

### ADAPTIVE SIGNIFICANCE OF THE USE OF MARGOSA LEAVES IN NESTS OF HOUSE SPARROWS *PASSER DOMESTICUS*

While studying the nesting of House Sparrows *Passer domesticus* in Calcutta and Sinthee, a suburb of Calcutta, I observed an interesting phenomenon: the use of green leaves of the margosa tree *Azadirachta indica* in nests. The usual nesting materials of the species were dry twigs, grasses and rags. In my study area House Sparrows took six or seven days to build the nest, though repair and occasional addition of materials could continue throughout the incubation period. The female usually laid her first egg on the third day after completion of building and the incubation period lasted 13.7 days on average (100 eggs in 35 nests).

On 5 April 1976 at 09:30 I saw a female Sparrow entering its nest with a green leaf of the margosa tree in its bill. Within a couple of minutes the male entered the nest also with a margosa leaf. I watched their building activities from about 09:45 to 10:30. In that period the male and female together brought margosa leaves seven times. I then inspected the nest, which was built in the ventilator of a house in Sinthee. It appeared complete. In it, I found fifteen fresh and thirty-five dry and half-dry margosa leaves. The dry and partly dry leaves showed that the birds had been collecting the leaves certainly from early in the building process. Next day I searched for and found fifteen accessible nests in an area of about 2,500 square metres. These were in different stages of construction. This area had many trees such as Mangoes *Mangifera indica*, Banyans *Ficus benghalensis*, Coconuts *Cocos nucifera*, Krishnachura *Caesalpinia pulcherrima* and various herbs and shrubs such as *Cassia* and *Lantana* species. Ferns and grasses also occurred in patches all over the place.

From 7 April I regularly visited all fifteen nests twice daily: once between 07:30 and 09:30 and again between 15:00 and 17:00. They all contained margosa leaves, green, partly dry and quite dry. I continued visits till 30 April when all nests had nestlings, from three to six in number in different nests and in different stages of development. In four nests I counted the hourly rate at which the Sparrows added margosa leaves.

Also in 1976 I watched ten nests in a different part of Sinthee about 500 metres away from the previous area. From 3 April, each day I in-

spected two nests in the morning and another two in the afternoon, observing each for thirty minutes. Next day, I observed another four nests and so on by rotation till 25 April. The number of visits by the Sparrows to their nests with margosa leaves varied between three and seven during my watches.

During November 1976 I selected two nests in the same area from the first day of building. From one, for seven days (10 to 16 Nov.) I removed all margosa leaves between 10:00 and 11:00 and again between 15:00 and 16:00. On the twelfth day after the start of building the female laid her first egg of a clutch of five, though eggs were normally laid in this locality on the sixth or seventh day after the start of building. From the other, I removed margosa leaves for four days consecutively after the start of building. The female laid her first egg on the ninth day. Though it is interesting that the removal of margosa leaves seemed to delay laying, I do not think that the two can be correlated at present because I carried out the experiment in two nests only.

In April 1977, I inspected nearly all the accessible nests in Sinthee (120 in 2 km<sup>2</sup>) and found margosa leaves in all. Then I made a random search for nests in different parts of Calcutta, finding 230 nests, of which only twenty had margosa leaves; these were found in buildings near roadside margosa trees in the heart of Calcutta.

The White-bellied Sea-Eagle *Haliaeetus leucogaster* of the Chinese coast sometimes partly covers its eggs with leaves of *Rhodomytus* (Aylmer in Armstrong 1965: 295). Armstrong also reported that Mallard *Anas platyrhynchos* and the Partridge *Perdix perdix* cover their eggs with leaves and grass. However, these authors do not say whether the plant materials were green. Taverner (1933) found that Purple Martins *Progne subis* kept their nests supplied with fresh green leaves to control the relative humidity favourable for incubation. Sengupta (1968) reported the covering of eggs by pieces of green leaves in the Common Myna *Acridotheres tristis*, presumably for the same reason. The House Sparrows, however, specifically brought green margosa leaves roughly from the start of building till the nestlings leaves the nest. So the question

of controlling the humidity for the eggs can be ruled out. It seems that, when the margosa leaves become available, the Sparrows use them for building in preference to the green leaves of other plants, even though these are plentiful. Thus, the use of green margosa leaves by the Sparrows may have a special significance.

Hickin (1964) contended that the wool- and fur-eating larvae of moths inhabited birds' nests before there were fur and woollen clothes. When man started to use such clothes, many of the moths began to live on them. Even now ticks, mites and the larvae of various insects live in the nests of House Sparrows as parasites, damaging the eggs and young. From time immemorial, the people of India (and perhaps elsewhere) have protected their clothes from insects and their larvae by putting dry margosa leaves in them. Indians also use an extract from these leaves for curing skin complaints. Beta-sitosterol and the compound Quercetin of margosa leaves are said to be antiseptic in nature; they presumably check the insect pest. Thus, perhaps the population of House Sparrows in Calcutta also uses margosa leaves to combat insects and other injurious nest-parasites.

Further support for the efficacy of margosa leaves comes from the National Chemical Laboratory, Pune: 'Scientists of the National Chemical Laboratory . . . have isolated from neem (margosa) a certain fraction which prevents egg-laying by some insects completely. Application of the active component has been found to completely

prevent egg-laying on treated surfaces. Neem seed and leaves are known to possess medicinal, insect-repellent and other beneficial properties' (Ambasta 1980).

Mayr (1963) thought that new habits and behaviour always started in a local population. If the new behaviour adds to fitness, it will be favoured by selection, as will the genes that control it. Therefore, the habit of using green margosa leaves by House Sparrows has perhaps evolved in the population in Calcutta through natural selection in response to nest-parasites. Mayr (pers. comm.) believes that the selective advantage of the use of margosa leaves by House Sparrows is quite reasonable.

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