

# Periodic Research

## Breeding Biology of White-Eared Bulbul *Pycnonotus leucotis* in Bikaner, Rajasthan

### Abstract

The breeding biology of the White-eared bulbul *Pycnonotus leucotis* was studied at the Bikaner district of Rajasthan, India for a period of one year. During study period a total of 16 nests were observed. The breeding occurred from March to September. The clutch size is normally three. The hatching success was found to be 64.51%. The incubation period in *P.leucotis* is 11-13 days and the nestling period is 9 to 11 days. In the present study fledging success was observed to be 45.16%. The breeding success of *P.leucotis* was 45.16%. Both male and female fed the nestlings.

**Keywords:** White-Eared Bulbul, Nest, Clutch, Hatchling, Fledgling.

### Introduction

The family Pycnonotidae (bulbuls) is a large group of passerines comprising 138 species and 355 taxa, widespread in southern Asia, Africa, Madagascar and islands of the western Indian Ocean (Sibley & Monroe 1990; Fishpool & Tobias 2005). They occupy a broad range of habitats from semi-arid deserts to rainforests. Of the 27 genera currently treated within the Family Pycnonotidae, 11 are exclusively Asian, 14 are restricted to Africa and islands of the Western Indian Ocean while the remaining 2 occur in both continents. Only a few widespread and lowland species have been well-studied, in their native and other introduced ranges (Prajapati et al. 2011; Rao et al. 2013; Sharma & Sharma 2013; Zia et al. 2014; Awais et al. 2014). The white-eared bulbul (*P.leucotis*) is a common resident bird of North India. This species is found to be abundant in gardens, cultivated lands, shrubs, herbs and urban areas. This bulbul has a medium gray body, jet black head; subtle rounded black crest and a distinct white patch over the ear coverts, hence the name. Feet and legs are mottled dark gray/brown. These birds are sexually monomorphic and have bright distinct yellow feathers in the vent area.

### Aim of the Study

The aim of the present study was to provide a detailed description of the breeding biology of White-eared bulbul. The information on this species is scanty (Srivastava 2012). Hence the present study was designed to investigate the breeding biology by studying clutch size, hatchling success, developmental period, breeding success, fledging rate, characteristics of nest in the urban areas of Bikaner and compare this information with available data for other Pycnonotids. Most of these species are common in their habitat and are open-cup nesters. Detailed examination of the breeding biology of these species is important to understand the evolution of life history strategies of open-cup nesting birds in the tropics.

### Review of Literature

Bird reproduction has some distinctive and unusual features compared with other vertebrates. All birds lay eggs, there is no viviparous species among them (Blackburn and Evans 1986). Carleton and Owre (1975) studied the breeding biology of Red-whiskered bulbul in Florida, U.S.A. Hsu and Lin (1997) studied breeding biology of Styan's bulbul *Pycnonotus taivanus* in Taiwan. The average clutch size was 3.3 eggs (n=34) and hatching success was 60%. Kruger (2004) studied breeding biology of the Cape bulbul *Pycnonotus capensis* in Port Elizabeth. He found strong differences between bush species with regard to predation risk and brood parasitism by the Jacobin Cuckoo *Climator jacobir*. Balakrishnan (2009) studied the breeding ecology and nest-site selection of yellow-browed bulbul *Iole indica* in Western Ghats, India. Birds laid



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clutches of 2-3 eggs and broods hatched synchronously. Overall nesting period lasted for about a month with 3-7 days for nest construction, 11-13 days for incubation and 12-13 days for nestling stage. Balakrishnan (2010) studied reproductive biology of the Square-tailed bulbul *Hypipetes ganeesa* in the Western Ghats, India. Clutch size was two in more than 96% of nests. Incubation and nestling periods were 13 and 12 days, respectively. Overall nest success rate was 12.84%. Balakrishnan (2011) studied breeding biology of the Grey-headed bulbul *Pycnonotus priocephalus* in Silent Valley National Park, Western Ghats, India. The clutch size averaged  $1.53 \pm 0.50$  eggs. Incubation and nestling periods were  $13 \pm 0.87$  (n=9) and  $12 \pm 0.50$  (n=9) days, respectively. Overall nest success was 10.79%. Srivastava (2012) studied breeding behaviour of white-eared bulbul (*Pycnonotus leucotis*) in a house courtyard at Bikaner, Rajasthan. Rao et al. (2013) observed breeding performance of Red-vented bulbul (*Pycnonotus cafer*) in Sikar region (Rajasthan), India. Hatching success was 50%, nestling success was 36% and nesting success was 18%. Zia et al. (2014) studied breeding of this species in Rawalpindi, Islamabad. Predation rate was only 6% in eggs and 9% in nestlings. Li et al. (2015) studied the breeding biology of Red-Whiskered bulbul (*Pycnonotus jocosus*) in Xinshuangvanna, Southeast China. The mean clutch size  $2.53 \pm 0.51$  eggs (n=40). The average incubation period was  $11.1 \pm 0.5$  days, and average nestling period was  $11.0 \pm 0.8$  days (n=31). The overall nest success was 34.22%. Aziz et al. (2017) studied the breeding biology of the White-spectacled Bulbul, *Pycnonotus xanthopygos*, at the northwestern edge of its distribution range. The clutch size is  $3.3 \pm 0.8$  eggs per pair, nesting success 68%, hatching success 94%, fledgling success 95%, and overall breeding success 89%.

#### Materials and Methods

##### Study Area

The study was carried out between September, 2015 and August, 2016 in the area of Bikaner ( $27^{\circ}11'$  to  $29^{\circ}03'$  North latitudes and  $71^{\circ}54'$  to  $74^{\circ}12'$  East longitudes). Bikaner district has a dry climate and forms part of the great Indian Thar desert. The climate is characterized by wide diurnal and seasonal variation in the temperature, low rainfall and low relative humidity.

##### Field Work

During the study, nests of white-eared bulbuls were located by following individuals carrying nesting material or food to the nests and by searching vegetation (Martin & Geupel 1993). Once located, the nests were checked every day to determine the time of egg laying, clutch size, start and duration of the development period (incubation and nestling), and fate of the nest. The clutch initiation dates were determined by direct observation of egg laying. For calculating the development period, only nests where breeding stage transitions could be observed directly were considered. Nest size parameters, such as inner diameter, external diameter were measured (Soler et al. 1998; Balakrishnan 2009, 2011). Photographs of

important events were taken using Nikon autofocus camera without disturbing the birds and special care was taken to not disturb the nests.

#### Results and Discussion

The breeding occurred in *P.leucotis* from March to September. Upto three broods per year were observed. The nests of *P.leucotis* were located on neem (*Azadirachta indica*) trees, China rose (*Hibiscus rosa-sinensis*), beri (*Zizyphus numularia*) and in the flowering pots in the houses of urban area. A total of 16 nests were located and egg lying was observed in 11 nests. The nests were found at a height of 3-9 feet, located in the forks of branches. Both the sexes took part in collecting the nesting material. The nests were open cup nests made of soft material like sticks and rootlets of locally available plants like *Ocimum sanctum* as well as plastic materials. The mean inner diameter of nests was 7.3 cm and mean depth was 5.1 cm.

The colour of the eggs was light beige with multishaped speckles. Average length and breadth are  $25 \text{ mm} \pm 0.52$  and  $15 \text{ mm} \pm 0.42$  (n=31). The clutch size is the number of eggs laid in an uninterrupted series. The upper limit of the clutch size is three in *P.leucotis*. During the study period 9 nests were found with three clutches and 2 nests were with 2 clutches (Table 1). In *P.leucotis* the largest clutch size is found in the wet season (August-September). The variation of the clutch size is correlated with the availability of food; the larger clutch is laid when the food for the young is more abundant (Vijayan 1980).

Incubation period is considered to be the period from the laying of the last egg of a clutch to the hatching of the last nestling (Nice 1954). Out of 31 eggs, 30 eggs were incubated and out of these 20 eggs were hatched showing hatching success of 64.51%. The nestling period is defined as the interval of time the last chick of the brood remained in the nest. The incubation period in *P.leucotis* is 11 to 13 days and the nestling period is 9 to 11 days. Nestling period depended upon the number of young in a brood, productivity of the habitat, nest height and age of parents (Dhanda & Dhindsa 1998). The female started hatching while before laying third egg of the clutch. The nestling hatched mostly on consecutive days and female and male started feeding chicks and in many nests it was observed the third egg remained unhatched. The female was solely responsible for incubation. The female incubated the eggs by sitting for long hours and leaving the nest only for small time. Wee (2009) observed in *P.goiavier* the female sitting for short spells of fifteen minutes. The nestlings on hatching were blind and naked. *P.leucotis* chicks come in the category of Altricial 2 (hatch without external feathers, eyes and ears closed at hatching, Starck 1993).

Hatching success is the proportion of eggs in a clutch that produce young. The hatching success is seen moderate because during the hatching period a single adult mostly female found in the nest, predators were responsible for average hatching success. Fledgling is the proportion of the chicks that fledge from a brood. The success of fledging depends on

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nestling deaths and predation. Fledging success was observed to be 45.16% (Table 1). Breeding success is defined as occurs when one or more young from a clutch of eggs survives to fledging. The breeding success of *P.leucotis* was 45.16% which is average as compared to other studies on other species like *P.cafer* (Rao et al. 2013; Sharma and Sharma 2013; Zia et al. 2014).

Both male and female fed the nestlings. Feeding started when the first chick hatched. Feeding started in the early morning and ended late in the evening. Feeding frequency increased near fledging time as the food requirement of the nestlings increased with increase in body size. The food consisted of juicy nectar plant material in the early period but later it contained more of insect material sometimes carrying whole grasshopper contrary to the observations made on Red-whiskered bulbul (*Pycnonotus jocosus*) by Li et al. 2015. There was no coordination between the two adults in feeding. As long as one managed to secure a morsel of fruit or an insect, it would bring it to the nest. If both arrived together, one would wait nearby for its turn. Flying to the nest was never direct. With food in its bill, an adult would fly to a nearby branch and look around to see if the coast was clear. Only then would it fly to the nest. As soon as it touched the nest, the chicks would crane their necks, gape widely and cry loudly, begging to be fed. The actual feeding took two to twenty seconds to complete depending on the amount of food brought in.

On the onset of fledging, chicks tried to sit on the edge of nest. On the day of fledging the chicks left the nests and sat nearby. Both parents fed them and in the night the nestlings and adults moved to different place. The predators of this species were observed to be cat and house crow. According to Wee (2009) predators aside, many active nests are being destroyed through pruning of trees and shrubs. In most, if not in all cases, the active nests are not noticed until the branches have been cut. The eagerness of birdwatchers and photographers to monitor and photograph nestling birds can contribute to nest predation.

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# Periodic Research

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**Table 1: Breeding of White-eared bulbul (*Pycnonotus leucotis*)**

Nests	1	2	3	4	5	6	7	8	9	10	11
Clutch Size	3	2	3	3	3	3	2	3	3	3	3
Eggs Incubated	3	2	3	3	2	3	2	3	3	3	3
Eggs Hatched	3	2	2	3	--	2	2	--	3	3	---
Incubation Period	13 Days	11 Days	11 Days	12 Days	---	11 Days	12 Days	---	12 Days	11 Days	---
Nestling Period	9 Days	10 Days	9 Days	---	---	12 Days	---	---	10 Days	11 Days	---
Number Fledged	3	2	2	---	---	2	---	---	2	3	---