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# SPECTRAL ANALYSIS OF SOUNDS OF *ACRIDOTHERES TRISTIS* (INDIAN MYNA)

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**ABSTRACT**

The present investigation focused on recordings of sounds of *Acridotheres tristis* **(**Indian myna) from Kalaburagi distract, Karnataka state. The study was undertaken during the January 2012 to December 2014. During the study period about 50 samples of sounds of Common myna or Indian myna were recorded and spectral analysis was performed subjected to sound samples. The study results indicate that, three types of sounds were identified and with significant variations in their structural hierarchy with distinct high and low frequencies.

**Key words:** *Indian myna, sounds of bird, spectral analysis, Introduction*

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## INTRODUCTION

Birds and especially sound of birds are importation for humans and to our culture. For many people sound of birds is the sign for starting of the spring. Bird-watching is also popular hobby in many countries. Birds can be heard even in big cities and there they are one of the few reminders of the surrounding nature. Also many composers, poets and writers have been inspired by the song of birds.

According to Krebs & Kroodsma (1980) the sound has been typically divided into two categories: songs and calls. Singing is play a pivotal role in bird survival and communication with other members of the group or different individuals (Beckers *et al.,* 2003). The composition and structural hierarchy of bird sound are more complex to understand (Gaunt 1983).

Syrinx is the primary sound source and unique organ to birds (King 1989). And also the vocal tract, whose main parts are trachea, larynx, mouth and beak, interacts to the sound of birds (Nowicki 1987).

According behavioral studies, the early sate of life influence on variations and type of sounds produced by birds (Nelson and Marler 1994 and MacDougall-Shackleton 2001). The typical characteristic of bird sound is useful for identification of particular species and it can be served as isolation of species (Payne 1986).

The major factors which have great impact on sounds of the birds, which includes, type of environment, and genetic makeup (Mundinger 1982, Kroodsma and Canady 1985, and Morton 1975). Previous reports on analysis of sounds of various birds from different localities indicate that, bird sounds (calls/songs)

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has hierarchical structure: these species specific sounds are composed of different elements, similar elements are called syllables, similar syllables are called as phrases (Catchpole and Slater 1995).

Studies on sound analysis of birds will helps us in understanding behavioral and evolutionary aspects of birds. In these directions some of the Indian workers are studied sounds of various birds in detailed. (Vijayan 1978, Kumar and Bhatt 2000).

Therefore the present study was undertaken to record and analyse sounds of Common myna or Indian myna inhabiting of Gulbarga district, Karnataka state.

**MATERIALS AND METHODS**

The Common myna or Indian myna (*Acridotheres tristis)*, is a is a member of the family Sturnidae (starlings and mynas) native to Asia. An omnivorous open woodland bird with a strong territorial instinct, the myna has adapted extremely well to urban environments.

The common myna is readily identified by the brown body, black hooded head and the bare yellow patch behind the eye. The bill and legs are bright yellow. There is a white patch on the outer primaries and the wing lining on the underside is white. The sexes are similar and birds are usually seen in pairs. The body length about 23 centimeters, average weight about 109 to 143 gm respectively.

The study area Kalaburagi located between $17^{O}$ 04' -$77^{O}$ 42' longitudes and 16v 12' -$17^{O}$ 46' latitude. Kalaburagi has district climatic conditions with temperature between 15 $^{O}$C to 44 $^{O}$C.

In the present investigation the sounds of Common myna or Indian myna were recorded in Kalaburagi district during May 2012 to April 2013. During the study period about sounds of 50 species were recorded by using Sony ICD-UX533F 4 GB sound recorders These recordings were digitized using M-Audiophile 2496 (sound card) at a sampling rate of 22.5 to 48 kHz and 16-bit resolution between early morning and late evening.. After digitized, the fragments of high quality recordings were analyzed with the help of Revan Lite 1.0 soft-ware. All spectrograms were produced with the following settings: 512 FFT-length, 75% Frame, Hamming window and 87.5% time window overlap. In the present study, minimum frequency, maximum frequency, range of frequency, dominant frequency (frequency of maximal amplitude), duration and gap in signals were measured to define the acoustical features of the vocalizations. Number and types of elements were also measured.

**Results and Discussion**

The sounds of Indian myna was tested by using Lite 1.0 software and classified as four different types of sounds and given name as Type I, Type II, Type III and Type IV respectively.

In the present investigation all the four types of sounds of Indian myna was divided in two three categories namely elements, syllable, phrase

In the type I sound consist of four elements **(a, b, c, d),** two syllables and one phrase respectively. the element **'a'** is originated between 1.792 KHz to 2.104 KHz and the time duration is 0.048 sec, the element **'b'** was existed between 3.584 to 4.085 KHz , the duration of time is 0.054 sec, similarly the element **'c'** originated between 5.571 KHz to 5.955 KHz and the time duration of element is 0.053 sec, whereas the element **'d'** was originated between 2.251 KHz to 4.959 KHz and the duration of time is 0.08 sec repetitively.

The type II sound comprises of three elements (**e, f, g**) and two syllable and no phrase has been identified. The element **'e'** was originated between 1.329 KHz to 4.599 KHz , the time duration was 0.071 sec. The element **'f'** was observed between 2.128 KHz to 2.976 KHz and the time duration was 0.062 sec. Similarly the element **'g'** was noticed between 1.367 KHz to 3.332 KHz and duration of time was 0.077 sec respectively.

The type III sound was composed of only two elements **(h** and **i )** and one syllable with elements of **'i'** only. The element **'h'** was originated between 1.147 KHz to 4.779 KHZ and time duration of element is 0.134 sec, the element **'i'** was identified between 1.772 KHz to 4.508 KHz and time duration about 0.23 sec respectively.

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The type IV sound of myna bird composed of five elements and one syllable. The element of **'j'** was generated between 2.178 KHz to 2.990 KHz and time duration is 0.174 sec, the element **'k'** was originated between 1.980 KHz to 2.805 KHz and duration of time is 0.218 sec respectively.

The element **'l'** was originated between 1.795 KHz to 3.047 KHz and time duration is 0.183 sec, the element **'m'** was originated between 1.965 to 3.409 KHz and time duration of element is 0.74 sec respectively. The element **'n'** was originated between 1.737 KHz to 4.827 KHz and duration of element is 0.152 sec respectively.

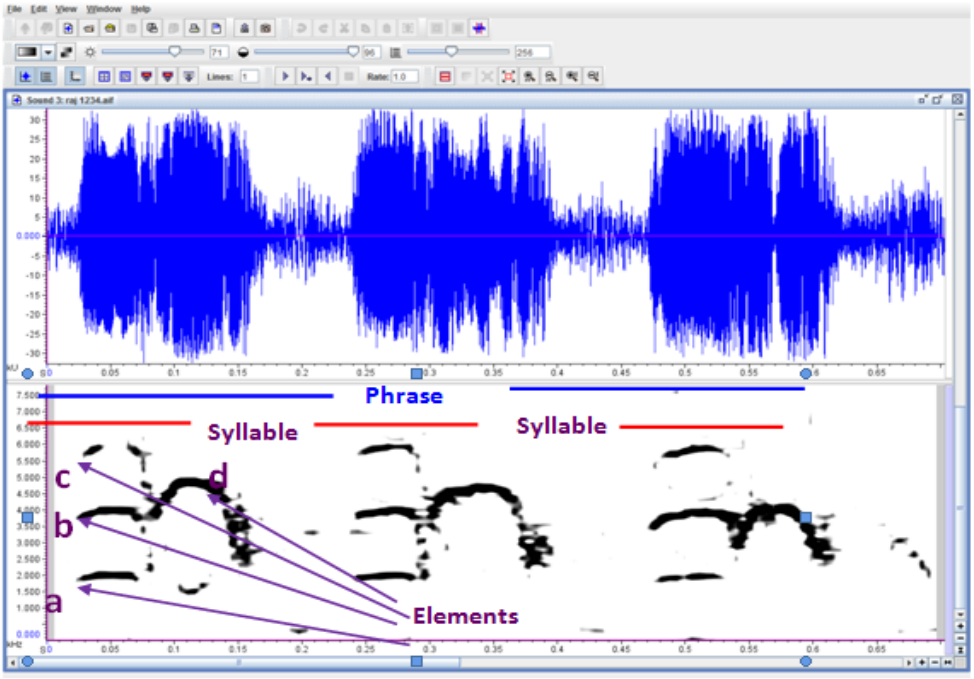


**Fig No 1. (Type –I) Spectral analysis of sounds of *Acridotheres tristis*** (Indian myna)

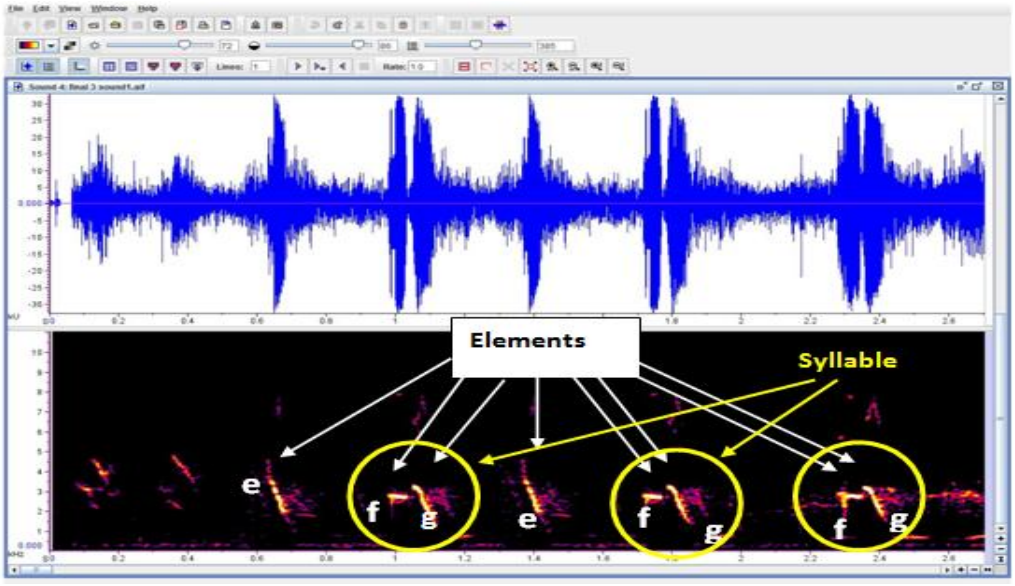


**Fig No 2. (Type –II) Spectral analysis of sounds of *Acridotheres tristis*** (Indian myna)

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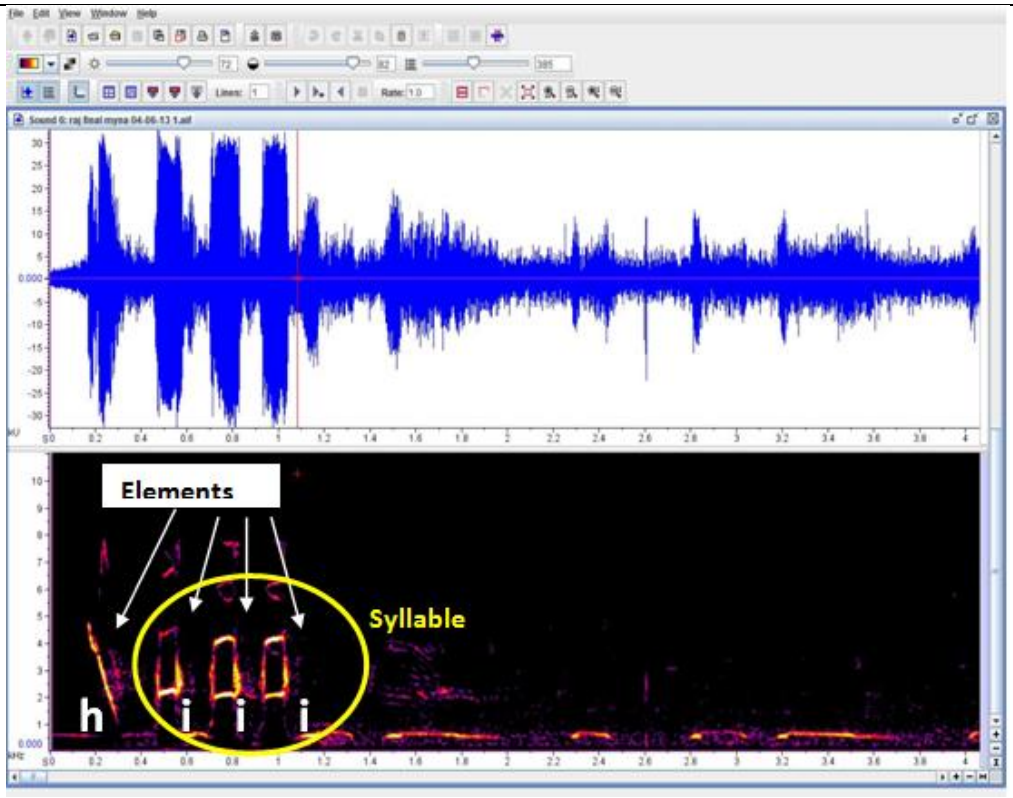


Fig 3. **(Type –III) Spectral analysis of sounds of *Acridotheres tristis*** (Indian myna)

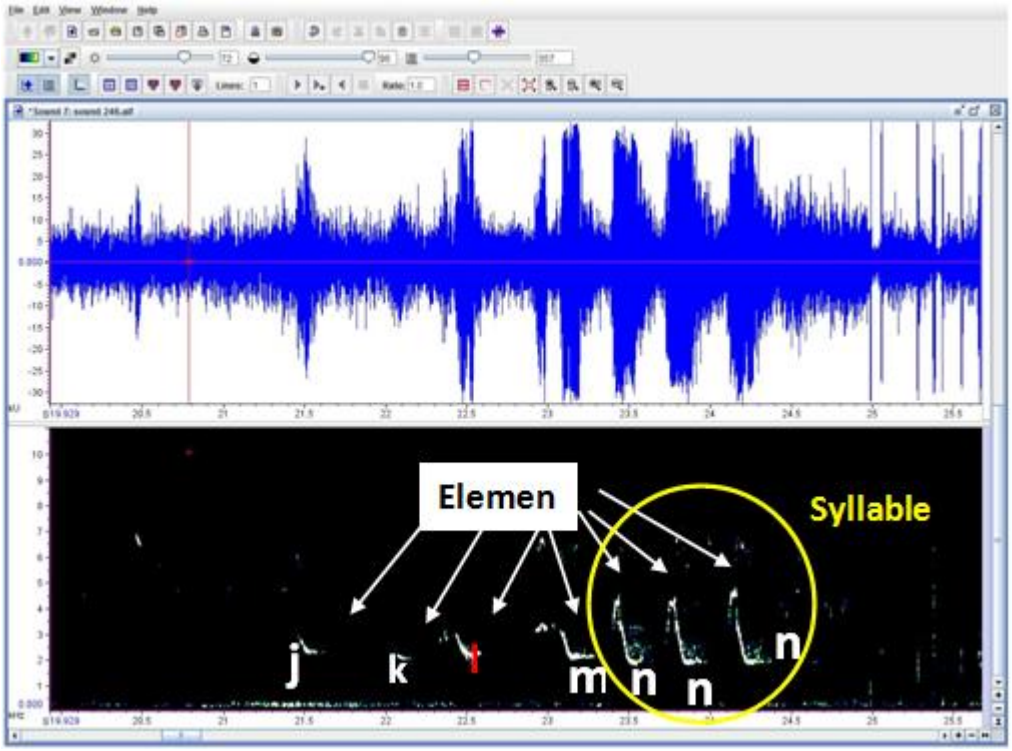


Fig 4. (Type –IV) Spectral analysis of sounds of Acridotheres tristis (Indian myna)

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