GASTROPODS - AN EMERGING RESOURCE IN THE BY-CATCH OF SHRIMP TRAWLERS AT SAKTHIKULANGARA - NEENDAKARA AREA

K.K. Appukuttan, Calicut Research Centre of CMFRI, Calicut - 5
and M. Babu Philip, Quilon Field Centre of CMFRI, Quilon.

INTRODUCTION

Among the molluscan resources exploited from Indian coast, very little attention is paid for the collection and utilisation of gastropods except for chanks, top shell and turbo shell. The cephalopod and bivalve production has increased considerably in recent years by intensive fishing. Although several species of gastropods are exploited from the intertidal and shallow waters of east and west coast of India, Lakshadweep and Andaman & Nicobar Islands, only 15 species are known as edible. A variety of gastropods are ornamental, forming raw material for shell handicraft trade. With the increasing demand for shrimps, cephalopods and quality fishes in the international seafood market, there is corresponding increase in the fishing effort in major fish landing centres all over the country in recent years. In Sakthikulangara - Neendakara area in Kerala, large number of shrimp trawlers are operated mainly for prawns and along with prawns, sizeable quantities of fishes, other crustaceans, cephalopods and gastropods are caught as by-catch. In the present account, species composition and landing details of five species of commercially important gastropods which are landed as by-catch of shrimp trawlers from June 1993 to May 1994 are given. The whelk meat export and the details of gastropod shell trade are also dealt.

By-catch of shrimp trawlers

George *et al. (Mar. Fish. Infor. Ser. I & E Ser.*, 28: 1-13) (1981) observed that the maximum by-catch in shrimp fishery was obtained from the trawl catches in Tamil Nadu followed by Gujarat, Kerala and Maharashtra. The percentage was high in Gujarat (92.5) and minimum in Maharashtra (60.96); in Kerala it was (69.15). At Sakthikulangara - Neendakara area the by-catch percentage during 1980 was only 54.98. In the present observation the by-catch percentage ranged from 48-55. In Kerala, this area shows the maximum number of shrimp trawl operations as well as shrimp landings. The shrimp trawl by-catch is mainly composed of a variety of demersal fishes, cephalopods, crustaceans other than prawns, gastropods, bivalves and echinoderms. Elasmobranchs, eels, catfishes, dorabs, lizard fishes, perches, polynemids, ribbon fishes, carangids, silver bellies, white fish, pomfrets, barracudas and soles constitute the finfish contribution to the by-catch. Crabs, stomatopods and lobsters constitute the crastacean component. Squids, cuttlefishes, *Octopus* spp., gastropods and bivalves are the major molluscan constituents. The by-catch obtained in this centre is utilised for local consumption or for export and no part is generally discarded. Present study revealed that gastropods form 5-7% of the total by-catch.

Species composition and landing details

Analysis of the gastropod samples from Sakthikulangara - Neendakara area for one year period with ten observations per month from June 1993 to May 1994 showed that 29 species are caught in the shrimp trawlers along with prawns. 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), *Phallium glaucum, P. Canaliculatum* (helmet shells), *Bursa spinosa* (purse shells), *Tonna dolium* (tun shells), *Ficus ficus* (fig shells), *Rapana bulbosa* (purples), *Murex trapa, M. virgineaus, M. baldius, Murex* sp., (venus combs) *Babylonia spirata, B. zeylanica* (whelks) *Hemifusus pugilinus, Fusinus toreuma* (spindle shells), *Olivia gibbossa. Olivia* 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, B. zeylanica* were dominant followed by *Turritella attenuata, Rapana bulbosa, Xanxus pyrum* and *Conus glans* and together they contribute to 80% of the total gastropod landings. The landing details of five commercially important species with catch per unit effort are given in Table 1. A perusal of the landing details reveals that the two species of *Babylonia* contribute 55.8% of the total catch of gastropods recorded during the year. *Bursa spinosa* landing was 78934 kg (23.3%), *Tibia curta* contributed to 51809 kg (15.3%) and *Xancus pyrum* catch was 19152 kg (5.6%). Total catch of all these five species together

Table 1. Total trawl units operated for each month and total landings of important species of gastropods with catch per effort at Sakthikulangara - Neendakara area from June, 1993 to May, 1994

Months	Total units operated	*Babylonia* spp. catch in Kg.	C/E	*Bursa spinosa* catch in Kg.	C/E	*Tibia curta* catch in Kg.	C/E	*Xancus pyrum* catch in Kg.	C/E	Total catch in in Kg.	Catch per effort
June. '93	1546	2163	1.40	4402	2.80	4142	2.27	-	-	10707	6.92
July. '93	7913	4275	0.54	865	0.11	1519	0.19	150	0.02	6809	0.86
Aug. '93	10106	706	0.07	346	0.03	-	-	999	0.10	2051	0.20
Sept. '93	11512	15976	1.40	656	0.05	1618	0.14	3669	0.32	21919	1.90
Oct. '93	11390	17919	1.57	13338	1.17	2361	0.21	681	0.06	34299	3.01
Nov. '93	9217	25092	2.72	-	-	-	-	-	-	25092	2.72
Dec. '93	7493	15319	2.04	-	-	-	-	1890	0.25	17209	2.30
Jan. '94	4773	12618	2.64	6526	1.36	1383	0.28	2140	0.48	22667	4.75
Feb. '94	6628	14446	2.18	8177	1.23	960	0.14	1255	0.19	24838	3.75
March '94	6743	17599	2.61	6207	0.92	2754	0.41	1671	0.25	28231	4.18
Apr. '94	3580	29310	8.20	15756	4.40	14641	4.09	3466	0.07	63173	17.64
May. '94	3211	33514	10.43	22711	7.07	22431	6.98	3231	1.00	81887	25.50
Total	84112	188937		78984		51809		19152		338882	6.14
Percentage		55.8		23.3		15.3		5.6			(Average)

was 338, 882 kg. The total number of units operated for the year was 84,112 with maximum numbers from August to November with peak in October. The catch per unit was 4.03 kg (Table 1). Monthly total catch of *Babylonia* spp. ranged from 706 to 33574 kg with minimum in August and maximum in May. the catch per unit varied from 0.07 kg to 10.43 kg with maximum in May. *Bursa spinosa* landings also showed an increasing trend with minimum landing of 346 kg in August and maximum of 22711 kg in May. Corresponding increase in catch per unit was also observed for this species with maximum of 7.07 kg in May. The landing of *Tibia curta* ranged from 1519 kg in July to 22431 kg in May and the catch per unit was 0.03 kg in August and with a maximum of 6.98% in May. Sacred chank, *Xancus pyrum* showed maximum catch of 3669 kg in September and minimum of 681 kg in October and catch per unit varied from 0.02 kg to 1.0 kg. The total monthly landings of five species of gastropods varied from 2.0 to 81.88 t and there is a sharp increase from September onwards with maximum production coming in April-May.

Disposal of by-catches

The by-catch brought to the landing centre is auctioned group-wise. The quality fishes are separated first and subsequently sorting of small prawns, crabs, other fishes, squilla, octopus and gastropods is done. The sorted groups are sold to the local fish merchants and they in turn take them in aluminium or plastic containers to nearby markets or to the processing sheds. None of the components of the by-catch are discarded and they are fully utilised for human consumption or for industrial use. Among the gastropods, sacred chank, *Xancus pyrum* is sorted and auctioned first and the rest of the gastropod shells separated group-wise (Fig. 1). Both the species of *Babylonia* are separated and kept together for auction and then taken to processing sheds in plastic containers. Remaining gastropod shells are transported to places near the harbour and dumped in open nearshore areas for disintegration of meat and extraction of operculum (Fig. 2).

Ornamental shell trade

Out of the 29 species of gastropods landed at Sakthikulangara - Neendakara area, at least 20-25 species are ornamental shells

Fig. 1 Gastropod shells being sorted out

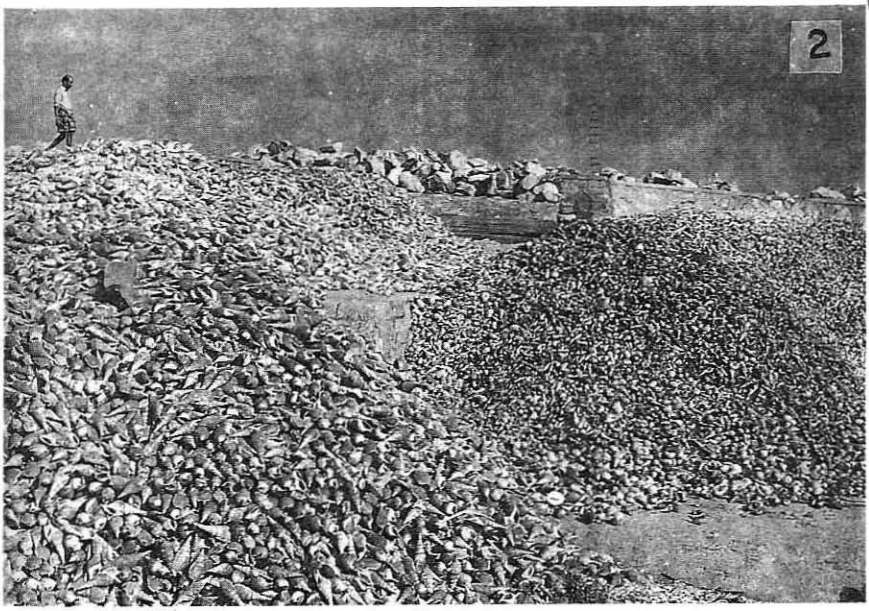

Fig. 2 Heaps of gastropod shells

commonly used in the shell craft industry. The shells dumped in open area are sorted group-wise and operculum is removed, once the soft body has completely disintegrated. The shells are packed in gunny bags (Fig. 3) for transportation to shell handicraft centres located in Tamil Nadu, viz., Ramanathapuram, Keelakkarai, Rameswaram and Kanyakumari. Here, the shells are cleaned and polished before making them into beautiful curio items like eve chains, ear rings, studs, rings, bangles, table lamps, bathi stands, ash trays, key chain pendants, dolls, toys and a variety of models. The shells which are not taken by the shell craft traders

Fig. 3 Shells being packed in gunny bags for transportation

are sent to calcium carbide industry located in Tamil Nadu. The total quantity of seashells exported during 1992-93 is 417 t worth Rs. 8.99 lakhs (Source : MPEDA).

The operculum, popularly known as 'fish nail' is an important product for export. Merchants collect operculum of all species (Fig. 4)., clean them in fresh water, sun dry and send it to exporters. The present cost of 1 kg operculum varies from Rs. 350 - 400. It is understood from shell traders that usually 100 kg gastropod shells yield 1 kg operculum. The total export of fish nail for 1992-93 is 2t worth Rs. 4.14 lakhs (Source: MPEDA).

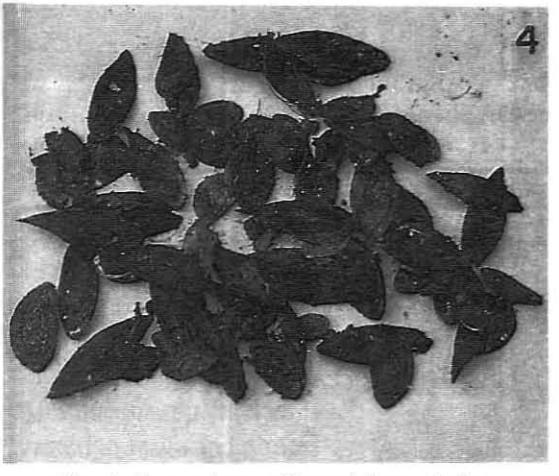

Fig. 4 Operculum collected from shells

Chanks caught at Sakthikulangara - Neendakara area ranges from 95-150 mm in total length and the cost of each shell varies from Rs. 15-35 depending upon the size. The shell traders who collect shells from landing centre send them to chank dealers in Tamil Nadu, who in turn sell the graded shells to merchants in West Bengal. Sacred chank is used mainly for the manufacture of shell bangles.

Whelk meat trade

Babylonia spirata and B. zeylanica, locally known as 'Pravumutt sank' and commonly known as whelks are commercially important edible gastropods coming under the family Buccinidae. Among all the gastropods landed at Sakthikulangara - Neendakara area Babylonia spp. ranks first in abundance forming 55.8% of total gastropod landing and also assumes greater importance since bulk of the whelk meat exported from India since 1993 July is being collected from this centre. The sorted out live Babylonia spp. brought to shed in plastic containers (Fig. 5) are cleaned well in freshwater before keeping them in boiling water. 10 - 15 kg of live shells are kept in boiling water for 10 - 15 minutes for meat extraction. The meat is removed by sharp knife or iron needles (Fig. 6) and from the extracted meat, operculum is removed. The meat is then washed thoroughly in chilled water and kept in containers with ice. The meat is taken to processing plants for further processing. The clean and graded whelk meat is packed in polythene bags of 2 kg weight each and stored at -15 to -40°C for export. The merchants sell whelk meat to the exporters for Rs. 10/- per kg. The shell and operculum give them additional income. At present there is good demand for frozen meat and shell-on whelk from Japan. The total quantity of whelk meat exported from India during 1993 - 1994 period is approximately 300 tonnes. From the whelk meat, whelk steaks are prepared by slicing the foot and body into pieces of 1 cm thickness and pounded between two pieces of cheese cloth with a hammer. These steaks are seasoned with black pepper and salt, rolled in flour, fried and served hot in Bahamas and other islands of the West Indies.

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Fig. 5 *Babylonia* spp. (whelk) kept in plastic container for processing

Remarks

George *et al.* (1981) while giving the details of by-catch of shrimp fishery in India stated that nothing much from the shrimp catches is wasted in India and almost all the fishes which are termed trash fishes are utilised either for human consumption or as fish meal or manure. However, they have not mentioned the occurrence of gastropod shells as an important resource in the by-catch of shrimp trawlers from any of the centres. The present study reveals that in the Sakthikulangara - Neendakara area the gastropod forms 5-7% of the total by-catch and they are valuable resource for shell trade with whelk meat emerging as an important item in the export trade. Among all the gastropods landed at this centre *Babylonia* spp. alone contribute to 55.8 percent of the total gastropod landings.

Though there are reports of rock whelk exploitation for human consumption by coastal fishermen in the southwest and southeast coast of India, the present report is the first giving details of commercial landings of

Fig. 6 Whelk meat being extracted

whelks and export of whelk meat from India. In this context, it is whorthwhile to mention that a close scrutiny of by-catches of shrimp trawlers in other major landing centres may reveal the availability of whelks in exploitable quantity. *Babylonia spirata* landed at Sakthikulangara - Neendakara area ranged from 25 to 54 mm in total length with a mode at 40 to 42 mm and *B. zeylanica* ranged from 37 to 60 mm with mode at 52 to 54 mm. Observations reveal that smaller size groups of both the species are not landed in the commercial catches. There is no information on the breeding behaviour of these gastropods from Indian waters and it could be assumed that there is every possibility of dislodging the egg masses of gastropods deposited in the bottom when trawling is done. It is suggested that a detailed study on the biology of whelks from trawling grounds with special reference to breeding behaviour is necessary to evolve suitable conservation measures for this resource. The present world landing of whelks is 17209 tonnes (FAO, 1988) contributed by *Buccinium undulatum* and *Busycon* sp. mainly from Belgium, France, Ireland, Spain, U.K., Channel Island and U.S.A. The contribution of Indian whelk from Sakthikulangara - Neendakara area is only 189 tonnes in 1993 - '94. It is understood from shell traders that at present whelks are caught in trawlers operated at Chavakkad, Calicut and Mangalore and are discarded in the sea. It is quite possible that the production can be increased by exploitation of whelks from these areas also. The proper utilisation of meat of *Rapana bulbosa*, *Tibia curta* and *Bursa spinosa* which are also landed in small quantities along with whelks as by-catch is to be explored.