PCR-RAPD ANALYSIS ON DNA OF MUDSKIPPER SPECIES, *Periophthalmus schlosseri* (Pallas)

IZZATUL SHIMA MD THAHIR

FACULTY OF APPLIED SCIENCE AND TECHNOLOGY
UNIVERSITI PUTRA MALAYSIA
TERENGGANU

1999

PCR-RAPD ANALYSIS ON DNA OF MUDSKIPPER SPECIES, *Periophthalmus schlosseri* (PALLAS)

BY

IZZATUL SHIMA MD THAHIR

This project report is submitted in partial fulfillment of

the requirements for the Degree of

Bachelor of Marine Science

Faculty of Applied Science and Technology

UNIVERSITI PUTRA MALAYSIA TERENGGANU

1999

Dedicated with love, to my parents:
Md Thahir and Siti Juriah,
And siblings:
Mizan, Atul and Iwan

ACKNOWLEDGEMENTS

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

In the name of Allah, The Beneficent, The Merciful.

Alhamdullillah, syukur to Allah the Almighty, for His Guidance, I was able to finish my final year project: PCR-RAPD analysis on DNA of mudskipper, *Periophthalmus schlosseri* (Pallas).

To my supervisor: Prof. Dr. Hj. Lokman Shamsudin, a million thanks for your confidence and advice.

To Prof. Madya Dr. Khatijah, Shoba, Vijay, Chong, Shahreza, Kak Asma and Abang Joe (Biology Lab, UPMT) for all your help and kindness.

My deepest appreciation goes to my family: Abah (Md Thahir Md Ibrahim), Emak (Siti Juriah Abdul Manan), Mizan, Atul and Iwan; for their love, courage and support.

To all my coursemates especially Dek' Ai and Ann; for always been there with me through good and bad times.

To a special person, Zainudin Abdul Wahab; for being my inspirations and mentor.

To all, who coup with me; I thank you very much.

Lastly but not least, to myself: **IZZATUL SHIMA MD THAHIR**; you proved to yourself that you can do it, well done!

ABSTRACT

The main objective of this project is to evaluate the usefulness of RAPD technique to identify and characterize different populations of mudskipper, *Periophthalmus schlosseri* in Malaysia.

Ten single RAPD markers were screened against the mudskipper, *P. schlosseri*. Nine out of ten primers gave positive results. This technique was successful in examining the genetic diversity present in three populations of *P. schlosseri* from Terengganu, Perlis and Penang. Three primers (OPA07, OPA09 and OPA10) were used in the population study. These three RAPD primers detected a total of 16 polymorphic markers.

The RAPD analysis revealed high genetic diversity in the Perlis population and a low genetic variability in the Terengganu population. In addition, small genetic distance among the Perlis and Penang populations was detected. Based on the position of each population in the dendogram, the Terengganu population, (located in the east coast of Peninsular Malaysia) is shown to clustered by itself, thus isolated from the rest of the populations which were located in the west coast of Peninsular Malaysia.

The RAPD technique is useful in rapid screening of a large number of genotypes since it is cheaper and less time is required for template DNA preparation.

The result of this study revealed that RAPD analysis, if carried carefully, give good indication of the separation between individuals of different populations. As such it is suitable for identification of closely related genotypes.

ABSTRAK

Tujuan kajian ini dijalankan adalah untuk menilai kegunaan teknik RAPD untuk pengecaman dan pengenalpastian populasi-populasi ikan belacak, *Periophthalmus schlosseri* di Malaysia.

Sepuluh primer tunggal RAPD telah digunakan ke atas 30 ekor ikan belacak, *P. schlosseri.* Sembilan primer daripada sepuluh primer RAPD tersebut memberikan keputusan yang positif. Tiga primer iaitu OPA07, OPA09 dan OPA10 telah digunakan untuk kajian populasi. Teknik RAPD ini juga telah berjaya digunakan untuk mengkaji kepelbagaian gen dalam tiga populasi *P. schlosseri* dari Terengganu, Perlis dan Pulau Pinang.

Tiga primer tersebut berjaya mengesan sejumlah 16 penanda polimorfik. Teknik RAPD ini telah menunjukan kepelbagaian gen yang tinggi pada populasi Perlis dan variasi gen yang rendah dalam populasi Terengganu. Malah teknik ini juga memberikan nilai jarak genetik yang kecil antara populasi Perlis dan Pulau Pinang. Berdasarkan pada kedudukan populasi di dalam rajah dendogram, populasi dari Terengganu (terletak di sebelah pantai timur Semenanjung Malaysia), terasing daripada populasi lain yang terletak di pantai barat Semenanjung Malaysia.

Pada keseluruhannya, teknik RAPD adalah berfaedah dalam mengenalpasti sekumpulan genotip kerana ia lebih murah dan menjimatkan masa dalam penyediaan templat DNA.

Daripada kajian ini, didapati bahawa analisis RAPD jika dijalankan dengan teliti dapat memberikan keputusan yang baik dalam pengecaman dan mengenalpasti sampel daripada populasi yang berlainan. Ia juga sesuai untuk kajian yang melibatkan pengecaman genotip yang hampir serupa.