Short Communication

The Journal of Animal & Plant Sciences, 24(4): 2014, Page: 1270-1275
ISSN: 1018-7081

A STUDY ON THE AVIAN (PASSERINE) DIVERSITY OF LAHORE

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ABSTRACT

A study was carried out to find the local status and population count of selected passerine birds species in Lahore during 2008. Comparison was made by relating the population density of passerine birds with reference to flora of 3 old and 3 new sites in and around Lahore. The results of the study revealed that the changing habitat of Lahore due to human disturbance and non-availability of breeding sites for birds was the main reason behind the loss of passerine avian diversity. Secondly, the trend of planting decorative or ornamental plants such as Eucalyptus in Lahore was the key factor forcing birds to migrate. Relative abundance of native trees and density of observed passerine bird species was higher in old reference sites rather than in newly established parks of Lahore city because new parks in the city have highly disturbed habitat and more exotic tree varieties. Results of the present study revealed that one of the new parks, woodland wildlife park outside the city is still providing the natural habitat to birds due to less human disturbance. So there is dire need to build such parks which have more natural environment. Conservation of passerine avian diversity within city area can be progressed by managing the urban green space and plantation of native flora. After completion of study, it was recommended that only ecological restoration of damaged habitat at Lahore can turn back the tide of biodiversity loss.

Key words: Avian fauna, biodiversity, passerine, habitat.

INTRODUCTION

Lahore lies between 31--15° to 31-- 45° North latitude and 74.01° to 74 - 39° East longitude and covers a total land area of about 461 acres' but the city is still growing at a considerable rate (Hamid, 2006). Birds normally live in association with man. The environmentalists warn that if the trend continues unchecked, it could lead to ecological imbalance that would affect avian diversity (Muzzafar, 2000). So to keep the city rich in avian diversity, it is necessary that old trees must be protected. The urban habitats of birds are of interest for the conservation of species of concern (Stohlgren *et al*. 1999).

Class Aves contains two suborders: Archaeornithes and Neornith, three Superorders and 29 Orders (Sibley and Ahlquist, 1990). According to IUCN (1996) many bird species have high threat to extinction (Stattersfield and Capper, 2000). One of the great difficulties in the classification of birds is their structure is very uniform. There are more than 9000 species of living birds, almost 150 having become extinct after the arrival of humans (Sibley, 2001). Birds are classified mainly by their external form. DNA structure and biochemical methods have recently been employed to reassess certain relationships. The earliest known species of class Aves is Proto Aves about 200 million years ago (Grimmette *et al*. 2001)

The present study deals with the Passeriformes group of birds and the main objective of the study was to observe and compare the population of passerine bird species in some selected sites in and around Lahore; assess the local status of passerine bird species by considering local conditions of the selected sites; Identify the overall threats to avian fauna; relate the population of passerine birds with reference to flora in old and new sites and suggest some recommendations to conserve the avian fauna in and around Lahore.

MATERIALS AND METHODS

The study was based on survey of six different localities of Lahore which were visited for count of the population, comparison and status of some species of order Passeriforms.

OLD REFERENCE SITES

Lahore Fort (Shahi Qila): The fort is 1400 feet long and 1115 feet wide (36 acres). It was built in the 11th century and the garden around the fort was expanded and managed effectively till the end of 16th century during the Mughal rule. The site contains the old plantation.

Shalimar Garden: The garden measures 658 m North to South and 258 m East to West. 410 fountains play in the garden. In addition, there are five cascades in the garden.

This garden was also established by the Mughal emperors and it also contains remarkable indigenous flora.

Jinnah Garden: It was amongst the biggest gardens of the Lahore and was established in 1860. Its total area was 121 acres. Jinnah garden has almost 150 varieties of trees, 140 types of shrubs, 50 types of creepers, 30 palms, almost 100 succulents and about more than 100 indoor plants along with almost all varieties of annual flowers.

NEWLY ESTABLISHED PARKS

Race Course Park: This garden covers almost 132 acres area. It has a polo club which covers about 44 acres area and the remaining area of 88 acres is a garden which has tree plantation. This recreational park contains eye catching fountains, waterfalls and a lake.

Woodland Wildlife Park (Raiwind): The Woodland Wildlife Park, which was established in 1982 over 242 acres, was handed over to Punjab Wildlife and Parks Department in 1998 by the Forest Department. The main idea for the establishment of this park was the preservation and conservation of indigenous wildlife, captive breeding of important wild animals & birds, and to provide recreational facilities to tourists.

Model Town Park: Model town Park Lahore was established in suburb of Lahore, but now it is surrounded by the congested residential areas as a result of urban sprawl. Its total area is about 47 acres. This circular park is surrounded by the inner-circular road of model town.

After observation, the birds were categorized as Very Rare, Rare, Fairly Common, Common, Very Common, Abundant and Very Abundant. The data was analyzed statistically by correlation between two variables. Average count of bird's population was also taken; the densities of observed passerine birds in all selected sites in and around Lahore were calculated by dividing the total bird's population by area of each site.

RESULTS AND DISCUSSION

The results obtained from this observational study of passerine birds in six selected sites including both old reference and new sites in and around Lahore are as follows: Total bird species found in Lahore were 272 including passerine and non-passerine, out of these 101 were breeding residents (37%), 13 were summer visitors (5%), 101 were winter visitors (37%), 35 were the passage visitors (13%) and 22 species were recorded as occasional (8%) (Figure 1).

Some of these were abundant and common while some were rarely found. About 71 passerine bird species were present in and around Lahore, out of which 38 were breeding residents, 2 were summer visitors, 18 were winter visitors, 9 were passage visitors, 2 were recorded for possible breeding and 1 species was recorded for occasional breeding and individual records (Grimmett *et al*., 2001).

Maximum bird count was found in Jinnah Garden i.e. 1592 birds while minimum population count was observed in Woodland Wildlife Park which was 980 birds (Figure-2). The maximum diversity of passerine bird species was found in Jinnah Garden and Woodland Wildlife Park which was 14 bird species out of 23 observed passerine bird species but the minimum diversity was found in Shalimar Garden which was 7 bird species (Figure-3)

The densities of observed passerine birds (Figure-4) in all selected sites in and around Lahore were calculated by dividing the total bird's population by area of each site. Density of Model Town Park was 31.95 bird's population /acre which was highest among densities of all other selected sites and density of Woodland Wildlife Park (Raiwind) was lowest of all other sites which was 8.09 bird's population /acre

As far as relative abundance is concerned, House Crow having maximum (38.395) while house sparrow having second most relatively abundant bird with a value of relative abundance 28.582. Plain Prinia and Indian Cliff Swallow represented the least relative abundance i.e. 0.0133. So, Crow was relatively more abundant bird in Lahore than any other passerine bird because of the presence of suitable conditions for its living. (Figure-5)

It was also found that three species of birds i.e. Crow, House Sparrow and Common Myna were very abundant, Red Vented Bulbul was abundant, another one species was very common forming 4% i.e. Bank Myna, four species i.e Sand Lark, Plain sand Martin, Common Babbler, and Jungle Babbler were common, 8 species i. e. Asian Pied Starling, Tree Pipit, Pied Bush-chat, Indian Robin, White Browed Fantail, purple Sunbird, Black Drongo and Paddy field Pipit, were fairly common. Four 4 species i.e. tailed Swallow, Oriental White Eye, Long Tailed Shrike and Rufous Tree-pie were rare and two species i .e. Plain Prinia and Indian Cliff Swallow were very rare

It was also evident from results that in old and new sites in and around Lahore, the higher percentages (62%) of native trees were in old reference sites while 41% native trees were in newly established parks. Total density of observed passerine birds was higher (72.40) in older sites than in new parks (Figure-6,7,8,9).

Statistical analysis reveals that the correlation values between the number of native trees and the density of birds in old sites was -0.899 and the correlation value between number of native trees to the density of birds in newly established parks in and around Lahore was -0.678. While the correlation value between the number of exotic trees and the density of the birds in the

old sites was -0.997 and the correlation value between the two parameters in the new parks was 0.615.

The trees offer a habitat for birds and the density of birds is directly related to the presence of suitable habitat. Maximum floral (tree) species were found in Woodland Wildlife Park because of the presence of a mini forest there but in older sites i.e. Jinnah Garden has higher tree species along with large number of native species. So the maximum population count as well as species number of Passeriformes order was observed there. By comparing the percentages of native and exotic trees in older and new sites in and around Lahore, it was found that there is a little difference in the percentage of native and exotic trees in both sites. Because in older sites when native trees fall, they are replaced by the new varieties. Due to which 38% of flora of old sites has been replaced by new and exotic varieties which was previously occupied by native fauna. This shifting of native fauna has a detrimental effect on avian fauna.

Similarly, density of observed passerine birds (Figure-10) was higher in old reference sites than in newly established parks i.e. 72.40 per acre. Because more food in the form of fruit, nesting sites on thick trees and natural habitat is present there. All these conditions are favorable for the old passerine avian fauna. While in the newly established parks percentage of exotic flora is comparatively higher as compared to the older sites. Reason is that beauty of new parks is the priority of the management so, ornamental and exotic species were planted in new parks than in native flora. The two newly established parks in the city have more disturbed habitat due to human interferences while Woodland Wildlife Park which is located outside the city has comparatively undisturbed environment. Moreover, this park inhabits a beautiful combination of both native and exotic tree species. Patches of agricultural land are also present around the park. Due to the availability of different niches, undisturbed natural environment, lesser traffic noise this newly established park showed the maximum diversified avian fauna. The density of birds in the newly established parks (52.42/ acre) is less than in old reference sites (72.4 / acre) .The correlation values also indicate that there is weak relationship between density of birds and native trees but much weaker between densities and exotic trees in older sites of Lahore. This shows that when number of native tree species decreases and exotic trees increases, then density of birds decreases in older sites. So relationship between native trees and densities is weak but relationship of exotic trees to densities is weaker as compared to the former one. This shows that density of birds depends upon the availability of native environment. So there is dire need to plant more native trees in new sites than exotic species for the survival of many native bird species. Density of birds in new sites is less as compared to older sites because of disturbed habitat, higher exotic species and human disturbance. So, It is also required that there is need to restore and manage the natural environment and habitat for birds in both older sites and newly established parks.

From this study it can be concluded that most of the bird species are declining in population and becoming threatened. If population falls below minimum viable population (mvpo), the long term breeding problems and environmental fluctuations will eventually varnish the population off. But some opportunistic species such as crows and common myna are increasing in number because they have adjusted themselves according to the changing habitat conditions. Old flora of Lahore in old reference sites has been replaced by exotic species by the concerned authorities. Due to this change number of native fauna is declining rapidly in those areas which play important roles in natural ecosystems, stability and sustainability of wild life.

The new parks in the city have disturbed habitat and exotic species of trees so, they are unable to accommodate diversified passerine fauna. Only the Wood Land Wildlife park which has comparatively undisturbed environment and both native and exotic tree species has diversified avian fauna. The newly established parks located in the center of the city have disturbed environment and exotic tree plantation which is unable to support the most of avian fauna. So there is a need to establish new parks in the suburbs of Lahore at the pattern of Wood Land Park. It is also recommended that in the old sites the felled native flora should not be replaced by exotic species.

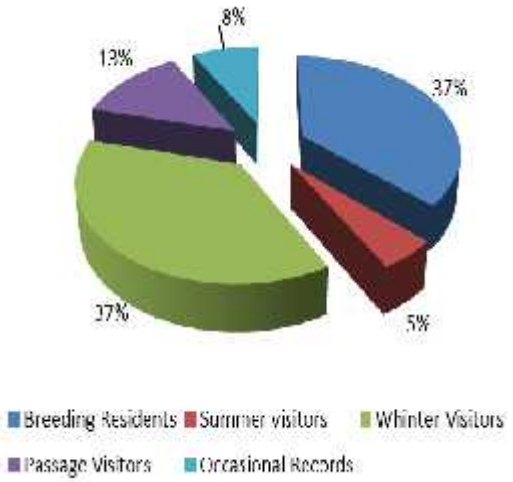

Figure: 1. Status of Birds

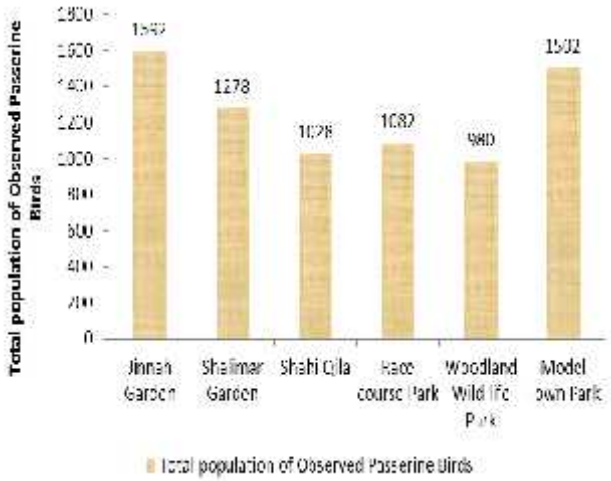

Figure: 2. Total Population of birds in Parks

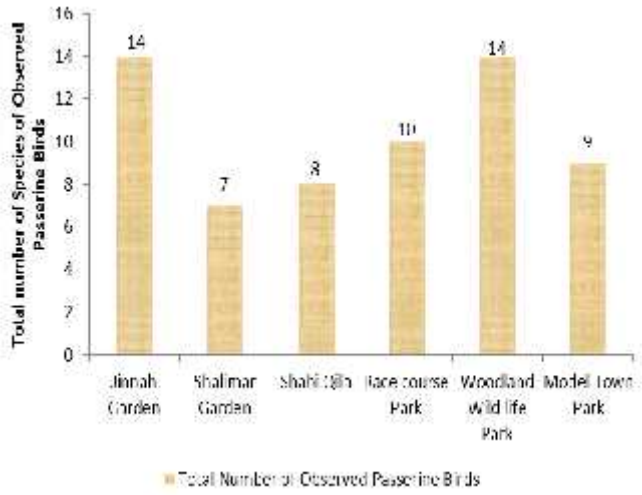

Figure: 3. Number of species in Parks

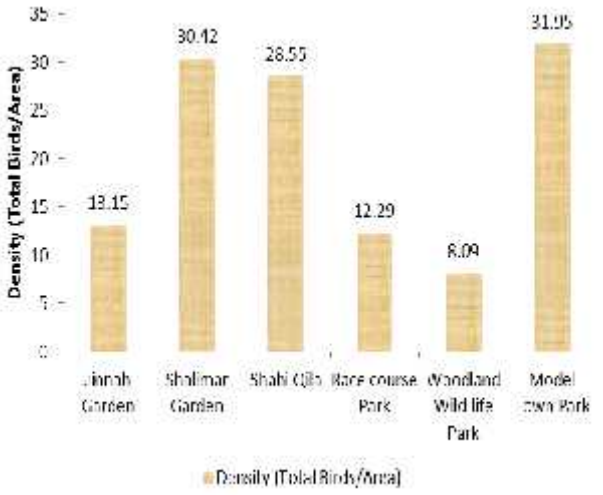

Figure: 4. Density of Birds in Parks

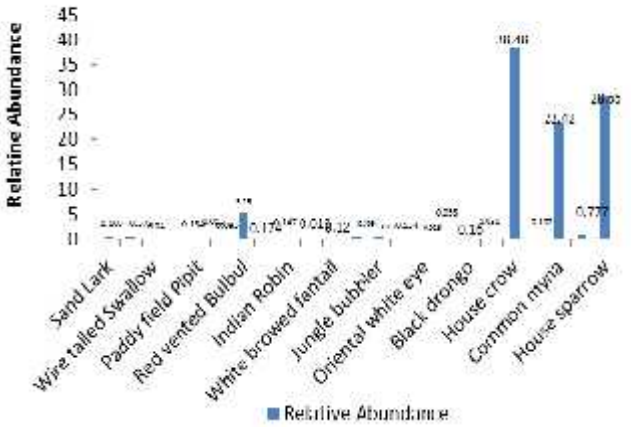

Figure: 5. Relative Abundance of Birds

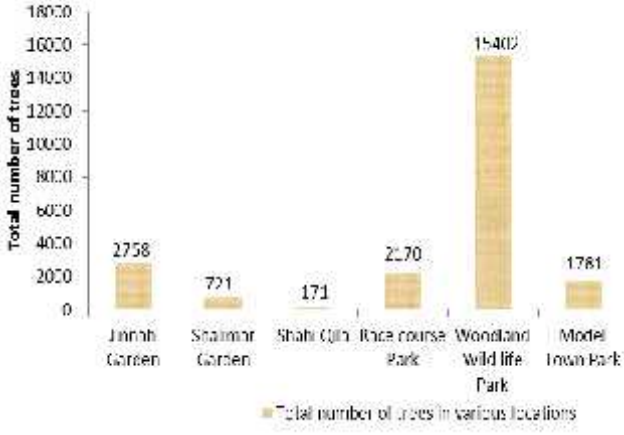

Figure: 6. Number of Trees in Parks

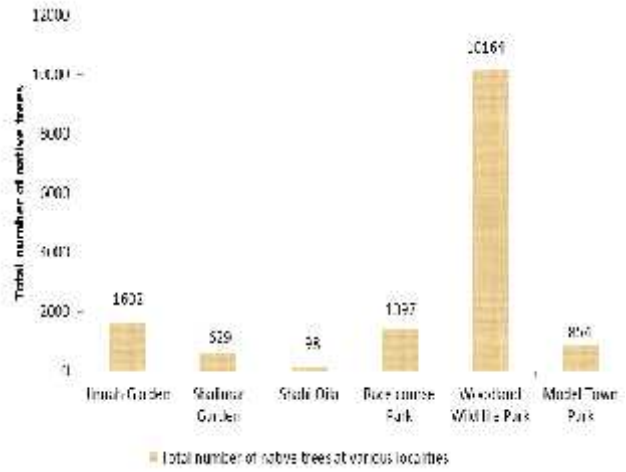

Figure: 7. Number of Native Trees in Parks

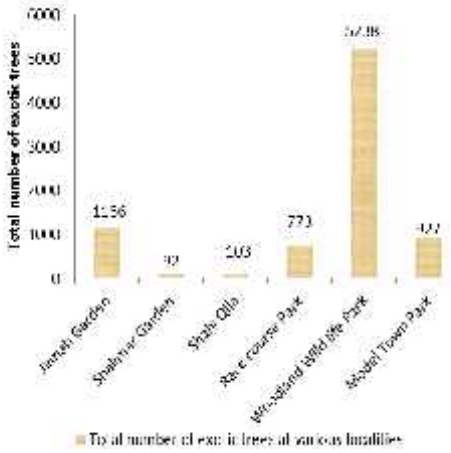

Figure: 8. Number of Exotic Trees in Parks

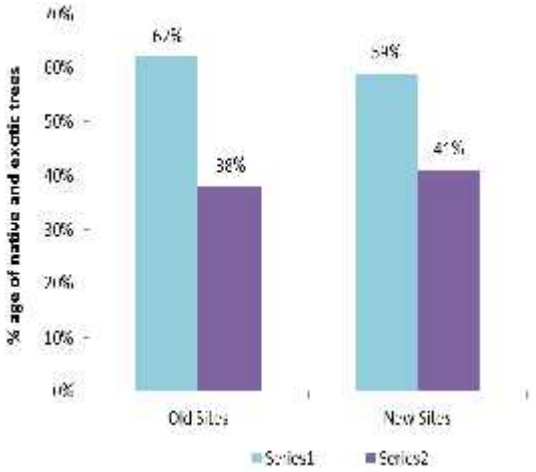

Figure: 9. Percentage of Native and Exotic Flora.

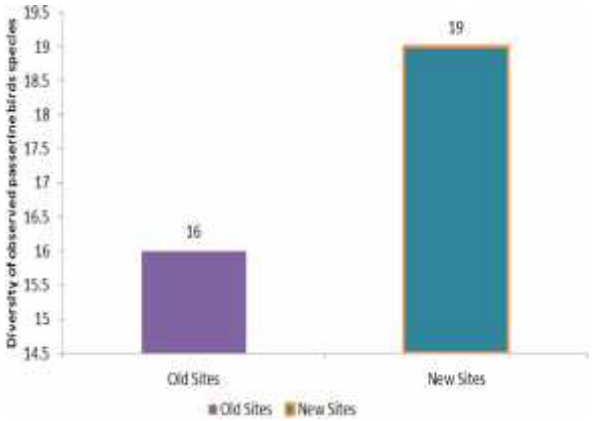

Figure: 10. Passerines in Old and New sites

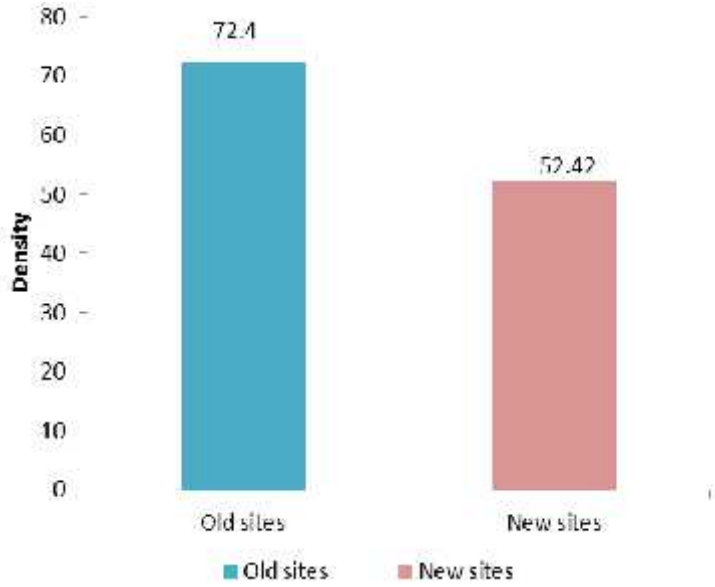

Figure: 11. Density of Birds at Old and New Sites

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