

Summary

Rasbora spp. are small fresh water fish belonging to family Cyprinidae. In Sri Lanka, *Rasbora* spp. are commonly found in small lowland and foot hill streams, rivers, lakes and ponds. Because of the smaller size, non-aggressiveness and bright colour patterns, they are popular aquarium fish. Some species are proven difficult to breed in captivity and hence wild stocks are often harvested to supply an expanding aquarium trade. Over exploitation of *Rasbora* for the aquarium trade has severely depleted the wild populations of *Rasbora* especially *R. wilpita* and *R. vaterifloris* which are endemic to Sri Lanka. This has led to significant declines in the natural stocks of some species that are consequently in need for conservation.

Fresh water fish Genus *Rasbora* consists of four species. *R. vaterifloris* is morphologically different from the other three species, which is now considered as a separate Genus. *R. daniconius* is commonly found and *R. caverii* also is an indigenous species found to be in the same habitat with *R. daniconius*. *R. wilpita*, identified as a 'new' endemic species, is rare and recorded to be found only in very limited locations.

Present study aimed to identify the taxonomically important morphological features in grouping the *Rasbora* into species, to clarify the taxonomic status of new species *Rasbora* 'wilpita' and *Rasbora vaterifloris* which is presently identified as *Rasborides vaterifloris*, to determine the phylogenetic relationships among *Rasbora* species in Sri Lanka.

To achieve the aim, the study was focused on two directions 1) To find out the morphological relationships 2) To find out the molecular relationships, among the *Rasbora* species. Finally the findings of these two different studies were combined to see whether there is any concordance in the results.

Morphological data were collected from *Rasbora* individuals from different river basins and hierarchical cluster analysis and Principal Component Analysis were performed using SPSS/PC statistical package. Different molecular techniques, viz. amplification of 12S rRNA gene of mitochondrial DNA, Temperature Gradient Gel Electrophoresis, and sequencing, were utilized to obtain the phylogenetic relationships of *Rasbora* spp. Combination of these results revealed that, genetic divergence of *Rasbora vaterifloris* from other species is sufficient for the inclusion of this species in a separate genus. The

molecular study also confirmed that *Rasbora wilpita* as a separate species and the presence of symphyseal knob is the major character in their identification. With respect to the species studied here, a sequence divergence rate of 1% per million years (for the 12S rRNA marker) suggests that *R. vaterifloris* diverged from the lineage to which other three species of Sri Lankan *Rasbora* belong, approximately 8.6 million years ago (mya). *R. daniconius* represents a lineage that diverged from a common ancestor with *R. caverii* and *R. wilpita* approximately 3.2 mya. *R. caverii* and *R. wilpita* shared a common ancestor approximately 1.6 mya.

This study gives the first hand information on phylogeny of *Rasbora* spp. in Sri Lanka which is essential to conserve the extant of biodiversity in this group of fishes and to implement the conservation and management strategies.

Publications:

K. S. K. De Silva (1999) Clarification of Taxonomic status of *Rasbora* spp in Sri Lanka . Proceedings of the 55th Annual Session, Part 1- Abstracts. Sri Lanka Association for the Advancement of Science.p.179. (D-48)

Phylogenetic relationships of *Rasbora* species in Sri Lanka (manuscript)

1. a) Contract Number: SIDA 98/BT/01

b) **Clarification of taxonomic status of newly described fish species *Rasbora wilpita* and its genetic relationship with other *Rasbora* species found in Sri Lanka.**

c) Institute where research was carried out:

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j) not relevant