

**Cruise Report of MV. SEAFDEC No. 50-4/1998
of
The Collaborative Research Survey in the South China Sea,
Area III: Western Philippines
7 April to 19 May 1998**

This cruise had the objective to carry out a fisheries resource survey in the South China Sea, Area III, Western Philippines, under the Inter-departmental Collaborative Research Program of SEAFDEC/Secretariat for 1998. MV. SEAFDEC left SEAFDEC/TD on April 7, 1998 with 11 Thai and TD researchers and assistants. The Malaysian and MFRDMD researchers were boarded at Terengganu on April 9. The ship arrived at Manila on April 13. The first technical group meeting was held on board in Manila on April 14, from 10:00-12:00 to inform about and discuss the survey schedule and activities. Thirteen Philippines researchers embarked on April 15. MV. SEAFDEC left Manila for survey equipment calibration at the entrance to Subic bay on the next day. Then the survey started on April 17, from Station No. 1 until completed at Station No. 30-A on May 9, 1998 almost 23 days.

Survey Activities

There were three major activities conducted during the cruise, an acoustic survey, an oceanographic survey and fish sampling. These activities were aimed to support data, information and to provide specimens for 23 research projects in the collaborative research program for the South China Sea, area III, including one project which was conducted by MV. Maya-Maya and two other projects which were conducted by both vessels. The survey covered 31 stations over the whole survey area. (see attached chart). Details of each major survey activity are as follows:-

1. Acoustic survey

The survey targeted fish schools down to 400 meters depth using the scientific echo-sounder (Furuno Model FQ-70). The survey was conducted with a controlled cruising speed of 10 knots station to station from station 1 until station 31 plus. Almost 1,870 nautical miles. It was carried out 24 hours a day continuously (day and night). Details are given in the survey report attached.

2. Oceanographic survey

This survey was composed of plankton sampling, water sampling and physical and chemical data recording by ICTD. The survey started with zooplankton and fish larvae sampling with an oblique tow of Bongo net and a surface tow of larvae net at dead slow ahead (2-3 knots) for 30 minutes. Samples were collected from the surface down to 60 meters depth. This was followed by the ICTD operation, large volume water sampling by Van Dorn and zooplankton sampling by vertical tow plankton net and also small volume water samples were also collected by the rosette water sampler of the ICTD. This survey has provided a lot of data and samples for many projects including phytoplankton, primary production, nutrients, physical characteristics and water currents. Details are given in the survey report of each project as attached.

Average time taken for surveying each station is shown in the following table.



Survey Activities	Time consumption in minutes			
	0-30	30-60	60-90	90-120
Bongo & Larvae net	← 30 →			
ICTD & Rosette water sam. (for 1500 m)	← 50 →			
Van Dorn water sam.	← 20 →		← 10 →	
Vertical Zooplankton sam. & 60 m. water sam.	← 60 →			
Chlorophyll max. check for St. No. 21-31A	← 15 →			
Van Dorn water sam. for St. No. 21-31A	← 15 →			

There were some problems during the survey

- a. Sharing water samples from both the rosette and Van Dorn water samplers were limited because many projects needed more water samples from various layers. Also because we have limited time and equipment.
- b. At Station No. 20, the fluorometer sensor of the ICTD did not function, and was taken off. We tried to find a spare part at Subic and Manila, but this was not available. At the remaining stations from No. 21 up to No. 31A, the relationship between oxygen and chlorophyll maximum value was used for predicting the chlorophyll maximum layer together with the micro-filtration check on the water samples from the predicted layer. (± 5 and 10 meter) This method functioned well, but it need about 15 minutes to check it and the water sampling at chlorophyll maximum layer could only be done 15 minutes later.
- c. At Station No. 28 , the sensor cage of the ICTD unit caught on the sea bottom, seven sets of Niskin bottle water samplers were lost but other the sensor units still functioned well. The ICTD using five sets of Niskin bottle water samplers were operated until the survey was completed.

3. Fish sampling,

Three types of fishing gear were operated for collecting samples, the tuna longline, an automatic

squid jigging machine and a giant squid jig.

- ÷ Ten operations of the tuna longline were conducted at Station Nos. 1, 5, 6, 12, 14, 17, 21, 27, 30-A and 31-A using three types of hook arrangement 4, 5 and 6 hooks in one basket in order to adjust the depth of hook. The results are shown in the fishing logsheet attached and details are given in the report of the project.
- ÷ Eleven fishing operation of the automatic squid jigging machine were conducted at Station Nos. 1, 5, 7, 9, 12, 14, 17, 21, 27, 30-A and between station 24 and 30. The results are shown in the attached fishing logsheet and details are given in the survey report of the project.
- ÷ Ten fishing operation of the giant squid jig were conducted at ten stations, the same as the tuna longline using many line arrangements. The results were no catch on MV.SEAFDEC but one catch by MV.Maya-Maya at Station No. 23 as mentioned in the survey report of the project.

Comments and Suggestions

At the end of the survey schedule, all responsible researchers have made a survey report (although some use the cruise report) as attached. They gave many comments and suggestions as follows:-

1. The copy diskette unit of data analyzer of the FQ-70 should be changed from 5 inch to 3.5 inches.
2. The large vessel was not suitable for Giant squid jigging operation.
3. Tuna longline operation should have a longer immersion time.
4. The oceanic squid catch was limited to only two species, this might be due to the selectivity of gear used, a different size of jig is suggested for use during the next survey, and the gear selectivity of the jig should be studied.
5. Due to the limited number of tuna samples, the researcher on the tuna biological project suggested that port sampling is needed to achieve the project's objective. The budget from the advance money for material and supply should be allowed to be spent for purchasing tuna samples from a local fishing port at the same or nearby survey area.
6. MV.SEAFDEC should be equipped with a spare set of water sampling bottles and spare-parts to assure the smooth implementation of the survey.
7. There was limited use of the sampling equipment, so that researchers could not collect as many samples as they need. She suggest to have a series of meetings among the researchers before the cruise and information of available sampling equipment, laboratory facilities should be made clear to researchers. (This might be the information that did not come to the technical coordinator)
8. Researchers should be included in the planning and formulation of methodologies and activities on board, so that every researcher could access and maximize all available facilities and equipment.
9. Due to some equipment failures and some being lost during the survey, the equipment should be checked and sent back to the manufacturer for repairs and the lost items replaced in order to make full use of the survey equipment for the next survey.
10. Because of the accident to the ICTD sensor unit at Station No. 28, many researchers have commented that SEAFDEC should buy insurance to cover the expensive survey equipment including the ICTD for the period of survey cruise.



Comment and Suggestion from Chief Scientist

With regard to the experience from this cruise, we learned many things, which may be classified as follows:-

1. It was observed that oceanic squid has shown more abundance and high distribution and over the survey area.
2. There are a lot of fish school were detected at the layer of 250 meters to 350 meters depth in the area, which this survey could not confirmed the species of those school. So others fishing gear should be designed to comfirm the species for the future survey, such as mid water trawl.
3. Tuna longline should be tried at more deeper layer drown to 200-250 meters, for the future survey too.
4. In order to avoid misunderstanding, the technical coordinator should respond very carefully on the comments and requests of the researchers in the program in relation to their project title.
5. The Technical coordinator should pay more attention to the information flow among researchers, coordinators and navigators.
6. To make for easier management of the survey, SEAFDEC should have their own equipment for the survey.
7. Project titles and proposals should be discussed in more detail among the technical coordinators or together with researchers (if possible) from the beginning.
8. Changes in the program and survey methods of each project, the responsible researchers must inform the chief scientist through their technical coordinator.
9. In relation to the ICTD accident, one Echo-sounder display unit or one for sea depth Echo-sounding should be installed in the dry laboratory room of MV.SEAFDEC.
10. Arrangements of accommodation for researcher should be considered in relation to the activities of the project.

Annex IV

Trouble Shooting Discussion on Board among technical coordinators and researchers concerned

The chief scientist called three meetings of the technical coordinators, researchers concerned and the captain to discuss some trouble shooting activities during the cruise. The meetings discussed matters as follows:-

1st meeting

April 25, 1998 - To adjust the time schedule during the period from 27-29 April 1998, due to the access time was still so much for the actual practice, and the discussion was also held on the adjustable fish sampling stations which was fixed at Station Nos. 14 and 21.

2nd meeting

May 4, 1998 - To determine the appropriate method for making decisions on what the chlorophyll maxima layer is, this was because of the malfunction of the fluorometer sensor of the ICTD, and to adjust the sharing of water samples among the closely related projects on board. There were two methods suggested:

- a) 1st trial, Dr. Anond would try to predict the chlorophyll maxima layer using the correlation of dissolved oxygen value from the oxygen sensor of the ICTD.
- b) 2nd trial, collected water samples at the high possibility layer at 25 meters class interval, at 25, 75, 100, 125 and 150 meter depth, then 180 ml water sample was filtered through a microfilter and the decision was made by observation.

After trials at stations 25 and 26, it was found that both two trials methods should be used at 10 meters class difference from the predicted value from the dissolved oxygen trial method. It was then used until the end of the cruise.

3rd meeting

May 7, 1998 - To inform the technical coordinators about the accident to the ICTD during the night of May 6, at Station No. 28. Also discussed was the bottom topography around this area which is irregular. There are many shoals and shallow reefs near the survey station, for example Station Nos. 30, 31 and especially Station No. 32 (thought to be reef at 20-30 meters) The meeting received strong comment from the Captain, not only for the safety of equipment, but also the safety of the vessel. The meeting agreed not to use Station No. 32, and to shift Station Nos. 30 and 31 away from the shallow area (30-A and 31-A), and the acoustic survey would be tried at the best of these.