

# Nature's Master Nest Builder: Reproductive Ecology and Nesting Behaviour of the Red-vented Bulbul (*Pycnonotus cafer*) in Sikar District, Rajasthan

Anita Jhahria<sup>1</sup>, Deepa Verma<sup>2</sup>

<sup>1</sup>Principal Seth Shree Kedarnath Modi Rajkiya Mahavidhyalya Gudha Jhunjhunu  
Email: [anita290106\[at\]gmail.com](mailto:anita290106[at]gmail.com)

<sup>2</sup>Research Scholar Department of Zoology Pandit Deendayal Upadhyaya Shekhawati University Sikar  
Email: [deepa.verma2577\[at\]gmail.com](mailto:deepa.verma2577[at]gmail.com)

**Abstract:** *The Red-vented Bulbul (Pycnonotus cafer) is one of the most common resident passerines in India and plays an important ecological role in seed dispersal, insect control, and pollination. The present study documents the reproductive ecology and nesting behaviour of the species in Sikar District, Rajasthan, during the breeding season (March–August). Field observations focused on nest-site selection, nest construction, breeding behaviour, incubation, hatching success, and parental care. The bulbuls preferred dense shrubs and small trees such as lemon (Citrus limon), bougainvillea, neem (Azadirachta indica), and ficus for nest placement at heights of 1–4 m. Cup-shaped nests were constructed using dry grasses, fine twigs, rootlets, plant fibres, spider silk, cotton fibres, and soft leaves. Both male and female participated in nest building, although females performed most of the final shaping. The clutch size generally ranged from two to three eggs with an incubation period of 12–14 days. Hatchlings were altricial and entirely dependent on both parents for feeding and protection. Insects formed the primary food for nestlings, while fruits and berries were gradually introduced during later development. Nest predation, extreme summer temperatures, and human disturbance were the principal causes of breeding failure. The findings demonstrate the remarkable adaptability of the Red-vented Bulbul to semi-arid and urban environments and highlight the importance of conserving native vegetation and urban green spaces for sustaining breeding populations. Similar nesting characteristics have been reported from Rajasthan, confirming the species' flexibility in habitat use and nest construction.*

**Keywords:** Red-vented Bulbul, reproductive ecology, nest construction, breeding biology, hatching success, Sikar, Rajasthan

## 1. Introduction

Reproduction is one of the most significant biological processes influencing the survival and continuity of bird populations. Among birds, nest construction is an essential behavioural adaptation that protects eggs and nestlings from predators, harsh climatic conditions, and environmental disturbances. The architecture of nests reflects evolutionary adaptations that maximize reproductive success while minimizing energy expenditure. Nest characteristics often vary according to habitat type, availability of nesting materials, food resources, and local climatic conditions.

The Red-vented Bulbul (*Pycnonotus cafer*) belongs to the family Pycnonotidae and is widely distributed throughout the Indian subcontinent. It inhabits agricultural landscapes, orchards, urban gardens, villages, scrublands, and forest edges. Because of its omnivorous feeding habits and tolerance of human activities, it has become one of the most abundant birds in India. The species contributes significantly to ecosystem functioning through seed dispersal and biological control of insect pests.

The breeding season of the Red-vented Bulbul generally extends from March to August in north-western India. During this period, pairs establish territories and construct compact cup-shaped nests using locally available materials. Nests are commonly built on shrubs, hedges, ornamental plants, and small trees where dense foliage provides

concealment from predators. Both sexes participate in nest construction, incubation, and chick rearing, although females perform most of the incubation. Studies from Rajasthan have shown that nests are usually placed below 3 m in height and are composed of fine twigs, grasses, cotton fibres, rootlets, and cobwebs that strengthen the nest structure.

Sikar District, situated in the Shekhawati region of Rajasthan, experiences a semi-arid climate characterized by hot summers, moderate rainfall, and scattered vegetation. Urban gardens, orchards, roadside plantations, and agricultural fields provide suitable nesting habitats for bulbuls. However, increasing urbanization, pesticide use, habitat modification, and climatic extremes may adversely affect breeding success. Understanding the reproductive ecology of this adaptable species is therefore essential for developing conservation strategies and maintaining urban biodiversity.

The present study aims to document nest-site selection, nest architecture, breeding behaviour, incubation, hatching success, and parental care of the Red-vented Bulbul in Sikar District, Rajasthan, and to compare the observations with recent studies conducted in other regions of India.

## 2. Objectives

The objectives of the study were:

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- To identify preferred nesting habitats of the Red-vented Bulbul.
- To study nest construction behaviour and nesting materials.
- To record clutch size, incubation period, and hatching success.
- To observe parental care during chick development.
- To identify major threats affecting breeding success.

### Study Area

The study was conducted in **Sikar District**, Rajasthan, located in the Shekhawati region of north-western India. The district lies between approximately 27°21'–28°12' N latitude and 74°44'–75°25' E longitude, with an elevation of about 430–450 m above sea level. The climate is semi-arid, with summer temperatures often exceeding 45°C and annual rainfall averaging 450–600 mm.

The study sites included urban gardens, residential colonies, agricultural fields, orchards, educational campuses, roadside plantations and Harsh Hills. Common vegetation comprised neem (*Azadirachta indica*), lemon (*Citrus limon*), bougainvillea, peepal (*Ficus religiosa*), banyan (*Ficus benghalensis*), and ornamental shrubs, which provided nesting sites and food resources for bulbuls.

### 3. Materials and Methods

Field observations were carried out during the breeding season (March- August). Nests were located through systematic surveys in gardens, orchards, and residential areas. The following parameters were recorded: Nesting plant species, Nest height above ground, Nest dimensions, Nest construction materials, Clutch size, Hatching success and Chick development and parental care

### 4. Results and Discussion

#### Nest-site Selection

During the study, the Red-vented Bulbul (*Pycnonotus cafer*) exhibited a clear preference for nesting in dense shrubs and small trees located in residential gardens, orchards, agricultural fields, and educational campuses. Most nests were observed on **lemon (*Citrus limon*)**, **bougainvillea**, **neem (*Azadirachta indica*)**, **peepal (*Ficus religiosa*)**, **figus**, and ornamental hedges (Fig 1)



**Figure 1:** A pair of Red-vented Bulbuls perched on a lemon tree twig

The dense foliage of these plants provided effective camouflage against predators while protecting the nests from intense sunlight and strong winds. Nest height varied between **1.2 and 4.0 m**, with the majority positioned between **1.5 and 3.0 m**, facilitating easy access for adults while minimizing predation risk. Similar nesting preferences have been reported in Rajasthan and Karnataka, where ornamental vegetation in urban and semi-urban habitats serves as suitable breeding sites for the species.

#### Nest Construction Behaviour

Nest construction commenced soon after pair formation during the early breeding season. Both sexes participated actively in nest building, although the female spent more time arranging and shaping the inner cup while the male primarily collected nesting materials and defended the nesting territory. Construction generally required **4–7 days**, depending on weather conditions and the availability of suitable materials.

The nests were **small, compact, and cup-shaped**, firmly attached between branches or within dense foliage. The external framework consisted of dry grasses, fine twigs, rootlets, and thin stems, whereas the inner cup was lined with soft fibres, cotton, hair, and delicate plant materials to provide insulation and comfort for the eggs and nestlings. Spider silk was frequently incorporated as a natural adhesive, increasing the elasticity and structural stability of the nest. The repeated turning movements of the female inside the nest helped mould a smooth incubation chamber capable of securely holding the eggs.

### Egg Laying and Incubation

Egg laying usually began within one or two days after completion of the nest. The average clutch size ranged from **two to three eggs**, although two eggs were the most common observation. The eggs were oval in shape, pale pinkish-white, and marked with reddish-brown speckles concentrated toward the broader end. (Fig2)



**Figure 2:** Nest of the Red-vented Bulbul (*Pycnonotus cafer*) containing three eggs

Incubation lasted approximately **12–14 days** and was performed mainly by the female, while the male remained nearby to guard the territory and provide food. Both adults displayed vigilant behaviour during this period and produced alarm calls whenever crows, squirrels, or other potential predators approached the nesting site. Such cooperative parental behaviour contributes significantly to breeding success in the species.

### Hatching and Chick Development

The chicks hatched asynchronously and were **altricial**, emerging blind, naked, and completely dependent on parental care. During the first week after hatching, both parents made frequent feeding visits, supplying mainly caterpillars, grasshoppers, beetles, ants, and other soft-bodied insects that provide the high protein required for rapid growth. As the chicks developed feathers and became more active, small berries, fruits, and soft plant material were gradually added to their diet.

The nestling period generally lasted **11–14 days**. (Fig 3) Before fledging, young birds exercised their wings inside the nest and on nearby branches. Even after leaving the nest, fledglings remained under parental supervision for several days while learning to forage independently.



**Figure 3:** Newly hatched chicks of the Red-vented Bulbul

Overall, the observations indicate that the Red-vented Bulbul is highly successful in exploiting both natural and human-modified habitats. Its flexible nest-site selection, efficient use of locally available nesting materials, cooperative parental care, and varied diet contribute significantly to its reproductive success in the semi-arid environment of Sikar District.

### 5. Conclusion

The present study demonstrates that the Red-vented Bulbul (*Pycnonotus cafer*) is a highly adaptable passerine with efficient reproductive strategies that enable it to thrive in the semi-arid landscapes of Sikar District, Rajasthan. The species constructs compact cup-shaped nests using readily available natural materials and exhibits cooperative parental care throughout the breeding cycle. Preferred nesting habitats include dense shrubs and small trees in gardens, orchards, and agricultural fields, where vegetation provides protection from predators and harsh climatic conditions.

The average clutch size of two to three eggs, an incubation period of approximately 12–14 days, and intensive parental care contribute to successful chick development. However, nest predation, extreme summer temperatures, and human disturbance remain major constraints on breeding success. Conservation of native vegetation, maintenance of urban green spaces, and reduced pesticide use will enhance nesting opportunities and improve reproductive success. Continued monitoring of breeding ecology in Rajasthan will provide valuable information for the conservation of this ecologically important bird and the sustainable management of urban biodiversity.

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