

**Annex 5: General procedures 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*

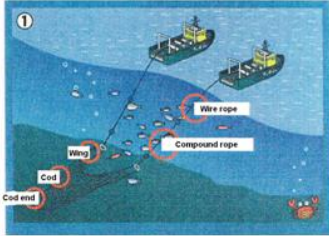
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**Procedure of fish collection**

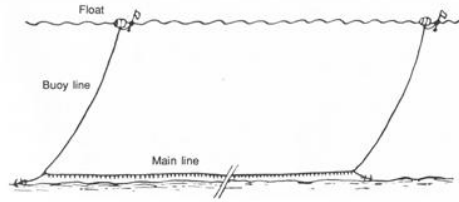
- 1 Sampling of deep-sea fishes**
    - onboard sampling with sampling gears
    - fish-market sampling
  - 2 Handling of fish specimens**
    - freezing
    - cold storage with ice
    - preservation in 10% formalin solution
  - 3 Identification**
    - photography
    - muscle sampling for DNA analysis
  - 4 Collection management**
    - registration of specimens in database
    - storage of registered specimens in the dark and cool space, and the tissues in refrigerator
- © **Request of identification for unknown specimens**
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# 1. Sampling of deep-sea fishes (gears)

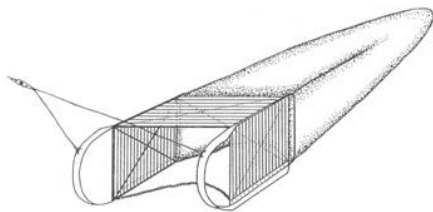
## Demersal fishes



Bottom trawl



Bottom horizontal longline



Beam trawl



Trap

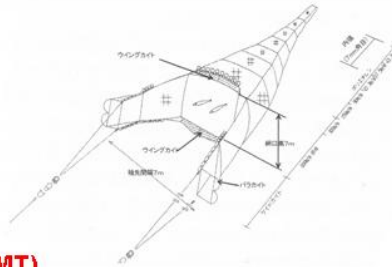
Note: gear(s) to be used is depending on sea bed topography, and has fish-size and species selectivity

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

## Bathypelagic fishes



Isaacs Kidd Midwater Trawl (IKMT)



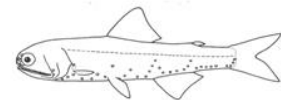
LC net



Hatchetfish (Sternoptychidae)



Bristlemouth (Gonostomatidae)



Lantern fish (Myctophidae)



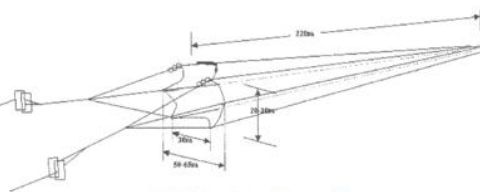
Snaggletooth (Astronesthidae)



Bigscale fish (Melamphidae)



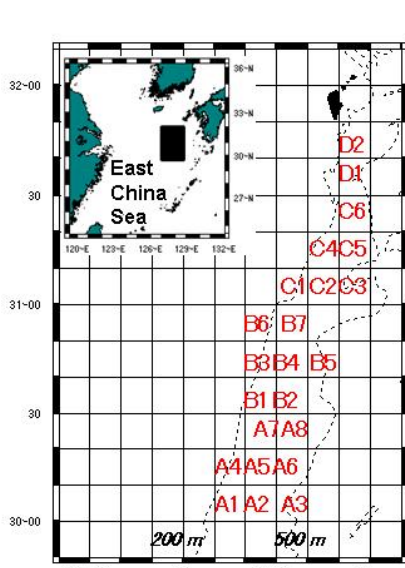
Rectangular Midwater Trawl (RMT)



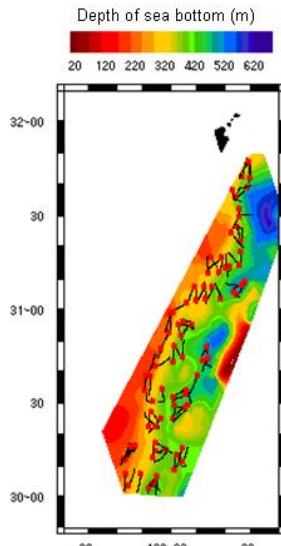
Midwater Trawl



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



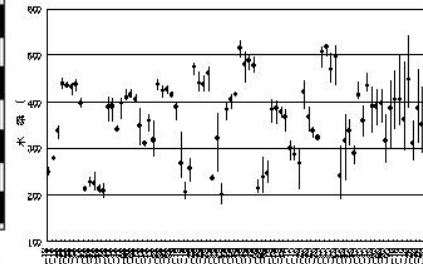
**Survey area**  
3 to 4 tows of the trawl net in each of 23 sub-area (10' Long. X 10' Lat.)



**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*



**Blackspotted gumard**  
*Pterygotrigla hemisticta*



**Deepsea smelt**  
*Glossanodon semifasciatus*



**Rockfish**  
*Helicolenus ferorovi*

(Photos by Sayan Promjinda)

### Landed fishes – (2)



**Silver chimaera**  
*Chimaera phantasma*



**Coffinfish**  
*Chaunax abei*



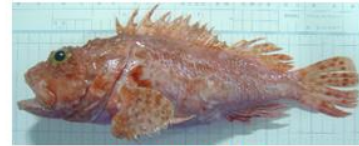
**Japanese lobster**  
*Cervimunida princeps*



**Gnomefish**  
*Scombrops boops*



**Deepwater scorpionfish**  
*Setarches guentheri*



**Scorpionfish**  
*Scorpaena neglecta*



**Silver eye**  
*Polymixia japonica*



**Japanese lobster**  
*Metanephrops sagamiensis*



**Blackeye greeneye**  
*Chlorophthalmus acutifrons*



**Stargazer**  
*Xenopthalmus elongatus*



**Chananel scabbardfish**  
*Evoxymetopon taeniatus*



**Armoured cusk**  
*Hoplobrotula armata*

(Photos by Sayan Promjinda)

### Landed fishes – (3)



**Yellow sea bream**  
*Dentex tumifrons*



**Japanese armorhead**  
*Pentaceros 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)

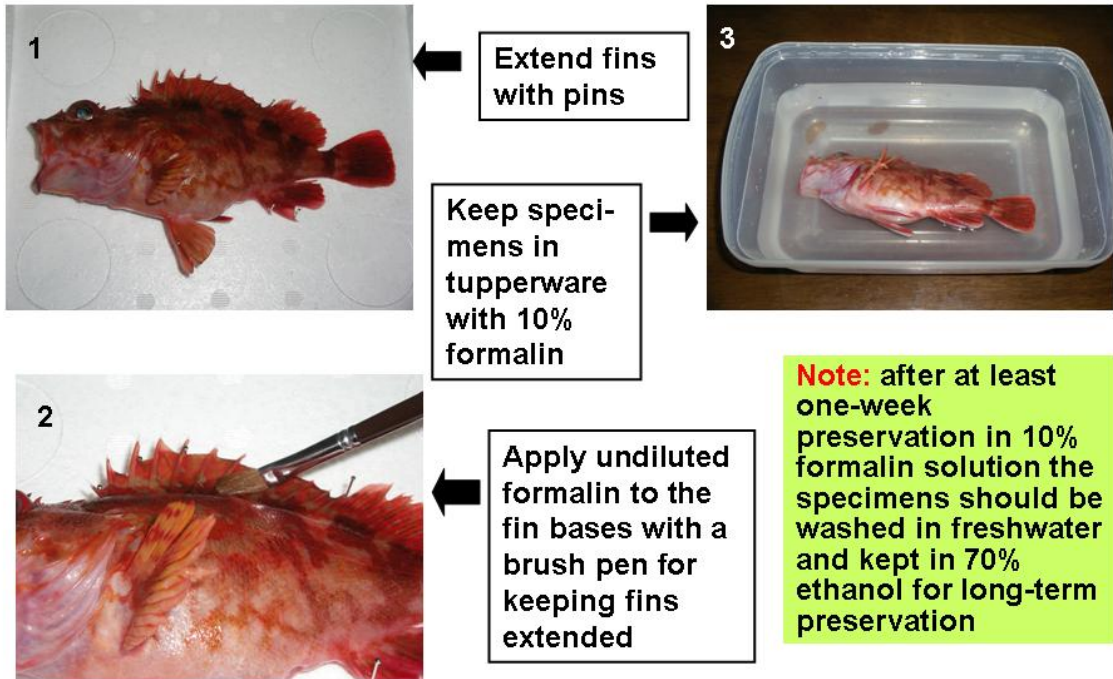
- Specimens are kept in a cooler with ice until identification in laboratory

### 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

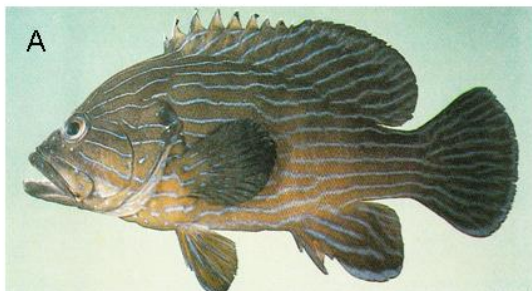
**Preservation of specimens in 10% formalin solution**



**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

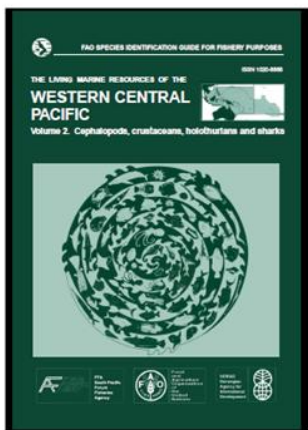
#### Tissues sampling for DNA analysis

- 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

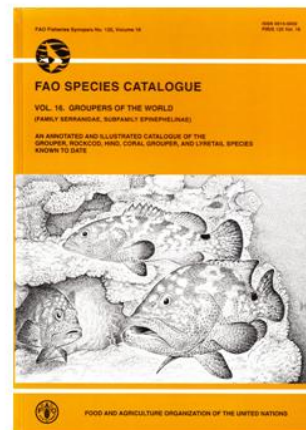


<http://www.fao.org/docrep/009/x2400e/x2400e00.HTM>

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



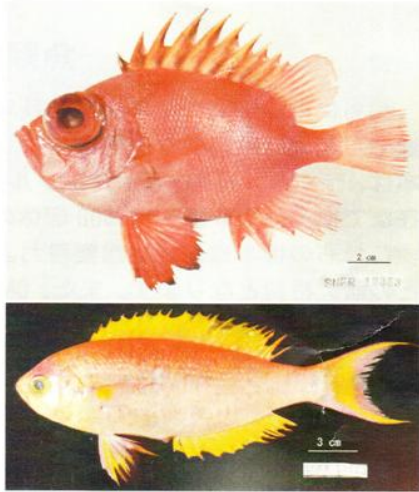
Nakabo, T. (ed.) 2002: Fishes of Japan with pictorial keys to the species (English edition). Tokai University Press, Tokyo, 1749pp.



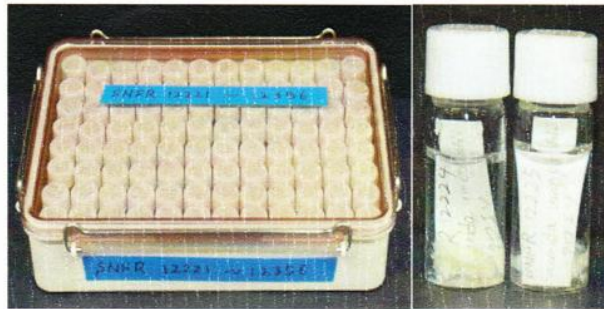
Heemstra, P. C. and J. E. Randall. 1993: Groupers of the world (family Serranidae, subfamily Epinephelinae). FAO Fisheries Synopsis, no. 125, vol.16, 382pp.



# Photography and tissues sampling



Photos:  
*Pristigenys nipponia* (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