BIOCHEMICAL GENETICS OF TIGER SHRIMP *Penaeus monodon*: DESCRIPTION OF ELECTROPHORETIC DETECTABLE LOCI

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ABSTRACT

As part of a search for biochemical genetic markers for tiger shrimp, *Penaeus monodon*, wild shrimp were collected from the coastal waters of Aceh, Bali and Sumbawa, (Nusa Tenggara Barat). Tissues samples of hepatopancreas and abdominal muscle from these were analyzed by starch gel electrophoresis. Specific staining for 13 enzymes resolved 21 loci, 6 of which were polymorphic (i. e., EST-2, GPI, IDH, LDH-1, MDH-1 and α-GPD). The observed number of phenotypes for respective loci agreed well with Hardy-Weinberg expectations. The genetic basis of each polymorphism is discussed. Most of the polymorphic loci were dimeric (GPI, IDH, MDH and α-GPD) except for EST-2 was monomeric and LDH-1 was tetrameric. The genetic variability in *Penaeus monodon* was indicated by the number of polymorphic loci, heterozygosity (H) and number of alleles per locus (N) was relatively low compared to other marine organisms. The values of H and N for this species ranged from 0.025 to 0.047 and 1.381 to 1.528 respectively. This study suggest the use of GPI, IDH and MDH loci as genetic markers in any genetic improvement program.

KEYWORDS: ***Biochemical genetic, electrophoretic, Penaeus monodon.***

INTRODUCTION

Tiger shrimp, *Penaeus monodon,* is an important species in both capture fisheries and coastal aquaculture in Indonesia. An estimated 300.000 ha. of brackishwater pond are in use, mostly converted from mangrove area (Chamberlain, 1991). Approximately 90% of the *Penaeus monodon* fry required for pond stocking originate from hatcheries. In 1994, 142 hatcheries were operating in Indonesia.

Although *Penaeus monodon* farms the basic of the largest penaeid aquaculture industry in Indonesia, little is known of it genetics. Some work has been carried out on the hybridization between *P. stylostris* and *P. monodon* (Benzie *et al.*, 1975) and some quantitative genetic data of *P. marguiensis* (Goswani *et al.*, 1986) and *P. monodon* (Sugama *et al.*, 1993) are currently available, but virtually no biochemical genetic research has been done on *P. monodon.*

Recently, electrophoretically - detectable enzyme or protein variants (*biochemical genetic variants* or *genetic variant*) have been used as biochemical genetic markers in biological research. Many workers have shown that enzymes and proteins are useful genetic markers for fisheries biology, aquaculture and breeding studies (Sbordoni *et al.*, 1986; Busack, 1988; Taniguchi and Sugama, 1990; Sugama *et al.*, 1992; Taniguchi *et al.*, 1994). Sbordoni *et al.* (1986) have summarized the importance of detecting genetic variance in *P. japonicus* in hatchery using electrophoretic markers in order to avoid inbreeding. Wohlforth and Hulata (1983) have obtained genetic improvement in tilapia using electrophoretic markers.

The objective of this study is to provide genetic interpretation for the variability patterns of electrophoretically detectable enzymes and proteins of wild stock tiger shrimp, *Penaeus monodon.* The technique will be useful for monitoring the genetic variability and popula-

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