**Research Article** [Dhandhukia & Patel, 3(8): Aug., 2012]
**CODEN (USA): IJPLCP** **ISSN: 0976-7126**

INTERNATIONAL JOURNAL OF PHARMACY & LIFE SCIENCES

# Selection of nesting sites and nesting material in common myna (*Acridotheres tristis*) in an arban area

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## Abstract

The nest is built in roofs of houses, holes of walls, trees, railway station and wells. Nesting materials were categorized and identified into different groups such as twigs of *Azadirachta indica, Delonix regia, Cocos nucifera*, grass, feathers of birds, plastic, cloth, flowers of *Acacia*, Rubber rings, matal wire and snake slough, which were found in nest cavity. The frequency of *A. indica, A. labback, T. indica, P. dulce, F. tsiela, f. religiosa* and *m. zapota* leaves in the nest was in proportion to the frequency of respective trees around the nest area. However, frequencies of *A. indica* leaves were high compared to other plants in the nest content of Common Myna. Among the animal byproducts used as nesting materials, bird feathers were the most frequent (100%). The weight of material from natural nest varied from 12.4g to 206.5g.

Keywords: Nesting site selection, Nesting material in Common Myna (*Acridotheres tristis)*, Arban area

## Introduction

The Common Myna (*Acridotheres tristis)* a member of the starling family, It is one of the common birds found all over tropical the Asian countries (Ali *et al*. 1983). They build bulky nests in tree cavities, pockets in buildings, and in heavy vegetation. It nests can be also observed in walls where air-conditioners, water drainpipes, open-ended steel rafters, narrow ledges, traffic lights, palm trees *etc*. (Cousilman 1974). They too build nests in roofs of houses and even old wells, in the earthen riverine banks that in some parts, the natives hang out for their use though very rarely (Pell *et al*.1997). Mostly it nests in the habitations of man and their immediate neighborhood. The nest is commonly made up of twigs, grass, straw and feathers and sometimes includes paper.

Selection of nesting site is considered to be one of the most important factors in reproductive success in many birds' species (Coulson 1968, McCrimmon 1978, Ryder and Ryder 1981, Rendell and Robertson 1989, Li and Martin 1991, Tuomenpuro 1991). Nest site selection in some birds such as American White Ibis is strongly affected by the availability of foraging sites (Kushlan 1976a).

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It has been recorded that in some species, reduced reproductive success has been attributed to poor nest site selection (Burger and Miller 1977, Frederick 1986, 1987a). Therefore, the study on nest site requirement of a bird species is fundamental to understand the management implications and its conservation. Common Myna in present study initiated breeding activity in March which lasted up to August, extending over a period of six months.

**Study Area**

The study was confined to Junagadh (21º 31'N and 70º 49' E) city a District head-quarter and a picturesque town, which was the former capital of the Princely State of Junagadh. The city is a gate way to famous Gir Forest which is the natural habitat for the last existing population of Asiatic Lion in the wild. Jungadh has a tropical monsoon climate with three distinct seasons i.e., monsoon, winter and summer.

The nesting sites of Common Myna (A. tristis) were identified viz. Sakkarbaug Zoological Garden (SBZ), Lalbaug (LB), Junagadh Agricultural University Campus (JAU),Raypur Farm Areas (RYP), Police Training Centre (PTC) in Junagadh city area. In this SBZ includes Zoological Garden, LB includes undisturbed and protected area of mixed vegetation of cultivated and natural plants, JAU includes undisturbed farm and garden area,

RYP includes Crops viz., Cotton, Ground nut, Mango, Wheat, Maize, Pearl millet, Mung, Sugar cane, Gram

etc. were cultivated throughout the year and PTC in the foot hills of Girnar with rocky terrain. This area is open ground with grassland patches and randomly disturbed native trees. Surounding lime stone mines provide water source round the year.

## Material and Methods

Data were collected and analyzed as per standard methodology available from ornithological studies. Intensive nest searching was done in every week during January to August during the study period of two years. Binoculars of 10 x 50 were used to scan the area; while scanning, even a single moving bird was followed which provided clues about its nesting. By following this method, a total of 990 natural nests of Common Myna wase identified from 16 deferent sites within the study area. Twenty nests were selected for detailed investigations in five selective sites.

**Nest material**

Surveys were conducted to record nest of mynas; and each nest was labeled. Status of the occupied nest by the myna was recorded as newly built nest or reused old deserted nest of its conspecific. To study the structural aspects of nest, a few nests were collected immediately after completion of breeding. The stick used in the nest was carefully dismantled one by one from the top and numbered serially. Each stick was separated, weighed and identified up to species level with the help of reference collection.

## Results and Discussion

Common Myna was monogamous and territorial during the breeding season. Nesting sites were protected by the bird only during the breeding season, which was from March to August extending over a period of six months. Mynas started constructing their nest in the first week of March.

**Selection of nesting sites**

The nest is built in roofs of houses, holes of walls, trees, railway station and wells. Birds readily accepted nest boxes. Occasionally the old nest of a squirrel is adopted and relined; instances are on record of their nests in a creeper or on the bough of a tree (Whistler 1949; Sengupta 1982; Ali and Ripley 1983).

During this study, it was observed that natural nests were preferred on different sites such as trees, wall, wall, etc. Nests were occupied by Common Myna along with other species such as Rose-ringed Parakeet, Oriental Magpie Robin, and Spotted Owlet. Rose-ringed Parakeet breeds earlier than mynas thus their abundant nests were reused by Common Myna, whereas Spotted Owlet does not allow mynas to nest in their occupied nests. Common Myna was observed to occupy nests of House Sparrow.

The myna may also construct nest in holes on the wall of houses even in city area and old forts. Its colony size is often delimited by the availability of holes in manmade structures like bridge.

Panicker (1980) observed that when barbets completed their breeding, the nest was taken over by Brahminy Mynas at the height of 5.18 to 7.62 meters. Tyagi and Lamba (1984) reported that in nature, a hole in a tree or a wall is the most common. Colonical breeding in this species has also been reported by Ali and Ripley (1983). Intraspecific competition between nest occupants and freshly paired birds occurs, which leads to fight and attacks among adult birds. Occurrence of fresh eggs in a hatching clutch or laying of two clutches in the same box could be the result of scarcity of safe nest sites and extreme intraspecific competition. Such situation is found in European Starling *Sturnus vulgaris* too (Yom-Tov *et al.* 1974), leading to a situation like brood parasitism.

Although selection of natural nesting sites was observed in 16 different places, Common Myna species varied in their preference, depending on biotic and abiotic components. Common Myna being a solitary hole nester could locate a suitable site within habitations and in its proximities. Distance between breeding and feeding sites also played an important role in the selection of breeding sites, along with safety from predators, and interspecific completion.

**Nesting materials**

Nest materials were collected from the nest after the completion of breeding activities. Nesting materials were categorized and identified into different groups such as twigs of *Azadirachta indica, Delonix regia, Cocos nucifera*, grass, feathers of birds, plastic, cloth, flowers of *Acacia*, matal wire and snake slough, which were found in nest cavity (Table 1; Plate 1).

Among the five sites, *A. indica* occurred in four sites and *Cocos nucifera, manikara.zapota, Pithecelobium dulce* and *Delonix regia* in one site. These materials had 100% occurrence at every site, which indicated that twigs or leaves of these trees were preferred for nesting material.

The nest cavity was invariably lined by green leaves. Occurrence of *A. indica* leaves at SBZ, JAU, and RYP was 100%. At LB and PTC it was 75%. Occurrence of leaves of other species such as *A. labback*, at SBZ was 50%, LB 75%, JAU 75%. *T. indica* at SBZ 25%, LB 75%, JAU and PTC 25%, *Pithecelobium dulce* at SBZ and LB 75%, JAU and RYP 25%, PTC 100%, *F. tsiela* at site SBZ was 75%, LB, RYP and PTC 50% (Table 1).

The frequency of *A. indica, A. labback, T. indica, P. dulce, F. tsiela, F. religiosa* and *M. zapota* leaves in the

nest was in proportion to the frequency of respective trees around the nest area. However, frequencies of *A. indica* leaves were high compared to other plants in the nest content of Common Myna (Table 5.9). Common Myna showed preference for *A. indica* over other tree material in natural nests (Figure 1).

Among the animal byproducts used as nesting materials, bird feathers were the most frequent (100%). Rubber rings, metal wire, snake slough, Neem seeds were found in all nests. Occurrence of rubber pieces at (SBZ, LB and RYP 25%, JAU and PTC 75%), metal wire (SBZ and LB 50%, JAU, RYP and PTC 25%), Snake slough (SBZ, JAU, RYP and PTC 50%, LB 75%), Cloths (SBZ and JAU 25%, RYP and PTC 50%) and Neem seed (SBZ 21.43%, LB 12.50%, JAU 70%, RYP 75%, PTC 12.50%). *Cycus* seeds and *A. arabica* flowers were also found in the nests (Table 1).

Plastic pieces (along with water pouches, audio tape ribbon, and chocolate wrapper, empty packets of wafers, disposable cups and shampoo pouches) occurred at (SBZ, JAU and PTC 75%, LB 100%, RYP 25%: Table 1).

The number of nesting materials used by myna other than plant origin in the natural nests were plastic, metal wire, feather, snake-slough in 2007 ( = 1.78, SD = 0.43, n = 20) and in 2008 ( = 1.59, SD = 0.52, n = 20). The weight of material from natural nest varied from 12.4g to 206.5g in 2007 ( = 86.78, SD = 63.24, n = 20) and 45.2g to 250.0g in 2008 ( = 85.86, SD = 36.40, n = 20; Table 2).

The mynas used wide varieties of nesting materials to construct a nest. They collected twigs usually from the ground and often returned to same places to do so. Therefore, a few plant species comprised the nest materials. Availability of nesting materials of required shape and size is important for mynas to build a nest rather than a species composition of plant matters in the nest building.

The commonly used nesting materials included twigs, leaves, feathers, paper plastics, etc., although snake slough and metal wire were also used occasionally. Lamba (1963) and Panicker (1980) have also recorded similar materials in Common Myna nests. In our study, twigs and leaves of neem was the most frequently used nesting material. Earlier, Sengupta (1981) found that House Sparrow using leaves of neem as nesting material in preference to other available vegetation, probably to repel nest arthropods. The use of nesting materials as insecticidal and anti-pathogenic agents has also been reported for other species of birds (Wimberger 1984; Clark and Mason 1985). The relative proportion of other types of materials probably depended upon their availability in the vicinity of the nests. Use of large quantities of nesting materials in cavity and boxes may be important because the Common Myna does not incubate eggs consistently (Panicker 1980) and nesting material may help in keeping the nests well insulated. Cavity nesters like parakeets do not use much nesting materials but incubate eggs much more consistently as compared to Common Myna. Since Common Myna breeds in open nests, cavity nesting seems to be a secondary adaptation (Dhanda and Dhindsa, 1998).

The primary function of green leaves in the nest content seems to provide soft bed to the nestlings and maintain humidity in the nest (Sengupta 1982). It is inappropriate to suspect the function of green leaves to minimize insect infection in rotting nest material unless it is tested adequately.

Feathers of Rose-Ringed Parakeet, Blue Pegion, and Black Kite were used depending on their availability around the nesting area. Birds' feather give protection from humidity to eggs and chicks, it is also useful to maintain nest texture and temperature. Snake slough are not easily traceable in the environment but mynas specifically search it out to incorporate it as a nest material (Sengupta 1982, Ali and Ripley 1983, Lamba 1963 and Whistler 1949).

Colored and transparent pieces of plastic were observed in each nest. The polythene pieces are chiefly used to line the egg chamber. The reason behind this may be protection of eggs from edged twigs as plastic provide smooth surface which remain in contact with eggs. In addition to that plastic acts as insulator decreasing heat exchange, which is helpful in incubation.

Previous experience is also important in habitat selection in the birds (Klopfer 1963). Many bird species are reported to remain or return to the previously used nesting areas (Catchpole 1972; Greenwood and Harvey 1976; Harvey *et al.* 1979; Newton 1979; 1982 Aumann 1989; Warketin *et al.* 1991). Breeding site fidelity was more often observed in the successful individuals than the unsuccessful one (Darley *et al.* 1977; Newton 1982; Coulson and Thomas 1983; Shields 1984; Gavin and Bollinger 1988; Gauthier 1990; Beletsky and Orians 1991). It is probably because of familiarity to an area, which may permit to take advantages of favorable foraging, predator avoidance and nesting sites that enhance reproductive success (Hinde 1956; Greenwood and Harvey 1982). Moreover, the main nesting areas viz., Sakkarbaug and Lalbaug were also the major roost sites that may be favored by social interactions and familiar environment especially foraging sites that probably make easy settlement of breeding pairs.

Similar pattern of colony site selection was observed in White Ibis in which breeding colony formation was initialized by displaying males at roost site during day time (Kushlan 1976a). Availability of food is another factor affecting nest site selection. In some localities roost site and thus nest sites of the White Ibis are often shifted from one site to the other accompanied by changing food availability (Kushlan 1976a). Whereas, in other places of its range, colony site fidelity has been observed due to adequate food availability even though drastic nesting failure occur after washout (Frederick 1987a).

The nest is built in roofs of houses, holes of walls, trees, railway station and wells. The frequency of *A. indica, A. labback, T. indica, P. dulce, F. tsiela, F. religiosa* and *M. zapota*, C*ocos nucifera* and *Delonix regia* leaves or twigs in the nest was in proportion to the frequency of respective trees around the nest area. However, frequencies of *A. indica* leaves were high compared to other plants in the nest content of Common Myna. The commonly used nesting materials included twigs, leaves, feathers, paper plastics, etc., although snake slough and metal wire were also used occasionally.

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**Table 1: Occurrence of nesting material used by Common Myna**

| S/No. | Name of the tree species /Other | Part of plant/ Other | SBZ (n=4) | LB (n=4) | JAU (n=4) | RYP (n=4) | PTC (n=4) |
|---|---|---|---|---|---|---|---|
| 1 | *Azadirachta indica* Juss. | Leaves | 100.00 | 75.00 | 100.00 | 100.00 | 75.00 |
| | | Twigs | 100.00 | 25.00 | 0.00 | 0.00 | 0.00 |
| 2 | *Pithecelobium dulce* Roxb. | Leaves | 75.00 | 75.00 | 25.00 | 25.00 | 100.00 |
| | | Twigs | 75.00 | 100.00 | 75.00 | 0.00 | 75.00 |
| 3 | *Delonix regia* Boj. | Leaves | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| | | Twigs | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | *Ficus religiosa* Linn. | Leaves | 0.00 | 25.00 | 0.00 | 75.00 | 25.00 |
| | | Twigs | 0.00 | 75.00 | 75.00 | 0.00 | 0.00 |
| 5 | *Cordia myxa* Auct. | Leaves | 0.00 | 25.00 | 25.00 | 0.00 | 0.00 |
| | | Twigs | 0.00 | 0.00 | 0.00 | 0.00 | 25.00 |
| 6 | *Zizyphus jujube* Linn. | Leaves | 0.00 | 50.00 | 25.00 | 0.00 | 0.00 |
| | | Twigs | 0.00 | 25.00 | 0.00 | 0.00 | 25.00 |
| 7 | *Manilkara zapota* Linn. | Leaves | 0.00 | 100.00 | 50.00 | 25.00 | 0.00 |
| 8 | *Tamarindus indica* Linn. | Leaves | 25.00 | 75.00 | 25.00 | 0.00 | 25.00 |
| 9 | *Polyanthia longifolia* Bth.& Hook. | Leaves | 0.00 | 0.00 | 50.00 | 0.00 | 25.00 |
| 10 | *Ficus tsiela* Roxb. | Leaves | 75.00 | 50.00 | 25.00 | 50.00 | 50.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11 | *Ficus benghalensis* Linn. | Leaves | 0.00 | 0.00 | 25.00 | 25.00 | 25.00 |
| 12 | *Albizia labback* Linn. | Leaves | 50.00 | 75.00 | 75.00 | 0.00 | 0.00 |
| 13 | *Thevetia peruviana* Pers. | Leaves | 0.00 | 0.00 | 0.00 | 25.00 | 25.00 |
| 14 | *Butea superba* Roxb. | Leaves | 0.00 | 0.00 | 25.00 | 0.00 | 0.00 |
| 15 | *Arachis hypogaea* Linn. | Leaves | 0.00 | 0.00 | 0.00 | 25.00 | 0.00 |
| 16 | *Allium cepa* Linn. | Leaves | 0.00 | 0.00 | 0.00 | 25.00 | 0.00 |
| 17 | *Suaeda fruticosa* Linn. | Leaves | 0.00 | 0.00 | 0.00 | 0.00 | 25.00 |
| 18 | *Cassia tora* Linn. | Leaves | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| 19 | *Cocos nucifera* Linn. | Twigs | 0.00 | 0.00 | 25.00 | 0.00 | 0.00 |
| 20 | *Mangifera indica* Linn. | Twigs | 25.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 21 | *Callistemon lanceolatus* | Twigs | 25.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 22 | *Tephrosia purpurea* Pers. | Twigs | 0.00 | 75.00 | 75.00 | 75.00 | 75.00 |
| 23 | Grass | Twigs | 75.00 | 50.00 | 50.00 | 50.00 | 50.00 |
| 24 | Grass root - | Twigs | 50.00 | 0.00 | 25.00 | 0.00 | 0.00 |
| 25 | *Digera muricata* Linn. | Twigs | 0.00 | 0.00 | 25.00 | 0.00 | 0.00 |
| 26 | *Euphorbia arientinum* Linn. | Twigs | 0.00 | 0.00 | 0.00 | 50.00 | 0.00 |
| 27 | *Pennisetum typhoideum* Rich. | Twigs | 50.00 | 0.00 | 50.00 | 0.00 | 0.00 |
| 28 | *Sorghum vulgare* Pers. | Twigs | 75.00 | 0.00 | 0.00 | 50.00 | 0.00 |
| 29 | *Imperata cylindrical* Linn. | Twigs | 0.00 | 0.00 | 0.00 | 0.00 | 50.00 |
| 30 | *Tinospora cordifolia* Miers. | Twigs | 50.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 31 | *Securinga leucopyrus* Muell. | Twigs | 0.00 | 0.00 | 0.00 | 25.00 | 0.00 |
| 32 | *Commelina benghalensis* Linn. | Twigs | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| 33 | Plastic Waste | No. of Plastic | 75.00 | 100.00 | 75.00 | 25.00 | 75.00 |
| 34 | Rubber ring | No. of other material | 25.00 | 25.00 | 75.00 | 25.00 | 75.00 |
| 35 | Metal wire | | 50.00 | 50.00 | 25.00 | 25.00 | 25.00 |
| 36 | Asbestos | | 0.00 | 25.00 | 50.00 | 0.00 | 0.00 |
| 37 | Snake slough | | 50.00 | 75.00 | 50.00 | 50.00 | 50.00 |
| 38 | Cloth | | 25.00 | 0.00 | 25.00 | 50.00 | 50.00 |
| 39 | Film Pieces | | 25.00 | 50.00 | 0.00 | 0.00 | 0.00 |
| 40 | Neem seed (*A.indica*) | | 50.00 | 25.00 | 50.00 | 50.00 | 0.00 |
| 41 | Cycus seed | | 25.00 | 0.00 | 25.00 | 0.00 | 0.00 |
| 42 | Flower desi baval (*A.arabica*) | | 25.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 43 | Feathers | | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

**Table 2: Natural nests dimensions in Common Myna (n = 20)**

| S/ No. | Dimensions | Statistics ± SD | |
|---|---|---|---|
| | | 2007 | 2008 |
| 1 | Weight of the nest (g) | 83.78 ± 63.24 | 85.86 ± 36.40 |
| 2 | No. of sticks used in the nest | 4.45 ± 3.10 | 4.53 ± 2 .86 |
| 3 | No. of non plant material used in the nest(Plastic, Metal wire, Feather, Snake slough) | 1.78 ± 0.43 | 1.59 ± 0.52 |

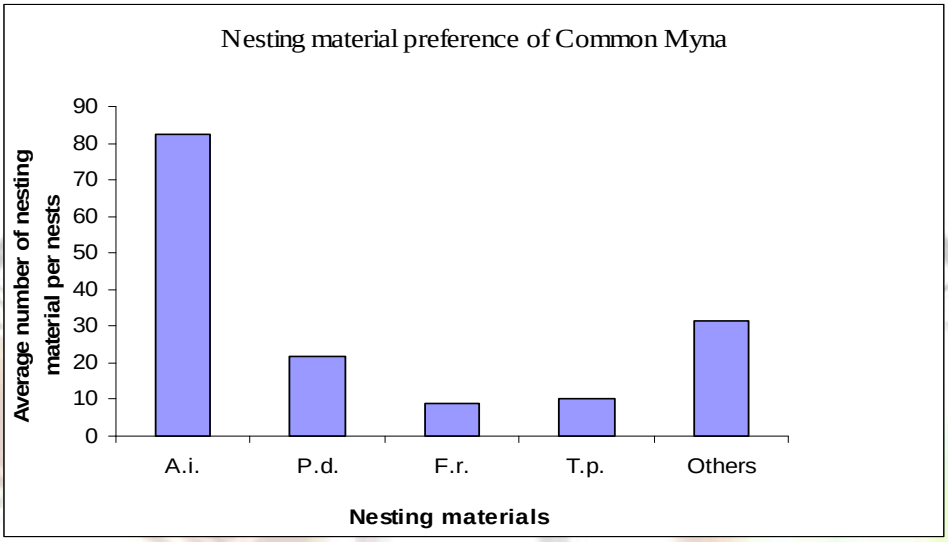


**Fig.1: Nesting tree preference of Common Myna in Natural nest (n=20)**

| | |
|---|---|
| A.i. | *Azadirachta indica* |
| P.d. | *Pithecelobium dulce* |
| F.r. | *Ficus religiosa* |
| T.p. | *Thevetia peruviana* |

**Abbreviation:**

| | |
|---|---|
| SBZ | Sakkarbaug Zoological Garden |
| JAU | Junagadh Agricultural University Campus |
| RYP | Raypur Farm Areas |
| PTC | Police Training Centre |
| LB | Lalbaug |

Common Myna collecting west plastic

Common Myna collecting leaves of

Egg and new born with Nesting

Common Myna with nesting material

Common Myna collecting leaves of Neem

Common Myna collecting leaves

**Plate 1: Nesting material**