

Sea cucumber fishery in the Philippines

Sabine Schoppe¹

For almost a century, the harvesting and processing of sea cucumbers into trepang has been a source of income for many Philippine families. Exports, however, increased tremendously in recent years, from 250 t in 1977, and 1189 t in 1984 (1977–1984 statistics from the Bureau of Fisheries and Aquatic Resources, Philippines) to 2123 t in 1996 (FAO, 1996). The Philippines is now the second major producer and exporter of dried sea cucumber in the world (Conand & Byrne, 1993; Conand, in press). Despite its importance in the world market, no comprehensive study about the bêche-de-mer exploitation in the Philippines has been conducted. The increasing depletion of sea cucumber stocks is obvious and has only been sporadically documented (Trinidad-Roa, 1987; Schoppe *et al.*, 1998; Schoppe, in press). In the mean time, sea cucumber sizes have become smaller and collections must be conducted in deeper waters.

A preliminary study on the sea cucumber fishery in Palawan from October 1999 to March 2000 revealed that of the 100 Philippine sea cucumber species, about 25 are regularly collected and processed (Table 1). Traders differentiate between 23 different species (local names) of dried sea cucumbers. Among local fisherfolk, greater variety of local names exists, due to several facts: (1) species characteristics are clearer in live specimens, (2) sometimes colour varieties of a species are assigned a separate name, and (3) the diversity of local dialects. However, the total number of collected species probably does not exceed thirty, including those that are used fresh and for local consumption only. The species most frequently collected and processed for export are *Holothuria scabra*, *Bohadschia marmorata*, *Actinopyga lecanora*, *Holothuria fuscocinera*, *Holothuria* sp. (**Patula**), *Holothuria atra*, and *Stichopus hermanni*. The highest prices (per kilogram of dry weight) are achieved with large specimens of *Actinopyga lecanora*, *Holothuria nobilis*, *H. whitmaei*, *H. scabra* and *Stichopus* spp. (Table 1). The lowest-priced species include *H. coluber*, *H. fuscocinera*, and *Pearsonothuria graeffei* (Table 1).

The sea cucumber fishery in Palawan is a year-round activity with a peak season from March to June. Holothurians are collected during low tide, mainly during the night. They are collected by

hand while walking along the intertidal zone with a lamp. It is mainly the women who are involved in the collecting of sea cucumbers from shallow areas, while the men skin dive or use an air-compressor connected to a breathing hose to reach deeper areas.

Sea cucumber processing involves four major steps: cleaning, cooking, smoke drying and sun drying. The duration of each process depends on the species and the size of the specimens. Processing has been sufficiently described in Trinidad-Roa (1987), Espejo-Hermes (1998), and Schoppe (in press).

After processing, the dried products are either sold to middlemen or directly to one of the four sea cucumber traders in Palawan. Prices received are up to 25 per cent higher if sold directly to the trader than selling to a middleman. Dried products are sold about 8.5 times per month during peak season. During this time, an average of 1.72 kg of dried sea cucumbers are sold per fisherfolk. This is equivalent to US\$ 13.93 (PHP 557.33) and amounts to a gross monthly income of US\$ 118.43 (PHP 4,737.31) during peak season. Between March and June, the sea cucumber fishery is supplemented through fishing, which is the main source of income during the rest of the year.

The processed sea cucumber (trepang) is shipped to Manila where exporters sell it to China, Hong Kong and Singapore. Prices have increased over the years; however, stocks are decreasing according to some fisherfolk. Local traders have not noticed a decline, probably because more and more fisherfolk have become engaged in the sea cucumber fishery due to its profitable nature.

Much more information on the sea cucumber fishery in the Philippines is needed to analyse the nation-wide situation. After Alcala & Alcazar (1984) and Trinidad-Roa (1987), nothing more has been published about the sea cucumber fishery in the Philippines. In the last decade, the results of only one other related study were published (Schoppe *et al.*, 1998). In that report, the importance of molluscs, sea cucumbers and other reef organisms as sources of income for the fisherfolk of the Cuatro

1. State Polytechnic College of Palawan, Aquatic Science and Technology Institute, Santa Monica, Puerto Princesa City, Palawan, Philippines. E-mail: Schoppes@pal-onl.com

Table 1. Regularly collected sea cucumber species from Palawan, Philippines. Prices achieved from traders in Puerto Princesa are given in Philippine pesos and in US dollars. Exchange rate: US\$ 1.00 = PHP 40.00 as of Feb. 2000.

No	Scientific name	Local name (Tagalog)	Price / kg (PHP)	Price / kg (US\$)
1	<i>Actinopyga echinites</i>	Brown beauty	180.00	4.50
2	<i>A. lecanora</i>	Buli-buli / Monang / Munang	Extra small: 350.00 Small: 430.00 Medium: 650.00 Large: 840.00	8.75 10.75 16.25 21.00
3	<i>A. mauritiana</i> c.f.	Bakungan	Small: 200.00 Large: 600.00	5.00 15.00
4	<i>Actinopyga</i> spp. (<i>A. obesa</i> , or <i>A. miliaris</i>)	Khaki	Extra small: 150.00 Small: 200.00 Medium: 350.00 Large: 400.00	3.75 5.00 8.75 10.00
5	<i>Bohadschia argus</i>	Leopard / Matang Itik	300.00	7.50
6	<i>B. marmorata</i>	Lawayan, Pulutan	Extra small: 100.00 Small: 170.00 Medium: 260.00 Large: ?	2.50 4.25 6.50 ?
7	<i>H. (A.) coluber</i>	Patola white / Tambor	20.00	0.50
8	<i>H. (C.) rigida</i> , <i>H. (C.) inhabilis</i>	Batunan	Fresh for local consumption	N/A.
9	<i>H. (H.) atra</i>	Black beauty	Small: 70.00 Medium: 100.00 Large: 200.00	1.75 2.50 5.00
10	<i>H. (H.) edulis</i>	Red Beauty	Small, medium: 150.00 Large: 200.00	3.75 5.00
11	<i>H. (H.) pulla</i> c.f.	Patola red	200.00	5.00
12	<i>H. (M.) fuscopunctata</i>	Sapatos	120.00	3.00
13	<i>H. (M.) nobilis</i> , <i>H. (M.) whitmaei</i>	Susuhan, Susan, Susuan	Medium: 700.00 Large: 1000.00	17.50 25.00
14	<i>H. (M.) scabra</i>	Cortido / Curtido / Putian	Extra small: 360.00 Small: 460.00 Medium: 700.00 Large: 900.00 Extra large: 1000.00	9.00 11.50 17.50 22.50 25.00
15	<i>H. scabra</i> var. <i>versicolor</i>	Curtido Bato	20.00	0.50
16	<i>H. (S.) fuscocinera</i>	Labuyo / Lubuyo	55.00	1.38
17	<i>Holothuria</i> sp.	White Beauty	200.00	5.00
18	<i>Holothuria</i> sp., <i>H. (M.) leucospilota</i> c.f.	Patola	190.00	4.75
19	<i>Holothuria</i> spp. (<i>Holothuria</i> black colour)	Patola black	Small: 70.00 Medium: 100.00 Large: 200.00	1.75 2.50 5.00
20	<i>Pearsonothuria graeffei</i>	Piña (Hanginan Mani Mani?)	70.00	1.75
21	<i>Stichopus chloronotus</i>	Cuatro Cantos, Hanginan black	850.00	21.25
22	<i>S. hermanni</i>	Hanginan	Extra small: 200.00 Small: 300.00 Medium: 450.00 Large: 850.00	5.00 7.50 11.25 21.25
23	<i>S. horrens</i>	Hanginan	Extra small: 200.00 Small: 300.00 Medium: 450.00 Large: 850.00	5.00 7.50 11.25 21.25
24	<i>Thelenotia ananas</i>	Talipan / Taripan	500.00	12.50
25	<i>T.anax</i> , <i>T. rubralineata</i>	Legs	170.00	4.25
26	?	Hodhod	500.00	12.50

Islands, an island group off Leyte, Philippines was discussed. Sea cucumber processing in the Philippines is treated as a minor chapter in Espejo-Hermes (1998) and Schoppe (in press).

This paper follows up initial efforts of the Philippine Council for Aquatic and Marine Research and Development, which encouraged the implementation of a management scheme for the sea cucumber fishery in the Philippines (PCAMRD, 1991). It is an appeal for further studies on stock assessment and catch statistics of sea cucumbers in the Philippines. The author started a long-term study on the sea cucumber fishery in Palawan in order to determine the current situation and to suggest management schemes appropriate for the local setting.

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Conservation of aspidochirotid holothurians in the littoral waters of Kenya

Yves Samyn¹

Abstract

Aspidochirotid sea cucumbers (Echinodermata: Holothuroidea) are heavily fished in the littoral waters of Kenya, and stocks have plummeted. In order to conserve and manage these natural resources, appropriate conservation and management plans must be developed. This can only occur if high quality research on different levels is done. This paper discusses five layers of understanding that should be achieved before holothurian conservation in East Africa can be effective.

Introduction

Along the Kenyan coast most aspidochirotid sea cucumbers are collected *en masse* and sold to foreign markets (sea cucumbers are not part of the Kenyan diet). Ferdouse (1999) reported on beche-

de-mer imports in Hong Kong and Singapore, the two main retailing centres. According to this source, Kenya exports only to Singapore, albeit in increasing levels (1.1 % of the total import in 1993; 2.9% in 1994; and 3.9 % in 1995). From the same data set it is clear that the Kenyan export is rising

1. Free University of Brussels (VUB), Department of Biology, Unit of Ecology & Systematics, Pleinlaan 2, 1000 Brussels, Belgium. E-mail: ysamyn@vub.ac.be