



Economic importance of marine molluscs

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Abstract: In India wide stretch of coastline offers beautiful beaches for tourism, and provides a variety of edible marine molluscs that are a delight to the plate and a major source of revenue for fishermen and tourist servers. Marine molluscs have an important role in the economic and cultural life of the Tamil Nadu. Fisherman captured different types of forms by using various nets. The ornamental molluscs are emerging resources in Indian seas. The fisherman has knowledge to the collection of species, store and preservation methods. The capturing species are transported to local market and surrounding area and some aquatic forms are exported to foreign countries. Collected samples are kept for removing soft body part by three general methods are burial, boiling and sun drying. After removing the soft parts the shells are kept in acid for cleaning. Molluscan in general had a tremendous impact on Indian tradition and economy and were popular among common man as ornaments and currency. This has the increasing global demand.

Key words: Molluscs, Ornamental, Important, Traditional

Introduction

Molluscs of commercial importance are all essentially marine and broadly come under two major categories, viz., (i) edible and (ii) ornamental. Squids, mussels, oysters, clams, etc., which are used for human consumption come under the edible molluscan fisheries. The marine molluscs are very important since many of them are used as food, they also have other uses such as crafts making, to dye cotton, yarn and clothes, etc., so it is that they have received special attention and become a natural resource of economic importance (Rafael Flores – Garza *et al.*, 2012). The edible oysters contain glycogen, lipids, protein, vitamins, especially A, B, and D and several essential minerals. Some coastal dwellers use oyster as food and fish bait. The shells are also used to make lime. The clams are highly valued as food. Most of the edible molluscs are consumed by the poor class of people along the coastal areas. Special reference is made regarding the scope for the development of the mussel fishery in certain parts of India. In addition to the dead shells and shell products are used for a variety of purposes including manufacture of lime and cement.

There are almost as many reasons for collecting shells as there people collecting them many people simply admire the endless beauty and variety of shells, a large collection can have up to 30,000 species, while others collect more for scientific reasons- there is still a great deal to learn from and about the shells of the world. Although exact figures on the value and trade of the ornamental fish industry do not exist; the value of ornamental fish and invertebrates imported into different countries worldwide is approximately \$278 million US dollars (FAO 1996-2005) (Arjunan Babu *et al.*, 2011).

Materials and Methods

A number of specific fishing techniques are used to collect ornamental gastropods from wild. For making ornaments samples

were mainly collected from by catch of different types of nets used to catch the fish, shrimp, crab as well as skin diving and hand picking. Collected samples are kept for removing soft body part by three general methods are burial, boiling and sun drying. After removing the soft parts the shells are kept in acid for cleaning.

A weak and thin shell which is not good for making ornament well damage while doing acid wash to remove stains, unwanted colour and extra attachments. Damaged thin shells after acid wash are removed and remaining is used for further shaping. During shaping again some of the damaged thin shells are removed. Finally thick as well as undamaged shells are using for making ornaments.

Sample preparation and preservation: The shells were carefully removed using the forceps and scalpels so that the edible parts could be separated. The flash was dried, crushed and powdered. This powder was used for the analysis. The vials of powdered sample were preserved in a dessicator. Only minerals were analyzed from the shells, as those are rich in minerals. 0.50 gram sample was added with one drop of nitric acid and kept in a muffle furnace at 600°C to get the ash samples to make stock mineral solutions (Baby *et al.*, 2010).

Results and Discussion

The commercially important gastropods which occur in the intertidal and inshore waters are edible. These and several other gastropods received considerable attention in recent years due to greater demand for meat and as ornamental shell for shell handicrafts. The ornaments and cowries made out of molluscan shells are becoming highly priced objects in Indian and foreign markets (Appukkuttan, 1996).

Humans have valued marine molluscs shells since prehistoric times. Shells have been used for currency, jewellery, ornaments, tools, horns, games, medicine, and as magical or religious symbols (Claassen, 1998). Even though tropical bivalves and

gastropods have lost much of their historical meaning as medicine, tools or religious symbols, they may be used in even larger quantities today. Shell-craft industries in Southeast Asia may still use thousands of tones of shells annually for mother-of-pearl products (Wells, 1989). The ornamental shell trade, which primarily includes shell exploited for their decorative or rareness value, is also substantial. The ornamental shell trade might even have intensified in recent years with the rise of the Internet. Abbott (1980) estimated that some 5000 mollusc and species are involved in the ornamental shell trade.

Commercial importance of marine molluscs:

Edible Marine Molluscs: Molluscs are used widely for various purposes like human consumption, Poultry feed In India the value of the edible gastropods as food is not realized by most people, in other countries the edible gastropods are very much relished. Molluscs are used widely for various purposes like human consumption, poultry feed, fish feed, lime fisheries etc. some species are also collected and used as feed to ducks and local farms including catfish farms and fishponds. Highly nutritious flesh and shells of molluscs should be used more vastly throughout the country.

Marine gastropods form the largest group of species in the phylum of mollusca in shallow seas. Of these only a small number of species are suitable for being utilized as food by man. The univalves are fished in many parts of the world for bait, for their beautiful shells and manufacture of lime.

The edible gastropods limpets, trochids, whelks, the sacred chank, olives, the green snail etc., are represented in different regions of the Indian coasts in the intertidal zone in shallow waters. Gastropods are seldom sold in the markets for being used as food. The utilization of the gastropods as food is very much less than bivalves.

Clams belonging to a number of species and a few other edible bivalves occur in appreciable quantities in different parts of the Indian coasts and support subsistence fisheries. Thousands of square kilometers of our coastal seas, backwaters and estuaries form ideal habitat for the growth of these bivalves and many among the poor classes of the coastal population use them as food although it should be admitted that a vast majority of other fish-eating population of our country have not developed a liking for these shellfish. The flesh of clams being rich in glycogen, protein and health giving minerals is highly nutritious.

In spite of the availability of substantial edible clam resources along the Indian coasts very little attention has been paid to clam fisheries. Hornell (1916) who made a detailed study of the utilization of shells for manufacturing lime was the first to draw attention to the importance of the clam resources of the Madras Presidency, He (1917) recorded that the clam *Meretrix casta* formed a most important food mollusc.

Many fishermen families are engaged in collecting shells as a part-time avocation 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 centers from the Southwest coast of India. Some species of

gastropods are exploited on a subsistence basis, for edible purposes. 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. These shells are in good demand in the handcraft industry.

Medicinal uses of Marine Molluscs: Most shells are used for multifarious purposes. Medicinal properties have been attributed to some of the molluscs and it is believed that certain diseases like asthma and rickets can be cured by eating particular molluscs. The power of seed pearls is said to be specific in healing certain skin ailments. *Placenta placenta* used by Chinese in making medicinal preparation for diseases of eye and other ailments. In Ceylon the pearls are used in making a costly kind of slaked lime for applying on betel leaves for chewing. The meat of the *Placenta placenta* oysters is not eaten in our country but is edible. Biomedical uses of mussels are presently being studied. Evidence from cancer research suggests that some mussels may be resistant to certain types of cancer and that the extraction of cancer-curing drugs from mollusks may be feasible in the future.

Ornamental Marine Molluscs: A limited study has also been conducted in the intertidal region. However, information on the gastropods and bivalves species of commercial (ornamental) interest from the Tamil Nadu is scarce. Only a few published records of these species are mentioned in the literature, they include checklists and museum collections. The most of the peoples are engaged for fishing. Different aquatic species of forms are landed in this area, like fish, crabs, shrimps, sepia, octopus different types of gastropods, bivalve, and etc.

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). Out of 1900 species of gastropods catalogues from Indian water, only 15 species are edible while a large numbers are commercially important ornamental/curios shells in handcraft trade (Appukuttan and Ramadoss, 2000). Molluscs are abundant and hence important in food chains in marine habitats. 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 shell craft industry.

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 handcraft 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 show cases 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.

Oysters, mussels, clams, pearl oysters and chank are the important molluscs exploited from India from time immemorial. Except for chanks, pearl oysters and cephalopod, much attention was not paid for organized exploitation of molluscan resources from Indian waters till recently. Other gastropod and bivalve fishery are of sustenance nature and are used for edible purpose, source of lime, as decorative shells or for industrial purpose. Twenty eight species of bivalves and about Sixty five species of gastropods are of important in shell trade and for edible purpose. Fourteen species of cephalopods are exploited commercially at present.

Among which the marine gastropods are most commercially attractive and important worldwide. Widespread depletion of this commercially important species of marine gastropods has led to increasing interest in enhancement and restoration of wild populations (Maran, 2000). Since chank fishing in Tamil Nadu is carried out by divers working from Canoes with no more apparatus than a face mask, a diving stone and a nylon rope bag into which the chanks are gathered, some of the divers could catch the animals according to size fixed by the government. This is due to lack of knowledge or awareness which leads to reduce the number and size of the population of most valuable species because they are not allowed even a single time for spawning in life (Narasimham, 2005). Not only ornaments, in olden day's molluscs were used in architect to built buildings, temples and Statues, etc. In coastal areas most of the buildings were constructed by corals and other associated gastropods because of the cheap and huge availability and also easy transportation.

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. 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, at present ranges from Rs 10-130% depending on the size.

The important species caught are *Turritella attenuata*, *Polystira sp.*, *Crassispiras* sp., (screw shells). *Architectonia perspectiva* (staircase shell), *Epitonium scalaris* (ladder shells), *Xenophora sp.* (carrier shells), *Tibia curta* (wing shells), *Naticaalbula*. *Naticalineata* (naticas), *Phaltum 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), *Olive gibbossa*, *Oliva sp.* (olive shells), *Xancus pyrum* (sacred chank), *Harpa conoidalis* (harp shells), *Conus glans* and *Conus sp.* (cone shells), *Placenta placenta* (Window-pane).

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. *Babylonia spirata* and *B. zeylanica*, locally known as 'puramutta' chank and commonly known as whelks, are commercially important edible gastropods belonging to the family Buccinidae. 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 sending to the processing plants for exporting. At present from Japan there is a good demand for frozen meat and shell – on whelk.

The thin, flat iridescent shells of the *Placenta placenta* (Window-pane) oysters are used for glazing windows and door. The shells are also used for decorative pieces in gardens (Rai, 1932). Pearls are formed by mature oysters. The pearls are not of good quality as they are small and irregular in shape. The lack hardness and have poor lustre.

Umbonium is sold in the live condition for Rs. 2-3 /- per litter. After boiling, the meat is extracted and consumed. The empty button – like beautiful colored polymorphic shells are sold to the shellcraft industry. The meat of the limpet, *Cellana radiata*, *Turbo intercoastalis*, *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.

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.

The spider conchs, *Lambis sp.* and *L. truncata* occur in greater abundance in Gulf of mannar. 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* and utilized in making doll models. Olivids are smooth surfaced shells of moderate size and are common inhabitants of littoral and sub littoral 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 shells of *Murex* are used as lamp shades and ashtrays. Four or five species of *Conus* which are important in the handcraft 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.

Molluscan shells of several species other than oysters and clams are suitable for preparing lime viz., *Mytilus spp.*, *Carditabicolor*, *Cardium spp.*, *Placenta placenta*, *Oliva spp.*, *Cerithium spp.*, *Cerithidea fluviatilis*, *Conus spp.*, *Murex spp.*, etc. The lime is used for preparing mortar and for whitewashing buildings. Some quantities of molluscan shells are also used in the manufacture of cement. People have been exploiting these invertebrate resources for thousands of years. The shell workers at the coastal villages of

Rameswaram, Tuticorin and Kanyakumari are following traditional as well as modern techniques for making molluscan ornaments include lamps, lamp shades, beads, fantasy flowers, bangles, flower vases and sculptures, etc. Because of the high value in market, the exploit and explore of molluscan resource is increasing day by day. Therefore, the present study is important since it provides information on the abundance of ornamental gastropods and bivalves which are considered as ornamental and edible mollusc.

In India, information about the molluscan resource and its exploitation is useful for fishing and sea ranching. The intensive trawling over the molluscan beds may lead to large scale destruction of egg mass and juveniles of economically valuable molluscs. Because of the commercial importance and demand in the market, conservation of marine mollusc, sea ranching and sea farming are worth attempting. Regulation to avoid trawling and a mesh size to prevent exploitation of undersized animals are to be implemented to conserve this resource. In this study based on the survey researchers conclude hatchery production and sea ranching of the seeds can help in increasing the natural stock. So, it is important to develop new technology for large scale production, training and transfer of technology programmes need to create an awareness of the importance of the molluscs in the economy of the country.

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