

Original Research

Trends in population density of house sparrow, *Passer domesticus* L in Jamakhandi area in Bagalkot district, Karnataka, India

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ABSTRACT:

A brief study is conducted in Jamakhandi town which possesses both urban and rural traits to understand the population trends of house sparrow, *Passer domesticus* L, for a period of six months. The current study area is divided into four parts of the town viz., Rural East, Rural West and Urban East, Urban West. In rural west, a total of 39 birds were recorded, out of which 26 male bird and 13 female birds and in rural east a total of 28 birds which include 18 male and 10 female birds were recorded respectively. In urban west, a total of 14 birds were identified, of which 8 male and 6 were females. In contrast to this, in urban east a total of 14 birds were recorded of which 9 were males and 7 were females. In the present investigation, a total of 40.20 % of birds were recorded in the rural area and 30.92 % in the urban areas respectively. The current study indicated that, the population of house sparrows is declining in urban areas compared to the rural areas.

Keywords:

House Sparrow distribution, Nesting, Insect food, Population trend.

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## INTRODUCTION

India is a country with great biological diversity which inhabit 12.5% of birds of the world. Among birds, house sparrow, *Passer domesticus* L, is the most common bird in India found both rural and urban human settlements. It is a non-migratory resident bird, closely associated with the human settlements both in urban and rural areas in olden days (Ali, 1974). But the current population trend of house sparrows, *Passer domesticus* is declining rapidly according to the survey conducted in the hitherto study (Ghosh *et al.*, 2010; Sudhira *et al.*, 2013). Of late, population of the house sparrow declined rapidly due to anthropogenic activities and modernization in human settlements. The main reason of its decline is the loss of habitat as well as construction of modern cement houses that are unsuitable for roosting and nesting of sparrows (Sudhira *et al.*, 2013).

In olden days, houses were built using thatched roof or wooden planks with mud roofing. The agro-pastoral society has old style of harvesting and grain processing. The women folk were processing the grains like, jowar, millets, rice, etc., in front of their houses, where sparrows were assembling for thrown grains and insects. They were roosting inside the thatched huts and mud houses. During nesting season, they were making burrows or hollows in the thatched or mud roof. As they were so common in and around residential areas, they are called as "House" sparrows.

Due to rapid development and socio economic improvement, India witnessed a greater shift in the field of construction of domestic human dwellings. The thatched huts and mud houses were gradually replaced by cement concrete buildings. The windows of which are covered with glass panes and mesh to prevent mosquito. Thus the house sparrow gradually lost their houses and resorted to the poor dwellings where still thatched and mud houses prevailed. Therefore, in the past 3-4 decades the population of house sparrow showed declining trend (Hole, 2002; Dandapat *et al.*, 2010). There are no

special efforts made in Karnataka or elsewhere in India to protect this species from decline, but it is given protection under wildlife Protection Act, 1972 and its amendments, under schedule-IV. Though, it predated on paddy crops but it also helps in controlling insect pests and hence, it is considered as insect bio control agent. Therefore, there is an urgent need to investigate its pest control status. Perhaps due to loss of nesting place and reduction of insect foods, the population was reduced (Summers-Smith, 1959). We do not notice any infectious diseases affecting this sparrow in our study area. The consumption of insects that were killed by chemical pesticides resulted in accumulation of poisonous chemicals in house sparrows (bio magnification), resulting in thinning of egg shells (Green, 1998).

On an average, both in the rural and urban areas, there was six times decline in population density revealed, (personal notes and interviews), which is an alarming situation. Hence, there is an urgent need to take necessary action to protect this species from further decline.

### Study area

Jamkhandi is a small town located about 80 km from the Bagalkote district headquarters of Karnataka, India. It lies between 12°41' and 22°N and 77° and 84° 40'E (Figure 1). The average rainfall is 599 per annum with 48 rainy days (2014). The maximum temperature in summer was 37° C and minimum temperature in winter was 24° C. The altitude is 510m MSL. Total population of Jamkhandi town is 68,968 with male 33,936 and female 35,002 according Census 2011 (Census of India).

Jamkhandi was the capital of the former Maratha regime of the Patavardhans, cousins of the Miraj family of Maharashtra. The place is known as Jambukhandi in records, probably derived from the Jambukeshwara temple of the place. There are several temples and monuments and other shrines which provide nesting and

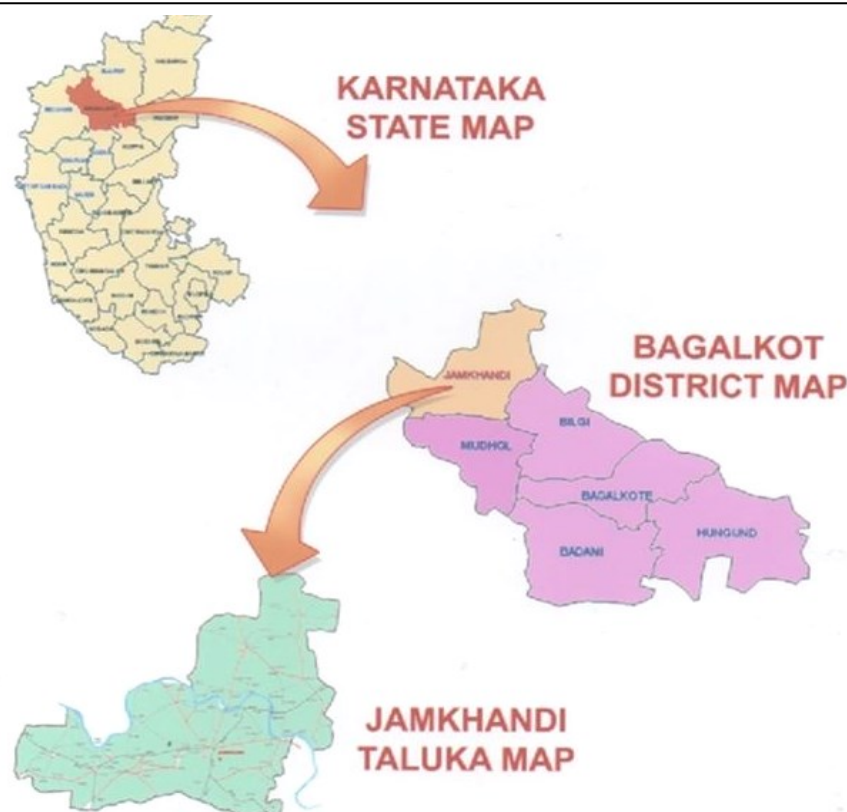


Figure 1. Study area

roosting places for House sparrows. To the west of the town on a hillock called Ramatirtha stands a grand edifice 'Ramachandra Prasad', which was the royal residence of the Jamkhandi rulers, and Tripura Sundari Temple. Shurpali, 10 Km from Jamkhandi is on the banks of river Krishna, and has a Lakshminarayana temple and the Sadananda Matha which was an agrahara (dwellings of Brahmin pundit).

## MATERIALS AND METHODS

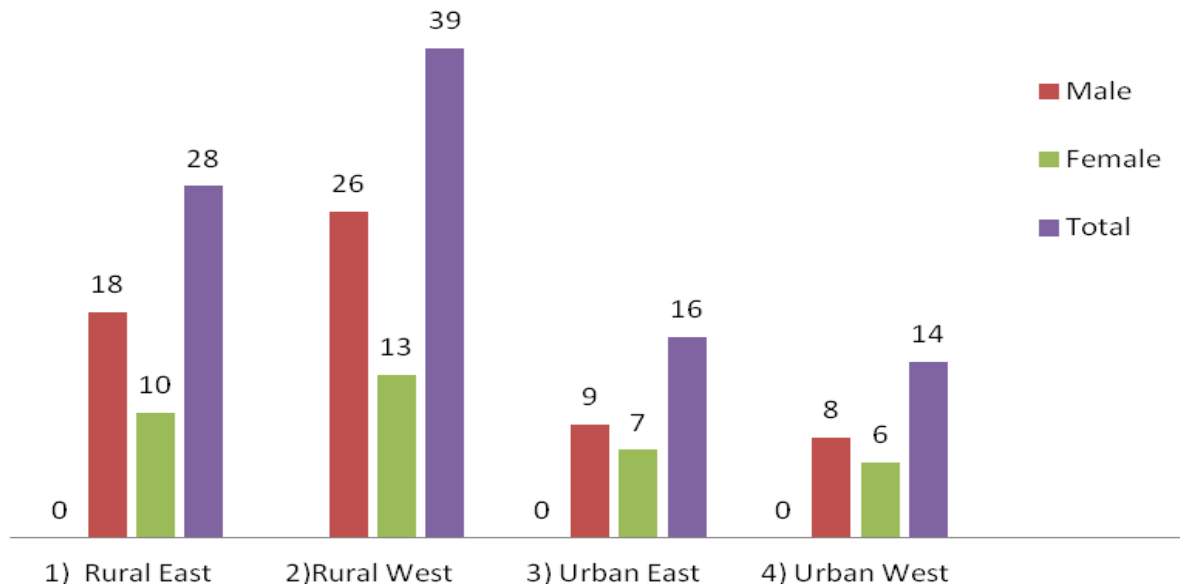
The study was conducted over a period of six months (July to December, 2015). Regular field trips were made during this period at intervals of fifteen days. The study consisted primarily of population dynamics of house sparrow of the selected areas viz. a rural area (East), rural area (West), urban area (East) and urban (West). Then, the status of house sparrow was determined by comparing the population pattern in different localities. Two census methods were adopted for the study of population estimation in different

localities. The first one was Line Transects method and the other was Point Count method. The roads in the village and river course are considered as line transects.

A powerful binocular with 10x50 powers, made by Nikon was used to track and trace the birds with a safe distance. Canon SX 540 digital bridge camera with 1,200 mm zoom was used to capture images of the sparrows throughout the study period. To record GPS coordinates, Garmin GPS instrument was used. Two different formats are prepared and used for recording the observations in the field during the study period.

### Line transects

The idea of walking along and counting all the birds cited is appeared to be simple and easy to count. One would expect to count more individuals of a species in its favored habitat. By keep moving, it is possible to cover more ground in a fixed time than by any more elaborate method. Long transects were divided into small sections and considered as small line transects that are relatively uniform in their length and size. To avoid



**Figure 2. Population of House sparrows in Jamakhandi area**

double counting of birds detectable at long range, always two persons were involved during observation at a time along either side of the line. Detecting and identifying birds while walking is a challenge to ornithological skill. The approach is thus sensitive to bias from observer quality and experience. Transects are probably more accurate than point counts.

#### **Point count**

In this method, the observer stands in one fixed place to count all the birds of that spot which are seen and heard. After spending some time in this spot, the observer will move to another spot about 100 meters away to repeat the same exercise. Like this, the point count method is followed till the end of the transect line in pre-determined study area. This is the simple and most effective method of counting the birds in any given time and space.

## **RESULTS AND DISCUSSION**

In the present study, the bird population was enumerated in two sections (rural and urban) for the period of six months from July to December 2015. The findings are presented in the Figure 2. House sparrow is usually active during cool hours of the day, as in the case

of most of the diurnal and terrestrial birds. These birds are actually searching for food sources like weed seeds, gross seeds, grains and insects during the entire day. The physical survey for sparrows was made in four sampling sites at morning hours (6-9 a.m.) once in fifteen days and monthly averages are tabulated.

The six months survey in rural areas [west and east] recorded a total of 69 birds and an average of 28 birds in urban areas [west and east ] respectively.

The response obtained through oral questions posed to senior citizen in rural and urban areas revealed a population of 400 - 500 birds in the vicinity during 1960-70 (personal communications, interviews and questionnaires). The data revealed that the population of house sparrows is drastically reduced during the past 5-6 decades.

The physical visits to the sampling sites and oral survey of senior citizens revealed that there was seven times reduction in population density of sparrows in rural areas. In contrast to this in urban areas, it is more than 15 times reduction in the population of house sparrows. Thus, the survey revealed that there is a drastic decline in population of sparrow in urban ecosystem. This is also

true with the hitherto studies of population trend of house sparrows in urban areas (Sudhira *et al.*, 2013)

The citizen of Jamakhandi also revealed that there is a drastic decline in sparrows' population. They witnessed large flocks during their childhood during 1960- 70. Now it is a rare sight for such flock in city environment.

In rural area (west), a total of 39 birds were recorded out of which 26 male birds and 13 female birds and in rural (east) a total of 28 birds which include 18 male and 10 female birds respectively. This disparity in male –female ratio may be due to the fact that, sparrows are both poly-gynous and poly-androus. In urban area, (west) a total of 14 birds were identified, of which 8 male and 6 were female birds. In contrast to this, in urban (east), a total of 14 birds were recorded of which 9 males and 7 were females (Figure 2). In the present study, maximum number of birds recorded in rural west (39) and minimum in urban east (16) of Jamakhandi area. The maximum number of males were recorded in rural west (26) and minimum in urban west (10) but the females were maximum in rural west (13) and minimum in urban west (6) (Figure 2) respectively.

In the present investigation, a total of 40.20 % of birds were recorded in rural areas and 30.92% accommodated in urban areas respectively.

## CONCLUSION

Based on the study conducted, the following inferences were drawn. It is conspicuous that the loss of habitat and change in human dwellings from thatched huts and mud houses to cement concrete buildings is the main reason for the rapid decline of house sparrows in both rural and urban areas. However, the decline is more in urban areas compared to that of rural areas. The loss of both roosting and nesting places resulted in loss of breeding sites and thus decline continued. The green revolution began in 1960's which advocated liberal use of chemical pesticides and fertilizers, resulted in loss of

natural protein source in the form of insect and their larvae for the house sparrows. Not only the consumption of insects that were killed by chemical pesticides resulted in accumulation of poisonous chemicals in house sparrows (bio magnification), but also resulted in thinning of egg shells. This is one of the reasons of the decline of their population. Though house sparrows build their nests inside the human dwellings, it is observed that they are highly adoptable and opportunist in using the available nesting places like bramble bushes (for instance, *Ziziphus mauritiana*) and such plants, wall cracks, bamboo holes, PVC and metal pipes, nest boxes, etc.

It is observed that most of the respondents believed that, the mobile phones and towers are responsible for rapid decline of the house sparrows. This is a baseless blind belief that spread across the country. This area needs to be explored for disqualifying this faith.

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