

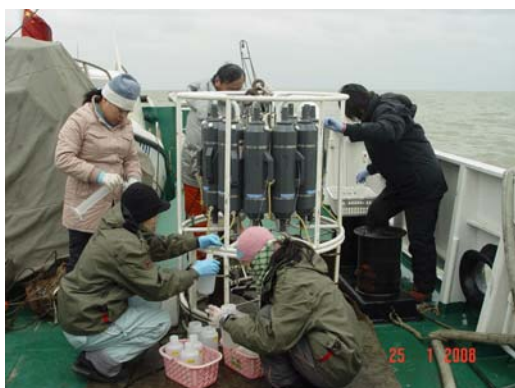
Activity Title: **Regional Collaboration: Co-operative Cruises and Joint Regional Stock Assessment**

Lead Organisations: **China:**
National Marine Environmental Monitoring Center (NMEMC), First Institute of Oceanography (FIO), Yellow Sea Fisheries Research Institute (YSFRI)

Republic of Korea:
Inha University, Korea Ocean and Research Development Institute (KORDI), Hanyang University, Ecocean Co. Ltd., West Sea Fisheries Research Institute (WSFRI)

Co-operative Cruises

In the winter and summer of 2008, 2 co-operative cruises were carried out by scientists from China and Republic of Korea on board the Hai Jian 17 and Xiangyanghong 9 research vessels belonging to China's State Oceanic Administration. The scientists carried out surveys on plankton, sediment, benthos, and water, and analysed the samples for nutrients, organics, trace metals, sediment profile, taxonomic composition of plankton, zooplankton, benthic organisms, pigments, and bacteria.



Collecting water samples during the Winter Cruise.

Some Results

- Results from the Summer Cruise showed some typhoon effects on seawater temperature.

- Nano- and micro- zooplankton were relatively high in the southwestern areas.
- Biomass and production of heterotrophic bacteria were significantly high in the surface near the mouth of the Yangtze River.
- The highest phytoplankton diversity indices were observed near the mouth of the Yangtze River due to the high occurrence of diverse diatoms and dinoflagellates there.
- Two major communities of macrobenthic organisms were identified, with a larger community in the north and a smaller community in the south.
- Strong stratification of nutrient concentrations was observed in summer, with higher concentration in the bottom layers.
- Unusually high concentrations of mercury were detected at several sampling stations.
- All of the OCP, PAH, and PCB compounds were detected in the study area.
- All data and samples were fully shared.

Future Work

Data differences between China and ROK on phytoplankton taxonomy, abundance, and chl-a concentration remain, and need more work, but will be used as material for further studies on how to harmonise data from different kinds of sampling methods and taxonomic classification.

A regional report consisting of all the results from both cruises will be published in early 2010.

Joint Regional Stock Assessment Surveys

Spring and autumn trawl surveys in the east and west of the Yellow Sea were performed by the R.V. Beidou and the R.V. Tamgu 8 using harmonised methods and standardised gear to enable comparison (Fig.1). The methods, data and analysis, and report drafting were discussed and agreed through close cooperation between the Yellow Sea Fisheries Research Institute, China and the West Sea Fisheries Research Institute, R. Korea in 3 Stock Assessment Workshops. Five commercial species were targeted and biological information collected. These institutes collaborated further in an exchange of scientists to harmonise the techniques using for ageing of fish and stomach content analysis.

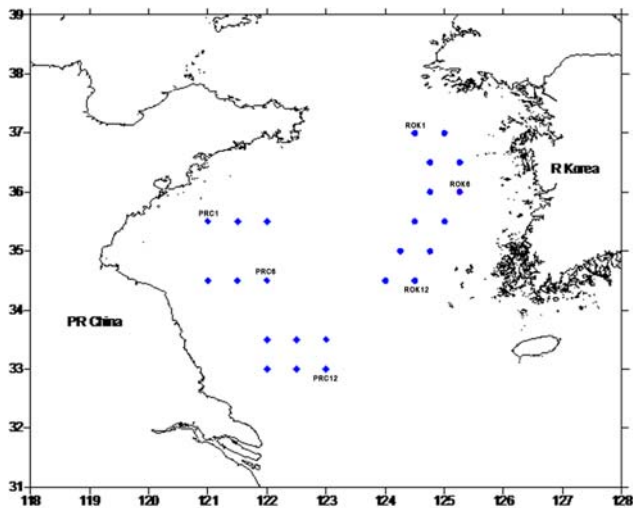


Fig 1: Spring survey sampling stations

Some Results

- Higher species diversity was observed in the western Yellow Sea with 86 species recorded compared to 58 in the eastern portion

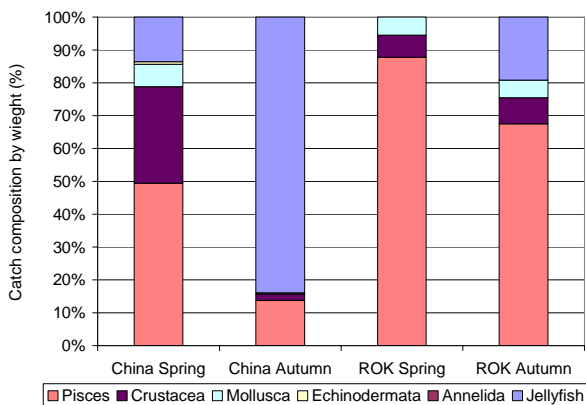


Fig. 2: Catch composition of the 4 surveys

- The fish catch composition appears to reflect the seasonal migration patterns with fish moving to shallower water to spawn in the spring and back to deeper water in the autumn for over-wintering. Fish formed a higher percentage of the catch in the eastern Yellow Sea in both seasons (Fig. 2).
- The proportion of jellyfish increased in both autumn surveys, especially in the western Yellow Sea where 86% of the total autumn catch by weight was jellyfish.
- Density of target species varied between seasons with anchovy and gosefish (angler fish) making the most significant contribution to catches by weight. Increase in densities in the autumn is due to recruitment of juveniles into the fished stocks (Fig. 3).
- In common with previous studies, over-exploitation of stocks has resulted in simple age structures. Most anchovy and yellow croaker were found to be 1 year old or less. No individuals were recorded greater than 3 suggesting that the fishery is highly reliant on recruitment to support catches.

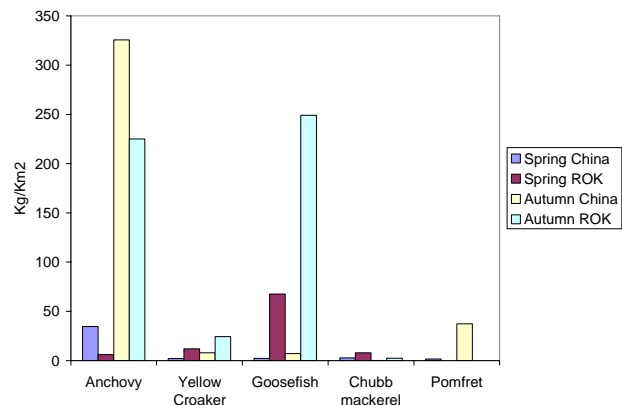


Fig. 3: Biomass of 5 target species in the 4 surveys

Future Work

Scientists agreed that even with the sensitivities surrounding fisheries issues there is a need for the countries to work together to improve management and understanding of these transboundary fish stocks. To do this a greater number of fisheries independent surveys are required. The present surveys were the first time China and R. Korea have conducted a joint fisheries stock assessment exercise. To continue building on this trust and cooperation, future studies should focus on biological characteristics of fish such as ageing, diet, prey selection as well as gear calibration to enable better comparison.