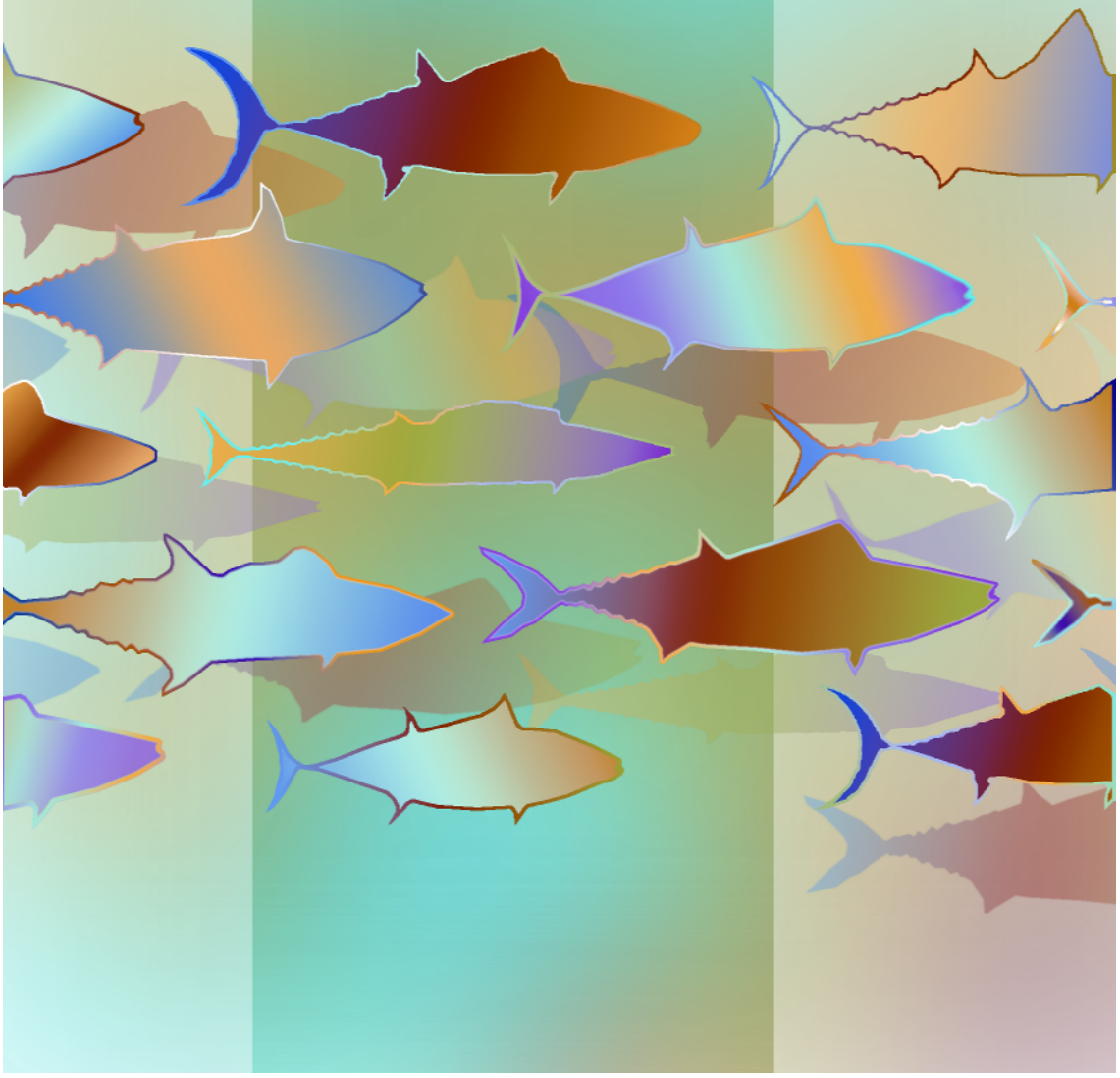
Status of Exploited Marine Fishery Resources of India



STATUS OF EXPLOITED MARINE FISHERY RESOURCES OF INDIA

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Gastropods

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1. Introduction

Gastropods occupy an important place in the commercial shell-craft industry. Approximately 80,000 species of these snails live on land, in freshwater and sea. The marine gastropod resources in India comprise a variety of species and are exploited regularly for various purposes. This exploitation goes unnoticed in several places because it constitutes a very minor fishing when compared to other fishery resources. Many of these gastropods are exploited for food, at the same time the beautiful shape and colour of the shells have attracted and aroused the imagination of man to use them for ornamental purpose also. The shells are used in making ornaments and curios of different shapes and sizes. They are being used whole or cut into pieces of desirable shapes during processing.

2. Status

Most of these commercially important gastropods are distributed in the shallow waters, lagoons and reef areas of the coastal sea. Of these, the sacred chank (Xancus pyrum) (Fig. 1) occupies the top status followed by the Turban shell (Turbo marmoratus) and Top shell (Trochus niloticus) (Fig. 2). The most important among them and

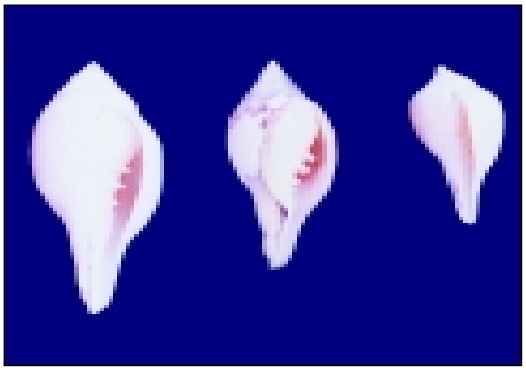

Fig. 1. Xancus pyrum

highly priced is the sacred chank. The species is reported from Gulf of Mannar, east coast of India, Andaman Islands and the Coramandal coast. Presently they are exploited from both the east and west coast of India and the fishing by trawl net is most popular. The bottom trawl exploits not only the shrimps and fishes but also the benthic animals like gastropods. In the earlier days, during sorting the by-catch, these shells were thrown out into the sea as discards. Once the shell-craft industries got established and flourished these gastropods were brought ashore and exclusively sold to the industries. They in turn used to separate the gastropod shells and sell to the exporters. The most important shells of commercial value are listed below.

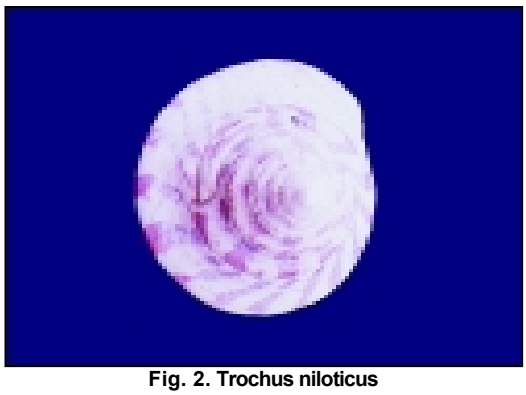

Fig. 2. Trochus niloticus

Button shell (Umbonium spp.): These shells measure 6-10 mm diameter. The spine of the shell is depressed and the body whorl flattened and hence called button shell. There are many colour variations from plain white to dark gray, pink, brown, stripped and banded. They occur at the mouth of sandy break waters and live in large numbers at four centimeters below the surface of the intertidal beach. The shell population is reported from both east and west coasts of India.

Winged shells (Strombidae): Members of this family live mainly in tropical waters. They are found in sandy shallow seas among the eelgrass and feed on dead sea animals.

The spider shells or the scorpion shells (Lambis spp.): Most of the species live on the sandy reef flats in deeper areas and feed on algae. The common species are Lambis chiragra (Fig. 3) and L. lambis (Fig. 4)

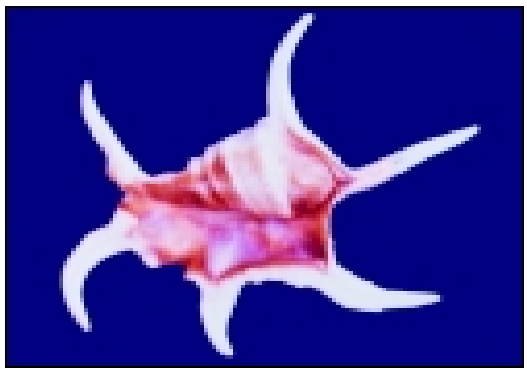

Fig. 3. Lambis chiragra

Cowries (Cypraeidae) : There are about 190 species in the world and distributed in the tropical and sub tropical region. Some feed on seaweeds while others are carnivores. Most of them prefer to live underneath the rocks and boulders. A few are found in deeper areas. In the ancient days, shells of Cypraea monita were used in place of coins in many countries.

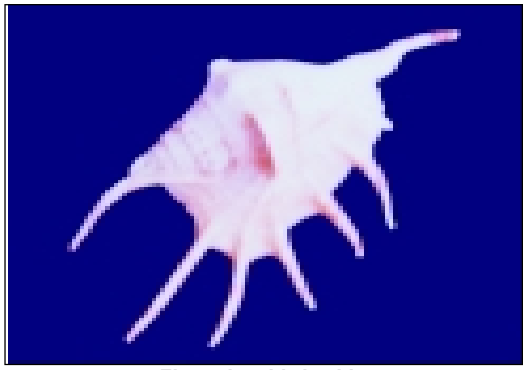

Fig. 4. Lambis lambis

Helmet shells (Cassididae): They are large and heavy and are found in tropical waters around the world. The shell of the animal consists of many different coloured layers and is much sought after for ornamental purpose (Fig. 5). These gastropods with the help of their long proboscis feed on animals like sea urchins.

Hairy tritons (Cymatidae): Members of this family have marked prominent shoulders, raised ribs, and heavy knobs in their shells with thick periostracum. They occur from shallow to deeper areas of the sea and are carnivorous in nature.

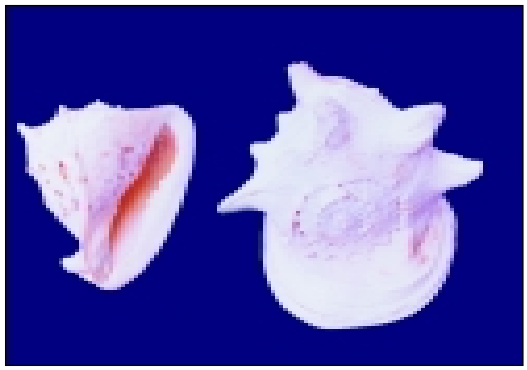

Fig. 5. Cassis cornuta

Frog shells (Bursidae): They resemble a frog when viewed from the side. They live on tropical rocks and coral areas at shallow waters and are carnivorous.

Murex shells (Muricidae): Members of this family are found on rocks, coral and muddy areas and occur from shallow to more deeper areas. Mostly they are tropical forms with prominent growth ridges and thick spines (Figs. 6&7). They feed on small clams and hence notified as predators.

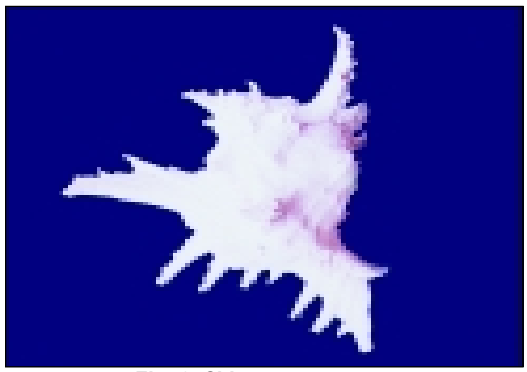

Fig. 6. Chicoreus ramosus

Rock snails (Thaididae): They are also called as drupes, thaids or purples. They are found on rocks and reefs in shallow waters. These littoral shells occur all along the coasts in tidal marks.

Whelks (Nassaridae): The shells are small and often tiny. They live in the littoral pool of the seawater and feed on the dead sea animals. They are found in tropical waters of the world and live in both muddy and sandy

bottom of the sea. The shells are generally coloured.

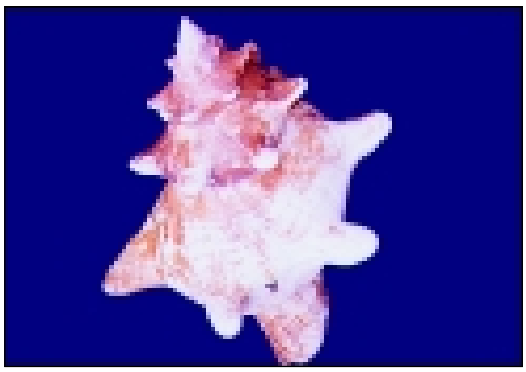

Fig. 7. Pleuroplaca trapezium

3. Exploitation

In the Gulf of Mannar, chank exploitation is a regular and organized fishery even today. The shells now a days are sent to the market directly from the divers since the government monopoly over the chank does not exist. The State Department of Tamil Nadu fisheries on the basis of licensing from 1993 onwards used to organize the most popular chank fishing in Tuticorin. The chanks are landed at Tuticorin and also at Thiruchendur landing centres. The chanks are found populated in the Paar areas locally known as Sangu nilam where coarse sand and dead corals characterize the bottom areas. About 49 such Paars extending on an average from 4 to 25 sq.km are present in the Gulf of Mannar. The depth of these grounds ranged from 16-24 meters. Chanks live in sandy areas preferably under burrows, in search of food such as small polychaete worms and algae. Their breeding season is during February-March. Sexes are separate and after mating, the female chank lays the egg capsule on a hard substratum. The fertilized eggs will be developing within the chambers. After 40 days, the young baby chanks of the size of 6-8 mm emerge out of the chambers. Chanks are fished normally by skin-diving which is a skill mastered exclusively by the local fishermen. The chank diving at Tuticorin starts from September and extends up to April of the next year. During a diving day, on an average 50 to 70 boats are engaged in chank fishing. In a boat about 4 to 6 divers take part and one diver collects about 15 to 20 chanks in a day. Trawlers also land chanks occasionally. At Tuticorin and Thirichendur, chanks are also caught by bottom set gill net (Fig. 8).

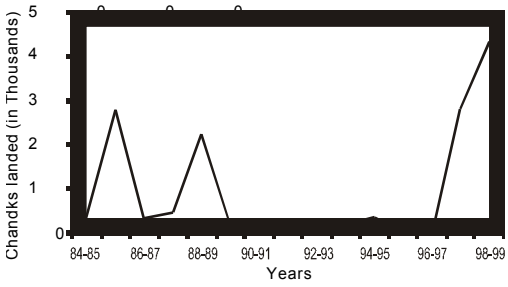

Fig. 8. Chanks landed at Tuticorin

There is no organised fishery for commercially valued gastropods shells except in the case of sacred chank, along the main land coast, and Trochus and Turbo in Andaman Islands. The size of the gastropods exploited is not at all regulated by any restrictive measures. The shells were always valued based on their size. There once prevailed some regulation on maximum and minimum exploitation sizes in the case of sacred chanks, when the fishery was under the control of the State Government. The Government used to purchase chanks of diameter ranging

from 64 mm to 70 mm only. Thus the under sized chanks were released back to the sea. When this fishery was under the control of Government, there was no fishing of the under sized chanks. Ever since the Government decontrolled the chank fishing in Tamil Nadu coast all restrictions on various sizes that are exploited have ceased to exist. On the east coast of India the shoreline of Bay of Bengal is mostly sandy. This sandy bottom is ideal for many of the gastropods for their survival. Under the ideal habitat many species of gastropods like Umbonium and Oliva are populated. The populations of these gastropods are mainly available in the seashore near the bar mouth. At Chennai, Cuddalore, Porto Novo and Tuticorin, Umbonium is available. During the summer days (Feb. and March) local people fish for these species. They scoop out the small sized gastropods with the sand and after washing, Umbonium is separated. The gastropods are collected in baskets. After boiling, the meat is extracted and consumed. The button like beautifully coloured shells are sold to the shellcraft industry. In the Gulf of Mannar, there is a string of 22 islands. The near shore areas of these islands provide a favourable environment for the various gastropod species to thrive. To exploit these gastropod shells the local fisherfolks camp in these islands and after fishing they bring them to the main land for sale. By way of this, every week, about 6 to 8 gunny bags consisting of a variety of gastropod species like Cypraea, Strombus, Turbo, Thais, Lambis, etc are exploited in a season.

In Andaman and Nicobar Islands, the density and diversity of the gastropod population is high due to the extension of rocky shore throughout. The rocky shore with algal growth is congenial and enables the gastropod population better survival and growth. Generally, people of the islands depend on the seafood which is supported by gastropods mainly Trochus and Turbo. Others like the limpets, Strombus, Thais and Cypraea are also being exploited for food and as well to support the shell craft industry. For Turbo and Trochus, there is an organized and periodical fishing in Andaman Islands. Among these two, Trochus is abundantly exploited. Although there was good landing during the past, of late the catch has decreased. The availability of this gastropod ranged from a depth of 4 to 8 meters in the rocky and coral beds. The Andaman administration has divided the Trochus and Turbo zones into nine fishing sectors for the purpose of leasing to the private entrepreneurs. Under the licensing system, only the shells above 9 cm diameter in Trochus and 6.3 cm in Turbo are allowed to be fished. Turbo is available in greater abundance at 12 to 25 m depth. The average annual landing of Trochus is reported to be 400 to 500 tonnes and Turbo about 100 to 150 tonnes.

Fig. 9. Nautilus pompilius

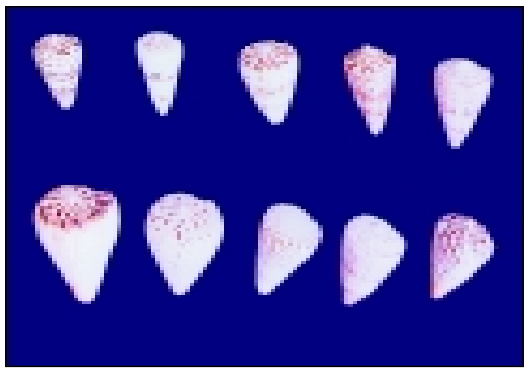

Fig. 10. Conus spp.

The shells of both these gastropods are widely used in the shell-craft industry. In Lakshadweep Islands, the population of gastropods is scarce. The occurrence of smaller gastropods has been reported in the lagoon and rocky shoreward areas. But an organized fishery exists only for Cypraea. The most commercially important gastropods occurring here are species of Trochus, Turbo, Strombus, Cypraea, Nautilus (Moon shells) (Fig.9) and Conus (Fig. 10). About 30 to 40 people go for cowrie picking during the peak low tide season in the exposed reef and shore areas of the lagoon. Monthly about 24,000-36,000 numbers are collected and the estimated production is around 5 to 7 lakh numbers per year. These shells are sent to Mangalore for the shell-craft industry. For commercial purposes many varieties of gastropods like cone shells, spider conchs, scorpion shells, trumpet shells, spider conch (Lambis spp.), top shells and helmet shells are also picked up from the reef areas. Although the Trochus (Trochus pyramis) shells are available in Lakshadweep Islands, there is no organized fishing since they are not available in commercially exploitable size and quantity. There is good scope for the export of these valued gastropods. However, the present demand is not met out in full. Many countries are still looking out for species of Turbo (Fig. 11), Trochus, chanks and other gastropods in larger quantities. In India the shell-craft industries are also in need of a variety of gastropod shells as raw materials. The local fisherfolks are unable to cater to the full demand of the industry. So there is urgent need to devise ways and means to exploit them without leading to depletion of their stock.

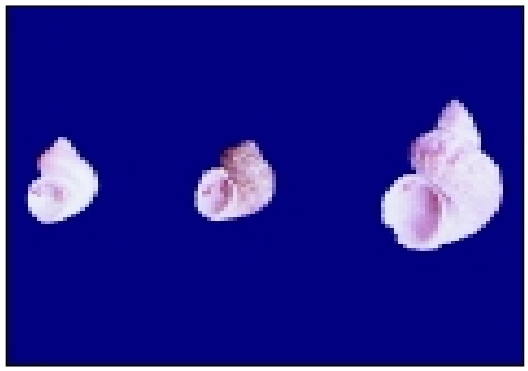

Fig. 11. Turbo spp.

At Tuticorin, the divers also exploit the egg capsules along with chanks for selling them for medicinal purpose. Daily about 10-20 egg capsules are brought to shore. This exploitation of egg capsules, every year in large numbers affects recruitment and the renewal of the population. Measures to prevent removal of egg capsules from the chank grounds are long over due. From the conservation angle of the sacred chanks it would be ideal to observe a two-year fishing holiday once in

every three years. This will enable resuscitation of the population. The landing of the turbo shells in Andamans also has very much come down when compared to few decades ago mostly due to overexploitation irrespective of the size of the animal. Hence the stock of this gastropod is to be replenished urgently. This can be achieved by breeding and rearing them under controlled conditions for sea ranching. At present there is no special hatchery setup for the gastropods or even a programme for their breeding and sea ranching. Now a days the smaller gastropods like Cypraea are also overexploited as evidenced by the decline in the availability of these shells. Regulation on size of the Cypraea exploited (above 5 mm) is highly necessary for enhancing the population level. The ban on the shell picking can be implemented atleast for three months once in a year during their breeding season. Thus it is a high time for the scientific community and enforcing agencies to take care of the gastropod resources to ensure a sustainable production by means of effective conservation measures.

Edible gastropods

A small number of gastropod species are suitable for being utilized as food by man. However, they are seldom sold in the markets for being used as food. The button-shell Umbonium vestiarium is the only species that find a place in fish-stalls in Malwan in Maharashtra. The important species of edible prosobranch gastropods of Indian coasts are: Cellana radiata, Trochus niloticus, T.radiatus, Umbonium vestiarium, Turbo marmoratus, T. intercostalis, Strombus canarium, Lambis lambis, Thais rudolphi, T.bufo, Oliva gibbosa and Xancus pyrum. Recently, whelks are exploited from east and west coasts of India on a commercial basis for meat export trade. Babylonia spirata and B.zeylanica are the two species of whelks, which form by-catch of shrimp trawlers in Sakthikulangara-Neendakara area along the southwest coast of India and Annappanpettai near Porto Novo along the southeast coast. The opercula of the species are said to have aphrodisiac qualities and are exported to Gulf countries under the trade name 'Fish nail.'

4. Management

When the chank fisheries were under the monopoly and control of the Tamil Nadu Government, strict enforcement measures were adopted to fix the fishing season and size of the chanks. Under-sized chanks caught were released to the sea. Now a days, due to the new licensing system, chank fishing is carried out by using bottom set gill nets and by diving. The chanks of all sizes are landed throughout the year without any restrictions on exploitation of the under-sized. The government should enact laws to prevent the fishing of under sized chanks. There must be a fixed season declared for chank fishing over the chank grounds. The fishing for chanks should be banned for three months (January-February) every year in order to conserve the egg capsules and baby chanks. This effective enforcement of conservation methods can save the sacred chank fisheries in future.

Recently, the following species of gastropods have been included in the Schedule I of the Indian Wildlife (Protection) Act, 1972. The species are Cassis cornuta,

Charonia tritonis tritonis, Conus milne-edwardsi, Cypraecassis rufa, Nautilus pompilius, Cypraea limacina, C.mappa, C.talpa, Fasciolaria trapezium, Harpulina arausiaca, Lambis chiragra chiragra, Lambis chiragra arthritica, Lambis crocata, Lambis millepeda, Lambis scorpius, Lambis truncata, Strombus plicatus sibbaldi, Trochus niloticus and Turbo marmoratus.

5. Suggested reading

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