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Comparative study of environmental habitat biological and physical components of nests of house sparrow, collared dove and white – cheeked bulbul in Baghdad

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Abstract

This is a first and novel native study aimed to investigate the biological and physical components of nests of three birds of Iraq included house sparrow (*Passer domesticus*), collared dove (*Streptopelia decaocto*) and white – cheeked bulbul (*Pycnonotus leucotis*) in Baghdad city. This study was carried out during the period from January to October 2017. Mechanical analysis for nests biological and physical components were carried out on three of Iraq birds house sparrow (*Passer domesticus*), collared dove (*Streptopelia decaocto*) and white – cheeked bulbul (*Pycnonotus leucotis*). A total of 26 (12, 9 and 5 for each bird respectively) nests were collected from different region of Baghdad city using the mechanical analysis and were deconstructed into their component parts and these were then arranged in order or classes. The nest materials were differed according to bird species and ecology, nest materials classified as plant matter, animal matter, anthropogenic matter and unidentified. The nests had two distinct layers, the structural layer and the inner layer.

Keywords: House sparrow, Collared dove, White – cheeked bulbul, Nest components, Baghdad.

Introduction

Every bird species has certain habitat requirements, which may be altered by interactions with other co-species, these interactions are mostly ignored in predictive models trying to identify key habitat variables correlated with species population abundance/ occurrence (Skórka *et al*., 2016). The main explanatory variables are habitat features, land covers, or landscape characteristics (Baker *et al.* 2014; Kosicki *et al.*, 2015). However, there are several aspects that can affect the predictive performance species distribution models. For example, species traits and the presence of associated or avoided species may cause differential responses to the processes that control their distribution (Campomizzi *et al.*, 2008; Kissling *et al.*, 2011; Morelli and Tryjanowski 2015). Bird nests represent an extended phenotype of individuals expressed during reproduction and so exhibit variability in composition, structure and function. Descriptions of nests based on qualitative observations suggest that there is interspecific variation in size and composition but there are very few species in which this has been confirmed. For these species, data of the amounts of different materials indicate that nest construction behavior is plastic and affected by a variety of factors, such as prevailing temperature, geographic location, and availability of materials. The lack of data on nest composition is hampering our understanding of how nests achieve their various functions and how different species solve the problem of building a nest that will accommodate incubation and allow successful hatching of eggs(Lucia *et al*., 2018).

House sparrows (*Passer domesticus*) have lived around humans for centuries, look for them on city streets, taking handouts in parks and zoos, or cheeping from a perch on your roof or trees in your yard. House sparrows are absent from undisturbed forests and grasslands, but they're common in countryside around farmsteads (Radhamany *et al.*, 2016). House sparrows generally build single or semi-colonial nests. Nesting is most intense during January to May (Vincent 2005). This multi-brooded species is widely distributed in cities and are known to build open-cup nests which may be reused during the same season as well as in successive breeding seasons (Cavitt *et al.,* 1999; Friesen *et al.,* 1999). The species mainly nests in holes and crevices of man-made structures and nest-boxes (Summers-Smith 1988). House sparrows use a broad range of materials for nest building, including feathers, grass inflorescences, stalks and roots of plants, barks, threads, strings, and pieces of paper and wool (Indykiewicz 1990).

Collared dove (*Streptopelia decaocto*) is actually member of the birds of Iraq, they have well adapted in Baghdad areas, nesting on the top of buildings, window sills and any other place they

can build a stable nest. Collared dove nests are simple, usually just consist of a platform of sticks. Collared dove nest in trees or shrubs but will also use buildings, favoring ledges, guttering, and the brackets of security lights or satellite dishes (Allouse, 1962; Moudhafer *et al.,* 2006).

White-cheeked bulbul (*Pycnonotus leucotis*) is a species of bird found in south-western Asia from India to the Arabian peninsula including Iraq, White-cheeked bulbul is medium-sized songbirds, usually constructed its nests on trees (Moudhafer *et al.,* 2006; Srivastava, 2012; Clements *et al*., 2015; BirdLife International, 2016).

This study aimed to comparative of biological and physical components of nests of house Sparrow, collared dove and white – cheeked bulbul in Baghdad, Iraq.

Materials and Methods

This study was carried out during the period from January to October 2017. Mechanical analysis for nests biological and physical components were carried out on three of Iraq birds house sparrow (*Passer domesticus*), collared dove (*Streptopelia decaocto*) and white – cheeked bulbul (*Pycnonotus leucotis*). A total of 26 (12, 9 and 5 for each bird respectively) nests were collected from different region of Baghdad city using the methodology of Biddle *et al.* (2017). Nests were collected in plastic bags after the breeding season was completed and were shipped to the laboratory in speed then the nests were frozen at – 20 °C to kill biting invertebrates (Britt and Deeming 2011) before being air-dried and stored in plastic bags in cardboard boxes at room temperature (Biddle *et al.*, 2017, 2018). Nests were deconstructed into their component parts. Each nest was carefully separated into its construction elements and these were then arranged in order or classes.

Results and Discussion

A total of 26 (12, 9 and 5 nests for each bird respectively) nests were collected from different region of Baghdad city. The nests were cup shaped. The nest materials were classified as plant matter, animal matter, anthropogenic matter and unidentified (materials which were dried and converted to powder form, thus could not be identified). The nests had two distinct layers, specifically, the structural layer and the inner layer. The structural layer formed the base of the nest and constituted predominantly of plant matters. The inner is the thin layer which was in direct contact with the eggs and the nestling. This layer is made of fine and soft materials such as paper pieces, cotton, and fine jute.

House sparrows use a broad range of materials for nest building, including feathers, grass inflorescences, stalks and roots of plants, barks, threads, strings, and pieces of paper and wool. House sparrows used whole/parts of grass species of which three were identified and one unidentified, one sedge, three herbs, one shrub, and two tree species excluding an unidentified matter. In some situations, anthropogenic nest materials could be a beneficial resource, enabling nest construction in places where natural materials are limited, this is agreed with the findings of Indykiewicz (1990). Riper (1977) observed the use of sheep wool as a binding material in the structural layer of nests of birds. In the study of Radhamany *et al.* (2016) they identified 11 plant species from the structural layer of the nests. Whole or parts of the flower, leaf, stem or the dried herbs itself formed the building material of the structural layer. Similarly, in the inner materials they determined two plant species, i.e., *Azadirachta indica* (fine parts of flowers and leaves) and one unidentified grass species. Similarly, two types of animal matters, i.e., fine feather and human hair, six types of anthropogenic materials including plastic pieces and fine rope were also recorded. Parts of leaf, flower, and stem which were powdered were also found in the inner layers.

Collared dove nests are simple, usually just consist of a platform of sticks and loosely built (Allouse, 1962; Moudhafer *et al.,* 2006). Nests analysis showed that the base of the outer nests were composed of significantly thicker, stronger and more rigid materials compared to the side walls, which in turn were significantly thicker, stronger and more rigid than materials used in the cup. The outer material of the nest was not as tightly packed as the cup, becoming more loosely bound at its extremities. It was mainly composed of shoots either from trees or from herbaceous species; roots and grass culms were also present but only in small amounts.

White-cheeked bulbul nests were shallow and bowl-shaped, built of thin grass leaves, fine roots, and spider silk outside of the nest. The adult bulbul was collecting nesting material, hovering in midair to peel strips off a palm trunk. Parts of leaf, flower, and stem which were usually find compared with animal materials. Their nest are tucked between the branching forks of shrubs, potted plants and even artificial plants. They are so comfortable around humans that they construct their nests in urban gardens, in garages, along verandahs of high-rise buildings as well as around offices. Our finding agreed with Huan *et al.,* (2015) they found that invertebrate food decreased with nestling age, whereas, plant food increased with nestling age.

Conclusion

The nest materials were differed according to bird species and ecology, nest materials classified as plant matter, animal matter, anthropogenic matter and unidentified. The nests had two distinct

layers, the structural layer and the inner layer.

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