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Not Waste in a Nest, but Waste as a Nest: Plastic Plates as Primary Structural Foundations in Rock Pigeon (*Columba livia* Gmelin, 1789) Nesting

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ABSTRACT

Due to the rapid expansion of the human population, which has replaced agricultural and natural ecosystems with urban areas to provide homes and jobs for people. Natural habitats within and around cities have been decreased, transformed, and fragmented. Certain urban-dwelling bird species use newly available resources for foraging or nest building. Breeding success may be positively or negatively impacted by artificial nest materials. Since the parents of the rock pigeons (*Columba livia*) in this study used a plastic bottom tray saucer as a nest, it is possible that variations in the optimal temperature required for the development of embryos and chicks caused the nest to collapse.

Keywords: Bird nest, urbanisation, urban nesting, anthropogenic waste, anthropogenic pressure, breeding success, *Columba livia*

1. INTRODUCTION

Natural habitats within and around cities have been reduced, altered, and fragmented as a result of the rapid growth of the human population, which has replaced agricultural and natural

ecosystems with urban areas to provide housing and employment for people. Due to the loss of food, freshwater, and nesting resources, many native species of arthropods, reptiles, amphibians, mammals, and birds have experienced sharp population declines as a result of these changes to natural ecosystems. Some bird species that have settled in urban areas make use of the newly accessible resources for constructing nests or feeding. Artificial nest materials may either have positive or negative effects on breeding success (Corrales-Moya et al., 2021). In terrestrial habitats, the inclusion of human-derived materials into bird nests is extensively documented (Heinze et al., 2025). Certain species use anthropogenic items (such as plastics, metal wires, and cigarette butts) that are more readily available in urban environments to build their nests. Certain anthropogenic elements have been linked in some studies to enhanced nest durability or persistence, while other research finds adverse effects, including entanglement risk or decreased nestling condition and survival (Candan Biler & Çelik, 2025).

The rock pigeon, *Columba livia*, is a cosmopolitan human commensal (Tang et al., 2018), domesticated about 5,000 years ago (Briskie & Shorey, 2021). The Blue Rock Pigeon's *Columba livia* nest is a flimsy collection of a few sticks on a ledge or in a fissure of a cliff, or on rafters and ceilings of dwelling houses, deserted or occupied. Two white, elliptical eggs. All domestic duties are shared by both sexes (Ali, 2002).

In this study, rock pigeons (*Columba livia*) used a plastic bottom-tray saucer as a nest, and breeding success was affected by this altered nesting biology influenced by unscientific urbanisation.

2. MATERIALS AND METHODS

From 4th June to 24th June 2025, the rock pigeon's (*Columba livia*) nest was observed with open eyes from a safe distance at Belegghata, Kolkata 700010, West Bengal, India (Figure 1). Study area map generated using QGIS 3.34.3.

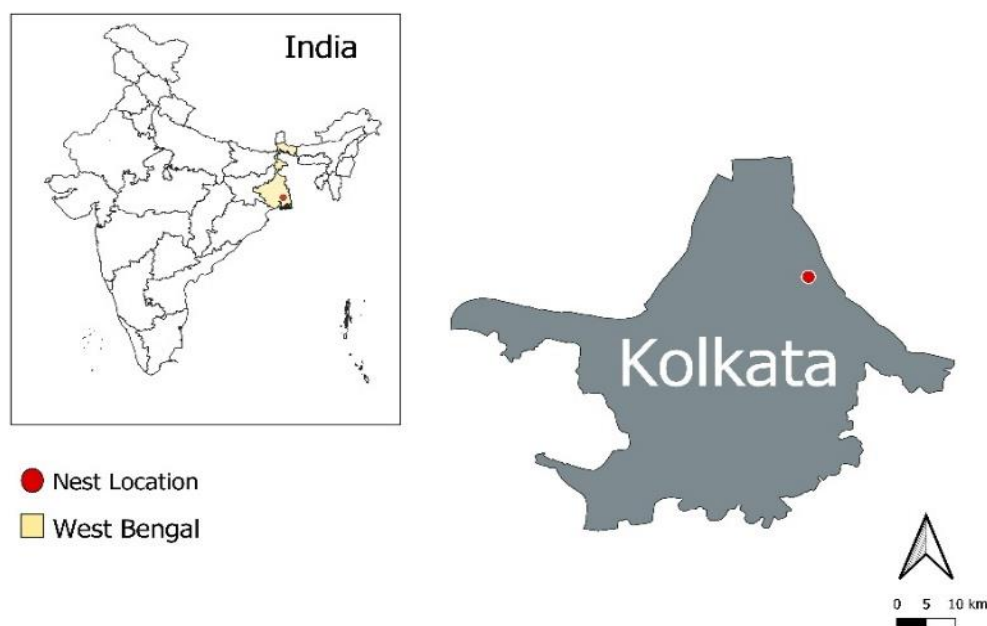


Figure 1. Study area - Kolkata West Bengal, India.

3. RESULTS AND DISCUSSION

On 4th June, 2025, a pair of rock pigeons (*Columbia livia*) was observed gathering a few small natural sticks and laying two eggs in an unused plastic bottom tray saucer of a plantation pot in a small window garden, right along the frequently used staircase. They used this unused plastic bottom tray saucer as a nest (Figure 2). From 4th June to the next 14 days, both parents shared all domestic duties, including incubation. Then, suddenly, they left the nest and never returned.



Figure 2. Rock pigeon (*Columbia livia*) & unused plastic bottom tray saucer nest.

To the best of our knowledge, however, it is unknown how the thermal characteristics of nests are affected using artificial materials. However, it is well established that even small variations in incubation temperature affect the development of embryos and chicks. Therefore, embryonic and chick development may suffer if artificial nest materials alter the ideal temperature range for incubation (Corrales-Moya et al., 2021). In this study, these rock pigeons (*Columba livia*) used a plastic bottom-tray saucer as a nest, so most probably changes in the

ideal temperature needed for the development of embryos and chicks likely altered the nest, causing it to fail.

4. CONCLUSIONS

This case study demonstrates that using a plastic bottom-tray saucer from a plantation pot as the primary structural foundation of the nesting substrate directly contributed to incubation failure in the observed pair of Rock Pigeons (*Columba livia*). The synthetic material most likely altered microclimatic conditions and prevented the stable temperature regulation required for successful embryonic development. While urban avian species increasingly adapt to anthropogenic litter for nest construction, this observation highlights an ecological trap in which novel materials compromise reproductive success.

Further systematic studies with larger sample sizes are needed to evaluate the broader demographic impacts of synthetic nest materials on Kolkata's urban bird populations.

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