

By-catch assessment of Selected Conus Species (Gastropoda: Conoidea) in Tuticorin Coast at Gulf of Mannar, Tamil Nadu

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Abstract:- The by-catch of Marine gastropods was collected from two different coastal area of Tuticorin district from Gulf of Mannar. In the present survey, 16 species of Conus(Gastropoda: Conoidea) were recorded in January 2018 to March 2018. A field survey was carried out to assess the availability of Conus species in by-catches of two fish landing centres via Tuticorin and Threshpuram in Gulf of Mannar coasts. At each centre, by-catch trash from crab net, trawl net, thallumadi and Karaivalai of fishing vessels was collected every fortnight. Sixteen type of conus species were recorded from the by-catches.

Keywords: Gastropod, Conus, By-catch Survey, Diversity, Gulf of Mannar,

INTRODUCTION

India is one of the twelve mega biodiversity countries. However, the marine fauna of India are not same everywhere. The phylum Mollusca constitutes dominant group of animals and includes familiar forms such as clams, oysters, squids, octopus and snails belonging to seven classes namely Aplousobranchia, Monoplousobranchia, Polyplousobranchia, Gastropoda, Bivalvia, Scaphopoda and Cephalopoda. Among these, Gastropoda, Bivalvia and Cephalopoda are considered as major classes which include commercially important species. Over 100,000 living species and 35,000 fossil species of molluscs were described (Bhamrah and Juneja, 1991). In India, there are 5050 molluscan species found distributed, out of which 3370 species are exclusively marine coming under 220 families and 591 genera. This includes 1900 species of gastropods, 1100 species of bivalves, 210 species of cephalopods, 41 species of polyplousobranchians and 20 species of scaphopods. The highest diversity of Conus spp. was reported as 48 species in Gulf of Mannar, followed by 22 species from Northern and 6 from Southern parts of Tamil Nadu and 5 from the Palk Bay region. The taxonomy and distribution of Conidae in India were studied earlier by (Benjamin Franklin et al., 2009), documented the diversity of the cone snails in Indian coastal waters and recorded 77 species of cones. The most important piscivorous Conus such as *C. geographus*, *C. amadis*, *C. marmoreus*, *C. striatus*, *C. tessulatus* and *C. inscriptus* are present in the Indo-Pacific area. These cone shells can sense the presence of prey through the passage of water odors to its chemoreceptor organ. These predatory gastropod cone shells have a diverse mechanism of prey capture and divided into three major feeding types namely; vermivorous, piscivorous and

molluscivorous (Kohn, A.J., et al. 2001). Among the various feeding types, piscivorous species are very dangerous; they can kill and swallow the prey of similar size. After immediately injection of the venom and having contact with the prey with single radular teeth whereas other species are using more than one radular teeth for injection of venom into the prey. Most of the work focused on the venom apparatus and their active secretion mainly based on the observation of man killing piscivorous cones as they pose real threats to humans.

REVIEW OF LITERATURE:

McIntosh (2001) collected fifty seven species of molluscs from the reef flat (intertidal areas) of four coral islands around Indian Ocean which included 41 species of gastropods and 16 species of bivalves. The world water comprises about 500 species in the family Conidae, all of them are members of the single genus Conus, with a few exceptions. They are confined to tropical and subtropical seas. Nearly, all taxonomists agree that large and worldwide extensive dispersal of this genus should be split into smaller groups, but scheme has been generally accepted for dividing the several hundred Conus species into compact generic groups (Oliver et al., 1990). The study on Indian Conus species started back 1860's. Winckworth (1949) studied the taxonomy and distribution of Indian Conidae. A total of 14 Conus species was reported from Krusadai Island of Gulf of Mannar and documented the diversity of Cone Snail in coastal waters of India. Shuto (1994) investigated larval ecology of prosobranch gastropods in Japan waters. The larval life stage ranges from long pelagic planktonic life histories to directly developing lecithotrophic ones, has a

strong influence on larval dispersion. Mutlu (1995) assessed the distribution of benthic molluscs from 20 localities along the Turkish Black Sea. The species composition of gastropods molluscs in the Black sea Biosphere Nature Reserve was observed by Anistratenko (1996). Gublin and Evseev (1997) recorded the distribution of intertidal prosbranch gastropods of Vietnam coast which included 153 species of 34 families. Cubas (1999) studied the diversity of marine gastropods in Yucatan Peninsula, Mexico. Kulkarni et al. (2006) investigated the diversity, population density and biomass of molluscs at Haji Ali sea shore of Mumbai. Investigated the vertical distribution and abundance of gastropods and bivalves from rocky beaches of Cuastecomate Bay, indicated that Sri Lanka was represented with 70 species of *Conus*, whereas Maldives and Chagos were found to be represented with 64 species. Franklin et al., (2009), indicated that the richness of *Conus* in Gulf of Mannar is far better than other parts of Tamil Nadu, which has been represented with 44 species. Adult specimens of two species viz; *C. virgo* (Linnaeus, 1758) and *C. bayani* (Jousseaume, 1872), recorded from the Pondicherry Coast, southeast coast of India were described by Khan, 2010. In most of the molluscan taxonomy, cone snails are generally brought under the single large genus, *Conus*, while other groups such as augers are assigned by the most taxonomists to several different genera like *Terebra*, *Hastula*, *Duplicaria* in the family *Terebridae*. The *Conus* species are found to have a remarkable range of structures in their radular tooth morphology and revealed that of the many active conopeptides, only a small fraction of the conotoxin property has been analyzed. In the present investigation, Gastropods fauna were very important role to play the coastal ecosystem of biodiversity.

MATERIALS AND METHODS:

This Study area was divided in two localities via Thoothukudi Fishing Harbor (Station I) and Threshpuram (Station II) located at southeast coastal area of Tuticorin district, Gulf of Mannar, Tamil Nadu, India, during January 2018 to March 2018. The samples were mainly collected by handpicking. A part from that sample has also been collected from crab net, trawl net, thallumadi and Karaivala from Thoothukudi Fishing Harbor (Station I) and Threshpuram (Station II). The data were collected at every fortnight from the above landing centers for post-monsoon (Jan 2018 to Mar 2018). The samples were brought to the laboratory and they were rinsed, adhering debris removed and sorted out species and then transferred to 4% formalin. The shell characters such as shape, spire length and shape, mouth opening, opercula shape, umbilicus shape and size, colour and ornamentation of the shell are used mainly for the identification of gastropods

(Ramesh et al. 2002). Various biodiversity indices were estimated using Paleontological Statistics (PAST) software.

RESULTS:

In the present study, by-catch assessment of selected *Conus* species of Thoothukudi Coast in Gulf of Mannar was carried out for three months from January 2018 to March 2018 for post-monsoon. A checklist of various *Conus* species collected and recorded from the Thoothukudi coast during the study period, was prepared (Table:1). 16 species of *Conus* (Gastropoda: Conoidea) were recorded in January 2018 to March 2018 (Plate I). Among the species, high number of *Conus Literatus* species turnover was recorded in Threshpuram fish landing centre and low number of *Conus virgo* species was recorded in Tuticorin fish landing centre. The Shannon-Wiener diversity index (H' (\log_2)) was calculated to be ranges of 2.57 – 2.709 for Thoothukudi. The index was in the ranges of 2.601 – 2.721 for Threshpuram. The Spatial variations in Simpson's diversity index (D) was calculated to be ranges of 0.9116 – 0.9298 for Thoothukudi (Fig.1). The index was in the ranges of 0.916 – 0.931 for Threshpuram. The Spatial variations in Brillouin index (HB) was estimated to be ranges of 2.37 – 2.49 for Thoothukudi. The index was in the ranges of 2.419 – 2.532 for Threshpuram (Fig.2). The Fisher's alpha diversity index (α) was calculated to be ranges of 4.752 for Thoothukudi. The index was in the ranges of 4.5 for Threshpuram. The Spatial variations in Margalef Species richness (d) was calculated to be ranges of 3.067 for Thoothukudi. The index was in the ranges of 2.982 for Threshpuram. The maximum densities of gastropods were recorded from Threshpuram Coast. The results of present study provide useful information for by-catch assessment. Species richness was found to be higher at Threshpuram followed by Thoothukudi. Among the 16 species *Conus Literatus* represented large numbers followed by *Conus virgo*. The *Conus Betulinus* were evenly found at Thoothukudi and Threshpuram.

Table:1 By-catch of Gastropods in Tuticorin Coastal from Gulf of Mannar, during Jan-2018 to Mar 2018.

S. No	Species Name	January 2018		February 2018		March 2018	
		Station-I	Station-II	Station-I	Station-II	Station-I	Station-II
1.	<i>Conus Amadis</i>	4	3	1	4	2	3

2.	ConusBetulinus	5	4	3	2	3	4
3.	ConusFigulinus	2	6	5	4	4	6
4.	ConusGeographus	6	2	2	6	6	0
5.	ConusInscriptus	2	7	0	3	2	3
6.	ConusJosephinae	1	0	4	1	4	5
7.	ConusKintoki	0	5	2	2	3	5
8.	ConusLiteratus	4	4	6	0	4	4
9.	ConusMarmoratus	5	6	4	2	0	6
10.	ConusParticulus	2	2	3	4	2	2

11.	ConusStriatus	3	4	2	3	3	4
12.	ConusSuturatus	1	1	3	2	4	1
13.	ConusTerebra	0	3	4	0	1	3
14.	ConusTessulatus	4	4	0	3	5	4
15.	ConusVirgo	2	2	1	2	0	2
16.	Conuszealandicus	5	4	3	2	1	4

Station-I – Tuticorin Fish Landing Centre

Station-II – Threshpuram Fish Landing Centre

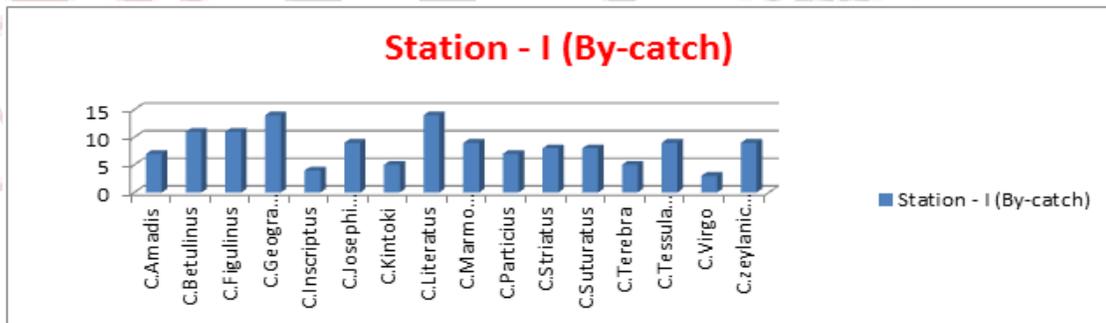


Fig:1 By-catch Assessment from Jan 2018 to Mar 2018 of Thoothukudi Fish Landing Centre.

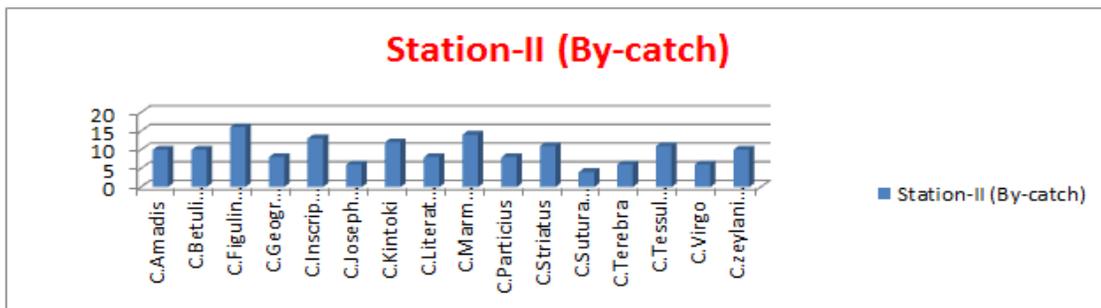
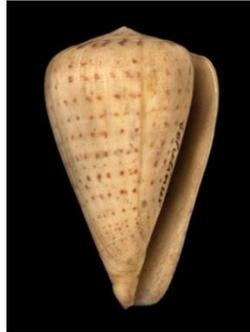


Fig:2 By-catch Assessment from Jan 2018 to Mar 2018 of Threshpuram Fish Landing Centre.

Plate – I



Conus Amadis



Conus Betulinus



Conus Figulinus



Conus Zeylanicus



Conus Geographus



Conus Inscriptus



Conus Josephinae



Conus Kintoki



Conus Literatus



Conus Marmoreus



Conus Virgo



Conus Particius



Conus Striatus



Conus Sutturatus



Conus Terebra



Conus Tessulatus

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