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Response of House Sparrow *(Passer Domesticus)* Towards Artificial Nest Boxes in Rural Areas

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Abstract

Sharp decline of house sparrow population has been observed over the globein recent years. In Odisha this trend has accelerated after super cyclone and Philin. In rural areas the natural habitat of house sparrow are rapidly replaced by concrete houses due to implementation of concrete housing schemes by the Government. Pertaining to this ongoing phenomenon, the present study evaluates the response of house sparrow towards the scientifically designed artificial nest boxes. This short term study has got high and positive response by the house sparrows towards the artificial nest boxes with respect to nesting and roosting behavior. This quick and significant response indicatesthat sparrows are in a need of nesting site. The individual and community efforts towards the installation of artificial nest boxes in the newly made concrete houses may be a pioneer method in conservative point of view.

Keywords: Artificial Nest Box; Concrete House; Thatched House; Nesting Site.

Introduction

The house sparrow has an extremely large range of population and is not seriously affected by the human activities, so it is assessed as least concerned for conservation on the IUCN red list [1]. However, population have been declining in many parts of the world [2].

The declines were first noticed in the North America where they were initially attributed to spread of house finches, but have been most severe in Western Europe [3].

Decline has not been universal as no serious decline has been reported from Eastern Europe, but has been occurred in Australia where the house sparrow was introduced recently. In Great Britain population peaked in the early 1970s [4], but have since declined by 68% overall [5], and about 90% in some regions [6]. In London the house sparrow almost disappeared from the central city [6].

In 2010 Britain's Royal society of protection of bird has enlisted the house sparrow in the red list on the basis of the finding of the research in the different parts of the world including India. The number of house sparrow in Netherland have dropped half since 1980, so the house sparrow even considered as endangered species (BBC news 2008). In Edenberg, Dublin, Glasgow, Humburg and Berlin are other European cities that have reported a sparrow decline. In recent years there has been significant drop in house sparrow population across Bangalore, Mumbai, Hyderabad and other cities in India [7].

Ornithologist survey conducted by Indian Council of Agriculture Research (ICAR) has reported that the sparrow population in Andhra Pradesh alone has dropped by 80% and in other states like Kerala, Gujurat and Rajasthan it has dropped by 20%, while the decline in coastal area was sharp as 70% to 80%. So far hose sparrow population status in the state of Odisha is concerned its pathetic condition is not so far behind the ongoing trend in different parts of the country. A sharp decline in their population has been observed since after the super cyclone hit Odisha in

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1999. The status is in the alarming stage especially in the coastal belt of the state.

Probable Causes of Decline of House Sparrow Population

A single reason cannot be ascertained for cause of decline of house sparrow because a combination of several factors is responsible for the urban declines of the sparrow [8].

Many reasons have been suggested including the wide spread use of garden pesticides resulting in the absence of insects needed by the new born sparrows. Joshi (2009) reported change in the agricultural practices, in particular the shift to the monoculture crop planting as the main cause of decline [9].

Joris Everaert and Dark Bauwens (2007) showed that fewer house sparrow males were seen at locations with relatively high electric field strength value of GSM base stations and there for support the notion that long term exposer to the high level of radiation negatively affect the abundance or behavior of the house sparrow in the wild [10].

The electromagnetic radiation is proved to effect reproduction, circulatory and central nervous system and may cause micro wave syndrome which lead to decline general health [11].

The lack of nesting sites in the modern concrete houses and decrease in the number of thatched houses are found to be the main causes of decline [13].

According to the findings of Kate Vincent [12] the lower rate of productive in house sparrow in sub-urban areas is due to starvation of the chicks because in the areas the food accessible to them lacks the animal product such as aphides. The lower average body mass of the fledglings would result in the lower post fledgling survival.

Crick *et al*. [13] reported that sub urban sparrow were found to experience higher nest failure rate and Peach et al. [14] explained that it is mostly due to reduced nest survival as compared to their rural counterpart in Britain. Thus decreased reproductive success has been suggested to account for the decline of urbanized population. Several reasons have been proposed for the reproductive failure of the urban sparrow.

First, nestlings require an arthropod diet, and parents may unable to find nestling foods of sufficient quality and/or quality due to the scarcity of the native vegetation [15,16].

Second, according to Summer-Smith [3] arthropod density may be reduced in the cities due to the introduction of unleaded petrol. The unleaded petrol releases harmful byproduct which kills small insects. The insecticidal nature of the byproduct makes the food for those birds feeding on the insects scarce. Though the adult sparrow can survive without insects in their diet, they need them to feed their young. The lacking of spine shrubs and trees less than 7ft height most preferred by house sparrows as roosting sites is also one of the causes of decline [8].

Aim of the present study is to find out the response of the house sparrow towards the artificial nest boxes installed in the rural area where the natural nesting site are rapidly replaced by the building of concrete houses.

Material and Methods

Study Area

The present study was carried out in different villages of Ganjam district. Geographically Ganjam district is located on 19.4 to 20.17 degree North Latitude and 84.7 to 85.12 degree East Longitude. The villages included in the present study were Dhunkapada, Pandiripada and Bhamasyali. This was a preliminary study carried out in the north east mansoon season (September to November).

Design of Artificial Nest Box

The artificial nest box was prepared by ply wood. Artificial nest boxes are designed on the basis of different parameters of the nest studied under natural condition. The nest box is designed in such a way that the sparrow can able to enter in to the nest box and freely accommodate.

After study of 50 nests from different study area the average diameter of the nest mouth was found to be 6.4 cm. accordingly the nest box mouth was made. Through this circular mouth only the house sparrow could able to enter in to the nest. Other predator birds are prevented from entering in to the nest. The height and breadth of the nest box was kept as 21cm and 17 cm respectively. The height of the nest mouth from the base was kept 7.5 cm.The pedestal of the artificial nest kept 2cm so that only the house sparrow can able to land on the nest while other birds like crow and pigeon are prevented due to large size of their claw.

These dimensional measurements are kept in accordance with the different morphometric parameters of the house sparrow such as length and height of the body.

During the study of different nest characteristics under natural condition it was found that house sparrow preferred to build nest in particular range of height from the ground. The average nest height from the ground was calculated as 7 meters. Keeping this in view the artificial nest boxes were installed above 7 meters from the ground.

In addition to this suspended earthen pots from the roof of the concrete house act as artificial nest. These settings are made more effective by suspending a bunch of rice grain twigs near to them. This food material would attract the bird towards the artificial nest. With a hope to extend the population over a large range from a particular habitat to a new habitat the nest box are installed in relay which is called as relay installation. 50 nest boxes were installed in different streets of the study area

The installed nest was observed in a regular interval of 4 days for 3 months. The nest observation was carried out in morning from 6 AM to 8 AM. During this time the birds were found to be more active. The entry and exit of the birds are visually observed and different activities at the nest site are photographed by camera.

Analysis of Data

The significance of response of house sparrow towards the nest box was analyzed by using student's t- test.

Result

The response of the house sparrow towards the installed nest boxes in different streets of study area categorized in three different categories such as attempted, unattempted and nesting. Attempted category refers to the nests those were found frequently visited by the sparrow and fed the food grains that were coupled with the installed nest box. On the other hand the nesting category refers to the nests those were made permanent nesting sites by the sparrow.

In these categories of nest boxes varieties of nesting materials such as straw, dry grass, feather, fine polythene fibers and the bird excreta were found. Out of 50 nest boxes installed in 5 different streets of the study area 48 nests were attempted by the house sparrow except 2 nest box were left un attempted each one in two different streets

This high response was statistically significant. Similarly out of 50 installed nest boxes 32 nest boxes were found under nesting category in three month of our study. This category of positive response was found statistically significant. Similar results were observed by Balaji*et al.* [17] and Bhatacharya *et. al.* [18].

Discussion

The present study indicated the high response of house sparrow towards the installed artificial nest boxes in rural areas within a short duration. This could be explained as the house sparrows were in high need of nesting sites. The natural nesting sites of the house sparrow in rural areas are mostly roofs of thatched houses. After super cyclone hits Odisha and Philin in 2013, most of the thatched houses were replaced by the concrete houses and the natural habitat of house sparrow is destroyed.

This replacement phenomenon has become accelerated after the implementation of different concrete housing schemes by the Government. In our study area, most of the thatched houses were replaced by concrete buildings. Artificial nest boxes were installed in safest height of above 3 meters from the ground and in a predator-free site were most significantly preferred by the house sparrows in place of natural nest sites.While installing nest boxes the height from the ground plays an important role because the sparrow always avoids predator's approachable height.

Table 1: Response of house sparrow towards the artificial nest box

Name of the study site	No. of nest box installed	Attempted	Un attempted	Nesting
Bada Sahi	10	10	0	7
Tala Sahi	10	10	0	6
Main road	10	09	01	6
Nua Sahi	10	10	0	7
Telanga Sahi	10	09	01	6
Total	50	48	02	32

(Number of attempted boxes was significantly different(calculated t value=18.77, df= 4, t=2.77)
(Number of nested boxes was significantly different (calculated t value= 14.69, df= 4, t=2.77)

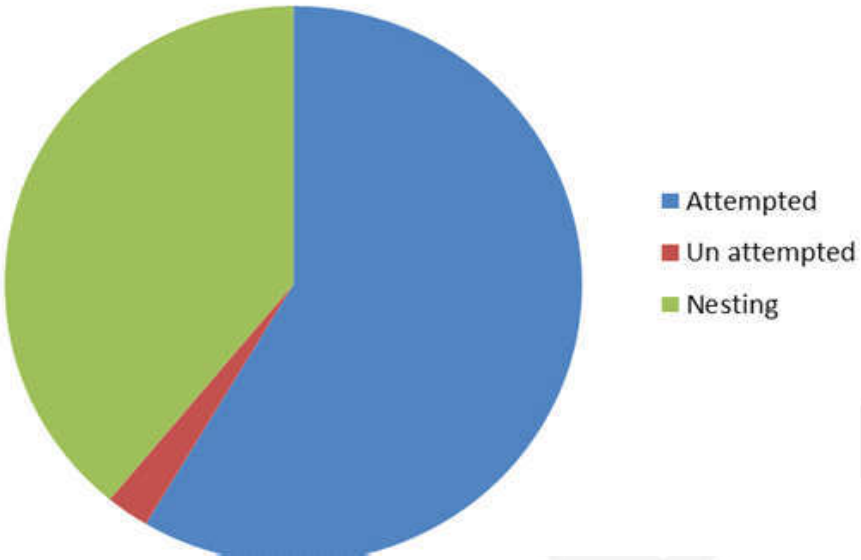

Fig. 1: Graph showing response of house sparrow towards artificial nest box

Fig. 2: Artificial nest box

Fig. 3: Nest box installed in concrete house coupled with bunch of rice grain twigs

Fig. 4: House sparrow collecting nest materials for nesting

Fig. 5: Pigeon a common competitor of house sparrow

The range of height which is mostly preferred by the sparrow is 3 meters to 8 meters. These birds are opportunistic pertaining to the nest materials. They collect the nest materials according to the availability of these materials in the surrounding [19].

In rural areas the nest materials mostly consist of light twigs dry straws, grasses, leaves, feathers, and polythene fibers. It was found that most of the nest boxes wereresponded by a pair of male and female bird and both the partners were observed collecting nest materials for the same. The crow and pigeon were seen competing and attempting to occupy the installed nest box, but couldn't get into the boxdue to small size of the entrance hole.

So, the appropriate diameter of entrance hole is important in making it accessible to the house sparrows only. The nest boxes those were coupled with the rice grain twigs were responded earlier than others without food grain. This infers that food accessibility is also an important factor in determining the nesting sites of the house sparrow. Nest boxes in the concrete houses should be installed in dry surrounding and away from the direct fall of sunlight and rain as natural nests are found in these conditions.

Conclusion

For conservational point of view every individual should take a noble step towards installing an artificial nest box in their concrete houses. At the same time Government should frame a strict guide line to install an artificial nest box in their newly made concrete houses for those who are the beneficiaries of different housing schemes of government such as Indira AvasYojana and Mo kudiaYojana.Man is the superior of all the creatures on the earth. By virtue of his superiority it is his moral duty to save and conserve the living world. At last by creating sympathy and awareness for this human friendly cultural bird among the people we can able to save it from the verge of extinction.

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