



Breeding Ecology of House Sparrow (*Passer Domesticus*) in Natural And Artificial Nests At Ludhiana, Punjab.

KEYWORDS

House Sparrow, Agro-ecosystem, Kaccha houses, Artificial nest.

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ABSTRACT

*Intensive agriculture may be one biggest drivers of homogenization in agro-ecosystem and birds have been projected to be one of the top five groups of organisms to be affected by homogenization. The House Sparrow (*Passer domesticus*) is a small sized bird of the family Passeridae. The present study deals with breeding biology of House Sparrow at Kular, Ludhiana. It was undertaken from March 2012 to February 2013 having different types of houses and vegetation. Observation were taken in morning and evening twice a week regarding their breeding biology. House Sparrow nests were observed in the holes of un-cemented walls, in crevices and in cavities of roof having wooden ceiling panels of kaccha (mud) houses and cattle sheds. The clutch size ranged from 1 to 4 eggs and incubation period was observed 11 to 13 days. Hatching success was found 60% to 100%, nestling period from 13 to 15 days success. In artificial nests, clutch size ranged from 3 to 4 eggs and incubation period was recorded 12 to 14 days. Hatching success was found 100% and nestling period from 14 to 15 days.*

INTRODUCTION

House Sparrow (*Passer domesticus*), which was once having ubiquities status and high population is now becoming localized in distribution both in urban dwellings and in rural areas. Agricultural intensification poses the largest threats to biodiversity besides, climate change and spread of exotic, invasive species (Pullin 2002). As a result, nearly 12 percent of India's birds are facing extinction. The sparrow population has declined by almost 70 percent in certain places in India (Bhattacharya et al 2010, Ghosh et al 2010). Studies on the bird community including the abundance of House Sparrow in different Rabi and Kharif crop carried out in the selected villages of Punjab under the All India Network project, on Vertebrate Pest Management (Agricultural Ornithology) PAU Ludhiana had revealed that House Sparrow comprise minor component of bird population (Kler 2010).

In Punjab state, House Sparrow was present in high abundance during the early 1980's. It was considered as an agricultural pest species and caused substantial losses to wheat, paddy, sorghum, pearl millet and rice nursery. It also damaged methi, spinach, peas and grapes in kitchen gardens (Sandhu et al 1985). House Sparrow was observed as the most dominant species followed by weaverbirds, collared dove and feral pigeon at grain store in Punjab (Toor et al 1986). Large decreases of sparrow population are reported by different countries over the globe (Chamberlain et al 2007). Recent studies on avian diversity have shown House Sparrow as less abundant and less common species in some agricultural habitats of Ludhiana (Kler 2009). The most preferred habitat of House Sparrow was gardens in urban areas and thorny bushes/shrubs/old houses in rural areas (Kler et al., 2015).

MATERIAL AND METHODS

The present study on the breeding biology of House Sparrow was undertaken in village Kular (30° 49'4" N and 75°

34'21" E) falling in Ludhiana district of Punjab state from March 2012 to February 2013. Observations were taken on the nest site selection, clutch size, incubation period, hatching, nestling period and nesting success of House Sparrow in natural and artificial nests (wooden nests and earthen pots) in the said village.

RESULTS AND DISCUSSION

During the present study, nest building was observed from February 2012 to June 2012. There were total of 17 nests found, out of these 5 and 3 nests in un-cemented walls of houses and cattle sheds respectively. There were also recorded 4 and 2 nests of House Sparrow in wooden roofs of houses and cattle sheds respectively. 3 nests were found in the cavity between girder and roofs of the houses and cattle shed. Egg laying was recorded from first week of March 2012. In first brood, total 17 natural nests were observed and the maximum clutch size of four eggs and minimum of one egg was recorded. In this brood average clutch size was 2.82 ± 0.19 (Table 1). There was one day's interval between successive eggs in each nest. The incubation period was observed maximum 13 days and minimum 11 days. During the first brood, the average incubation period was observed 12.18 ± 0.19 days (Table 1). The average hatching was recorded $83.17 \pm 6.19\%$ during the first brood. Nestling period ranged from 13 to 15 days and average nestling period was observed 14.06 ± 0.20 days. The average nesting success was recorded $78.23 \pm 6.30\%$ (Table 1). Seel (1968) had showed that the interval between the laying of each egg is approximately 24 hours and both sexes take part in incubation. Simwat (1977) had stated that House Sparrow raised 1-3 broods from February-July and one from September-October, i.e 1-4 broods/year in Punjab. The average clutch size recorded from the Punjab was 4.11 eggs in villages. Summers-Smith (1988) recorded that the nestlings remain in the nest for between 12 – 18 days and typically averaging 14 – 16 days. Lowther and Cink (1992) had stated that the incubation lasts between 10 – 17 days with an aver-

age of about 11 days from the last egg to the first hatch.

Second brood was observed in six nests out of 17 nests. The average clutch size was 2.66 ± 0.19 eggs and average incubation period 12.16 ± 0.36 days. The average hatching was observed $94.33 \pm 5.17\%$ and average nestling period of 14 ± 0.33 days (Table 1). Maximum nesting success was 100% and minimum 66% and average of nesting success was $88.66 \pm 6.54\%$ in the studied nests (Table 1). High predation by Shikra (*Accipiter badius*) and cat (*Felis catus*) on the breeding pairs was noticed during the second brood. Breeding pairs were observed raising third brood in three nests out of the 17 nests. Average clutch size during third brood was 2.60 ± 0.27 eggs (Table 1). The minimum incubation period was observed 11 days and maximum was 13 days; average incubation period during third brood was 12.33 ± 0.54 days. Hatching was 100% and average nestling period in third brood was recorded as 14 ± 0.47 days (Table 1). Nesting success was less during the third brood due to predation by Shikra (*Accipiter badius*) and cat (*Felis catus*). Maximum nesting success was observed 66% and minimum was 50%; average nesting success was observed $60.66 \pm 4.35\%$.

During the present study, the breeding of House Sparrow was observed from February to July in natural nests and from May to July in artificial nests. Breeding season of House Sparrow varies in different parts of the country and world. It extends from March-June in North India continuing up to Sept-Oct in Central India and throughout the year in Southern India (Ali and Ripley 1974). Mating in House Sparrow occurs throughout the breeding cycle, i.e., from March to early August (Franklin 2007).

Wotton et al (2002) had showed that houses built between 1945 and 1984 were more suitable for House Sparrows if no recent roof repairs had been undertaken. Vincent (2005) had stated that the House Sparrow preferred holes or small crevices near roofs as a nesting site but modern or renovated buildings often lack such opportunities.

During present study, seven nests were found in artificial nests. Out of these, three were in wooden nests and four in earthen pots. The maximum clutch size was four in most of the artificial nests and minimum of three eggs. Average clutch size was observed 3.71 eggs. The time interval be-

tween laying of two eggs was one day which was same as in natural nests. In these artificial nests incubation period ranges from 12 to 14 days and average incubation period was recorded 13.14 days. The hatching was recorded 100% in the artificial nests. Nestling period was maximum 15 days and minimum of 14 days; average nestling period was recorded 14.71 days. In artificial nests the nesting success was recorded minimum 66% and maximum 100%. The average of nesting success in artificial nests was recorded 91.57% (Table 2). Similar studies on the House Sparrow breeding success in artificial nests have shown that breeding season extends from early April and mid-August in England (Peach et al 2008). Bhattacharya et al (2010) found the positive response of House Sparrow to artificial nests.

During the present study, parent birds were observed feeding insects along with wheat, rice and weed seeds to their nestlings. It was further recorded that nestlings were initially fed on insects, and later on cereals crops like wheat, rice, maize, sorghum and pearl millet formed the major component of the diet. House Sparrow is a mixed-diet species, grainivorous for most of the year, with nestling diet largely composed of invertebrates (Summers-Smith 1988). Many workers had mentioned that House Sparrow was one of the depredatory species in rice, pearl millet and pulses (Dhindsa and Toor 1980; Parasharya et al 1986). Saini and Dhindsa (1991) studied by gravimetric analysis of gut content of House Sparrow, cereals dominated the food forming 83.6%; weed seeds and animal matter constituted only 6.2% and 4.3% respectively.

It can be concluded that the changes in architectural style of houses/cattle sheds and loss of shrubs/vegetation may be the main factors behind the decline of House Sparrow population in rural areas. Furthermore, if we happen to increase its population by adopting conservation measures, there is every possibility that House Sparrow may attain its previous (1980's and early 1990's) pest status in agriculture. So, serious rethinking is needed on various aspects of conservation strategies in agricultural habitats.

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Table -1 Breeding biology of House Sparrow at village Kular during first, second and third broods

Nest No.	LOCATION	Clutch Size			Incubation Period			Hatching %			Nestling Period			Nesting Success(%)			Total Broods
		1 st	2 nd	3 rd	1 st	2 nd	3 rd	1 st	2 nd	3 rd	1 st	2 nd	3 rd	1 st	2 nd	3 rd	
1	Wall of house	2	-	-	11	-	-	100	-	-	14	-	-	100	-	-	1
2	In roof of house	4	3	2	13	12	11	100	100	100	13	15	13	75	100	50	3
3	Wall of house	3	2	3	12	11	13	66	100	100	13	13	14	66	100	66	3
4	Wall of house	2	-	-	11	-	-	100	-	-	13	-	-	100	-	-	1
5	Roof of cattle shed	4	-	-	13	-	-	75	-	-	15	-	-	75	-	-	1
6	Wall of cattle shed	3	-	-	12	-	-	100	-	-	15	-	-	100	-	-	1
7	Wall of cattle shed	2	-	-	11	-	-	100	-	-	13	-	-	100	-	-	1
8	In roof of house	3	-	-	13	-	-	66	-	-	15	-	-	66	-	-	1

9	Wall of cattle shed	3	-	-	13	-	-	100	-	-	14	-	-	100	-	-	1
10	In roof of house	4	2	-	13	11	-	75	100	-	15	13	-	50	100	-	2
11	In cavity b/w roof and girder	3	3	-	12	13	-	100	100	-	14	15	-	100	66	-	2
12	Roof of cattle shed	2	-	-	11	-	-	100	-	-	13	-	-	100	-	-	1
13	Cavity b/w roof and girder	3	-	-	13	-	-	66	-	-	14	-	-	66	-	-	1
14	In roof of house	3	3	3	12	13	13	66	100	100	14	14	15	66	100	66	3
15	In roof of house	3	-	-	13	-	-	100	-	-	15	-	-	100	-	-	1
16	In roof of house	3	3	-	12	13	-	100	66	-	15	14	-	66	66	-	2
17	In cavity b/w roof and girder	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	1
Average		2.82±0.19	2.66±0.19	2.66±0.27	12.18±0.19	12.16±0.36	12.33±0.54	83.17±6.19	94.33±5.17	100	14.06±0.20	14±0.33	14±0.47	78.23±6.30	88.66±6.54	60.66±4.35	

Table 2: Breeding biology of House Sparrow in artificial nests boxes (Wooden and earthen pots)

Nest Type	Clutch Size	Interval of Laying Between 2 Eggs (Days)	Incubation Period (Days)	Hatching %	Nestling Period (Days)	Nesting Success (%)
Wooden Nest	4	1	14	100	15	100
Wooden Nest	3	1	12	100	15	100
Wooden Nest	3	1	13	100	14	66
Earthen Nest	4	1	13	100	15	100
Earthen Nest	4	1	13	100	14	75
Earthen Nest	4	1	14	100	15	100
Earthen Nest	4	1	13	100	15	100

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