

NESTING ECOLOGY OF THE RED-WHISKERED BULBUL AT CITY CENTRE AND PERIPHERY IN LUCKNOW, NORTHERN INDIA

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Abstract. The nesting ecology of Red-whiskered Bulbul was investigated and compared between the city centre and peripheral areas among farmlands and dense vegetation of Lucknow city, India. Both the study regions had a 16 km² area. The nests at the city centre showed clumping due to less food supply, were fewer in number, thin walled, had lesser mean depth, lesser mean clutch size and were at times constructed on man made structures due to shortage of nesting sites, had a greater mean height and took a longer duration to be completed as against the peripheral nests located on city outskirts. In both study areas male and female bulbuls took active part in site selection, nest construction, incubation and protecting and feeding the young. However, city centre nests had a higher mortality rate and lower nesting success which could be attributed to less favourable conditions related to nest concealment, protection from inclement weather and food availability.

Key words: Red-whiskered Bulbul, *Pycnonotus jocosus*, India, behaviour, ecology, breeding, nest, egg.

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Гнездовая экология краснощекого бюльбюля в центре и на периферии г. Лукнов, Северная Индия. - А. Мазумдар, П. Кумар. - Беркут. 16 (1). 2007. - Краснощекий бюльбюль – обычный вид на севере и востоке Индии. Исследования проводились с февраля по июль 2006 г. на двух участках по 16 км² в центре города и на окраине среди полей и густой растительности. Гнезд в городе было меньше, они имели меньшие размеры и меньшее количество яиц. Самцы и самки на обоих участках принимали активное участие в выборе мест гнездования, постройке гнезд, насиживании и выкармливании птенцов. Успешность размножения в центре города была ниже, что может быть связано с менее благоприятными условиями.

Introduction

The Red-whiskered Bulbul (*Pycnonotus jocosus*) occurs abundantly in northern and eastern parts of India. The bird has economic significance since it feeds on grains and fruits in orchards, causing losses to agriculture, however, interestingly it compensates the loss by its insectivorous habits. It breeds both in urban as well as farmland areas on city outskirts. To study the nesting ecology of this bird the city of Lucknow (26° 55' N, 80° 59' E, 450 m above sea level) was chosen because of its high number here.

prismatic binoculars 8 x 30 was used for study of nesting habits. Folding type of ladder was used to approach the nests situated at different heights. The study was carried out since February to July 2006. We observed the difference in the nesting ecology of Red-whiskered Bulbul between the city centre and peripheral areas among farmland and dense vegetation. Care was taken to ensure that maximum nests were located both in the city centre and the periphery. All the mean values are given with Standard Deviation (mean ± SD).

Results

Material and methods

For studying the nesting ecology of Red-whiskered Bulbul, 60 nests were found in Lucknow city centre and on its periphery among farmland and dense vegetation. Both regions covered a 16 km² area each. A pair of

The Red-whiskered Bulbuls formed pairs during the breeding season (February to July) and the courtship behaviour included tickling of head of female by male bulbul, using its beak. Either of the two birds touched the beak of the other bird and rubbed it as well. Either of the two birds regurgitated and provided food



of animal or plant product to the other bird. The pre-copulatory behaviour of the male included plumage display with the hovering of the head, spreading the tail and fluttering the wings along with giving out shrill calls. A female bulbul that perched near male lowered itself with wings half spread and tail feathers raised, made a call to male. At times females were observed trying to mount the male but at the time of copulation male mounted the female on her back. Then male grasped the flank feathers of female in its feet and the neck feathers in its bill. Now female, with the wings slightly raised, tail feathers raised vertically and the feathers around the cloaca spread apart, prepared to copulate. The process of copulation required a few seconds as male mounted female and balanced itself with its feet and beak hold. After five or six cloacal contacts male switched sides by placing its tail on the other lateral side of female bulbul while maintaining the rhythm of copulation. This process was repeated for five to ten minutes. Copulation occurred generally in the morning or in the evening. After the copulation was over male dismounted from female at its own initiative, while remaining in the copulatory posture for a few seconds. This process was similar in both the study areas.

Both parent birds were involved in selecting suitable sites for construction of nests. They chose small trees, especially thorny ones like *Euphorbia tirucalli*, bushes, hedges and creepers and man made structures as nesting sites. Many birds chose those sites for nest construction that they had used previously; this information we collected from the local residents of the area. The mean height at which nests were located in the city centre was 12.50 ± 2.27 feet and the mean depth of nests was 1.75 ± 0.35 inch. We could locate only 20 nests at the city centre over a 16 km^2 area, which were clustered in small groups within $100\text{--}200 \text{ m}^2$ area that can be attributed to the availability of less food in the city centre area. However, nests located on the periphery, numbering 40, over a 16 km^2 area among farmlands and dense vegetation were well spaced out with no clump-

ing of nests seen which can be attributed to better nesting conditions with respect to food availability, better nesting sites and lesser human interference. The peripheral nests had a greater depth (mean depth 2.20 ± 0.84 inch). The peripheral nests were at a minimum distance of $400\text{--}500$ metres from each other. All the nests located on city periphery were constructed on thorny plants, bushes, shrubs having a mean height of 8.0 ± 2.4 feet. No nest was constructed near the man made huts etc. This was in stark contrast to the location of nests in the city centre area, with some nests being constructed on lamp shades and other man made structures, suggesting a scarcity of nesting sites in urban areas. Peripheral nests were better concealed than the city centre nests given the dense vegetation presence.

Both male and female partners of Red-whiskered Bulbul, constructed their nest by procuring nesting material that consisted of small dried sticks, grasses, leaves, metal wires, creepers and threads etc. A piece of paper at the base of a nest was observed in several city centre nests. During the early stages of nest construction small sticks were arranged in a criss-cross fashion by both birds that rose to a small platform. Either bird sat inside the incomplete nest and then concluded the construction of the cup-shaped nest. At times the nest was plastered on the outside with little cobwebs. The lining was made of fine stem of grasses. The presence of thread and wires may be attributed to the scarcity of nesting material or to avoid the extra labour of having to procure nesting material from far away places. It took the Red-whiskered Bulbuls of the city centre 6 to 7 days to construct the nests which clearly indicates a lack of availability of nesting material in the city centre area. It took the bulbul less than 5 days to prepare the nests in the peripheral region. The short time for nest construction could be ascribed to the short distance of the nest building material from the nesting sites and the hard working nature of the pair bulbuls. The peripheral nests located on city's outskirts were visibly thicker and stronger and no nest showed any evidence of



threads, wires and papers in them thereby suggesting the availability of nesting material in good amount in the peripheral region. Also one could attribute the greater thickness of the nest to the ever greater need of protection from rain, storm and predators present in the region and also to support a larger clutch of eggs. Soft grasses, stems and roots were used to line the inner cavity of the nest. Only one bulbul sat at a time in the nest. The birds spent hours in their nests and at times they were observed repairing their nests by collecting some nesting material nearby. They also used plant twigs as roofing material for concealment to protect themselves and their young ones from predators and adverse weather conditions. The bulbuls never used the readymade nests of other birds; no other bird used the abandoned nests of bulbul.

These bulbuls showed territorial behaviour, the size of which depended on the abundance of the member of the same species present in the same area. The nesting territory in these birds was defended only during egg laying, hatching of eggs and the rearing of young ones by both the individuals of the pair. Thus the bulbul defended the eggs and the fledglings. It defended its territory against all animals and also against the individuals of its own species. Though it remained less hostile towards less harmful birds such as sparrows during the early stages of nest building, yet it became more and more aggressive as it started laying eggs and rearing its young ones. Both the individuals of a pair became extremely aggressive and attacked the intruder with their beaks, wings and claws, thus forcing the intruder to escape. Though they defended their territories against large predators yet they remained silent at the advent of large preying birds such as kites. While defending their territories against members of other species they did not find support from members of their own species. This territorial behaviour remained uniform both at city centre and periphery.

The female bulbul, during egg laying, sat at the edge of the nest in a fluttering and uneasy mood with its tail feathers erect and slightly spread wings. The broader end of the

egg first came out of the cloaca and the egg was laid in the center of the nest. The bird stayed in its nest for a few minutes; after laying the egg it moved away. In these birds the second egg was laid after 24 hours and the third after another 24 hours. The clutch had two or three eggs. Among the nests of bulbul under the present study at the city centre many had three and a few had two (mean clutch size 2.70 ± 0.30). However, most nests on the periphery had a clutch size of three eggs leading us to assume that favourable nesting conditions increase clutch size. The mean clutch size among peripheral nests was 2.95 ± 0.20 .

The eggs of bulbul were light brown in colour with pinkish coloured markings on them. The shape of eggs ranged from oval to sphero-conoidal, rarely pyriform or elongated or globular. Twenty eggs were measured at city centre and periphery each. Length: 18–24 mm (mean length 22.0 ± 2.24 mm). Breadth: 14–16 mm (mean breadth 15.5 ± 1.46 mm). The female incubated the eggs for a much longer duration than male. As soon as the first egg was laid female bird sat on it but the female bird avoided incubating eggs at night till the clutch was complete. The male bird incubated the eggs for short durations during daytime. The incubating bird left the nest twice or thrice every two hours for some activities such as feeding, drinking and attending to the call of nature. Birds of city centre took a lot of time to return to their nests as against the nesting bulbuls on city periphery. This could be due to lack of food and other resources that were available in plenty on the outskirts among the dense vegetation and farmlands. The bird placed all the eggs in a definite order for incubation, with the broad end facing the outer side and the narrow end directed towards the center of the nest. The incubation period varied between 13–14 days (mean 13.7 ± 0.48 days). Egg fertility at the city centre and periphery was 87.0% and 89.8% respectively.

Since the young hatchlings were blind and naked, they were dependent on their parents for food and protection. After hatching of all eggs the female bulbul did not sit in the nest during day time but sat at night for protecting



the fledglings. The fledglings were never left unguarded and at least one parent bird remained in the vicinity of the nest to protect the nestlings from predators. However, in city centre nests only one parent bird remained in the vicinity for a longer duration than the peripheral nests since the other parent bulbul had to scour for food over large distances to feed itself and the hatchlings and this at times led to predators like cats preying on the fledglings. Both parents were involved in feeding the young ones and provided them regurgitated food. The fledglings were blind till the fifth day. On the sixth or seventh day the fledglings opened their eyes and raised their heads. Initially they raised their heads and opened their mouths for food the moment the nests were disturbed, but as they became mature they learnt to distinguish between various external factors which disturbed them. Henceforth, they raised their heads with open mouths only when their parents came near their nests. The young birds left the nests 12–13 days after their birth.

In the Red-whiskered Bulbul the mortality rate was 17.0% (8 fledglings of the 47 hatched eggs died) in the city centre area which could be attributed to lack of proper concealment of nests from predators and long absence of parent birds from their nests. However, the mortality rate was 10.4% (11 fledglings of the 106 hatched eggs died) among the nests under study on the periphery. This could be due to proper concealment of nests and safety from predators due to greater level of protection from parent bulbuls since they don't have to scour for food for a long time daily. In city centre bulbuls out of 54 eggs laid 39 mature fledglings flew away from their nests showing 72.2% nesting success. Among the peripheral nests on the city outskirts of the 118 eggs laid 95 fledglings matured and left the nests giving a nesting success of 80.5%.

Discussion

Wright (1957), reported May to August as the breeding season in bulbul. Breeding in birds is mostly seasonal, hence reproduction in birds is periodic in nature. It is a general

rule that passerine birds come into breeding condition at an early age. Most passerine birds breed in first spring before they are one year old. Bulbuls probably start their breeding season when day length and temperature are towards increasing side. In some birds shortening of day lengths initiates breeding (Berger, 1969). Courtship behaviour differs in different birds. In Red-vented Bulbul (*Pycnonotus cafer*) these activities include billing, spooning and head tickling (Lamba, 1977).

In bulbul, both the birds of the pair take part in constructing the cup-shaped nest by placing sticks in a criss-cross manner followed by the addition of dry leaves, grass twigs etc. (Baker, 1922). The clutch size of every species is definite. Inglis (1922) reported mean clutch size of 3.0–3.1 in Red-vented Bulbul. Baker (1922) reported the largest clutch of five eggs in a nest of this species.

The eggs of bulbul have pinkish spots. Similar observations on the eggs of bulbul were reported by Ali (1992). In bulbul the female does not wait for the entire clutch to be laid, but starts sitting on the first egg as soon as it is laid. Though both sexes in bulbul share incubation duty, yet most part is done by female in Red-vented Bulbul (Dixit, 1963). Law (1924) recorded 12 days in bulbul. Mortality or death among fledglings was caused due to several factors such as predators, diseases, size of nests and chances of nestlings falling off their nests. Vijayan (1978) reported the nesting success to be maximum when the cover was dense. A high nesting success rate as reported in these birds could be attributed to a number of factors such as favourable atmospheric conditions, nesting sites that were camouflaged by thorny plants, less infections among fledglings, less predators and high egg fertility rate. All these factors culminated in a high nesting success rate. Nest building property is acquired genetically (Mathur, 1998). Due to experience many birds build better nests as they grow older.

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**Tryjanowski P., Sparks T.H.,
Jerzak L. (Eds.).
The White Stork in Poland:
studies in biology, ecology and
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Wyd. Naukowe, 2006. 492 p.**

Польские орнитологи выпустили интересный сборник по изучению и охране белого аиста (*Ciconia ciconia*). Он состоит из вступления редакторов и 38 статей. Тематика работ очень разнообразна – от региональных сводок по экологии и динамике численности до специальных публикаций по миграциям, поведению, определению пола по биометрическим параметрам, биохимии крови, акарофауне гнезд, методам охраны. Сборник полностью на английском языке, что делает опубликованные результаты исследований доступными для ученых из любых стран.

По данным последнего VI Международного учета белого аиста в 2004–2005 гг., в Польше гнездится ок. 52,5 тыс. пар, что составляет примерно 20 % общей их численности (Guziak, Jakibiec, 2006). Польская популяция аистов – крупнейшая в мире (украинская, кстати, – третья, после Испании). Понятно, что изучение крупнейшей мировой популяции вида важно и для науки, и для охраны птиц. Надо отдать должное польским коллегам, по активности изуче-

ния белого аиста они уступают разве что немцам. Исследования целого ряда авторов уже стали классическими.

В сборнике обсуждаются изменения распространения, численности, экологии белого аиста, происходящие за последние десятилетия. Численность вида растет, он расселяется на новые территории. Причем, происходит это даже в Польше – аист поднимается все выше в горы на юге и юго-западе страны. Практически повсеместно все больше аистов изменяют свои традиционные места гнездования и переходят на линии электропередачи. Это представляет немалую проблему и для экономики, и для охраны самих птиц. Многие исследования касаются влияния различных факторов на успешность размножения аистов – качества местообитаний и богатства кормовой базы, внутривидовой конкуренции, погодных условий. Интересны и информативны статьи по результатам кольцевания в Польше и поведению аистов.

У польских орнитологов и природоохранников накоплен уже богатый опыт охраны белого аиста, что также нашло отражение в сборнике.

Сборник может быть интересен не только орнитологам, но и биохимикам, физиологам, тем, кто занимается практической охраной птиц.

В.Н. Грищенко