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Different Nesting Sites, Feeding Ecology and Behaviour of the Indian Myna (*Acridotheres tristis*)

Anshu* and Dr. Arvind Kumar**

* Assistant Professor-Zoology, Govt. Girls Degree College, Kharkhoda, Meerut, anshusandeep2114@gmail.com

**Corresponding author, Associate Professor-Zoology, GDC BB Nagar Bulandsahar, U.P., zooaayush@gmail.com

Abstract

The Indian Myna (*Acridotheres tristis*, Linnaeus 1766), a member of the family Sturnidae within order Passeriformes, represents one of the most behaviourally plastic avian species inhabiting the Indian subcontinent. This field study, conducted from February to May 2025 under natural conditions, systematically documents the diversity of nesting site selection, nest construction and modification strategies, feeding ecology and their habits in a peri-urban population. Photographic documentation was obtained using a 64.0 megapixel 20× zoom camera. Findings indicate that the species exhibits remarkable cognitive flexibility in habitat exploitation, selecting sites that optimise safety from predators, thermoregulatory ventilation, proximity to food sources, and structural stability. Dietary composition was predominantly insectivorous during the breeding season, with deliberate preference for high-protein prey items delivered to nestlings. Nest hygiene maintenance, territorial radii (approximately 5–10 m²), cooperative post-fledgling flight tuition, and re-nesting behaviour following fledgling independence are described in detail. The results contribute to understanding the ecological success and urban adaptability of this species, with implications for urban ecology and avian conservation management.

Keywords: Indian Myna, Nesting Site, Feeding Ecology, Urban Avifauna, Nest Modification

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1. Introduction

The Indian Myna commonly known as the Common Myna or sometimes spelled Mynah, is a robust, omnivorous passerine bird. Distributed throughout the Indian subcontinent and now widely naturalised across southern Asia, Australia, parts of Africa, and several Pacific island archipelagos (Feare & Craig, 1999), this species is classified as one of the world's 100 most invasive species by the IUCN Invasive Species Specialist Group (Lowe et al., 2000). Its ecological

and evolutionary success is attributable to a combination of behavioural plasticity, dietary opportunism, and an extraordinary capacity to exploit anthropogenically modified landscapes. Taxonomically, the species belongs to the order Passeriformes and genus Acridotheres literally "grasshopper hunter" a name that reflects its ancestral dietary specialisation for orthopteran insects (Rasmussen &Anderton, 2005). Morphologically, the Common Myna is a medium-sized bird (body length 23–26 cm, body mass 80–145 g, wingspan 120–142 mm) characterised by brown plumage, a glossy black head, a distinctive yellow orbital skin patch, yellow bill, and yellow tarsi (King et al., 1975). Pronounced sexual dimorphism in body size exists: male body length averages 239.1 ± 8.8 mm compared with 227.7 ± 5.3 mm in females, and male tail length is 90.7 ± 0.7 mm compared with 80.6 ± 1.5 mm in females (Dhandhukia& Patel, 2016). Despite this size differential, the species is otherwise monomorphic in plumage, complicating field sexing.

From an ecological perspective, nest site selection is among the most consequential decisions avian species make each breeding season, directly influencing clutch size, hatching success, and fledgling survival (Li & Martin, 1991). Suboptimal nest site selection has been demonstrated to reduce reproductive success significantly in numerous bird species (Frederick, 1986). The Indian Myna naturally occupies cavities in trees, rock faces, building walls, and reclaimed nests of other bird species (Kaur & Khera, 2014; Dhandhukia & Patel, 2012). In peri-urban and urban habitats, however, this species has expanded its nest site repertoire to include electric poles, hollow iron pipes, traffic signal housings, highway underpasses, and even improvised human structures such as cardboard boxes. While the species' general biology has been documented across South Asia (Ali & Ripley, 1983; Bakhtawar et al., 2016), detailed field accounts quantifying nest site characteristics, behavioural budgets during parental care, nest maintenance frequencies, and post-fledgling pedagogical behaviour in Indian peri-urban settings remain limited.

1.1 Taxonomic and Phylogenetic Context

Within the family Sturnidae, *Acridotheres tristis* is one of approximately 25 species within the genus *Acridotheres* (Chris et al., 1999). Molecular phylogenetic analyses position the Common Myna within a clade of omnivorous, cavity-nesting mynas that diverged from Old World starlings approximately 5–8 million years ago during the late Miocene. This evolutionary history predisposed the lineage towards exploitation of pre-existing cavities rather than open-cup nesting, conferring enhanced protection from nest predators and thermal extremes (Feare & Craig, 1999). The species vocalisations are complex and include learned elements, contributing to its popularity in aviculture and its capacity for cultural transmission of alarm calls.

1.2 Urban Ecology and Anthropogenic Adaptation

Urbanisation represents perhaps the most significant ecological transformation occurring globally in the 21st century. The Indian Myna is considered a model organism for studying avian responses to urbanisation due to its demonstrated capacity to shift nest site selection, dietary composition, and territorial behaviour in response to human infrastructure (Lalremsanga et al., 2020). Studies in Mizoram (Lalremsanga et al., 2020) have documented nest box occupation rates of 42.40% in disturbed/non-forested areas, substantially higher than in undisturbed forest zones,

suggesting that habitat modification, while potentially negative for many species, actively facilitates Myna reproductive success through provision of novel cavity sites and increased food availability in the form of domestic waste and commensal insects.

2. Materials and Methods

2.1 Study Site and Period

The study was conducted from February to May 2025 at a peri-urban research site in India under fully natural conditions. The study area encompassed a mixed-use landscape including residential buildings, small commercial establishments, roadside vegetation (Ficusreligiosa, Mangiferaindica, Azadirachtaindica), and open ground, typical of settlements across northern India. Observations were concentrated in the early morning (06:00–09:00 IST) and early evening (15:00–18:00 IST) hours, coinciding with peak foraging and nest provisioning activity in this species.

2.2 Observational Protocol

Behavioural observations were conducted using GOR Standard 10×50 binoculars for distant assessment and direct observation for close-range interactions. All nests (natural sites and nest boxes) were monitored daily through the egg-laying phase (clutch completion), incubation, nestling development, and fledging. Nest contents were accessed using a 12-foot wooden ladder. Photographic documentation was obtained with a Realme GT Master Edition mobile camera (64.0 megapixel, 20× extended optical zoom) under natural illumination, without supplementary flash to minimise disturbance. Clutch size (egg count), feeding frequency, nest maintenance events, and territorial interaction episodes were recorded per observation session. Welfare constraints were strictly observed: no nests, eggs, nestlings, or adult birds were harmed, handled, or displaced at any point during the study.

2.3 Feeding Behaviour Assessment

Feeding behaviour was assessed through direct focal observation of individual adults and through controlled substrate trials. In one trial, cooked rice and small pieces of flatbread (roti) were placed at 2 m from the nest to assess parental food preference and allocation between self-consumption and chick provisioning. In a second trial, a ripe banana and ripe edible barley were simultaneously presented, and the birds' selection behaviour was recorded. Foraging distance from the nest and inter-foraging interval duration (time between successive provisioning visits) were estimated from direct observation.

Fig. 1. Adult bird in hole of wall

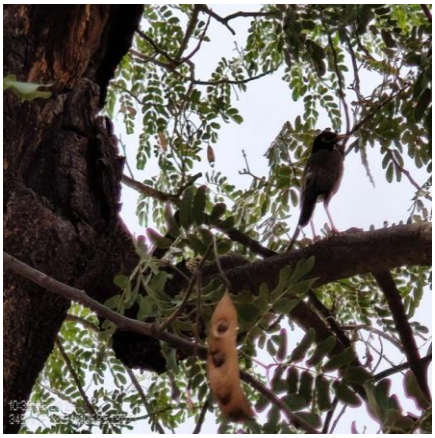

Fig. 2. An observed hole in a tree used for a nesting site (tree cavity)

3. Results and Discussion

3.1 Nesting Site Selection and Diversity

One of the most striking findings of the present study is the remarkable diversity of nest sites exploited by the Indian Myna within a relatively small geographic area. Natural cavity sites including hollow branches, rock crevices, and cavities in old building masonry were occupied alongside a range of anthropogenic structures. The most unusual documented example was a commercial cardboard box (approximately 30 × 30 cm) secured by rope and suspended outside a shop front by the shopkeeper: the female laid four eggs in this improvised cavity, completing a full clutch. This finding corroborates earlier reports of Myna exploitation of cardboard and other non-conventional materials (Feare& Craig, 1999) and underscores the species' capacity to evaluate structural stability and predator-exclusion properties of novel substrates independently of material composition. The deployment of ten standardised wooden nest boxes resulted in rapid occupation, with the first nest commencing construction within 14 days of box erection. Box selection correlated with proximity to known foraging patches and height above ground, consistent with predictions from nest site selection theory (Li & Martin, 1991). Shared occupation between Common Myna and co-nesting species was also recorded: rose-ringed parakeet (Psittaculakrameri), oriental magpie robin (Copsychussaularis), spotted owlet (Athene brama), and house sparrow (Passer domesticus) were all documented at nest boxes at various periods. This interspecific nesting proximity resulted in occasional territorial disputes, resolved invariably in favour of the Myna through aggressive displacement behaviour.

Table 1. Summary of nesting site types documented in the study area

Nesting Site Type	Description	Height (m)	Eggs Observed
Cardboard box (shop-hung) (located 05 nesting sites)	Man-made improvised nest	2-3	24
Wooden nest box (Found nesting in 06 box out of 10 box)	22×20×26 cm, 7 cm hole	1.5–3	31
Wall cavity / hollow (located 02 nesting sites)	Natural cavities in old buildings	2–8	9
Electric pole box (located 02 nesting sites)	Cavity in high-tension infrastructure	4–40	8
Hollow tree cavity (located 03 nesting sites)	Natural arboreal sites	3–7	16
Underpass of highway (located 8 nesting sites)	Anthropogenic sheltered site	2–6	39
Hollow iron pipe (railway) (located 01 nesting sites)	Industrial anthropogenic site	3–5	4

3.1.1 Nest Site Selection Criteria

Through systematic observation, the following hierarchically organised selection criteria were identified in the order of apparent behavioural priority:

(i) **Predator exclusion:** Sites were consistently selected for structural features that physically exclude or impede access by common nest predators including corvids (Corvussplendens), kites (Milvus migrans), and mongoose (Herpestesedwardsii). The preference for cavities with narrow entrance apertures (7 cm diameter in nest boxes; 6–9 cm in natural cavities) reflects evolutionary selection for clutch protection.

(ii) **Thermal regulation:** All occupied sites demonstrated adequate ventilation for thermoregulatory control of nest microclimate, critical during the pre-monsoon breeding period when ambient temperatures frequently exceed 40°C. Cavity orientation and depth influenced air circulation within the nest chamber.

(iii) **Proximity to food sources**: Nest sites were consistently within 50–200 m of reliable food patches (open turf, refuse areas, cultivated plots). No nest was observed at distances

exceeding 200 m from identified foraging sites, consistent with the energy-minimisation hypothesis for central-place foraging.

(iv) **Surveillance** capacity: Adult birds demonstrated clear preference for sites from which one or both parents could maintain continuous visual monitoring of the entrance from nearby elevated perches (tree branches, electricity cables, building parapets).

(v) **Structural stability:** Unlike annual open-cup nesting species, the Indian Myna selected sites with demonstrated load-bearing capacity sufficient for repeated nest construction, modification, and fledgling movement.

Fig. 3. Adult myna bird prepare their nest

Fig. 4. Adult myna out side the nest

3.2 Nest Construction, Material Selection, and Modification

Nest construction was observed as an exclusively biparental activity, with both male and female contributing approximately equally to material gathering and deposition. Each construction cycle (departure from nest box to return with material) required 15–25 minutes, with 3–5 cycles completed per hour during peak construction phases. Materials incorporated into the nest included dried grass stems, shed bird feathers (both own species and heterospecific), fresh neem leaves (*Azadirachtaindica*), eucalyptus leaves, tissue paper, thin metal wire, small rubber fragments, and pieces of cloth. The incorporation of fresh green leaves, particularly neem a species with documented insecticidal and antimicrobial properties is consistent with the "green material" hypothesis (Gwinner et al., 2000), which proposes that aromatic plant materials serve as fumigants reducing ectoparasite load within the nest cup.

Nest modification was observed as a continuous, throughout-season process rather than a discrete pre-laying phase. The nest interior was dynamically restructured in response to nestling growth: as chick body volume increased, large items including polythene fragments, dried leaves, and old feathers were removed and discarded, effectively increasing available space within the cavity. Nest sanitation behaviour was highly regular: waste material (including chick faecal sacs and debris) was removed from the nest cavity at an estimated frequency of 3–4 times per hour during daylight hours. Faecal sacs from nestlings consisting of mucous-enclosed uric acid deposits were removed by beak, carried externally, and discarded at distances of 3–10 m from the nest, a behaviour consistent with nest sanitation reducing predator olfactory detection (Petit et al., 1989).

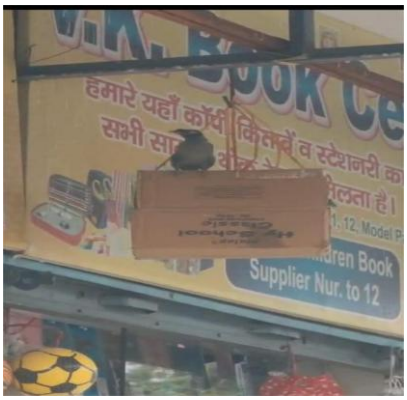

Fig. 5. Myna bird nesting site in cardboard box

Fig. 6. Adult Myna bird, nesting site in wooden box

3.3 Feeding Ecology and Dietary Composition

Feeding behaviour reflected the broadly omnivorous dietary strategy characteristic of the genus, with seasonal variation in prey selection. During the nestling phase, provisioning items were predominantly animal-derived protein sources, specifically: soil-dwelling earthworms (extracted by adults by digging 2–3 cm into soft ground), large ants (particularly species foraging in grass tufts), grasshoppers and other orthopterans, and unidentified small arthropods. This high-protein provisioning strategy is consistent with the demonstrated energetic requirements of rapidly growing passerine nestlings (Ricklefs, 1969), and with the findings of Bakhtawar et al. (2016) who documented peak insect and earthworm frequency in Myna diet during summer months.

For adult self-provisioning, a broader dietary range was recorded including grain (particularly barley, which was enthusiastically consumed in the controlled trial), papaya and other soft fruits, and opportunistically available human food waste (cooked rice and roti were consumed by adults but provided to juveniles only in minimal quantities). Notably, banana offered in the controlled trial was entirely refused by both adults. This selectivity — preference for barley over banana — may reflect post-ingestive feedback mechanisms (or learnt food preferences) rather than simple palatability responses, and warrants further experimental investigation. The species also demonstrated scavenging-adjacent behaviours consistent with urban commensal ecology: adults readily approached areas of domestic food disposal and investigated refuse. These observations align with descriptions of Myna foraging on "domestic edible waste" by Bruggers (1983) and on "fruiting tendrils, coplics and bushes" by Feare and Craig (1999).

Table 2. Dietary items recorded during the study period

Food Category	Examples	Season / Frequency	Recipient
Insects & arthropods	Grasshoppers, ants, arachnids	Year-round; highest summer	Chicks & adults
Earthworms	Extracted from 1–2" soil	Rainy/humid periods	Primarily chicks
Grains & cereals	Barley, wheat seedlings	Highest in winter	Adults & juveniles
Fruits	Papaya, orchard fruits	Summer/monsoon	Mostly adults
Human food waste	Cooked rice, roti pieces	Opportunistic	Adults (small quantity to juveniles)
Reptiles & small mammals	Small lizards, rodent pups	Opportunistic	Adults
Flowering nectar / berries	Fruiting tendrils, coplics	Seasonal	Adults

Fig. 7. Chicks of Myna bird in wooden box

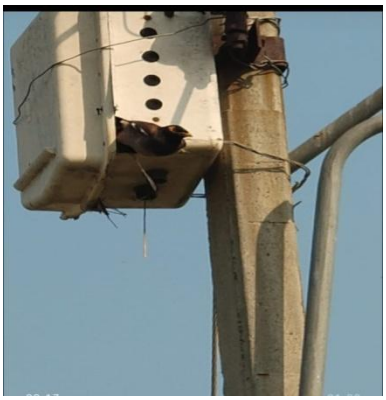

Fig. 8. Juvenile bird in first perch position - post-fledging

3.4 Parental Care, Behavioural Budgets and Nest Monitoring

Both parents participated fully in all phases of parental care including incubation, brooding, chick provisioning, nest sanitation, and territorial defence. This biparental symmetry is consistent with published accounts (East & Perrins, 1988) and reflects the reproductive costs of cavity-nesting in thermally challenging environments, where continuous brooding may be energetically demanding for a single parent. After each provisioning bout (typically consisting of 3–8 feeding insertions per visit), both parents entered a rest phase of 5–25 minutes duration during which they remained in visual proximity to the nest entrance, performing preening (wing and beak cleaning),

head-scratching, body feather alignment, wing-flapping, and vocalisation. These inter-provisioning intervals appeared to serve multiple functions: recovery from the physical demands of provisioning, nest surveillance, and particularly during high-temperature periods thermoregulatory rest in shaded perches near the cavity.

A notable behavioural observation was the pattern of foraging coordination: both parents frequently departed in the same or opposite directions simultaneously, or at 90-degree divergent angles, suggesting a loose but apparent partitioning of foraging space that would minimise competition for prey between mates while maintaining complementary surveillance of the nest area. Inter-foraging return intervals of approximately 5 minutes were recorded for unsuccessful foraging attempts (returns without prey), while successful visits typically required 8–15 minutes depending on prey type and foraging distance.

Fig. 09. Both parents at resting phase above the nest show roosting behaviour

Fig. 10. Adult Myna bird nesting site in hole of under pass

3.5 Territorial Behaviour and Predator Defence

The Indian Myna demonstrated clear territorial behaviour centred on the nest site, with an estimated active defence radius of approximately 5–10 m². Within this zone, adults responded differentially to potential threats based on the perceived predator body size relative to their own. Large birds including jungle crows (*Corvus macrorhynchos*), cattle egrets (*Bubulcus ibis*), black drongos (*Dicrurus macrocercus*), hawk cuckoos (*Hierococcyx varius*), spotted doves (*Streptopelia chinensis*), and feral pigeons (*Columba livia*) triggered immediate cooperative mobbing behaviour from both adults: the pair would vocalise loudly, pursue the intruding bird, and make repeated contact strikes (2–3 attacks per incident) until the intruder vacated the territory. Larger raptors approaching within 5–10 m prompted both parents to respond cooperatively, with one adult ascending to a high vantage point post-defence to survey the broader territory. Small birds including house sparrows (*Passer domesticus*), red-vented bulbuls (*Pycnonotus cafer*), Indian robins (*Copsychus fulicatus*), and wire-tailed swallows (*Hirundo smithii*) were consistently ignored when they entered the vicinity of the nest, suggesting a body-size threshold for threat assessment. This size-dependent threat discrimination is ecologically adaptive, concentrating costly aggressive behaviour on genuine nest predators while avoiding unnecessary energy

expenditure on non-threatening neighbours. Female and male cuckoos (*Cuculus canorus*) observed near the nest were treated as threats and expelled, presumably because cuckoos represent a brood parasitism risk rather than a direct predation threat a cognitively sophisticated threat categorisation.

Fig.11.Adult bird in surveillance posture above nesting site

Fig. 12. Egg, chicks and nesting materials of Indian Myna

Fig. 13. A little chick of Indian myna inside the hole

Fig. 14. Juvenile birds receiving feed from their parents

Fig. 15. Juvenile birds with their parent bird

Fig. 16. A tree hole, natural nesting site for Indian myna

Fig. 17-18. Nesting site of the Indian Myna bird in roof tiles and inside hole of high voltage power line tower

4. Broader Ecological and Conservation Implications

4.1 Urban Adaptability as an Ecological Model

The behavioural data collected in this study collectively illustrate why the Indian Myna has become one of the most successful urban-adapted birds globally. Its cognitive flexibility in nest site selection (demonstrated by willingness to exploit cardboard boxes, iron pipes, and electrical infrastructure), its dietary opportunism, its biparental cooperation in all phases of reproduction, and its capacity to reinitiate nesting almost immediately after fledgling independence all contribute to elevated annual reproductive output relative to ecologically less plastic species occupying similar trophic levels. These traits carry dual conservation significance. From a native species conservation perspective, the Myna's aggressive territorial behaviour and competitive exclusion of cavity-nesting species (sparrows, parakeets, owlets) from preferred sites places it in direct competition with species of conservation concern. Conversely, the species' ecological success in degraded urban habitats where many other cavity-nesters have declined provides a model for

understanding which biological traits confer resilience under anthropogenic landscape transformation.

4.2 Implications for Urban Green Infrastructure Planning

The preference of the Indian Myna for anthropogenic nest structures including those not purposely designed as nest sites (cardboard boxes, electrical conduits, iron pipes) suggests that passive nest site provision via urban infrastructure design represents an unrecognised mechanism shaping avian community composition in cities. Urban planners and ecologists should consider incorporating nest box programmes preferentially targeted at native cavity-nesting species to counterbalance Myna competitive dominance, as has been successfully implemented in parts of Australia (Dhami& Nagle, 2009).

4.3 Feeding Behaviour and Agricultural Impact

The dietary data recorded in this study particularly the consumption of wheat seedlings and standing cereal crops documented in broader literature (Bruggers, 1983), alongside the current documentation of barley preference over fruit has direct relevance to agricultural pest management. While the Myna's insectivorous role during the breeding season provides ecosystem services through suppression of orthopteran pest populations, its grain consumption in winter months represents a documented source of crop damage. Spatially targeted monitoring of Myna nesting density near cereal-growing areas, combined with assessment of dietary switching across seasons, would support evidence-based agricultural management.

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