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HOLOTHURIAN RESOURCES FROM INDIA AND THEIR EXPLOITATION

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ABSTRACT

In the seas around India nearly 200 species of holothurians are known, of which about 75 species are from the shallow waters within 20 m depth. Of these, about 15 species are of commercial value. At present processing is restricted only to the Gulf of Mannar and Palk Bay on the mainland. Here *Holothuria (Metriatyla) scabra* is mainly used. The other species exploited are *Holothuria (Thelothuria) spinifera* and *Bohadschia marmorata*. *Holothuria (Halodeima) atra* which occurs in large numbers can also be tried. At present there is no exploitation in the Lakshadweep. In Lakshadweep, *Holothuria (Microthele) nobilis* which yields first grade *beche-de-mer* occurs in abundance followed by *Bohadschia argus* and *Stichopus choloronotus*. Exploitation is stopped in Andaman and Nicobar Islands. *Holothuria (Metriatyla) scabra* and species of *Actinopyga* are important from the Andaman and Nicobar Islands.

INTRODUCTION

The seas around India are rich in holothurian resources for *beche-de-mer*, but information on them and their exploitation is limited. Hornel (1917) wrote a classical paper on the history and revival of the *beche-de-mer* industry in India. James (1973, 1983) has given for the first time an account of the holothurian resources of India chiefly based on the intensive surveys along the Gulf of Mannar and Palk Bay and the Andaman and Nicobar Islands. Soota *et al.* (1983) had listed some holothurians used in the *beche-de-mer* industry in Andamans. The latest information on holothurian resources from India have been published by James (1986). The holothurian resources of the Lakshadweep have been studied in greater detail after conducting a planned survey to all the 10 islands in the Lakshadweep by James (1989 a, 1989 b).

SPECIES EXPLOITED AT PRESENT

There are over 650 species of holothurian known from the various parts of the world. In the seas around India nearly 200 species of holothurians are known, of which about 75 species are from the shallow waters within 20 m depth. Of these about 10 species are of commercial value. Large size holothurians with thick body walls are used in processing. There are special methods of processing holothurians such as *Stichopus variegatus* (Pl. I A) and *S. chloronotus* which become gelatinous and disintegrate when kept out of water. At present in India the most common species for exploitation is *Holothuria scabra* (Pl. I B) commonly known as sandfish. This contributes to more than 90% of the processed material. Next is *Holothuria spinifera*. This species fetched once high price, but at present does not fetch high price. This species is not seen in the intertidal region, but it often found on clean sand and in slightly deeper waters. Due to the high price offered for *beche-de-mer* in recent years, *Bohadschia marmorata* is also processed to-day.

SPECIES FOR EXPLOITATION

Beche-de-mer prepared from holothurian *Microthele nobilis* (Pl. I C) popularly known as the "teat fish" commands the highest price in the world to-day. This species is abundant in some of the islands of the Lakshadweep. It grows to a size of 400 mm, weighing from 2 to 3 kg in live condition. Body wall is very thick

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10 to 15 mm, it occurs in two colour forms - white and black. The white one which is more valuble sometimes referred to as *M. fuscogalva*. The white variety is found on clean sand and near sea-grass. Young white forms live among turtle-grass plants. Black form is found in shallow water of about 3 m on clean sandy bottom where there is live coral. *Actinopyga* is a very valuble genus for *beche-de-mer* preparation. Four species are known from the Indian seas, two of them occur in somewhat good concentrations. Unfortunately this genus is not utilised at present in India due to ignorance of the value and the procesing methods. The most common and important species of the genus is *Actinopyga mauritiana* popularly known as Surf red-fish. It is found at places where the surf breaks on the outside of the reef. The tubefeet are firmly attached to the rocks to prevent the animals being carried away by waves. It is distributed in Andaman and Nicobar Islands and Lakshadweep. Live weight varies from 0.5 to 1 kg. Colour in the living condition is brick red above and white below. This species is not exploited at present, but has a good export market. Next in importance in this genus is *Actinopyga echinites* commonly known as deep water red-fish. It occurs between 3 and 30 m depth on sandy bottom among live corals. Sometimes it also found in the intertidal region. It grows to a size of 300 mm length and the live weight varies from 0.5 to 1 kg. The body is wider in the middle and tapers towards the ends. The dorsal surface is wrinkled with fine sand settling over it. Colour in living condition is uniform brown. It occurs both at Andamans and the Lakshadweep. It is somewhat common in Andamans. Another species under this genus is *Actinopyga lecanora* commonly known as stone fish. It grows to a size of 400 mm in length, colour in live condition is brown with a lighter ash grey colour around anus. It occurs 2 to 10 m depth on the underside of large stones. It is active during nights. This species is somewhat rare at Andamans. The last species under this genus is *Actinopyga miliaris* commonly known as black-fish. It is found mainly in water less than 2 m depth on reef flats among live corals and on algal beds. It grows to about 300 mm and live weight varies from 0.5 to 2 kg. It is black in colour with a dark brown underside. It yields a good quality *beche-de-mer*.

Thelenota ananas (Pl. I D) commonly known as prickly red-fish was once considred as a prized species for *beche-de-mer* processing. This species is found of a depth of 2 to 30 m on clean sandy bottoms. They are also found in the lagoon in the Lakshadweep feeding exclusively on the calcareous alga *Halmeda* sp. and grows to a massive size of 700 mm in length, live weight varies from 3 to 6 kg. It is occasionally found in the lagoons of Lakshadweep. In living condition it is reddish orange with teats darker in colour. The Lakshadweep specimens were brown on the dorsal side and bright orange on the ventral side.

Potentially Important Species

The genus *Bohadschia* qualifies for *beche-de-mer* preparation, because of its large size and thick body wall. The presence of Cuvierian tubules in large numbers however hamper and hinder processing operations since these tubules stick to the hands on contact. *Bohadschia marmorata* is the most common species, found in the lagoon often covered by a coating of fine sand. It grows to a size of 400 mm. In the living condition it is yellowish brown with black spots. It is now processed at Kilakarai and Vedalai. It occurs in the Gulf of Mannar and Palk Bay, the Andaman and Nicobar Islands and the Lakshadweep. *Bohadschia argus* is another species popularly known as Leopard-fish or Tiger-fish. It lives freely in the lagoon on coarse sand. A few coral piece and sand particles are found attached to the body. It occurs from 2 to 6 m depth. Body is cylindrical with very smooth surface and on slightest disturbance white stickly threads are thrown out. It grows to a size of 600 mm in length and 1 to 2 kg in weight. Colour in living condition is brown or black with distinctive eye-like spots all over the body which are encircled with light yellow, white or grey. In Lakshadweep the specimens are black in colour and are abundant.

The most abundant holothurian in the seas around India is *Holothuria atra* commonly known as Lolly-fish grows to a size of 600 mm in length on the outer edge of the reef. Specimens on the reef flat reach a size of 200 to 300 mm in some areas, 10 to 15 specimens are found in 25 sq. m area. It occurs usually

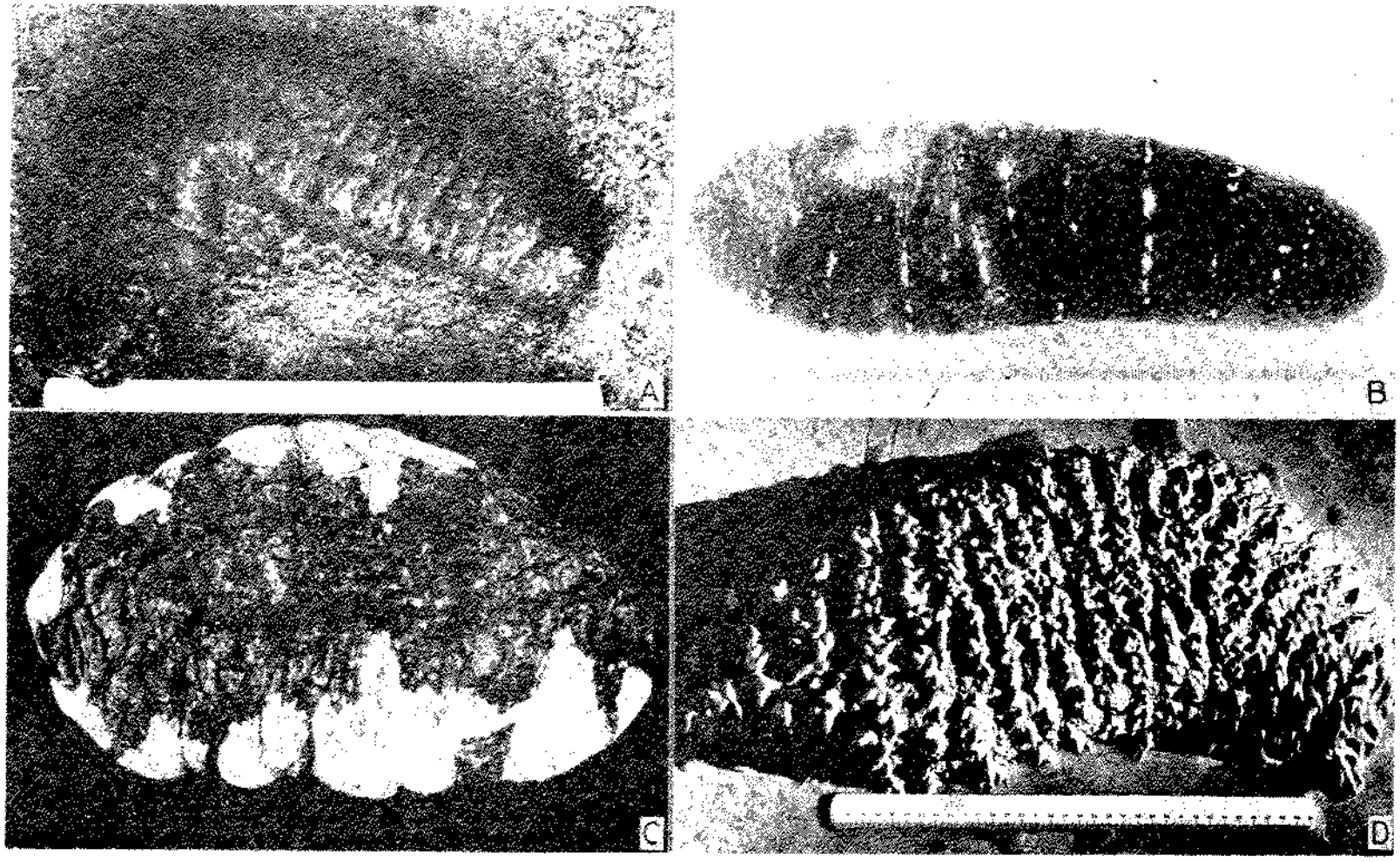

Plate I A. *Stichopus variegatus*, B. *Holothuria scabra*, C. *Holothuria nobilis* and D. *Thelenota ananas*.

on the dead coral reef flats with sandy or muddy patches. It prefers areas where calcareous alga *Halmeda* sp. is abundant and it feeds on it. When the body of this holothurian is rubbed a red fluid stains the hand. The red fluid is a toxin known as *holothurin*. Boiling the specimens while processing breaks down the toxin. James (1981) reported that this species was processed in small quantities in Andamans for the first time in 1976. On the mainland also, it is often processed along with *H. scabra*, but due to its small size and thin body wall, the processed material is very less. Therefore this species is not preferred for processing in large scale, although it occurs in abundance in the Gulf of Mannar and Palk Bay. It is extensively processed in Philippines today and commands fairly high price in the international market.

As stated earlier the genus *Stichopus* grows to larger size with body disintegrating and becoming gelatinous when taken out of water. It needs special treatment for processing. *Stichopus chloronotus* most abundant in some of the lagoons of Lakshadweep, occurs freely in shallow water in the lagoons. It lies out in the open without making any attempt to conceal its body. Gravely (1927) reported this species as abundant in Rameswaram, but today not a single specimen is seen anywhere. This species is dark green in colour which appears black under certain light conditions. *Stichopus variegatus* grows to a large size of 900 mm in live condition. It is dark yellow with irregular brown patches and pink tubefeet. Massive forms occur in deeper waters in Andamans. It is found on algal beds and on clean sand bottom between depths of 3 to 30 m. Hornell (1917) experimented on processing the species by keeping them in sea water. To process the above two species same methods as those employed for *Stichopus japonicus* in China should be adopted.

Areas of Exploitation

At present sea-cucumbers are caught and processed from the Palk Bay and the Gulf of Mannar. Palk Bay being relatively shallow with extensive areas, has higher resource potential. Consequently the number of processing centres along the Palk Bay are also more in number. Devipattinam, Tirupalakudi, Thondi, Karangadu, Mullimonai, Kottaipattinam, Kattumavadi and Sethubavachatiram are some of the important centres along the Palk Bay. Due to intensive fishing during the last several years, the size of the animal is now less. The processing along the Gulf of Mannar are fewer in number. Vedalai, Periapattinam, Kilakarai and Tuticorin are the main centres of processing along the Gulf of Mannar. The processing of sea-cucumbers at Tuticorin is carried out during the last 20 years.

Potential Areas for Exploitation

As stated earlier the Andaman and Nicobar Islands and the Lakshadweep have valuble sea-cucumber resources for exploitation, which are much more valuble than the species processed on the mainland. In Andamans *Holothuria scabra*, *Actinopyga mauritiana*, *A. echinites* are abundant. In the Lakshadweep best grade sea-cucumber *Microthele nobilis* is found in abundance in some of the islands. Another valuble species in the Lakshadweep is *Thelenota ananas*. *Actinopyga mauritiana* also occurs fairly in good numbers in some of the islands. On the mainland important potential area for exploitation is from Kilakarai to Tuticorin which remains untouched now. *Holothuria scabra* and *Holothuria spinifera* area available in this area for exploitation.

Methods of Collection

The most common and efficient method for the exploitation of sea-cucumbers is by skin diving. The introduction of face masks have helped a good deal in locating and collecting sea-cucumbers due to the clarity of vision it offers. Earlier days face masks were rare and all of them were imported. Now these are locally fabricated and sold at cheaper rates to enable the fishermen to purchase and use them. Another innovation in this line is the use of aluminium plates as 'flippers' in the last years. The use of 'flippers' gives a diver greater mobility and manoeuvr under water increasing his efficiency to collect more material. The introduction of mechanised fishing in early sixties has some effect upon the fishery since sea-cucumbers regularly enter accidentally into the bottom trawlers. In fact at some of the

places like Mandapam where hundreds of trawlers are operated, the *beche-de-mer* industry is sustained by the material collected by the trawlers. In recent years another important gear locally known as *Thalluvalai* has been introduced in the Gulf of Mannar and Palk Bay to primarily cach juvenile prawns. Sea-cucumbers regularly enter these nets accidentally and they are made use in processing. During the low tide vast areas of muddy flats get exposed. During such time women and children are engaged in the collection of sea-cucumbers lying half buried.

CONCLUSIONS

The holothurian resources in the seas around India are varied and diversified in species. We have excellent habitats for sea-cucumbers such as muddy flats, reef flats and lagoons. The Gulf of Mannar and Palk Bay are well known for the richness of marine fauna particularly the sea-cucumbers. *Holothuria scabra* and *Holothuria spinifera* are the two important species in the Gulf of Mannar and Palk Bay. In the Andaman and Nicobar group there are more than 550 islands offering excellent habitats for sea-cucumbers. *Holothuria scabra* is found to be distributed in the Andaman group of islands where some dilution takes place. Species of *Actinopyga* abound on the coral reefs. In the Lakshadweep the most prized holothurian *Microthele nobilis* is abundant in the lagoons of some of the islands. *Thelenota ananas* a massive holothurian is also a dweller of the lagoons. *Bohadschia argus* and *Stichopus chloronotus* are exceedingly abundant in some of the lagoons in the Lakshadweep. If proper exploitation and the utilisation is restored, India can export huge quantities of *beche-de-mer* by introducing the industry to the Andaman and Nicobar Islands and Lakshadweep.

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