**REPORT OF THE**

# ON-SITE TRAINING ON IDENTIFICATION OF DEEP-SEA FISHES

**Kuala Terengganu, Malaysia, 18-21 July 2011**

TD/RP/150

**Preparation and distribution of this document**

The Report of the On-Site Training on Identification of Deep-Sea Fishes was prepared by the Coastal Fisheries Technology Division of the Training Department of the Southeast Asian Fisheries Development Center (SEAFDEC). The Document is distributed to the participants and resource persons of the Training, SEAFDEC Member Countries, SEAFDEC Departments and concerned institutions/organizations.

**BIBLIOGRAPHIC CITATION**

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# Report of the On-Site Training on Identification of Deep-Sea Fishes

18-21 July 2011, Kuala Terengganu, Malaysia

## PART I

# Report of the On-Site Training on Identification of Deep-Sea Fishes

18-21 July 2011, Kuala Terengganu, Malaysia

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## I. Introduction

1. The on-site training on identification of deep-sea fishes is jointly organized by the Marine Fishery Resources Development and Management Department (MFRDMD) and the Training Department (TD) of the Southeast Asian Fisheries Development Center (SEAFDEC) from 18 to 21 July 2011 at the SEAFDEC/MFRDMD in Kuala Terengganu, Malaysia through the Japanese Trust Fund.

2. This program was developed under the SEAFDEC project on "Deep-Sea Fisheries Resources Exploration in the Southeast Asian Waters" implemented since 2007, with the overall objectives to:

    - enhance the capacity of the participants for identifying fish species found at the continental shelf break and slope (sea area from depth 100-400 m depth);
    - confirm the preliminary identification results of fish specimens collected from the waters of Sabah and Sarawak, Malaysia during 28 June -11 August 2010 onboard M.V. SEAFDEC 2;
    - integrate the information/data on the distribution of deep-sea fishes in the Southeast Asian waters for fulfillment of the project.

3. The training was carried out by both lecture and practices with attendance by 16 (sixteen) person in charge for fish taxonomy from the Department of Fisheries, Malaysia, Department of Fisheries Sabah and the SEAFDEC/MFRDMD. The list of the participants and resource persons appears as **Annex 1**.

## II. Opening and introduction of the training

4. The workshop was officially opened on July 18, 2011. On behalf of the Department Chief, Dr. Masaya Katoh, the Deputy Chief of SEAFDEC-MFRDMD welcomed and thanked to the Japanese experts and participants for their participation to the training. He underlined the needs of building human resources capacity with regards to fish identification to support the effort on deep-sea fishery resources exploration. He also expressed the wish for all participants to have strong interest in gaining knowledge and experiences in fish identification during the training.

5. The introduction of the workshop was made by Mrs. Penchan Laongmanee, Fishing Ground and Fishery Oceanography Section Head of the SEAFDEC/TD. She provided the background and progress of the project "Deep-Sea Fisheries Resources Exploration in the Southeast Asian Waters" and the arrangement of the workshop activities which appear as **Annex 2 to 4**.

## III. Resource person's presentations

6. The presentations by the resource persons provided the basis on deep-sea demersal fish identification and fish collection management and the experiences of deep-sea bottom trawl surveys. The presentations included:
    - General procedure for sampling, identification and collection management of deep-sea fishes by Dr. Yoshinobu Konishi (**Annex 5**).
    - Fish morphology and general characters for identification of deep-sea fishes in the Southeast Asian Region by Dr. Toshio Kawai (**Annex 6**).
    - Collection building at the Hokkaido University Museum, Hakodate, Japan by Dr. Toshio Kawai (**Annex 7**).
    - Share experience on the "Japan-Indonesia Deep-Sea Fishery Resources Joint Exploration Project" during year 2004 and 2005 by Dr. Toshio Kawai.

## IV. Practice of fish photography, fish identification, and results presentation of assigned work

7. In the first day (July 19) of practical works in the wet laboratory, according to a demonstration of fish photography by Drs. Toshio Kawai and Yoshinobu Konishi, participants handled the fresh fish specimens for expanding fins with pins and formalin solution on a polystyrene board, and then too photos of the fishes using a digital camera.

8. During the two-days practice (July 19-20), participants did the group works on identification and description of meristic and morphometrical characters for the preserved specimens collected from the Sabah and Sarawak waters during 28 June and 11 August 2010 onboard M.V. SEAFDEC 2 under the supervision of the resource persons.

9. In the last day, each group of participants presented the results of their identification and description for the specimens. Then the discussion and clarification including advice on the results were made among the resource persons and participants. The results presentations appear as **Annex 8/1- 8/4**.

10. The presentation on the fish catalogue from the survey and the online database was shared to the training by Dr. Natinee Sukramongkol **(Annex 9)**.

## V. Discussion and recommendations

11. Based on the discussion, the workshop agreed to:
    - establish a network for deep-sea fish taxonomy through coordination and collaboration among the participants/experts of the workshop; and
    - share the information and dissemination on the results of deep-sea fisheries resources surveys on the website and database provided by the SEAFDEC/TD.

12. The workshop agreed that the online catalog of fishes could help researchers in the SEAFDEC/MFRDMD to confirm the identification results as well as provide service and knowledge to them and promote the organized activities. Mr. Mohammad Faisal, a participant and researcher of the SEAFDEC/MFRDMD, informed that the catalogue of fishes was existed at the Department and would be online soon.

13. As regards the taxonomic work on the deep-sea fish species and the maintenance of the fish collection in the SEAFDEC/MFRDMD, Dr. Toshio Kawai recommended that:
    - the fish collections should be kept under moderate ~~(~~room~~)~~ temperature, relatively low humidity, and should avoid being exposed to the sunlight;
    - fish specimens in the collection should be kept in 70% ethanol after fixation by formalin solution;
    - type specimens should be kept separately from other collections under the special care.

14. Dr. Yoshinobu Konishi suggested to the workshop that the fish specimens with insufficient information on identification should be send to the Hokkaido University Museum in order to confirm the species names of the specimens, and then the species diagnosis with photos and morphological character data should be provided to all participants.

## VI. Closing

15. Dr. Masaya Katoh, Deputy Chief of the SEAFDEC/MFRDMD expressed his appreciation to the experts and thanked the participants for their active participation in the workshop as well as the organizing team for their support and cooperation during the workshop. He also reminded the participants that the realization of their respective activities for the fish identification depends on their willingness and intention to apply what the participants have learned from this training workshop, and then he declared the workshop close.

**Annex 1**

## List of participants and resource persons

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**Annex 2**

## Agenda and arrangement of the training

**1 Opening**

**2 Introduction to the training activities**

**3 Lecture and sharing experiences on fish taxonomic study and deep-sea resource exploration as well as fish specimens collection**

- General procedures for sampling, identification and collection management of deep-sea fishes
- Fish morphology and general characters for identification of deep-sea fishes in the Southeast Asian region
- Collection Building at the Hokkaido University Museum, Hakodate, Japan
- Share experience on the “Japan-Indonesia Deep-Sea Fishery Resources Joint Exploration Project” during year 2004 and 2005

**4 Laboratory practice**

- Fish specimens setting for photography
- Fish photography
- Fish identification

**5 Report the results of the identification**

**6 Discussion and Recommendations**

**7 Closing**

**Annex 3**

## Time table

| Date/Program | Activities/Topics |
|---|---|
| 17 July (Sunday) | - Arrival of resource persons and participants.<br>- Workshop preparations |
| **18 July (Monday) Opening ceremony, Lectures** | |
| 09:00 – 09:15 | Opening Ceremony |
| 09:15 – 09:30 | Project introduction and activity brief<br>by Ms. Penchan Laongmanee |
| 09:30 - 10:00 | Group photo/Break |
| 10:00 – 11:00 | General procedures for sampling, identification and collection management of deep-sea fishes by Dr. Yoshinobu Konishi |
| 11:00 – 13:00 | Fish morphology and general characters for identification of deep-sea fishes in the Southeast Asian region<br>by Dr. Toshio Kawai |
| 13:00 – 14:30 | Lunch |
| 14:30 – 15:30 | Collection building at the Hokkaido University Museum<br>by Dr. Toshio Kawai |
| 15:30 – 16:00 | Break |
| 16:00 – 17:30 | Specimens and equipments preparation |
| **19 July (Tuesday) Practice of photography and fish identification** | |
| 08:30 – 13:00<br>(Laboratory) | Practice on Fish specimens setting and photography<br>(supervised by resource persons and project ) |
| 14:00 – 17:00 | Practice of fish identification with preserved specimens<br>(supervised by resource persons and project ) |
| **20 July (Wednesday) Practice on fish identification** | |
| 08:30 – 17:30<br>(Laboratory) | Practice of fish identification with preserved specimens<br>(supervised by resource persons and project ) |
| **21 July (Thursday) Results presentation, Discussions, Closing** | |
| 11:00 – 12:00 | Presentation and discussion on results of fish identification (4 group presentations) |
| 12:00 – 12:30 | Demonstration of deep-sea fishes online database and fish catalog by Dr. Natinee Sukramongkol |
| 12:30 – 12:45 | Discussion and recommendation |
| 12:45 – 13:00 | Closing |

# Report of the On-Site Training on Identification of Deep-Sea Fishes

18-21 July 2011, Kuala Terengganu, Malaysia

## PART II
## Presentations and results of deep-sea fishes identification

## Annex 4: Introduction to the Workshop

**By Mrs. Penchan Laongmanee, Project manager**

**Annex 4**

# Deep-Sea Resource Exploration in the Southeast Asian Region

## Capture Fishery Technology Division

## SEAFDEC/TD


## Background

- Depletion of the inshore/coastal fisheries resources in the Southeast Asian Countries
- Search new fishing ground targeting at **deep-sea area**

In serving Member Countries, SEAFDEC /TD, with the active financial and technical support of Japanese Government start the

"Deep Sea Fisheries Resources Exploration in the Southeast Asia" since 2008

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# Objectives

1. Provide technical support of exploration of deep-sea resources in the Southeast Asian waters by using M.V. SEAFDEC2 to member countries and/or by other research vessels in collaboration with the member countries;
2. Increase number and capacity of researcher in Member Countries to explore deep-sea fisheries resources as well as its ecosystem (recognized that deep-sea ecosystems are vulnerable to damage)

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# Activities

- Activity 1: Meeting/workshop
- Activity 2: Development/Improvement of sampling gear and exploration methodology
- Activity 3: Supporting deep-sea fisheries resources survey of Member Countries
- Activity 4: HRD programs on deep-sea fisheries resources exploration
- Activity 5: Information dissemination

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## Activity 1: Meeting/workshop

1. **Workshop on the Standard Operating Procedure (SOP) and Development of Sampling Gears for Deep-Sea Resource Exploration,**

   26-28 May 2009 at SEAFDEC/Training Department,

   22 Participants: SEAFDEC/TD and MFRDMD, Brunei, Japan, Indonesia, Philippine, Malaysia, Myanmar Thailand and Vietnam

- Output
- SOP for Deep-Sea Resources Exploration in Southeast Asian Region
- Suggestion for deep-sea fisheries resource sampling gear
- Network of scientist

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## Activity 1: Meeting/workshop

2. **Expert meeting on deep-sea fishing and its impact on ecosystem**
31 August - 2 September 2010, Bangkok, Thailand

21 participants: SEAFDEC/TD,NOAA, Brunei, Japan, Indonesia, Philippine, Malaysia, Myanmar, Thailand and Vietnam

**Output :** topic and priority of data/info that should be collected for implementing the precautionary approach for deep-sea fisheries

**Full report can be download at**
http://map.seafdec.org/DeepSea/index.html

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## **Activity 2:** Development/Improvement of sampling gear and exploration methodology

- Beam trawl
- Agassiz trawl (Beam trawl)
- Deep sea trap
- Isaccs-Kidd Midwater trawl (IKMT)
- Under water VDO camera

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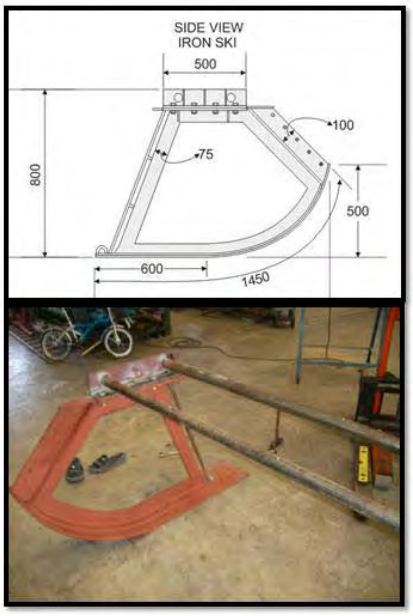
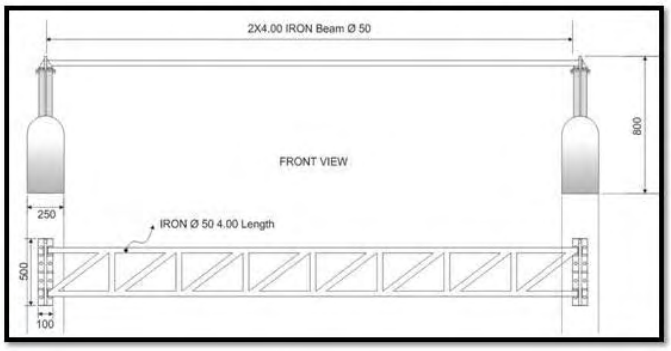
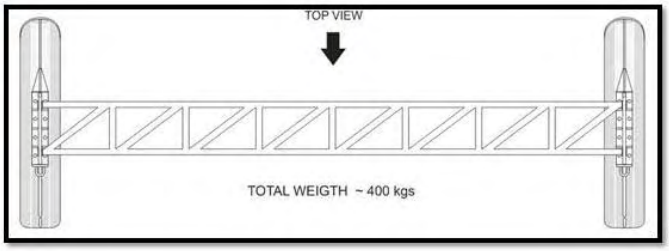
## Beam trawl

**Beam / Frame diagram**

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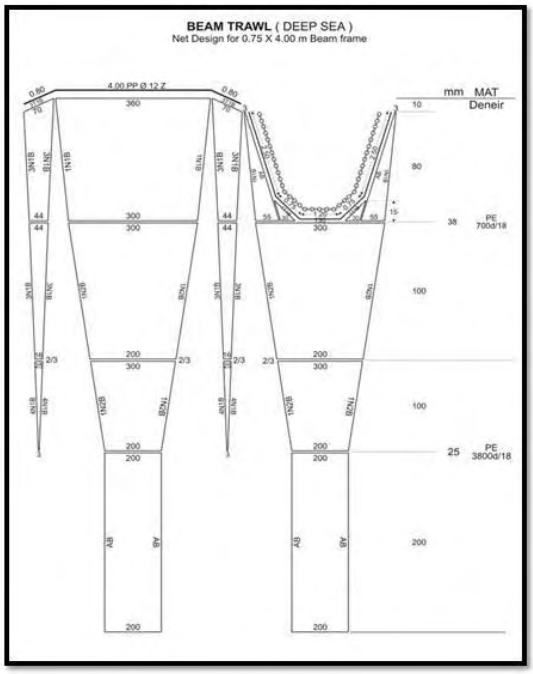
# Beam and net diagram

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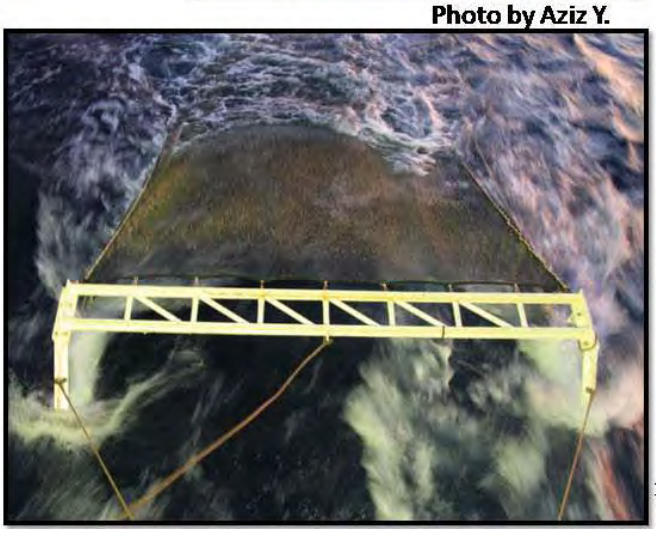
# Operation of beam trawl

Photo by Aziz Y.

Photo by Aziz Y.



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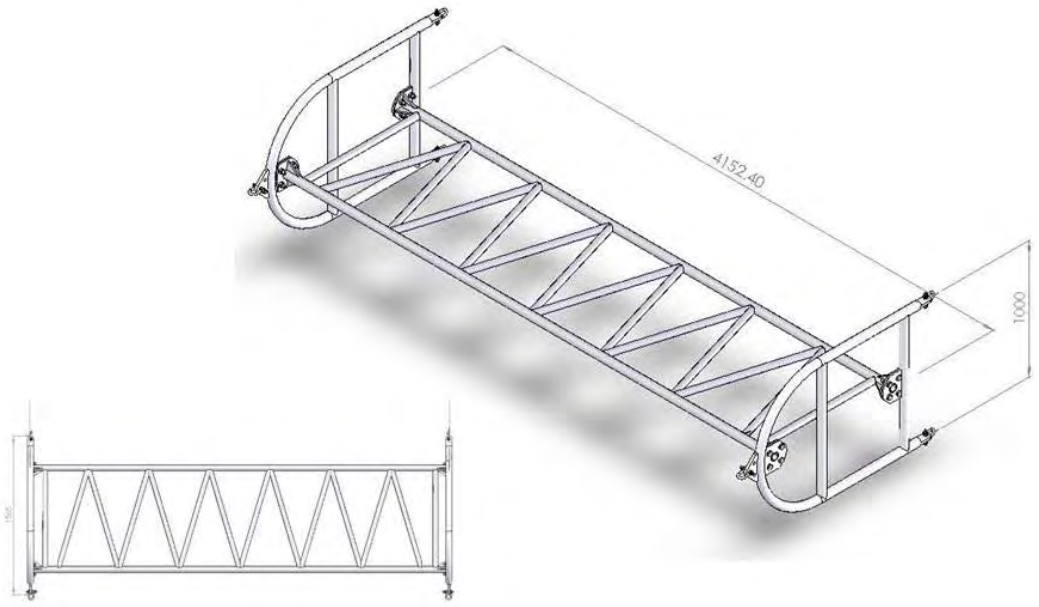
## Sample from beam trawl

## Agassiz trawl diagram

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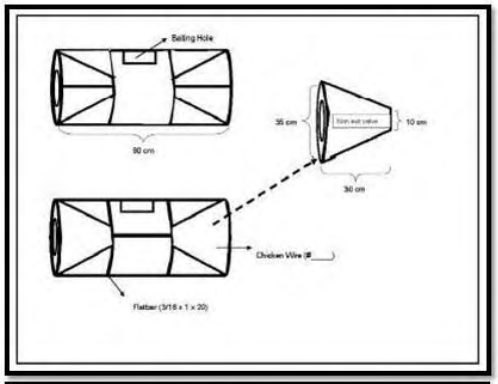
# Agassiz trawl operation

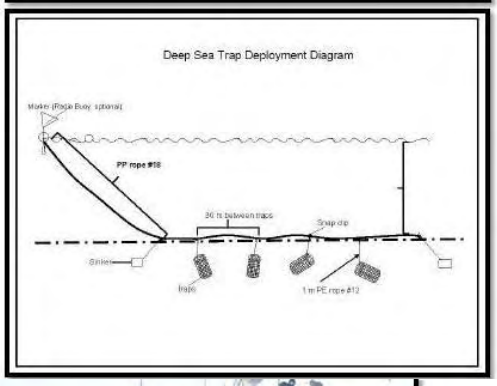
13

# Sorting of Agassiz trawl catch

14

# Deep Sea Trap

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## Operation and sample

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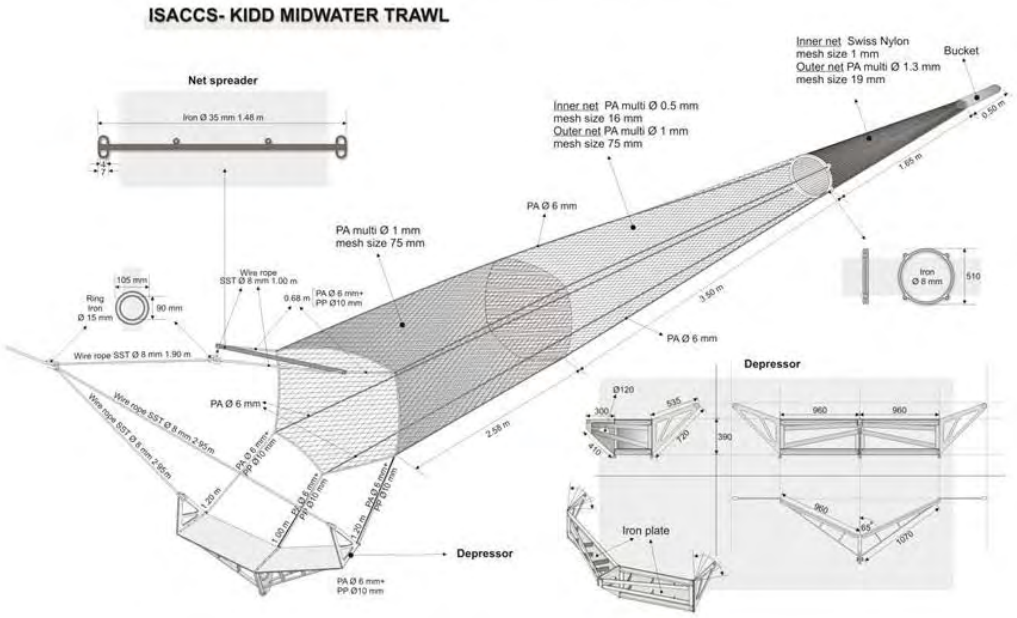
# Isaccs-Kidd Midwater Trawl

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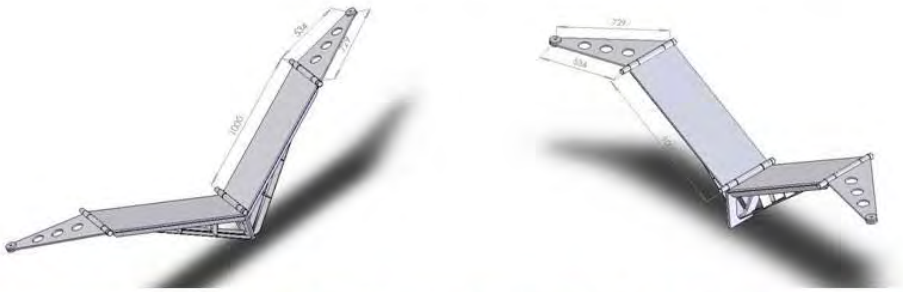
# Construction of IKMT at SEAFDEC's workshop



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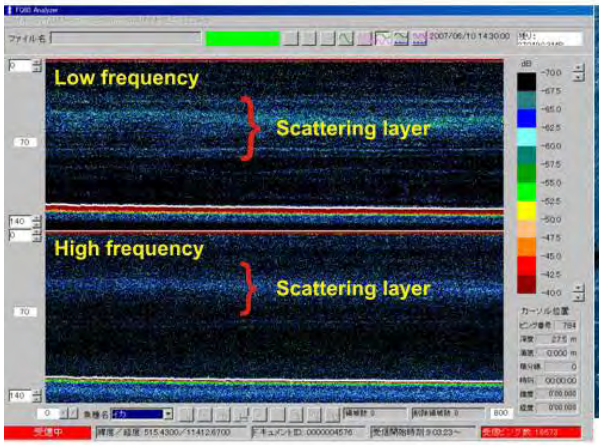
# IKMT Operation




Using scientific echo-sounder (Furuno FQ80 onboard M.V. SEAFDEC2) provide a target area

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# Sample from IKMT

Mesopelagic fishes, mostly Myctophidae

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# Under water VDO camera



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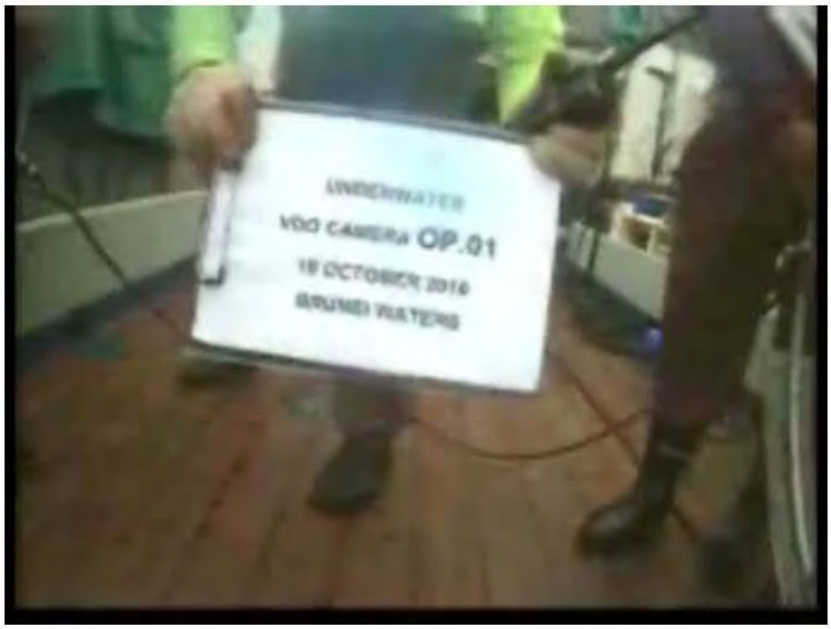
# Under water VDO camera clip from Brunei water

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## **Activity 3:** Support deep-sea fisheries resources survey

Support technical staff of SEAFDEC/TD to join the actual survey on M.V.SEAFDEC2 and national research vessel

-2008 Brunei and Philippine
-2009 Brunei
-2010 Brunei and Malaysia
-2011 Brunei

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## M.V.SEAFDEC 2 Cr29-2/2008, Brunei water, 4 June-5 July 2008

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## M.V.SEAFDEC 2 Cr31-1/2009, Brunei water, 6 March-11 April 2009

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## M.V.SEAFDEC 2 Cr35-3/2010, Sabah-Sarawak water, Malaysia, 28 June-11 August 2010

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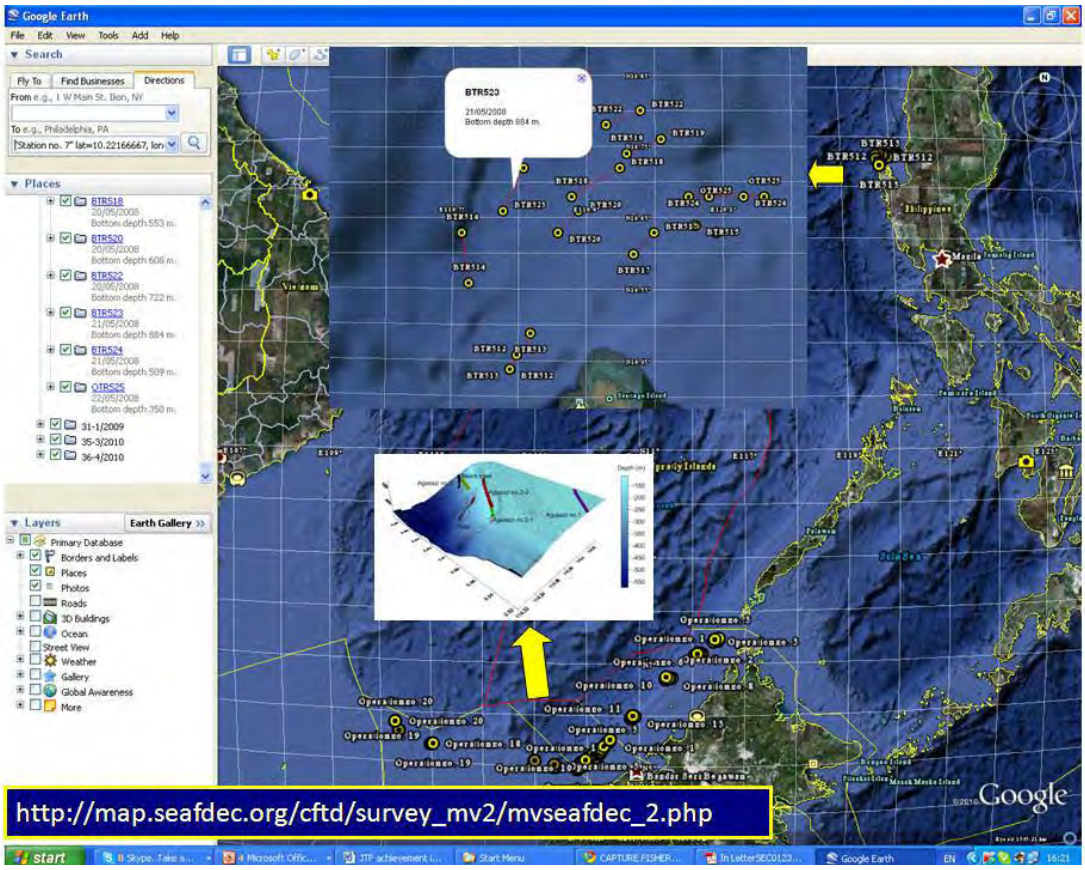


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## **Activity4:** HRD programs on Deep-sea fisheries resources exploration

- 11-25 May 2008, Ship board training on deep sea exploration, R.V.DA BFAR, Philippine
- 7-11 April 2009,On the job training on collection, preservation and digital imaging technique for deep-sea fish, Brunei
- 18-22 January 2010-Training Workshop on Identification of Deep-sea Fish, SEAFDEC/TD
- 2-4 February 2010 - On site training on technique for preparation of deep sea fish pictorial book, Brunei

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## Activity4: HRD programs on Deep-sea fisheries resources exploration

- 16-20 October 2010, Training on research methodologies for study on impact of fishing on deep-sea ecosystem, Brunei
- 11-15 July 2011, Training/workshop on identification of deep-sea benthic macroinvertebrate vulnerable to fishing gear, SEAFDEC/TD
- 18-21 July 2011, On-site training on Identification of Deep-sea Fish, Malaysia

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## Ship board training on deep sea exploration on M.V.DA-BFAR (Co -organize by Bureau of Fisheries and Aquatic Resources, the Philippine)

**Objective:** to enhance the human resources capacity on the deep sea resources exploration including

- Methodology for samplings of deep sea fisheries resources,
- Identification of deep-sea fish and larvae

**Participants from Member Countries : Brunei (1) , Indonesia (1), Malaysia (2), Philippine (5), Thailand (1) , Vietnam (1) and SEAFDEC staffs (5)**
**Resource person:**
**Fish taxonomist : Mr. Montri Sumontha**
**Invertebrate zoology: Associate Professor Kotaro Tsuchiya, Tokyo University of Marine Science and Technology**

Read full report : http://map.seafdec.org/DeepSea/pub03.html

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# Ship board training on deep sea exploration on M.V.DA-BFAR

## Training Workshop on Identification of Deep-sea Fish

**Objective:**

- To enhance the human resources capacity on deep-sea fish species identification;
- To encourage the SEAFDEC Member Countries to initiate deep-sea resources exploration ensuring the accurate deep-sea fishes identification

**Participants** from Member Countries : Brunei (2), Indonesia (1), Malaysia (1), Philippine (1), Thailand (2) , Vietnam (1) and SEAFDEC staffs (2)

**Resource persons**:

1. Dr. Yoshinobu Konishi, Retire researcher of Fishery Agency, Japan
2. Dr. Fayakun Satria, Research Center for Capture Fisheries, Indonesia
3. Assistant Professor Dr. Toshio Kawai, Fisheries Science Center, The Hokkaido University Museum

Watch: Summary activities VDO at http://map.seafdec.org/DeepSea/

Read: Training report at http://map.seafdec.org/DeepSea/pub01.html

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# Training Workshop on Identification of Deep-sea Fish

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# Training Workshop on Identification of Deep-sea Fish

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# Training Workshop on Research Methodologies for the Study on Impact of Fishing to Deep-Sea Ecosystem (co-organize by Department of Fishery, Brunei Darussalam)

**Objective:**

- To enhance participants' knowledge on research methodologies on impact of fishing to deep-sea ecosystem
- To build human resources capacity through actual practices on: research planning, topographic survey; sampling gears operating methods; sampling methods (quantitative and qualitative); and data collection methodology from the actual survey.

**Participants** from Member Countries : Brunei (4), Indonesia (1), Malaysia (1), Philippine (1), Thailand (1) , Vietnam (1)

**Resource persons**:

1. Dr. Yoshinobu Konishi, Retire researcher of Fishery Agency, Japan
2. Dr. Chittima Aryuthaka, Associate Professor , Kasetsart University
3. Dr. Sumaitt Putchakarn, Senior Scientist, Institute of Marine Science, Burapha University

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# Training Workshop on Research Methodologies for the Study on Impact of Fishing to Deep-Sea Ecosystem

Read: Training report at
http://map.seafdec.org/DeepSea/pub01.html

MIPR Hosts Workshop On Impact Of Fishing On Ecosystem

Participants in a group photo

THE Department of Fisheries, Ministry of Industry and Primary Resources is hosting a training workshop on Research Methodology for Study on Impact of Fishing on Deep-Sea Ecosystem beginning from October 16 to 20.

The workshop is jointly organised by the Southeast Asian Fisheries Development Centre (SEAFDEC) at SEAMEO VOCTECH, Gadong.

The workshop was officially opened by the Guest of Honour, Dr Chumnarn Pongsri, SEAFDEC Secretary General and Training Department Chief.

Among the objectives of the workshop are to enhance the human resources capacity for improvement of in-depth knowledge on research methodologies to study the impact of fishing on the deep-sea ecosystem, to encourage the SEAFDEC's member countries on the initiation of deep-sea resources exploration to improve quality of data and to support fisheries resources survey and exploration of the deep-sea trawling impacts on sea-bottom ecosystem through the human resources development programme.

The workshop is attended by SEAFDEC member countries namely Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam and host country Brunei Darussalam.

It is anticipated that the training workshop will enhance the participants' knowledge on research methodologies on the impact of fishing to deep-sea ecosystem and to build human resources capacity through actual practices on research planning, topographic survey, sampling gears operating methods, sampling methods (quantitative and qualitative) and data collection methodology from the actual survey.

## Training Workshop on Identification of Benthic Macro invertebrate vulnerable to fishing gear 11-15 July 2011, SEAFDEC/TD

**Objectives**

- **Participants' ability on deep-sea benthic macroinvertebrate identification will be enhanced through practical works.**
- **Deep-sea benthic macroinvertebrate specimen collected from fisheries resource survey by MV.SEAFDEC 2 will be identified to the lowest taxa.**

**Participants from Member Countries : Brunei (2), Indonesia (2), Malaysia (2), Philippine (2), Thailand (5) , Vietnam (2)**

**Resource persons:**

**1.Dr. Mike Kendal, Senier export, England**
**2.Dr. Chittima Aryuthaka, Associate Professor , Kasetsart University**
**3.Dr.Suriyan , Kasetsart University**
**4.Ms.Punthip "**
**5.Mr. Teerapong "**
**6.Dr. Sumaitt Putchakarn, Senior Scientist, Institute of Marine Science, Burapha University**

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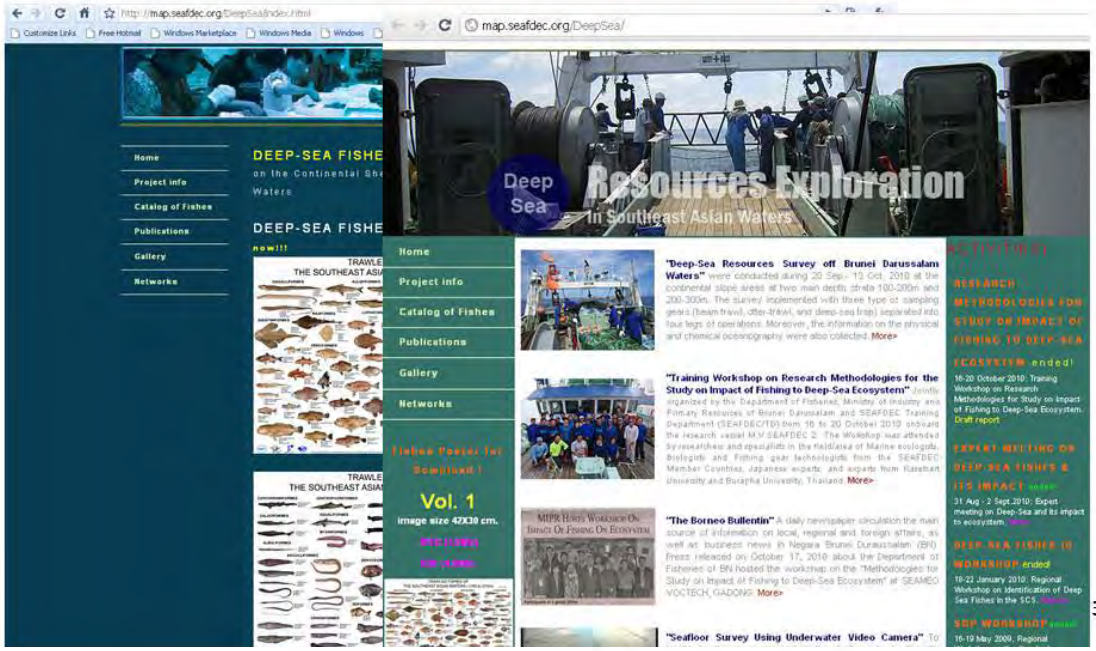
## Training Workshop on Identification of Benthic Macro invertebrate vulnerable to fishing gear ,11-15 July 2011

38

## Activity5: Information Dissemination

- Project Website: http://map.seafdec.org/DeepSea/




39

## Activity5: Information Dissemination

- Guide for Deep-Sea Trap Operation
- Guide for Beam Trawl Operation
- Guide for Isaacs-Kid Mid-water Trawl
- Check lists of the deep-sea fishes in the South China Sea and Adjacent Waters
- Report of Training Workshop on the Deep Sea Fishery Resources Exploration on the Continental Slopes in Southeast Asian Waters, 11-25 May 2008, M/V DA-BFAR, Philippines
- Report of the Regional Training/Workshop on Identification of Deep-Sea Fishes, SEAFDEC/TD, Thailand, 18-22 January 2010
- Report of the Expert Meeting on Deep-Sea Fishing and Its Impact on Ecosystem, 31 August - 2 September 2010, Bangkok, Thailand
- Report of the Training Workshop on Research Methodologies for the Study on Impact of Fishing to Deep-Sea Ecosystem 16-20 October 2010, Brunei Darussalam

40

## Activity5: Information Dissemination

Series of publication:
http://map.seafdec.org/DeepSea/pub01.html

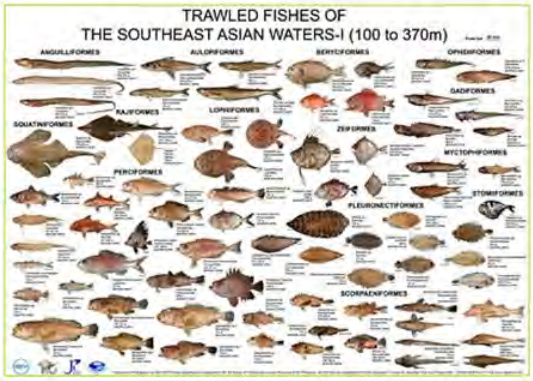

41

## Activity5: Information Dissemination


Poster presentation in
Marine Science Seminar,
Phuket, Thailand
28-30 June 2010

42

## Activity5: Information Dissemination





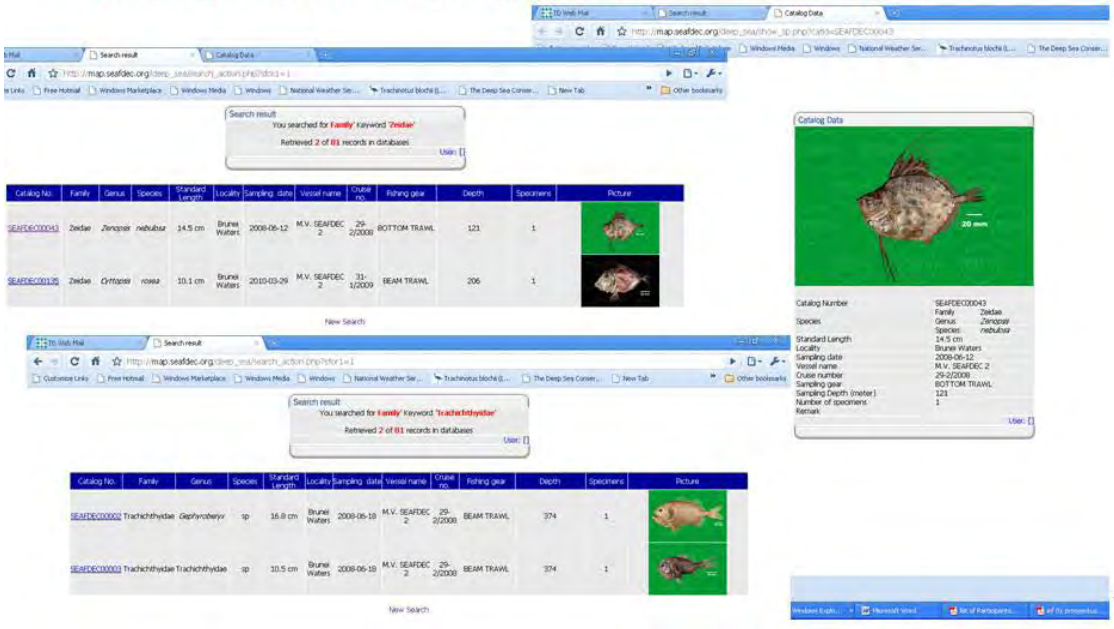
Poster of trawled fish of the Southeast Asian Water:
I- 100 - 370 m
II - 300- 1,200 m

- 500 pcs./type distribute through networks
- Download at http://map.seafdec.org/DeepSea/

43

## Activity5: Information Dissemination

Database of Deep-sea fish in SEAFDEC collection at http://map.seafdec.org/deep_sea/search.php



44

# Potential fisheries resources

- Deep-sea shrimp : pandalid shrimp species (*Heterocarpus woodmasoni, H. hayashi, H. dorsalis*) found in Brunei ,Philippine, Malaysia and Thailand (Andaman sea)

Philippine : A pilot deep-sea shrimp trap fishery
-Improve efficiency of fishing gear
- Study impact to deep-sea ecosystem
-Cost-benefit study

Aim: to formulate a management plan/policy on deep-sea shrimp trap fishery

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# Thank you

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## Annex 5: General procedure for sampling, identification and collection management of deep-sea fishes

**By Dr. Yoshinobu Konishi**

# General procedure for sampling, Identification and collection management of deep-sea fishes

KONISHI Yoshinobu

Blackedge greeneye
*Chlorophthalmus acutifrons*

## Procedure of fish collection

1 Sampling of deep-sea fishes
- onboard sampling with sampling gears
- fish-market sampling

2 Handling of fish specimens
- freezing
- cold storage with ice
- preservation in 10% formalin solution

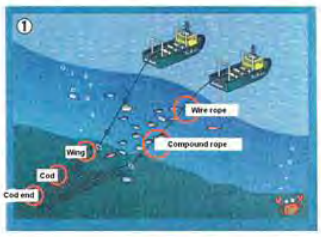
3 Identification
- photography
- muscle sampling for DNA analysis

4 Collection management
- registration of specimens in database
- storage of registered specimens in the dark and cool space, and the tissues in refrigerater

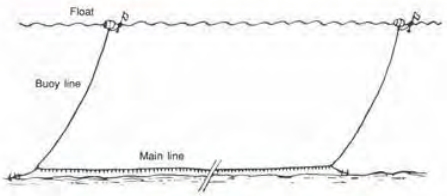
◎ *Request of identification for unknown specimens*

# 1. Sampling of deep-sea fishes (gears )

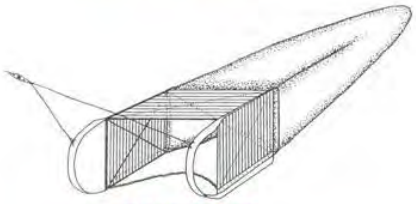
## Demarsal fishes




Bottom trawl




Bottom horizontal longline



Beam trawl

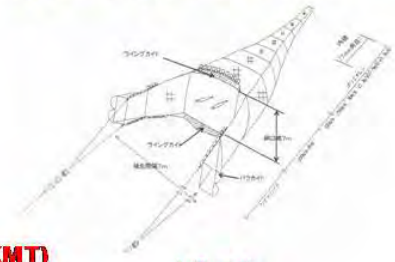
Trap

**Note: gear(s) to be used is depending on sea bed topography, and has fish-size and species selectivity**

# 1. Sampling of deep-sea fishes (gears)

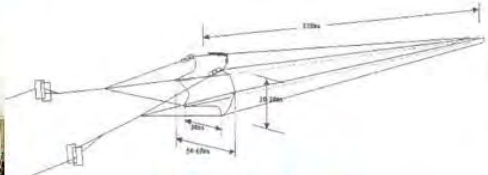
## Bathypelagic fishes

Isaacs Kidd Midwater Trawl (IKMT)



LC net

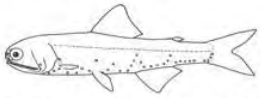
Rectangular Midwater Trawl (RMT)



Midwater Trawl

Hatchetfish (Sternoptychidae)

Bristlemouth (Gonostomatidae)

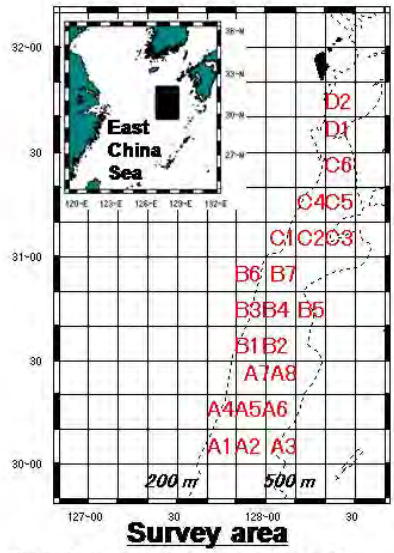


Lantern fish (Myctophidae)

Snaggletooth (Astronesthidae)

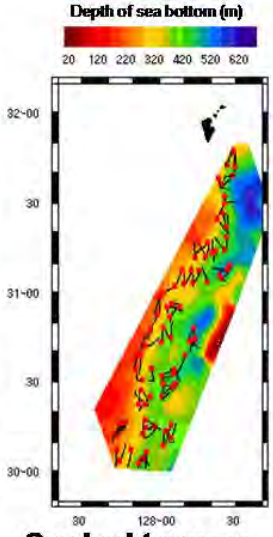
Bigscale fish (Melamphaidae)

# Bottom trawl survey at the continental slope in the northern East China Sea (July-August 2008)



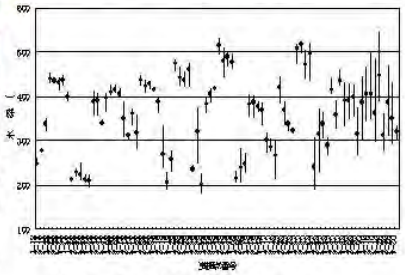

**Survey area**

3 to 4 tows of the trawl net in each of 23 sub-area (10' Long. X 10' Lat.)




**Sea bed topography and boat tracks at net tow** (84 hauls; red circle: starting point)

**Commercial fishing boat of pair bottom trawl used for the survey** (162 gross tons)



**Sea depth changes during net haul** (X ax.: sea depth (m); Y ax.: station)

## Landed fishes (1)

Common squid
*Todarodes pacificus*

Japanese splitfin
*Synagrops japonicus*

Deep sea shrimp
*Haliporoides sibogae*

Seaperch
*Malakichthys wakiyae*

Mirror dory
*Zenopsis nebulosa*

Rattail
*Caelorichus* sp.

Rosy seabass
*Doederleinia berycoides*

Rockfish
*Helicolenus ferorovi*

Blackspotted gurnard
*Pterygotrigla hemisticta*

Deepsea smelt
*Glossanodon semifasciatus*

(Photos by Sayan Promjinda)

## Landed fishes – (2)

Silver chimaera
*Chimaera phantasma*

Coffinfish
*Chaunax abei*

Japanese lobster
*Cervimunida princeps*

Gnomefish
*Scombrops boops*

Deepwater scorpionfish
*Setarches guentheri*

Scorpionfish
*Scorpaena neglecta*

Silver eye
*Polymixia japonica*

Japanese lobster
*Metanephrops sagamiensis*

Blackedge greeneye
*Chlorophthalmus acutifrons*

Armoured cusk
*Hoplobrotula armata*

Stargazer
*Xenocephalus elongatus*

Chanenel scabbardfish
*Evoxymetopon taeniatus*

(Photos by Sayan Promjinda)

## Landed fishes – (3)

Yellow sea bream
*Dentex tumifrons*

Japanese armorhead
*Pentacerous japonicus*

Goosefish
*Lophius litulon*

Daggertooth conger pike
*Muraenesox cinereus*

Longfinned bullseye
*Cookeolus japonicus*

Japanese gissu
*Pterothrissus gissu*

(Photos by Sayan Promjinda)

# 1. Sampling of deep-sea fishes (in markets)

**Ranong Fish Market (Thailand)**
- Most of landed fishes were demersal and coral-reef fishes (12 Dec 2009)
- Fishes landed were captured by Thai and Myanmar fisher

***Epinephelus flavocaeruleus***
- Geographical Distribution: Indian Ocean from South Africa and eastward to the Andaman Sea
- Adults (max. size 80 cm) are deep reefs, to depth of 150 m

(Photos by Sayan Promjinda)

# 2. Handling of fish specimens

Freezing (on board)
- Specimens are kept frozen until identification in laboratory
- To avoid drying the specimens, each of them is better to be kept into a plastic bag or be covered with wrap

Cold storage with ice (on board, at fish market)
- Specimens are kept in a cooler with ice until identification in laboratory

Preservation in 10% formalin solution (on board, at fish market)
- Under no freezer or limit of capacity of the freezer at specimen sampling/handling, the specimens should be preserved in 10% formalin solution
- Muscle tissues in right-side body of specimen to be registered in database should be sampled before preservation with formalin

**Note:** specimens which have characteristic body color and/or pigment patterns on the fin membranes are better to be taken photo prior to the handling above

## Preservation of specimens in 10% formalin solution


Extend fins with pins


Keep specimens in tupperware with 10% formalin


Apply undiluted formalin to the fin bases with a brush pen for keeping fins extended

**Note:** after at least one-week preservation in 10% formalin solution the specimens should be washed in freshwater and kept in 70% ethanol for long-term preservation

## Example of characteristic body color and pigment on body and fins

**A part of key to Indo-Pacific species of *Cephalopholis* (from FAO species catalogue, vol. 16)**

7a. Pectoral fins short, their length contained 1.5 to 1.8 times in head length; color generally brown or yellowish brown, with dark blue lines on head, body and fins (Fig. A) ····· *C. formosa*

7b. Pectoral fins 1.3 to 1.6 in head length; body brown, usually with 7 or 8 dark bars; no blue lines on head or body; fins dark brown, with a pale blue line at corners of caudal (Fig. B) ····· *C. boenak*


# 3. Identification (laboratory work)

## Identification

- Defrosting of frozen specimens prior to identification (sometimes from one-day before )
- Identification of specimens with references

## Photography

- Taking pictures of important specimens scientifically

## Tissues sampling for DNA analysis

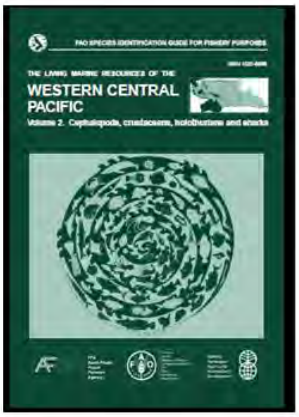
- Sampling of muscle in the right-side body for specimens to be registered in database

* DNA analysis is useful for verification of the original identification and larval fish identification

## Preservation of specimens

- Preservation of fresh specimens in 10% formalin solution for collection (the specimens should be transferred into 70% ethanol 1 week to 1 month later)

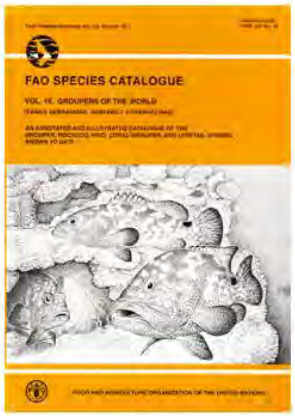
## Some useful references for identification of fishes in the Southeast Asian region




http://www.fao.org/docrep/009/x2400e/x2400e00.HTM

**FishBase:**
http://www.fishbase.org/


Nakabo, T. (ed.) 2002: Fishes of Japan with pictorial keys to the species (English edition). Tokai University Press, Tokyo, 1749pp.




Heemstra, P.C. and J. E. Randall. 1993: Groupers of the world (family Serranidae, subfamily Epinephelinae). FAO Fisheries Synopsis, no. 125, vol.16, 382pp.

# Photography and tissues sampling

**Photos:**
***Pristigenys niphonia*** **(upper)**
***Callanthias japonicus*** **(lower)**

**Tissues samples in 90% ethanol**

- **Cut a small piece of muscle in the right-side body (two pieces/specimen)**
- **Put the piece and a label into a vial with 90% ethanol**
- **Keep a tupperware with vials in a refrigerator as tissues collection**

## 4. Collection management

- registration of specimens into database
- storage of the registered specimens in the dark and cool space, and the tissues samples in refrigerator

**Input items of database**
- **catalogue (bottle) number**
- **genus name**
- **species name**
- **no. of individuals**
- **min. body length (mm)**
- **max. body length (mm)**
- **TL/FL/SL**
- **body weight (g)**
- **family name**
- **order name**
- **sampling position/place**
- **sampling date**
- **sampling gear/method**
- **sampling person**
- **identification person**
- **vial no. of tissues**

**Preserved specimen and a water-proof label (catalogue no., species, sampling position, sampling date, family)**

**Storage shelf**

## Package of specimens for request of identification

Fig. 1

Fig. 2

1. Roll a specimen by wet gauze with the preserved solution (Fig. 1)
2. Put the specimen into a reinforced plastic bag (Fig. 2)
3. Seal the opening portion of the plastic bag by impulse sealer
4. Put the plastic bag with the specimen into another plastic bag and seal the outside plastic bag

Impulse sealer →

## Package of specimens for request of identification

Fig. 3

Fig. 4

5. Roll the double plastic bag with the specimen by plastic sheet with air cells
6. Put the specimen rolled by plastic sheet into a box (Fig. 3)
7. Cover the box with hard paper and stick a sticker of "Scientific specimen of fish preserved" (Fig. 4)
8. Send the parcel (or EMS) with the specimen and its data to an expert

## Annex 6: Fish morphology and general characters for identification of deep-sea fishes in the Southeast Asian Region

**By Dr. Toshio Kawai**

**Annex 6**

# Fish morphology and general characters for identification of deep-sea fishes in the Southeast Asian region

- Methods of measurements and counts
- How to identify deep-sea fishes
- Deep-sea fishes from Southeast Asia

Toshio Kawai (Hokkaido University Museum, Japan)

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- Methods of measurements and counts
- How to identify deep-sea fishes
- Deep-sea fishes from Southeast Asia

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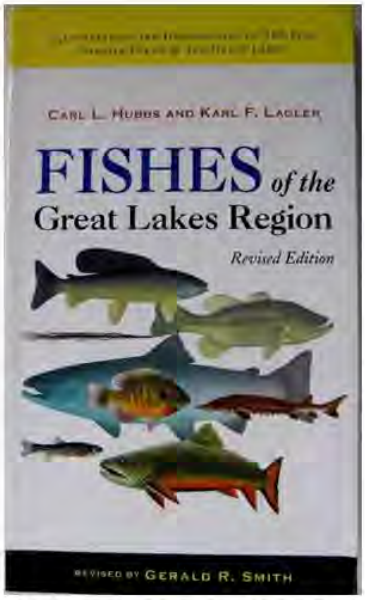
# Methods of measurements and counts

Hubbs, C. L. and K. F. Lagler (1947) Fishes of the Great Lakes region.

Hubbs, C. L. and K. F. Lagler (1958) Fishes of the Great Lakes region.

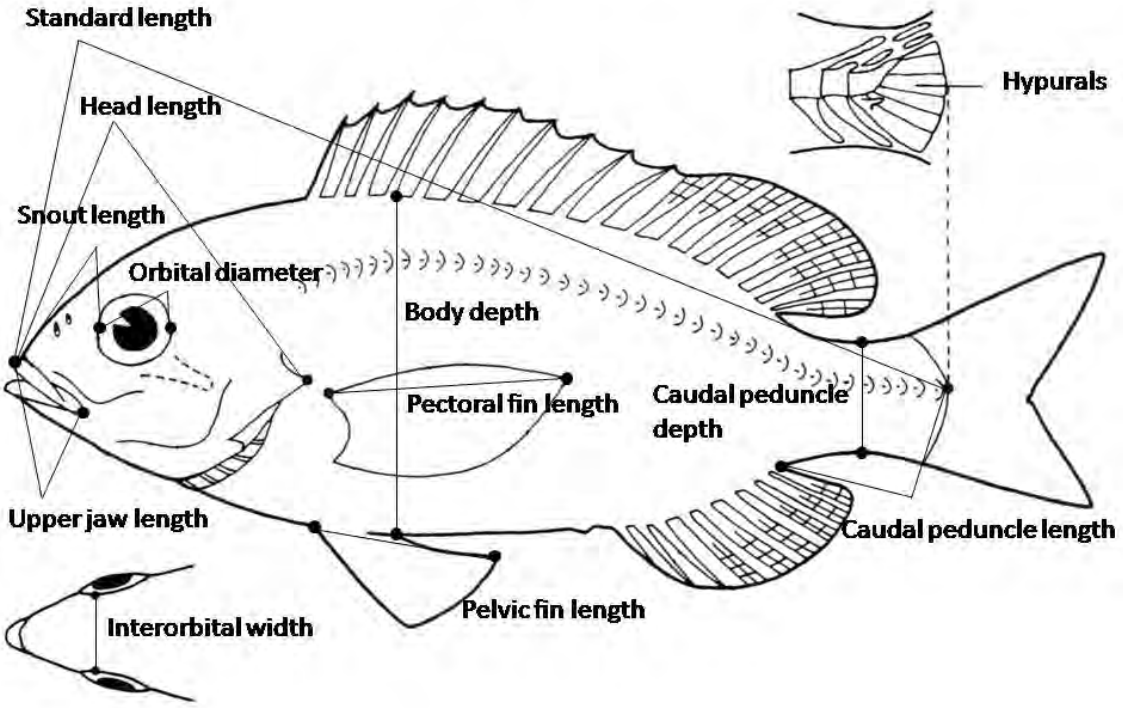
Hubbs, C. L. and K. F. Lagler (1964) Fishes of the Great Lakes region.

Hubbs, C. L. and K. F. Lagler (2004) Fishes of the Great Lakes region. Revised edition.

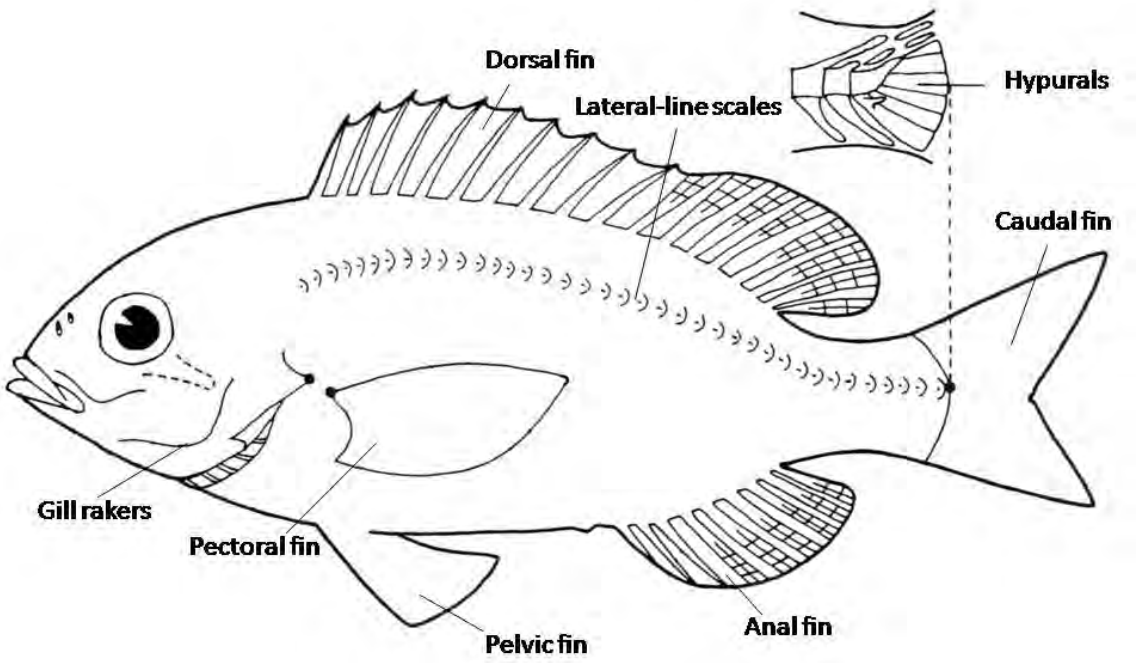



Hubbs and Lagler (2004)

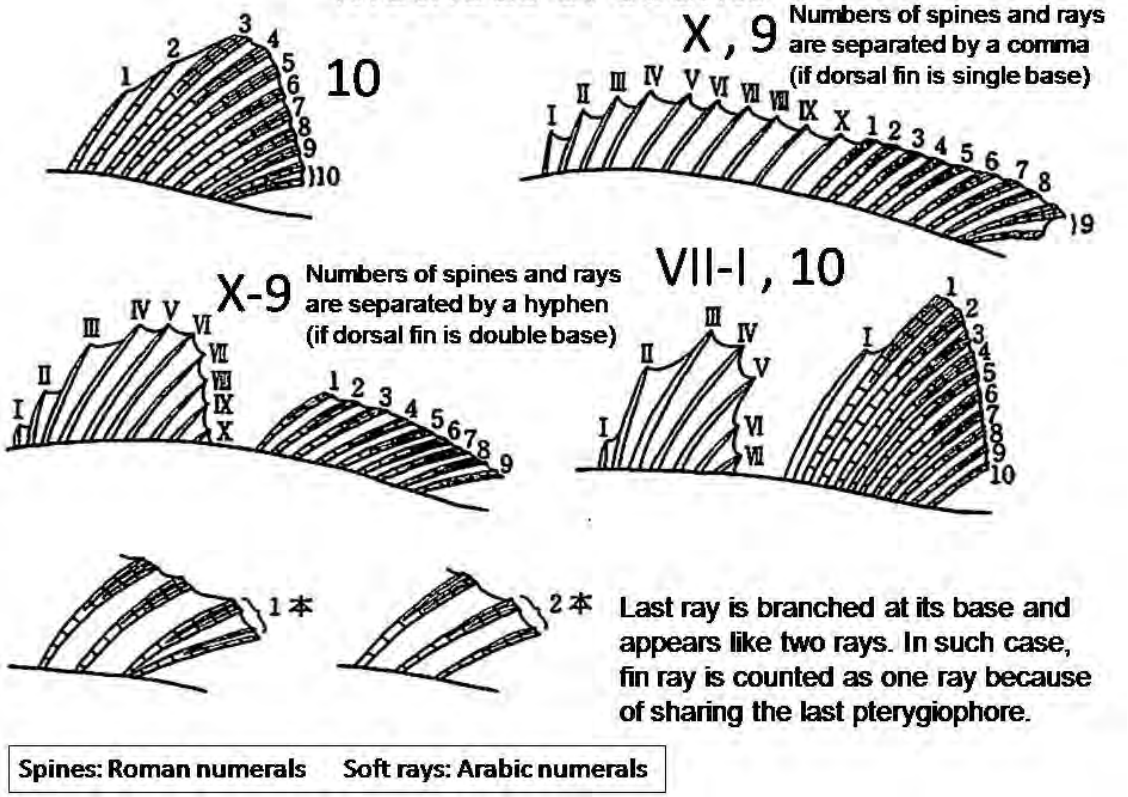
# Methods of measurements



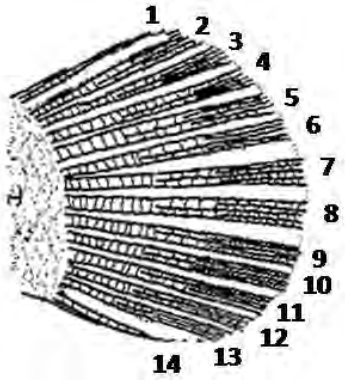
# Methods of counts




# Methods of counts



## Principal caudal fin counts




Branched rays +Two unbranched rays

12+2=14

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- Methods of measurements and counts
- How to identify deep-sea fishes
- Deep-sea fishes from Southeast Asia

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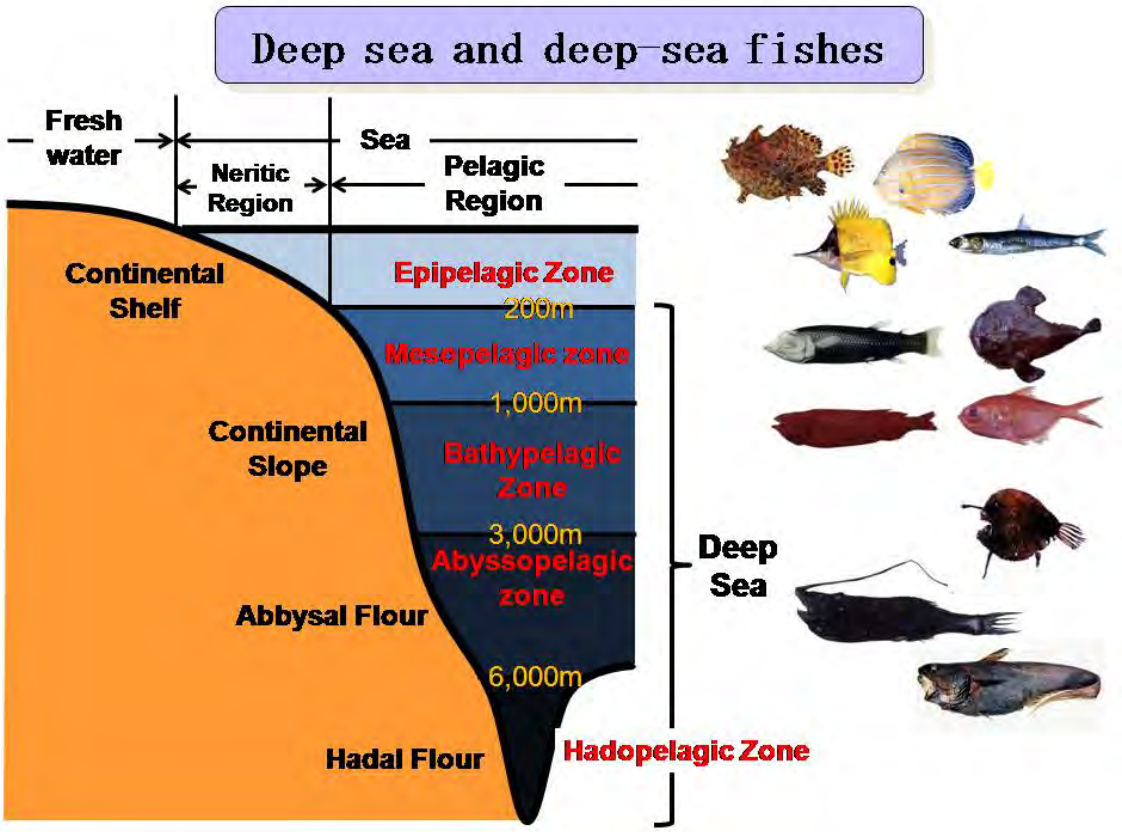
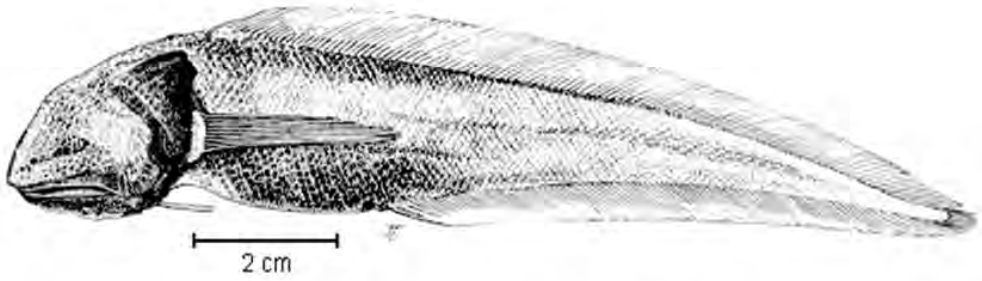



# Record of deepest fish




*Abyssobrotula galatheae* (Ophidiidae)

★8,370 m depth from the Caribbean Sea, Puerto Rico
Nielsen (1977)

## *Pseudoliparis amblystomopsis*

Japan Trench
7,703 m depth



By Takashi P. Satoh (National Museum of Mature and Science, Tokyo) **Put cut fish in the case**


*Pseudoliparis amblystomopsis* By Ocean Research Center, University of Tokyo

# How to identify deep sea fishes?

Method : Deep Sea Fishes = Shallow Water Fishes

Family level identification

↓

(Genus level identification if needed)

↓

Species level identification

---

## Family level identification

Nakabo (2002)
Fishes of Japan with pictorial keys to the species

**Most fish families around western North Pacific are included in this book**

Not found ↓


Nelson (2006) Fishes of the World. Fourth Edition
No Identification Key

**e.g. Hispidoberycidae**

Remember fish faces

---

# Picture books

1. Shen S.-C. (ed.). 1984
   Coastal fishes of Taiwan. Department of Zoology, National Taiwan University, Taipei, 189pp.
2. Masuda, H., K. Amaoka, C. Araga, T. Uyeno & T. Yoshino. (eds.). 1984
   The fishes of the Japanese Archipelago. Tokai Univ. Press, Tokyo, 437pp.
3. Gloerfelt-Tarp, T. & P. J. Kailola. 1984
   Trawled fishes of southern Indonesia and northwestern Australia. Australia Develop. Assist. Bureau, Direct. Gener. Fish., Indonesia, German Agency Tech. Coop., 406pp.
4. Shen S.-C. (ed.). 1993
   Fishes of Taiwan. Department of Zoology, National Taiwan University, Taipei, 961pp. (in Chinese)
5. OFCF, Japan & AMFR, Indonesia. 2006
   The Japan-Indonesia deep sea fishery resources joint exploration project (photo album)


# Genus level identification (if needed)

Carpenter & Niem (1999) FAO species identification field guide for fishery purposes. The living marine resources of the western central Pacific.

# Species level identification

Carpenter & Niem (1999) FAO species identification field guide for fishery purposes. The living marine resources of the western central Pacific.

No key ↓

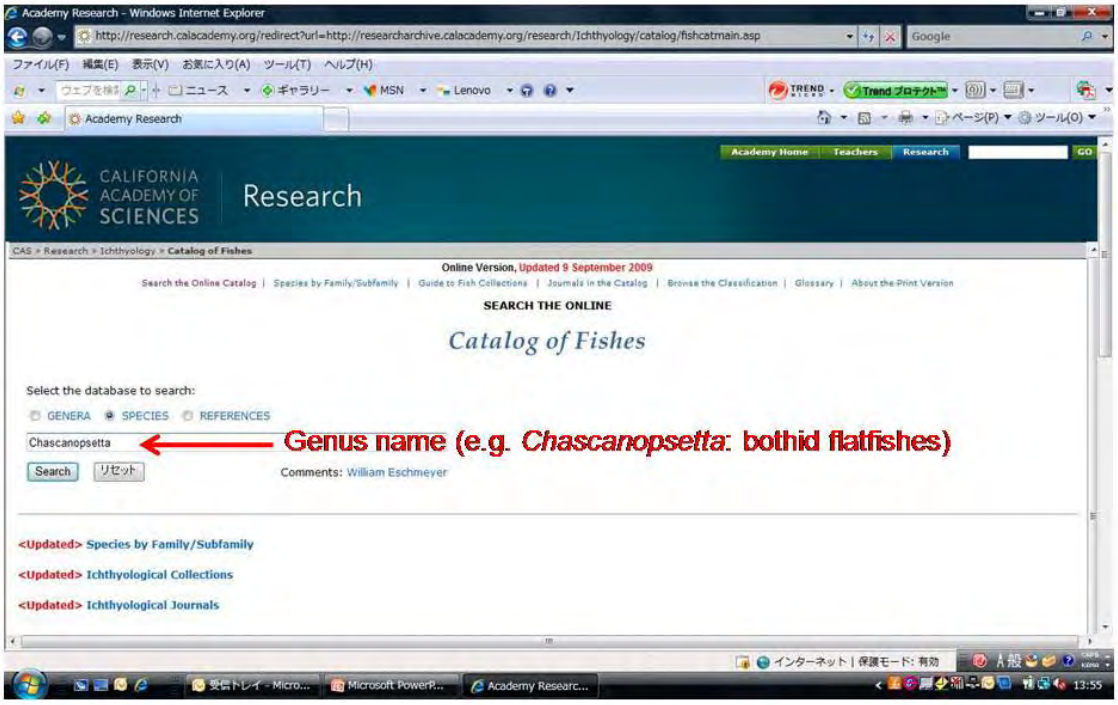
Eschmeyer (on line version) Catalog of Fishes, California Academy of Science

↓

Find manuscripts

---

# Eschmeyer (on line virsion) Catalog of Fishes

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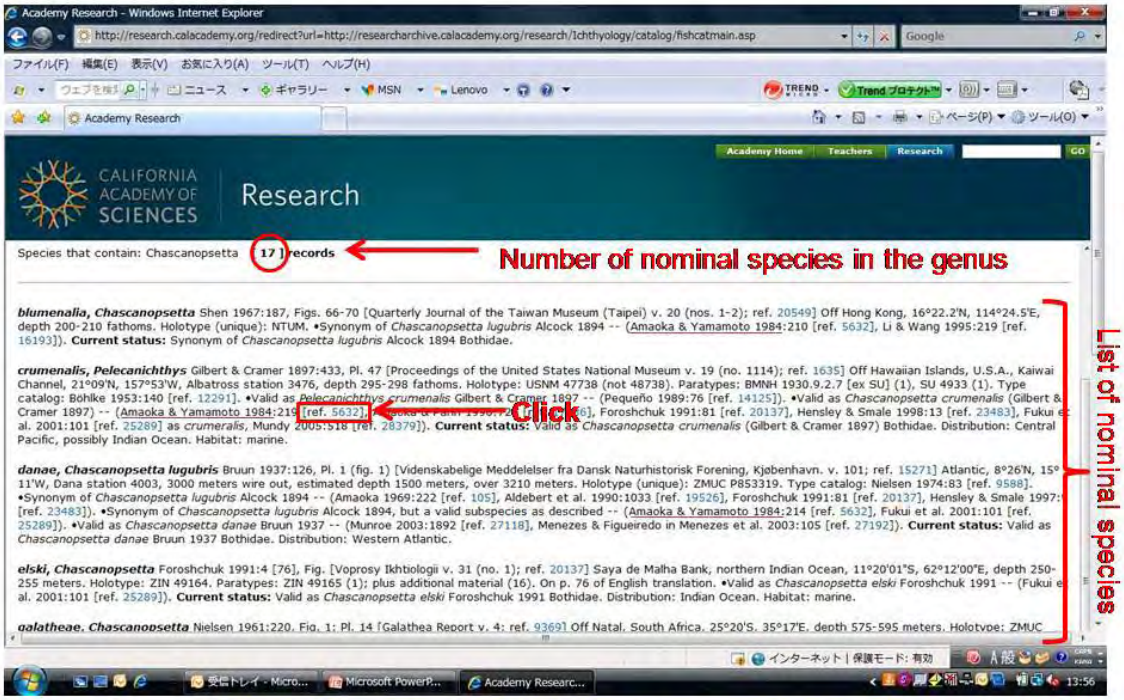
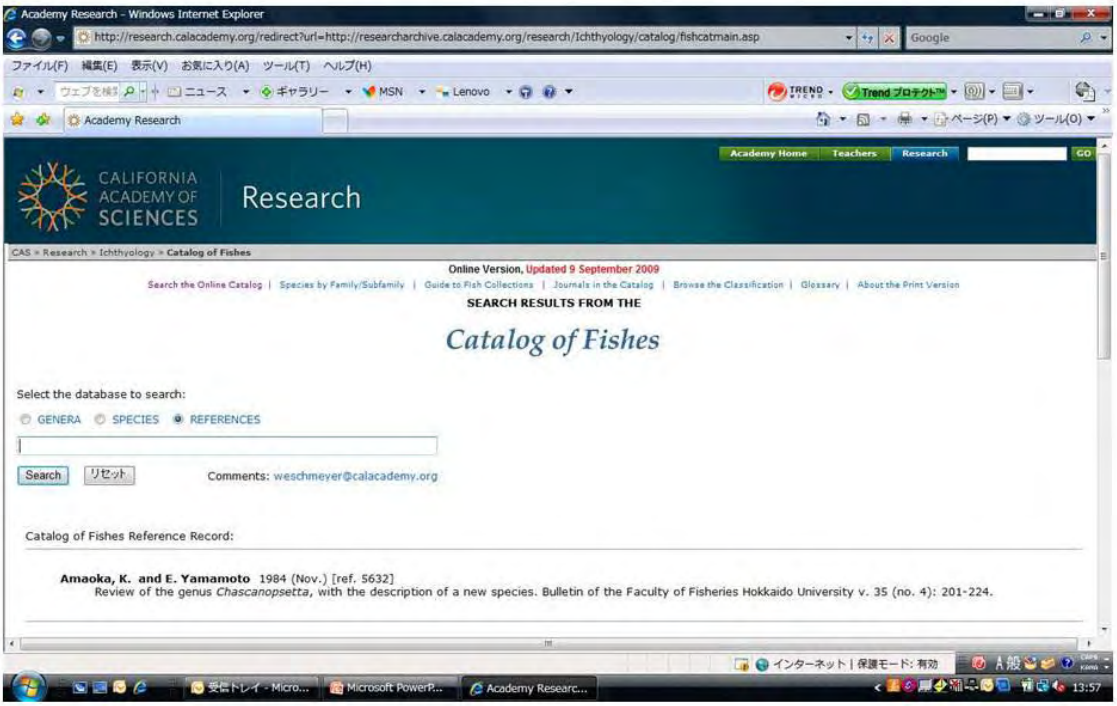
**(continued)** **Annex 6**

# Eschmeyer (on line virsion) Catalog of Fishes




**Look for a manuscript which quote many species.**

# Eschmeyer (on line virsion) Catalog of Fishes



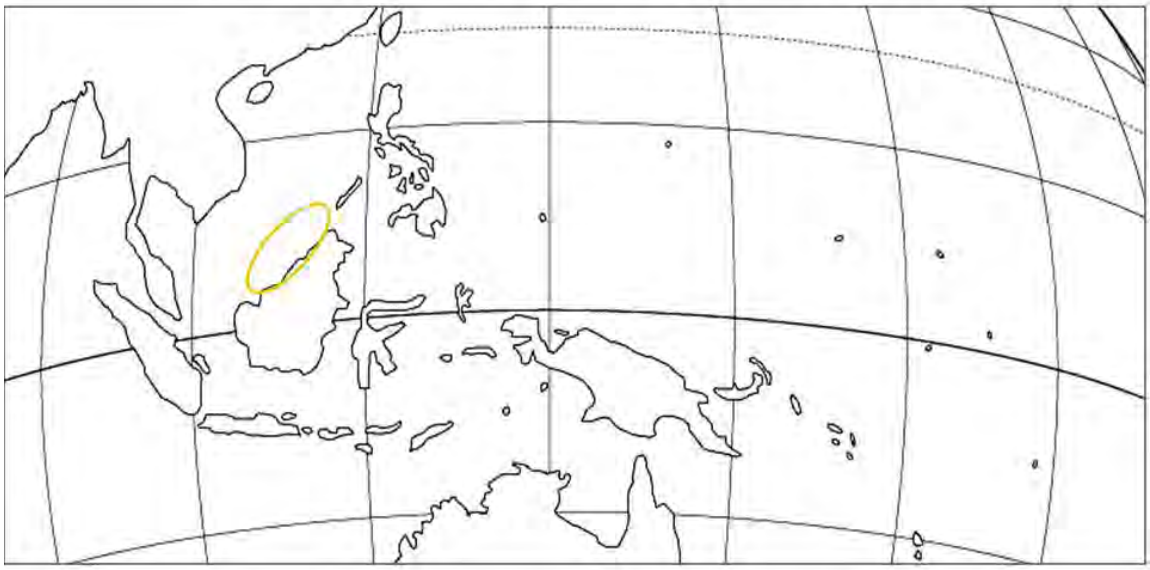
## Genus *Chascanopsetta*

| | Nominal species | Valid species |
|---|---|---|
| Amaoka & Yamamoto (1984) | 14 species | 5 species 2 subspecies |
| key to species of the genus | 1 step | |
| Amaoka & Parin (1990) | 15 species | 6 species 2 subspecies |
| *C. megagnatha* sp. nov. | 2 step (if not identified by 1 step) | |
| Foroshchuk (1991) | 16 species | 7 species 2 subspecies |
| *C. elski* sp. nov. | | |
| Hensley & Smale (1998) | 17 species | 8 species 2 subspecies |
| *C. kenyaensis* sp. nov. | | |

undescribed species → new species

- Methods of measurements and counts
- How to identify deep-sea fishes
- Deep-sea fishes from Southeast Asia

## Deep-sea fishes from Southeast Asia



**Malaysia: 130-513 m depth**

**Other deepsea fishes from Southeast Asia**

---

# Myxiniformes

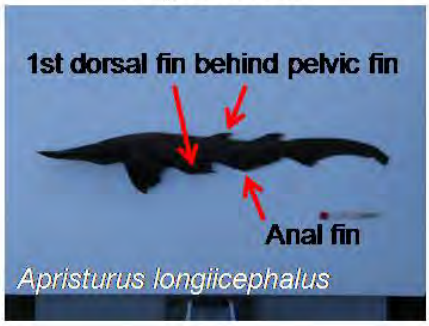
## Myxinidae


**Mouth without jaws, a simple hole beneath snout**
**3 pairs of barbels**

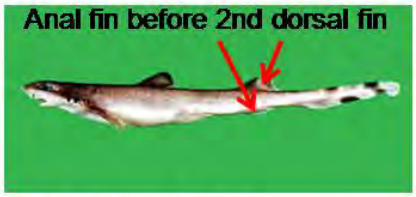
---

# Elasmobranchii 1

**Scyliorhinidae**

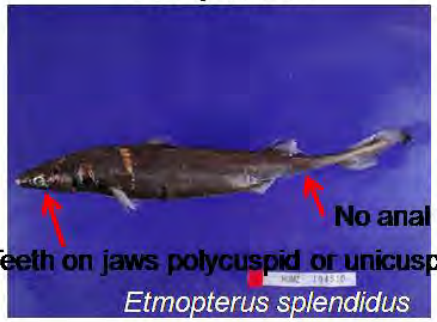



**Proscyllidae**
**(Not deepsea fishes)**

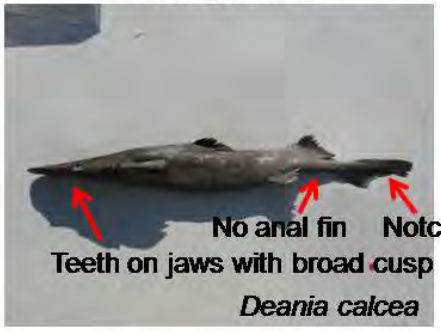



*Eridacnis radcliffei*

**Etmopteridae**




**Centrophoridae**

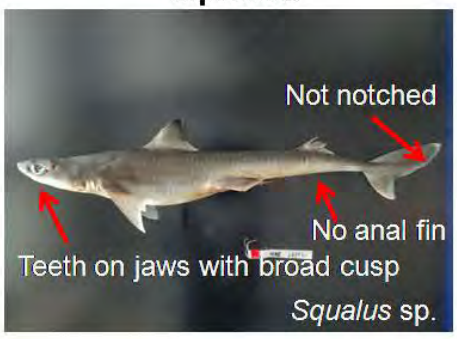



# Elasmobranchii 2

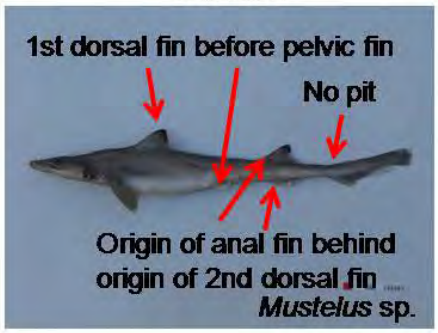
**Mitsukurinidae**


*Mitsukurina owstoni*

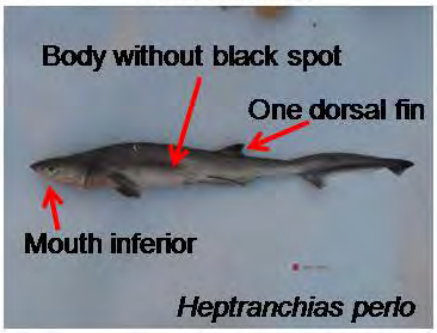
**Squalidae**




**Triakidae**




**Hexanchidae**



# Elasmobranchii 3

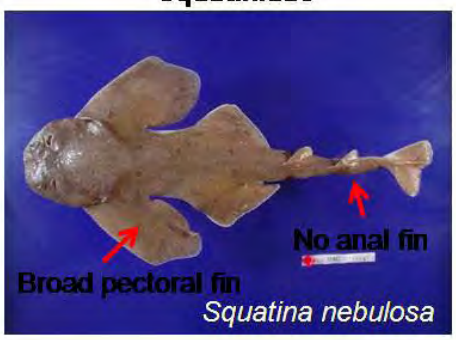
**Rhinobatidae**


*Rhinobatos schlegelii*

**Rajidae**

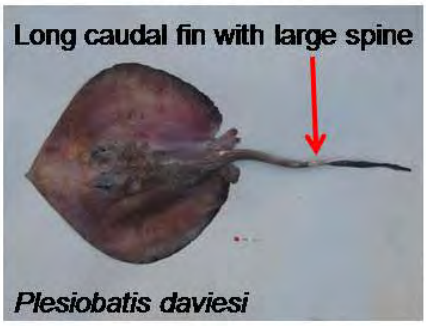

**Narcinidae**


**Squatinidae**




# Elasmobranchii 4

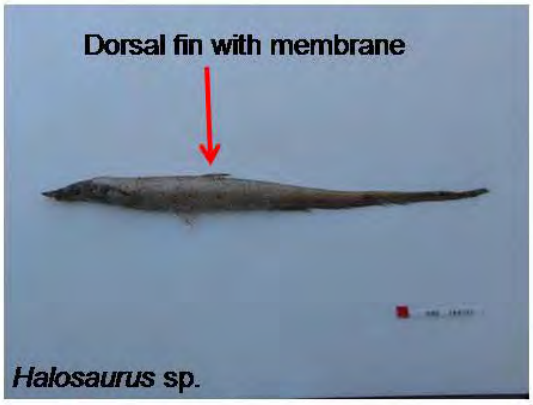
**Plesiobatididae**



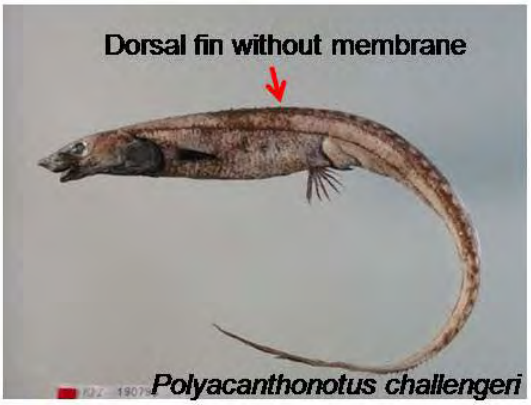

**Hexatrygonidae**

# Notacanthiformes

Halosauridae

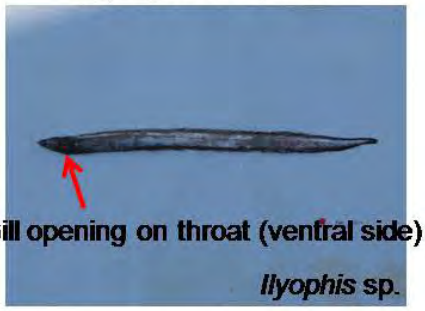



Notacanthidae




# Anguilliformes 1

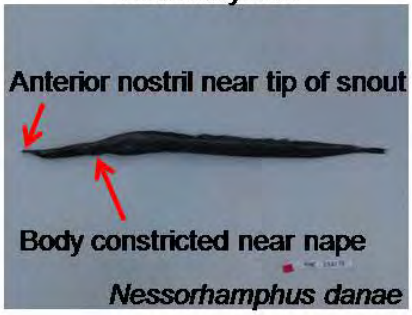
Synaphobranchidae




Colocongridae


Congridae

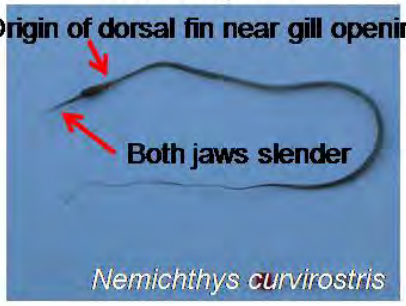
Derichthyidae



# Anguilliformes 2

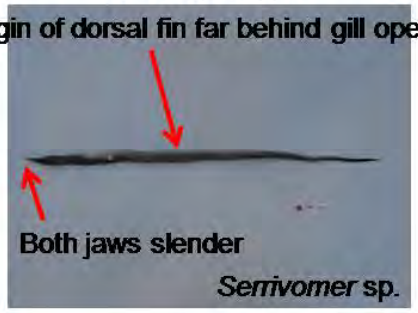
**Nemichthyidae**

Origin of dorsal fin near gill opening




**Serrivomeridae**

Origin of dorsal fin far behind gill opening




**Nettastomatidae**

Anterior nostril near tip of snout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# Anguilliformes 3

**Moringuidae**
**(Not deepsea fishes)**


**Ophichthidae**
**(Not deepsea fishes)**


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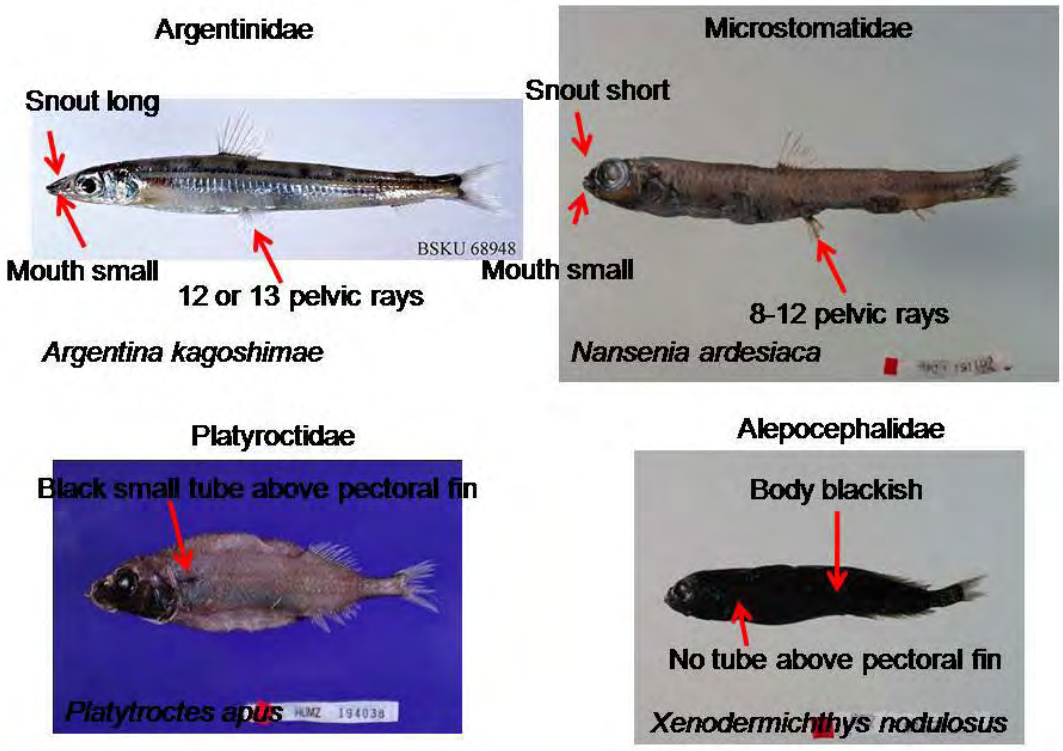
# Argentiniformes




# Argentiniformes 2

## *Macropinna microstoma*

From Monterey Bay Aquarium

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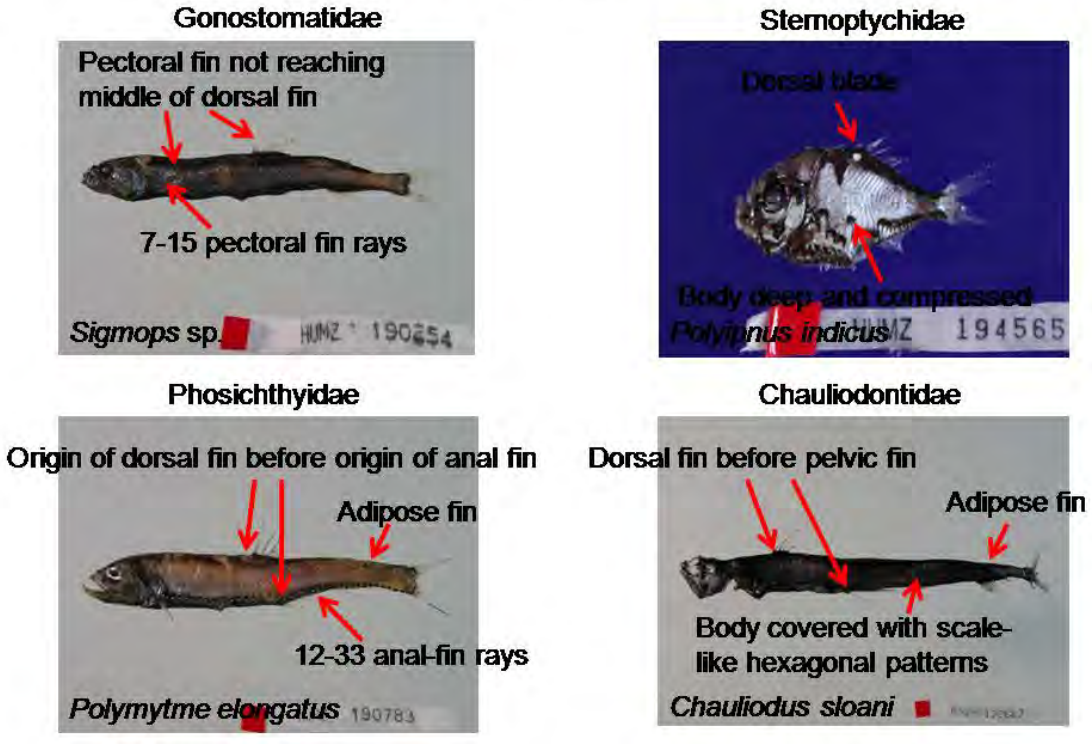
## Stomiiformes 1

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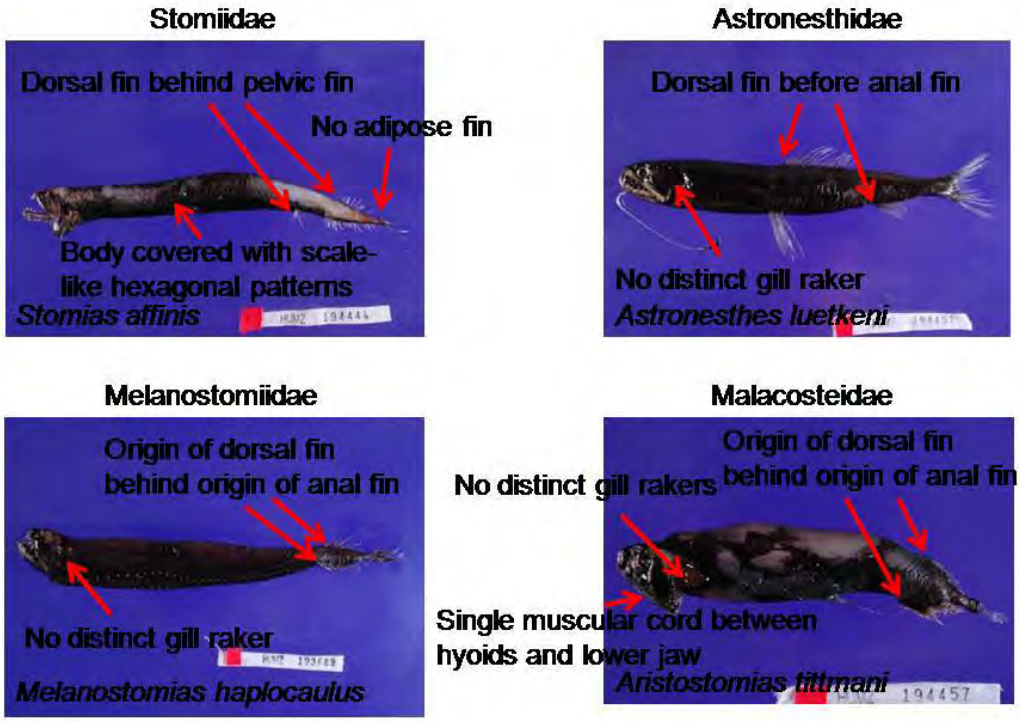
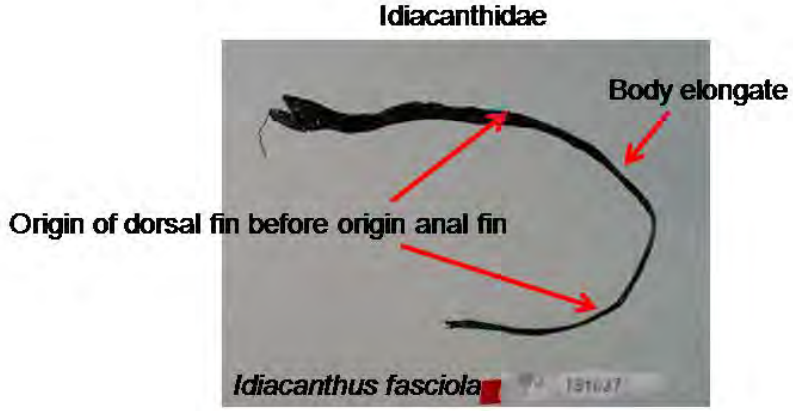
# Stomiiformes 2

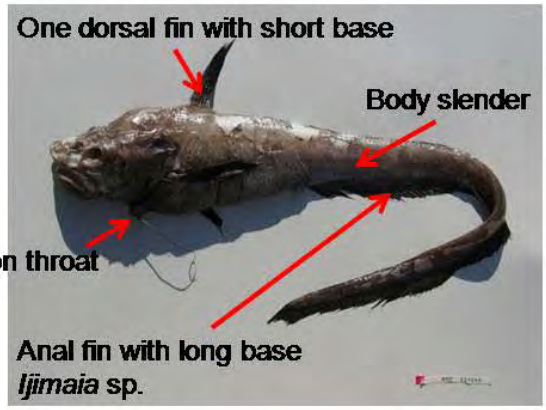



# Stomiiformes 3



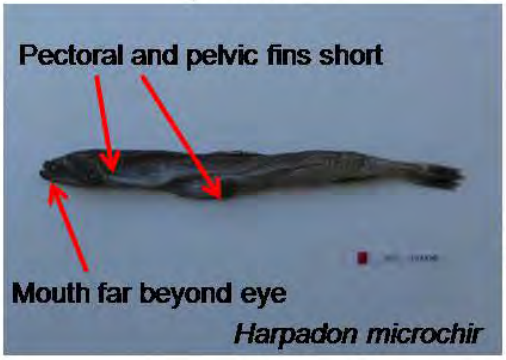
# Ateleopodiformes

**Ateleopodidae**

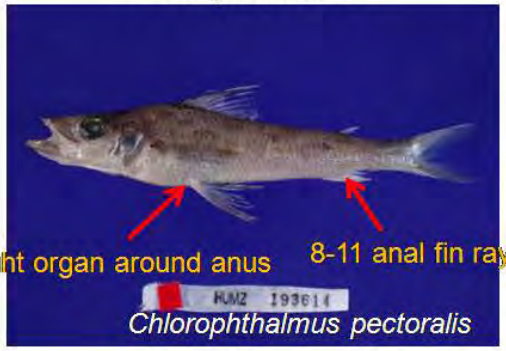



# Aulopiformes 1

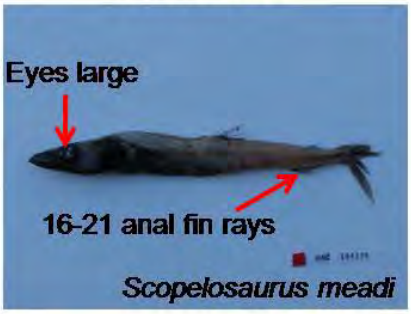
**Synodontidae**



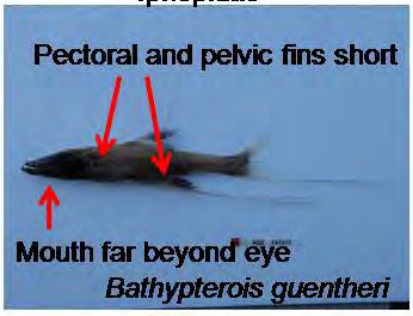

**Chlorophthalmidae**




**Notosudidae**

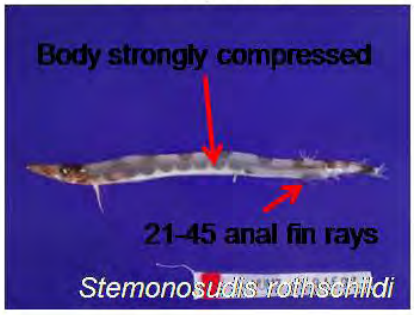



**Ipnopidae**

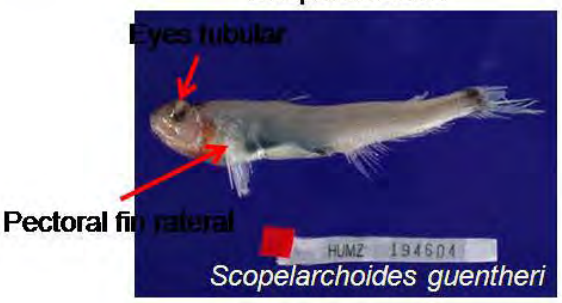


# Aulopiformes 2

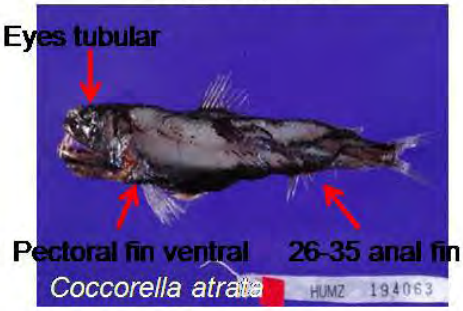
**Paralepididae**



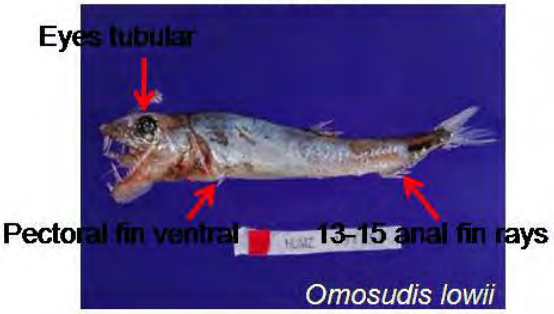

**Scopelarchidae**




**Evermannellidae**

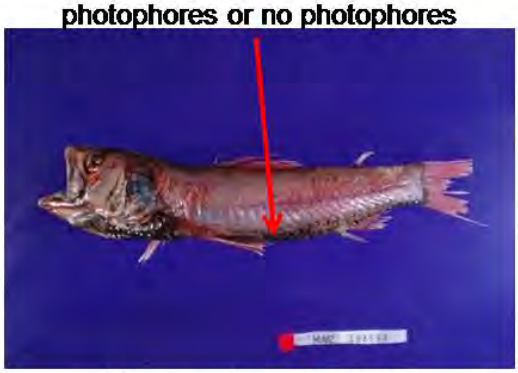



**Omosudidae**




# Myctophiformes

**Neoscopelidae**
**Body with longitudinal row of photophores or no photophores**



*Neoscopelus microchir*

**Myctophidae**
**Body with not longitudinal row of photophores**

# Neoscopelidae

*Neoscopelus microchir*

Lateral series of photophores extending beyond origin of anal fin

*Scopelengys tristis*

No photophores

*Neoscopelus macrolepidotus*

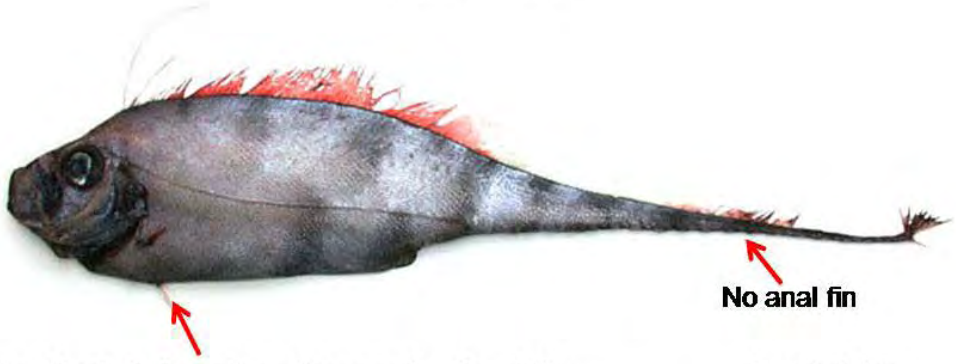
Lateral series of photophores not extending beyond origin of anal fin

*Neoscopelus porosus*

3 series of photophores behind pelvic fin to origin of anal fin

# Lampridiformes

Trachipteridae



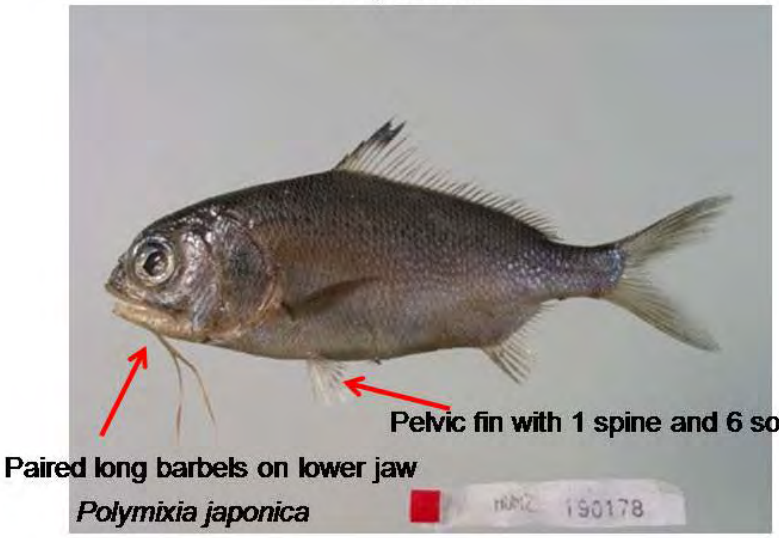
No anal fin

Small pelvic fin in juveniles, disappearing in adults

*Zu cristatus*

# Polymixiiformes

**Polymixiidae**




# Gadiformes

**Moridae**


**Melanonidae**


**Bregmacerotidae**


**Macrouroidae**


**Macrouridae**

# Macrouridae (1)

*Caelorinchus*

Snout long, pointed

*Abyssicola*

Second dorsal spine smooth

Snout blunt

*Coryphaenoides*

Second dorsal spine serrated

Snout blunt 6 branchiostegal rays

*Nezumia*


Mouth small

Anus well separated from origin of anal fin

*Ventrifossa*

Mouth large

Anus well separated from origin of anal fin

*Cetonurus*

Head large

Anus close to origin of anal fin

# Macrouridae (2)

*Pseudonezumia*

Scales absent on branchiostegal membrane

6 pelvic rays

*Hymenogadus*

Body cylindrical

Anus close to origin of anal fin

*Malacocephalus*

First dorsal fin II, 10-14

Scales present on branchiostegal membrane

*Hymenocephalus*

Body compressed

Anus close to origin of anal fin

# Macrouridae (3)

*Gadomus*

Two dorsal fins close to each other

Long uppermost pectoral ray

Long barbel on lower jaw

*Bathygadus*

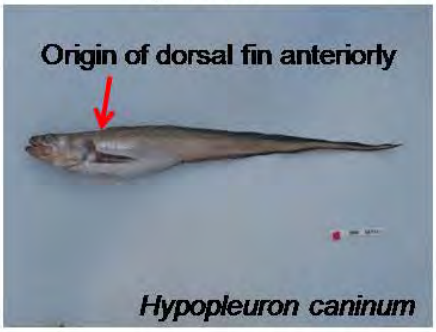
second dorsal fin more developed

No pectoral rays elongated

No barbels or minute barbels on jaw

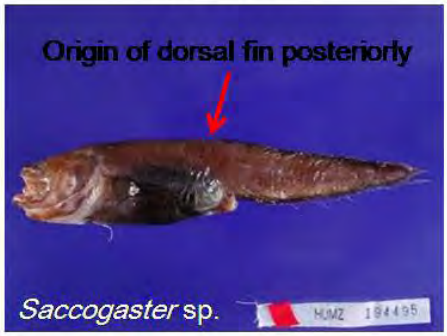
# Ophidiiformes

Ophidiidae




Carapidae


Bythitidae



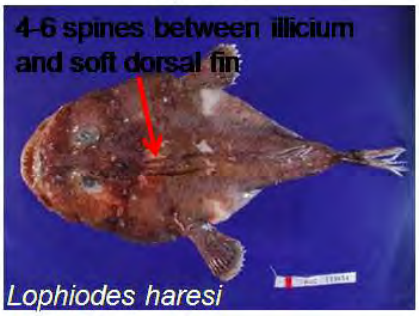

Aphyonidae

Eye indistinct

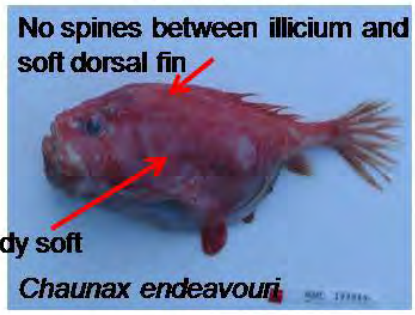

Pelvic fin with single ray

# Lophiiformes 1

**Lophiidae**




**Chaunacidae**




**Ogcocephalidae**


**Ceratiidae**


# Lophiiformes 2

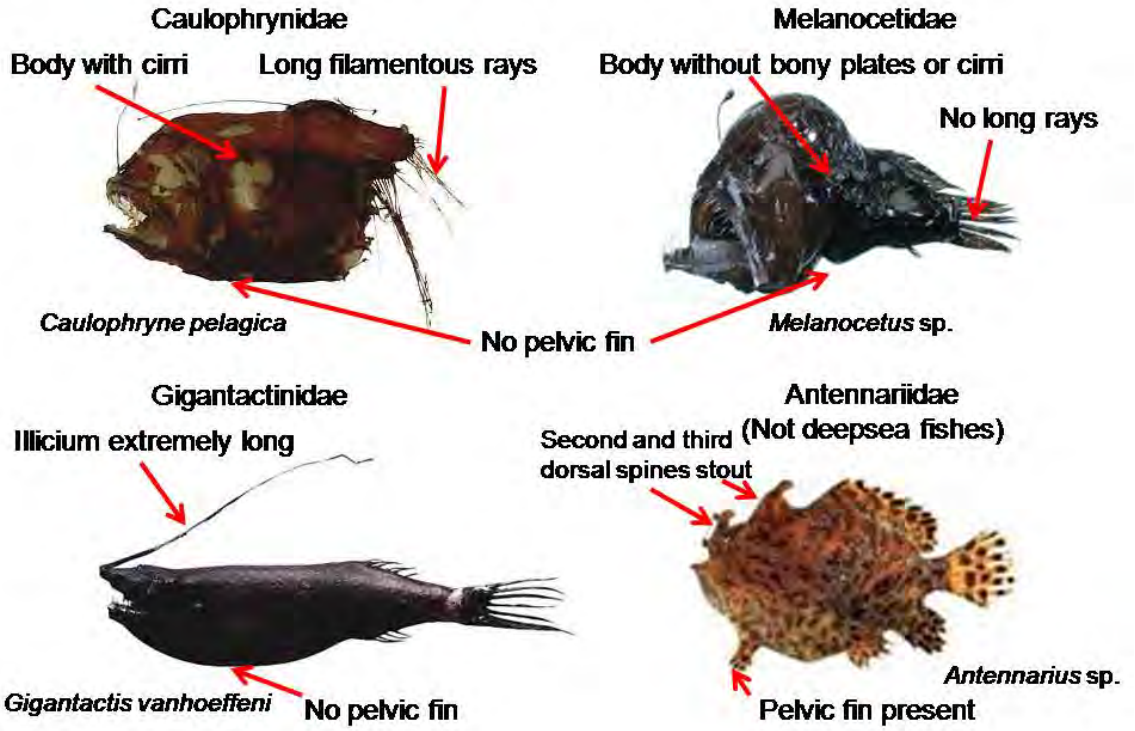
**Linophrynidae**


**Oneirodidae**

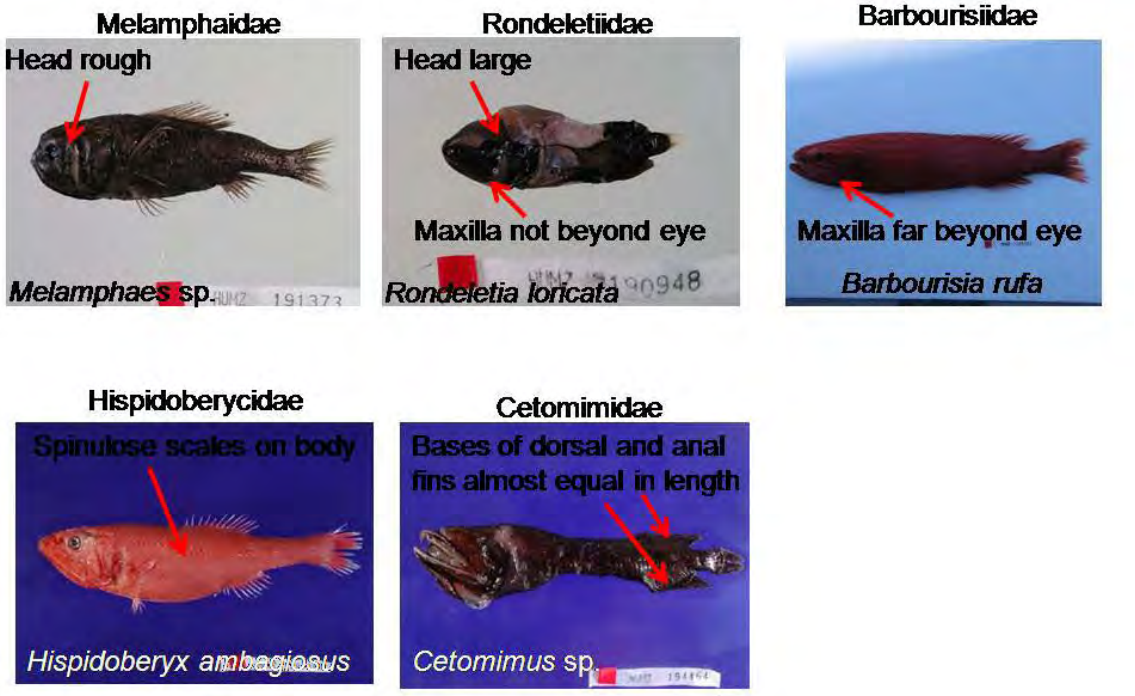

**Diceratiidae**


**Himanotolophidae**

# Lophiiformes 3

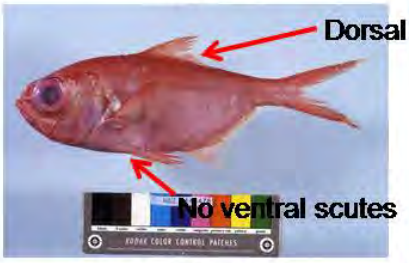



# Stephanoberyciformes



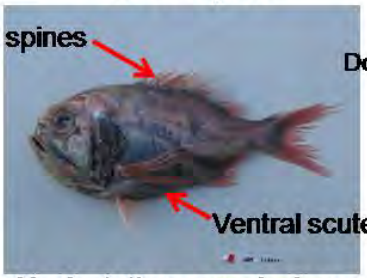
# Beryciformes

**Berycidae**




*Beryx splendens*

**Trachichthyidae**

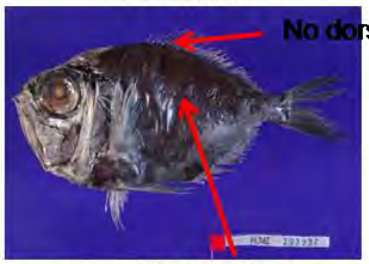



*Hoplostethus crassispinus*

**Holocentridae**
**(Not deepsea fishes)**

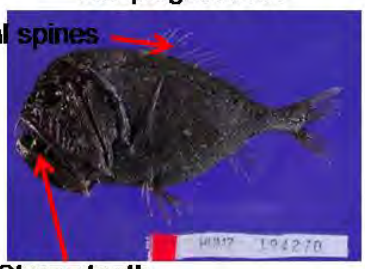
Dorsal fin with 11-13 hard spines

**Diretmidae**




*Diretmoides pauciradiatus*

**Anoplogastridae**



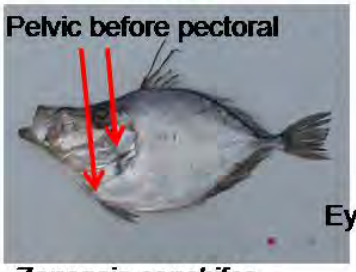

*Anoplogaster cornuta*

# Zeiformes

**Macrurocyttidae**


*Zenion japonicum*

**Zeidae**

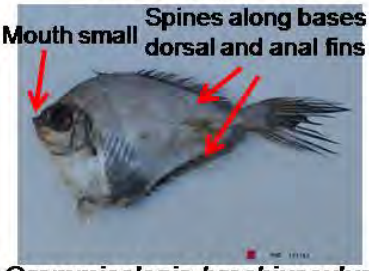



*Zenopsis conchifer*

**Oresomatidae**

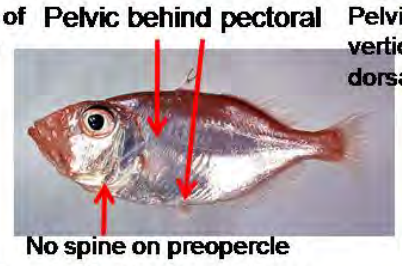

*Neocyttus acanthorhynchus*

**Grammicolepididae**




*Grammicolepis brachiusculus*

**Parazenidae**




*Parazen pacificus*

**Caproidae**


*Antigonia rubicunda*

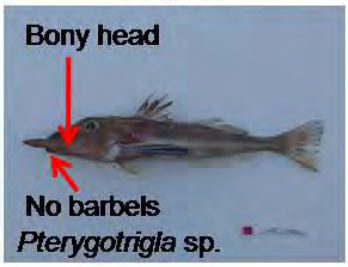
## Gasterosteiformes

**Fistulariidae**
**(Not deepsea fishes)**

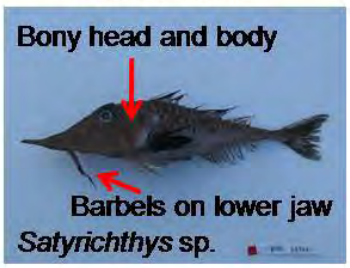

**Syngnathidae**
**(Not deepsea fishes)**


## Scorpaeniformes1

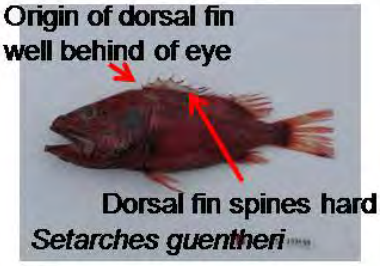
**Triglidae**



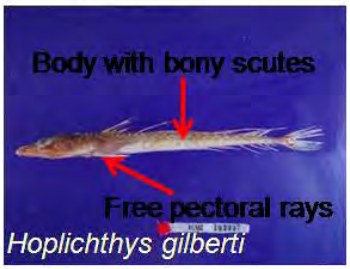

**Peristediidae**




**Scorpaenidae**



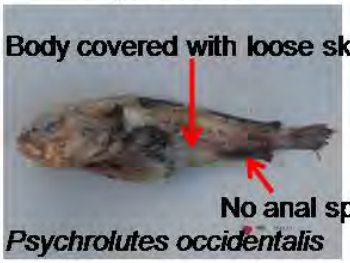

**Hoplichthyidae**



# Scorpaeniformes2

**Hoplichthyidae**

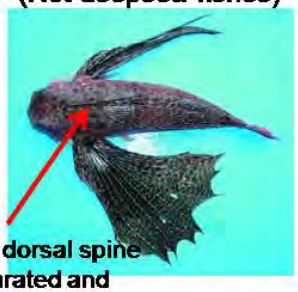

**Psychrolutidae**




**Platycephalidae**
**(Not deepsea fishes)**


**Anal fin without spines**

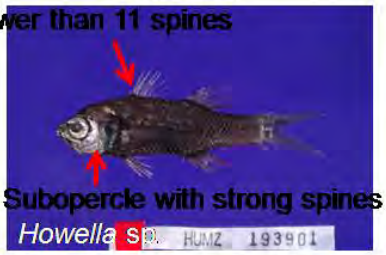
**Dactylopteridae**
**(Not deepsea fishes)**



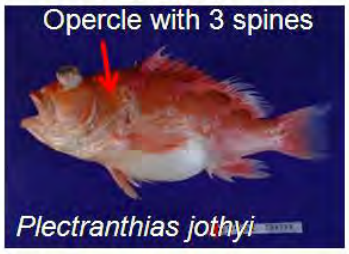

# Perciformes 1

**Acropomatidae**


**Howellidae**

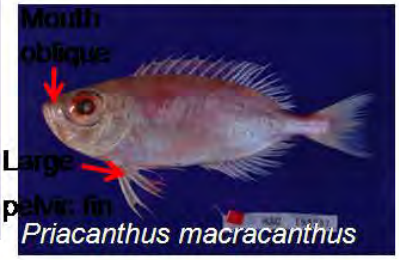



**Serranidae**




**Ostracoberycidae**


**Priacanthidae**




**Apogonidae**
**(Not deepsea fishes)**


**Anal fin with 2 spines and 8-18 rays**

# Perciformes 2

**Epigonidae**


**Nemipteridae**


**Malacanthidae**
**(Not deepsea fishes)**

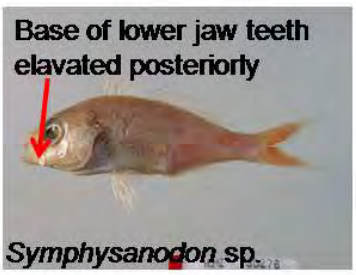

**Cepolidae**


**Centrolophidae**


**Nomeidae**

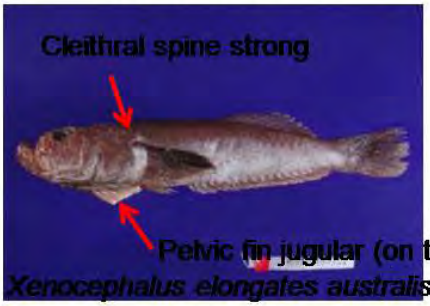

# Perciformes 2

**Symphysanodontidae**




**Sciaenidae**


**Uranoscopidae**

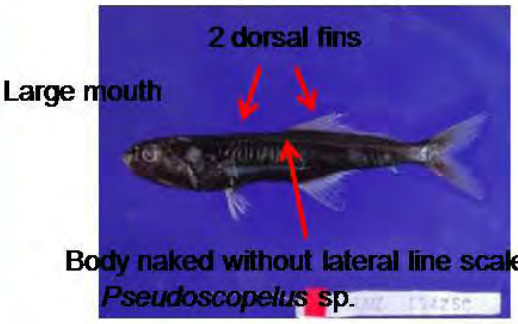



**Gobiidae**

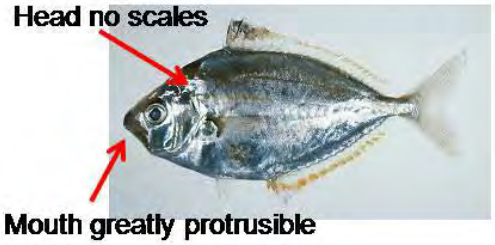
# Perciformes 3

**Percophidae**


**Chiasmodontidae**



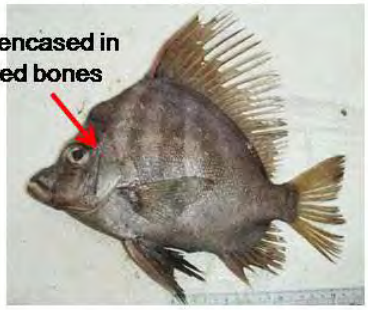

**Leiognathidae**
**(Not deepsea fishes)**



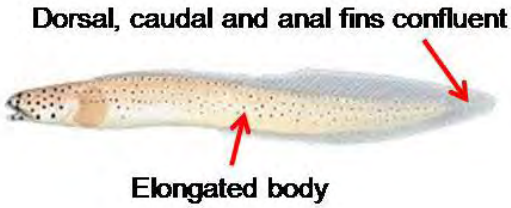

**Mullidae**
**(Not deepsea fishes)**


# Perciformes 4

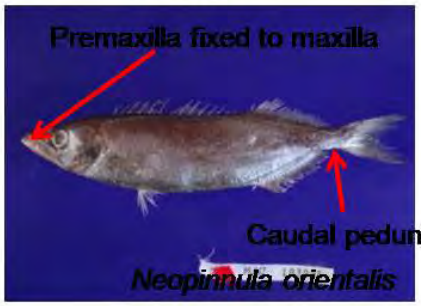
**Pentacerotidae**



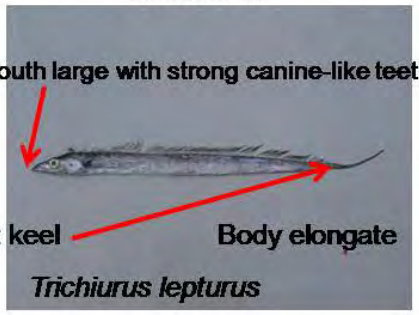

**Notograptidae**




**Gempylidae**

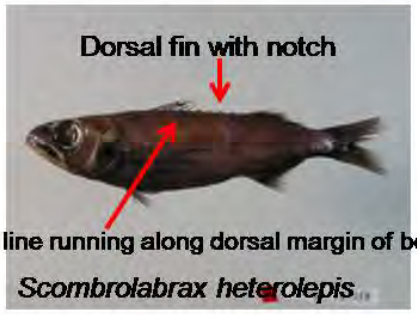



**Trichiuridae**



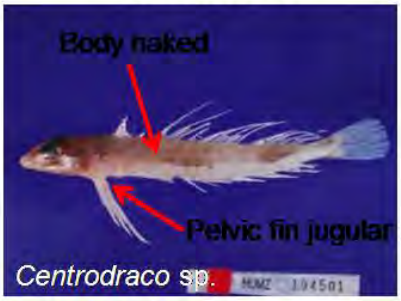
# Perciformes 5

**Scombrolabracidae**

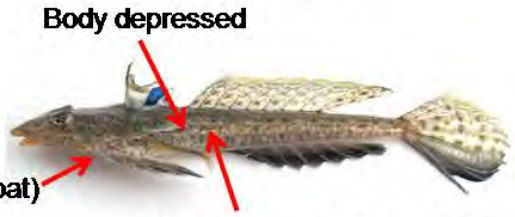



**Champsodontidae**


**Draconettidae**

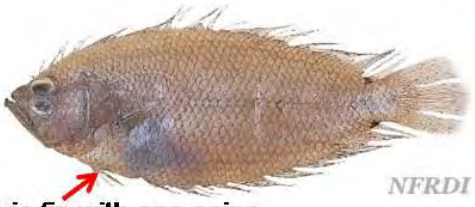



**Callionymidae**
**(Not deepsea fishes)**

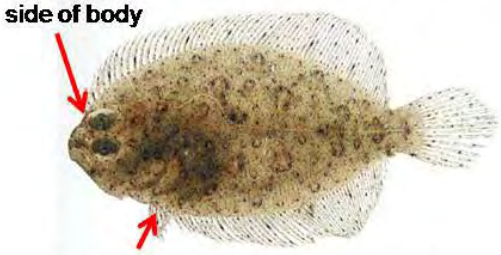



# Pleuronectiformes 1

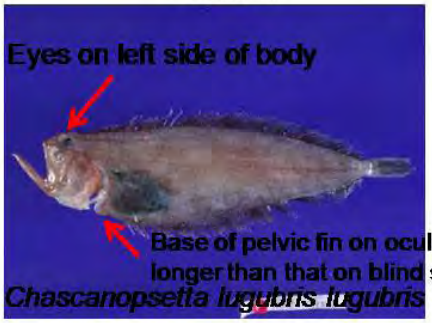
**Citharidae**




**Paralichthyidae**
**(Not deepsea fishes)**




**Bothidae**



# Pleuronectiformes 2

**Poecilopsettidae**


**Samaridae**


No pectoral fin on blind side

**Soleidae**

Eyes on right side of body

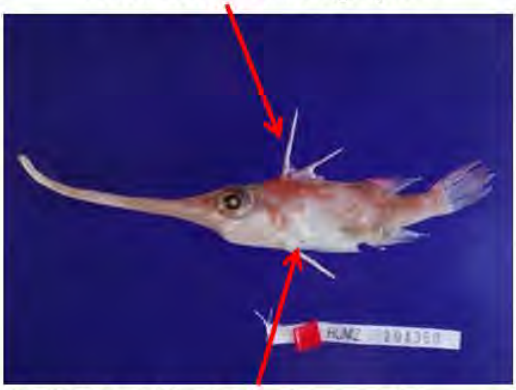
Preopercle without free margin

**Cynoglossidae**


# Tetraodontiformes

**Triacanthodidae**

Dorsal fin with strong spines



Pelvic fin with single strong spine

**Tetraodontidae**
**(Not deepsea fishes)**

Dorsal without spines

Body covered with skin

Peristedion from NOAA

Thank you so much for your attention

## Annex 7: Collection building at the Hokkaido University museum, Hakodate, Japan

**By Dr. Toshio Kawai**

**Annex 7**

# Collection Building
# at the Hokkaido University Museum, Hakodate, Japan


**Toshio KAWAI**

## Methods of making fish specimens

**Field work**
**(Fishing, trawling, scuba diving, …)**
↓
**(Defrosting if freezing)**
↓
**Assigning tag to specimen**
↓
**(Taking tissue samples)**
↓
**(Photography)**
↓
**Taging**
↓
**Fixation**

## Methods of making fish specimens

**Field work**
**(Fishing, trawling, scuba diving, …)**
↓
(Defrosting if freezing)
↓
Assigning tag to specimen
↓
(Taking tissue samples)
↓
(Photography)
↓
Taging
↓
Fixation

**Scuba diving**

**Photo by T. Abe**

**Seine net**


**Photo by H. Imamura**

**Gill net**

*Physiculus maximowiczi*
(Gadiformes: Moridae)

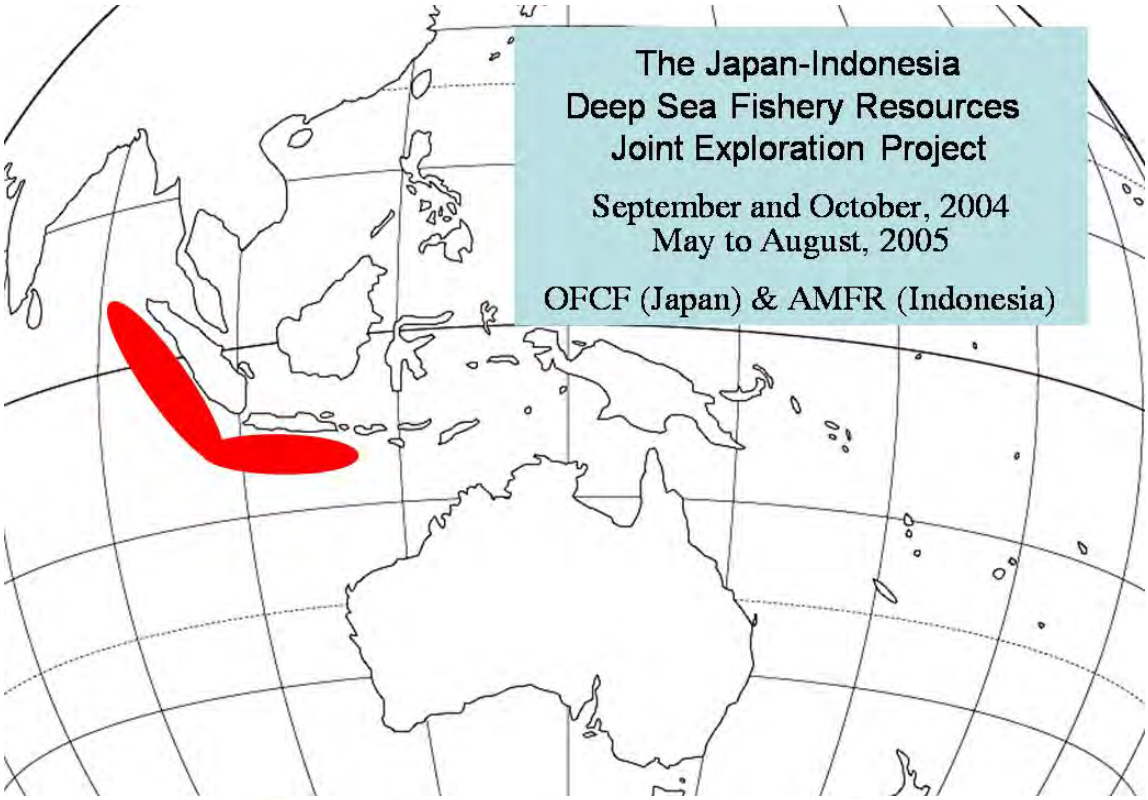
**Photo by O. Tsuruoka**

**Dredge**

Photo by O. Tsuruoka

**Otter trawl (R/V Oshoro-maru, Hokkaido Univ)**

Photo by J. Yamamoto




**Methods of making fish specimens**

Field work
(Fishing, trawling, scuba diving, …)

↓

(Defrosting if freezing)

↓

Assigning tag to specimen

↓

(Taking tissue samples)

↓

(Photography)

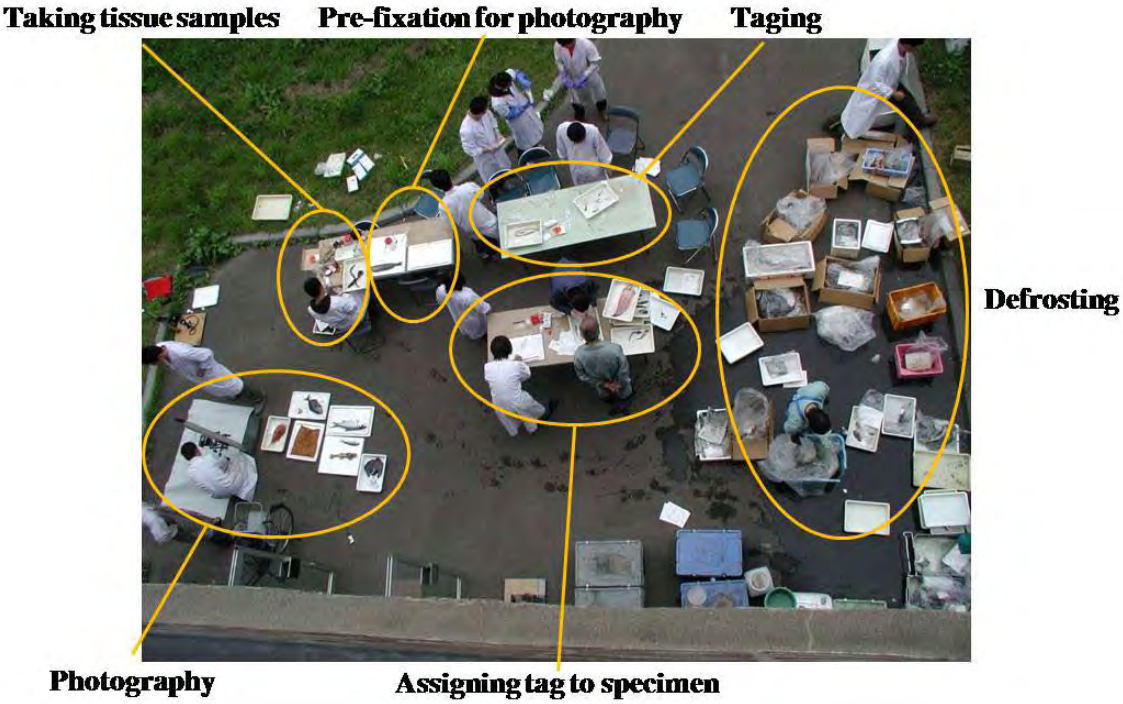
↓

Taging

↓

Fixation

## Work for making fish specimens




## Methods of making fish specimens

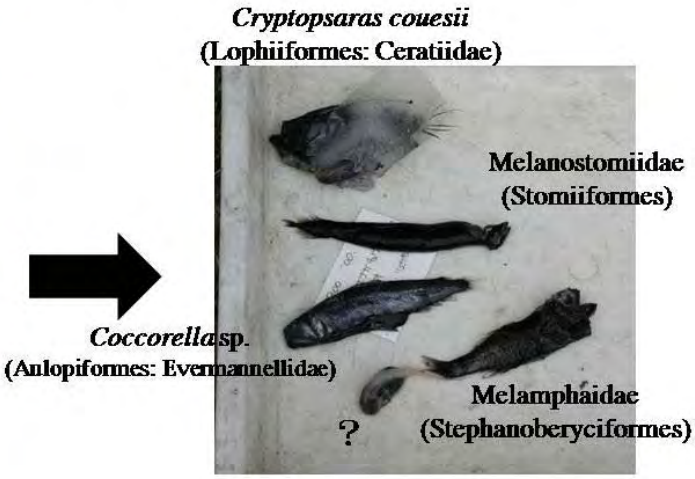
Field work
(Fishing, trawling, scuba diving, …)
↓
(Defrosting if freezing)
↓
Assigning tag to specimen
↓
(Taking tissue samples)
↓
(Photography)
↓
Taging
↓
Fixation

## Defrosting

Not to mistake captured data

## Rinse

Cleaning mucosal
Fin membrane
Scales




Internal organ spoils easily

## Methods of making fish specimens

Field work
(Fishing, trawling, scuba diving, …)
↓
(Defrosting if freezing)
↓
**Assigning tag to specimen**
↓
(Taking tissue samples)
↓
(Photography)
↓
Taging
↓
Fixation

## Assigning tag to specimen

Captured data
- Locality (Latitude, longitude, depth, …)
- Date
- Methods (Fishing, set net, …)
- Ship name

etc

Specimen data
- Fish name (*Clupea pallasi*, *Cottus* sp., …)
- Number of specimens

etc

## Methods of making tag

Printing numbers on cloth

HUMZ (Hokkaido University Marine Zoology)
+ specimen number

↓

Dry up

↓

Collodion ← 

・Cutting easily

↓

Storing

・100-150 tags


## Methods of making fish specimens

Field work
(Fishing, trawling, scuba diving, ...)

↓

(Defrosting if freezing)

↓

Assigning tag to specimen

↓

(Taking tissue samples)

↓

(Photography)

↓

Taging

↓

Fixation

## Taking tissue samples

Cut out body muscles on right body
- 1cm$^3$
- No formalin

↓

Put in 99.5% ethyl alcohol
- Small bottle 13.5 cc
- Waterproof paper with specimen number

↓

Exchange ethyl alcohol
- Dehydration

↓

Exchange bottle to 6 cc for storing
- Saving space

## Methods of making fish specimens

Field work
(Fishing, trawling, scuba diving, …)

↓

(Defrosting if freezing)

↓

Assigning tag to specimen

↓

(Taking tissue samples)

↓

**(Photography)**

↓

Taging

↓

Fixation

## Pre-fixation for photography (1)

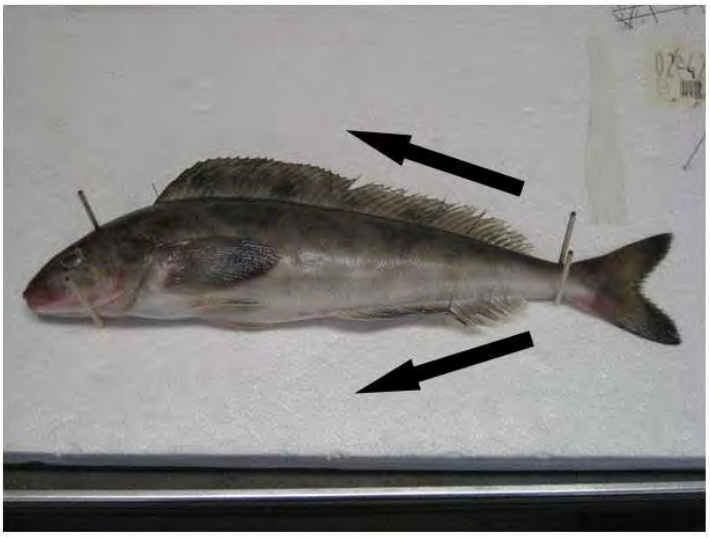

**Left side body**

↓

**Fixing body**

- foamed styrol
- toothpick
- needle

## Pre-fixation for photography (2)



**Rising fins**

- minimum damage to fin membrane
- thin needle
- along fin ray
- sting needles from posterior to anterior dorsal- or anal-fin rays
- not to dry up fish

## Pre-fixation for photography (3)

**Putting formalin**
- ink brush
- waiting fixation of fins about 5 min

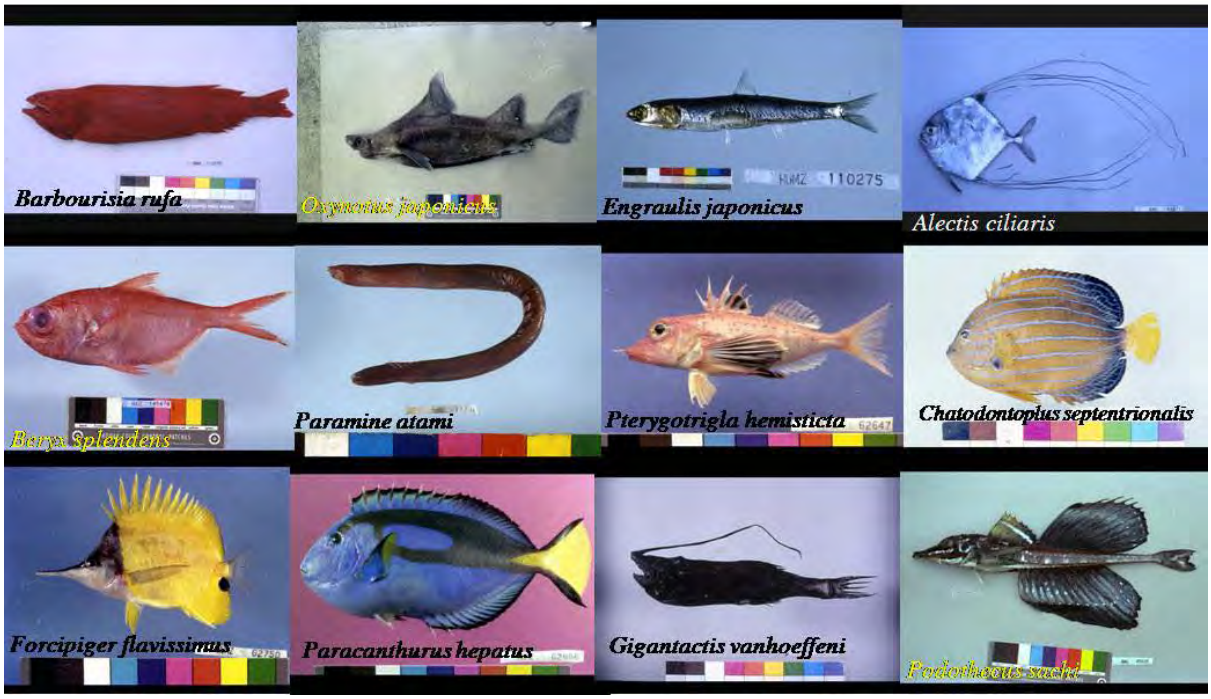
## Pre-fixation for photography (4)

**Completion !!**
**(Rising fins)**

# Photography

- Shed light from the same angle and distance

# Fish photos deposited in Hokkaido University Museum



## Methods of making fish specimens

Field work
(Fishing, trawling, scuba diving, …)
↓
(Defrosting if freezing)
↓
Assigning tag to specimen
↓
(Taking tissue samples)
↓
(Photography)
↓
**Taging**
↓
**Fixation**

## Taging


Surgical needle

Pay attention to damage of body
- Surgical needle
- Gill opening to mouth on right body
- Jaw
- Caudal peduncle

etc

## Fixation

10 % formalin (10 days to 3 weeks)
Big size specimen: cut abdominal area
to avoid spoiling fish

## Replacing with alcohol

Pure water (a few days)
To remove formalin

Alcohol (storing)

50 % isopropyl alcohol: dehydration mild (reasonable)
70 % ethyl alcohol: dehydration effective (expensive)

## Specimen building (at Hakodate Campus)

About 210,000 fish specimens

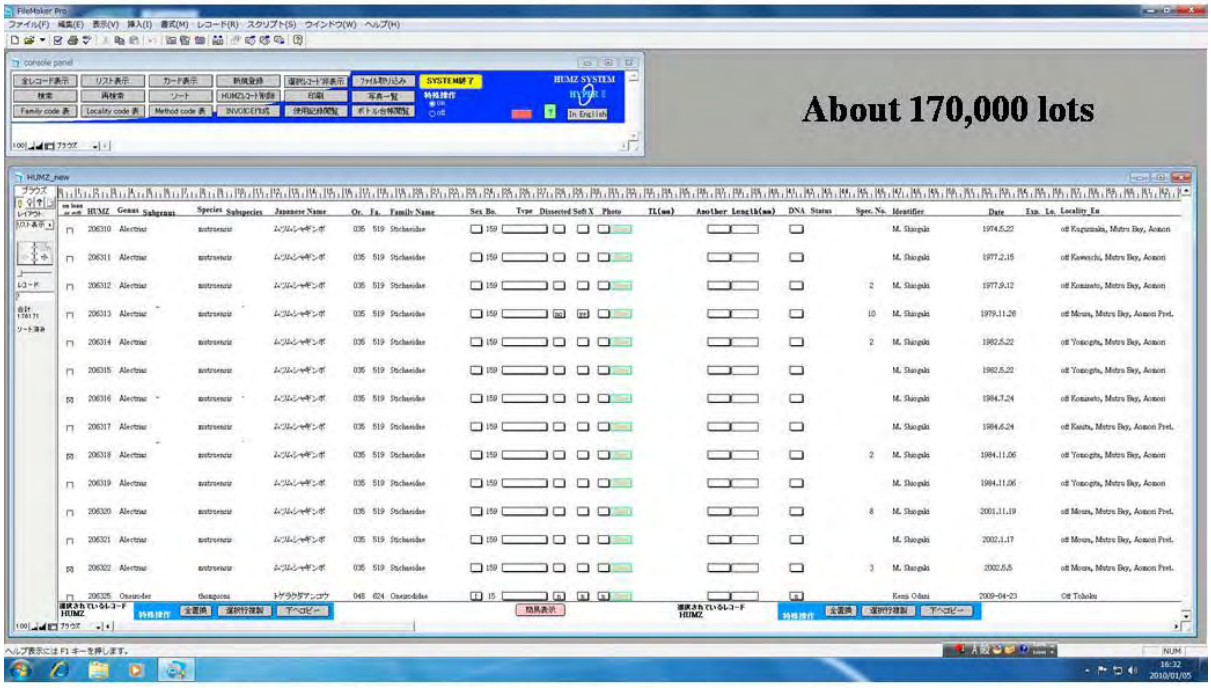

North Pacific
・cold water fishes
Peru
Indonesia
・
・
・

# Fish specimens

About 1,050 type specimens

Plastic jar:
500 cc, 1 L, 2 L, 20 L, 30 L, 60 L

# Database




HUMZ number, Family name, Genus name, Species name, Japanese name,
Locality, Date, .....

## Main building (at Hakodate Campus)

## Exhibition at Hakodate

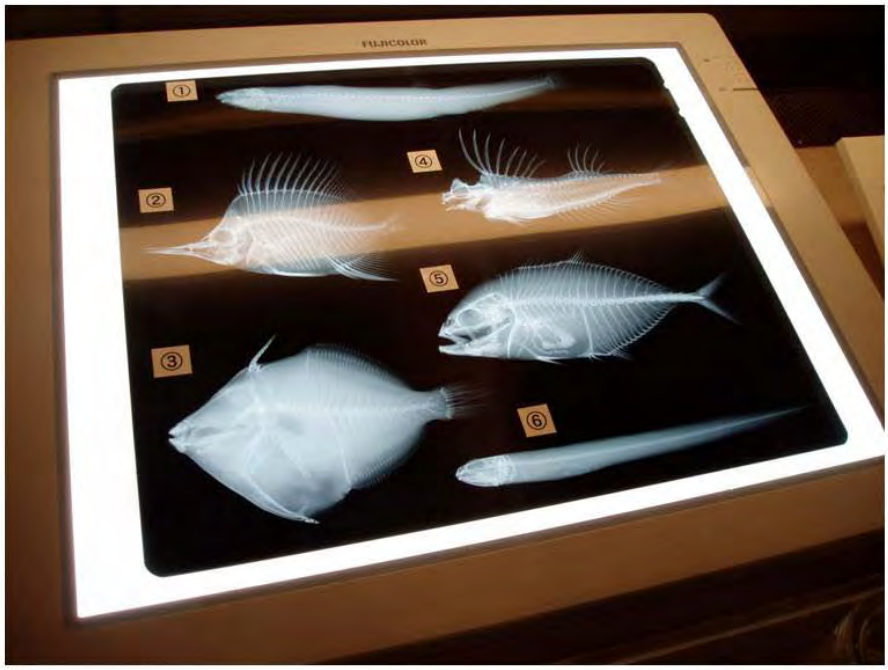
## Exhibition at Hakodate (2)

## Main building (at Sapporo Campus)

## Exhibition at Sapporo

## Clear & stain specimens at Sapporo

# X-ray film for exhibition





**Thank you very much for your attention !!**

## Annex 8/1: Identification results

**By Encik Ahmad bin Ali**

**Mr. Binjimin Martin**

**Encik Nor Azman bin Zakaria**

**Puan Nik Zuraini**

# Technique Taking Photo of Fishes

Prepared by
**Ahmad Ali**
**Binjimin Martin**
**Nor Azman Zakaria**
**Nik Zuraini**



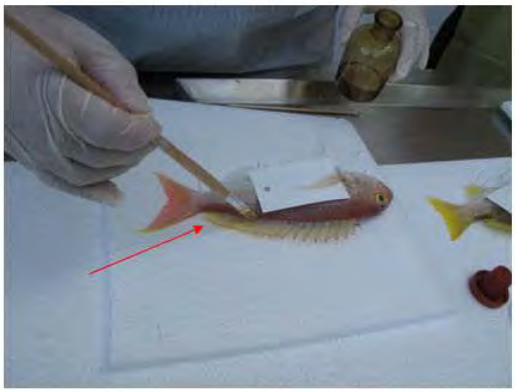

**On-Site Training on Identification of Deep-Sea Fishes**
**18-21 July 2011 SEAFDEC-MFRDMD**

# Position of sample (Fish)

1. Left side body
2. Fixing body - styrofoam
   -needle

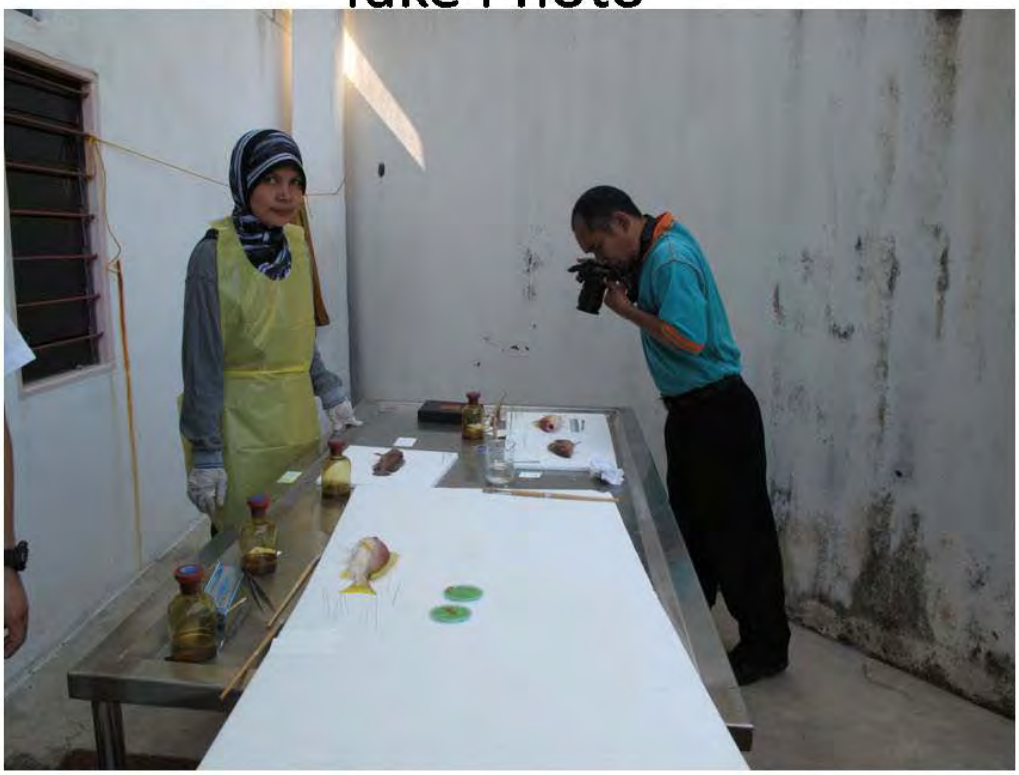

# For Pectoral Fin


# Put formalin using ink brush



Wait for 5 minutes to fix the fin

Take Photo



# Wonderful results from our group

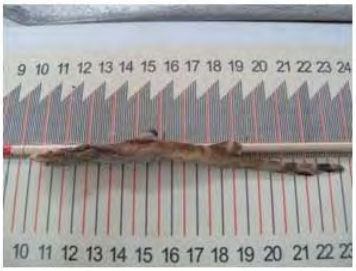



# Identification of Deep Water Specimens




# Identification of Deep sea Fishes

- 4 orders
- 4 families
- 4 genus
- 4 species



**Bottle No: 4-1**

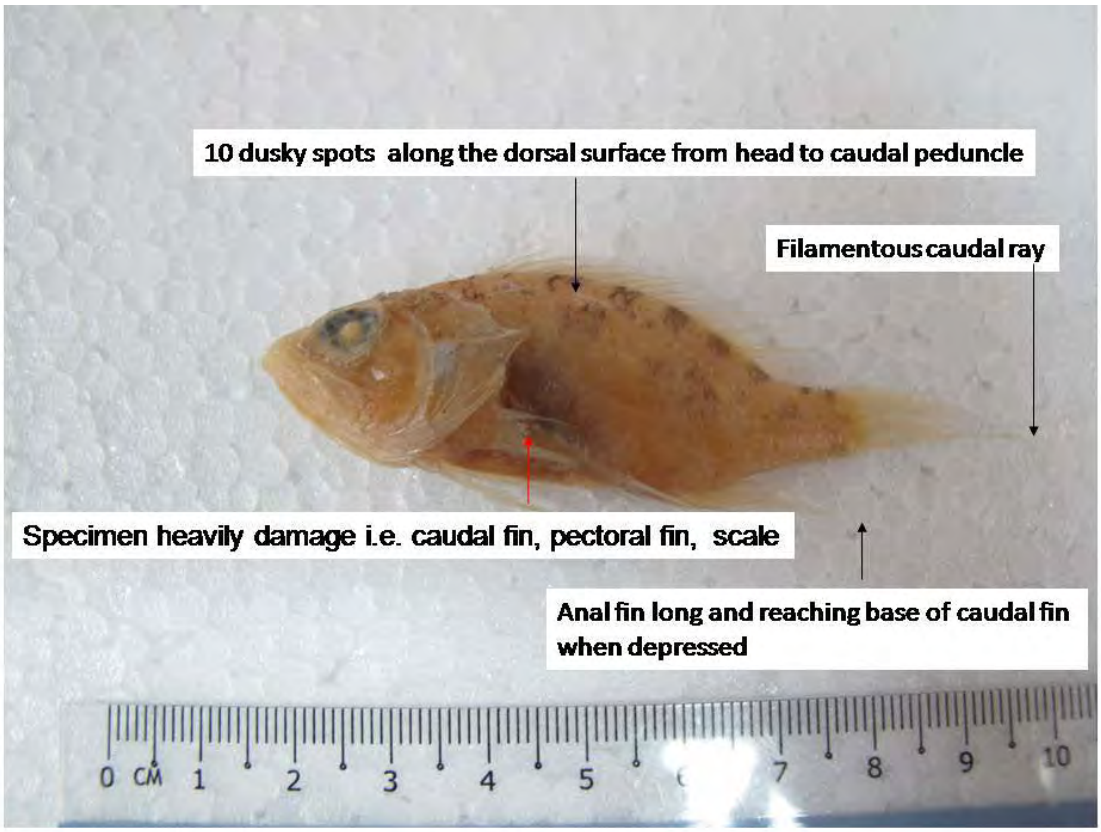
**Order: Perciformes**
**Family: Serranidae**
**Sub- Family: Anthiinae**
**Genera: ?**

**Remarks**
1.Specimen heavily damage i.e. caudal fin, pectoral fin, scale
2.Filamentous caudal ray
3.10 dusky spots along the dorsal surface of body from head to caudal peduncle
4.Anal fin long and reaching base of caudal fin when depressed

**MEASUREMENTS (MM)**

Standard length:60
Head length: 26.6
Body depth:23.3
Snout length: 6.3
Orbit diameter: 6.0
Eye diameter: 5.6
Inter-orbital width: 2.9
Upper jaw length: 12.6
Pectoral fin length: 20.6
Pelvic fin length: 14.6
Deep of caudal peduncle: 7.5
Length of caudal peduncle: 7.8

**COUNTS**
Dorsal fin: D X, 14
Anal fin: A III, 6
Pectoral fin: 13
Pelvic fin: P I, 5
Principle caudal fin rays: 13
Lateral line scale: 29
Gill rakers: 17 (12+5)




**Bottle No: 7**

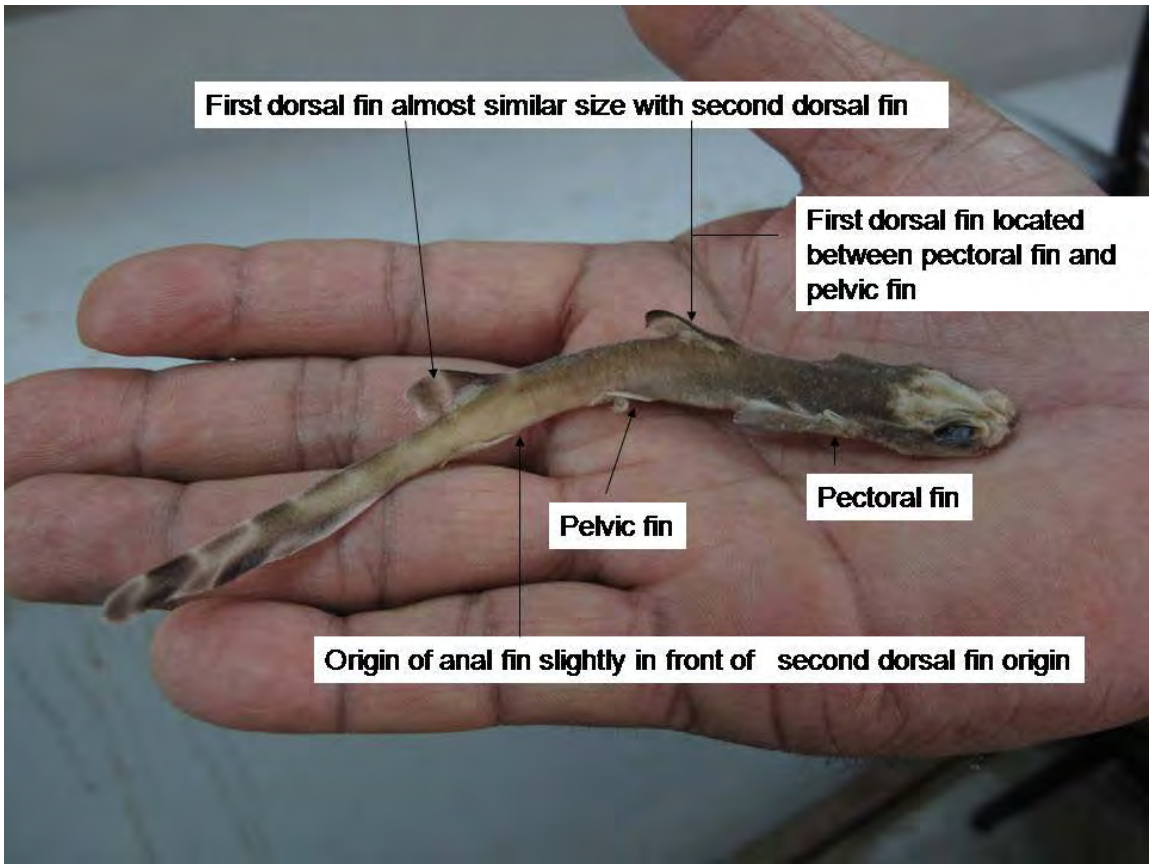
**Order: Carcharhiniformes**
**Family: Proscylliidae**
**Genera: ?**


**Remarks**
1.Specimen very small and heavily damage i.e. pectoral fin, anal fin, mouth,
2.Second dorsal fin almost similar size as compared to first dorsal fin
3.First dorsal fin located between pectoral fin and pelvic fin
4.Origin of anal fin slightly in front of second dorsal fin origin

**MEASUREMENTS (MM)**

Total length: 130
Pre caudal length: 90
Head length: 21.9
Body depth:7.93
Snout length: 7.29
Orbit diameter: 6.15
Eye diameter: 4.92
Inter-orbital width: 6.45
Upper jaw length: 3
Pectoral fin length: 15.42
Pelvic fin length: 11.1
Depth of caudal peduncle:5.20
Length of caudal peduncle: 8.9

**COUNTS**
Dorsal fin: 2
Anal fin: Yes




**Bottle No: 18**

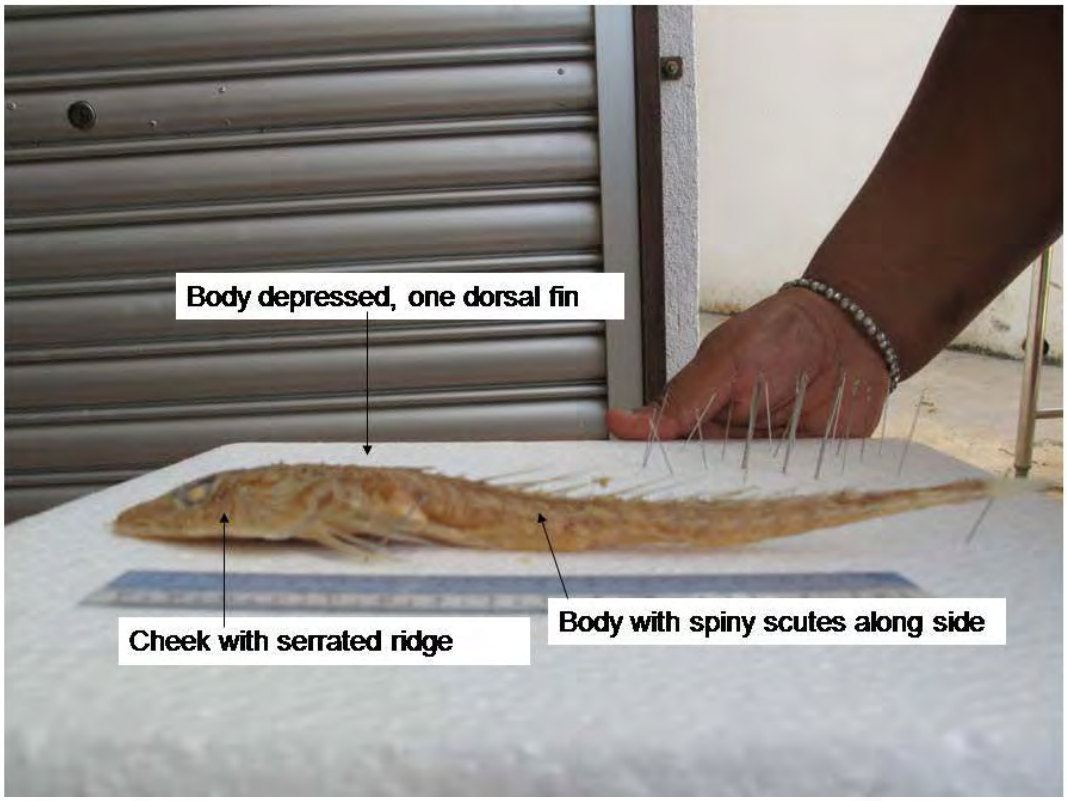
**Order: Scorpaeniformes**
**Family: Hoplichthyidae**
**Genera: *Hoplichthys* sp**

**Remarks**
1.Body depressed, one dorsal fin
2.Cheek with serrated ridge
3.Body with spiny scutes along side
4.Small specimens

**MEASUREMENTS (MM)**

Standard length:214
Head length: 65.5
Body depth:18.3
Snout length: 20.2
Orbit diameter: 17.5
Eye diameter: 14.1
Inter-orbital width: 4.2
Upper jaw length: 23.7
Pectoral fin length: 45.9
Pelvic fin length: 23
Deep of caudal peduncle: 4.6
Length of caudal peduncle: 11.6

**COUNTS**
Dorsal fin: VI, 15
Anal fin: 16
Pectoral fin: 13
Pelvic fin: I, 5
Principle caudal fin rays: 11
Lateral line scale: 26
Gill rakers: 13 (2+11)




**Bottle No: 2-1**

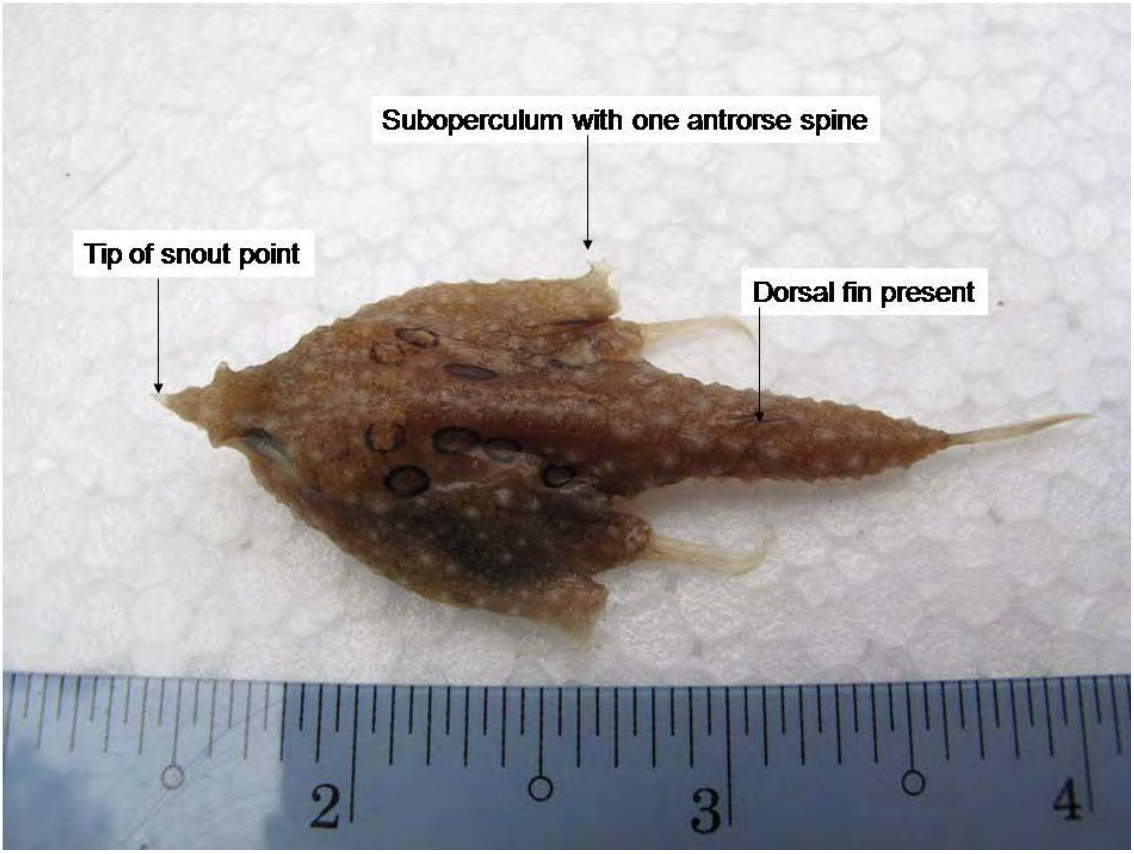
**Order: Lophiiformes**
**Family: Ogcocephalidae**
**Genera: *Malthopsis* sp**

**Remarks**
**1.Suboperculum with one antrorse spine**
**2.Tip of snout pointed**
**3.Dorsal fin present**
**4.Specimen small and difficult to find important organ for identification of this species such as tubercles and minute spines**

**MEASUREMENTS (MM)**

Standard length:55
Head length: 30.3
Body depth:6.6
Snout length: 7.4
Orbit diameter: 5.3
Eye diameter: 5.1
Inter-orbital width: 4.0
Upper jaw length: 2.9
Pectoral fin length: 9.8
Pelvic fin length: 9.1
Deep of caudal peduncle: 3.1
Length of caudal peduncle: 2.0

**COUNTS**
Dorsal fin: 4
Anal fin: 4
Pectoral fin: 11
Pelvic fin: I,5
Principle caudal fin rays: 9
Lateral line scale: not recorded
Gill rakers: not recorded




Thank you so much for all our expert sensei to Dr. Yoshinobu Konishi, Dr. Toshio Kawai, Dr. Natinee Sukramongkol and Mrs. Penchan Laongmanee.

## Annex 8/2: Identification results

**By Cik Noorul Azliana binti Jamaludin**

**Encik Osman bin Muda**

**Encik Norfaizal Azli bin Mat Nor**

**Encik Mohd Sukri bin Muda**

# IDENTIFICATION OF FISHES

Noorul Azliana binti Jamaludin
Osman bin Muda
Norfaizal Azli bin Mat Nor
Mohd Sukri bin Muda

PRESENTED ON THE REGIONAL TRAINING/ WORKSHOP ON
IDENTIFICATION OF DEEP SEA FISHES
18-21 July 2011

SEAFDEC-MFRDMD , Malaysia


Standard length = 76 mm
Head length = 37 mm
Body depth = 8.9 mm
Snout length = 6.2 mm
Orbit diameter = 7.7 mm
Eye diameter = 2.6 mm
Interorbital width = 4.1 mm
Upper jaw length = 5.1 mm
Pectoral fin length = 15.2 mm
Pelvic fin length = 12.3 mm
Depth of caudal peduncle = 4 mm
Dorsal fin = 4
Anal fin = 4
Pectoral fin= 12
Pelvic fin = 5
Principal caudal fin rays = 9

ID : 2-2
Family name : Ogcocephalidae - batfishes
Scientific name : *Malthopsis annulifera*

Remarks :
1.Body strongly depressed, forming disc, triangular with suboperculum protruded laterally.
2.Tip of snout pointed, suboperculum with 0 or 1 antrorse spine.
3.Bony tubercles sparsely distibuted between pelvis, fin and anus.
4.Posterior tip of anal fin not reaching base of caudal fin when depressed.


Standard length = 61.1 mm
Head length = 28.4 mm
Body depth = 20.7 mm
Snout length = 8.9 mm
Orbit diameter = 7.9 mm
Eye diameter = 4.5 mm
Interorbital width = 5.2 mm
Upper jaw length = 14.5 mm
Pectoral fin length = 21.8 mm
Pelvic fin length = 14.8 mm
Depth of caudal peduncle = 4.6 mm
Length of caudal Peduncle = 1.7 mm
Dorsal fin = XI, 11
Anal fin = III,6
Pectoral fin= 18
Pelvic fin = I,5
Principal caudal fin rays = 14
Lateral line scales = 28
Gill rakers = 14

ID : 9-1
Family name : Scorpaenidae -scorpion fishes
Scientific name : *Setarches guentheri*

Remarks :
1. Lateral line as continous through, covered with large, thin, cycloid, decidous scales.
2. Anal fin with 3 spines.
3. Maxilla without keel, second preopercular spine well developed.


Standard length = 235 mm
Head length = 76.7 mm
Body depth = 22.6 mm
Snout length = 25.9 mm
Orbit diameter = 18.7 mm
Eye diameter = 13.3 mm
Interorbital width = 3 mm
Upper jaw length = 29.6 mm
Pectoral fin length = 37.5 mm
Pelvic fin length = 30.1 mm
Depth of caudal peduncle = 12.6 mm
Length of caudal peduncle = 23.1 mm
Dorsal fin = VI, 14
Anal fin = 16
Pectoral fin= 26
Pelvic fin = 6
Principal caudal fin rays = 14
Lateral line scales = 49
Gill rakers = 18

ID SEAFDEC : 12-2
Family name : Percophidae
Scientific name : *Bembrops filifera*

Remarks :
1. No spine at snout. head depressed, posterior and of upper jaw with dermal flap. Lateral line gradually descending above pectoral fin.
2. First dorsal spine elongated into filament and first dorsal fin black on anterior most part
3. Lower margin of caudal fin blackfish.

**(continued)** **Annex 8/2**


Standard length = 190 mm
Head length = 77 mm
Body depth = 66 mm
Snout length = 19 mm
Orbit diameter = 20.7 mm
Eye diameter = 10.6 mm
Interorbital width = 9.1 mm
Upper jaw length = 38.1 mm
Pectoral fin length = 64.4 mm
Pelvic fin length = 43.6 mm
Depth of caudal peduncle = 22.9 mm
Length of caudal peduncle = 37.4 mm
Dorsal fin = X, 18
Anal fin = III, 7
Pectoral fin= 12
Pelvic fin = I,5
Principal caudal fin rays = 19
Lateral line scales = 33
Gill rakers = 18

ID : 15
Family name : Seranadae
Scientific name : *Plectranthias kamii*

Remarks :
1.Operculum 3 spines, third dorsal spine longest, pectoral fin rays branched.
2.Maxiilla scaleless, lateral line complete, anal fin with 6-8 soft rays, pectoral fin with 12-17 soft rays, dorsal fin with 13-18 soft rays.

## Annex 8/3: Identification results

**By Encik Mohammad Faisal bin Md Saleh**

**Puan Kamariah binti Ismail**

**Encik Rosdi bin Mohd Nor**

# IDENTIFICATION OF FISHES

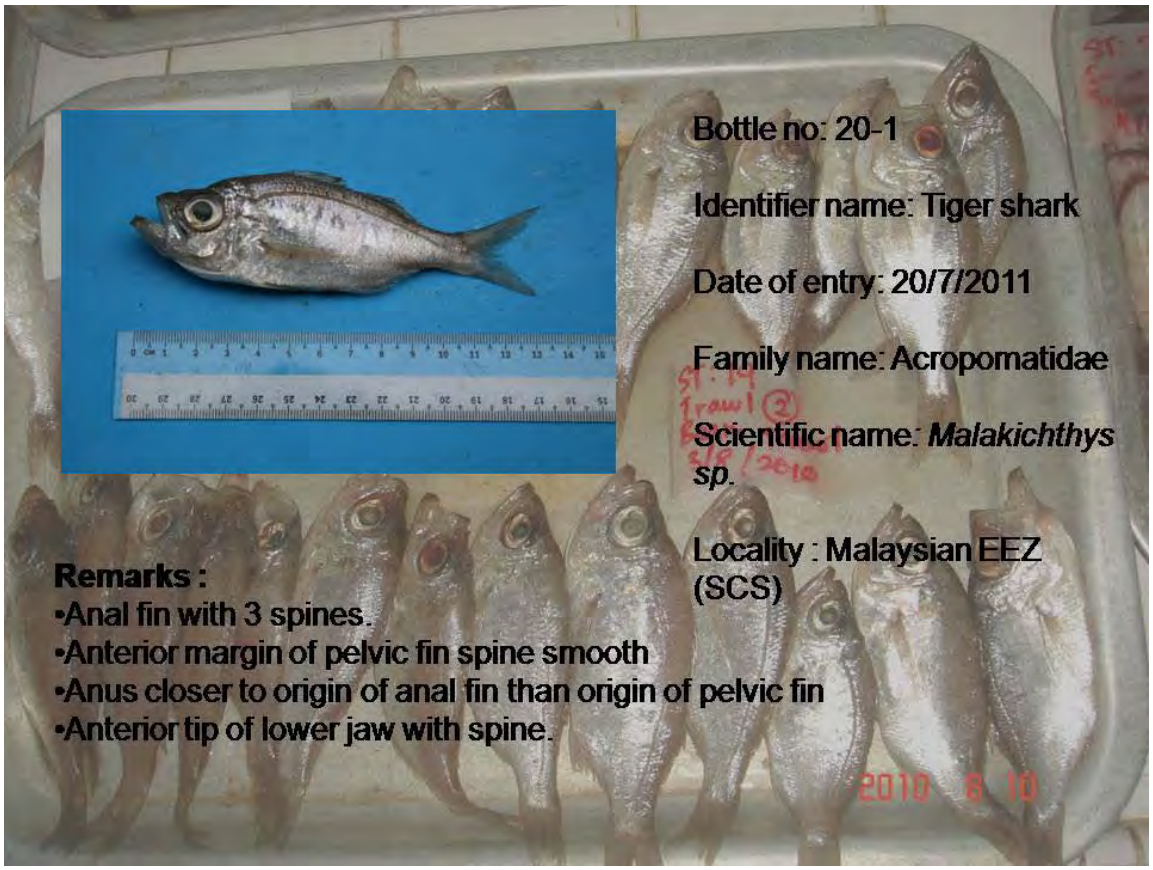
## Group: Tiger shark

**Mohammad Faisal Md. Saleh**
**Kamariah Ismail**
**Rosdi Mohd Nor**

**PRESENTED ON THE REGIONAL TRAINING/ WORKSHOP ON IDENTIFICATION OF DEEP SEA FISHES**

**18 - 21 July 2011**

**SEAFDEC/MFRDMD**
**MALAYSIA**




Family name: Acropomatidae
Scientific name: *Malakichthys sp.*

**Measurements (mm)**

- Standard length: 100.11
- Head length : 34.64
- Body Depth : 37.38
- Snout length : 8.85
- Orbit diameter: 13.61
- Eye diameter :
- Interorbital width : 8.90
- Upper jaw length : 14.74
- Pectoral fin length : 27.42
- Pelvic fin length : 14.93
- Depth of caudal peduncle : 11.79
- Length of caudal peduncle : 19.88

**Counts**

- Dorsal fin : D X,9
- Anal fin : A III,9
- Pectoral fin : 12
- Pelvic fin : I,5
- Principal caudal fin rays: 17
- Lateral line scales : 61
- Gill rakers (upper + lower) : 29

Bottle no: 13-2

Identifier name: Tiger shark

Date of entry: 19/7/2011

Family name: Moridae

Scientific name: *Physiculus rhodopinnis*

Locality : Malaysian EEZ (SCS)

**Remarks :**

- 2nd dorsal fin without notch.
- Scaly patch on gular portion.
- Lower halves of 1st and 2nd dorsal fin black.
- Light organ closer to pelvic fin base than to anus.

## Family name: Moridae
## Scientific name: *Physiculus rhodopinnis*

**Measurements (mm)**

- Standard length: 197.63
- Head length : 50.62
- Body Depth : 44.98
- Snout length : 17.07
- Orbit diameter: 13.96
- Eye diameter :
- Interorbital width : 13.32
- Upper jaw length : 20.40
- Pectoral fin length : 31.99
- Pelvic fin length : 31.66
- Depth of caudal peduncle : 4.65
- Length of caudal peduncle : 13.13

**Counts**

- Dorsal fin : D 6 – 69
- Anal fin : A 75
- Pectoral fin : 29
- Pelvic fin : 5
- Principal caudal fin rays: 23
- Lateral line scales :
- Gill rakers (upper + lower) :

Bottle no: 14

Identifier name:Tiger shark

Date of entry: 19/7/2011

Family name: Peristediidae

Scientific name: *Satyrichthys rieffeli*

English name: armored searobins

Locality : Malaysian EEZ (SCS)

**•Remarks** :
• Lower 2 pectoral rays free.
• 4 pairs of barbel present on lower jaw; two pairs in the lip part and another two pairs in chin part.
• Small black spot densely distributed on head and body dorsally
• Roastral projection more than 2 times distance between bases

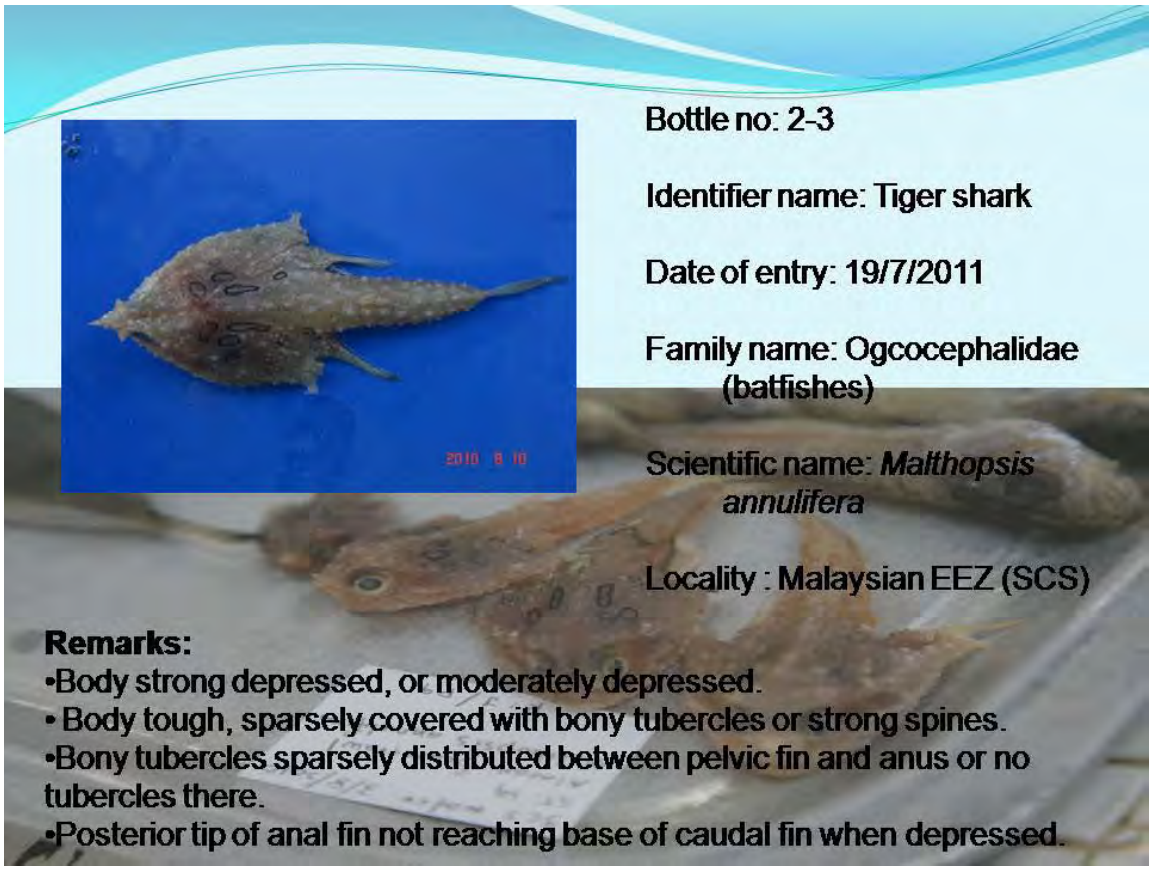
Family name: Peristediidae
Scientific name: *Satyrichthys rieffeli* (armored searobins)

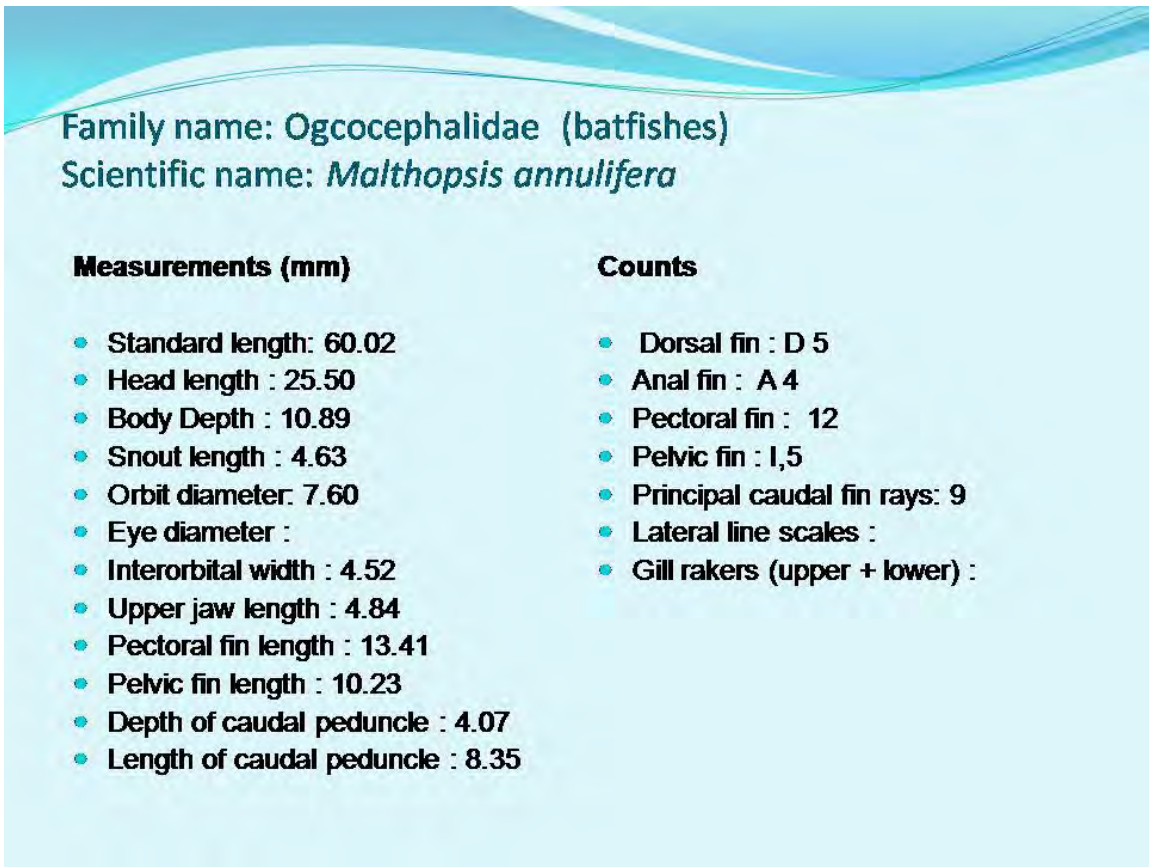
**Measurements (mm)**

- Standard length: 186.24
- Head length : 61.88
- Body Depth : 35.23
- Snout length : 33.36
- Orbit diameter: 15.59
- Eye diameter :
- Interorbital width : 14.73
- Upper jaw length : 30.30
- Pectoral fin length : 30.22
- Pelvic fin length : 37.29
- Depth of caudal peduncle : 5.29
- Length of caudal peduncle : 24.87

**Counts**

- Dorsal fin : D VII,15
- Anal fin : A 15
- Pectoral fin : 14
- Pelvic fin : I,5
- Principal caudal fin rays: 14
- Lateral line scales : 30
- Gill rakers (upper + lower) : 22


Bottle no: 2-3
Identifier name: Tiger shark
Date of entry: 19/7/2011
Family name: Ogcocephalidae (batfishes)
Scientific name: Malthopsis annulifera
Locality : Malaysian EEZ (SCS)
Remarks:
•Body strong depressed, or moderately depressed.
• Body tough, sparsely covered with bony tubercles or strong spines.
•Bony tubercles sparsely distributed between pelvic fin and anus or no tubercles there.
•Posterior tip of anal fin not reaching base of caudal fin when depressed.


Family name: Ogcocephalidae (batfishes)
Scientific name: Malthopsis annulifera
Measurements (mm)
Standard length: 60.02
Head length : 25.50
Body Depth : 10.89
Snout length : 4.63
Orbit diameter: 7.60
Eye diameter :
Interorbital width : 4.52
Upper jaw length : 4.84
Pectoral fin length : 13.41
Pelvic fin length : 10.23
Depth of caudal peduncle : 4.07
Length of caudal peduncle : 8.35
Counts
Dorsal fin : D 5
Anal fin : A 4
Pectoral fin : 12
Pelvic fin : I,5
Principal caudal fin rays: 9
Lateral line scales :
Gill rakers (upper + lower) :

Picture by The Fish Database of Taiwan

Bottle no: 12-1

Identifier name: Tiger shark

Date of entry:20/07/2011

Family name: Percophidae / duckbills

Scientific name: *Bembrops caudimacula*

Locality: Malaysian EEZ (SCS)

**Remarks** :
- 1st dorsal spine not elongated into filament.
- 1st dorsal fin uniformly dark or dark with irregular white marking.
- Body moderately slender.
- 2 dorsal fin completely separated.

Family name: Percophidae / duckbills
Scientific name: *Bembrops caudimacula*

**Measurements (mm)**

- Standard length: 280.19
- Head length : 76.51
- Body Depth : 25.27
- Snout length : 25.31
- Orbit diameter: 19.56
- Eye diameter :
- Interorbital width : 3.23
- Upper jaw length : 27.71
- Pectoral fin length : 39.18
- Pelvic fin length : 30.78
- Depth of caudal peduncle : 13.07
- Length of caudal peduncle : 23.20

**Counts**

- Dorsal fin : D VI – 14
- Anal fin : A 16
- Pectoral fin : 23
- Pelvic fin : I,5
- Principal caudal fin rays: 15
- Lateral line scales :
- Gill rakers (upper + lower) :


Thank You Very Much
For Your Attention

## Annex 8/4: Identification results

**By Encik Mohd Tamimi bin Ali Ahmad**

**Encik Nadzri bin Seman**

**Encik Nik Ab Rahman bin Nik Ismail**

**Encik Nik Nasrudin bin Nik Ismail**

**Encik Rosdi bin Mohd Nor**

# IDENTIFICATION OF FISHES

MOHD TAMIMI BIN ALI AHMAD – MFRDMD
NADZRI BIN SEMAN – MFRDMD
NIK RAHMAN BIN NIK ISMAIL – MFRDMD
NIK NASRUDIN BIN NIK ISMAIL – FRIRA
ROZALI BIN MUHAMAD – FRIRA

**PRESENTATION FOR TRAINING WORKSHOP ON IDENTIFICATION OF DEEP SEA FISHES 18 – 21 JULY 2011**

SEAFDEC – MFRDMD
TERENGGANU, MALAYSIA

# DETAIL INFORMATION FOR SPECIMENS

- Area :
- Date :
- Ship name :
- Fishing method :
- Lat :
- Long :
- Depth :

# INTRODUCTION

- 10 SPECIMENS OF DEEP SEA FISHES.
- 7 SPECIMENS MANAGE TO IDENTIFIED.
- 6 FAMILY HAVE IDENTIFIED.
  - 2 FAMILY SCORPAENIDAE,
  - 1 FAMILY PERCOPHIDAE,
  - 1 FAMILY LOPHIIDAE,
  - 1 FAMILY OGCOCEPHALIDAE,
  - 1 FAMILY POLYMIXIIDAE,
  - 1FAMILY ACROPOMATIDAE.

**Bottle No.** : **17**
**Family name** : **Scorpaenidae**
**Scientific name** : ***Pontinus rhodochrous***

**Measurements.**
**Standard length = 245 mm**
**Head length = 102.23 mm**
**Body depth = 83.79 mm**
**Snout length = 43.98 mm**
**Orbit diameter = 25.68 mm**
**Eye diameter = 23.11 mm**
**Interorbital width = 11.68 mm**
**Upper jaw length = 50.37 mm**
**Pectoral fin length = 68.81 mm**
**Pelvic fin length = 59.00 mm**
**Depth of caudal peduncle = 24.85 mm**
**Lengh of caudal peduncle = 44.24 mm**

**Counts.**
**Dorsal fin = XII, 10**
**Anal fin = III, 5**
**Pectoral fin = 16**
**Pelvic fin = I, 5**
**Principal caudal fin rays = 14**
**Lateral line scale = 27**
**Gill rakers (upper + lower) = 6 + 14**

**Remarks :**
1. **All pectoral-fin rays simple**
2. **Head large; snout long**
3. **This species very close with *Pontinus macrocephalus*.**
4. **Reference from Book Fishes of Japan Ed.1 p577.**

**Bottle No.** : 5 - 1
**Family name** : Scorpaenidae
**Scientific name** : *Lioscorpius trifasciatus*

**Measurements.**
Standard length = 78 mm
Head length = 13.57 mm
Body depth = 12.86 mm
Snout length = 10.18 mm
Orbit diameter = 7.55 mm
Eye diameter = 5.26 mm
Interorbital width = 3.10 mm
Upper jaw length = 12.26 mm
Pectoral fin length = 11.81 mm
Pelvic fin length = 10.95 mm
Depth of caudal peduncle = 16.57 mm
Lengh of caudal peduncle = 5.40 mm

**Counts.**
Dorsal fin = X, 11
Anal fin = III, 7
Pectoral fin = 23
Pelvic fin = I, 5
Principal caudal fin rays = 21
Lateral line scale = n.a.
Gill rakers (upper + lower) = 3 + 8

Remarks :
1. This fish have anal fin with 3 spine, very difficult to identified.
2. The real color are red with spotted.
3. Looks like *Lioscorpius longiceps* but it have anal fin with 2 spines.
4. Important specimen in the region.
5. Reference from book Fishes of Japan Ed.1 p566.

**Bottle No.** : 5 - 1
**Family name** : Scorpaenidae
**Scientific name** : *Lioscorpius trifasciatus*

**Bottle No.** : 12 - 3
**Family name** : Percophidae
**Scientific name** : *Chrionema chlorotaenia*

**Measurements.**
Standard length = 194 mm
Head length = 66.73 mm
Body depth = 24.59mm
Snout length = 22.00 mm
Orbit diameter = 17.39 mm
Eye diameter = 13.54 mm
Interorbital width = 3.24 mm
Upper jaw length = 26.73 mm
Pectoral fin length = 31.58 mm
Pelvic fin length = 29.24 mm
Depth of caudal peduncle = 10.19 mm
Lengh of caudal peduncle = 21.94 mm

**Counts.**
Dorsal fin = VI, 16
Anal fin = 26
Pectoral fin = 24
Pelvic fin = I, 5
Principal caudal fin rays = 13
Lateral line scale = 83
Gill rakers (upper + lower) = 6 + 14

**Remarks :**
1. Teeth and upper lip black
2. Reference from book Fishes of Japan Ed.II p 1067.

**Bottle No.** : 1
**Family name** : Lophiidae
**Scientific name** : *Lophiodes mutilus*

**Measurements.**
Standard length = 63.75 mm
Head length = 25.16 mm
Body depth = 6.87 mm
Snout length = 9.78 mm
Orbit diameter = 7.62 mm
Eye diameter = 3.92 mm
Interorbital width = 6.43 mm
Upper jaw length = 16.69 mm
Pectoral fin length = 19.59 mm
Pelvic fin length = 10.92 mm
Depth of caudal peduncle = 4.56 mm
Lengh of caudal peduncle = 7.77 mm

**Counts.**
Dorsal fin = II-I-II, 7
Anal fin = 5
Pectoral fin = 16
Pelvic fin = 5
Principal caudal fin rays = n.a.
Lateral line scale = n.a.
Gill rakers (upper + lower) = n.a.

**Remarks :**
1. 3rd dorsal-fin spine longer than head length, reaching middle of soft-rayed portion of dorsal fin when depressed.
2. Reference from Book Fish of Japan Ed.1 - Page 453.

**Bottle No.** : 2 - 4
**Family name** : Ogcocephalidae
**Scientific name** : *Malthopsis* sp.

**Measurements.**
Standard length = 73 mm
Head length = 15 mm
Body depth = 32.63 mm
Snout length = 9.56 mm
Orbit diameter = 8.53 mm
Eye diameter = 6.78 mm
Interorbital width = 5.17 mm
Upper jaw length = 6.20 mm
Pectoral fin length = 17.61 mm
Pelvic fin length = 15.33 mm
Depth of caudal peduncle = 3.57 mm
Lengh of caudal peduncle = 11.56 mm

**Counts.**
Dorsal fin = 5
Anal fin = 4
Pectoral fin = 9
Pelvic fin = I, 5
Principal caudal fin rays = n.a
Lateral line scale = n.a
Gill rakers (upper + lower) = n.a

**Remarks :**

1. Bony tubercles densely distributed between pelvic fin and anus
2. Posterior tip of anal fin reaching base of caudal fin when depressed.
3. Reference from Book Fish of Japan Ed.1 - Page 453.

**Bottle No.** : 10-2
**Family name** : Polymixiidae
**Scientific name** : *Polymixia longispina*

**Measurements.**
Standard length = 63 mm
Head length = 16.04 mm
Body depth = 22.73 mm
Snout length = 5.3 mm
Orbit diameter = 7.08 mm
Eye diameter = 5.3 mm
Interorbital width = 6.11 mm
Upper jaw length = 9.63 mm
Pectoral fin length = 11.66 mm
Pelvic fin length = 6.68 mm
Depth of caudal peduncle = 7.04 mm
Lengh of caudal peduncle = 12.09 mm

**Counts.**
Dorsal fin = V, 35
Anal fin = IV
Pectoral fin = VI
Pelvic fin = VII
Principal caudal fin rays = 28
Lateral line scale = 34
Gill rakers (upper + lower) = 13

**Remarks :**

1. 4th spine of anal fin snout and long, more than 38% head length.
2. Dorsal contour of head strongly curved.
3. Body depth more than 37% standard length.
4. Reference from Book Fish of Japan Ed.1 - Page 407.

**Bottle No.** : 20 - 2
**Family name** : Acropomatidae
**Scientific name** : *Malakichthys sp.*

**Measurements.**
Standard length = 100.11 mm
Head length = 34.64 mm
Body depth = 37.38 mm
Snout length = 8.35 mm
Orbit diameter = 13.61 mm
Eye diameter = - mm
Interorbital width = 8.90 mm
Upper jaw length 14.74 mm
Pectoral fin length = 27.42 mm
Pelvic fin length 14.93 mm
Depth of caudal peduncle = 11.79 mm
Lengh of caudal peduncle = 19.88 mm

**Counts.**
Dorsal fin = X, 9
Anal fin = III, 9
Pectoral fin = 12
Pelvic fin = I, 5
Principal caudal fin rays = 17
Lateral line scale = 61
Gill rakers (upper + lower) = 29

Remarks :

1. Anal fin with 3 spines
2. Reference from Book Fish of Japan Ed.1 - Page 686.

# REFERENCE


- Nakabo T. 2002. FISHES OF JAPAN, with pictorial keys to species, English edition I. Tokai University Press.
- Nakabo T. 2002. FISHES OF JAPAN, with pictorial keys to species, English edition II. Tokai University Press.


# RESOURCE PERSON

- Dr. Yoshinobu Konishi - Expert from Nagasaki, Japan.
- Dr. Toshio Kawai - Assistant Professor from Hokkaido University museum, Japan.
- Mrs. Penchan Laongmanee - SEAFDEC TD, Thailand.
- Dr. Natinee Sukramongkol - SEAFDEC TD, Thailand.


THANK YOU
TAMIMI
NADZRI
NIK RAHMAN
NIK NASRUDIN
ROZALI

## Annex 9: Fish collection and online database

**By Dr. Natinee Sukramongkol**

**Annex 9**

# Fish Collection & Online Database

## Under the program "Deep-Sea Fisheries Resources Exploration in the Southeast Asia" (2007 to 2012)

On-Site Training on Identification of Deep-Sea Fishes, 18-21 July 2011
SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia

## Objectives

- Sharing information and dissemination the results of the deep-sea survey on the website and database
- Establish the network/expert for deep-sea fish taxonomy through coordination and collaboration among the participants/experts of the workshop and also other initiatives in the region

**(continued)** **Annex 9**


# Fish collection in TD

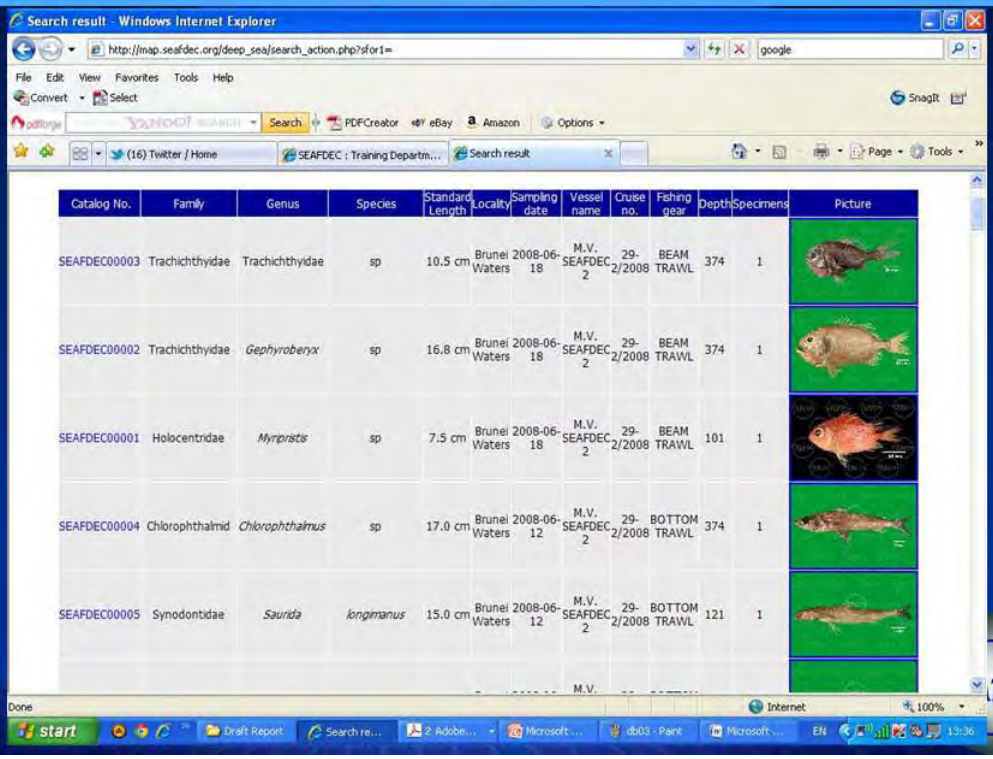
**19** Fish Order
**56** Fish Family
**>96** Fish species
More than **200** specimens

Catalog Data


| | | |
|---|---|---|
| Catalog Number | SEAFDEC00010 | |
| Species | Family | Lophioidei |
| | Genus | Lophiomus |
| | Species | setigerus |
| Standard Length | 18.5 cm | |
| Locality | Brunei Waters | |
| Sampling date | 2008-06-13 | |
| Vessel name | M.V. SEAFDEC 2 | |
| Cruise number | 29-2/2008 | |
| Sampling gear | BOTTOM TRAWL | |
| Sampling Depth (meter) | 162 | |
| Number of specimens | 1 | |
| Remark | | |

User: [natinee]

# Catalog of Fishes




| Catalog No. | Family | Genus | Species | Standard Length | Locality | Sampling date | Vessel name | Cruise no. | Fishing gear | Depth | Specimens | Picture |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEAFDEC00003 | Trachichthyidae | Trachichthyidae | sp | 10.5 cm | Brunei Waters | 2008-06-18 | M.V. SEAFDEC 2 | 29-2/2008 | BEAM TRAWL | 374 | 1 | |
| SEAFDEC00002 | Trachichthyidae | *Gephyroberyx* | sp | 16.8 cm | Brunei Waters | 2008-06-18 | M.V. SEAFDEC 2 | 29-2/2008 | BEAM TRAWL | 374 | 1 | |
| SEAFDEC00001 | Holocentridae | *Myripristis* | sp | 7.5 cm | Brunei Waters | 2008-06-18 | M.V. SEAFDEC 2 | 29-2/2008 | BEAM TRAWL | 101 | 1 | |
| SEAFDEC00004 | Chlorophthalmid | *Chlorophthalmus* | sp | 17.0 cm | Brunei Waters | 2008-06-12 | M.V. SEAFDEC 2 | 29-2/2008 | BOTTOM TRAWL | 374 | 1 | |
| SEAFDEC00005 | Synodontidae | *Saurida* | *longimanus* | 15.0 cm | Brunei Waters | 2008-06-12 | M.V. SEAFDEC 2 | 29-2/2008 | BOTTOM TRAWL | 121 | 1 | |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TRAINING DEPARTMENT(TD)
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Samut Prakan 10290, Thailand
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http://td.seafdec.org

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E-mail: mfrdlibr@pacific.net.sg
http://www.fishsafetyinfo.com

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