flowers. While feeding on nectar or pollen, pigeons may inadvertently transfer pollen between flowers, facilitating cross-pollination and promoting genetic diversity within plant populations. While their contribution to pollination may be less pronounced compared to other animal pollinators, pigeons can still play a role in the reproductive success of certain plant species.

7. Economic Significance:

Pigeons have been historically valued for their role as a food source and tourist attraction. Tourists often favour destinations with abundant pigeons for their scenic beauty, enhancing the economic appeal of such areas. Additionally, their waste-cleaning behavior reduces local cleaning costs and provides a nutritious food source for urban residents, thereby bolstering public health and the urban economy.

8. Supporting Predatory Animals:

Pigeons serve as prey for both humans and other predatory animals, maintaining a balanced ecosystem and supporting the natural food chain. Pigeons fulfill an important role as prey for a diverse array of predators, including birds of prey like hawks, falcons, and owls, as well as mammals such as foxes and raccoons, and reptiles like snakes. Being a readily accessible food source, pigeons contribute significantly to supporting the populations of predator species. Their presence in the food chain helps maintain the balance and functioning of ecosystems by providing sustenance for various predators, thereby contributing to the complexity and stability of food webs.

9. Religious and Cultural Importance:

Pigeons hold symbolic significance in various religious traditions, representing purity and harmony. Pigeons have been esteemed by humans for millennia, playing significant roles in culture, history, and society. Descended from wild rock doves, domesticated pigeons have served various purposes, including messenger duties, racing competitions, and as ornamental pets. Pigeon racing boasts a rich tradition and continues to be a beloved pastime in many nations.

Furthermore, pigeons hold revered status as symbols of peace, freedom, and spirituality across diverse cultures and religions. For instance, the dove symbolizes peace and reconciliation in Christianity, Judaism, and Islam, drawing from narratives such as Noah's Ark and the dove bearing an olive branch. They are often revered in many religious sites hosting flocks of pigeons as a symbol of compassion and connection to the divine.

Conclusion

In conclusion, pigeons fulfil crucial ecological roles as seed dispersers, prey for predators, contributors to nutrient cycling, creators of habitat, potential pollinators, and bearers of cultural and historical significance. Despite being sometimes disregarded as urban pests, pigeons play integral parts in maintaining ecosystem functionality and resilience. Their deep intertwining with human culture and society underscores their importance beyond mere urban inhabitants.

Overall, pigeons play integral roles in both urban and rural ecosystems by facilitating seed dispersal, influencing trophic dynamics, contributing to nutrient cycling, modifying habitats, and aiding in pest control. Understanding and conserving these ecological functions are essential for maintaining the biodiversity and sustainability of rural environments.

By acknowledging and valuing the ecological contributions of pigeons, we can cultivate greater awareness and spur conservation efforts to safeguard these remarkable birds and the ecosystems they inhabit. Recognizing pigeons' multifaceted roles fosters a deeper understanding of urban biodiversity and promotes harmonious coexistence between humans and wildlife. This scenario underscores a fundamental principle of nature: everything within the biosphere operates in harmony with one another, except perhaps for Homo sapiens. It's a reminder of the interconnectedness of all living things and the vital roles they play in sustaining ecosystems.

References

1. Blechman, A. D. (2007). *Pigeons: the fascinating saga of the world's most revered and reviled bird*. Open Road+ Grove/Atlantic.
2. Burger, J. (1995). A risk assessment for lead in birds. *Journal of Toxicology and Environmental Health, Part A Current Issues*, *45*(4), 369-396.
3. Dunmore, R. (1968). Plumage polymorphism in a feral population of the rock pigeon. *American Midland Naturalist*, 1-7.
4. Capoccia, S., Boyle, C., & Darnell, T. (2018). Loved or loathed, feral pigeons as subjects in ecological and social research. *Journal of Urban Ecology*, *4*(1), juy024.
5. Krautwald-Junghanns, M. E., Zebisch, R., & Schmidt, V. (2009). Relevance and treatment of coccidiosis in domestic pigeons (*Columba livia* forma domestica) with particular emphasis on toltrazuril. *Journal of Avian Medicine and Surgery*, 1-5.
6. Gilbert, M. Thomas P.; Shapiro, Michael D. (2014). "Pigeons: Domestication". Encyclopedia of Global Archaeology. pp. 5944–5948. doi:10.1007/978-1-4419-0465-2_2214. ISBN 978-1-4419-0426-3.
7. Jerolmack, C. (2008). How pigeons became rats: The cultural-spatial logic of problem animals. *Social problems*, *55*(1), 72-94.
8. Levi, Wendell (1977). The Pigeon. Sumter, S.C.: Levi Publishing Co, Inc. ISBN 978-0-85390-013-9.
9. Schilderman, P. A., Hoogewerff, J. A., van Schooten, F. J., Maas, L. M., Moonen, E. J., Van Os, B. J., ... & Kleinjans, J. C. (1997). Possible relevance of pigeons as an indicator species for monitoring air pollution. *Environmental health perspectives*, *105*(3), 322-330.
10. Toro, H., Saucedo, C., Borie, C., Gough, R. E., & Alcaino, H. (1999). Health status of free-living pigeons in the city of Santiago. *Avian pathology*, *28*(6), 619-623.
11. Yalden, D. W. (1980). Notes on the diet of urban kestrels. *Bird study*, *27*(4), 235-238.

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