

ZSA-27

SS 119 (2002)

Morphological and genetic relationships of six selected *Puntius* species of Sri Lanka.

Nuwan Pathmasiri Prathapainghe Liyanage

Supervisor - Dr. M.P.K.S.K. De Silva, Dept. of Zoology, Univ. of Ruhuna

Species of the Genus *Puntius* (Family Cyprinidae) are very important to Sri Lanka as they represent the large portion (16 species) of freshwater fish fauna and their high endemism. Most of the species are economically important as aquarium fish and food fish. Economic importance as well as habitat degradation has resulted most of the *Puntius* spp. to be threatened. Therefore conservation of these fishes has become a priority at present. Correct identification, morphological and genetic relationships of *Puntius* spp. are very important in this context. Accordingly the present study was focused on investigations of the morphological and genetic relationships among six selected *Puntius* spp.

Samples of six *Puntius* spp. namely *P. titteya*, *P. nigrofasciatus*, *P. dorsalis*, *P. filamentosus*, *P. bimaculatus*, and *P. chola* were collected from Nilwala river basin and some of the meristic and morphometric data were recorded. These data were subjected to hierarchical cluster analysis, Principle Component Analysis (PCA) and Multi Dimensional Scaling (MDS), to determine their morphological relationships. DNA was extracted from muscle tissue of each fish and subjected to two molecular-based analysis; Polymerase Chain Reaction – Restriction Fragment Length Polymorphism (PCR-RFLP) and Random Amplified Polymorphic DNA (RAPD). In the PCR-RFLP analysis, a fragment of 12S rRNA gene of mitochondrial genome was amplified using specific primers and subjected to restriction digestion using seven restriction enzymes. In RAPD, DNA samples were amplified using four arbitrary primers. In both studies (morphological and molecular) *Rasbora daniconius* (Family Cyprinidae) was used as an out-group.

Hierarchical cluster analysis using all characters (meristic and morphometric) and only meristic characters separated the six *Puntius* spp. in a similar manner except in clustering of *P. dorsalis* and *P. chola*. PCA, MDS show that meristic characters have higher contribution than morphometric characters in separating the six *Puntius* spp. Among the seven restriction enzymes five were able to restrict the amplified fragment. Only one primer was able to produce a RAPD profile. *R. daniconius* differ from *Puntius* spp. at a higher degree in genetically than in morphologically. *P. titteya* and *P. nigrofasciatus* show a close relationship morphologically as well as genetically. *P. bimaculatus*, *P. filamentosus*, *P. dorsalis*, and *P. chola* are closely related in their morphology, but *P. bimaculatus* and *P. dorsalis* greatly differ from other two species at molecular level.