



**The 7th Meeting of Regional Scientific and Technical Committee
For the SEAFDEC/UNEP/GEF Project on Establishment and Operation of
a Regional System of Fisheries *Refugia* in the South China Sea and the Gulf of Thailand**

8-10 November 2022

Grand Mercure Harmoni-Jakarta, Indonesia

**STATUS OF THE REGIONAL TRAINING PROGRAMS
ON FISH LARVAE IDENTIFICATION**

Larvae of marine fishes termed ichthyoplankton usually are pelagic, drifting in the sea and interacting with pelagic predators and planktonic prey. Most fish larvae, even species that ultimately are herbivores as juveniles or adults, are primarily carnivorous during the larval stage, feeding smaller planktonic organisms. In turn, larval fishes prey on larger nektonic and planktonic organisms. Escape from the precarious larval stage is accomplished via growth and ontogeny. Only a few individuals from thousands of newly hatched larvae survive the ever-present threats of starvation and predation during planktonic life. Surveys at sea generally estimate distributions, abundance, diversity, and structure of 'ichthyoplankton' communities, including associations of larvae with their predators and prey. Such surveys sometimes are a component of stock assessments used in fisheries management. Furthermore, many developed countries have long used ichthyoplankton data in stock identification to indicate spawning locations and times and as an index of spawning stock biomass (Heath, 1993; Richardson et al., 2010).

In Southeast Asia, early life stages in stock identification studies have been regionally conducted in the South China Sea (SCS) and the Gulf of Thailand (GoT) by the Southeast Asian Fisheries Development Center (SEAFDEC) in collaboration with member countries since 1997 by M.V. SEAFDEC and since 2004 by M.V. SEAFDEC 2. At the Regional Training Program on larval fish identification held in 2007, 2008, and 2016 supported by the GEF/UNEP project on "Reversing Environment Degradation Trends in the SCS and GoT," some larval fish samples from the survey have been identified. Later a team of ichthyologists and fisheries biologists led by Dr. Yoshinobu Konishi reanalyzed the findings from training and published a Larval Fish Identification Guide for the South China Sea and the Gulf of Thailand in 2008 and Scombridae Larvae Identification Guide for Southeast Asian Countries in 2022.

The SEAFDEC/UNEP/GEF project entitled "Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and the Gulf of Thailand" has been developed and implemented since 2016. The overall objective of the fisheries refugia (FR) initiative project is to improve the understanding and management of the links between fish stocks and critical fisheries habitats. The project focuses on sustainable use by implementing the fisheries refugia concept as "Spatially and geographically defined, marine or coastal areas in which specific management measures are applied to sustain important species during critical stages of their life-cycle." To achieve the project target objectives, identifying fisheries refugia sites, including the samplings and species identified for fish eggs and larvae, is one of the essential activities. In addition, the results from larval fish identification would further support the local knowledge to develop a critical science-based management policy for sustainable management of fisheries refugia.

Nevertheless, knowledge and human resources on ichthyoplankton studies, particularly larval fish identification, are limited in many countries implementing the FR project. Many fish eggs and larvae were identified at family and genus levels, not at the species level. Considering the long-term sustainable management of fisheries, capacity building on larval fish identification and early life history science is also critically needed. In association with the above circumstance, the Regional Scientific and Technical Committee, at its third meeting (RSTC3) held in Hai Phong, Viet Nam, in 2020, requested the Project

Coordination Unit (PCU) to arrange another regional training course on larval fish identification. Accordingly, the PCU, with the support from the Research and Development Division (RDD) of the SEAFDEC Training Department, proposes conducting the Regional Training Course on Larval Identification and Fish Early Life History Science before the fisheries refugia project's termination by the end of 2022. The Regional Training Course is scheduled on 16–27 November 2022 at SEAFDEC/Training Department, Samut Prakan, Thailand. The training focuses on six (6) fish groups related to the fisheries refugia target species, namely Scombridae, Carangidae, Engraulidae, Lutjanidae, Siganidae, and Serranidae. The training course includes sharing experience on a country plan/strategy for fisheries resources survey and fish stock identification, including scientific-based management to protect the critical stages of the fish life cycle. It is expected that the outcomes from this training courses are: 1) improved understanding of fish early life history science and skill in larval fish identification for further application for managing the fish stock at national and sub-regional levels; 2) Regional cooperation on fish stock identification and management strengthened through communication networking; and 3) built awareness of the importance of the early life history science study for fish stock identification and management for long-term sustainable fisheries management. The expected outputs from this activity are: a networking of scientists on larval fish identification and early life history science in the Southeast Asian Region; reports and training materials are published and shared online; and photographs and illustrations of morphological characteristics of the marine fish larvae are compiled and published online.

List of Resources Persons and Technical/Administrative support are as follows:

Resource Persons	Position/Institution
1) Dr. Yoshinobu KONISHI	Former staff of the Seikai National Fisheries Research Institute, Japan
2) Mr. Rangsan CHAYAKUL	Former staff of the Department of Fisheries, Thailand
3) Dr. Teerapong DUANGDEE	Lecturer, Kasetsart University, Thailand
4) Dr. Keita KOEDA	Lecturer, University of the Ryukyus, Japan
5) Dr. Cecilia CHU	Researcher, University of Nottingham Malaysia
Technical and Administrative Support	SEAFDEC/TD
1) Mr. Sukchai ARNUPAPBOON	Fisheries Oceanographer, Head of Research and Development Division (RDD)
2) Ms. Siriporn PANGSORN	Fishing Ground Information scientist, RDD
3) Ms. Nathacha CHANGPHETPHOL	Fishery Oceanographer, RDD
4) Ms. Nathacha SORNVAREE	Administrative Officer, RDD
5) Ms. Nujasa SOMJIT	Finance Officer, Refugia PCU
6) Ms. Nuttaya PHAISANTAWECHOK	Technical/Admin Officer, Refugia PCU

TRAINING PROGRAM		
Date/Time	Training Activity/Topic	Responsibility
15 Nov. 22 – Tuesday		
	Participants arrive at SEAFDEC Training Department, Samut Prakan, Thailand	SEAFDEC Personnel
16 Nov. 22 – Wednesday		
0830–0900	Registration	All Participants
0900–0920	Opening ceremony & group photo	SEAFDEC/TD FR/PCU
0920–0940	Brief on schedule and anticipated outputs	SEAFDEC Personnel
0940–1000	Coffee break	SEAFDEC Personnel
1000–1200	Country report on the research plan for fisheries resources survey and study on fish stock identification (15 minutes for each country)	Country Representative (10 Countries)
1200–1330	Lunch break	SEAFDEC Personnel
1330–1430	Keynote Address: Early life history studies of the subtropical marine fishes in Okinawa, Japan (via Online)	Dr. Keita KOEDA
1430–1450	Coffee break	SEAFDEC Personnel
1450–1600	Lecture: Utilization of DNA barcodes for the identification of tropical larval fishes in Klang Strait, Straits of Malacca	Dr. Cecilia CHU
1600–1700	Practical: DNA barcode collecting and preserving technique	Dr. Cecilia CHU
17 Nov. 22 – Thursday		
0900–1000	Lecture: Review of morphological development of larval fish characters	Dr. Yoshinobu KONISHI
1000–1020	Coffee break	SEAFDEC Personnel
1020–1200	Lecture: Identification methods of the Scombridae larvae and juveniles in the Southeast Asian region	Dr. Yoshinobu KONISHI
1200–1330	Lunch break	SEAFDEC Personnel
1330–1500	Practice: Species identification and morphological description of the Scombridae larvae and juveniles (1)	Instructor Team Dr. Yoshinobu KONISHI, Mr. Rangsan CHAYAKUL Dr. Teerapong DUANGDEE
1500–1520	Coffee break	SEAFDEC Personnel
1520–1700	Continued Practice: Species identification and morphological description of the Scombridae larvae and juveniles (1)	Instructor Team
18 Nov. 22 – Friday		
0900–1000	Practice: Species identification and morphological description of the Scombridae larvae and juveniles (2)	Instructor Team
1000–1020	Coffee break	SEAFDEC Personnel
1020–1200	Continued Practice: Species identification and morphological description of the Scombridae larvae and juveniles (2)	Instructor Team
1200–1330	Lunch break	SEAFDEC Personnel
1330–1500	Practice: Species identification and morphological description of the Scombridae larvae and juveniles (3)	Instructor Team
1500–1520	Coffee break	SEAFDEC Personnel

1520–1700	Continued Practice: Species identification and morphological description of the Scombridae larvae and juveniles (3)	Instructor Team
19 Nov. 22 – Saturday		
0900–1000	Lecture: Identification methods of the Carangidae larvae in the Southeast Asian region	Dr. Yoshinobu KONISHI
1000–1020	Coffee break	SEAFDEC Personnel
1020–1200	Practice: Species identification and morphological description of the Carangidae larvae (1)	Instructor Team
1200–1330	Lunch break	SEAFDEC Personnel
1330–1500	Practice: Species identification and morphological description of the Carangidae larvae (2)	Instructor Team
1500–1520	Coffee break	SEAFDEC Personnel
1520–1700	Continued Practice: Species identification and morphological description of the Carangidae larvae (2)	Instructor Team
20 Nov. 22 – Sunday		
	Refreshment/Excursion	SEAFDEC Personnel
21 Nov. 22 – Monday		
0900–1000	Practice: Species identification and morphological description of the Carangidae larvae (3)	Instructor Team
1000–1020	Coffee break	SEAFDEC Personnel
1020–1200	Continued Practice: Species identification and morphological description of the Carangidae larvae (3)	Instructor Team
1200–1330	Lunch break	SEAFDEC Personnel
1330–1430	Lecture: Identification methods of the Engraulidae larvae in the Southeast Asian region	Dr. Yoshinobu KONISHI
1430–1500	Practice: Species identification and morphological description of the Engraulidae larvae (1)	Instructor Team
1500–1520	Coffee break	SEAFDEC Personnel
1520–1700	Continued Practice: Species identification and morphological description of the Engraulidae larvae (1)	Instructor Team
22 Nov. 22 – Tuesday		
0900–1000	Practice: Species identification and morphological description of the Engraulidae larvae (2)	Instructor Team
1000–1020	Coffee break	SEAFDEC Personnel
1020–1200	Continued Practice: Species identification and morphological description of the Engraulidae larvae (2)	Instructor Team
1200–1330	Lunch break	SEAFDEC Personnel
1330–1500	Practice: Species identification and morphological description of the Engraulidae larvae (3)	Instructor Team
1500–1520	Coffee break	SEAFDEC Personnel
1520–1700	Continued Practice: Species identification and morphological description of the Engraulidae larvae (3)	Instructor Team
23 Nov. 22 – Wednesday		
0900–1000	Presentation of case study on early life history science based on the references for planning of future working subjects in country	Country Representative (10 Countries)
1000–1020	Coffee break	SEAFDEC Personnel

1020–1200	Continued Presentation of case study on early life history science based on the references for planning of future working subjects in country	Country Representative (10 Countries)
1200–1330	Lunch break	SEAFDEC Personnel
1330–1430	Lecture: Identification methods of the Lutjanidae, Siganidae and serranid Epinephelinae larvae in the Southeast Asian region	Dr. Yoshinobu KONISHI
1430–1500	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinephelinae larvae (1)	Instructor Team
1500–1520	Coffee break	SEAFDEC Personnel
1520–1700	Continued Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinephelinae larvae (1)	Instructor Team
24 Nov. 22 – Thursday		
0900–1000	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinephelinae larvae (2)	Instructor Team
1000–1020	Coffee break	SEAFDEC Personnel
1020–1200	Continued Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinephelinae larvae (2)	Instructor Team
1200–1330	Lunch break	SEAFDEC Personnel
1330–1500	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinephelinae larvae (3)	Instructor Team
1500–1520	Coffee break	SEAFDEC Personnel
1520–1700	Continued Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinephelinae larvae (3)	Instructor Team
25 Nov. 22 – Friday		
0900–1000	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinephelinae larvae (4)	Instructor Team
1000–1020	Coffee break	SEAFDEC Personnel
1020–1200	Continued Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinephelinae larvae (4)	Instructor Team
1200–1330	Lunch break	SEAFDEC Personnel
1330–1500	Preparation of presentation on species identification and morphological descriptions of examined larvae and juveniles, and on future working subjects to be planned	Country Representative (10 Countries)
1500–1520	Coffee break	SEAFDEC Personnel
1520–1700	Continued Preparation of presentation on species identification and morphological descriptions of examined larvae and juveniles, and on future working subjects to be planned	Country Representative (10 Countries)
26 Nov. 22 – Saturday		
0900–1000	Presentation on results of species identification and morphological descriptions of examined larvae and juveniles, and on future working subjects to be planned	Country Representative (10 Countries)
1000–1020	Coffee break	SEAFDEC Personnel
1020–1200	Continued Presentation on results of species identification and morphological descriptions of examined larvae and juveniles, and on future working subjects to be planned	Country Representative (10 Countries)
1200–1330	Lunch break	SEAFDEC Personnel

1330–1430	Training course evaluation	FR/PCU
1430–1500	Closing Ceremony for Phase I	FR/PCU SEAFDEC/TD
	Free	
1700–2200	Farewell Dinner	
27 Nov. 22 – Sunday		
	Refreshment/Excursion	SEAFDEC Personnel