# BIOCHEMICAL AND MOLECULAR STUDIES ON SOME SPECIES OF MULLET FISH

**By**


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## ABSTRAC

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Fish is one of the most important foods of the human because of its high nutritional content especially polyunsaturated fatty acids (PUFAs omega-3 and omega-6) which are available in mullet species. The aims of this study was to show how the traditional, biochemical and molecular methods can be used to assess the genetic diversity among the four mullet species, namely *Mugil cephalus, Liza ramada, Valamugil sihilil* and *Liza garana* ,in addition to bioinformatics tools .The fish were collected from four different governorates in Egypt (Alexandria, Ismailia, Port Said and Damietta). The four species were morphologically characterized using seventeen morphometric characters. The ANOVA test showed that out of seventeen characters four morphometric characters (i.e., head length, distance of first dorsal fin, distance of second dorsal fin and body weight) showed significant differences ($p<0.05$) among the four species. While, the remaining morphometric characters revealed no significant differences (p0.05) among the species. The morphology-based dendrogram divided the four species into two main clusters. The first cluster was divided into two subclusters and comprised the ten genotypes. The second cluster contained the six remaining genotypes and was divided into two subclusters. Protein banding patterns using SDS-PAGE (protein electrophoresis) revealed the total number as 59 bands in the profiles of the four species. *Liza garana* (Port Said) showed the highest number of bands (18). While, the lowest number of protein bands showed in *Valamugil sehili* (Ismailia) was 10 bands**.** The dendrogram constructed using protein data was successful in clustering the species together. Moreover, eleven SCoT primers and ten ISSR primers were used to estimate the genetic diversity among the four mullet species. The two markers SCoT and ISSR successfully amplified amplicons with a total number of 176 and 132 of which 153 and 111 were polymorphic, representing a percentage of polymorphism of 86.9% and 84.1% polymorphic amplicons/ primer, respectively. The similarity indices ranged from 0.47 to 0.84, 054 to 0.92 and 0.52 to 0.86 for SCoT, ISSR and combined, respectively. Cluster analysis based on similarity matrices of SCoT, ISSR and combined dendrograms revealed some similarities;i.e. the *Mugile cephallus* (Alexandria, Ismailia and Port Said) clustered together and the *Valamugil seheli* (Ismailia and Damietta) clustered together based on the three dendrograms. Also, *Liza ramada, Liza garana* (Damietta) and *Mugile cephallus* (Damietta) were clustered together based on the three dendrograms. Concerning the PCR product**,** one SCoT fragment was sequenced, blasted and aligned with the NCBI data based. This fragment revealed a high similarity to a sequence located on Chr1 near a gene called "Type II keratin E3 for fish species *Dicentrarchus labrax* (the European bass).

**Key words:** Mullet fish, morphological characterization, protein electrophoresis, molecular markers (SCoT and ISSR)

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