

BREEDING BIOLOGY OF INDIAN ROBIN *SAXICOLOIDES FULICATA* IN NORTHERN INDIA

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ABSTRACT – In the present study an effort has been made to document the breeding biology of an endemic passerine, the Indian Robin *Saxicoloides fulicata*. In northern India this species breeds March to July. Males used songs for territory advertisement and mate acquisition. After pairing, both sexes participated in nest formation for about 6 to 13 days. The female laid 2-4 eggs (mean: 2.92 ± 0.3). Eggs were pale greenish in background with specks and small brownish, reddish blotches, laid at the intervals of about 24 hours during morning hours (5.00 to 10.00 am). Only female incubated the eggs and male guarded the nest. Average incubation period was 11.86 ± 0.09 days. After hatching both sexes participated in parental duties. The average nestling period was 13.25 ± 0.27 days.

Key words : *Saxicoloides fulicata*, Indian Robin, Breeding biology, incubation period.

INTRODUCTION

The Indian subcontinent occupies an area of about 3.5 million km² (Padmanabhan and Yom-Tov 2000). Its avifauna comprises about 2000 species/ subspecies (Ali and Ripley 1983), of which about half are songbirds. For most Indian songbirds (passerines) systematic data on various aspects of breeding biology are lacking. Once obtained, such data may be used to test hypothesis about the evolution of life-history traits (Ricklefs 1969; Martin 1996). The breeding season is the most fascinating phase in the socio-biology of birds. A number of interesting events take place during this period (Lack 1968; Faaborg and Chaplin 1988). Birds use a variety of strategies for successful execution of their breeding activities. They invest a lot of energy to find a suitable mate, safe nesting site, and to maintain pair-bond throughout breeding period. In most passerines the song is mainly used for territory establishment and pair formation (Catchpole and Slater 1995; Kumar 2003; Kumar 2004, Kumar 2011). After pairing the individuals select suitable site for nesting and further breeding activities (Cody 1985; Robertson 1995). Nest guarding, successful incubation, feeding to young ones and parental care even after successful dispersal of fledglings are the important components of breeding.

The Indian robin is an endemic, small sized (19 cm), passerine species, distributed throughout the Indian subcontinent except northeast, higher Himalaya and Thar Desert (figure 1). It is a common, resident, territorial and sexually dimorphic bird. Males have glossy black under part and white shoulder patch, while females have grayish-brown upperparts and grayish under parts and lacks white

shoulder patch (figure 2). It prefer dry, stony areas with sparse scrub, arid stony ridges, low rocky hills outcrops, edges of cultivation and deserted buildings, and gardens and groves (Whistler 1949; Grimmett *et al*, 1998). Males use discrete songs for inter- (mate attraction) and intra-sexual (male-male competition for territory) contexts (Kumar 2011). Information is scanty on the natural history and sociobiology of this species (George 1963; Ali and Ripley 1973; Nirmala and Vijayan 2003). In this article, I am reporting the breeding behaviour of this species in northern India.

Methodology

Observations on the breeding behaviour of total 18 pairs/ individuals of Indian Robin were carried out in their natural habitats from four different places in northern India (figure 1). Breeding behaviour of seven individuals were made, in Dehradun (30°26'N; 78°06'E), during April 2002 to February 2005. In the same period, three birds were recorded at Srinagar, Garhwal (30°21'N; 78°77'E). During March 1997 to August 1999, four pairs were studied in Haridwar (29°55'N; 78°08'E). Some observations (n=4) were made in and around Jodhpur (26°21'N; 73°06'E) during March to May 2001.

Observations were made with the help of field binocular (7x 50) or with naked eyes as required, focused on the different aspects of breeding biology such as pair formation, singing behaviour, nest formation, egg-laying, incubation, feeding to nestlings and fledging. Nesting period was calculated period *w.e.f.* the day when nest formation initiated, till the day of completion. Incubation period (*w.e.f.* time of first egg laid to the time of last egg

Table 1 : Details of nests studied, nesting sites and breeding performance in Indian robin.

| Nest ID | Nesting location | Nesting period in days (from— to—) | Clutch size (no. of eggs) | Incubation period in days (from-- to—) | Nestling period in days (from— to—) |
|---|--|------------------------------------|---------------------------|--|--|
| Study site 1: Haridwar (29°55'N; 78°08'E) | | | | | |
| H-1 | On a wall covered with a dense creeper plant | 9 days (27.03.97 to 04.04.97) | 2 Eggs | 12.21 days (06.04.97 to 18.04.97) | 14 days (19.04.97 to 02.05.97) |
| H-2 | In Iron dumping (inside railway station premises) | 7 days (07.05.97 to 13.05.97) | 3 Eggs | 11.87 days (16.05.97 to 28.05.97) | 13 days (29.05.97 to 10.06.97) |
| H-3 | In side the wild bushes near Gurukul Kangri University | 6 days (29.05.98 to 04.06.98) | 3 Eggs | 11.92 days (07.05.98 to 19.05.98) | 15 days (20.05.98 to 03.06.98) |
| H-4 | Near Roadside, Bheemgoda barrage, Haridwar | 8 days (21.05.98 to 28.05.98) | 3 Eggs | Nest destroyed by predator | - |
| Study site 2: Jodhpur (26°21'N; 73°06'E) | | | | | |
| J-1 | In mud-hole located in the premises of a graveyard | 10 days (04.04.01 to 13.04.01) | 3 Eggs | 12.08 days (15.04.01 to 27.04.01) | 12 days (28.04.01 to 09.05.07) |
| J-2 | In wall hole, near Jhalamand chowk | 9 days (09.04.01 to 15.04.01) | 3 Eggs | 11.75 days (19.04.01 to 01.05.01) | - |
| J-3 | In wall hole, near ZSI campus | - | 3 Eggs (seen on 17.04.01) | Hatching completed on 22.04.01 | 13 days (23.04.01 to 05.05.01) |
| Study site 3: Dehradun (30°26'N; 78°06'E) | | | | | |
| D-1 | On a wall covered by Cucurbit plant | 13 days (13.04.03 to 25.04.03) | 4 Eggs | 11.66 days (28.04.03 to 10.05.03) | 15 days (11.05.03 to 25.5.03) |
| D-2 | In Lantana Bushes located in the peripheral area of WII premises | 8 days (09.04.03 to 16.04.03) | 3 Eggs | 11.75 days (21.04.03 to 03.05.03) | 12 days (04.05.03 to 15.05.03) |
| D-3 | In Lantana Bushes located in the peripheral area of WII premises | 9 days (18.05.04 to 26.05.04) | 3 Eggs | 11.62 days (01.05.04 to 13.05.04) | Nest destroyed by unknown predator |
| D-5 | Near roadside, outside the WII campus | 7 days (29.05.04 to 16.04.04) | 2 Eggs | - | - |
| Study site 4: Srinagar, Garhwal (30°21'N; 78°77'E) | | | | | |
| S-1 | In side bushes located near road side | - | 3 Eggs (seen on 27.04.03) | Hatching completed on 04.05.03 | - |
| S-2 | Near HNB Garhwal University Guest House | - | - | Hatching completed on 08.06.04 | 12 days (2 nestlings; fledged on 20.06.04) |

hatched) was recorded in hours and converted into days. The time of egg-laying/ hatching was round-off to hours. Nestling period was calculated *w.e.f.* the next day of hatching till the day of fledging.

RESULTS AND DISCUSSION

In northern India this species breeds March to July. Onset of breeding phase started with the initiation of song of males in their respective territories. In most cases

(n=16), the song was started in the third week of March, while in two cases it was initiated in second week of March. It was observed that males usually sing from elevated places such as walls, electric poles/ wires and top of the bushes. Observations revealed that males usually sing in morning hours (5.00 to 9.00 am) compared to rest of the hours of day. Review of literature reveals that in many species, the birds sing their songs most intensively at dawn. The acoustic transmission hypothesis predicts



Fig. 1 : Map of the India shows the distribution of Indian robin and study sites in northern India.

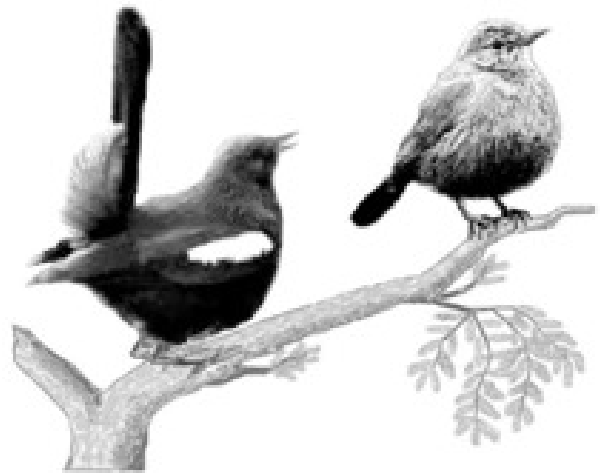


Fig. 3 : Male Indian Robin is producing complex song with extremely up tail and courtship display.



Fig. 2 : (A) Indian Robin (male) in its typical posture, (B) The female Indian Robin, and (C) The male is providing the food to a fledgling. (Photo credits: J.M. Garg)

that, birds sing most intensively at dawn because this is the time of the day when songs suffer least from environmentally induced degradation and hence propagate over the longest distances (Henwood and Fabrick 1979; Dabelsteen and Mathevan 2002; Marler and Slabbekoorn 2004). It seems that it is true in the case of Indian Robin also, as males mostly sing in morning hours.

It seems that song was used to advertise territories/ mate acquisition. Songs were discrete type with occasional monosyllabic whistles, composed of usually stereotyped phrases (structural units), preceded and followed by temporal intervals. Two categories of songs have been reported in Indian Robin (Kumar 2011). First category songs were simple, stereotyped, spontaneous and common used for territory advertisement, while second category songs were rare, female oriented and more complex (Kumar 2011).

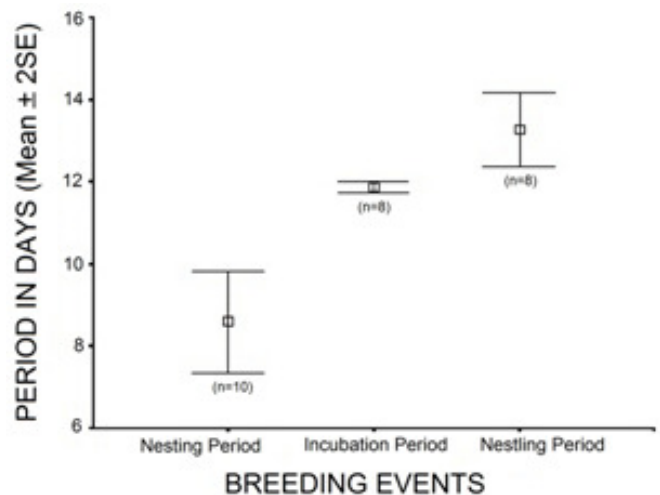


Fig. 4 : Duration of nesting, incubation and nestling in Indian Robin.

After pairing males and females were seen foraging together. For courtship, male performed a physical display with complex vocalizations (figure 3). Courtship behaviour was observed during the last days of nesting or just after nest formation. During courtship display male bird approached quickly towards female with extremely up tail, forwarded, lowered head and complex song. According to previous studies (Faaborg and Chaplin 1984), most avian species use either visual or vocal or both types of displays for mating. For mate acquisition, mostly male birds use various postures, display of brilliant plumage and colour badges. They also have known to use undulating flights and/or spreading of tail feathers mostly along with fascinating songs to attract a prospective mate (Welty and Baptista 1988; Kumar 2010).

After searching a suitable nesting place, both sexes participated in nest formation for about 6 to 13 days (figure 4). Nests were observed at different places such as in wall-hole, on open wall under the leaves of creeper plants, in mud-hole in a graveyard, under iron wastage (dump) near railway and in *Lantana* bushes (Table 1). The nest was a shallow cup made up of thin twigs with fine inner linings. The female laid 2-4 eggs (mean \pm SE: 2.92 \pm 0.3 eggs, n=12). Eggs were pale greenish in background with specks and small brownish, reddish blotches, laid at the intervals of about 24 hours during morning hours (5.00 to 10.00 am). Only female incubated the eggs and male guarded the nest. Average incubation period was 11.86 \pm 0.09 days (n=8). After hatching both sexes participated in parental duties. The average nestling period was 13.25 \pm 0.27 days (n=8).

Study of the literature reveals that, information on the breeding behaviour of Indian Robin is scanty and based on few natural history notes (George 1961; George 1963; Ali and Ripley 1973). In southern India, this species breeds throughout the year with major peak in July and minor peak in May, and usually lays 3 eggs. Incubation period is reported 7.75 days followed by nestling period ranging 11 to 13 days, in Coimbatore (11°05'N; 76°47'E) by Nirmala and Vijayan (2003). It is worth considering that, when compared to present study the incubation period is much lower in southern India. A careful perusal of the literature reveals that there should not be this much intra-specific variation in the incubation period of passerine birds. However some variations (in hours) are possible due to some ecological factors (Ali and Ripley 1973; Faaborg and Chaplin 1988).

According to one hypothesis, the incubation period of birds breeding at higher latitudes is shorter than those breeding at lower latitudes (Lack 1968). Contrary to this hypothesis, the incubation period in Indian Robin is quite

lower at lower latitude at Coimbatore (11°05'N) than present study area (26°21'N to 30°26'N). It should not be this much low as shown by Nirmala and Vijayan (2003). At this moment it is quite interesting/ mysterious! and opens further scope for discussion and comparative studies at different latitudes to know the factors affecting the duration of incubation period in passerine birds.

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REFERENCES

- Ali S and Ripley S D (1973) *Hand book of the birds of India and Pakistan*. Vol. 9, Robins to Wagtails, Oxford University Press, Bombay.
- Ali S and Ripley S D (1983) *Hand book of the birds of India and Pakistan*. Compact edition, Oxford University Press, New Delhi.
- Catchpole C K and Slater P J B (1995) *Bird Song: Biological Themes and Variations*. Cambridge: Cambridge University Press.
- Cody M L (1985) *Habitat selection in Birds*. Academic Press: New York, USA.
- Dabelsteen T and Mathevan N (2002). Why do songbirds sing intensively at dawn? A test of the acoustic transmission hypothesis. *Acta Ethol.* **4**, 65-72.
- Faaborg J and Chaplin S B (1984) *Ornithology: An Ecological Approach*. Prentice Hall, Englewood Cliffs, New Jersey, USA, x+470pp.
- George J C (1961) Parental cooperation in the feeding of nestlings in the Indian robin, *Saxicoloides fulvicata*. *J. Bombay nat. Hist. Soc.* **56**, 4.
- George J C (1963) Some observations on the breeding behaviour of the Indian robin, *Saxicoloides fulvicata* (Linnaeus). *Pavo* **1**, 71-78.
- Grimmett R, Inskipp C and Inskipp T (1998) *Birds of the Indian subcontinent*. Mumbai: Oxford University Press.
- Henwood K and Fabrick A (1979) A quantitative analysis of the dawn chorus: temporal selection for communicatory optimization. *Am. Nat.* **114**, 260-274.
- Kumar A (2003) Acoustic communication in birds: Differences in

- songs and calls, their production and biological significance. *Resonance* **8**, 44-55.
- Kumar A (2004) Acoustic communication in the Red-vented bulbul *Pycnonotus cafer*. *An. Acad. Bras. Cienc.* **76**, 350-358.
- Kumar A (2010) Communication value of displays and postures in Red-vented Bulbul *Pycnonotus cafer* (Aves: Pycnonotidae). *J. Threatened Taxa* **2**, 919-929.
- Kumar A (2011) Physical characteristics, categories and functions of song in Indian Robin *Saxicoloides fulicata* (Aves: Muscicapidae). *J. Threatened Taxa* **3**, 1909-1918.
- Lack D (1968) *Ecological adaptations for breeding in birds*. London: Methuen & Co. Ltd.
- Marler P and Slabbekoorn H (2004) *Nature's music: the science of birdsong*. Elsevier Academic Press, San Diego, USA.
- Martin T E (1996) Life history evolution in tropical and south temperate birds: What do we really know? *J. Avian Biology* **27**, 1-10.
- Nirmala Sr T and Vijayan L (2003) Breeding behaviour of the Indian robin *Saxicoloides fulicata* in the Anaikatty hills, Coimbatore. In Proceedings of 28th ESI Conference, Feb. 7-8, 2003, KMTR, Tirunelveli, India, pp 43-46.
- Padmanabhan P and Yom-Tov Y (2000) Breeding season and clutch size of Indian passerines. *Ibis* **142**, 75-81.
- Ricklefs R E (1969) An analysis of nesting mortality in birds. *Smithsonian Contribution to Zoology* **9**, 1-48.
- Robertson G J (1995) Factors affecting nest-site selection and nesting success in the Common eider *Somateria mollissima*. *Ibis* **137**, 109-115.
- Shanbhag A B and Gramopadhye A (1996) Peculiar nesting site and some observations on the breeding behaviour of Indian robin *Saxicoloides fulicata* Linn. *Newsletter for Birdwatchers* **36**, 3-5.
- Whistler H (1949) *Popular handbook of Indian birds*. Oliver and Boyd Ltd., 39a, Welbeck street, London.
- Welty J C and Baptista L (1988) *The life of birds*. Saunders College Publishing, USA, 698pp.