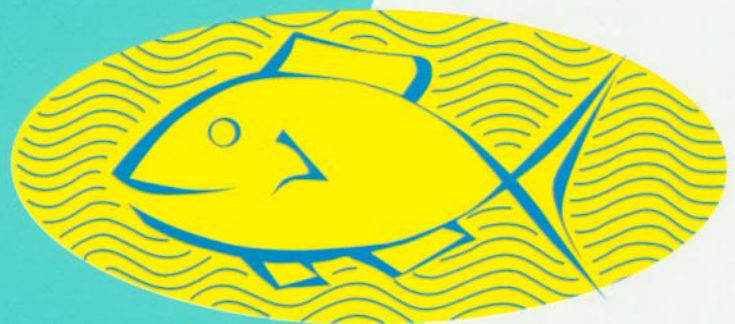


ISSN 0853 - 8980

# INDONESIAN FISHERIES RESEARCH JOURNAL



**AGENCY FOR MARINE AND FISHERIES RESEARCH  
MINISTRY OF MARINE AFFAIRS AND FISHERIES**

Ind. Fish Res. J.	Vol. 21	No. 2	Page 61 - 128	December 2015	ISSN 0853-8980
-------------------	---------	-------	---------------	------------------	-------------------

ISSN 0853–8980

## INDONESIAN FISHERIES RESEARCH JOURNAL

---

---

Volume 21 Number 2 December 2015  
Acreditation Number: 704/AU3/P2MI-LIPI/10/2015  
(Period: October 2015-October 2018)

Indonesian Fisheries Research Journal is the English version of fisheries research journal. The first edition was published in 1994 with once a year in 1994. Since 2005, this journal has been published twice a year on JUNE and DECEMBER.

### Head of Editor Board:

Prof. Dr. Ir. Ngurah Nyoman Wiadnyana, DEA (Fisheries Ecology-Center for Fisheries Research and Development)

### Members of Editor Board:

Prof. Dr. Ir. Hari Eko Irianto (Fisheries Technology-Center for Fisheries Research and Development)  
Prof. Dr. Ir. Gadis Sri Haryani (Limnology-Limnology Reseach Center)  
Prof. Dr. Ir. Husnah, M. Phil (Toxicology-Center for Fisheries Research and Development)  
Prof. Dr. Ir. M.F. Rahardjo, DEA (Fisheries Ecology-Bogor Agricultural Institute)  
Dr. Mochammad Riyanto, M.Sc (Fishing Technology-Bogor Agricultural Institute)

### Referees for this Number:

Prof. Dr. Ir. Endi Setiadi Kartamihardja, M.Sc. (Institute for Fisheries Enhancement and Conservation)  
Ir. Duto Nugroho, M.Si (Center for Fisheries Research and Development)  
Dr. Ir. Rudhy Gustiano, M.Sc (Institute for Freshwater Research and Development)

### Language Editor:

Lilis Sadiyah, Ph.D (Center for Fisheries Research and Development)

### Managing Editors:

Dra. Endang Sriyati  
Amalia Setiasari, A.Md

### Graphic Design:

Ofan Bosman, S.Pi

### Published by:

Agency for Marine and Fisheries Research and Development

### Manuscript send to the publisher:

Indonesian Fisheries Research Journal  
Center for Fisheries Research and Development  
Gedung Balitbang KP II, Jl. Pasir Putih II Ancol Timur Jakarta 14430 Indonesia  
Phone: (021) 64700928, Fax: (021) 64700929  
Website : <http://p4ksi.litbang.kkp.go.id.>, Email: [drprpt2009@gmail.com](mailto:drprpt2009@gmail.com).

Indonesian Fisheries Research Journal is printed by Center for Fisheries Research and Development Budgeting F.Y. 2015.

## PREFACE

Indonesian Fisheries Research Journal Volume 21 Number 2 December 2015 is the second publication of English journal of the Research Center for Fisheries Management and Conservation in 2015. The journal is expected to be a source of newest science and technology for all scientists and researchers in Indonesia and other countries. The financial for publication is provided by the Research Center for Fisheries Management and Conservation budget in the fiscal year of 2015.

This volume contains: Genetic Variation of *Tor tambroides* Bleeker, 1854 Along Batang Tarusan River, West Sumatera: Implications for Stock Identification; Determining Monofilament Gillnet Optimum Mesh Size To Mitigate *Amphilophus citrinellus* Population Outbreaks in Ir.H.Djuanda Reservoir; Effects of Dipole Mode and El-Nino Events on Catches of Yellowfin Tuna (*Thunnus albacares*) in the Eastern Indian Ocean Off West Java; Some Biological Aspects of Scalloped Hammerhead Sharks (*Sphyrna lewini* Griffith & Smith, 1834) Caught From Coastal Fisheries in the Eastern Indian Ocean; Dynamics of Gears, Fleets, Catch and Fishing Season of Small-Scale Tuna Fisheries in Labuhan Lombok, West Nusa Tenggara; Population Structure and Bioreproduction of Bigeye Tuna (*Thunnus obesus*) in Western Part of Sumatera and Southern Part of Java and Nusa Tenggara, Indian Ocean; Utility of Fishery High School Data in Examining Spatial and Temporal Catch and Effort Trends in the Indonesian Longline Tuna Fishery.

We hope that all the articles on this volume may contribute significantly to the development of fishery science and technology in Indonesia. We are grateful to the editorial board for their improvement and suggestion on reviews of the manuscripts.

Editor

**INDONESIAN FISHERIES RESEARCH JOURNAL**  
**Volume 21 Number 2 December 2015**

**CONTENS**

	Page
PREFACE .....	i
CONTENTS .....	iii
ABSTRACT.....	v-vii
Genetic Variation of <i>Tor tambroides</i> Bleeker, 1854 Along Batang Tarusan River, West Sumatera: Implications for Stock Identification <i>By: Arif Wibowo and Siswanta Kaban.....</i>	61-66
Determining Monofilament Gillnet Optimum Mesh Size To Mitigate <i>Amphilophus citrinellus</i> Population Outbreaks in Ir.H.Djuanda Reservoir <i>By: Prawira A.R.P. Tampubolon, Imanda Hikmat Pradana and Andri Warsa.....</i>	67-74
Effects of Dipole Mode and El-Nino Events on Catches of Yellowfin Tuna ( <i>Thunnus albacares</i> ) in the Eastern Indian Ocean Off West Java <i>By: Khairul Amri, Ali Suman, Hari Eko Irianto and Wudianto.....</i>	75-90
Some Biological Aspects of Scalloped Hammerhead Sharks ( <i>Sphyrna lewini</i> Griffith & Smith, 1834) Caught From Coastal Fisheries in the Eastern Indian Ocean <i>By: Umi Chodriyah and Bram Setyadji.....</i>	91-97
Dynamics of Gears, Fleets, Catch and Fishing Season of Small-Scale Tuna Fisheries in Labuhan Lombok, West Nusa Tenggara <i>By: Bram Setyadji and Budi Nugraha.....</i>	99-107
Population Structure and Bioreproduction of Bigeye Tuna ( <i>Thunnus obesus</i> ) in Western Part of Sumatera and Southern Part of Java and Nusa Tenggara, Indian Ocean <i>By: Ali Suman, Hari Eko Irianto, Khairul Amri, Budi Nugraha and Gatut Bintoro.....</i>	109-116
Utility of Fishery High School Data in Examining Spatial and Temporal Catch and Effort Trends in the Indonesian Longline Tuna Fishery <i>By: Lilis Sadiyah, Natalie Dowling, Budi Iskandar Prisantoso, Retno Andamari and Craig Proctor.....</i>	117-128
<b>AUTHOR INDEX.....</b>	<b>129A</b>

**INDONESIAN FISHERIES RESEARCH JOURNAL**  
**Volume 21 Number 2 December 2015**

**ABSTRACT**

**GENETIC VARIATION OF *Tor tambroides* Bleeker, 1854 ALONG BATANG TARUSAN RIVER, WEST SUMATERA: IMPLICATIONS FOR STOCK IDENTIFICATION**

Arif Wibowo  
*IFRJ, Vol. 21 No.2, Page: 61-66*

**ABSTRACT**

Mahseer (*Tor tambroides*, Bleeker, 1854) is an important consumption fish species in the Batang Tarusan River, located in the West Sumatera, Indonesia. In this study the CO1 of mtDNA sequence data were used to investigate genetic variability within and between populations of mahseer. Twenty four tissue samples were collected for genetic analysis in the Batang Tarusan River. Genetic analysis revealed two different haplotypes were existed. The overall nucleotide and haplotype variability were low in all sampling sites. Hierarchical AMOVA analysis showed that mahseer populations form a single panmictic population with low  $F_{ST} = 0.02794$ ;  $p = 0.418$  and high gene flow among population sampling. Corroborated result by genetic analysis; there is a strong argument suggesting that the populations could be treated as a single stock unit.

**KEYWORDS:** *Tor tambroides*, mitochondrial DNA CO1, stock, Batang Tarusan River

**DETERMINING MONOFILAMENT GILLNET OPTIMUM MESH SIZE TO MITIGATE *Amphilophus citrinellus* POPULATION OUTBREAKS IN IR.H.DJUANDA RESERVOIR**

Prawira A.R.P. Tampubolon  
*IFRJ, Vol. 21 No.2, Page: 67-74*

**ABSTRACT**

Gillnet is the most common fishing gear used by fishers in Ir. H. Djuanda Reservoir. Currently, gillnet catches are dominated by midas cichlid (*Amphilophus citrinellus*) which is not the main target catch. To some extent, their presence is even considered intrusive by the fishers. The aim of this study is to reveal the optimum gillnet mesh size in catching this alien species, which in turn can be useful to control the fish population in Ir. H. Djuanda Reservoir. The study was conducted from August 2011 to January 2012. The mesh size of the gillnets were 1, 1.5, 2, 2.5, 3, and 3.5 inches. The total

midas cichlid caught were 628 fish which were mostly caught in 1.5 inches sized gillnet. Length first mature fish is 13.31 cm. The optimum size of fish caught in the mesh of 1.5, 2, 2.5, 3, and 3.5 inches are 9.7, 12.9, 16.2, 19.4, and 22.6 cm, respectively.

**KEYWORDS:** Selectivity, gillnet, midas cichlid, Ir. H. Djuanda Reservoir

**EFFECTS OF DIPOLE MODE AND EL-NINO EVENTS ON CATCHES OF YELLOWFIN TUNA (*Thunnus albacares*) IN THE EASTERN INDIAN OCEAN OFF WEST JAVA**

Khairul Amri  
*IFRJ, Vol. 21 No.2, Page: 75-90*

**ABSTRACT**

The effects of Indian Ocean Dipole Mode and El Niño–Southern Oscillation events on catches of Yellowfin Tuna (*Thunnus albacares*) in the Eastern Indian Ocean (EIO) off Java were evaluated through the use of remotely sensed environmental data (sea surface temperature/SST and chlorophyll-a concentration/SSC) and Yellowfin Tuna catch data. Analyses were conducted for the period of 2003–2012, which included the strong positive dipole mode event in association with weak El-Niño 2006. Yellowfin Tuna catch data were taken from Palabuhanratu landing place and remotely sensed environmental data were taken from MODIS-Aqua sensor. Results show that regional climate anomaly Indian Ocean Dipole Mode influenced Yellowfin Tuna catch and its composition. The catches per unit effort (CPUE) of *Thunnus albacares* in the strong positive dipole mode event in 2006 and weak El-Niño events in 2011 and 2012 was higher. The increase pattern of CPUE followed the upwelling process, started from May-June achieved the peak between September and October. Very high increase in CPUE when strong positive dipole mode event (2006) and a weak El-Niño events (2011 and 2012) had a relation with the increase in the distribution of chlorophyll-a indicating an increase in the abundance of phytoplankton (primary productivity) due to upwelling. In contrast, yellowfin tuna CPUE is very low at the La-Niña event (2005), though as the dominant catch when compared to others.

**KEYWORDS:** Indian Ocean Dipole Mode, Yellowfin Tuna, Eastern Indian Ocean off west Java



## **SOME BIOLOGICAL ASPECTS OF SCALLOPED HAMMERHEAD SHARKS (*Sphyrna lewini* Griffith & Smith, 1834) CAUGHT FROM COASTAL FISHERIES IN THE EASTERN INDIAN OCEAN**

Umi Chodrijah  
*IFRJ, Vol. 21 No.2, Page: 91-97*

### **ABSTRACT**

Indonesia has the largest chondrichthyan fishery in the world, with a reported of 105,000 and 118,000 tonnes landed in 2002 and 2003 respectively. Scalloped hammerhead shark was either targeted or by-catch from this fishery, mostly for its fins. Despite of the growing concern around the world, the availability of biological data of this species, especially in the Eastern Indian Ocean is still lacking. The objectives of this paper are to present some biological information (size composition and sex ratio) of the scalloped hammerhead, from coastal fisheries in Eastern Indian Ocean. The data used for the analysis comprised of two components, i.e. survey data in 2010 (February, March, June, August, October and December) and data from daily monitoring shark landing in 2013 (January to December). Substantially lower mean size, more immature sharks and more frequent of female caught over years showed that scalloped hammerhead shark in the Eastern Indian Ocean are facing intensive fishing pressure which could lead to overfishing. This could harm the sustainability of scalloped hammerhead shark resource in the long run. The relationship between clasper length and total length was positively correlated where every 5 cmTL increment on clasper length adding 51 cmTL on total length.

**KEYWORDS:** Scalloped hammerhead shark, sex ratio, clasper length, eastern Indian Ocean

## **DYNAMICS OF GEARS, FLEETS, CATCH AND FISHING SEASON OF SMALL-SCALE TUNA FISHERIES IN LABUHAN LOMBOK, WEST NUSA TENGGARA**

Bram Setyadji  
*IFRJ, Vol. 21 No.2, Page: 99-107*

### **ABSTRACT**

In Indonesia, about 80% of fishing activities are small-scale and play major role both economically and socially. Previous studies mostly concentrated in Java, while in eastern part of Indonesia the information still scarce and limited. The study was conducted from January to December 2013, describes in detail the gears, fleets and catch dynamics of the small-scale tuna

fisheries operating based in Labuhan Lombok Coastal Fishing Port (PPP. Labuhan Lombok). Small-scale tuna fishery in Labuhan Lombok are characterized by the small boats less than 10 GT, operating both troll line and hand line simultaneously, targeting large tuna, skipjack tuna and small tuna. Fishing season starts from April to August and influence by southwest monsoon wind and the presence of middleman as the connector between fishers and the market are the main character of the small-scale fisheries business in this area.

**KEYWORDS:** Small-scale tuna fisheries, fishing gears, fishing season, Labuhan Lombok

## **POPULATION STRUCTURE AND BIOREPRODUCTION OF BIGEYE TUNA (*Thunnus obesus*) IN WESTERN PART OF SUMATERA AND SOUTHERN PART OF JAVA AND NUSA TENGGARA, INDIAN OCEAN**

Ali Suman  
*IFRJ, Vol. 21 No.2, Page: 109-116*

### **ABSTRACT**

Bigeye tuna is an important fish resource in the Indian Ocean. This species like other tuna species needs to be managed properly in both national and international levels. Therefore some data and information on population structure and bioreproduction are required for management purpose. The current research was conducted to identify the population structure and bioreproduction of bigeye tuna (*Thunnus obesus*) in west off Sumatera and south off Java and Nusa Tenggara of Indian Ocean where tuna fishing spots are important. This research was based on catch landed by fishermen from the Indian Ocean during 2010. Analysis of population structure was done using DNA genetic analyses and bioreproduction by using histology technique. Results show that the population structure of the bigeye tuna in the Indian Ocean consisted of two different sub populations namely sub population of west off Sumatra and sub population of south of Java and Nusa Tenggara waters. Most of catch (about 39%) was categorized as immature fish (GI I). The immature fish was mostly found in west off Sumatera waters, meanwhile the catch in south off Java and Nusa Tenggara waters was mostly categorized as mature fish. This result may indicate that south off Java and Nusa Tenggara waters is a spawning ground of the bigeye tuna.

**KEYWORDS:** Histology, genetic, population structure, bigeye tuna, Indian Ocean

## UTILITY OF FISHERY HIGH SCHOOL DATA IN EXAMINING SPATIAL AND TEMPORAL CATCH AND EFFORT TRENDS IN THE INDONESIAN LONGLINE TUNA FISHERY

Lilis Sadiyah

*IFRJ, Vol. 21 No.2, Page: 117-128*

### ABSTRACT

One of the endeavours to address the shortage of catch per unit effort (CPUE) information from the Indonesian Indian Ocean tuna fishery is the collation of a large amount of catch and effort data collected by Indonesian Fisheries High School students ("FHS data"). This paper attempts to investigate spatial-temporal patterns of catch and effort of the FHS data for the main tuna species caught by the fishery: bigeye tuna (*Thunnus obesus* - BET), yellowfin tuna (*T. albacares* - YFT), albacore (*T. alalunga* - ALB) and southern bluefin tuna (*T. maccoyii* - SBT). Reported sets occurred in the Eastern Indian Ocean, north and south of 20°S. Recorded effort

from the FHS data set was concentrated within the only known SBT spawning ground. However, within this data set, SBT were recorded in the lowest catch proportion relative to BET, YFT and ALB. The catch composition data suggested that YFT and ALB were predominantly targeted by the fishery, with ALB and SBT most predominantly recorded south of 20°S, whereas BET and YFT were mostly recorded north of 20°S. Unfortunately, there was no strong information on targeting practices reported by this data set, limiting any attempts to understand the factors that influenced those results. As the sampling predominantly occurred in between July and December, the data are not representative of fishing activities throughout the entire year, and any seasonal patterns from the FHS data set are biased. In addition, the FHS data set is prone to observation error and uncertainty in terms of fish identification and fishing location. Therefore, the FHS data set needs to be interpreted with caution.

**KEYWORDS:** Indonesian Fisheries High School Students Data, longline, Indian Ocean