MARINE BIODIVERSITY CONSERVATION AND MANAGEMENT

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VII. CONSERVATION OF SEA CUCUMBERS

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Over the years there is a fall in the landings of the sea cucumbers all over the Gulf of Mannar and Palk Bay along with fall in the size of the specimens collected. The catch per unit of effort has also significantly fallen in the recent years. All these factors point to over exploitation of the sea cucumbers and need for their conservation.

INTRODUCTION

There are over 650 species of sea cucumbers known from the various parts of the world. In the seas around India nearly 200 species are known of which about 75 species are reported from the shallow waters within 20 metres depth. Of these about a dozen species are of commercial importance. India has been processing sea cucumbers from time immorial. Hornell (1917) wrote on the Indian *Beche-de-mer,* its history and revival. At present India earns a foreign exchange of more than one crore rupees by exporting *Beche-de-mer.* It is a delicacy for the Chinese and has become part of their life and tradition. It is procured in the dry form, is soaked in water, cleaned and cooked in many delicious ways. It is rich in protein and has low fat content.

Sea cucumbers are sluggish and defenceless against man and offer no resistance at time of capture. From the East Coast, they are exploited at present from Pamban to Tuticorin on the Gulf of Mannar side and from Rameswaram to Mallipatnam on the Palk Bay side. Over the years there is a fall in the landings of the sea cucumbers all over the Gulf of Mannar and Palk Bay along with fall in the size of the specimens collected. The catch per unit of effort has also significantly fallen in the recent years. All these factors point to over exploitation of the sea cucumbers and need for their conservation.

SEA CUCUMBER RESOURCES

The seas around India have rich and valuable resources of sea cucumbers (James, 1973). The present status of *Beche-de-mer* industry in the Palk Bay is assessed by James (1988) and by James and Baskar (1994). On the mainland of India, rich resources of sea cucumbers are available in the Gulf of Mannar and Palk Bay (James, 1973, 1986, 1988, 1989). Earlier, mostly, *Holothuria scabra* was processed along with *Holothuria spinifera*. *Bohadschia marmorata* and *Holothuria atra* were also processed in small quantities from the Gulf of Mannar particularly from Kilakarai. In the Andamans, *Holothuria scabra* was processed chiefly around Port Blair earlier. Species of *Actinopyga* which occur in small quantities are also valuable for processing. The most valuable species *Holothuria nobilis* is found in good quantities in some of the Islands in the Lakshadweep. *Stichopus chloronotus* and *Bohadschia argus* are also abundant around some of the Islands. In recent years *Actinopyga echinites* and *A. militaris* are also processed from the Gulf of Mannar. The former is processed particularly from Mandapam and the latter from Tuticorin. In 1994 *Stichopus chloronotus, Bohadschia argus, Holothuria nobilis, Bohadschia marmorata, Actinopyga mauritiana* and *Thelenota ananas* were processed from the Lakshadweep.

Sea cucumbers are collected in the Gulf of Mannar from Mandapam to Tuticorin and in the Palk Bay from Rameswaram to Mallipatnam. They are mostly collected by skin divers from a depth of 1-5 metres. Sea cucumbers which enter accidentally into trawlers and Tallu Valai are also used by the industry. *Holothuria scabra* and *H. spinifera* which are over exploited from the Gulf of Mannar and Palk Bay are endangered species. This has been pointed out by Silas *et al.* (1988) and also by James (1988).

Holothuria scabra Jaeger

Over 96% of the sea cucumbers at present processed belongs to this species. It is distributed in the Gulf of Mannar and Palk Bay and also in the Andaman and Nicobar Islands. Reported from the west coast also, but very little is known about the resource from there. It is popularly known as sand fish and the local (Tamil) name is *Vella attai*.

It grows to a length of 400 mm and weighs 500 g. Found in silty sand often near estuaries and frequently on *Cymadocea* beds. It is distributed from 1 to 10 m depth.

Holothuria nobilis (Selenka)

This species is popularly known as Teat fish or Mammy fish. This is the most valuable species for *Beche-de-mer* processing. It is abundant in the Lakshadweep and also reported from the Andaman and Nicobar Islands. It grows to 400 mm length and live weight varies from 2-3 kg. Body wall is very thick (10-15 mm). Occurs in two colour forms, white one which is more valuable is sometimes referred to as *Holothuria fuscogilva.* The black variety is abundant in some of the Islands of the Lakshadweep. White form is most abundant on clean sand and turtle grass. Black form is found in shallow water of about 3 m on clean sand bottom where there is live coral.

Holothuria spinifera Theel

This species is popularly known as *Cheena attai* or *Raja attai.* The distribution of this species is restricted to the Gulf of Mannar and Palk Bay, Red Sea, Persian Gulf, Sri Lanka, North Australia and the Philippines. Five percent of the material that is processed today belongs to this species. It is never encountered in the intertidal region. It occurs in slightly deeper waters than *Holothuria scabra.*

Bohadschia marmorata Jaeger

This species is popularly known as chalky fish and the local name is *Nool attai* since it ejects copious white sticky threads known as Cuvierian tubules. In the Indian region this species is known from the Gulf of Mannar and Palk Bay, Andaman and Nicobar Islands and the Lakshadweep. It grows to 400 mm in length. The colour is highly variable. In general it is yellowish-brown with black spots. It is found in the lagoons and often covered by a coating of fine mud.

Bohadschia argus Jaeger

This species is popularly known as Leopard or Tiger fish. In the Indian region it is distributed in the Andaman and also at Lakshadweep.

The eye-like spots are very characteristic for this species. It grows to a length of 400 mm. In some of the islands of the Lakshadweep this species is abundant. It lives freely in the lagoon on coarse sand. A few coral pieces and sand particles are found attached to the body which is very smooth. It is distributed in 2-6 metres depth. At the slightest disturbance white sticky threads are thrown out.

Actinopyga echinites (Jaeger)

This species is popularly known as deep-water Red Fish and the local name is *Paar Attai* since it is found attached to *Paars* or rocks in the sea. It grows to a size of 300 mm and weigh about 500 g. At present it is fished from a depth of 3 - 7 metres. The resource however seems to be good beyond 7 metres. Fresh specimens are purchased at the rate of Rs. 1.50 to 3.50. The processed product is sold at the rate of Rs. 120.00 to 150.00 per kg. On processing generally the weight is reduced to one tenth.

Actinopyga militaris (Quoy & Gaimard)

This is popularly known as Black fish. This species is known from the Andaman and Nicobar Islands and the Lakshadweep in the Indian region. It grows to a length of 350 mm. Adults are found in depths more than 2 m, juveniles of 20-35 mm beyond are generally found in murky shallow waters and are black in colour.

Actinopyga mauritiana (Quoy & Gaimard)

This is popularly known as Surf Red Fish since it occurs at the low tide mark where the surf breaks on the reef. In the Indian region it occurs at Andaman and Nicobar Islands and the Lakshadweep. It grows to a length of 400 mm. On the dorsal side it is brick red and on the ventral side it is white in colour.

Thelenota ananas (Jaeger)

This species is popularly known as Prickly Red Fish. It is a massive form and grows to a length of 700 mm. Live weight is between 3 to 6 kg. In the Indian seas it is distributed in the Lakshadweep. Colour is reddish-orange in live condition with teats darker in colour.

Lakshadweep specimens are brown in colour on the dorsal side and bright orange on the ventral side. Found in depth of 2-30 metre on clean sand bottoms. In the lagoons in Lakshadweep it is found to feed exclusively on the calcareous alga *Halmida* sp.

Stichopus variegatus Semper

This is popularly known as curry fish. In the Indian region this species occurs in the Gulf of Mannar, Palk Bay, Lakshadweep and the Andaman and Nicobar Islands. The specimens that occur in the Andamans are massive, reaching a length of 500 mm. This species has to be processed quickly after it is collected otherwise the body wall will become gelatinous. It is locally known as *Mul Attai.*

Stichopus chloronotus Brandt

This species is popularly known as Greenfish. It is distributed in the Andaman and Nicobar Islands and in the lagoon of Kiltan Island. It lies out in the open without making any attempt to conceal its body under corals. The green colour and four-sided body is characteristic of the species.

NEED FOR CONSERVATION

The fall in the catch per unit of effort and also the size reduction of the material fished are clear indications of over fishing of this valuable resource. James and James (1994) have stressed the need for conservation and management of Sea Cucumbers from the seas around India.

The Central Marine Fisheries Research Institute has played a significant role in the conservation of sea cucumbers. During the last 32 years considerable amount of information on the taxonomy, resources, ecology and zoogeography of sea cucumbers is collected. James *et. al* (1989) produced the seed of *Holothuria scabra* in the laboratory for the first time as early as in 1988. This significant breakthrough goes a long way to pave the way for the culture of the species. *Holothuria scabra* is the most valuable species for *Beche-de-mer* today. Although this species is processed at several places in the Indo-Pacific region so far the seed for this species is not produced anywhere. In 1989 the

CMFRI conducted a National Workshop on *Beche-de-mer* to create an awareness among the scientists, administrators, enterpreneures, exporters, processors and the fishermen about the problems facing the *Beche-de-mer* industry. Conservation methods were taught during the workshop. An awareness was created among the fishermen about the need to conserve sea cucumbers by arranging special lectures and also by conducting an exhibition. Scientists from the CMFRI took part in the Training Programme for fishermen at Thirupalakudi (Tamil Nadu). The University Grants Commission has taken a video film on the hatchery and culture of sea cucumbers based on the work done by the Institute. In 1994 the Institute conducted a Group Discussion on Research and Development of *Beche-de-mer* industry in India at Mandapam Camp. The need for conservation and conservation methods were discussed in detail during this meeting. The Government of India, Ministry of Agriculture constituted a committee to study the stock position of sea cucumbers with scientists from CMFRI.

EXISTING LEGISLATIONS

In order to conserve the resources of sea cucumbers, Government of India took a right decision to ban the export of *Beche-de-mer* less than 75 mm in length in 1982. Since the coast is long, the processing centres are too many and scattered all along the Gulf of Mannar and Palk Bay it is not possible to regulate the catch of undersized material. The size regulation can be effectively implemented at the time of export. It is also significant to note that the Lakshadweep Administration took the first step in the conservation of the species by restricting the size of the specimens collected for processing. This action of the Government of India is hailed by other countries as the first step in the right direction.

It is gratifying to note that after the National Workshop on *Beche-de-mer* in 1989 and the group discussion on Research and Development of *Beche-de-mer* industry in India in 1994 some fishermen in the northern region of Palk Bay near Mallipatnam and other nearby places have started growing the undersized specimens of sea cucumbers caught during the diving season. They have impounded shallow muddy areas

near the shore and started growing juvenile sea cucumbers by pumping sea water. The work done by these fishermen is being monitored and technical advice is rendered to the fishermen in the conservation of sea cucumbers. Now the fishermen are well aware of the need to conserve the resource. They also do not process small forms which are less than 75 mm length and fetch low price. This is a remarkable achievement of the C.M.F.R. Institute in the conservation of sea cucumbers.

CONSERVATION MEASURES

Size regulation : Holuthurians shrink by 42% on processing (Baskar and James, 1989). Materials below 3" (75 mm) length is banned by the Government in 1982 for export. This will be 250 mm in living condition. The size at first maturity in the case of *H. scabra* is estimated at 230 mm (Baskar, 1994). Therefore it is advisable to return to sea all sea cucumbers less than 250 mm in length. Holothurians live out of water for 4-6 hours. Therefore the undersized specimens collected can be returned to the sea for further growth. It is better to leave them on the beds from where they were collected rather than bringing them to the shore and throwing them into the sea.

Closed seasons : Sea cucumbers should not be fished round the year for processing. Certain months should be declared as closed seasons for the collection of sea cucumbers. It is known that *H. scabra* breeds more than once in a year i.e., once in March and again in October. At Tuticorin the same species has a major breeding peak during March - April and again a minor peak during November- December. It is better to declare the breeding peaks as closed seasons for collection since this will give the animals a chance to breed and propogate their progeny.

Catch limits : Catch limits can be enforced from particular areas as a measure of conservation. For example for the exploitation of *Trochus* and *Turbo* in the Andaman and Nicobar Islands the whole region is divided into five areas and for each area catch limits are set annually. This can be enforced for holothurians too.

Ban or control on rare and endangered species : Total ban on catching of the rare and endangered species should be enforced. In the lakshadweep

the sea cucumber *Thelenota ananas* in very rare and collecting of this species should be totally banned. The best way to implement the ban on catching is to ban the export of particular processed species. Control also should be exercised on the catch of endangered species like *Holothuria scabra* and *Holothuria spinifera*. The processing of *Actinopyga militaris* was introduced at Tuticorin in 1990. During 1991-92 more than 30 tonnes of this species was exported and during 1993-94 only 18.7 tonnes was exported. Further exploitation of this species has to be carefully monitored.

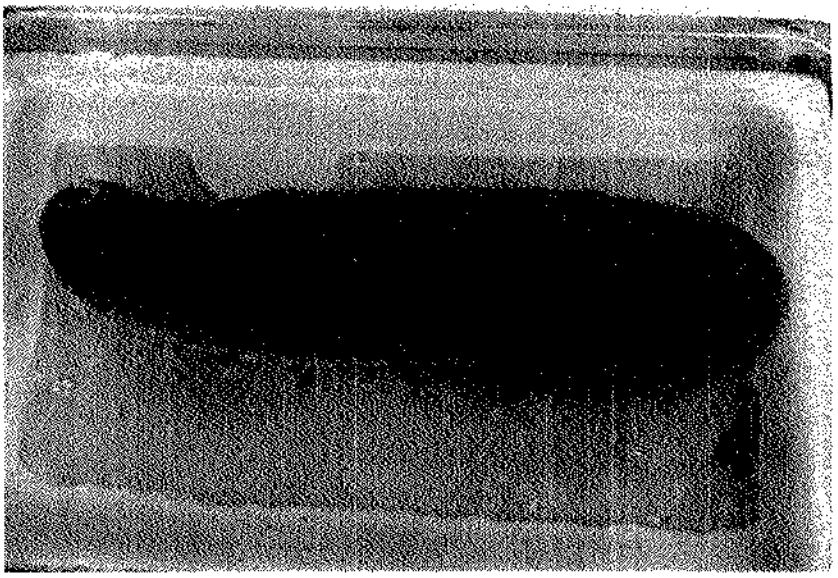
Closed areas : It is well known that certain areas are the breeding grounds for the sea cucumbers and also in certain areas juveniles are found in large numbers. Collection in such areas should be totally banned. Normally the inshore areas have more number of juveniles than the offshore areas. So such areas should be treated as out of bounds for catching of the sea cucumbers.

Diversification of the industry : As stated earlier the industry in India depended mainly on one or two species till very recently although valuable other species are available in the Gulf of Mannar and Palk Bay, the Andaman and Nicobar Islands and also in the Lakshadweep. In 1989 *Actinopyga echinites* was processed for the first time from Mandapam and also at Kilakarai, . In 1990 year another species *Actinopyga miliaris* is collected and processed from Tuticorin. In 1994 *Holothuria nobilis, stichopus chloronotus. Bohadschia argus. B. marmorata, Holothuria atra, Actinopyga mauritiana and Thelenota ananas* are processed for the first time from the Lakshadweep. However at present there is a ban on the collection of the sea cucumbers in the Andaman and Nicobar Islands and also in the Lakshadweep. This is not justified in view of the abundant resources. If this resource is not exploited natural mortality will over take the same in a few years the whole resource will go as a waste. By extending the processing to these Islands the fishing pressure will be much relieved on the mainland thus leading to the conservation of sea cucumbers.

Seed production and sea ranching : James et al. (1989) for the first time induced *Hlothuria scabra* to spawn in the laboratory. They have suc-

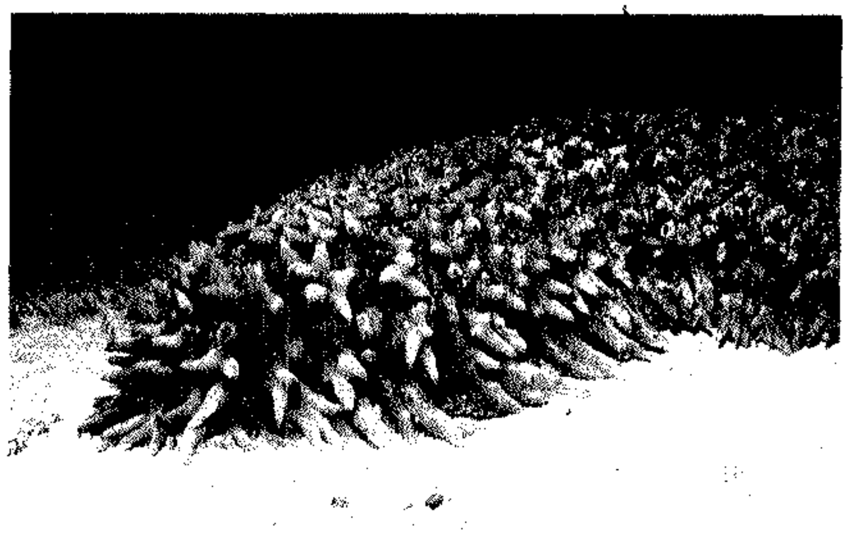
Holothuria scabra

Holothuria spinifera

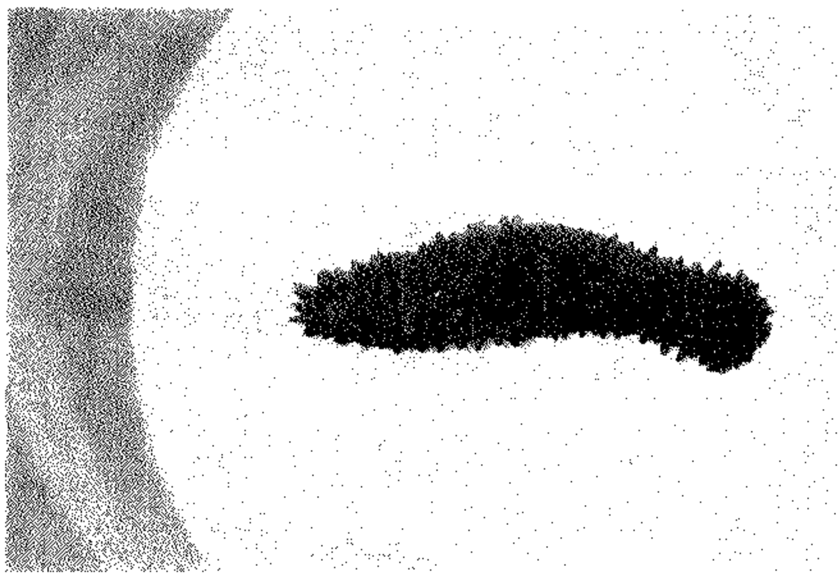


Bohadschia marmorata

Actinopyga militaris



Thelenota ananas



Stichopus chloronotus

cessfully reared the different stages of larvae to juveniles. sinces *H. scabra* is already an endangered species intensive seed production and sea ranching should be taken up on the natural beds to enrich the local populations. The sea ranching programme should be taken up in a big way as a conservation measure.