

MORPHOLOGICAL VARIATIONS AND LENGTH-WEIGHT RELATIONSHIPS OF BULLET TUNA, *Auxis rochei* IN COASTAL WATERS OF SRI LANKA

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The sustainability of Sri Lanka's capture fishery is under threat due to overfishing and improper fishing practices. Therefore, effective fisheries management, including accurate identification of fish stocks, is crucial. This study focused on the morphological identification of bullet tuna, *Auxis rochei* from three fishery harbours: Beruwala, Galle, and Negombo, Sri Lanka. Given the migratory nature of bullet tuna, it is essential to determine whether they constitute a single stock due to their cross-boundary movements. A total of 140 fish samples were collected and 31 morphological variables were assessed. The most recently collected 38 specimens were used for truss network analysis. Using a measuring board and vernier calliper, 21 morphometric variables, truss measurements, and meristic variables were recorded. Principal Component Analysis (PCA) and factor analysis revealed significant population differences. MANOVA results showed a statistically significant distinction in 21 morphometric characters ($p < 0.05$) and eight meristic characters ($p < 0.05$). Additionally, ANOVA revealed a significant difference among the three localities ($p < 0.05$). PCA of meristic data showed that the first two principal axes explained 38.79% of total variability. A truss network of 15 measurements and eight landmarks showed significant differences across the three locations ($p < 0.05$). Length-weight relationships indicated Galle had a higher allometric coefficient ($b = 4.23$), suggesting faster weight gain relative to length, while Negombo ($b = 1.5$) and Beruwala ($b = 1.24$) exhibited weaker allometric relationships. Condition factors close to 1 suggested that the health of tuna populations is good across all sites (Galle = 0.998, Negombo = 0.977, Beruwala = 0.976). The morphometric differences indicated that the fish populations may have diverged due to genetic differences or environmental factors. The study concluded that the samples collected from Negombo, Beruwala, and Galle represent distinct fish stocks. However, following up with DNA molecular analysis to confirm the stock differences is recommended.

Keywords: *Auxis rochei*, Condition factor, Meristic characters, Morphometric characters, Truss measurements