SPECIES COMPOSITION OF ICHTHYOFAUNA UPSTREAM AND DOWNSTREAM OF KOTMALE RESERVOIR

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Introduction

The freshwater ichthyofauna of Sri Lanka is mainly supported by the major river basins in Sri Lanka (Pethiyagoda, 1991). Mahaweli river basin consists of a catchment area of 10327 km^2 and cover various climatic and agroecological regions (Pethiyagoda, 1991). A total of 47 species of fish occur in the Mahaweli basin, including 13 endemic species (Pethiyagoda, 1991). Studies on Ichthyofauna of the region are very limited (Deraniyagala, 1963; Pethiyagoda, 1991). Since the river basin is experiencing several environmental changes mainly due to human activities, it has become important to carryout detailed studies to assess the current status of ichthyofauna, especially for conservation purposes. Among the various types of threats to Sri Lankan fresh water fauna, alterations of habitat especially due to construction of dams across major river basins have become a major concern. Therefore, the current survey was conducted to compare the species composition of fish in upstream and downstream of Kothmale reservoir.

Materials and Methods

Study sites were selected on the basis of their relative positioning to the reservoir *i.e.*, upstream, transitional zone, and downstream of the reservoir. Survey was done from August 2008 to April 2009. Species composition in each study site was evaluated by direct observations and by collecting fish using a hand net. Additional data was collected from the villages and local fishermen. Physico-chemical variables of the sites were determined using standard methods. Field measurements were taken for conductivity, salinity, pH, flow rate and temperature using portable meters. For chemical analysis water samples were collected according to the American Public health Association (APHA) guidelines and analysis were done at Inorganic research laboratory, Department of Chemistry, University of Peradeniya.

The relationship between physico-chemical variables and composition of icthyofauna was determined by cluster variable analysis using Minitab. The differences in environmental conditions of the three sites were assessed by ANOVA test using Minitab.

Results

During the survey, a total of 17 fish species belonging to 8 families were observed from all the three sites. Highest number of fish species was observed from the downstream site (Table 1). Seven species belonging to five families were recorded from upstream site, while transitional zone had only five species representing three families. The downstream site,

which recorded the highest number of fish species, recorded a total of nine species which belonged to four families.

According to the cluster analysis, upstream and downstream sites show more similarities in species composition (Figure 1). They show similarity up to 55 %. Transitional zone shows a clear variation from other two sites. According to the results of the ANOVA test the temperature, (P-0.0), pH, (P-0.0) Conductivity, (P-0.3) and flow rate (P-0.0) show significant variation in three study sites.

Discussion

According to the results of this study it is clear that there is a potential effect on ichthyofauna due to the formation of a reservoir. The composition of fish has altered significantly in the reservoir area. The main victims of the changes are likely to be the endemics. This may be mainly because of their higher sensitiveness to environmental changes, both physico-chemical and biological. It can also be suggested that introduction of highly adaptable exotic fish, increased human activities that directly influence the modification of structure and dynamics of the primary producers could have a direct impact of Ichthyofauna of the region.

Conclusions

The results of the study suggest that the alteration of the habitats due to construction of the reservoir has a significant impact on ichthyofauna. Therefore, before construction of reservoirs it is necessary to take suitable actions to minimize ecological damages.

References

Deraniyagala, P.E.P. (1990). A Coloured Atlas of some Vertebrates from Ceylon. Vol.1-Fishes. National Museum of Sri Lanka, Colombo.

Pethiyagoda, R. (1991). Fresh water fishes of Sri Lanka. Wildlife Heritage Trust, Sri Lanka.

Table 1. Observed fish species recorded from each site

Upstream	Transitional	Downstream
Garra ceylonensis (Cyprinidae)	*Oreochromis mossambicus* (Cichlidae)	*Puntius nigrofasciatus* (Cyprinidae)
Channa orientalis (Channidae)	*Catla catla* (Cyprinidae)	*Puntius bimaculatus* (Cyprinidae)
Rasbora daniconius (Cyprinidae)	*Glossobius giuris* (Gobidae)	*Belontia signata* (Belontidae)
Devario malabaricus (Cyprinidae)	*Cyprinus carpio* (Cyprinidae)	*Rasbora daniconius* (Cyprinidae)
Poecilia reticulata (Poecilidae)	*Oreochromis niloticus* (Cichlidae)	*Acanthocobitis uropthalmus* (Balitoridae)
Acanthocobitis uropthalmus (Balitoridae)		*Lepidoceohalichthys thermalis* (Cobitidae)
Lepidoceohalichthys thermalis (Cobitidae)		*Devario malabaricus* (Cyprinidae)
		Puntius cumingii (Cyprinidae)
		Puntius singhala (Cyprinidae)

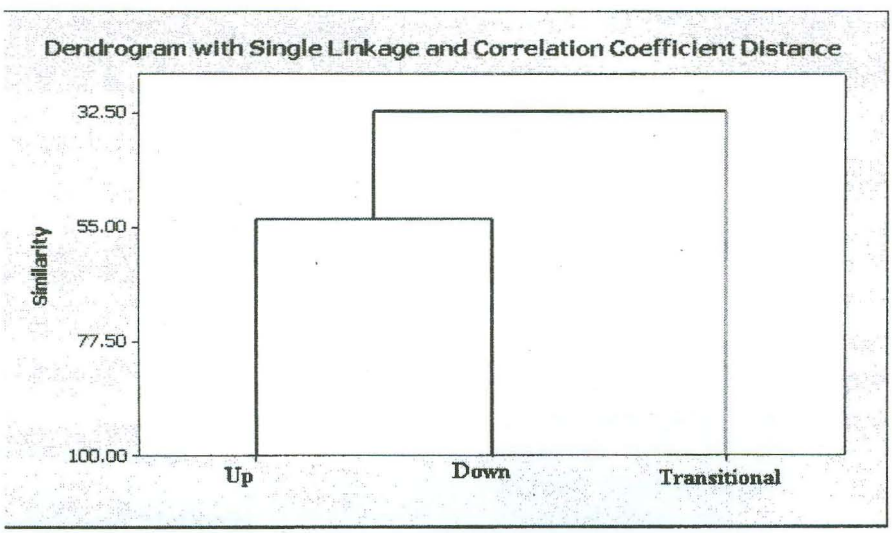

Figure 1. Cluster variable analysis showing similarity of each site based on composition of ichthyofauna