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A survey on the preference of nesting sites of house sparrows (*Passer domesticus*) in Madurai district

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Abstract
House sparrows are ubiquitous birds, intimately connected with human habitation. These sparrows adapt themselves to the different changes in their habitat, finding their own nesting place and food. According to the recent sparrow census reported in India, there has been 80 percent decline in their numbers during the past decade. Lack of nest sites, food availability, predation was the proposed cause for decline of house sparrows in urban-suburban habitats. Hence this study was done to monitor the habitat preferences of sparrow by observing the number of nests in specific areas i.e., houses, shops, temples, unused wells, electric poles. 168 places in Madurai District were surveyed for the presence of sparrows and their nesting sites. Independent sample t- test was performed to find the level of significance of preference natural and artificial nest of House sparrows. A total of 150 nests was observed in which sparrows were found to show preference to houses and shops than artificial nests.

Keywords: house sparrow, nesting site, habitat, Madurai district, passer domesticus, bioindicator

1. Introduction
Biodiversity is a key component for sustainable environment. The pressure on the environment caused by economic development and other human activities make it difficult to safeguard the natural environment that is large enough to accommodate entire ecosystem. Worldwide humans are changing the structure and composition of habitats [1]. Birds are commonly used as indicators for ecological monitoring, as they are sensitive to even small environmental changes [2]. The House Sparrow, *Passer domesticus* is one such species that co-existed with humans from historic times, and thus serves as an excellent indicator of the ecological quality [3]. As per the survey conducted at different places of India on the occurrences of house sparrow, considerable decrease was observed in house sparrow population at present [4, 5, 6, 7, 8]. One of the main factors responsible for the decline is changes in habitat structure owing to urbanization processes. But still a high degree of evolutionary conservatism was showed generally in nesting behaviour of passerines [9], the House Sparrow was recognized as one of the species that shows adaptability and innovation [10,11,12]. Present study aims to identify the nesting status and various habitats preferred by the House sparrow in urban and rural areas of Madurai district.

2. Materials and Methods
The study was conducted at a number of locations throughout the Madurai District during the period of Feb 2019-Jan 2020. A preliminary survey of all the 13 blocks of Madurai was carried out**.** We targeted areas where sparrows were known to be living and for which we could gain access by prior communication. The residential areas of nearly 168 villages were surveyed for House Sparrow (*Passer domesticus*) where they were found in varying numbers. The sparrows were found to be nesting in natural nests as well as in artificial nests like shoe boxes and wooden boxes provided by the villagers.

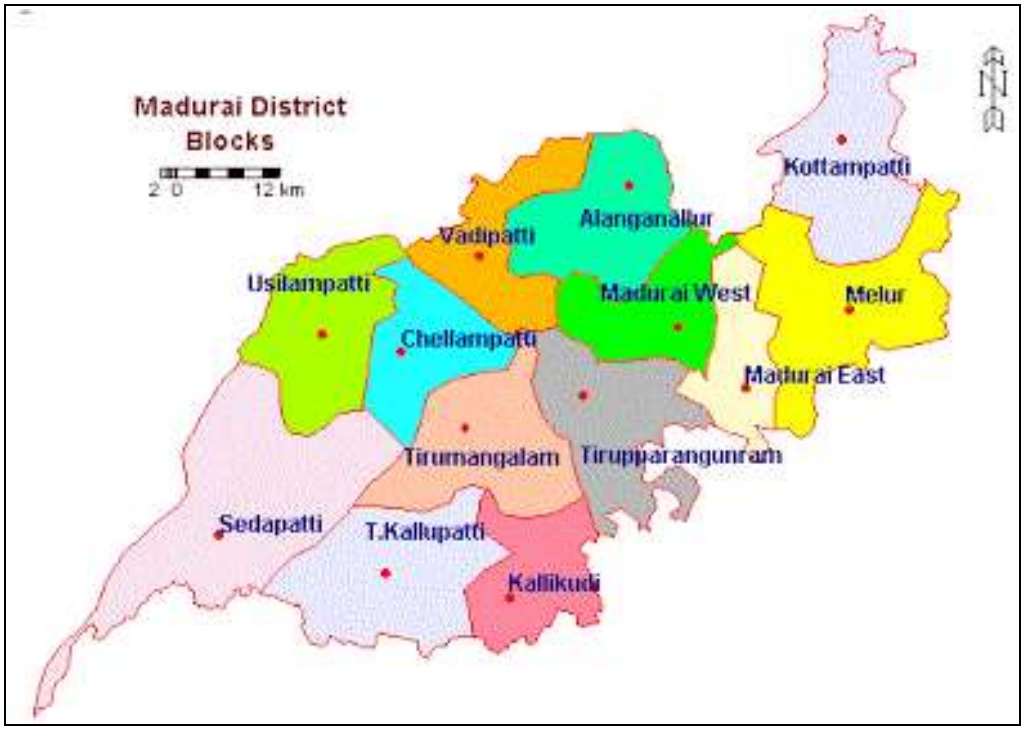

Fig 1: Block wise map of Madurai District

House Sparrow nests were searched by looking in every accessible building, appropriate flora (e.g. trees, bushes, hedges, and shrubs), and other structures (crevices, unused poles, nooks, ventilators, unused wells, etc.) around the site. The total number of nests and the habitats preferred by House Sparrow were recorded and statistically calculated. Walkover survey method was adopted for studying the nest status in different locations.

3. Results and Discussion

Table 1: Status of the nests of House Sparrow (*Passer domesticus*) in Madurai District - Block Wise (During the period from Feb 2019 to Jan 2020)

S.No	Name of the Blocks in Madurai District	Observed Nesting sites		
		Total No.of.Nest observed	Total No. Of Natural nest	Total No. Of Artificial nest
1	Madurai East	13	9	4
2	Madurai West	29	26	3
3	Thiruparankundram	8	7	1
4	Melur	12	11	1
5	Kottampatti	2	1	1
6	Vadipatti	6	5	1
7	Alanganallur	10	5	5
8	Usilampatti	13	11	2
9	Chellampatti	17	14	3
10	T. Kallupatti	13	12	1
11	Sedapatti	7	6	1
12	Thirumangalam	10	9	1
13	Kallikudi	10	8	2
Total		150	124	26

Table 2: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Natural Nest	Equal variances assumed	.411	.527	2.077	24	.049	.70513	.33956	.00431	1.40595
	Equal variances not assumed			2.077	23.980	.049	.70513	.33956	.00427	1.40598

In the present study, 150 nests was observed in different locations, which attributes to the fact that the sparrows are successfully breeding in villages. Table 1 shows that the House sparrows prefer natural nests (124) than the artificial

nests (26). The Independent Sample t-Test as performed between the two types of nests. Levene's Test was done to determine Equality of Variances between the nest types and the obtained p value is. 049 which is less than <0.05 at 5% level of significance.

Table: 2: Nesting site preferences of House sparrows observed in Madurai District (During the period from Feb 2019 to Jan 2020)

S.no	Name of the Blocks in Madurai District	Observed Nesting Sites					
		House	Shop	Temple/Mandhai	Plantations (Tree/Shrub/Climber)	Unused wells	Electric poles/street lights
1.	Madurai East	9	1	1	2	-	-
2.	Madurai West	20	4	3	1	-	1
3.	Thiruparankundram	5	1	1	1	-	-
4.	Melur	5	6	1	-	-	-
5.	Kottampatti	1	1	-	-	-	-
6.	Vadipatti	5	-	-	1	-	-
7.	Alanganallur	5	2	2	1	-	-
8.	Usilampatti	4	3	3	3	-	-
9.	Chellampatti	7	1	1	6	2	-
10.	T. Kallupatti	8	2	2	1	-	-
11.	Sedapatti	5	2	-	-	-	-
12.	Thirumangalam	4	3	2	1	-	-
13.	Kallikudi	5	3	-	2	-	-
Total		83	29	16	19	2	1

The high proportion of nests in residential areas as shown in Table 2 is unsurprising, given that these areas meet both the nesting and foraging requirements for the species. Next to houses it prefers shops for building nests. The occurrence of house sparrow, *P.domesticus* was previously reported in and around Bangalore [4]. They reported that, more number of sparrows were found in rural and market area of Bangalore and suggested that the availability of a variety of food sources for both adults and nestlings, and essential nesting sites around the food sources primarily play an important role in the population of house sparrows. Figure: 1shows the status of total nests in Madurai District, in which Madurai west region shows more nests, with a preference to natural nests due to the availability of nesting materials, which might be from farming practices and vegetation in the surrounding area.

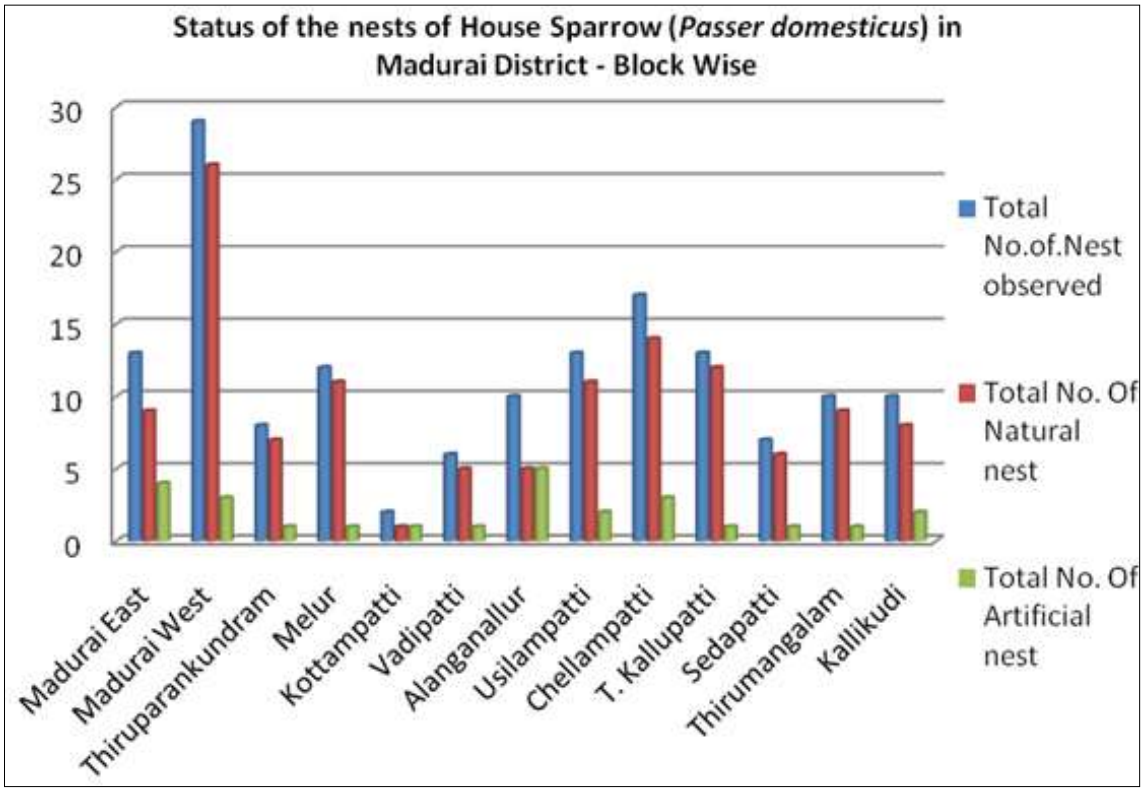

Fig 2: Status of total Nests distributed in Madurai District

Based on the value, it was evident that sparrows consistently selected houses for Building natural nests in crevices and crannies than any other habitat.

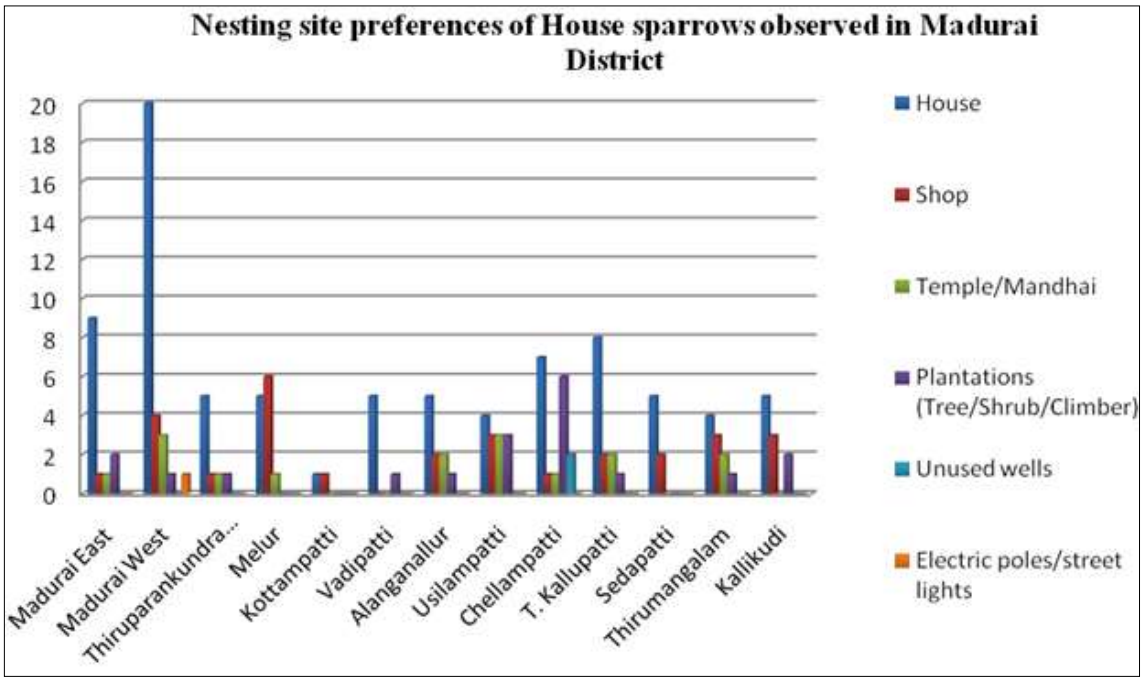

Fig 3: Nest Site Preferences of House sparrow

The nesting sites preferred included Shops, Plantation, temple/Mandhai (a community gathering place), unused wells. The present study shows that inspite of various reports on the dwindling number of House Sparrows, it was observed to be thriving in the rural areas in and around Madurai district where suitable nesting places and food material were available. Inspite of the initiatives taken up by the locals in providing nest boxes, it was observed that the sparrows preferred self-made nests. Though nest boxes may help substitute natural nests, only in the absence of nesting sites, sparrows preferred artificial nests.








Fig 4: Nesting Sites of House Sparrow

Fig 5: Habitat preferred by House Sparrow in vegetation

Conclusions

Selection of nesting sites by the House Sparrows shows increased number of natural nest in Madurai West block which may be due to increased farming practices and availability of food and nesting material, whereas, villages in allanganallur block showed high number of artificial nests adapted by sparrows. In these localities, it was observed that people were aware of the need to provide nest for sparrows, as a conservation measure. Hence they have placed artificial nest boxes in their homes and nearby shops. The sparrows were also found to prefer houses compared to shops. House Sparrows might not be naturally dependent on cavities in buildings for nesting sites. It was also observed that House Sparrows had nests in trees too which is an adaptation worth studying. In our study, sparrows found to prefer nesting in trees and shrubs like *Azadirachta indica* (Neem), *Citrus limon (*Lemon*), Lawsonia inermis* (Mehndi), *Punica granatum* (Pomogranate), *Prosopis juliflora (*Seemai karuvelam *), Pisonia grandis* R.Br (Lettuce tree), *Prosopis cineraria* Linn. (Vanni tree). Change in habitation could be due to minimum farming practices. Mitigation measures to preserve House Sparrow populations should concentrate on improving existing habitats wherever possible, creating awareness among the society, in developing the areas where sparrows are present. Our findings emphasize the need for future work to examine the exact reasons for their decline and change of habitation from houses to shops and vegetation etc.

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