

GENETIC DIVERSITY OF BIGEYE TUNA (*Thunnus obesus*) BASED ON mtDNA ANALYSIS WITH THE PCR-RFLP TECHNIQUE

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ABSTRACT

The genetic diversity study of bigeye tuna in Indonesia from Indian Ocean has never been done. One of the analysis to obtain information on the genetic diversity is by using the PCR-RFLP technique. The objectives of this study were to analyze the genetic diversity and genetic distance within population of bigeye tuna from Indian Ocean, south of Java and Nusa Tenggara based on mitochondrial DNA analysis with the PCR-RFLP technique. The results show that the value of haplotype diversity (genetic diversity) from bigeye tuna population varied between 0.5578-0.8136. The value of haplotype diversity was relatively high compare with marine fish species other fast swimmers such as sharks, indicated that the condition of bigeye tuna population was undisturbed. The average of genetic distance among the sample group was 0.2572. Based on the genetic distance, bigeye tunas Indian Ocean, south of Java, and Nusa Tenggara were divided into two population groups (subpopulations), the first group was bigeye tuna from the sample groups 2, 5, and 1, and the second group was from the sample groups 3 and 4.

KEYWORDS: genetic diversity, bigeye tuna, mitochondrial DNA, PCR-RFLP

INTRODUCTION

Bigeye tuna (*Thunnus obesus*) is one of the Scombrid family members and is one of the most important tuna fishery export commodities of Indonesia's than yellowfin tuna (*Thunnus albacares*) and southern bluefin tuna (*Thunnus maccoyii*). Along with the increasing market demand from year to year, the higher the exploitation of bigeye tuna species, in the Indian Ocean, mainly in the fishing grounds of tuna longline vessels PT. Perikanan Samodra Besar Benoa Bali, has indicated over fishing. During this period over the last decade, the average weight of tuna caught, hook rate and the catch per unit effort tends to decrease (PT. Perikanan Samodra Besar 2006, *in* Kosasih, 2007). Therefore, it needs an appropriate management concept, in the long term to ensure a profitable catches (sustainable yield) but the sustainability of resources (spawning stock) is maintained. This concept will be implemented effectively if the available data on the condition of the bigeye tuna population with a clear definition and accurate.

One method that can be applied to determine the condition of the fish population and its genetic structure with a high degree of accuracy is based on DNA polymorphism, and mitochondrial DNA is believed to be relevant for the study. Other information that can be known are the diversity of genetic, molecular changes in the genome (mutations), and the phylogenetic relationships between populations.

Measurement method based on the genetic diversity of genotypes can be done by DNA analysis. DNA analysis can also be used to measure the kinship between species, population, taxonomic studies, and population genetics (Ryman & Utter, 1987). DNA analysis has several advantages, among others are relatively unaffected by environmental factors and growth factors, more sensitive and more accurate results. DNA analysis can be done by several methods, one of which is the method of Restriction Fragment Length Polymorphism of Mitochondrial DNA.

Research on population genetics, particularly genetic diversity of fish in Indonesia have been implemented, such a is the mahseer fish population (*Tor soro*) originating from North Sumatra Province and West Java Province (Nugroho *et al.*, 2006), red snapper (*Lutjanus malabaricus*) from some fishing grounds on the North Coast of Java and East Java Sea section (Suwarso, 2002) and yellowfin tuna from Bali region, North Maluku, and North Sulawesi (Permana *et al.*, 2007).

The genetics diversity study of bigeye tuna in Indonesia from the Indian Ocean, has never been done. This is the underlying need for the research on the genetic diversity of bigeye tuna. The objectives of this study were to analyze genetic diversity and genetic distance within population of bigeye tuna from the Indian Ocean, south of Java, and Nusa Tenggara.