

**DISTRIBUTION AND HABITAT RELATIONSHIPS OF  
AVIFAUNA IN THE NORTHERN FLANK OF THE KNUCKLES  
REGION, SRI LANKA**

**By**

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**A THESIS SUBMITTED FOR THE FULFILMENT OF THE  
DEGREE OF DOCTOR OF PHILOSOPHY TO THE FACULTY  
OF NATURAL SCIENCES OF THE OPEN UNIVERSITY OF  
SRI LANKA**

**2011**

**OPEN UNIVERSITY**



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## ABSTRACT

The distribution and habitat relationships of Avifauna were studied in three altitudinal locations (Riverston-1200-1450m, Pitawala-710-860m and Ilukkumbura- 475- 600m) in the Northern Flank of the Knuckles Region, Sri Lanka, as providing information on avifauna will be of great importance for the conservation of their natural habitats.

The first objective of the present study was to study the structure of the vegetation and the environmental characteristics that prevailed in different habitats (undisturbed, disturbed and riverine) in the three selected study locations. The next objective was to study the composition and conservation status of the avifaunal communities in the different habitats in the three altitudinal locations and to find out their relationships to the vegetational structure in different habitats in the three selected altitudinal locations.

To relate the distributional pattern of the avifaunal communities in the three study locations, and their relationships to important environmental parameters in the three different altitudes in the study area was the next objective of the present study.

To establish any altitudinal variation in composition and diversity in relation to Alpha and Beta diversity indices among nine selected avifaunal communities in relation to different habitats types (undisturbed, disturbed and riverine ), in the three selected altitudinal locations was another objective of the present study.

To study the composition and nature of mixed species foraging flocks in the three selected altitudinal locations was the final objective, which included behavioral aspects of members of mixed species foraging flocks in relation to different social roles , especially the nuclear role.

Standard vegetation sampling techniques for vegetation and Variable Circular Plot counts, mist netting and opportunistic observations and focal animal and scan sampling methods for birds were adopted as methods in the study.

A total of 179 species which included 31 migrant species and 16 definitive endemic species were recorded in the total study area that covered an area of around 25 km<sup>2</sup>.

79, 107 and 152 avifaunal species were recorded in Riverston, Pitawala and Ilukkumbura respectively. These numbers included 14, 12 and 10 species of definitive endemics and 14, 22 and 25 migrants, in Riverston , Pitawala and Ilukkumbura respectively. A gradual increase in total avifaunal species records, a gradual increase in migrant species records and also a gradual decrease in endemic records were found along with the decrease in altitude among the three study locations.

The total study area harboured 37.3% of Sri Lanka's total avifauna which included 34% of Sri Lanka's winter visitors and 61.5% of Sri Lanka's definitive endemics.

16% of Sri Lanka's Globally threatened species and 39% of Sri Lanka's Nationally Threatened avifaunal species were encountered in the total study area which indicates that the avifaunal community studied, has a high conservation status.

It was revealed that there was a significant difference among the avifaunal communities along the altitudinal gradient. Four Alpha diversity indices namely the Menhinick's Index (MEI), Margalef Index (MAI), Shannon Weiner Index (SWI) and the Brillouin Index (BI) were found to be suitable species diversity indices to measure Alpha diversity, of avifaunal communities in the study area. The Highest correlation is found between Species Richness and the Menhinick's Index (MEI). The Inverse Simpson Index (INSIM) did not indicate a suitable Alpha diversity measure for the avifaunal communities studied among the five indices tested.

Insectivores were found to be the dominant feeding guild in all three altitudinal locations. As the formation of mixed species foraging flocks is a characteristic feature of insectivorous avifaunal communities worldwide, the investigation on structure composition and behavioural aspects of mixed species foraging flocks in the avifaunal communities in the three altitudinal locations studied, commenced.

As endemic as well as migrants are equally important where the avifaunal wealth of a region is concerned, all three study locations irrespective of altitude are important and should be considered as important from a conservationist's point of view, and in recommending conservation areas for avifauna.

As five important avifaunal species move locally from Riverston to Ilukkumbura, through the Pitawala location, all three altitudinal locations should be included when planning protected areas and when improving the conservation status of the Knuckles Conservation Forest.

Species Diversity Indices and statistical analyses indicated that the undisturbed forest habitats in the three study locations were significantly different in composition from each other and the least similarity among communities were found between habitats in Riverston and Ilukkumbura.

The avifaunal community in the Riverston, Pitawala and Ilukkumbura included 45%, 40% and 34% of insectivores respectively in their total communities and 37%, 33% and 28%, of the avifaunal communities in Riverston, Pitawala and Ilukkumbura, were involved in flock formation. A gradually decreasing trend in the insectivorous component in the communities and also in their contribution for flock formation was observed along with the decrease in altitudes of the study locations were observed.

Flocks displayed a similar pattern of representation of migrant endemic and resident categories, to those of the total communities. The flocks in Riverston included the highest participation of endemics while the flocks in Ilukkumbura included the highest participation of migrants. Therefore mixed species foraging flocks in the three study locations could be considered as representative sub-sets of the total avifaunal communities that they represent.

Flock systems in the three locations did not show a high degree of similarity. The flock systems in Riverston resembled the montane flock systems already studied in Sri Lanka and the flock systems in Pitawala and Ilukkumbura had high resemblance to the lowland flock systems studied already in Sri Lanka.

However the flock systems in Pitawala and Ilukkumbura had a special characteristic which was not seen in other flock systems studied in Sri Lanka to date. It was, that the nuclear species in both flock systems in Pitawala and Ilukkumbura represented family Irenidae.

A good degree of family level similarity was observed between the montane flock systems which were already studied in Sri Lanka (Horton plains and Thangamalai) and the montane flocks in the study area (Riverston). In the mean time a good degree of family level similarity was observed between the lowland flock systems which were already studied in Sri Lanka (Sinharaja) and the lowland flocks studied in the study area (Pitawala and Ilukkumbura).

Altitudinal variation exists among avifaunal communities studied within the same geographical area, which is the Northern flank of the Knuckles Conservation Area. Differences in endemic and migrant representation and also in flock composition among the three altitudinal locations also exists. The phenomenon of local movement of species from Riverston to Ilukkumbura also occurs in between the study locations. The above observations and findings reveal that Land form ecology and the application of habitat linkages between the different study locations should be recommended as one of the important solutions, for the conservation of the avifaunal communities in the Northern flank of the Knuckles Conservation Area.

As human beings are a major force in changing nature, Communicator Education and Public Awareness (CEPA) programmes should be recommended to the study area for the conservation of especially the habitats which are used for tea, cardamom and other plantations. CEPA strategies should be developed by means of promoting the stakeholders of the areas to conserve the valuable biodiversity that exists in their habitats. They also should be educated to utilize the natural resources sustainably. Stake holders' views and problems should be considered and discussed and solutions should be found especially by the authorities responsible for the conservation of the valuable biodiversity of the country.