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Nestling Growth and Development of an Endemic Avian Species, The Brown Rock Chat (*Cercomula fusca*), in Udhampur District, Jammu and Kashmir, India

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ABSTRACT

Nine species of genus *Cercomela* mainly distributed across the African continent (Muscicapidae), out of these nine species only one species i.e. *Cercomula fusca* occurs in India. *C. fusca* is endemic to the Indian subcontinent and therefore deserves importance from conservation point of view. Pictorial data have been gathered on nestlings growth and development of the Brown Rock Chat during March 2017 to July 2017 in the suburban areas of Tehsil & District Udhampur (32.93°N 75.13°E, J&K,UT), India. Brown Rock Chat generally laid three eggs in a cup shaped nest made up from grass, root fibers, wool, hair etc. in a roadside holes, cutting, wall or window of both unoccupied and occupied houses. The female incubated the eggs for 12-14 days. After incubation the 1st egg was hatched out and synchronously 2nd and 3rd egg were hatched out with in an interval of 24 h per egg. The parents were found to take care of the nestling. At the age of 5-6 days the nestlings started to attain maximum weight at an explosive rate. At the age of 15-16 days the flight feathers were completely erupted and would continue to elongate through fledging and beyond. At the age of 16-17 days the nestling fledged out from the nesting area. From nest building to fledging the Brown Rock Chat taken 5-6 weeks.

Key words: Brown Rock Chat, *Cercomula fusca*, Nestlings, Growth, Development, Udhampur.

INTRODUCTION

Cercomela is a genus of small passerine birds of the Old World flycatcher. It belongs to family Muscicapidae (Boarman 2003). It includes of nine arid-adapted terrestrial bird species spread primarily across the African continent with only one species i.e. Brown Rock Chat (*Cercomula fusca*) occurring in India (Sethi 2003). The Brown Rock Chat is endemic to the central part of the Indian peninsula, from Punjab (Pakistan) in the west through Punjab (India), north of the Narmada River, Uttarakhand, Bihar to

West Bengal, Uttar Pradesh, and in the foothills of western Himalayan up to 1300 m (Ali and Ripley 1998). It falls under the 'least concern' category of IUCN so far the conservation status of this species is concerned (IUCN Red List 2006). The call repertoire of this species has been well documented (Sethi and Bhatt 2008). However, there seems a wide gap of information in the form of long term and systematic data on its nestling growth and development its parasites and predation except for few observations on its nesting habitat and range extension (Sethi 2010). Studies on the growth and development of nestling

birds give insight into the environmental and social factors such as parasite infection, predation pressure, food supply, and amount and type of parental care that are important to a species during its reproductive cycle (Winterstein 1983). Studies on nestling growth and development have been an area of concern for a greater part of the last century (Sutton 1935; Walkinshaw 1948) and continue to be of concern today. This is not surprising since studies on growth of nestling can provide a wealth of biological information that has larger effects for avian management and conservation (Jonsomjit 2007). The basic information is still limited for many species despite of studying this history of nestling development. In the literature contradictory conclusions and many questions remain unanswered, are often found (Starck and Ricklefs 1998a). Hence, much information on development can still be gained from studying the development patterns of similar species and from comparative studies, across avian orders. A better understanding of the factors that influence reproductive success is a vital component of avian conservation (Jonsomjit 2007) Indeed, the relatively short time period young spend developing in the nest is a very difficult part of a bird's life cycle and a developmental path of nestling's can affect its survival to independence, its survival as an adult, and its future reproductive success (Jonsomjit et al. 2007) In the light of this background, this paper attempts to gather pictorial information on nestling growth & development of Brown Rock Chat in its natural habitat.

Breeding

The breeding season ranges from spring to summer and more than one clutch is raised. Nest of Brown Rock Chat is roughly cup shaped and it is made up from grass, root fibers, wool, hair etc. in a roadside cutting, window or wall even making use of occupied houses. The foundation of the nest is made up of clay & large pebbles are used (White 1919). The parents guarded the nests against invaders and will chase palm squirrels and other birds that approach too close. The usual clutch is 3 to 4 pale blue eggs which are incubated by the female alone. The young leave the nest after about two weeks after hatching (Ali and Ripley 1998).

STUDY AREA

The area under study was the suburban part of Tehsil & District Udhampur, Jammu & Kashmir, India. Udhampur is located in the Shivalik range of Himalayas which is a part of the Northwest Lower Himalayas with mostly mountainous topography. Udhampur city is situated at 32.93°N 75.13°E in a relatively semi plateau part of the district at an altitude of 756m (2480 feet) from mean sea level. The climate of study area is sub-tropical and the temperature ranges between 40°C during summer while in winter dips to 2°C or even sometimes to zero with yearly rainfall is 130cm mostly in rainy season and winters because of Western disturbances. However due to

altering climate patterns snowfall has been experienced in some years. Heavy hailstorms with piles of hail can be experienced in February and March of 2011(Kumar 2019). The study was carried out from March 2017 to July 2017.

MATERIALS AND METHODS

This study aimed to gather pictorial data of nestling growth and development in breeding seasons of Brown Rock Chat during March –July, 2017 in the suburban area of district Udhampur, India. Study area was composed of mainly residential part made up of concrete houses, few unoccupied houses, roads, Govt. buildings etc. This study extended from March to July 2017. Four nests, one was in the eave of cow shed, two were in the college buildings and last was found fortunately in my house. Among these four nesting sites only three became assessable to gather the data. Each nest was observed daily until the young one fledged out. Field visits were carried out to monitor nests in most parts of the day almost on alternate days or as required during the breeding season of this species (March to July). During the regular field survey to gather pictorial data of nestling growth, development, the key observations were made by the naked eye with 5m away from the nesting area and fortaking photographs by Nikon D-5300(70-300mm lens) camera. The photography is slightly challenging due to high pitched threat call and aggression shown by the Brown Rock Chat. For this motive the nests observed twice a day at various sites.

RESULTS AND DISCUSSION

Nest of Brown Rock Chat was roughly cup shaped and made up from grass, root fibers, wool, hair etc. The foundation of nest made up of clay and large pebbles generally of concretes and bricks (Fig. 1C). It has been observed from one nest that the male of Brown Rock Chat left out the nest after eggs hatched out and only the female was found to take care of the nestling. In this circumstance the male successfully claimed two nest sites and there were female and young in both. It was observed that the male was found to focus his feeding efforts at one nest only. The burden of feeding young at the other nest fell mostly or entirely on female. But it was not observed in the others nesting. It shows that in Brown Rock Chat polygynous nature of mating might occurs and was used by the males to increase its reproductive fitness. Brown Rock Chat laid generally three eggs, one per day. Similarly, a number of other avian species also laid eggs at 24 hours interval (Franks 1974; Aguon and Conant 1994; Prather and Cruz 1995; Dhanda and Dhindsa 1998; Kumar 1999; Kumar et al. 1999). Eggs having pale blue colour with rusty specks and spots at large end (Fig. 1D). The weight of freshly laid eggs averaged 2.50 g and the length, breadth and volume of 12 eggs averaged 20.68 mm, 15.85 mm and 2.66 cm³ respectively. Brown Rock Chat, like most other species, did not lay eggs

until the nest was complete. However, there were species that lay eggs even before the nest completion (Natarajan 1997). It was very difficult to distinguish the male and female stone chat morphologically. It was found that only female (Fig. 1B, 1E) incubated the eggs and male (Fig. 1A) guard the nest but not involved in incubation. The incubation period of Brown Rock Chat range from 12-14 days depending upon the environmental conditions. Near the day of hatching the colour of the eggs turned slightly dull (Fig. 1F).

Growth and Development

After incubation of 12-14 days the 1st egg was hatched out and synchronously 2nd and 3rd egg were hatched in an interval of 24 h per egg (Fig. 2A to 2C). At hatching the nestlings were naked, with yellowish red skin through which the visceral parts were easily observed. However, there were presences of some tufts of downy feathers, particularly on the head and along the back region of the body. The legs were yellow, the bill was dull yellow, and egg tooth was present on the upper mandible. At hatching the nestlings gave soft squeaks and extended their necks vertically to beg. The bright yellow colour gape visible during begging. The gape flanges were light yellow or somewhat creamy in colour. At the age (days counted from 1st egg hatched) of 3 days the nestlings body was still covered in down feather around the head and back, although the wings were now became dark spotted as the future feathers were started to developed and eyes of the chick remained closed (Fig. 2D). At the age of 4 days old nestling the feather sheaths clearly emerged on forelimb just under the skin. Strips on their bodies darken as feathers tracts where feathers were rapidly grown. The eyes began to open as slits (Fig. 2E). By day 5 of the nestling period the future feathers along the back, fore limb, head and legs began to develop. The nestling continued to gape. The hungriest baby chirps the loudest and gapes the most to stimulating feeding by the parents. At this stage the nestlings started to attain maximum weight at an explosive rate. The eyes opened at this stage (Fig. 2F). By the day 6 the feathers that cover the ventral cervical tract, dorsal tract and capital tract region were began to emerge. Contour feathers that cover their bodies start to emerge. Flight feathers of tail and wings, looking like quill at first, began poked through the skin of wings and tail. At this age the feathers are surrounded by sheath that protects them as they grow out from the pit like follicle. The nestling competes and begging for food at the same time. It was found that young ones fed every 4-5 minutes by the parents to attained maximum growth at the age from 5-7 days. Nestling cannot regulate their body temperature for the first six days and female found to brood the nestlings (Fig. 3A). At the age of 7 days the first feather burst out from tip of sheath and shedding of down feather takes place. The female no longer broods, by this period; the nestlings were able to maintain their own body temperature. At this point, the female would

cease to brood them during the day, but may continue in inclement weather (Fig. 3B). By 8 days old nestlings the secondary wing coverts were broken out of the feather sheaths from their protective covering. The sheaths of the primary feathers broken through the skin and began to grow. These feathers were the "pin feathers". The primary feather continued to come out of the sheaths (Fig. 3C). At the 9 days old nestlings the capital feathers, secondaries, and rectrices (caudal feathers) were came out of their sheaths. The primaries continue to grow. The feathers lateral to cervical region began to emerge. At this stage the down feather are completely removed. Nestling could use sight as well as sound and touch to sense when parents arrived with food. They started to imitate the parent call like chee chee. In case of any danger or threat call received from the parents they hunker down themselves, with eyes closed in the nest (Fig. 3D). At the age 10 days the young ones were more mobile. They become able to crawl around the nest and they were able to stretch their wings out more effectively. They may stretch and hop a little to strengthen muscles and grasp objects in the nest (Fig. 3E). By day 11 old nestlings the innermost primaries, all secondaries, and most capital-tract feathers and tail feather were emerged and that had partially exploded from their sheath resemble like paint brush. Though their bodies are not fully feathered, after this point the nestling might considered entirely feathered for the sake of observing (Fig. 3F). The nestlings were almost fully feathered by day 12, (Fig. 4A) except for the mid-ventral region around the belly, which was feathered by day 13. Nestling exercise more and may stand on the edge of the nest. At day 13 the feathers had developed enough and covered all over the body of the nestlings (Fig. 4B). By day 14-15 the nestlings were completely feathered and came out from the nest. They should be capable of weak, short-distance flights by this time. The nestling stood up on the margin of the nest and made for fledging, they jumbled together, glare toward adults, clean, exercise their wings, stretch, move their wings, stand on the margin of the nest, look out of from the nest, and poke at grass in the nest (Fig. 4C, 4D). At the age of 16 days the nestling fledged out from the nesting area. The flight feathers were completely erupted and would continue to elongate through fledging and beyond (Fig. 4E, 4F). Though the chicks may not be fully grown they would reach adults size and resembled with their parents with in 3 to 4 weeks after fledging. At the age of 32 days the juvenile resembled somewhat with their parents and had blakish-bronwn feathers and sign of gape flange was still present (Fig. 5A). At the age of 46 days old the juvenile completely resembled with the parents and gape flange was completely disappeared (Fig. 5B). From nest building to fledging the Brown Rock Chat taken 5-6 weeks. After fledging young birds typically remains closed to their parents for a short period. During this period, the young birds must learn to survive on their own in the open environment.

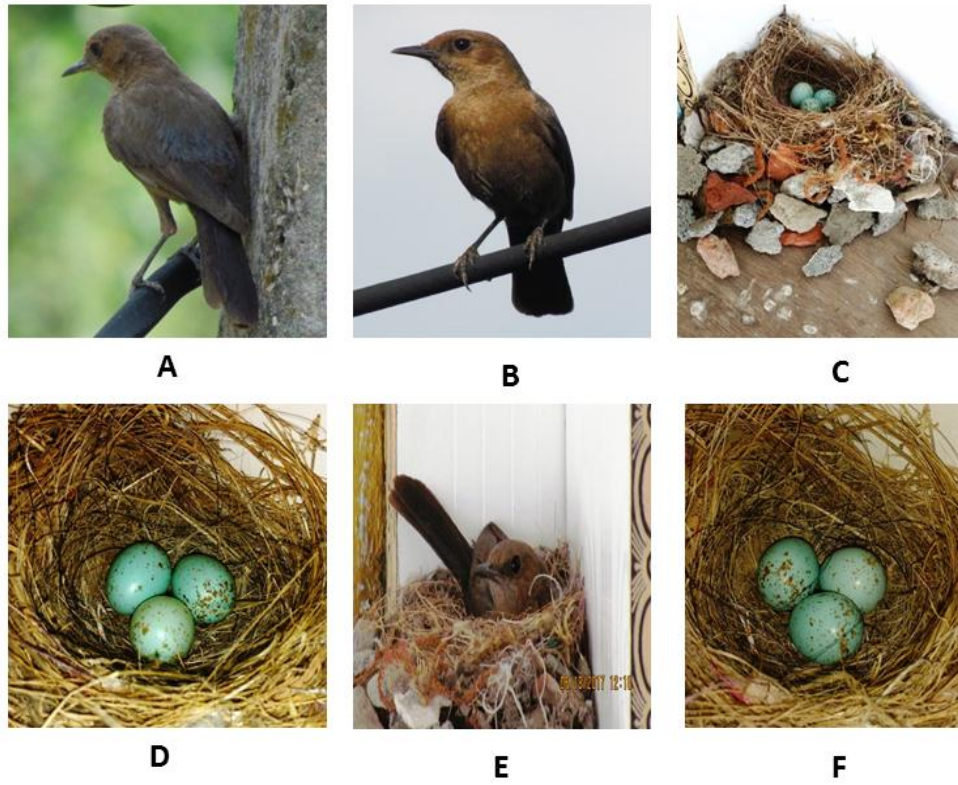


Fig. 1. A. Male, B. female, C. nest of Brown Rock chat, D. eggs, E. incubation by female only, F. egg prior hatching.



Fig. 2. A. 1st egg hatched, B. 2nd egg hatched, C. hatching complete, D. 3-days nesting, E. 4-days nesting, F. 5 days nesting.



Fig. 3. A. 6 days nesting, B. 7 days nesting, C. 8 days nesting, D. 9 days nesting, E. 10 days nesting, F. 11 days nesting.



Fig. 4. A. 12 days nesting, B. 13 days nesting, C. 14 days nesting, D. 15 days nesting, E. 16 days nesting fledged out, F. 17 days nesting in my hand.

