

Clutch size and egg dimetrics of House Sparrow *Passer domesticus indicus* eggs in urban and rural areas of Jammu region

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ABSTRACT

Clutch size and egg dimetrics of house sparrow, *Passer domesticus indicus* were studied during breeding season from March, 2011 to August 2011 some rural and urban regions of Jammu, India. Clutch size of House Sparrow revealed variations in rural from minimum 1 to 6 with mean 3.48 ± 0.79 in Ramban, Chenani (n=97). The clutch size of 3 was found to be most common (53.60%) followed by clutch size of 4 (31.95%). In urban areas, variations from minimum 1 to maximum 5 with mean 3.24 ± 0.83 in Jammu (n=37). The clutch size of 3 was found to be most common (51.35%) followed by clutch size of 4 (29.72%). Of the total eggs measured (n=46), the average length, breadth, egg volume, egg shape index and egg weight found to be 2.29 ± 0.10 cm (Min. 2.10 cm:Max. 2.46 cm), 1.70 ± 0.09 cm (Min. 1.50 cm : Max. 1.92 cm), 3.26 ± 2.17 cm³ (Min. 2.32 cm³ : Max. 4.36 cm³), 74.29 ± 2.17 (Min. 69.55 : Max. 79.75), 2.70 ± 0.13 gm (Min. 2.44 gm :Max. 2.91 gm) respectively.

Keywords: House Sparrow, Clutch size, Eggs diametrics, egg volume, Breeding Season.

1. Introduction

The House Sparrow has a historical commensal relationship with man and has followed his colonisation of the majority of the earth. Through the introduction to islands and continents it would otherwise not have reached, it has become one of the most widely distributed land birds in the world. The house sparrow (*Passer domesticus*) is a member of the family Passeridae. House sparrows are abundant near human habitations. The house sparrow has a historical commensal relationship with man and has followed his colonisation of the majority of the earth. It is the most widely distributed land birds in the world. It is associated with human habitations e.g. agricultural land, villages and urban areas. It is primarily a seed eater but requires insects and their larvae in the breeding seasons (Lowther and Clink, 1992). Among the various species of birds, the house sparrow *Passer domesticus* L. is one of the familiar species that has followed man everywhere and is inseparable from human habitations (Turner, 2003). 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 and Cotgreave, 1994). However, this bird species, once seen widely everywhere, has now shown marked decline in its population in many parts of the world including India (Summers-Smith, 2005) and is assessed as least concern on the IUCN Red List (Bird Life International, 2008). The house sparrow number has also found to be decreasing in urban areas of the Jammu region (Singh et

al.,2013b). Surveys and Studies by Scientific centers of our country indicated that there is not any much research on House sparrow *P. Domesticus indicus* clutch size and egg diametrics and from Jammu region no such studies has been reported. Therefore, this research selected.

2. Materials and methods

2.1 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.

2.2 Methodology

During present study, selected habitats were surveyed during breeding season from March, 2010 to July, 2010 to locate viable nests of house sparrow (Figure 1) and information about the various eggs morphometric parameters of house sparrow, *Passer domesticus indicus* was collected. Clutch size, colour of eggs and egg weight per clutch was also recorded following Narang and Lamba, 1980; Sengupta, 1982 and Kandwal, 1990. Eggs were weighed at the site with the help of Electronic Weighing Balance and the length and width of eggs were measured with the help of Digital Calliper. Eggs volume calculated as follows (Holloway, 1993 used by Chopra et al., 2012)

Eggs volume $V = k \times L \times B^2$

Where L: eggs length (cm)

B: egg width (cm)

K: constant coefficient = 0.4866

Eggs shape index calculated as follows

Eggs shape index: $B \div L \times 100$

Whatever the eggs shape index increases, the eggs have spherically position.

3. Results

In the present study, clutch size of house sparrow revealed variations from minimum 1 to maximum 6 with mean 3.48 ± 0.79 in rural area of Ramban, Chenani (n=97). The clutch size of 3 was found to be most common (53.60%) followed by clutch size of 4 (31.95%). In urban areas of Jammu (n=37), variations from minimum 1 to maximum 5 with mean 3.24 ± 0.83 . The clutch size of 3 was found to be most common (51.35%) followed by clutch size of 4 (29.72%).

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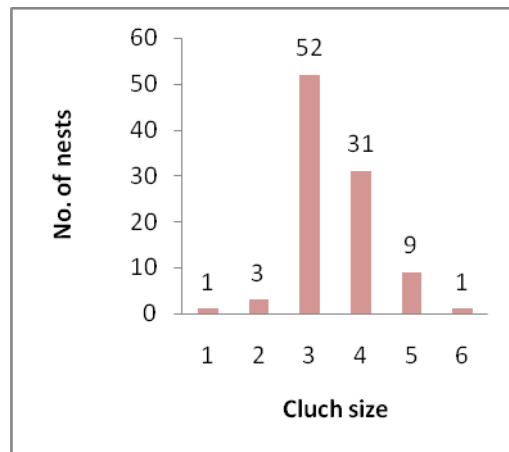


Figure 1: Bar diagram showing clutch size of House Sparrow *Passer domesticus indicus* in rural areas

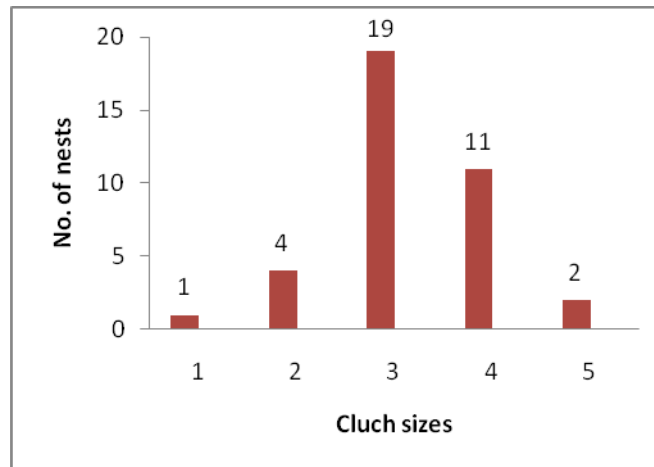


Figure 2: Bar diagram showing clutch size of House Sparrow *Passer domesticus indicus* in urban areas

4. Egg Diametric

The egg diametrics of 46 eggs is given in table 1. Of the total eggs measured (n=46), the average length measured to be 2.29 ± 0.10 cm with minimum 2.10 cm and maximum 2.46 cm. The average breadth measured was 1.70 ± 0.09 cm with minimum 1.50 cm and maximum 1.92 cm. The average egg volume calculated was found to be 3.26 ± 2.17 cm³ with minimum 2.32 cm³ and maximum 4.36 cm³. The egg shape index measured was 74.29 ± 2.17 with minimum 69.55 and maximum 79.75. The average weight measured was 2.70 ± 0.13 gm with minimum 2.44 gm and maximum 2.91 gm.

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Table 1. Table showing length, breadth, egg volume, egg shape index and egg weight of eggs (n=46) of *Passer domesticus indicus*

Egg No.	Length	Breadth	Egg Volume	Egg shape index	Weight
	L(cm)	B (cm)	$V=0.4866*L*B^2$ (cm ³)	(SI=B/L)*100	(gm)
1	2.25	1.73	3.27	76.88	2.78
2	2.36	1.76	3.55	74.57	2.56
3	2.24	1.65	2.96	73.66	2.68
4	2.35	1.76	3.54	74.89	2.78
5	2.21	1.70	3.10	76.92	2.67
6	2.41	1.80	3.79	74.69	2.81
7	2.12	1.50	2.32	70.75	2.56
8	2.43	1.80	3.83	74.07	2.86
9	2.37	1.89	4.11	79.75	2.76
10	2.39	1.75	3.56	73.22	2.89
11	2.37	1.72	3.41	72.57	2.87
12	2.27	1.65	3.01	72.69	2.86
13	2.21	1.63	2.86	73.76	2.78
14	2.34	1.73	3.41	73.93	2.79
15	2.44	1.74	3.59	71.31	2.89
16	2.31	1.70	3.25	73.59	2.81
17	2.33	1.69	3.24	72.53	2.86
18	2.29	1.64	3.00	71.62	2.83
19	2.45	1.83	3.99	74.69	2.91
20	2.25	1.78	3.47	79.11	2.79
21	2.46	1.81	3.92	73.58	2.87
22	2.35	1.71	3.34	72.77	2.80
23	2.36	1.75	3.52	74.15	2.85
24	2.12	1.56	2.51	73.58	2.56
25	2.15	1.63	2.78	75.81	2.58
26	2.10	1.54	2.42	73.33	2.50
27	2.18	1.61	2.75	73.85	2.72

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28	2.24	1.74	3.30	77.68	2.61
27	2.23	1.64	2.92	73.54	2.57
30	2.34	1.81	3.73	77.35	2.72
31	2.31	1.76	3.48	76.19	2.71
32	2.37	1.74	3.49	73.42	2.69
33	2.41	1.82	3.88	75.52	2.75
34	2.11	1.56	2.50	73.93	2.51
35	2.26	1.74	3.33	76.99	2.54
36	2.34	1.69	3.25	72.22	2.67
37	2.16	1.56	2.56	72.22	2.44
38	2.43	1.69	3.38	69.55	2.67
39	2.43	1.92	4.36	79.01	2.76
40	2.19	1.64	2.87	74.89	2.46
41	2.37	1.78	3.65	75.11	2.69
42	2.32	1.67	3.15	71.98	2.70
43	2.23	1.63	2.88	73.09	2.58
44	2.27	1.68	3.12	74.01	2.67
45	2.13	1.56	2.52	73.24	2.48
46	2.23	1.67	3.03	74.89	2.51
Maximum	2.46	1.92	4.36	79.75	2.91
Minimum	2.10	1.50	2.32	69.55	2.44
Average	2.29	1.70	3.26	74.29	2.70
Standard deviation	0.10	0.09	0.47	2.17	0.13

5. Discussion

The present study on clutch size observed clutch size variations from minimum 1 to maximum 6 in rural area with clutch size of 3 to be most common followed by clutch size of 4. In urban areas, variations in clutch size was seen from 1 to 5 with the clutch size of 3 most common followed by clutch size of 4. The most common clutch sizes are from three to six eggs in most populations, but rarely clutches contain only a single egg (Naik and Mistry, 1972) or as many as nine (Gil-Delgado et al., 1979). Usual clutch size of 4 or 5 eggs and occasional only one egg to as many as 11 eggs have also been recorded from different parts of the world (Summer-Smith, 1988; Crick

and Siriwardena, 2002). In Iraq and Israel, clutch size of house sparrow varied from 2 to 7 and from 3 to 7 eggs respectively, and most successful clutch size was 5 and 6 eggs per clutch respectively (Al-Dabbagh and Jiad, 1988). In contrast clutches size of 4 eggs were the most common and most successful in England (Seel, 1968). Mirza (1972) reported from Pakistan clutch size in the range of 3-5 with mean of 4.3. In India different clutch size ranging from 2-5 with mean 3.79 ± 0.87 by Kumudanathan et al. (1983) for $n=107$, 1-7 with mean 3.62 by Naik and Mistry (1972) for $n=1508$, 2-6 with 3.60 ± 1.19 by Rana and Idris (1991b) for $n=94$, 1-6 with mean 3.62 ± 0.55 by Chopra et al. (2012) for $n=59$. In present study the mean clutch size in rural areas was found to be slightly higher (3.48 ± 0.79) than urban clutch size (3.24 ± 0.83) but not significant difference was found. Mathew and Naik (1998) found no significant difference in mean clutch size between rural (3.72) and urban (3.78) populations in India. Some apparent habitat differences may be related to differences in breeding density. Clutch size is one of the fundamental elements of the reproductive strategy of a species, because it represents the number of offspring that an individual (or pair) endeavors to produce in a reproductive attempt (Anderson, 2006). Lack (1947) pioneering paper on the significance of clutch size in birds suggested that, for most altricial species, clutch size should correspond to the amount of food available for provisioning the young. This hypothesis predicts that the most common clutch size in a population should be the most productive. Lack's hypothesis predicts that the average number of young fledging from nests with the normal brood size (corresponding to the most common local clutch size) will be higher than that of either reduced or enlarged broods. Lack (1947) suggested that the primary factor limiting the number of young that could be successfully reared was the amount of food that the parents could provide to the rapidly developing chicks. Several factors such as food supply during the breeding season, condition of the breeding female, time of laying in the season and variation in climatic conditions may contribute to variation in the clutch size of house sparrow (Aslan and Yavuj, 2010 seen by Chopra et al., 2012).

Azam et al. (2011) reported average of eggs length, width, volume, egg shape index and weight in from four locations in Iran as 2.29 ± 0.13 cm, 1.62 ± 0.11 cm, 2.94 ± 0.48 cm³, 70.89 ± 5.28 gm: 2.44 ± 0.34 , 2.19 ± 0.15 cm, 1.58 ± 0.13 cm, 2.70 ± 0.53 cm³, 72.44 ± 5.70 gm and 2.31 ± 0.35 gm: 2.13 ± 0.14 cm, 1.55 ± 0.10 cm, 2.51 ± 0.42 cm³, 73.01 ± 5.01 and 2.38 ± 0.44 gm in respectively. According to Chopra et al. (2012) that the House sparrow was found to lay eggs with a average length and width of 2.24 ± 0.97 cm and 2.45 ± 0.10 cm respectively and the average weight of eggs was 2.79 ± 0.20 g. In the present study Length, width, volume, egg shape index and weight of 46 eggs were found to 2.46 ± 0.09 (Minimum 2.1 cm: Maximum 2.29 cm), 1.92 ± 0.09 cm (Minimum 1.50 cm: Maximum 1.70 cm), 4.35 ± 0.47 cm³, 79.74 ± 2.16 and 2.91 ± 0.13 gm (Minimum 2.44 gm: Maximum 2.91 gm) respectively. Egg measurements in the present study support earlier reports of Chopra et al. (2012) and Azam et al. (2011). Anderson, 2005 observed that egg size varies geographically, primarily in parallel with female body size. There is also considerable variation in egg size within a population, with egg size tending to be characteristic of a particular female and showing some tendency to vary with female size within a population as well as between populations. Egg size also tends to vary with laying order within a clutch. The adaptive significance of egg size differences is poorly understood, although hatchling size does have a significant relationship with egg size (Anderson, 2006).

6. References

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