

Nesting Behaviour of a Tropical Avian Species, the Pied Bush Chat (*Saxicola caprata*)

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Abstract: Nesting behaviour in majority of bird species in India is poorly studied. The present study deals with some aspects of breeding behaviour in the Pied Bush Chat (*Saxicola caprata*) such as the length of breeding season, peak breeding activity, nest site selection, nest building and nest site characteristics. Observations were made during March-June in 2008 and 2009 in the scrub lands, agricultural fields and suburban areas of district Haridwar (29° 55' N and 78° 08' E; Himalayan foothills of Uttarakhand state), India. Systematic field visits were carried out in most parts of the day almost on alternate days. The breeding activities of Pied Bush Chat commenced in late February and continued till July. The peak in breeding activity was observed in May as maximum clutches (35%) were observed in this month. Nest-site selection was performed by both the sexes. However, final decision seemed to be of the female. Male initially explored the whole territory and inspected various sites such as quarries, gravel pits, road cuttings, construction site, under-bushes etc. Thereafter, he approached the female to show her sites for final selection. Only female performed the nest building. Nest was an open cup made up of grasses and rootlets tucked into a hole or crevice. Nest construction period averaged 8.47 ± 2.68 days and did not vary between study periods. The outer nest diameter, cup diameter and cup depth were measured 76.32 ± 5.52 mm, 61.3 ± 4.26 mm, and 51.73 ± 3.61 mm respectively.

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Key words: Breeding season, bird, nesting behaviour, Pied Bush Chat, *Saxicola caprata*

1. Introduction

In the tropics, avian breeding seasons extend throughout the year in keeping with the extended favourable conditions; nevertheless, breeding in individual species is essentially periodic (Baker, 1938; Chandola and Thapliyal, 1978). In addition, survival success in birds depends to a greater extent on their ability to decide when and where to form a nest (Cody, 1985). Nest site selection involves discrimination among alternative sites that provides different sets of circumstances affecting survival and reproduction. Also, the architecture of the nest should be such that helps to survive the young against unfavorable conditions. Hence, it is an important decision to be made by birds. All the avian species build species-specific nests and architecture of the nest has been known to be perfect through the process of natural selection (Hansell, 1984). However, nest-site selection of the majority of bird species in India is poorly studied (Gokula, 2001).

The present study attempts to study the nesting behaviour of a tropical avian species- the Pied Bush Chat (*Saxicola caprata*) in its natural habitat. The objectives of the present study were to gather information on the length of breeding season, peak in breeding activity, nest site selection, nest building and nest site characteristics of the Pied Bush Chat.

2. Materials and Methods

2.1 Study Area and Period

We observed individuals of the Pied Bush Chat during March-June in 2008 and 2009 in the scrub lands, agricultural fields and suburban areas of district Haridwar (29° 55' N and 78° 08' E; Himalayan foothills of Uttarakhand state), India. Study area was composed of mainly bare stone grounds and small patches of bushy vegetations (Figure 1). In addition, some nests were observed in partially-developed human settlements also.

2.2 About the Pied Bush Chat

The Pied Bush Chat (Order Passeriformes, Family Muscicapidae), a sexually dichromatic species, occurs discontinuously from Transcaspia and the Indian subcontinent to southeast Asia, the Philippines, Indonesia (except Borneo), New Guinea and New Britain (Ali and Ripley, 1998). The male is black except for a white rump, wing patch and lower belly along with dark brown iris (Figure 2). The female is drab brown and slightly streaked. Juveniles have a scaly appearance on the underside but are dark above, like the females (Grimmett et al., 1998).

This species is found in open habitats including scrub, grassland and cultivated areas. They nest in cavities in stone walls or in holes in an embankment, lining the nest with grass and animal

hair. Males are very territorial and actively resist intrusion into their feeding and breeding areas by conspecifics or other chats (Ali and Ripley, 1998). During the breeding period, males deliver short whistling songs from prominent perches to defend and maintain their respective territories (Ali and Ripley, 1998).

2.3 General Methodology

Systematic field visits were carried out in most parts of the day almost on alternate days or as required for recording activities such as nest site selection and nest building. Behaviours were observed/recorded mostly from hides or considerable distance using 8x50 prismatic field binocular without disturbing the individuals. Still camera (Nikon FM 3A) with 300mm zoom lens and video camera (Sony DVD803E) were also used to capture the relevant behavioural activities. Results are reported as Means \pm SD. Data were analyzed with two-tailed *t*-test (Zar, 1999).

3. Results and Discussion

3.1 Breeding Season of the Pied Bush Chat

The breeding activities of Pied Bush Chat commenced in late February and continued till July in the study area. Female started adding nesting material to nest site in the first week of March. Building of first nest started on 06 March and 09 March in 2008 and 2009 respectively. Dates of laying of the first egg were 14 March and 19 March 2008 and 2009 respectively.

The peak in breeding activity (availability of maximum clutches) in Pied Bush Chat was observed in April-May in both the study years as 37.7% nests in 2008 and 36.84% nests in 2009 were observed in the month on May and April respectively (N = 83 nests). On pooling the data of both years, maximum clutches (35%) were observed in the month of May alone (Figure 3). Some birds, however, started breeding late probably because of non-availability of suitable nesting sites. The first batch of nestlings fledged on 16 April and 14 April in 2008 and 2009 respectively.

The breeding season in the Pied Bush Chat extended over a period of five months chiefly from late February to July. Similarly, there are other studies that indicate almost the same length of breeding season in the Pied Bush Chat (Ali and Ripley, 1998; Grimmett et al., 1998). However, in Port Moresby, Papua New Guinea, breeding season of Pied Bush Chat extends over a period of seven months from July to January (Bell and Swainson, 1985). The long breeding season of Pied Bush Chat allows breeding pairs to raise more than one brood. Although availability of insect food for the nestlings in April-

May (when early breeder rear their young) was not as abundant as in the June-July (monsoon period), early breeding in the season might be adaptive in acquiring better nesting sites (Dhanda and Dhindsa, 1998).

3.2 Nest Site Selection in the Pied Bush Chat

In the Pied Bush Chat nest-site selection was performed by both the sexes. However, final decision seemed to be of female. Male Pied Bush Chat, in most of the cases (>97%) initiated to explore the whole territory. He inspected various sites such as quarries, gravel pits, road cuttings, construction site, under-bushes etc. repeatedly and then delivered songs. Thereafter, he restricted his activities to certain smaller areas and explored them more thoroughly. Then he approached the female to show her the sites for final selection. In an instance observed on 14 April 2008, a male was seen fluttering in front of a crevice. The female flew to and perched near him and followed him into the crevice. The male went inside, out of sight, and then emerged. The female then went inside. Both went in and out thrice more. Thereafter, the site was selected and the pair raised its first brood in it.

During nest site selection there were frequent interactions between male and female Pied Bush Chats. Sometimes, both males and females were seen displaying at potential nest sites by spreading their wings in combination with nest-shaping motions. The female usually performed this behaviour with the mate nearby. After visiting a number of sites the female started collecting small rootlets. This behaviour was usually brief, ineffectual at first and the female soon tried more sites. Finally, a rootlet was brought to one of the nest sites that had been tried recently (not necessarily the last tried). Female was observed trying the other sites also even after she had brought several loads of material to one site. Like Pied Bush Chat, in other species also the male typically displays at several nest sites, one of which is finally selected by the female (Pinkowski, 1979; Aguon and Conant, 1994; Bhatt and Kumar, 1999; Sethi, 2008).

In addition to nest in abandoned open areas and scrublands, Pied Bush Chat selected different structures (like any hole in the walls of any building) within human settlements also. The reason for the selection of such human populated sites by a wild species could be related to the shortage of natural habitat. That is, the increasing urbanization is continuously engulfing the natural open lands (habitat of Pied Bush Chat) of the study area, thus leaving less nest site options for the Pied Bush Chat. Adaptation to survive in/near the human settlements may be a good indication also. Because there are a number of avian species that support the idea that urbanization may

even provide better opportunities for the survival of the species (Sodhi et al., 1999).

3.3 Nest Building and Nest Characteristics in the Pied Bush Chat

Once a nest site was selected, interactions between male and female became infrequent. Only female performed the nest building in Pied Bush Chat. Female gathered nesting material and constructed the nest while the male sang from a nearby perch. The bird did not bring nesting material from far off distances. Nesting material was searched and collected mostly from the defended territory itself. However, sometimes but rarely, female was seen collecting materials outside of its territory but not from other birds' territory.

Nests of Pied Bush Chats were open cups of grasses and rootlets tucked into a hole or crevice. Nests observed in this study were identical to those described for other *Saxicola* species (Dementiev and Gladkov, 1968; Bell and Swainson, 1985). Spider web was also used in the cup boundary by the bird probably as a plastering material. The use of spider webs for securing nests to substrate, as well as for binding nesting materials together is found in a number of species within the families Tryannidae and Muscicapidae (Baicich and Harrison, 1997). Nests that were observed in depression on level ground were completely covered overhead by tussocks of grass. Some nest sites were crevices in rocks or under large stones. Despite this, freshly turned earth, as at construction sites also seemed preferred by this species. However, such site selection often led to brood destruction due to construction activities by human beings.

Nest construction period averaged 8.22 ± 2.77 days ($N = 22$ nests) and 8.81 ± 2.61 days ($N = 16$ nests) in 2008 and 2009 respectively and did not vary between study periods ($t = 0.66$, $df = 34$, $P > 0.05$). On pooling the data of both the study periods, nest building period varied from 4 to 14 days and averaged 8.47 ± 2.68 days ($n = 38$). Bell and Swainson (1985) have also reported almost similar nest building period for the Pied Bush Chat. However, *Saxicola torquata* takes on an average 5.3 days to build the nest (Fujimaki et al., 1994). Seven nest cups were measured in which outer nest diameter was 76.32 ± 5.52 mm. Cup diameter was 61.3 ± 4.26 mm and cup depth was 51.73 ± 3.61 mm.

Individuals attempting to raise second or third brood in a single breeding season did not often use the nest of first brood. That is, for each breeding attempt pair looked for a new nesting site and built the new nest. For example, in total 83 nesting attempts, we observed only for 7 times when the pair raised the subsequent brood in the nest of the previous brood.

The possible reason for rebuilding the new nest for successive broods was probably related to the shape of the nest. The nest at the time of egg laying was observed quite compact and in a cup-like shape. However, as soon as the 3-4 young grew in this small nest, it got enlarged and de-format. Probably this caused the pair to look for a new nest site and rebuild the nest. Bell and Swainson (1985), however, have reported that the Pied Bush Chat raises its subsequent broods in the same nest. Unlike Pied Bush Chat in our study, Plain Chachalaca (*Ortalis vetula*) and Brown Rock Chat also use the same nest for raising further broods in the same breeding season (Marion and Fleetwood, 1978; Sethi, 2008). While Northern goshawks (*Accipiter gentilis*) use the same nest for breeding in many successive years (Wiens and Reynolds, 2005).

Hadden (1975) and Ali and Ripley (1998) have pointed out that both sexes of Pied Bush Chats may participate in nest building. However, we never observed any male co-operating the female in nest building. There were several observations when the female alone enlarged and excavated a cavity in a vertical bank of earth. The male merely remained on nearby song-posts throughout and did not participate on the occasions that we watched. Bell and Swainson (1985) and Fujimaki et al. (1994) have also found that only female builds the nest in *Saxicola* species. Like Pied Bush Chat, nest building entirely by female has been reported for a number of other avian species also (see Sethi, 2008).



Figure 1: View of the natural habitat of the Pied Bush Chat (*Saxicola caprata*)



Figure 2: Male Pied Bush Chat (*Saxicola caprata*) in its habitat

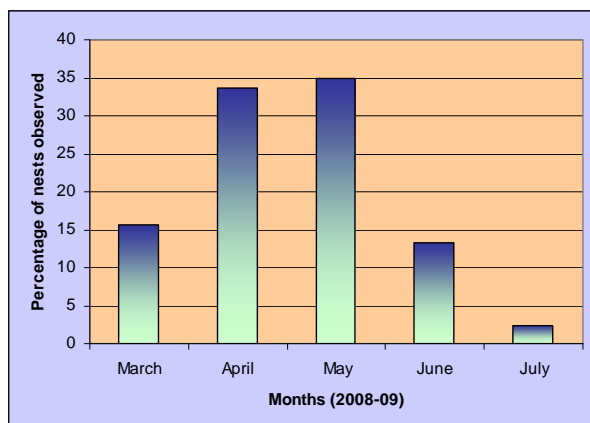


Figure 3: Monthly frequency of nests in Pied Bush Chat (*Saxicola caprata*)

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