

AGE, GROWTH AND REPRODUCTIVE
BIOLOGY OF INDIAN MACKEREL
Rastrelliger kanagurta (Cuvier, 1817) OFF THE
WESTERN WATERS OF ACEH

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MASTER OF SCIENCE
UNIVERSITI MALAYSIA TERENGGANU

2015

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**Thesis Submitted in Fulfillment of the Requirement
for the Degree of Master of Science in the School of
Fisheries and Aquaculture Sciences
Universiti Malaysia Terengganu**

May 2015

DEDICATION

This thesis is dedicated to my parents, Mama (Nurhasanah binti Usman) and Papa (Baddarul Zaman bin Idris Nyak Gam), and also to my wife, Yofa Safriani Adnan and my son, Nabil Musyaffa.

ABSTRACT

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfillment of the requirement for the degree of Master of Science

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School : Fisheries and Aquaculture Sciences

A study of Age, Growth and Reproductive Biology of Indian Mackerel *Rastrelliger kanagurta* (Cuvier, 1817) Off The Western Waters of Aceh, Indonesia was carried out from January to December 2013 at Ujong Baroh fishing port. A total of 1343 Indian mackerels (mainly from fishing vessel that used danish seine) were collected randomly twice a month. This study was conducted not only to determine the growth and age parameters using length frequency data, but also to investigate the biological aspects of the indian mackerel species, i.e. length-weight relationship, condition factor, sex ratio, gonad maturity stages, gonadosomatic index (GSI), length at first maturity and fecundity.

Asymptotic length (L_{∞}) and growth coefficient (K) and t_0 were estimated at 27.3 cm (TL) 0.56 y^{-1} and - 0.526 y respectively. The allometric coefficients (b) in the present study were between 2.625 and 3.449 with coefficient of determination (R^2) values that range between 0.612 and 0.984. The condition factor (K) ranged from 0.9176-1.4509. The sex ratio of male to female was 1 : 1.02. Overall the sex ratio

were not differed significantly ($\chi^2 = 26.757$; $df = 11$; $p < 0.05$). The data suggested that there are two spawning seasons, the first is from January to March and the second is from August to October. The monthly mean GSI values ranged from 0.32 to 3.37. The observation of length at first maturity of female was estimated as 19.58 cm (TL). The fecundity of *R. kanagurta* varied from 28,542-123,760 with an average of 56,635 eggs.

Legal minimum size must apply for fisheries management, in which it is suggested that the appropriate size of the catch must be above of 19.87 cm (TL) to sustain the Indian mackerel fisheries over time. Further research needs to be done, such as histological analysis of the gonads and comprehensive parameters of the population dynamics. Result of this study may help to provide some useful information for sustainability of Indian mackerel fisheries.

ABSTRAK

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk ijazah Master Sains

UMUR, TUMBESARAN DAN BIOLOGI PEMBIAKAN IKAN KEMBUNG *Rastrelliger kanagurta* (Cuvier, 1817) DI PERAIRAN PANTAI BARAT ACEH

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Satu kajian umur, tumbesaran dan biologi pembiakan ikan kembung, *Rastrelliger kanagurta* (Cuvier, 1817) di perairan pantai barat Aceh telah dijalankan dari Januari hingga Disember 2013 di Pelabuhan Pendaratan Ikan Ujong Baroh. Sebanyak 1343 ikan kembung (terutamanya daripada kapal penangkap ikan yang menggunakan pukot payang) telah dikumpulkan secara rawak dua kali sebulan. Kajian ini dijalankan bukan sahaja untuk menentukan parameter tumbesaran dan umur menggunakan analisa data kekerapan-panjang, tetapi juga untuk mendapatkan aspek-aspek biologi ikan kembung seperti hubungan panjang-berat, faktor kondisi, nisbah jantina, tahap kematangan gonad, indeks gonadosomatik (GSI), panjang pada mula matang dan fekunditi.

Panjang asimptot (L_{∞}) dan pekali tumbesaran (K) dan t_0 didapati masing-masing bernilai 27.3 cm 0.56 y^{-1} dan -0,526 y. Pekali hubungan alometrik (b) dalam kajian ini antara 2,625 dan 3,449. Faktor kondisi (K) antara 0,9176 dan 1,4509. Nisbah jantina yang diamati adalah 1 : 1.02. Keseluruhan nisbah jantina tidak menunjukkan perbezaan secara signifikan ($\chi^2 = 26.757$; $df = 11$; $p < 0.05$). Data menunjukkan

bahawa terdapat dua musim perlepasan telur, yang pertama adalah dari Januari hingga Mac dan yang kedua dari Ogos hingga Oktober. Nilai purata GSI bulanan adalah di antara 0,32-3,37. Pengamatan panjang pada mula matang telah dianggarkan pada saiz 19.58 cm (TL). Fekunditi *R. kanagurta* berubah dari 28,542-123,760 dengan purata 56,635 telur.

Peraturan saiz minimum perlu diterapkan untuk pengurusan perikanan, di mana disarankan bahawa saiz ikan yang boleh ditangkap mestilah di atas 19.87 cm (TL), untuk mengekalkan perikanan ikan kembung masa ke masa. Kajian lebih lanjut perlu dijalankan, seperti analisis histologi gonad dan parameter dinamik populasi yang komprehensif. Hasil kajian ini boleh membantu untuk menyediakan beberapa maklumat yang berguna untuk kemampanan perikanan ikan kembung.