Candidate: Prantik Hazra

Abstract of Ph. D. thesis

Title of the thesis

**Photoperiodic Effects and Temperature Impacts in Migratory Waterbirds at some Tropical Wetlands of South Bengal, India**

Migration is an adaptive response to seasonal environments, permitting birds to take advantages of spatial variations in the abundance of resources, to avoid the uncertainties of northern winters with short-days, low temperatures, and low food availability and to escape from competition in saturated habitats. Thus, bird migration is essential for the survival and propagation of many birds.

Onset of migration in birds is influenced by a number of factors. Seasonal changes in the environment, especially in the photoperiod, impose constraints for the timing and durations of migration. The timing of migration may also be constrained by local temperatures, temperatures en route, temperatures at the wintering grounds and global climatic indices of a particular area.

Mean global temperature has increased by 0.6°C over the last century with the consequent impact of global warming on a range of ecosystems. Birds constitute well-established monitoring programmes that provide time series detailing of the ecological parameter of various species.

Although much studies have been done with respect to the factors triggering the onset and termination of migration, research has been strongly limited to the northern-hemisphere, breeding-site perspective and very little is known of these aspects from the tropics, wintering-site perspective. Moreover, most of our knowledge of these aspects has been acquired from studies under captive or simulated conditions and there is currently a lack of information in the wild, particularly from the tropics. Therefore, the potential effects of photoperiod and climate at the wintering grounds on migratory onset should be given adequate importance.

Thus, there are still unanswered questions regarding the factors that control the timing of migration, especially the photoperiod and climate, in the wintering grounds. To achieve a better understanding of these important aspects of the life-history strategies of migrants, we need to assess the significance of multiple factors potentially affecting the phenology of migration. Although India is one of the most important wintering grounds for a wide variety of long-distance migrants knowledge of these aspects is very poor.

This study is attempted to provide comprehensive idea of (i) Influence of photoperiod and temperature on the migration phenology of waterbirds. (ii) Effects of environmental variables on the abundance, assemblages or community composition of these waterbirds. (iii) Relationship between the migration phenology with the changing spring temperatures. (iv) Effects of important water parameters on the migratory waterbirds.

During the course of this study it has been observed that the arrival dates, departure dates, length of stay and abundances of the waterbirds were observed to show significant relationships with photoperiod and temperature. Phytoplanktonic productivity and dissolved oxygen concentration affected the abundances of most of these birds significantly.

This study suggests that the appearance, disappearance, abundance and assemblage of migratory waterbirds in South Bengal are greatly influenced by photoperiod and temperature. Dissolved oxygen concentration does have a positive effect on the waterbirds. Therefore, this study answers some of the fundamental questions regarding the influences of day length and temperature on the migration phenology, abundance and assemblages of waterbirds. However, detailed analyses of the factors determining these events are urgently needed to understand the cues, which are utilised by the migratory birds to arrive at and depart from their tropical wintering abodes at an optimum time. This is crucial for future protection of migratory birds. These results would certainly provide the first-hand idea of these cues from six tropical wintering sites, which will obviously guide future research on this field.

Prantik Hazra