



BREEDING PERFORMANCE OF RED-VENTED BULBUL (*Pycnonotus cafer*) IN JHUNJHUNU REGION (RAJASTHAN), INDIA

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ABSTRACT Breeding performance of the Red-vented Bulbul (*Pycnonotus cafer*) was studied in Jhunjhunu region, Rajasthan state during March, 2016 to October, 2017. The population of *P. cafer* was more observed in human habitat region than the non-human habitat region of the study area. Red-vented Bulbul is a common breeder bird in this region. During study period total 24 nests were observed. Breeding period was observed March to October in 2016 and 2017. *P. cafer* prefers small, leafy and dense bushes for the nesting. It prefers different plant species as a nesting site. It is found that the hatching success was 50 %, nestling success was 33 % and fledging success was 18 %. It is found that in this region the breeding performance of the Red-vented Bulbul was low. Reasons for the low breeding performance are due to predation, food availability, starvation and desert environmental conditions.

KEYWORDS : Jhunjhunu, Red-vented Bulbul (*pycnonotus cafer*), Breeding, Nest, Clutch Size, Fledge.

1. Introduction

The Red-vented Bulbul (*P. cafer*) is a common bird in the Jhunjhunu region. It is resident and common breeder bird within the study area. The first systematic investigation of the breeding biology of Red-vented Bulbul (*P. cafer*) has been done by Vijayan (1980). Baker (1932) has also gives a general review on the breeding of *P. cafer* and most of his conclusions are drawn from the scattered notes of others, which were based on causal observation on one or two pairs. However, satisfactory but generalized details are available on the size, shape, and color of the eggs (Ali and Ripley 1971 and Baker 1932). Scattered notes on some of the features of the breeding biology of *P. cafer* are given by Ali (1930), McCann (1931), Dutt (1932) and Lamba (1968). Dixit (1963) and Prajapati (2006) have also gives the recorded notes on the breeding of a pair of *P. cafer* in human settlements. After Vijayan (1980) gives detailed information of breeding biology of the *P. cafer*, in Rajasthan and elsewhere, the work was related to breeding season and its regulation in individual bird was done at various places and time: Parasarya (1984), on *Nycticorax nycticorax*, Patel (1986) on *Columba livia*, Naik and Mistry (1975) on *Passer domesticus*, Mathew and Naik (1986) worked on *Passer domesticus* at tropical population. The present paper deals with various aspects of breeding performance of the Red-vented Bulbul (*P. cafer*).

2. Material and Methods

The Jhunjhunu region has a sub-tropical climate, which is exceptionally seasonal with a cold winter (November-February), hot summer (April-June) and warm rainy season (July-September). The scarcity of water and food, intense radiation, dry winds, strong sandy storms, wide diurnal and seasonal variation in the temperature and low humidity are the common characteristic features of the area. Regular weekly field trips were made throughout the period. Morning session of two hour duration (6-8 AM) and evening session of two hour duration (4-6 PM). I observed the Red-vented Bulbul during the breeding season using a photographic camera (Nikon SLR) and a 10 x 50binocular (Nikon). About 360 hours were spend time to time in the study field and a total 24 Nests and 18 breeding pairs were recorded in two breeding season (2016 to 2017). During the observation the nests, other activities were also counted. Some nests were traced by following the bird while they carrying the food. The nests were checked every day during the laying period and four to five day intervals during the incubation and hatching periods. After hatching regular visit to be made for the check the hatched chicks, till they leave the nest. After three or four days the chicks were fledged from the nest. The length and breadth of eggs were measured by the Varnier's Calipers. The Shape Index (SI) for eggs was calculated using given formula, $SI = (\text{Length} / \text{Breadth}) \times 100$.

3. Results and Discussion

During the study period of 16 months a total of 24 nests of *P. cafer* were studied. There were 22 nests found in active condition. From the distribution of the nests in different months it appears that the breeding

season as well as peak periods of breeding of *P. cafer* at Jhunjhunu region varies from year to year (Table 2). In general the breeding season of *P. cafer* is March to October. The peak breeding period for *P. cafer* was noted during September 2016 and 2017. August and September month are more suitable for breeding for *P. cafer*. Newton (1964) reported that the year to year variation in the breeding season and peak of breeding.

4. Nesting Sites

Red-vented Bulbul mostly preferred the small leafy, dense bushes and small leafy trees for nesting. In the study area *P. cafer* preferred as nesting plant species like as *Ziziphus jujuba* (Ber Jhari), *Hibiscus rosa-sinensis* (Gudhal), *Acacia nilotica* (Kikar), *Morus alba* (Shahtoot), *Aegle marmelos* (Beel), *Emblica officinalis* (Awnla), *Bauhinia racemose* (Jhinja), *Syzgium cumini* (Jamun), *Polyalthia longifolia* (Ashapala), *Tecomella undulata* (Rohida), *Prosopis cineraria* (Khejri).

5. The Nest

Both sexes take part in the nest construction during the breeding season. *P. cafer* constructs the nest at the junction of the bifurcated or trifurcated branch or on some similar substrate so as to get a firm support at the bottom. Sometime *P. cafer* constructs the nest at the junction where four or five branches meet and cross each other. It prefers the material for built up the nest like as small and smooth dry branches of stems and roots of herbs and grasses. I observed the polythene fibre as construct material of nest by *P. cafer*. All bird builds their nests at different height of trees. Red-vented Bulbul generally selects 2.0 to 3.5 m. height for nest construction, but they do not prefer low height i.e. < 1.0 m (Table 3).

6. The Eggs

The colors of eggs are pinkish white with dark and light brown spots. The weight of one egg of seven days old was 3.00 gm. Average length and breadths of eggs are 18.8 mm \pm 0.5378 and 14.6 mm \pm 0.4373 (n=70). Takagi (2003) stated that the natural selection should favor females that produce larger eggs. According to Horak et al. (1995) high investment into egg size might be in conflict with energetic demands of female and her willingness to produce more offspring. The mean egg shape does not differ significantly in different months (Patel 1986). Shape index is depended on weight. A positive correlation between egg size (weight or an index of volume derived from the length and breadth of eggs) and nesting survival, or growth, has been found for most bird species studied by Schif ferli (1973). Reddy et al. (1979) observed that there was an adverse relation between decreased shape index and increasing egg weight.

7. Clutch Size

The clutch size means the number of eggs laid in series without any interruption. Normally the upper limit of the clutch size is three in *P. cafer* but sometime two also. 21 nests were found with 03 clutches and

01 nests were with 02 clutches during the study period (Table 5).

The largest clutch is laid in the rainy season, i.e. August- September in *P. cafer*. Vijayan (1980) observed that 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 most abundant. According to Lack's hypothesis (Lack 1954) that the clutch is a hereditary characteristic of each species and has evolved through natural selection of correspond with larger number of young for which the parent can, on the average, provide enough food. Roff (1992) observed that the clutch size reduction under high risk of nest predation has been hypothesized to be adaptive for at least two reasons.

8. Incubation and Nestling Period

Incubation period is the interval between the laying the first egg and hatching of that egg within clutch. Skutch (1945) and Nice (1954) also it is considered and define incubation period from the laying of the last egg of a clutch to the hatching of the last nestling. The nestling period is defined as the interval of time the last chick of the brood remained in the nest. As per my observation the incubation period in *P. cafer* is 11 to 13 days. Ali and Ripley (1971) have also recorded the period of *P. cafer* as approximately 14 days and the nestling period is 12 days. Patel (1986) observed that the environmental temperature has some effects on the length of incubation period in *C. livia*. The nestling period probably depended upon the number of young in a brood, productivity of the habitat, nest height and age of parents (Dhanda and Dhindsa 1998). The best food source for the parents is one of the reasons for less required period than the other places. Patel (1986) reported that the length of incubation period is dependent upon the ambient air temperature and the nestling period upon the light hours.

9. Hatching, Fledging and Breeding Success

The success of hatching is the proportion of eggs in a clutch that produce young ones. The hatching success is seen moderate during study period, because during the hatching period a single adult mostly found in the nest. Some time high wind velocity, heavy rainfall as well as predators were responsible for average hatching success. The success of fledging depends on nestling deaths and predation. Heavy rainfall with high wind velocity and starvation are responsible for loss of fledging success. Fledging is the proportion of the chicks that fledge from a brood. Breeding success is defined as "When one or more young from a clutch of eggs survives to fledging are occurs". The breeding success of *P. cafer* in and around Jhunjhunu appeared to be exceptionally low for period of 19 months, of the 70 eggs laid by *P. cafer* but only 12 nestling were fledged. However, Ali (1930) was noted that out of six nests of *P. cafer* under his observation none produced a fledgling that flew. It might be depending on place, time, environmental conditions and parents care, etc. During my observation period vegetation looking good, but there are some ecological factors inhibits the breeding success. They are like heavy rainfall, high wind velocity, House Crow, Shikra, Black Kite, Indian Tree Pie, Squirrels, and Cats as predators. The breeding performance of *P. cafer* is poor (Table 6), but the hatching and fledging success is overall moderate. Breeding season is almost seen during monsoon but some nests were observed in summer season also. The nest places, nesting materials, and availability of food were looking good in the study areas, but environmental factors, predation and sometimes dearth of food etc. are responsible for lower breeding success of *P. cafer*. At present the population of *P. cafer* is well maintained in the study area because adults are well adapted with respective food and good vegetation. As per my knowledge by the human being provide the food and shelter for the birds purposely and accidentally in the study area. So the population of birds is well maintained in the study area.

Table 1: Meteorological data.

Year	Maxi. Temp. (°C)	Mini. Temp. (°C)	Rainfall (in mm.)
2016	47	+0.5	356.48
2017	45.5	+0.5	638.35

Table 2: Nest distribution in percentage during breeding season.

Year	March	April	May	June	July	August	Sept.	Octo.
2016	3.6 (1)	7.1 (2)	3.6 (1)	3.6 (1)	7.1 (2)	7.1 (2)	10.7 (2)	3.6 (1)
2017	3.6 (1)	3.6 (1)	3.6 (1)	3.6 (1)	10.7 (2)	10.7 (2)	14.3 (3)	3.6 (1)

Table 3: Vertical distribution of nests.

Height (in meter)	No. of nests	Distribution
0.0-0.5	0	0.0

0.5-1.0	0	0.0
1.0-1.5	2	8.3
1.5-2.0	3	12.5
2.0-2.5	5	20.8
2.5-3.0	10	41.6
3.0-3.5	4	16.6

Table 4: Length and breadth of eggs in *P. cafer*

No. of eggs	Mean length	Mean breadth
70	18.8 ± 5378	14.6 ± 4373

Table 5: Clutch size in *P. cafer*

Year	Clutches	No. of nests
2016	3	10
	2	0
2017	3	12
	2	1

Table 6: A summary of the breeding performance of *P. cafer*

Summary	Year		Average
	2016	2017	
Clutches	10	12	11
Total eggs laid	30	35	32.50
Hatched	15	17	16
% of hatched	50	48.57	49.28
% of hatching failure	5.50	3.40	4.40
% of egg loss	50	50.70	50.36
Fledged	5	7	6
% of fledged from hatched	33.33	41.17	37.25
% of fledged from total eggs laid	16.66	20	18.33

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