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## RESEARCH ARTICLE

# COMPARATIVE NESTING MATERIALS USED BY HOUSE SPARROW PASSER DOMESTICUS INDICUS IN URBAN AND RURAL AREAS OF JAMMU REGION

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## ABSTRACT

Nesting materials used by House sparrow *Passer domesticus indicus* was identified and compared in rural (N=45 nests) and urban (N=25 nests) areas of Jammu region in 2009 and 2011 respectively. Jammu lies between 32° 27' and 33° 50" North latitudes and 74° 19' and 75° 20" East longitudes. The nesting materials (plant, animal and synthetic) were sorted, identified and weighted with Digital Electronic Balance. Different components of nesting material were compared using One-way ANOVA and computed on a Burroughs 6700 using SPSS programs and Microsoft Excel 2007 version and online software used by Soper. Average weight of nest was found as 119.7 gm in urban areas and 86.2 gm in rural areas as nesting sites in urban nesting sites were found not convenient and they have to make bigger nests and have to put more efforts as compared to rural areas.

Plant matter was found dominant component both in rural areas 82.9% and urban areas 82.1%. The straw and hay of grasses and cereals were found to be dominant in all the nests. Leaves of *Melia azadirachta* were also found in four nests. Animal matter collected was 13.3 % in rural area and 12.7% in urban areas. Synthetic matter was found 3.8% in rural area and 5.2% in urban areas. In animal components the bird feathers were found as the most frequent animal component. When plant matter, animal matter and synthetic matter were compared using One-way ANOVA difference among nest components were found highly significant for all the three size parameters both in rural and urban areas ( $P < 0.05$  for rural areas and  $P < 0.05$  for urban areas).

### Key words:

Plant matter, animal matter, synthetic matter, rural, urban

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## INTRODUCTION

The non-migratory sparrows are widely distributed in the Indian subcontinent and occur worldwide. House sparrow, commonly called as Chidi or Gouriya, is among the most common birds of India and has been earlier reported to be prevalent in good numbers in Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Gujarat, Maharashtra, Orissa and Kerala (Clayton et al., 2002).

The House Sparrow *Passer domesticus* became one of the most widespread and abundant avian species by following man throughout the world (Anderson, 2006).

The nest is build around the human habitation, in wall holes, roof spaces, undisturbed locations in the house, specially windows, or any such places found suitable for nesting around the human house and apartments (Chetan, 2012).

## MATERIAL AND METHODS

### Study area

The study was carried out in urban, suburban and rural areas of Jammu region. Geographically, Jammu lies between 32° 27' and 33° 50" North latitudes and 74° 19' and 75° 20" East longitudes. Attitudinally, it extends from 250 meters to 410 meters above the mean sea level. The climatic conditions in and around the study area are dry sub-humid to arid. There are four well marked seasons in a year, winter, summer, Monsoon and autumn. January is generally the coldest month while May and June are the hottest ones. Jammu city is the main urban area in Jammu district. The flora of urban areas is dominated by natural as well as exotic species. Predominant native plant species in the study area are *Ficus bengalensis*, *Ficus religiosa* (Peepal), *Dalbergia sisoo*, *Mangifera indica*, *Acacia modesta*, *Acacia arabica*, *Zizyphus* species, *Gravillea robusta* (Pallavi), *Cannabis sativa* (Bhang), *Dedonia viscosa*, etc.

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## METHODOLOGY

The nesting material of nests both in rural areas and urban areas were sorted and their components were identified. The weight of each component was done with Digital Electronic Balance.

### Statistical Analysis

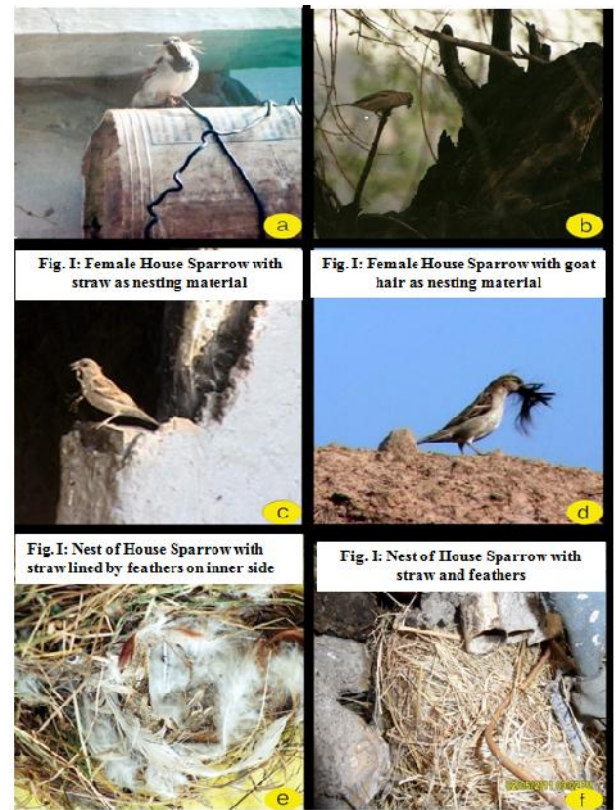
Different components of nesting material were compared using One-way ANOVA. All statistical analyses were computed on a Burroughs 6700 using SPSS programs (Nie et al., 1975) and Microsoft Excel 2007 version. Online software used by Soper (2014) was also used for calculation of Analysis of Variance (ANOVA)-One-Way ANOVA from site <http://www.danielsoper.com/statcalc>.

## RESULTS

### Nesting Material (Fig. Ia, Ib, Ic, Id, Ie & If and Fig. Iia, Iib, Iic & Iid)

It was observed that nesting birds did not bring nesting material from far off distances and nesting material include all grass, straws, twigs, feathers or rage, vegetable fibres, Human or animal hair found in the nests belong to the adjacent trees, tree itself and surrounding area. Average weight of nest was found as 119.7 gm in urban areas and 86.2 gm in rural areas (Table 2). It was observed that hay and straw of different grasses and feathers were used in significantly greater quantities than leaves, vegetable fibres, hairs of animal and man and the collected material could be divided into three types:

(Mustard), *Imperata cylindrica*, *Cyperus rotundus*, *Digitaria ciliaris*, *Triticum aestivum* (Wheat), *Oryza sativum* (Rice), *Zea mays* (Maize) were found dominant both in rural areas (N=45 nests) and urban areas (N=25 nests).



Figures I Nesting materials used of House Sparrow *Passer domesticus indicus*

Table 1 Frequency of material used in building nests by House Sparrow in rural and urban areas in 2009 and 2011

Type of Material	Material	Frequency in rural areas (N=45 nests in 2009)	Frequency in urban areas (N=25 nests in 2011)
Plant Matter	Mustard ( <i>Brassica juncea</i> ) hay and straw	26	8
	<i>Cynodon dactylon</i> straw and hay.	12	16
	<i>Imperata cylindrica</i> hay and straw.	21	9
	<i>Cyperus rotundus</i> hay and straw.	37	23
	<i>Digitaria ciliaris</i> hay and straw	22	13
	Wheat ( <i>Triticum aestivum</i> ) hay and straw	36	22
	Rice ( <i>Oryza sativum</i> ) hay and straw	32	21
	Maize ( <i>Zea mays</i> ) hay	21	7
	Hay and straw of unidentified grasses	23	18
	<i>Melia azadarachta</i> leaves	4	-
Animal Matter	Grass Roots	19	12
	Vegetable fibre	40	16
	Feathers	45	25
	Hair of man	5	1
	Hair of sheep	6	3
	Hair of goat	4	-
Synthetic Matter	Unidentified hair	7	3
	Threads	20	14
	Cement bag thread	13	9
	Small pieces of torn clothes	3	4
	Pieces of polythene	4	6
	Jute fibre	6	8

### Plant component

The frequency of occurrence of different plant materials in rural areas and urban areas is shown in Table 1. Hay and straw of grasses and cereals *Cynodon dactylon*, *Brassica juncea*

Plant matter was found dominant component in rural areas as it constitutes 82.9% (3431 gm out of 4137.9 gm) of total nesting material. Average weight of nest was recorded as 86.2 gm. In urban areas, the plant material was found to 82.1% (2412.5 gm out of 2939.2 gm for N=25).

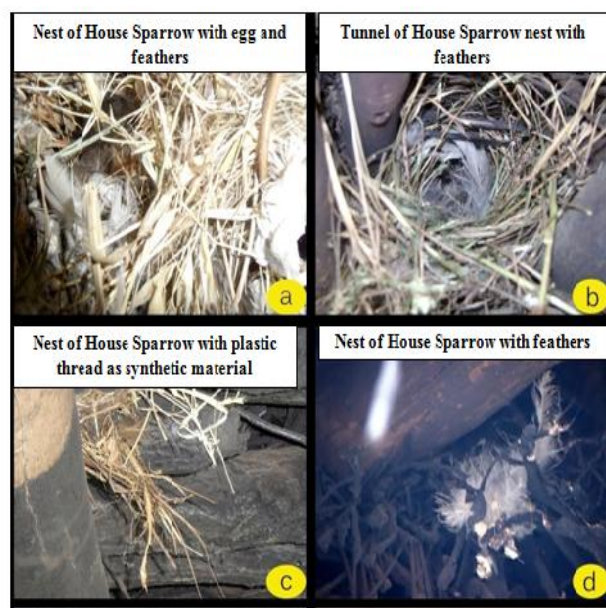
**Table 2** Weight of different components of nests of House Sparrow in rural and urban areas in 2009 and 2011

Rural areas (N= 45 nests in 2009)					Urban areas (N= 25 nests in 2011)			
Nest No.	Plant Matter (gm)	Animal Matter (gm)	Synthetic matter (gm)	Total weight (gm)	Plant Matter (gm)	Animal Matter (gm)	Synthetic matter (gm)	Total weight (gm)
Min	34.0	3.4	0.9	38.9	45.7	5.7	6.1	56
Max	150.2	27.1	8.7	185.5	198.7	25.9	14.3	236.7
Av.	71.5	11.4	3.3	86.2	98.4	15.0	6.4	119.7
Total	3431.0	549.1	157.7	4137.9	2412.5	374.7	152	2939.2
% age	82.9	13.3	3.8	100.00	82.1	12.7	5.2	100.00

For rural areas Differences between material type (ANOVA)						For urban areas Differences between material type (ANOVA)				
	Sum of Squares	df	Mean Square	F	Sig.	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	121733.493	2	60866.747			124161.125	2	62080.563		
Within Groups	39376.404	132	298.306	204.041	0.000**	38840.206	72	539.447	115.082	0.000**
Total	161109.897	134				163001.331	74			

\*\*Highly significant at the 0.05 level

\*\*Highly significant at the 0.05 level

**Figure II** Nests of House Sparrow with feathers and synthetic matters

The straw and hay of grasses and cereals were found to be dominant in all the nests. Leaves of *Melia azadarachta* were also found in four nests.

### Animal component

Animal matter collected from the 45 nests was 13.3% (549.1 gm out of 4137.9 gm) in rural area. In urban areas the animal material was found to 12.7% (374.7 gm out of 2939.2 gm for N=25 nests) (**Table 2**). In animal components the bird feathers were found as the most frequent animal component. The bird's feathers in the nests were found of its own or of any other birds. Occasional material like hair of man, animals were also found present in the nests.

### Synthetic matter

Synthetic matter collected from the 45 nests was 3.8% (157.7 gm out of 4137.9 gm) in rural area. In urban areas the synthetic material was found to 5.2% (152 gm out of 2939.2 gm for N=25 nests) (**Table 2**).

When plant matter, animal matter and synthetic matter were compared using One-way ANOVA difference among nest components were found highly significant for all the three size parameters both in rural and urban areas ( $P < 0.05$  for rural areas and  $P < 0.05$  for urban areas).

## DISCUSSION

The nests in urban areas were found heavier in urban areas than rural areas in the present area. The urban House Sparrow found to have collected more nesting materials as nesting sites in urban nesting sites were found not convenient and they have to make bigger nests and have to put more efforts as compared to rural areas. In present study, plant matter, animal matter and synthetic matter were found as 82.9%, 13.3% and 3.8% respectively (N=45 nests) in rural areas and in urban areas, these components were found as 82.1%, 12.7% and 5.2% respectively (N=25 nests). When plant matter, animal matter and synthetic matter were compared using One-way ANOVA difference among nest components were found -significant for all the three size parameters both in rural and urban areas in present study ( $P < 0.05$  for rural areas and  $P < 0.05$  for urban areas) (**Table 2**). Heij (1986) also recorded that the nests from both habitats combined were composed of 77.7% vegetable material (primarily straw), 12.8% animal material (mainly feathers), and 9.5% artificial material (including string, paper, wool, and sundry other substances). Kulczycki and Mazur-Gierasinska (1968) reported that the materials most frequently used in Poland were hay (in 95% of nests) and straw (in 89.4%), and feathers were found in the nest cups of 96.7% of the 96 nests examined. In present study hay and straw of grasses like Hay and straw of grasses and cereals like *Cynodon dactylon*, *Brassica juncea*, *Imperata cylindrica*, *Cyperus rotundus*, *Digitaria ciliaris*, *Triticum aestivum*, *Oryza sativum*, *Zea mays* were found dominant both in rural and urban areas. Among the animal matters, feathers were found to be dominant in all the nests (**Table 1**). Anderson (2006) recorded fresh green leaves or sprigs of plants producing potent defensive secondary compounds in the nest of House Sparrow. In India, green leaves of the Margosa tree (*Azadirachta indica*) were found in several nests. Both sexes brought Margosa leaves to the nest, and when the Margosa leaves were removed twice daily from two nests, egg-laying was delayed in both nests. Sengupta (1981) reported that Margosa leaves often used

as an insect repellent suggested that the adaptive significance of their use in sparrow nests was to discourage insects and parasites from occupying the nest. In present study, leaves of *Melia azadiractica* (Dhrenk) were reported in four nests which belong to the same family as Neem and which also has insect repellent properties (**Table 1**). Sengupta and Shrilata (1997) reported that all of 13 nests examined in Calcutta, India, in September and October 1994 were lined with green leaves from the Krishnachura tree (*Caesalpinia pulcherrima*) and that four of the nests also contained Margosa leaves. He reported that such defences may be effective in reducing the negative effects of the many mites and ticks that infest sparrow nests. Sahi (1985) reported use of use of grasses, vegetable, fibres, human or animal hair, feather or rages in nest construction of House Sparrow.

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