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The aesthetic importance of song constitution in male Baya weaver, *Ploceus philippinus*, in the breeding habitat

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Abstract : The paper strives to assess the biological themes and variations underlying in the structure of the songs of Baya weaverbirds. The paper approaches to examine the quality of songs delivered by the weavers of different age-groups. The paper also looks at the aesthetic improvement mechanism of the song constitution and suggests the significance of the tonal purity relevant to the sexual selection.

Keywords: Biological themes, Aesthetic improvement, Tonal purity, Sexual selection.

INTRODUCTION

The acoustic communication system is a widespread phenomenon in both lower and higher vertebrates as well as in both aquatic and terrestrial environment. The ecological factors, coupled with social interactions, operate the principal force in the evolution of biocommunication systems in animals. The avian vocalization, one of the important means of biocommunication in the animal kingdom, is not only meant for species-recognition but it also entails about individual's quality and status in its population. The wide range of acoustic signals in birds is consisting of calls and songs (Catchpole and Slater, 1995). They produce a series of varied sounds in predictable pattern audible to human beings. The songs of bird species are mostly long and complex framework of highly varied sounds (Catchpole and Slater, 1995). Songs are almost emitted only by male birds primarily for the establishment and maintenance of a territory and mate acquisition (Catchpole and Slater, 1995). A large number of song birds inhabit in the Indian subcontinent and they are known for their complex, elaborate and repertoires of

songs (Kumar, 2011, 2012, 2013). The avian song is an integral part of the breeding system in songbirds. Moreover, many passerine avian songs differ in their spatiotemporal patterns and contextual use. The vocal communications of certain bird species were also documented in previous studies (Abs, 1963; Bremond, 1963; Thorpe, 1963; Borror and Gunn, 1965; Grimes, 1966; Marler, 1967; Thielcke, 1970; Frankenberg, 1982; Sharma, 1987; Bhatt *et al.*, 2000; Hall, 2006; Marler, P and Slabbekoorn, H. 2004; Podos, J., Peters, S., Rudinicky, T., Marler, P., and Nowicki, S. 1992). Avian song is supposed substantially different during the initial phase of breeding. The means by which this occurs is not known. Much further investigation is required to conclude on the relationship of songs, singers and populations. The previous studies with regard to the vocal signals in Baya weaverbird were scanty. It realized us to understand and document the modulating influence of songs in the selection of the breeding sites and the establishment of the colony by the male weavers.

MATERIALS AND METHODS

The Baya weaverbird (*Ploceus philippinus*) is widely distributed across the Indian Subcontinent. These are the sparrow-sized finches habitually foraging in flocks and breeding in colonies (Sharma, 1987; Kumari and Sharma, 2009). The large local population of the

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weaverbirds get fragmented into different age-specific groups prior to establishment of the breeding colony in a selected breeding site.

The present study was carried out in the Tata Steel Zoological Park ,Jamshedpur. The songs relayed by the male weaverbirds were recorded with the help of Sony Digital-8 in the year 2012. Recording of songs were conducted both in traditional and transitional nesting sites. Songs were recorded at 8 meters distance from the source to avoid disturbance. After editing the selected songs, in very low background noise without masking by vocalizations of other birds, were taken for analyses. We did spectrographic analyses and quantified the developmental changes that occurred in the songs of the male weaverbirds. Moreover, the sound spectrographs were printed with the help of Nero Web Editor 3.0.0.4. The acoustic feature of the song was recognized in terms of the number of basic elements syllable, type of phrases, phonetic representation, etc. The situation-specific context of song delivery by the male weavers of different age-groups ,viz.youngs, sub-adults and adults was also quantified.

RESULTS AND DISCUSSION

A type of song, referred to as advertising song, was heard from the onset of breeding (late-March) till its termination (late-August) in the study area of the Baya weaverbird. This study revealed that the male weavers of all age-groups, such as young, sub-adult and adult, were

intended to congregate as an open, floating population where they used to relay their songs individually, specially during the mid-day hours for about a week prior to settle as breeding colony. They showed their aesthetic approach to mediate as well as modulate songs by conducting the sessions of singing periodically every day . The weavers were observed relaying songs sporadically from their selected nesting sites. There were reasonable variations in songs delivered by some of them dressed with either partially or almost completely nuptial plumage. Moreover, a separate group of young weavers (yearlings) together with two or three sub-adult birds (first year breeders) were found close to the traditional breeding site. All members were found involved broadcasting unstructured or incomplete songs (Fig 1A), but a few songs were aberrant ones.

The spectrographic analyses of the songs that the young weavers used to deliver songs were simple and unstructured (without phrases) with a terminal flourish. Moreover, the terminal snatch of the song was flat with piercing sound(Fig 1A). The songs of the sub-adult males were consisting of a few unturned introductory pulses or phrases. These sub-songs were composed of incomplete versions. The introductory snatch of the song had turbulent-type of song constitution, while the middle segment showed a transient-type of constitution (Fig 1 B,C,D,E). It was evident that the adult or early male breeders were producing a complete version of the song with tonal purity, a pulsatile-like song (Fig 1F).

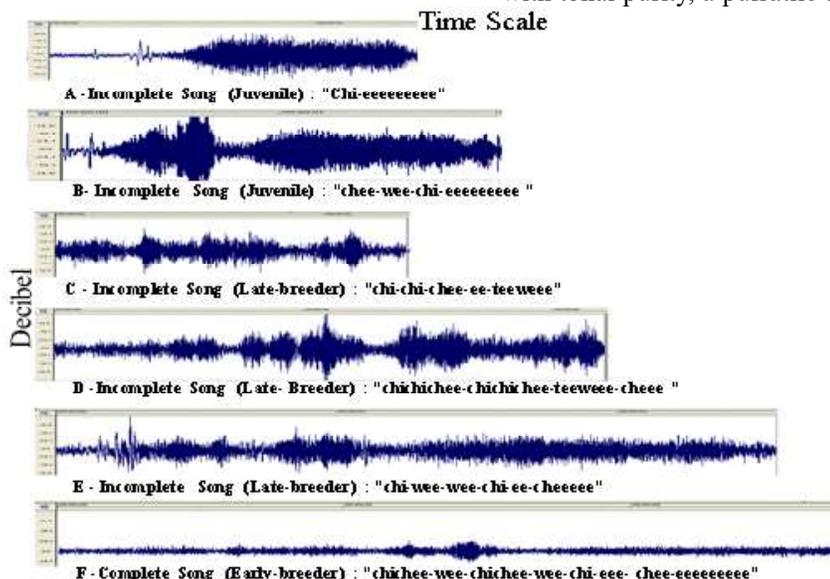


Fig-1: Spectrographic representation of songs delivered by the different age-groups of the Baya weaverbird.

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This study suggests that the original version of the song gets changed progressively over time, where new phrases and the themes are placed. The songs of the weaverbirds facilitating male-male interactions that are integral to the selection of breeding habitat and maintenance of the colony-based breeding activities. It further suggests that the individual singers, on the basis of their song quality and social status attract the prospective breeding partners in the colony. The transient or sub-songs seem to be modulated through counter-singing song contests in the floating population. Such a regular broadcasting practice of singing by weaverbirds may improve the tonal purity of their songs as a consequence of learning through imitation, where some individuals making changes and others learning them. Moreover, the spectrographic analyses of the age-groups specific songs indicate the subtle differences in their trilled phrases, pulse number, pulse amplitude and pulse interval. Thus, the songs with significant differences presumably decide the social status and arousal profiles of the weavers in their breeding habitats.

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