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Bird Acoustics and Aesthetics

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ABSTRACT

This article gives an overview of bird acoustics and its aesthetic values. Birds use acoustics as a key element for communication. They use both calls and songs for communicating among themselves. They usually vocalize during dawn and dusk. Moreover, their songs have been utilized in various innovative ways to reduce stress and frustration in workplace as well as home.

INTRODUCTION

The word "acoustic" is derived from the Greek word "akoustikos" i.e. "relating to sound". Sound is a wave i.e. disturbance that propagates through medium. The science dealing with the methods of generation, reception and propagation of sound is called

Acoustics and the branch dealing with sounds produced by animals is called bioacoustics.

Birds are acoustically active organisms. Many important aspects of life of bird are mediated through sound. They heavily depend on sound signals as it can travel far away distance, in all directions. Despite the visual signals, these signals can be used both during day and when dark. These sounds are an important criteria for measuring the environmental quality. Studying the acoustic diversity of birds is one of the ways of monitoring biodiversity. Bioacoustic monitoring is an indispensable tool for conservation. It is a rapid and non-invasive biodiversity assessment method. Bird research and monitoring programme use bird sounds for counting birds

in dense forests. Many new species of birds are being discovered on the basis of their vocalisation.

There are two kinds of vocalizations of birds –calls and songs, which are categorised on the basis of length and function. Calls are generally short and produced throughout the year. It contains one or two notes. It is mainly for coordinating activities in the species like fooding, flocking, alarming etc. Songs are long rhythmic patterns. They are seasonal and under sexual hormones. They are mainly for attracting female and repelling rivals and establishing territory (Josselyn and Andrew, 1976). They basically vocalize during dawn and dusk. The dawn chorus starts when birds start vocalizing in the early hours of morning. The transmission of sound signals is good during early morning due to less wind turbulence (Catchpole and Slater, 2003). Moreover there is less background noise i.e by orthopterans. There is insufficient light for foraging. Moreover, male birds establish their territory by singing as some territories might have become vacant overnight (Catchpole and Slater, 2003).

When birds settle down to sleep in the evening, it's called roosting and the chorus during this time is called roosting chorus. Three main reasons behind communal roosting given by Guy Beauchamp are supposed to be due to thermoregulation, decrease in predation risk, and an increase in foraging efficiency.

i. Thermoregulation benefits-

When a large number of birds gather in a tree it increases the temperature of that area

and thus helps in decreasing the energy they would require to maintain their optimal body temperature. The physical structure of the roost can provide protection from weather, evidence suggests that thermoregulation benefits also accrue from the presence of companions. In addition, smaller species may benefit to a greater extent from savings in energetic demands due to their high body surface-to-body mass ratio (Guy, 1999).

ii. Decrease in predation risk-

Birds in group decrease the chances of being eaten by predators. The geometric structure of communal roost is also thought to provide increased predation avoidance. "For example, birds in the center have a greater chance of being protected from predators than those sleeping on the edge" (Guy, 1999).

iii. Increase in foraging efficiency-

Roosting areas act as information centre where younger birds get a chance to follow the older and experienced birds to good feeding sites which saves energy and time (Guy, 1999).

The vocal signals are produced by organs called syrinx. Syrinx is located at the junction of trachea and bronchi. Sound is basically generated by the vibration of tympaniform membranes (present on the medial walls of the bronchus) when the pressurized air flows from bronchi to trachea during expiration. In songbirds, vibrations are produced by a pair of soft tissue pads (which are located opposite to each other in each bronchus) known as lateral labia (outside) and medial labia (inside). The two lungs can work independent of each other

and thus can produce lots of sound at the same time (Bradbury and Vehrencamp, 1998). It is mostly the male that sings. But in tropical regions female birds also sing.

These bird songs have aesthetic properties. It revitalises our mind body and soul. In various Environment Psychological studies done by Ratcliffe et al, (2013) it was founds that exposure to natural sounds that of birds and streams in office can reduce fatigue. It enhances motivation and recovers from stress. It also drives away negative mood. It increases concentration in workplace and home (Ratcliffe et al., 2013). Bird songs were used to lift up the moods in hospitals, airports and trains. It had therapeutic effects. Bird songs have been used in various innovative ways to increase productivity while working. Julian Treasure, has designed an app which plays birdsongs to create a natural soundscape while working (www.bbc.com). Thus it enhances human health and promotes well-being.

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