Chapter 6

Fish diversity studies in the JSPS Coastal Marine Science Program (Project-3: Fish Group)

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Introduction

The JSPS Core University Program on Coastal Marine Science (CMS) started in April 2001 under the leadership of the Atmosphere and Ocean Research Institute (formerly the Ocean Research Institute) of the University of Tokyo and will be completed in March 2011 (FY 2010). The project team comprises more than 300 marine scientists from six countries: Indonesia, Japan, Malaysia, Philippines, Thailand, and Vietnam. Marine biodiversity research is one of four components of the Program (Project-3 in the CMS). The research team of Project 3 is composed of 96 marine biologists and is divided into four groups: fishes, benthos, plankton, and sea algae/sea grasses. The research group on fishes includes 12 ichthyologists: two from Indonesia, five from Japan, two from Malaysia, one from Thailand and two from Vietnam (Table 1, Appendix-1).

The study area includes the Indo-Malayan Archipelago, which has long been known as the region of the highest marine fish diversity having about 3000 shore-fish species (Carpenter and Springer 2005). The members of the fish group have been making efforts to clarify fish diversity in the seas in Southeast Asia and Japan. Our research outputs are compiled here and these demonstrate the scientific accomplishments by the fish group. We also have been trying to build capacity among young fish researchers in Southeast Asia. The result of this activity is shown in Part III of this volume.

Research Plan

The fish group focused on studies on taxonomy, morphology, zoogeography and ecology of fishes. The members of the fish group have been carrying out their own projects individually, placing emphasis on taxonomy, ecology and zoogeography. These individual studies were mainly done using their own funds.

In addition to their individual studies, the fish group collected shallow-water fishes in the participant countries when they held fish taxonomy workshops by the JSPS fund (details about the workshop shown in Part III of this volume). The workshop venues were as follows: Bintan Island in Indonesia, Okinawa in Japan, Port Jackson in Malaysia, Panay Island in...
Table 1. Members of the fish team for the JSPS Coastal Marine Science Program.

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teguh Peristiwadi</td>
<td>Indonesia</td>
<td>Research Centre for Oceanography, Indonesian Institute of Sciences</td>
</tr>
<tr>
<td>Savanti R. Suharti</td>
<td>Indonesia</td>
<td>Research Centre for Oceanography, Indonesian Institute of Sciences</td>
</tr>
<tr>
<td>Hisashi Imamura</td>
<td>Japan</td>
<td>Hokkaido University</td>
</tr>
<tr>
<td>Sesshi Kimura</td>
<td>Japan</td>
<td>Mie University</td>
</tr>
<tr>
<td>Keiichi Matsuura</td>
<td>Japan</td>
<td>National Museum of Nature and Science</td>
</tr>
<tr>
<td>Hitoyoaki Motomura</td>
<td>Japan</td>
<td>Kagoshima University Museum</td>
</tr>
<tr>
<td>Tezuo Yoshino</td>
<td>Japan</td>
<td>University of the Ryukyu</td>
</tr>
<tr>
<td>Aziz Arshad</td>
<td>Malaysia</td>
<td>Universiti Putra Malaysia</td>
</tr>
<tr>
<td>Mazlan Abdul Ghaffar</td>
<td>Malaysia</td>
<td>Universiti Kebangsaan</td>
</tr>
<tr>
<td>Ukkrit Satapoomin</td>
<td>Thailand</td>
<td>Phuket Marine Biological Center</td>
</tr>
<tr>
<td>Bui Dinh Chung</td>
<td>Vietnam</td>
<td>Research Institute for Marine Fisheries</td>
</tr>
<tr>
<td>Nguyen Van Quan</td>
<td>Vietnam</td>
<td>Institute for Marine Environmental Resource</td>
</tr>
</tbody>
</table>

In addition to those studies, a survey of needs assessment in fish diversity studies was done by the members in each member country, which clearly shows that there is a strong need for fish identification guides in Southeast Asia. Because it takes time to produce identification guides for fishes, we did not try to cover the whole area of Southeast Asia but decided to focus on several areas in Southeast Asia: Sulawesi in Indonesia, Andaman Sea in Thailand, and the southern part of the Peninsular Malaysia.

**Results**

**Research papers and new species**

The studies by the members of the fish group resulted in 297 publications (see Appendix-2) with descriptions of 60 new fishes (Table 2). Many of these publications are devoted to clarify taxonomic issues on fishes found in the research area. In addition to taxonomy, ecology, life history and zoogeographic issues are also found in the rest of the publications. The taxonomic papers are highlighted in descriptions of 60 new species that are classified into 36 genera of 25 families. Although most of the new species are shallow-water fishes, there are several deep-sea fishes of the Acropomatidae and Zoarcidae. The list of new fishes shows some bias in species composition due to specialities of the members of the fish group. The list clearly shows that there is a strong need for taxonomic studies on fishes in the region.

**Fish identification guides**

The fish group has been working to publish field guides to fishes in Southeast Asia. Based on the needs assessment for fish diversity studies, it is clear that the fishery scientists in Southeast Asia strongly desire field guides to fishes. As shown above, shallow-water fishes were obtained in the fish taxonomy workshops held in the participant countries. Based on these materials and the museum collections the series of the field guides was produced under the leadership of the Japanese ichthyologists. We have already published three field guides (Fig. 1): *Fishes of Bitung, Northern Tip of Sulawesi, Indonesia* (Kimura and Matsuura 2003); *Fishes of*
Table 2. Sixty new fishes reported through the JSPS CMS Program.

<table>
<thead>
<tr>
<th>Species</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acropoma boholensis</td>
<td>Acropomatidae</td>
</tr>
<tr>
<td>Malakichthys levis</td>
<td>Acropomatidae</td>
</tr>
<tr>
<td>Cocotropus keramensis</td>
<td>Aploactinidae</td>
</tr>
<tr>
<td>Cocotropus possi</td>
<td>Aploactinidae</td>
</tr>
<tr>
<td>Cocotropus rosomaculatus</td>
<td>Aploactinidae</td>
</tr>
<tr>
<td>Cocotropus izuensis</td>
<td>Atherinidae</td>
</tr>
<tr>
<td>Atherinomorus aetholepis</td>
<td>Atherinidae</td>
</tr>
<tr>
<td>Abalistes filamentosus</td>
<td>Balistidae</td>
</tr>
<tr>
<td>Selenostomus (Alloplectis) urostigma</td>
<td>Blenniidae</td>
</tr>
<tr>
<td>Stolephorus tegului</td>
<td>Engraulidae</td>
</tr>
<tr>
<td>Atherinomorus anampas</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Gerres microphthalmus</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Gerres shima</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Gerres ryukyuensis</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Ancistrogobius ochiaii</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Onigocia ochiaii</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Omogocia lacrimalis</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Platycaryus perlevis</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Rogadius mcgrawbailey</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Saracocia sainsburyi</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Myctophus japonicus</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Polydactylus bifurcus</td>
<td>Gobiidae</td>
</tr>
<tr>
<td>Cephalopholis polypila</td>
<td>Serranidae</td>
</tr>
<tr>
<td>Acanthopagrus chinshira</td>
<td>Sparidae</td>
</tr>
<tr>
<td>Zoarchias hosoyai</td>
<td>Stichaeidae</td>
</tr>
<tr>
<td>Mesopristes iravi</td>
<td>Terapontidae</td>
</tr>
<tr>
<td>Eosynotus macropterus</td>
<td>Trichiuridae</td>
</tr>
<tr>
<td>Bilabria gigantean</td>
<td>Zoarcidae</td>
</tr>
<tr>
<td>Davidjordania yabei</td>
<td>Zoarcidae</td>
</tr>
</tbody>
</table>
Fig. 1. The covers of the three field guides. A, Fishes of Bitung, Northern Tip of Sulawesi, Indonesia; B, Fishes of Libong Island, West Coast of Southern Thailand; C, Fishes of Andaman Sea, West Coast of Southern Thailand.

Fig. 2. WEB version of Fishes of Andaman Sea, West Coast of Southern Thailand. A, top page; B–C, family browser; D, species account page.
Fig. 2. (continued).
Libong Island, West Coast of Southern Thailand (Matsuura and Kimura 2005); Fishes of Andaman Sea, West Coast of Southern Thailand (Kimura et al. 2009). Another field guide, Field Guide to Fishes of Terengganu, Malaysia, is now being prepared and is expected to be published in the first half of 2011.

Fishes of Bitung was published in English and Bahasa Indonesia to make it easy for local students and fish researchers to use this book for their studies. There were five contributors: Seishi Kimura (Mie University, Japan), Keiichi Matsuura (National Museum of Nature and Science, Japan), Teguh Peristiwady (LIPI, Indonesia), Koichi Shibukawa (National Museum of Nature and Science, Japan), and Sasanti R. Suharti (LIPI, Indonesia). This book provides taxonomic accounts with color photographs of 584 species of shallow-water fishes.

Fishes of Libong includes 128 species of shallow-water fishes; many of them are found in mangroves and sandy-muddy flats but some coral-reef fishes are also included. This field guide was published only in English because many local fish researchers and students are familiar with English. There were six contributors: Hisashi Imamura (Hokkaido University, Japan), Seishi Kimura (Mie University, Japan), Keiichi Matsuura (National Museum of Nature and Science, Japan), Ukkrit Satapoomin (Phuket Marine Biological Center, Thailand), Koichi Shibukawa (National Museum of Nature and Science, Japan), and Tetsuo Yoshino (University of the Ryukyus, Japan).

Following the publication of Fishes of Libong, we decided to expand the coverage of the field guide to the west coast of Thailand. The new target is the whole west coast of Thailand. It took four years for us to publish Fishes of Andaman Sea. The species compositions in these two field guides are also different. Most species published in Fishes of Andaman Sea are coral-reef fishes, though there are some fishes living in mangroves and sandy-muddy flats. There were eight contributors for Fishes of Andaman Sea: Hisashi Imamura (Hokkaido University, Japan), Yukio Iwatsuki (Miyazaki University, Japan), Seishi Kimura (Mie University, Japan), Keiichi Matsuura (National Museum of Nature and Science, Japan), Hiroyuki Motomura (Kagoshima University Museum, Japan), Ukkrit Satapoomin (Phuket Marine Biological Center, Thailand), Koichi Shibukawa (National Museum of Nature and Science, Japan), and Tetsuo Yoshino (University of the Ryukyus, Japan).

WEB sites of the field guides

All the three field guides were converted into WEB versions and are available through the website of the National Museum of Nature and Science (http://www.kahaku.go.jp/english/research/specimen/index.html). The WEB versions of the field guides are almost the same in contents as their hard copies. However, the WEB versions provide users with additional functions such as family browser including lists of species, making it easy for users to find species that they wish to see (Fig. 2).

Conclusion

This project has made great contribution to develop fish diversity studies in this region. Although research products such as scientific papers and field guides are great in terms of science, it should also be pointed out that this project was the first and great opportunity for marine biologists in this region to develop and establish the human network helping studies on fish diversity of the region. The CMS will soon be finished and every participant of this
project should make efforts to continue this wonderful cooperative research framework.

Acknowledgements

I would like to thank the members of the fish group who all made a great contribution to the JSPS CMS Program. On behalf of the fish group I thank the JSPS and the National Museum of Nature and Science, Tokyo, for providing us with funds for fieldwork and publications. My thanks also go to the Atmosphere and Ocean Research Institute, the University of Tokyo in Japan, the LIPI in Indonesia, the Phuket Marine Biological Center in Thailand, the Universiti Kebangsaan, the University Putra Malaysia in Malaysia, and the Institute for Marine Environmental Resource and the Research Institute for Marine Fisheries in Vietnam for their continuous help for the fish group. I thank Edward Murdy of the National Science Foundation for kindly reading the manuscript and offering helpful comments.

References