

The next International Echinoderm Conference will be held in New Zealand at the beginning of the year 2000. Its site is:
<http://macintosh.otago.ac.nz/iec2000>

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Chantal Conand



new info

beche-de-mer

The Conservation of sea cucumbers in Malaysia, their Taxonomy, Ecology and Trade: International Conference

Bilik Mesyuarat (2nd Floor), Ministry of Agriculture, Wisma Tani, Jln. S. Salahuddin, 25 February 1999.

Agenda included the following presentations:

- Holothurian fisheries, an overview with emphasis on the SE Asian region (Professor Chantal Conand, Univ- Reunion, Reunion)
- Holothurian culture, An overview and future prospects (Dr. Stephen Battaglène, ICLARM, Solomon Islands)
- Holothurian fisheries and trade in Thailand (Dr. Somchai Bussarawit and Ms. Nalinee Thongtham, Phuket Marine Laboratory, Thailand)
- Reproductive biology in the population of *Stichopus variegatus* from the Johore Islands (Dr Zulfigar Yasin, Universiti Sains Malaysia)
- Species of sea cucumber in Pulau Besar Johor (Siti Zaamar et al., Universiti Sains Malaysia)
- The taxonomy and ecology of Holothurians in Malaysian waters (Mr Bobby Forbes, Heriot-Watt University, Scotland and Mr. Zaidnuddin Ilias, Fisheries Research Institute, Malaysia)
- Holothurian fisheries and trade in Malaysia (Dr. Mark Baine, Heriot-Watt University, Scotland and Ms. Choo Poh Sze, Fisheries Research Institute, Malaysia)
- Towards a Holothurian conservation and management strategy for Malaysia (Ms. Choo Poh Sze, Mr. Bobby Forbes, Dr. Mark Baine and Mr. Zaidnuddin Ilias)
- Expert Panel Presentation (Prof. Chantal Conand and Dr. Stephen Battaglène).

Expert panel presentation

by Pr C. Conand & Dr S. Battaglène

Concluding remarks presented at the end of the Conference

1. The presentations have shown that much progress has been achieved in a field where previous knowledge was very low. First looking at the 'sea cucumber fishery system' as a whole, it appears that the collaboration has been very effective between the different partners, scientists from the universities and the fishery depart-

ments. Further developments should tend towards a co-management involving also fishermen and traders. The 'sea cucumber fishery system' should be taken as an example of co-management for one particular resource of reef communities, and consequently be included in the various programmes focusing on reef monitor-

- ing and rehabilitation. Some sea cucumber species could be taken as indicators of the state of the reef.
2. Major progress has been made on the taxonomy and ecology of sea -cucumbers in Malaysia, which is located within the highest biodiversity areas of the world. Despite the difficulties of their taxonomy, 37 species have been determined, a few others still remain to be identified or described if they appear as new to the science. A collection of underwater photographs of the sea cucumbers in their characteristic habitat has been constituted. With the increase of interest during the last decade given to biodiversity, sea-cucumbers appear as a group of macro-invertebrates where many large species, common in shallow waters, are yet to be described.
 3. Despite an important increase of interest during the last decade, by the scientific community, the managers and the users, it has appeared that further studies are needed on different aspects to enable sustainable exploitation of sea cucumbers. They should first focus on biology and ecology of the species, in Malaysia as well as on a regional basis, as there are many interactions with the neighbouring countries, Thailand and the Philippines for example. The life-history traits and the ecology of the populations of many of the commercial species are yet mostly undescribed in the region. Very little is known concerning recruitment, growth and mortality of most species; in general, these species appear as slow-growing and very vulnerable and constitute therefore fragile stocks. More research intended to quantify the population parameters is still necessary. Stock assessments are also needed, but the resource seems to be already severely depleted although the situation is variable in the different zones in Malaysia. Solutions appropriate to each case have to be found.
 4. As far as the trends in fisheries and trade are concerned, it appears that the number of producing countries has recently increased worldwide, both in tropical and temperate regions, but the tonnages are still incompletely recorded. The situation in Malaysia appears to be particularly difficult, the country been at the same time importer, consumer, producer and exporter. It remains important to better collect and standardise the statistics at the different levels of the 'holothurian system'. It is also important to emphasise the importance of the processing methods, to make the activity profitable. The recent conflicts appearing within, or between, several countries might be interpreted as signs of overexploitation of the resource, and of a high level of demand. The management has to be appropriate for each case. The question of fishery regulations has been debated; if fishery regulations are to be taken, it is very important to watch over their application. The present depletion of most stocks has been noticed.
 5. Development of a regional network, dealing with the same set of species and fishery context, has been requested during the meeting; it can be achieved through e-mail, or other media. It will help to circulate the information on the different aspects of the subject.

Abstracts from papers presented during the Conference

World sea-cucumber exploitation and the market for trepang: an overview

Chantal Conand

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Characteristics of the morphology, anatomy and biology of sea cucumbers, particularly the commercial species used to prepare *trepang* (or beche-de-mer) are presented as an introduction, before an overview of the complex 'fishery system'. The main world fisheries, tropical and temperate, traditional and contemporary and their recent catches are analysed. There is an increase of interest in this commercial resource, many recent fisheries witnessing conflicts in relation to conservation needs. The processed product generally passes from the producer country to the main world markets, Hong Kong, Singapore and Taiwan, before being imported to the consumer countries. From different indices, overexploitation is becoming more and more noticeable worldwide as the demand for *trepang* increases. Sustainable management should become a priority and regulations should be adapted for these fisheries. In conclusion, further studies should develop a greater understanding of the fisheries biology of the commercial species; stock assessments; improving available statistics on catches and markets; and the development of alternative measures for con-

servation based on mariculture techniques. Despite an increasing interest, these fields are poorly understood, yet they deserve more attention as their social value in small artisanal activities is high.

Culture of tropical sea cucumbers for the purposes of stock restoration and enhancement

Stephen C. Battaglene

International Center for Living Aquatic Resources Management, Coastal Aquaculture Centre (CAC), Honiara, Solomon Islands

Severe over-fishing of sea cucumbers has occurred in most countries of the tropical Indo-Pacific. The release of cultured juveniles is being examined at the ICLARM Coastal Aquaculture Centre in Solomon Islands as a means of restoring and, eventually, enhancing tropical sea cucumber stocks. Sandfish (*Holothuria scabra*) are the tropical species with the most potential for stock enhancement. Sandfish are of high value, widely distributed and relatively easy to culture in simple systems at low cost. This paper summarises what is known about the culture of *H. scabra* and compares it to that of the temperate species *Stichopus japonicus*. Sandfish live in high-nutrient environments at densities of hundreds per hectare. They have reproductive peaks in September and October, but can be induced to spawn year-round. Increases in water temperature and addition of powdered algae are effective ways of inducing spawning. *Chaetoceros muelleri* and *Rhodomonas salina* are two of the better micro-algae for feeding the larvae. Sandfish larvae are more robust and easier to rear than those of other tropical species. Larvae metamorphose into juveniles after 2 weeks at 28°C and settle on 'diatom-conditioned' plates. ICLARM has produced over 200,000 juveniles from six separate spawnings. Sandfish can be reared on hard substrates until they reach 20 mm in length and are then best transferred to sand substrates. Absolute daily growth rates for juvenile sandfish averaged 0.5mm day⁻¹ (0.03 s.e.) and ranged from 0.2 to 0.8 mm day⁻¹, depending on stocking density, light intensity and addition of powdered algae. Overall, there are good reasons to believe that sandfish can be produced cost-effectively for the purposes of restocking and stock enhancement. The potential for using cultured juveniles to manage fisheries for sea cucumbers now depends on the development of strategies to optimise the survival of juveniles released into the wild, and to evaluate commercial-scale releases.

Sea cucumber fisheries and trade in Thailand

Somchai Bussarawit & Naline Thongtham,

Phuket Marine Biological Center, Phuket, Thailand

Sea cucumbers are ecologically and commercially important. Used in the production of beche-de-mer (*trepang*), in Thailand they are collected both in the Gulf of Thailand and the Andaman Sea for local consumption and for the export market. The decrease of sea cucumbers in their natural habitat, however, has raised concern and prompted the Ministry of Agriculture and Cooperatives to request the Department of Fisheries for information on the present status of the sea cucumber fishery in Thailand. From the study, a list is provided of species diversity and commercial use of sea cucumbers found in Thai waters. Of the species occurring on sea grass, reef flats and reef slopes, the sea cucumbers used in the production of beche-de-mer are *Holothuria scabra*, *H. atra*, *H. leucospilota*, *Stichopus chloronatus*, *S. variegatus*, *Bohadschia marmorata*, and *B. argus*. Further research is necessary to study the taxonomy, biology and ecology of sea cucumbers in order to properly assess restocking and conservation in Thai waters.

Species of sea cucumber found in Pulau Besar, Johor, with special emphasis on the genus *Stichopus*

Siti Zaama Rizal Boss, Zuffigar Bin Yasin & Aileen Tan Shau-Hwai

Universiti Sains Malaysia, Pulau Pinang

A preliminary survey was completed in Pulau Besar, Johore to list the species of sea cucumber found in the island. Three genera and seven species of sea cucumber were found in the study area, with four species from the genus *Stichopus* yet to be identified. The characteristics taken into account for taxonomic consideration are presented in this paper. The number of species from the genus *Stichopus* is higher than the number of species from other genera of the same order. *Stichopus* is considered the dominant genus in the study area.

The taxonomy and ecology of sea cucumbers in Malaysia

Bobby Forbes¹ & Zaidnuddin Ilias²

1. Heriot-Watt University, Orkney Islands, Scotland

2. Institut Penyelidikan Perikanan, Pulau Pinang, Malaysia

During the period July 1996 to December 1998 six surveys were carried out in Peninsular Malaysia and Sabah in order to determine species presence, abundance and distribution. A total of 148 sites were surveyed and the biological habitats and relative abundance of sea cucumber species described at each. Thirty-seven species of sea cucumber have been described with a further six species requiring verification. Species abundance, although relatively high at most locations, displayed considerable patchiness. The *Stichopus horrens* was rare at Pulau Langkawi, the site of a traditional fishery and failed restocking trials. There were temporal variations in species abundance at two sites although it was unclear from the data if these were the result of a true seasonal variation.

Sea cucumber fisheries and trade in Malaysia

Mark Baine¹ & Choo Poh Sze²

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Through an examination of existing statistical data on sea cucumber trade and qualitative discussion on historical and present fisheries (both communicated and observational), this paper provides an analysis of the current situation with respect to fisheries management, suggesting possible areas of future consideration in the development of a conservation and management plan for holothurians in Malaysia. There currently exists no countrywide regulation in this fishery. In the wake of purported overfishing of sea cucumber populations in Langkawi, supplies from Adang, Thailand ensure the maintenance of a healthy infrastructure for the trade and processing of sea cucumbers through Langkawi. Concerns are raised, however, for the long term sustainability of such cross-border links and potential knock-on effects. Pulau Pangkor, located off the west coast of Peninsular Malaysia supports a one-man fishery aimed at *Stichopus horrens*, which, although small in associated effort, does raise the question of permissibility with respect to juvenile catches. Sabah state, in north-east Borneo supports Malaysia's largest fishery, with current fishing levels requiring review and monitoring to determine the need for regulation and management. Existing trade statistics for Malaysia are erratic and at times confusing, requiring re-evaluation of the sub-categorisation of beche-de-mer and the classification of origin of catches. A more detailed monitoring programme for Sabah is required on top of the existing, recognisably under-achieving, landing surveys.

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