2012
East and Southeast Asia Biodiversity Information Initiative
(ESABII)

ESABII-ACB-JAIF
Training Course on
Freshwater/Brackish-water Fish Taxonomy

Completion Report

January 2013

East and Southeast Asia Biodiversity Information Initiative

(ESABII)

Contents

Introduction

This is to report the completion of the training course on "Freshwater and brackish water fish taxonomy" as a program for 2012 under East and Southeast Asia Biodiversity Information Initiative (ESABII), organized by ASEAN Centre for Biodiversity (ACB) and Ministry of the Environment of Japan (MoEJ).

Japan Wildlife Research Center (JWRC) and Nagao Natural Environment Foundation (NEF) were jointly entrusted with the task of implementing the training course.

1. Summary

- **Background**

  At the meeting of ESABII, "Inception Workshop and 2nd Project Steering Committee Meeting for the Expanded Taxonomic Capacity Building and Governance for Conservation and Sustainable Use of Biodiversity" held in Hanoi, Vietnam from 5-6 March 2012, freshwater and brackish water fishes were adopted as a target taxon which would be dealt with in a training course of taxonomy in 2012. For the venue of the training course, the Mekong River which runs through 4 countries of Indochina was proposed as the region because of its richness in species diversity of freshwater and brackish water fishes. After that, Thailand was proposed and selected as the country where the training course would be implemented because of the high number of qualified resource persons and training facility there.

- **Duration**

  November 5-10, 2012 (6 days)

- **Venue**
  - Faculty of Science, Srinakharinwirot University, Bangkok, Thailand (5-6 November)
  - Faculty of Agriculture, Ubon Ratchathani University, Ubon Ratchathani, Thailand (7-10 November)

- **Participants**

  Seventeen participants from nine ASEAN countries, and seven from East Asia participated in the training course (Table 1 and 2). In addition, two voluntary participants joined the course from Japan (Table 3).

Venues:
Srinakharinwirot University, Bangkok
Ubon Ratchathani University, Ubon Ratchathani

Field practice sites:
Mun River, Ubon Ratchathani
Sae Huea MaewUbon Ratchathani

- **Trainers**

  The Mekong River is an international river that runs through six countries including four in Indochina (Vietnam, Cambodia, Laos and Thailand), as well as Myanmar and China, and we could assign trainers on Mekong fishes not only from Thailand but also from neighboring countries including Cambodia, Laos and Vietnam. In order to manage and lead 26 participants from various countries properly, a team of 14 skilled trainers composed of ten from Indochina etc. and four from Japan were closely taking care of the participants throughout the duration. See Table 3 for details of trainers.

- **Organizers**

  Two officials from respective co-organizers of the training course (MoEJ and ACB) accompanied the participants and trainers throughout the duration of the training course, and made opening and closing addresses, and presented the award certificates. See Table 4 for details of organizers.

- **Overall program**

  The overall program was conducted as seen in Table 5.

Table 1. Participants

No.	Country	Title	Name	Job title	Organization
1	China	Dr.	Wan-Sheng Jiang	Assistant Professor	State Key Laboratory of Genetic Resources and Evolution, Kunming Institute of Zoology, Chinese Academy of Sciences
2	China	Dr.	Xuzhen Wang	Researcher	Institute of Hydrobiology, Chinese Academy of Sciences
3	Japan	Dr.	Hiroaki Takeuchi	Postdoctoral Fellow	Kinki University
4	Japan	Mr.	Seigo Kawase	JSPS Research Fellow	Kinki University
5	Korea	Mr.	Hyeong-Su Kim	Doctoral course	Chonbuk National University
6	Korea	Mr.	Hyun-Geun Cho	Researcher	National Institute of Biological Resources
7	Mongolia	Mr.	Purevsuren Myagmarjav	Master course	National University of Mongolia
8	Cambodia	Mr.	Chak Sokhavicheaboth	Chief	International conservation and Biodiversity Department, Ministry of Environment
9	Cambodia	Mr.	Hong Lork	Chief	Wetland and Coastal Zone Department, Ministry of Environment
10	Indonesia	Mr.	Bernadus Agus Hartanto	Director of Biodiversity Conservation	Rawa Aopa Watumohai National Park, Ministry of Forestry
11	Indonesia	Mr.	Hadi Dahruddin	Director of Biodiversity Conservation	Research Center for Biology, Indonesian Institute of Science (LIPI)
12	Lao PDR	Ms.	Tick Nouanthavong	Government Officer	Living Aquatic Recourse research Center (LARReC)
13	Lao PDR	Ms.	Vanida Boualaphan	Technical Officer	Living Aquatic Recourse research Center (LARReC)
14	Malaysia	Mrs.	Normah Said	Fisheries Officer	Department of Marine Parks Malaysia
15	Myanmar	Ms.	Khin Mar Myint	Research Assistant 2	Forest Research Institute, Forest Department
16	Myanmar	Ms.	L.K.C. Yun	Ranger	Ranger, Nature and Wildlife Conservation Division, Forest Department
17	Philippines	Mr.	Al Orolfo	Regional Technical Director	Protected Areas, Wildlife and Coastal Zone Management Service, Department of Environment and Natural Resources Region 7
18	Philippines	Mr.	Demosthenes Togonon	Aquaculturist II	Bureau of Fisheries and Aquatic Resources
19	Singapore	Mr.	Bi Wei Low	Postgraduate Student	Freshwater and Invasion Biology Laboratory, Department of Biological Sciences, National University of Singapore
20	Singapore	Mr.	How Choon Beng	Section Head (Sungei Buloh Wetland Reserve)	National Parks Board
21	Thailand	Ms.	Jantharas Posombat		Thailand Natural History Museum, National Science Museum
22	Thailand	Mr.	Yongyote Reekanong	Fisheries Biologist	Inland Fisheries Research and Development Bureau, Department of Fisheries
23	Vietnam	Mt	Nguyen Dinh Tao	Researcher	Institute of Ecology and Biological Resources (IEBR), Vietnam Academy of Science and Technology
24	Vietnam	Ms.	Yan Hai Nguyen	Researcher	Institute of Science for Environmental Management (ISEM), Viet Nam Environment Administration, Ministry of Natural Resources and Environment

Table 2. Voluntary Participants

No.	Country	Title	Name	Job title	Organization
1	Japan	Dr.	Tomomi Yamashita	Assistant Professor	Kyushu University
2	Japan	Dr.	Yuichi Kano	Assistant Professor	Kyushu University

Table 3. Trainers

No.	Country	Title	Name	Job title	Organization
1	Japan	Prof. Dr.	Yasuhiko Taki	President	Nagao Natural Environment Foundation
2	Japan	Dr.	Kenzo Utsugi	Research Scientist	Nagao Natural Environment Foundation
3	Japan	Dr.	Koichi Shibukawa	Research Scientist	Nagao Natural Environment Foundation
4	Japan	Ms.	Tomoko Oizumi	Research Scientist	Nagao Natural Environment Foundation
5	Australia	Mr.	Stefan Ottomanski	Research Scientist	Nagao Natural Environment Foundation
6	Cambodia	Mr.	Phanara Thach	Head of Laboratory	Inland Fisheries Research and Development Institute (IFReDI), Fisheries Administration
7	Lao PDR	Mr.	Bounthob Praxaysombath	Head	Department of Biology, Faculty of Science, National University of Laos
8	Thailand	Dr.	Achariya Rangsiruji	Deputy Dean	Research and International Affairs, Srinakharinwirot University
9	Thailand	Dr.	Apinun Suvarnaraksha	Assistant Professor	Faculty of Fisheries Technology and Aquatic Resources, Maejo university
10	Thailand	Mr.	Chaiwut Grudpan	Lecturer	Department of Fisheries, Faculty of Agriculture, Ubon Ratchathani University
11	Thailand	Dr.	Chavalit Vidthayanon	Senior Aquatic Ecology Specialist	Environment Programme, Mekong River Commission
12	Thailand	Ms.	Jarungjit Grudpan	Lecturer	Department of Fisheries, Faculty of Agriculture, Ubon Ratchathani University
13	Thailand	Dr.	Wichian Magtoon	Dean	Faculty of Science, Srinakharinwirot University
14	Vietnam	Dr.	Dinh Dac Tran	Head of Department	Fisheries Resources Management, College of Aquaculture and Fisheries, Can Tho University

Table 4. Organizers

No.	Country	Title	Name	Job title	Organization
1	Japan	Dr.	Masaya Tatara	Deputy Director	Biodiversity Center of Japan, Nature Conservation Bureau, Ministry of the Environment
2	Japan	Ms.	Mari Takehara		Biodiversity Center of Japan, Nature Conservation Bureau, Ministry of the Environment
3	Philippines	Dr.	Filiberto Pollisco	Program Management Specialist	ASEAN Centre for Biodiversity
4	Philippines	Ms.	Rhia Galsim	Capacity Development Officer	ASEAN Centre for Biodiversity

Table 5. Overall Program

ESABII - JAIF Training Course on Freshwater / Brackish Water Fish Taxonomy

Day 1: 5 November (Monday) - Arrival of Participants and ACB Staff at Srinakharinwirot University, Bangkok	
17:30 - 18:00	Registration
18:00 - 19:00	Opening Ceremony
	Remarks by Assistant Prof Dr Chalermchai Boonyaleepun (President, SWU)
	Remarks by Dr Masaya Tatara (Deputy Director, BIODIC, MoEJ)
	Remarks by Dr Filiberto a. Pollisco, Jr. (Policy and Program Development Specialist, ACB)
	Introduction of ESABII by Ms Mari Takehara (BIODIC, MoEJ)
	Keynote Speech
	"Taxonomy of freshwater fishes in Southeast Asia: its past, present and future"
	by Prof Dr Yasuhiko Taki (President, NEF)
19:00 - 20:30	Welcome Party
Day 2: 6 November (Tuesday)	
8:00	Departure from the Hotel
10:00 - 12:00	Visit the Natural History Museum, Pathum Thani
12:00 - 13:00	Lunch break
13:00	Departure to the Bangkok Airport
16:00 - 17:05	Flight from Bangkok to Ubon Ratchathani
Day 3: 7 November (Wednesday) - Venue: Ubon Ratchathani University, Ubon Ratchathani	
9:00 - 12:00	Opening ceremony
	Remarks by Dr Sirintip Boonmee (Assistant to the President, International Relation, UBU)
	Lectures on fish taxonomy (general)
	"Current status on freshwater/estuarine fish biodiversity in Southeast Asia"
	by Dr Chavalit Vidthayanon (Senior Aquatic Ecology Specialist, Environment Programme, Mekong River Commission)
	"System of naming fishes - how to propose a new species?"
	by Dr Koichi Shibukawa (Research Scientst, NEF)
	"Lerning how to prepare and manage fish specimens" and "Practical training on fish species identification (with prepared samples)"
	by Mr Chaiwut Grudpan (Lecturer, Department of Fisheries, Faculty of Agriculture, UBU)
	Ms Jarungjit Grudpan (Lecturer, Department of Fisheries, Faculty of Agriculture, UBU)
12:00 - 13:30	Lunch break
14:00 - 17:30	Practical training on fish species identification (with prepared samples)
	Lerning how to use keys to species
	Lerning how to observe samples
Day 4: 8 November (Thursday) - Venue: Ubon Ratchathani University, Ubon Ratchathani	
9:00 - 12:00	Fieldwork on collecting fishes (1)
12:00 - 14:00	Lunch break
14:00 - 17:30	Specimen preparation (fixation) and photographing
	Species identification of collected specimens
Day 5: 9 November (Friday) - Venue: Ubon Ratchathani University, Ubon Ratchathani	
5:30 - 7:30	Visit morning market
7:30 - 12:00	Fieldwork on collecting fishes (2)
	Visit the Pha Taem National Park
12:00 - 14:00	Lunch break
14:00 - 17:30	Specimen preparation (fixation) and photographing
	Species identification of collected specimens
	Report writing
Day 6: 10 November (Saturday) - Venue: Ubon Ratchathani University, Ubon Ratchathani	
9:00 - 12:00	Presentation of reports
	Closing program
	Conclusing remarks by Dr Masaya Tatara
	Conclusing remarks by Dr Filiberto a. Pollisco, Jr.
	Awarding of workshop certificates
12:00 - 13:30	Lunch break
14:00 - 17:00	City tour
19:00 - 22:00	Farewell party
Day 7: 11 November (Sunday) - Homebound: participants go back to home countries/ACB staff go back to HQ	

2. Course summary

2－1 Assembling participants

The actual training practice was conducted in Ubon Ratchathani because of its suitability of field sites, however the reception of participants, opening ceremony and keynote speech were held in Bangkok.

2－2 Opening ceremony

After the registration, Dr. Chalermchai Boonyaleepun, president of Srinakharinwirot University, Dr. Masaya Tatara (BIODIC, MoEJ), Dr. Filiberto Pollisco (ASEAN Centre for Biodiversity) made opening remarks. Ms. Mari Takehara gave a presentation introducing ESABII. A keynote speech "Taxonomy of freshwater fishes in Southeast Asia, its past, current and future" was given by Professor Dr. Yasuhiko Taki, a special trainer of this course.

Figure 1. President of Srinakharinwirot Univ.

Figure 2. Dr. Tatara makes opening remarks

Figure 3. Keynote speech by Prof. Dr. Taki

2－3 Museum Visit

In the morning following the opening ceremony a study tour was conducted at the Natural History Museum in National Science Museum in Phatum Thani. Participants visited the specimen management unit of the museum, where there could be shown the importance of and difficulties in keeping historical and/or type specimens. After having lunch in the museum, we flew to the second and main venue of the training course: Ubon Ratchathani University in the east of Thailand.

Figure 4. Specimen management unit of Natural History Museum

2－4　Lectures on freshwater and brackish water fish taxonomy

In the morning of the first day in Ubon Ratchathani, the following lectures were given.

- Current status on freshwater and estuarine fishes in Southeast Asia
  (by Dr. Chavalit Vidthayanon)
- System of naming fishes—how to propose a new species
  (by Dr. Koichi Shibukawa)
- Learning how to prepare and manage fish specimens
- Guidance about practicals in the course
  (by Mr. Chaiwut Grudpan)

Dr. Vidthayanon began with an inspiring talk about both the known and unknown issues of freshwater and estuarine fishes in Southeast Asia to date. He also pointed some problems that arose in the region such as habitat degradation caused by dam construction, deforestation, etc.

Dr. Shibukawa illustrated his presentation with a first hand account about a new species that was described from the Mekong Delta through a project of Nagao Foundation. He emphasized that before a new species can be confidently described, a thorough check of all available literature and specimens needs to be done before a species can be proven to be new to science.

Mr. Grudpan spoke about basic principle on biodiversity study such as: how to preserve fish as permanent specimens, what kind of data should be accompanied with them, etc. Participants were also informed that the training course would be implemented in accordance with that principle.

Figure 5. Lecture room

Figure 6. Dr. Vidthayanon giving a lecture

2－5　Fish identification practice with prepared specimens

2－5－1　Laboratory works

After the lunch break, laboratory work began in a room of the Fisheries Department at the Faculty of Agriculture. The room had enough space to accommodate all the participants, and already furnished with the necessary equipment such as desk lamps, specimen trays, forceps, etc.

Figure 7. Laboratory work

2－5－2　Identification practice with prepared specimens

Typically, a novice looking at a fish tends to pay attention to more obvious features such as color, size and overall shape, however freshwater fish species are very similar in overall appearance. Furthermore, color is usually faded or altered in preserved specimens preserve the only way to distinguish the species is to examine less obvious details, such as the number of fin rays, barbels and the arrangement of scales are often the preserved specimens.

The participants were also shown a staining method using cyanine blue, a dye for temporarily staining fish specimens to make their less obvious features more visible. In this period, participants successfully mastered terminologies on fish body parts, and methods of counting and measurements.

Figure 8. Participants observing prepared specimens

2－6　Sampling fish in the field (large river) and photographing fish specimens

2－6－1　Capturing fish and treatment of fish specimens in the field

On the first day of field practice, participants helped some local fishermen harvest their fish by means of large seine net in a large, slow-flowing river, and selected a proportion of the fish landed for later identification. Some captured fish were kept alive in aerated containers. Those fish that died during the sampling operation were immediately put in ice-cold water and sent to the laboratory.

Figure 9. Seining for fish specimens in the main stream of the Mun River

Figure 10. Fish landing

Figure 11. Ice-cold fresh specimens

2－6－2　Sorting and fin-setting of specimens

Fresh specimens brought back from the field were numbered and sorted by species (Figure 12). As is often the case with other animal specimens, fish specimens are fixed by dipping in 10% formalin, but if a fish specimen is fixed in a state with its fins retracted, it is difficult to count the fin rays therefore its fins need to be manually extended and fixed prior to the full fixation of body (Figure 13). In order to fix the extended fin tips and barbels as they would be in the water, whole body of each specimen is dipped in formalin solution, and their fins and barbells are expanded with insect pins (Figure 14). During this process, participants were required to wear a mask and to keep the laboratory ventilated well (Figure 15). Covering exposed parts of specimens with a piece of tissue paper soaked in formalin helps avoid any color gap between the two parts. Duration of fixation for fins and barbels should be less than about 15 minutes because keeping in formalin longer time fades natural color of the fish.

Figure 12. Sorting by species

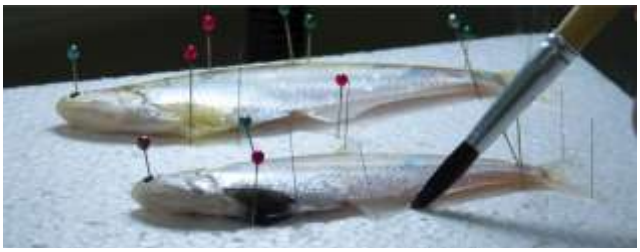

Figure 13. Fin-setting in the air

Figure 14. Fin-setting in fixative liquid

Figure 15. Fin-setting work

2－6－3　Photographing specimens

Fin-set specimens are then transferred into clean fresh water and put in a case for photographing. Photographing a specimen submerged in water is preferable as the fish not only looks more lifelike, but also to reduce reflections from the wet and shiny parts of the fish. Some fish tend to float, and need to have the air extracted from the body cavity with a syringe in order for them to submerge properly (Figure 16).

For photographing scientific specimens, traditionally a digital single lens reflection camera (DSLR camera) is used (Figure 17) but these days most modern digital cameras can be used. Many participants took pictures of their specimens with their own cameras (Figure 18).

After photographing, specimens are well-fixed in 10% formalin for about 3 weeks, and transferred into 70% ethyl alcohol for long term preservation.

Figure 16. Positioning a sample in a photographing case

Figure 17. SLR camera

Figure 18. Compact camera

2－7　Sampling fish in the field (fast-flowing river), species identification and preparation of presentation

2－7－1　Capturing fish and treatment of specimens in the field

On the second day of field practice, field sampling was conducted in the Upper Mun River, and a rocky area with rapids and fast flowing water (Figure 19). A lot of unique species that are well-adapted to this habitat were collected (Figure 20). Many of rapid water fishes are quickly moving fishes thus it is difficult to capture them with only scoop nets. Others adhere to and/or hide under rocks in rapid water are also not easy species to capture with conventional methods, therefore we used an electric shocker after obtaining permission from local authorities. Use of electric shocker is usually forbidden but is recommendable for research purpose because it is selective and only targets fish between the negative and positive electrodes. Fish stunned by electric shock are easily scooped by hand nets (Figure 21). In many cases, the stunned fish recovers and starts swimming again within a few minutes. Care must be taken not to electrocute any people watching. Treatment of collected fish samples is the same as mentioned in the previous section.

Figure 19. Habitat of rocky rapid

Figure 20. Fishes of rocky rapid

Figure 21. Fish collection with an electric shocker

2－7－2　Species identification

Fish collected during the two days of field collection were identified to species. The reference book "Fishes of Cambodian Mekong" written by Rainboth (1996) was used for identification. Although the book was published about 15 years ago and information is already out of date, the identification key was still useful for this training.

Figure 22. Species identification

2－7－3　Preparation of presentation

Species identification is not just a quiz for fish name, but a process of checking characters that leads to species. Participants were divided into six groups and representative of each group would give a presentation in the next day. Each group busily prepared the slides together with trainers in charge of each group till late evening.

Figure 23. Preparation of presentation

2 － 8　Presentation of the results

Presentation of results was given by each of the six groups (Figure 24). Each group correctly determined the diagnostic characters of freshwater and brackish water fishes that they identified. Their slides contained a lot of pictures that they took by themselves (Figure 25) and all groups had successfully grasped the methodology of species identification and presentation.

Figure 24. Presentation of results

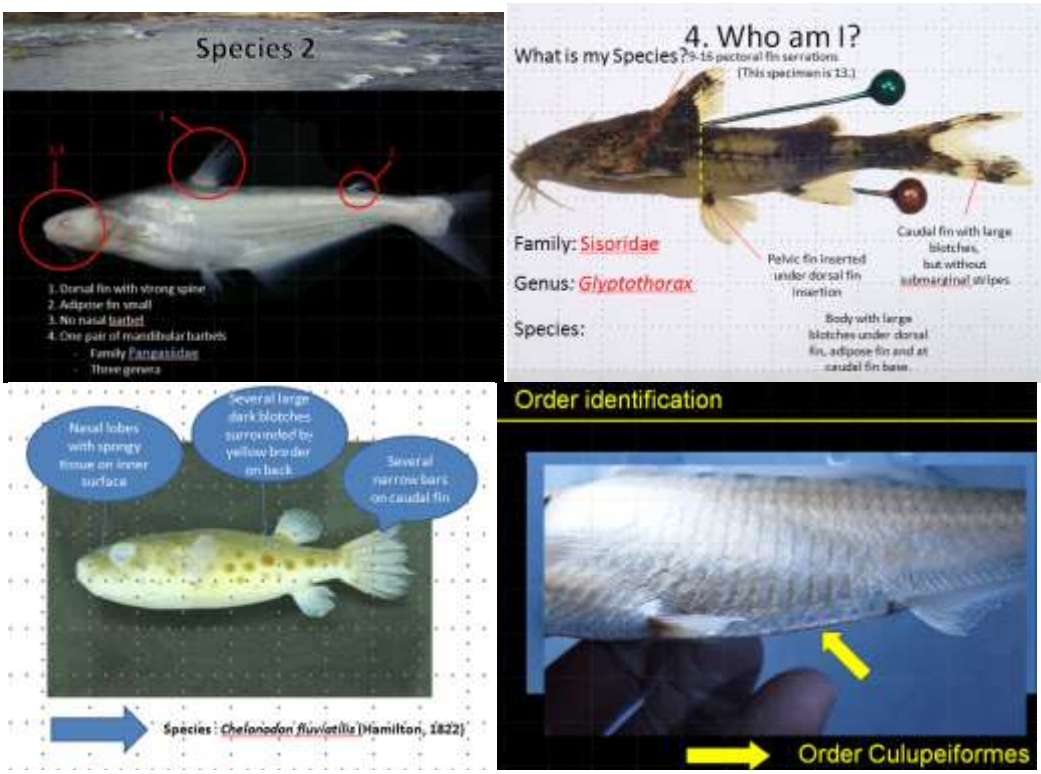

Figure 25. Examples of slides from the presentations

2－9　Awarding certificate

Just after the presentation, certificates were awarded to each participant from organizers. Dr. Pollisco of ACB and Dr. Tatara of MoEJ gave concluding speeches.

Figure 26. Awarding certificate

Conclusion

This training course was conducted as part of an international endeavor aiming to conserve all the species existing on the earth, and was designed to develop parataxonomists who are able to identify species precisely to a certain extent. We believe that the only way to achieve the aim is to build capacity of people who:

- have established roots in their regions
- are willing and able to enter the field, in search of wildlife
- can identify species accurately
- can record the status of biodiversity correctly
- can conduct monitoring surveys of that biodiversity
- can provide advance warning of threats to that of biodiversity in the rapidly changing global environment.

We do not want participants to be satisfied only with knowledge of taxonomy. As the course planner, we honestly wish them to be the persons who:

- will collect primary data on biodiversity in their region
- who provide reliable information from their region

no matter what occupation they have.

Figure 27. People associated with the training course

Training Course on Freshwater/Brackish-water Fish Taxonomy
January 2013

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