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Use of Morphometric Characters of a Fish Species to Predict its Location; A Statistical Approach

A.W.L Pubudu Thilan [*1], M.P.K.S.K. de Silva [2] and Leslie Jayasekara [1]*

[2]*Department of Zoology, University of Ruhuna, Matara, Sri Lanka*

[1]*Department of Mathematics, University of Ruhuna, Matara, Sri Lanka*

Precise taxonomic identification is the preliminary requirement in a study of an organism/specimen. Correct identification however gives only the identity of the specimen. The value of the correctly identified specimen as a study material becomes low when the place/habitat of its collection is unknown. Knowledge on place of collection exactly, enables to gather information on the distribution of the organism, possible environmental conditions that the organisms encounter and to describe the variations found in morphological and genetic features of the organism etc.

Present study therefore, aimed on to develop a statistical rule to predict place of collection (river which is unknown) of a given *Puntius dorsalis* (a freshwater fish species) specimen using its morphometric characters.

Fifty two individuals were collected from four major rivers (Mahaweli, Kelani, Kalu, Nilwala) in Sri Lanka and 23 morphometric characters were measured from each specimen. Those individuals were categorized into 4 groups according to the river from which they were collected. Measured morphometric characters were used as independent variables of the model to predict unknown group membership (river) of a given *Puntius dorsalis* specimen.

The assumptions for predictive discriminant analysis were satisfied, and 82.7% of the *Puntius dorsalis* specimens were successfully classified or predicted with respect to the place of collection (river) using their posterior probabilities. The process had a hit ratio of 69.2% when generalized, as a valid tool to classify fresh *Puntius dorsalis* specimen of unknown group membership. Also four Fisher's linear classification functions can be used to predict group membership easily. The paper concludes with some suggestions to move into nonparametric approach like *classification and regression trees* (CART) and *Neural Networks*.