AMPHIBIAN ASSEMBLAGE ALONG KEVUMKAHATA ELA IN HANTANA MOUNTAIN RANGE, SRI LANKA

W.M.G.M.B Bowatte and K.B. Ranawana*

Department of Zoology, Faculty of Science, University of Peradeniya

Introduction

Different amphibian assemblages are found in different habitat types. Riparian vegetation is good refugia for many amphibians. Diversity and abundance of amphibians change with different vegetation types and changing elevation. Therefore, distribution patterns of amphibians get high attention in ecological studies. This study was conducted to determine amphibian assemblages along a mountain stream in Hantana Range. Kevumkahata Ela originates at an elevation of 910 m above the sea level. The lowest elevation of the stream, where it meet a tributary of River Mahaweli, was 540 m above the sea level. The specific objectives of this study were to (1) identify change of amphibian diversity with increasing elevation along the selected stream, (2) record the amphibian assemblage in different riparian vegetations, (3) record seasonality changes in amphibian diversity along the selected stream.

Materials and Methods

The study was carried out from October 2008 to April 2009. Sampling design was based on stratified sampling, considering the different types of riparian vegetation. Three major vegetation types were identified; they were (1) home gardens, (2) *Alstonia* Woodlands and (3) *Pinus* plantations & grasslands. Belt transects were established along the stream in different vegetation types. Each belt transect (10 × 2 m) was perpendicular to the stream. Elevation was marked at intervals of 60 m from the lowest elevation (i.e. from 540 m) and altogether six elevation levels were marked (540-600 m, 600-660 m, 660-720 m, 720-780 m, 780-840 m and 840-900 m) along the stream. Altogether 21 locations in the stream and 42 transect belts were surveyed. Survey was carried out two days a month; one during day time (0800 h to approximately 1300 h) and the other during night (1900 h to approximately 0100 h). Transects were extensively searched for amphibians. Stream amphibians were sampled using 2 × 1 m net with 1 mm mesh size. All amphibians that found in transect, were identified to species level. Rain fall data were obtained from Natural Resource Management Center, Peradeniya. The impact of vegetation and elevation on amphibian distribution was determined by using one-way ANOVA. Means were separated using Duncan Multiple Range Test (DMRT). DMRT test was performed to amphibian species which were not commonly shared in all elevation levels. Correlation analysis was done in order to determine the relationship between amphibian abundance and monthly average rainfall.

Results

Altogether eleven species of amphibians belonging to two families were recorded (*Bufo melanostictus, Polypedates cruciger, Fejervarya limnocharis, Fejervarya kirtisinghei, Lankanectes corrugates, Rana temporalis, Philautus rus, Philautus zorro, Philautus popularis, Philautus hailidayi* and *Philautus sordidius*). Of these eight species are endemic to Sri Lanka. *Bufo melanostictus, Philautus rus, Polypedates cruciger, Rana temporalis F. kirtisinghei, R. temporalis, P. rus,* and *P. popularis* were found in all three vegetation types. There was a significant difference between the mean abundance values of all other nine species of amphibians in different vegetation types. DMRT values showed significant difference for some vegetation types for commonly shared species in different vegetation types. Only 4 species of amphibians were found in *Pinus* plantations and grasslands. One way ANOVA showed that mean abundance values of *B. melanostictus* ($p=0.088$) and *Polypedates cruciger* ($p=0.174$) were not significantly different in all elevation levels. All other species showed a significant difference in mean abundance in different elevation levels. Monthly average rainfall showed a variation from 3.2 – 300.3 mm during the study period. Higher number of individuals was recorded during the rainy months and low number of individuals was found in the dry months. Correlation analysis for the monthly abundance of amphibians and monthly average rainfall revealed that there was a positive relationship ($r^2 = 0.797856$).

Discussion and Conclusion

Presence or absence and different distribution of amphibians in different vegetation types are probably based on many factors such as diversity of associated vegetation, amount of shade, abundance of insect prey, water availability, amount of leaf litter and soil conditions. Low abundance and low diversity of amphibians in *Pinus* plantations and grasslands were due to the unfavorable conditions in the habitat. On the other hand *Alstonia* woodlands has the highest number of amphibian species which is characterized by high diversity of vegetation, abundant leaf litter and shade. Distribution of amphibian species in different elevation levels were not only determined by elevation factor, but also with associated vegetation. Water availability is very important in development of amphibians, for both amphibians which has complete life cycle and for direct developers. High reproductive rates are apparent during the rainy seasons not only due to rain fall, but also because resources required by amphibians increase such as abundance of insect prey and microbial activity in water with the rainfall. Elevation range of *P. rus* (500-900 m) was found to be extended than previously reported (Manamendra-Arachchi and Pethiyagoda, 2006). This study demonstrates that vegetation, elevation and rainfall affect spatial and temporal distribution of amphibians throughout the riparian vegetation zone.

References

Manamendra-Arachchi, K. and Pethiyagoda, R. (2006). *Amphibians of Sri Lanka.* Wildlife Heritage Trust of Srilanka, Colombo.59-410.