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V.N. Pillai and N.G. Menon

Central Marine Fisheries Research Institute
(Indian Council of Agricultural Research)
Tatapuram P.O., Cochin-682 014
Kerala, India

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34 Edible and ornamental gastropod resources

K.K. Appukuttan and K. Ramadoss

ABSTRACT

Out of 1900 species of gastropods catalogued from Indian waters, only 15 species are edible, while, a large numbers are commercially important ornamental /curios shells in handicraft trade. Sacred chank, top and turban shells are widely exploited from their distributional range. Their flesh and shell are in great demand. The paper reveals the commercial importance of gastropods in export and handicraft trade and gives the distribution details, abundance and habitat of ornamental gastropods along Indian coast. The paper reviews the status of molluscan shell handicraft trade in India and the potential for domestic and export trade.

Introduction

Since the dawn of human civilization molluscs have a tremendous impact on Indian tradition and economy. They have been in great demand as ornaments, currency, as a popular panacea for illnesses and as mascots to ward off evil spirits. Shell handicraft is an age-old industry of our country, people of all walks of life from very early times used to wear rings and bangles carved out of shells. Now, molluscs have assumed greater significance in our industrial, technological and aesthetic aspects of life. Their shells are used as raw material for many calcium carbonate- based industries as well as domestic applications. It is also an attractive curio. Molluscan shells in showcases are a symbol of social status and great pride. The demand at home and abroad for polished shells and hand-crafted products encourages entrepreneurs in south India who have established several cottage industries producing beautiful curios and several utilitarian objects with molluscan shells. Many fishermen families are engaged in collecting shells as a part-time avo-

cation and supply them regularly to various firms at Ramanathapuram, Rameswaram and Kanyakumari in Tamil Nadu. Huge quantities of shells are taken to these places from major shrimp-trawling centres from the southwest coast of India. Some species of gastropods are exploited on a subsistence basis, for edible purposes. India has a total heritage of 3271 species of molluscs belonging to 220 families and 591 genera, including about 1900 species of gastropods (Appukuttan, 1996).

Among the molluscan resources exploited from the Indian coast on commercial basis, very little attention has been paid to the collection and utilization of gastropods, except for chanks, top and turbo shells. Among the several species of gastropods that are exploited from the intertidal and shallow waters of the east and west coasts of India, Lakshadweep and Andaman & Nicobar Islands, only 15 species are edible. There is a variety of ornamental gastropods and it is used as the raw material for the shell handicraft trade. Hornell (1914) has described the chank industry and its importance along the Tirunelveli coast. Sundaram (1974) has made a detailed study on the edible gastropods. Nayar and Mahadevan (1973) have dealt with the chank fisheries and the industrial uses of the shells along the Tuticorin coast. Two other important gastropods, *Turbo* and *Trochus* seen in large quantities in the Andamans, have been studied by Nayar and Appukuttan (1983). The potential and population density of the ornamental and edible gastropods of Lakshadweep Islands are studied in detail by Appukuttan *et al.* (1989). Devaraj and Ravichandran (1988) have made a detailed study on the dynamics of the Indian sacred chank. Ayyakkannu (1994) has made a report on the commercially important gastropods from the southeast coast of India. Philip and Appukuttan (1995) have described the gastropods in the by-catch of shrimp trawlers from the Quilon area, with special reference to the whelk fishery.

The C.M.F.R.I. has made an extensive survey on the potential of the commercially important gastropods in the mainland of India, Andaman & Nicobar and Lakshadweep Islands. Various observations of the researchers are discussed in detail in this paper.

Sacred chank (*Xancus pyrum*)

The sacred chank (*Xancus pyrum*) is the most important one among the ornamental and edible gastropods. The sacred chanks are exploited severely along the southwest coast of India, Andaman Islands and the Gulf of Mannar. The chank meat, extracted from the animal is cut into chips, sun dried and marketed locally. One kilogram of chank flesh chips is sold for Rs.150-200/. These chips are fried in oil for consumption. The price of a single whole chank, at present ranges from Rs.10-130/- depending on the size. The most popular chank fishing is made at Tuticorin by the Department of Fisheries, the Government of Tamilnadu on the basis of licensing. At present Rs.100/- per diver and Rs.500/- per boat are charged as licence fees. The chanks are landed at Tuticorin and Thiruchendur landing centres. The chank beds or 'paars' are areas locally known as 'sangunilam', where the bottom is of coarse sand and dead corals. The depth of these grounds ranges from 16 to 24 meters. Usually chanks live in sandy areas preferably under burrows. Chanks usually eat small polychaete worms and algae.

Chanks are fished by skin diving and it is an exclusive skill of the local fishermen. Normally chank diving at Tuticorin begins from the month of September and extends upto April of the next year. The success of chank fishing mainly depends on the clarity of the sea. The chank grounds in the Gulf of Mannar extend from off Vaipar in the North of Tuticorin to off Manapad in the south of Tuticorin. During a normal diving day, 50 to 70 boats are usually engaged, each boat with 4 to 6 divers. One diver gets about 15 to 20 chanks a day. Normally about 100 to 130 actual chank diving days are organised in a season. Occasionally chanks are also landed by trawlers.

There is an age-old chank fishery along the Trivandrum coast on the west coast of India. However, skin-diving is the main fishing method. Longline fishing for chanks from deeper waters off Vizhinjam has also been reported during the December to March season (Appukuttan *et al.*, 1980).

Chanks caught by shrimp trawlers as a by-catch along the Sakthikulangara - Neendakara area on the south west coast, range from 95 to 150 mm in total length and the price of each shell varies from Rs. 15 to 35 depending on the size . The traders collect the shells from the landing centres

and send it to the dealers in Tamil Nadu and they sell the graded shells to the merchants of West Bengal.

Other gastropods

West coast of India : Analysis of the gastropod samples from the by-catch of shrimp trawlers along the Sakthikulangara - Neendakara area of Kerala for one year, with ten observations per month, from June 1993 to May 1994 showed that 29 species were caught in the shrimp trawlers along with prawns (Philip and Appukuttan, 1995). The important species caught are *Turritella attenuata, Polystira sp., Crassispira sp.*,(screw shells), *Architectonia perspectiva* (staircase shell), *Epitonium scalaris* (ladder shells), *Xenophora* sp. (carrier shells), *Tibia curta* (wing shells), *Natica albula, Natica lineata* (Naticas), *Phalium glaucum, P. canaliculatum* (helmet shells), *Bursa spinosa* (purse shells), *Tonna dolium* (tun shells), *Ficus ficus* (fig shells), *Rapana bulbosa* (purples), *Murex trapa, M.virgineus, M.badius, Murex* sp., (venus combs), *Babylonia spirata, B. zeylanica* (whelks), *Hemifusus pugilinus, Fusinus toreuma* (spindle shells), *Oliva gibbossa, Oliva.* sp. (olive shells), *Xancus pyrum* (sacred chank), *Harpa conoidalis* (harp shells), *Conus glans* and *Conus* sp. (cone shells).

Among these species *Tibia curta, Bursa spinosa, Babylonia spirata* and *B. zeylanica* are dominant followed by *Turritella attenuata, Rapana bulbosa, Xancus pyrum* and *Conus glans*. They contribute 80 % of the total gastropod landings. All these shells are sorted and taken to different shell handicraft centres in Tamil Nadu for the manufacturing of various curio items.

Babylonia spirata and *B. zeylanica*, locally known as 'pravumutta' sank ' and commonly known as whelks, are commercially important edible gastropods belonging to the family Buccinidae. Among all the gastropods landed at Sakthikulangara - Neendakara area, *Babylonia* spp. ranks first in abundance. They form 55.8 % of the total gastropod landings. Bulk of the whelk meat exported from India since July 1993 comes from the catches landed at this centre . The sorted - out live shells of *Babylonia* spp. are send to the processing plants for exporting. At present from Japan there is a good demand for frozen meat and shell - on whelk. The total quantity of whelk meat exported from India during the period 1993 -1994 was approximately 300 tonnes and shell - on whelks 500-600 tonnes in the 1995 - 1996 period.

East coast of India : On the east coast of India bordering the Bay of Bengal, gastropods like *Umbonium vestatum* and *Oliva* spp. are commonly found. *Umbonium* is available at Chennai, Cuddalore, Portonovo and Tuticorin. During summer (February and March) the local people scoop out small - sized *Umbonium* and is separated after the sand is washed off. Every day about 3 to 4 baskets are collected along with 20 to 40 *Oliva* shells. *Umbonium* is sold in the live condition for Rs. 2-3 / - per litre. After boiling, the meat is extracted and consumed . The empty button - like, beautifully coloured polymorphic shells are sold to the shellcraft industry.

The meat of the limpet, *Cellana radiata*, *Turbo intercostalis*, *Strombus* and *Thais* inhabiting the intertidal rocky areas, is consumed by coastal fishermen of Tamil Nadu. These shells, after extraction of the flesh, are sold to the shellcraft industry. There is a good landing of *Chicoreus ramosus* and *Plueroploca trapezium* in the Gulf of Mannar and Palk Bay coast. Much demand exists for the shell, meat and the operculum of these species (Patterson *et al.*, 1994).About 75 to 100 t of these species are collected annually from this coast. There is a good fishery for the whelk, *Babylonia spirata* on the south eastern coast of India near Portonova. The annual landings recorded in 1993 was about 211 t (Ayyakkannu, 1994).

A variety of gastropods are collected from the intertidal areas of the Gulf of Mannar and the Palk bay (Satyamurti, 1952). The most important groups include the cowries, cone shells, five - fingered chank (*Lambis lambis*), ' begger's bowl' (*Melo indica*), *Murex* spp., *Pyrene* spp. *Cerethium* spp., *Cerithidium* spp., *Strombus* sp, *Trochus* spp., *Turbo* spp., Littorinids, *Tibia* sp. *Bursa* sp, *Tonna* spp., *Natica* spp., *Phalium* spp., *Ficus* spp, *Oliva* spp., *Harpa* sp, *Nassa* sp, *Neritina* spp., and *Dentalium* sp.

Andaman and Nicobar Islands: Among the commercially important molluscs in the Andaman and Nicobar islands, *Trochus niloticus* and *Turbo marmoratus* occupy a prominent position due to its abundance and economic value . Commercial exploitation of these shells may have started as early as 1929 (Panikkar, 1938). Even earlier to this, Japanese fishermen from Singapore had been fishing for them around these islands unauthorisedly (Rao, 1939). Of the two species *Trochus niloticus* was found to be more abundant in all the islands surveyed. Eventhough earlier years recorded good land-

ings it started declining later . This in turn prompted the Andaman administration to appoint a Special Officer to carry scientific studies on the fishery. A consolidated report on the shell fishery of these islands during 1930 - 35 was published by Rao (1939). Amirthalingam (1932), Setna (1933), Rao (1936) and Panikkar (1938) have made detailed observations on the feeding habits, breeding seasons, size at sexual maturity, growth rate and other biological details of *T.niloticus*. Appukuttan (1979) has explained the importance of *Trochus* and *Turbo* in the shell craft industry. In 1978 the Central Marine Fisheries Research Institute has conducted a survey on the *Trochus* and *Turbo* resources of the various islands.

The meat of *Trochus* and *Turbo* is edible and is removed by a short-pointed instrument resembling a gimlet, which has a bent at the ends. The body portion of the animal, mainly the foot, is boiled, salted and dried for consumption, as is done with the sacred chank fished from the Gulf of Mannar. The bulk of the exploited shells is pit-cured and despatched to Calcutta and some of the South Indian markets. These shells are in good demand in the handicraft industry. A small quantity of the shells landed is exported to Japan, Italy, Australia, France and Germany where they are having modern industrial facilities for processing them into curios, jewellery, buttons etc. Apart from *Trochus* and *Turbo* shells, the sacred chank, *Xancus pyrum* is also caught in abundance from Kalapadu, Vandur and Rose Island areas in the Andamans. Shells ranging from 115 to 175 mm are usually exploited. Other shells like *Cyprea*, *Strombus* and *Lambis* are collected regularly and after extracting the meat, the shells are sold to the shell craft industry. Some of the *Conus* sp. , *Thais* and limpets are used for the shell craft industry. This is in fact a dominant attraction for the tourists. Along the Nicobar islands, the locals collect the edible gastropods from the intertidal areas during low tide. The meat is consumed and the shells are stored and sold to the industry.

Lakshadweep Islands: More than 100 species of gastropods belonging to 25 families have been collected and identified. Commercially important gastropods include *Trochus*, *Turbo*, *Strombus*, *Cyprea* and *Conus*. Fishing for *Cyprea* has been reported from Agatti, Bangaram, Chetlat, Valiapatnam and Suheli paar. About 30 to 40 people are engaged in cowrie picking during the peak low tide in the exposed reef and lagoon shore areas. Rate of about 24000 to 36000 cowries per month and about 5 to 7 lakhs cowries are being col-

lected every year. The price ranges for Rs 25 to 30 for *C. moneta* and Rs 30 to 35 for *C. caputserpentis*. A fairly big shell of *C. tigris* costs Rs.5 to 15. The shells are sent to Mangalore for the shell craft industry. In the Lakshad - weep islands, the meat of *Strombus* and *Nerita* is consumed. In Kalpeni island, *Strombus* are found in the lagoons at a density of 2 to 3 per meter square, whereas in Bitra 10 to 15 shells per meter square, have been reported . Among the spider conchs , *Lambis* sp. and *L. truncata* occur in greater abundance in Minicoy, Agati, Bangaram, Bitra, Kadamat and Suheli. The trumpet shell, *Charonia tritonis* which is used for blowing in mosques, is reported rarely from Agatti, Amini and Chetlat. Although *Trochus pyramis* shells are available in the Lakshdweep islands, it is not generally exploited. *Cyprea moneta*, the money cowry, is exploited in abundance from all the islands from the inner reef flats and are marketed to the main island.

Molluscan handicrafts

Artistic combinations of gastropods and bivalve shells are shaped into attractive toys and models. Generally gastropods like *Cerithium, Cerithedia, Phalium, Planaxis* and *Conus* along with bivalves like *Donax, Atactodea, Arca, Cardium* and *Gafrarium* are utilized in making doll models. The tusk - shells (*Dentalium*) are used immensely for this purpose.

Trochus niloticus, Turbo marmorata and *Xancus pyrum* are costly due to its large size and glittering surface when it is polished. *Trochus* and *Turbo* are common on the reefs of Lakhadweep and Andaman and Nicobar islands. While one small species *Trochus* is fairly common on the rocky shores along the Indian mainland coast, *Trochus pyramis* is available in plenty in the Lakshadweep. All the three species are used as lamp - shades and incense - stick (bathi) stands or they are made into necklaces, buttons and rings. An average shell of these species costs Rs. 25 to 500, but *Turbo* is the costliest. Replicas of big mansions are made using *Trochus, Turbo, Cerithium, Dentalium* etc. Bangles are made exclusively from the sacred Chank. *Cerithium* and *Cerithedia* are abundant on the mud flats, reefs and mangrove swamps. The periwinkles, *Littorina* spp. and *Nodilittorina* spp. are abundant in the littoral fringe zones of rocky shores and mangroves. *Pyrene*, represented by about seven species along the east coast is very common on the reefs and are found attached to the algae like *Sargassum, Turbinaria* and *Padina* growing on hard

bottom. From the Palk bay and the Gulf of Mannar large quantities are collected for making garlands and chains.

Wing shells are moderately large gastropods with finger like projections on the shell margin. The five fingered chank (*Lambis lambis*) is commonly seen in and around the reefs of Palk Bay, Gulf of Mannar and Lakshadweep waters. They are fished for making lamps, bathi stands and other items. *Tibia curta*, common along the west coast of India is caught as a by- catch in shrimp trawlers

Olivids are smooth surfaced shells of moderate size and are common inhabitants of eulittoral and sublittoral zones . They are used as raw material for pendants and rosettes for chains, garlands and necklaces.

Cowries constitute a group of attractive gastropods. *Cyprea moneta*, the smallest member, found along our coast was used as a currency during ancient times. Still it is a good tool of the astrologers and fortune tellers. Large species such as *C. arabica* and *C. tigris* are used as paper weights and are much coveted items of shell collectors. Not less than seven species of *Cyprea* are reported from the seas around India.

Large shells of *Murex* are used as lamp shades and ashtrays. Four or five species of *Conus* which are important in the handicraft industry are polished and sold as paper weights, often engraved, with good wishes and greetings on it. Small shells form pendants in garlands and key chains. Volutes are comparatively cheap since the shells are thin, eventhough it is of large size. The common, reddish brown shell of *Melo indica* may grow upto 25 cm in length and breadth. It is used as lamp shades and is often seen in the deeper waters of Palk Bay.

Tusk - shells, *Dentalium* are collected from the intertidal zones of Palk Bay and the Gulf of Mannar for making toys and models. Beaks of birds and antlers of deer are made out of *Dentalium*. A useful and worthy item made of *Dentalium* is door and window curtains, strung on nylon threads.

The operculum of gastropods popularly known as "fish nail" is exported. Merchants collect the opercula of all species, cleans it in fresh water, sundry and send them for exporting. The current price of one Kg operculum varies

from Rs. 350 - 400. 100 Kg. of gastropod shells usually yield 1 kg of opercula. The total export of fish nail during 1992 -1993 was 2 ton, worth Rs. 4.14 lakhs.

Remarks

Gastropod resources available along the Indian coast are rich and varied. From both the coasts several species are being exploited from time immemorial for edible purpose and for shell handicraft. The sacred chank *Xancus pyrum* is the most important gastropod collected from mainland and it has an age old fishery in the Gulf of Mannar. *Turbo* and *Trochus* fishery of Andaman and Nicobar islands assumes importance for its unique distribution, high cost and great demand in the shell handicraft industry. New emerging resources of economic importance are the whelks caught as by- catch of shrimp trawlers and *Chicoreus ramosus* and *Pleuroploca trapezium*, collected from the south east coast of India . These edible gastropods command good export demand. The Central Marine Fisheries Research Institute has done research on the distribution pattern of the gastropods from the mainland of India, Andamans and Nicobar and Lakhadweep islands and has recorded the abundance and fishery of most of the commercially important species.

The available information on the gastropod resources of India indicates good potential for augmenting the production by exploiting new areas by improved fishing methods and by undertaking farming. As there is good demand for gastropods, especially *Xancus pyrum*, *Trochus*, *Turbo*, cowries, cone shells, whelks and a variety of others for ornamental and edible purposes, sea ranching and sea farming are worth attempting. Seed production by hatchery methods and sea ranching of juveniles in the natural beds may help in augmenting the production . Conservation measures are required for the judicious exploitation of chanks , *Turbo*, *Trochus*, cowries and whelks. Trawling in inshore waters causes destruction to the stocks of chanks and *Babylonia* spp. Exploitation of undersized gastropods is to be restricted. A few protected areas in the known gastropod beds , where commercial exploitation is being carried out may be earmarked as sanctuaries for replenishing the stock.

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