Status of the sea cucumber fishery in the Sultanate of Oman

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Abstract

Sea cucumber harvesting in Oman constitutes a minor fishery. Harvesting takes place in Mahout Bay and centers on the sandfish, *Holothuria scabra*. The sea cucumber fishery was revived in 2003 with the increased demand of beche-de-mer from international markets. Sandfish are collected by hand by walking in shallow-water areas during low tide, between late November and May. Sandfish are traditionally processed to a dried form after first gutting, boiling and cleaning. While local prices paid to collectors varies from 10–50 Omani rials (OMR)[2] for 100 live specimens, depending on the size of the sea cucumber and the season, local traders receive OMR 35–55 per kg of dried sandfish (beche-de-mer) when they export their product. Almost all Omani beche-de-mer are exported to the United Arab Emirates (UAE) for re-export to international markets.

Introduction

Very few studies have been conducted on sea cucumber harvesting and management in Oman (Johnson 1990). The primary species harvested in Oman is the sandfish, *Holothuria scabra* (*feik albahar* in the local language, which means "sea jaw"). Men involved in this fishery perform a wide range of other income-generating activities and 50% of the fishers are women. Mahout Bay, which is in the Gulf of Masira in the Arabian Sea, is the main area of sea cucumber harvesting in Oman. *H. scabra* is considered to be the most valuable species for beche-de-mer production (Conand 1990, 2004) and the most widely harvested in the tropics (James 2001). Information on the status of this Omani fishery was obtained through a questionnaire developed by the authors of this paper. Sea cucumber fishing in Mahout Bay began in the 1960s, when Mahout Island was a small traditional port used to transport goods to and from East Africa and India; the islanders used to collect sea cucumbers and exchange them for food stuffs from abroad. The fishery was discontinued in the 1970s because the port was no longer operating. However, the sea cucumber fishery was revived in 2003 due to an influx of foreign traders from UAE and subsequent intensive fishing during 2004 and 2005. The fishery now is unregulated with open access to anyone. This paper describes the status of the existing fishery and resource, and provides management recommendations.

Methodology

A preliminary survey of sea cucumbers was carried out during September and October 2005, in Mahout Bay. Information on the species exploited, fishing techniques, processing and trading was obtained through direct field observations and through a questionnaire that was given during interviews with sea cucumber fishers, processors, traders and local authorities around the Mahout area. More than 30 people, including women and traders answered the questionnaire.

Results and discussion

The fishery

The existing sea cucumber fishery in Oman centers on a single species, *Holothuria scabra* (Fig. 1). This species exists only on the eastern side of Mahout Bay and in limited areas, such as sea grass beds with fine sand in sheltered flats and lagoons.

Sea cucumbers are harvested by hand during low tide, and mainly during spring low tides. There are six main *H. scabra* fishing grounds in Oman: Al-Eigah, Wadsumah, Al-Naqel, Al-Shaghia, Al-Hofnat and Ras-Knasah (Fig. 2). The first three fishing grounds are sandy islets exposed during spring low tides, while the other fishing grounds include other coastal areas and lagoons. To reach the sandy islets during spring low tides, collectors

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2. 1 (Oman rial) OMR=26 USD

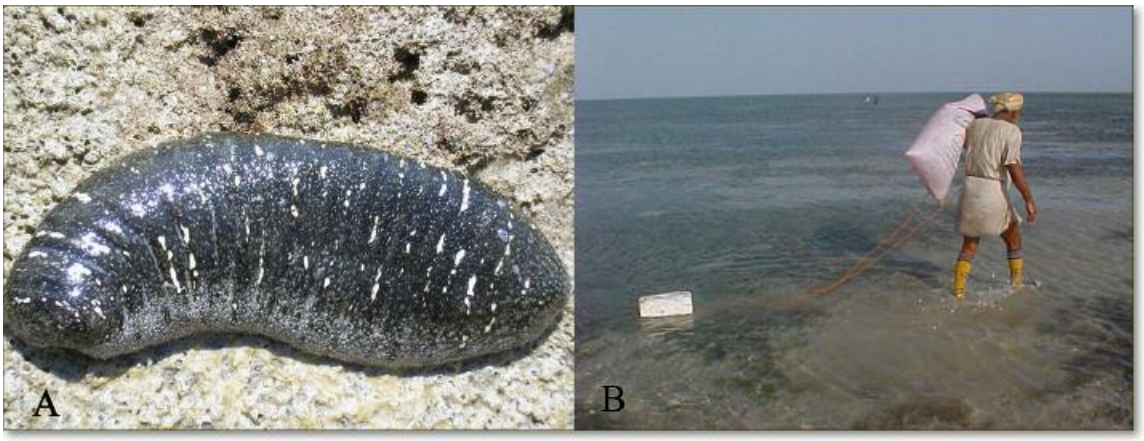

Figure 1.
(a) ***Holothuria scabra*** **is currently the only exploitable sea cucumber species in Oman.**
(b) ***H. scabra*** **being collected at low tide in Al-Eigah, Mahout Bay.**

use motorized boats that generally belong to the traders. Traders often contract groups of collectors, mostly women, in order to buy their sea cucumber harvests, providing them with free services such as transportation (boats or vehicles), drivers, dive masks and food.

About three boats, each owned by four major traders, are used in fishing operations. Each boat has 7–10 collectors on board, and may make two round trips in one day with 10 collectors in each trip. It takes around 15–60 minutes to reach the fishing grounds. Fishers work individually and collect and store sea cucumbers separately from other fishers' catches in large flour bags or plastic buckets (Fig. 1). Free diving (mask only) is only done infrequently, and is restricted to men.

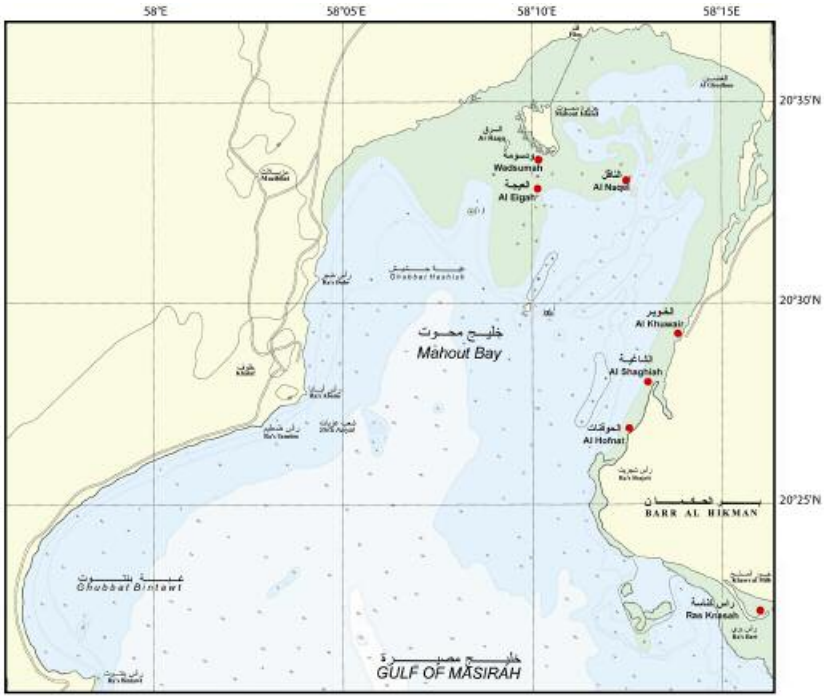

Figure 2. Mahout Bay in the Gulf of Masirah. Red spots indicate the main sandfish fishing areas.

The number of monthly fishing days per season per fisher is estimated to vary from 10 to 20. The estimated number of fishers per season was 100 in 2004 and 200 in early 2005, indicating an increase in demand for beche-de-mer and resulting in a high income for the fishers and traders. The average fishing hours per fisher per working day is three to four hours with an average collection of 100 live sandfish per fishing trip. Among the collectors, women represent the largest group, about 50%, while men and children account for 30% and 20%, respectively.

The sea cucumber fishery is linked with the shrimp fishing season, which runs from September to March. Sea cucumber fishing begins when the number of shrimp landed decreases. This occurs in late

Figure 3. Steps for processing *H. scabra* in Oman, Mahout area.

November. The primary reason for low landings of shrimp in November is the migration of shrimp at this time to deeper waters for spawning. And because fishermen use only traditional cast nets to catch the shrimp, once the shrimp go to deeper waters the fishermen are no longer able to catch them. Therefore, in November, fishers begin collecting sea cucumbers. When the shrimp fishing season ends, sandfish harvesting begins. Sea cucumber harvesting begins in late November, reaching its peak between January and March, and then gradually decreasing through to May. The shrimp fishing season is related to the socioeconomic traditions of the Mahout communities as well as sea conditions. Because most Mahout communities are Bedouins, they seasonally move out of Mahout to adjacent areas, particularly during the summer months (June–August) when sea conditions are too rough for fishing due to the southwest monsoon.

Processing

The processing of sea cucumber is done by the traders, and the process in Oman involves gutting, boiling, preserving, cleaning and drying (Conand 1999) (Fig. 3).

Gutting

Once the sea cucumber is harvested, the body is immediately shaken and squeezed to extract the gut through the anus. However, some fishers make a 3-cm-long slit from the mouth to the anus, and squeeze the body to remove the gut.

First cooking

Prior to boiling, the sea cucumbers are sorted by size and then boiled in seawater with extra salt added. Cooking time is about 1–1.5 hours. This step softens the meat, kills microorganisms, contracts the sea cucumber to the desirable body size, and reduces the water in the tissues, thereby speeding up the drying process.

Preserving and storing

In order to facilitate the removal of the outer skin, which contains tiny calcareous spicules, the body wall is stored indoors in a covered barrel for 24–30 hours to smoothen the outer layer of the body wall. Another method used to achieve this step is to bury the cooked sea cucumbers in the sand for 24 hours. Both methods are done at the processing sites.

Cleaning

Cleaning involves scraping the outer body wall with a knife or brush to remove the chalky particles in the surface wall.

Second cooking

The second cooking is similar to the first cooking, except it is for less time (< 40 min), to eliminate and odors and residues.

First drying

The cooked sea cucumbers are kept indoors for four to five days so that dust and sand do not get on them and so that they become semi-solid. Rice sacks are placed under the processed sea cucumber to absorb moisture and wetness.

Second drying

The sea cucumbers are left outdoors under the sun for final drying and solidifying. The beche-de-mer are then ready for marketing.

Trade

Prices paid by local traders to collectors vary, depending on the size of the sea cucumbers and the season[3]. However, the average price paid between 2000 and 2004 was roughly OMR 10 per 100 live sea cucumbers. From January to March 2005, the price increased to OMR 45–50 for 100 live sea cucumbers, with an average price of OMR 30. This can be attributed to the high demand for this species and the low supply from major beche-de-mer producing countries because of overfishing (Uthicke and Conand 2005). All fishing and processing expenditures for the fishery in Oman (e.g. transportation, fuel, dive masks, cooking gas, salt and generator are paid for by the traders (Table 1).

Table 1. Expenditures paid by beche-de-mer traders for the sea cucumber fishery.

Expenditures / day	Cost (OMR)
Hired boat	10
Boat fuel	5
Cooking gas	3
Salt	2
Total	20

Once the beche-de-mer are processed, they are stored unsorted in a warehouse. Two or three days before loading, the beche-de-mer are sorted into different sizes and packed in polypropylene bags. Presently, four major local traders are actively involved in marketing beche-de-mer.

Although Oman is a beche-de-mer producing and exporting country, it still remains relatively unknown to most international markets. Beche-de-mer from Oman are mainly exported to UAE, and to a lesser extent, Hong Kong. The major Omani sea cucumber traders have agents in UAE for purchasing the product. Prior to fishing season, the agents visit the area to give the traders processing instructions and to negotiate the price. The price paid by the agents varies between OMR 35 and 55 per kg (dry weight), depending on size and quality.

Although Oman has been harvesting and processing sea cucumber since 1995, the Directorate of Statistics groups sea cucumber production with "unidentified fish". Yet, from December 2004 to June 2005, about 1.2 tonnes of frozen sea cucumbers were documented as having been exported to UAE (Directorate of Fisheries statistics, pers. comm.). Similarly, the Directorate of Fisheries at Mahout permitted one trader to harvest and process 250, 150 and 300 kg of dried sea cucumbers during January, May and June 2005, respectively. Because this is a minor and relatively new fishery, in term of fetching high prices, the ministry of Agriculture and Fisheries does not care of it. Fish inspectors at the border check post are not familiar with or do not recognize sea cucumbers, especially dried ones, and so the product passes through the border without identification. Some sea cucumber traders do occasionally register their product at the Directory of Alwusta region, where sea cucumbers are present. But communications within these channels are sometimes missed. Therefore, we are working hard to strengthen communications. There is cooperation in the collection of fisheries data among fisheries organizations, but this does not include sea cucumbers. Starting from this year and based on our study the data will be collected.

Although UAE is the main importer of Omani beche-de-mer, Hong Kong has recently (2000 and 2001) begun importing Oman's beche-de-mer products (Bruckner et al. 2003), although in lower quantities than what UAE imports (Table 2). Oman production rarely appears in international beche-de-mer statistics, which may be because only small quantities are exported directly to international markets, and Omani beche-de-mer production is limited to UAE markets.

Table 2. Imports of sea cucumber into Hong Kong (after Bruckner et al. 2003; Ferdouse 2004).

Year	Oman		UAE	
	Quantity (t)	Value (USD'000)*	Quantity (t)	Value (USD'000)
1996			3.00	19
1997			22.00	70
2000	0.96	14.25	10.85	161
2001	0.49	7.26	40.62	602

* Estimated values based on UAE values during the same period

Issues and recommendations for the management of the *H. scabra* fishery in Oman

At present, sea cucumber fishing in Oman is not regulated, due in great part to a lack of understanding about the biology and ecology of Omani sandfish resources.

Despite the fact there are no direct regulations to manage sea cucumber resources, a few general

3. At the beginning of the sea cucumber fishing season, competition among traders is low, but is high among fishers. So, the sandfish fishing amount per fisher is high but the price is low. At this time, negotiation between local traders and exporters (or foreign traders) takes place. The high price is often gained in December and January, when the demand is high and competition among traders occurs.

fishery management restrictions are practiced in the region, such as restrictions on harvesting any kind of marine resource use scuba. Sea cucumber harvesting is mainly restricted to collection by hand while walking during low tide or by free diving. Although there is no specific closed season for sea cucumber harvesting, fishers usually collect them for six months, from November to May, with peak harvesting occurring from January to March. Harvesting in the area is historically restricted only to Mahout traditional fishers; there is no commercial fishery and fishers from neighboring areas are not allowed to collect sea cucumbers

From the above description of the fishery coupled with the walk survey using transect (Khalfan 2005), several management issues have been identified by this study.

1. There is a lack of information on landings, catch per unit of effort, densities, and processed production of *H. scabra* from Oman, and action should be taken to begin collecting this information.
2. The Directorate of Fisheries at Al-Wusta (Central) Region should be made responsible for collecting the above data by providing local traders with export permission certificates that indicate the name of the trader, age of trader, area of the trader, form of product (dried, frozen, live or salted), quantity of the product, origin of the product, country/area to which the product will be exported, name of border/check post/sea port, date of permission etc.
3. Fish inspectors at borders should be made familiar with sea cucumbers, both in their live and dried form. This will facilitate the Directorate of Fisheries Statistics to group sea cucumber data separately in the annual statistical book.
4. Research in various aspects of biology, ecology, stock assessment and enhancement, and marketing must be initiated. Reproductive biology and size at first maturity are required in order to establish regulations. The exploration of new fishing grounds and the designation of marine protected areas (MPA) in some remote sea cucumber sites are also needed to minimize fishing pressure and to protect brooders, respectively. The marketing structure should be studied to develop an understanding of the socioeconomic aspects of this fishery. The initiation of feasibility studies on sandfish aquaculture in Oman is essential as it is the quickest and most stable solution for meeting export demands and ensuring natural stock enhancement.
5. Capacity building programmes — training, study tours, participation in national and international meetings and workshops on sea cucumbers — should be conducted and supported by government organisations.

Acknowledgements

This project was funded by Oman Fisheries Company (OFC). We are grateful to Dr Ahmed Al-Hosni, Director General of Fisheries Research and Extension and Mr Saeed Al-Rawahi, Deputy General Manager (OFC) for their special interest and continuous encouragement throughout the project. Special thanks are due to Drs. Chantal Conand and N. Jayablan for critically reviewing this paper. Their numerous comments and suggestions aided considerably in improving the manuscript. Appreciation is also extended to all staff of the Marine Science and Fisheries Center for their assistance and encouragement.

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