

Allozyme Variation in the Large-scale Mullet *Liza macrolepis* (Perciformes: Mugilidae) from Coastal Waters of Western Taiwan

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Sin-Che Lee, Hui-Ling Cheng and Jung-Ti Chang (1996) Allozyme variation in the large-scale mullet *Liza macrolepis* (Perciformes: Mugilidae) from coastal waters of western Taiwan. *Zoological Studies* 35(2): 85-92. Allozyme variation was studied in the large-scale mullet *Liza macrolepis* collected from 4 sites: 3 sites on the west coast of Taiwan, the Tanshui estuary, the Kaohsiung River (Love River) and Dapong Bay (Tungkang); and 1 site about 50 km off the west coast of Taiwan, the Penghu Islands. The genetic similarities among these 4 localities are rather high (0.992-0.999), indicating that they belong to the same population. The inter-sample comparisons of heterozygosity based on 10 polymorphic loci (*sAAT-1*, *CK-B*, *GPI-A*, *GPI-B*, *IDHP-A*, *LDH-C*, *sMDH-A*, *sMDH-B*, *ME-1* and *MPI-1*) under the 0.99 criterion revealed that most loci conform with the Hardy-Weinberg Equilibrium, except those at *GPI-B* from Dapong Bay and *IDHP-A* from the Tanshui estuary. Analysis of overall mean heterozygosities among 4 inter-sample comparisons revealed that the samples from Dapong Bay and the Tanshui estuary have higher values (0.044 and 0.043, respectively) than those from the Kaohsiung River and Penghu (0.029 and 0.028, respectively), probably due to heavy organic pollution in Dapong Bay and colder temperatures in the Tanshui estuary. Comparisons of overall F_{ST} (local subpopulation differentiation) of Dapong Bay with those of the three other locations indicate a moderate genetic differentiation which is mainly contributed by the unusually high allele frequency of the *MPI* locus. A higher inbreeding coefficient (F_{IS}) in the Dapong sample corresponds to the high inbreeding potential at this site, probably due to its nearly land-locked habitat, which limits the exchange of individual fish between the bay and the open coast.

Key words: Population genetics, Allozyme comparisons, Large-scale mullet.

The large-scale mullet *Liza macrolepis* (Smith 1846) is a wide ranging Indo-West Pacific species, with a northern limit to southern Japan and extreme western limit to southern Africa. Morphologically, it has a poorly-developed adipose eyelid, a yellowish pectoral fin base, and a short distance from the dorsal fin origin to the snout tip. There are 4 spines and 8-9 soft rays on the dorsal fin, 3 spines and 9-10 soft rays on the anal fin, 15-18 soft rays on the pectoral fin, and 30-33 longitudinal series of scales on the sides of body. It resembles the most closely related sympatric species, *L. subviridis*, but the latter has no yellowish stripe at the pectoral base and, in addition, it has a well-developed adipose eyelid.

Liza macrolepis occurs in inshore bays, estuaries and even in freshwater. It spawns in autumn,

with juveniles gathering in the muddy-sand inshore bays and estuaries during April and May (Okiyama 1988). The juveniles may further spread out to tidal rocky shores. In Taiwan, *Liza macrolepis* adults are a common inhabitant of inshore waters and bays. It seems that *Liza macrolepis* is well adapted to habitats with variable environmental conditions. This species would be potential study material for detection of genetic variation in relation to the environment. The present investigation determined the level of electrophoretically detectable gene variation in *Liza macrolepis* and assessed whether different stocks of subpopulations exist in the waters of Taiwan. Furthermore, *Liza macrolepis* is a medium-sized food fish in Taiwan; thus, an understanding of the genetic basis of its variation will aid the future management of

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