

Effects of Inner Shelf Environment on the Distribution of Recent *Ostracoda* from the Southern Part of Gulf of Mannar, SE Coast of India

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Authors' contributions

This work was carried out in collaboration between both the authors. Authors VK and BS designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript, managed the analyses of the study and the literature searches. Both the authors read and approved the final manuscript.

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ABSTRACT

To understand the impact on temporal variation of inner shelf environments of the southern part of Gulf of Mannar on the distribution of *Ostracoda*, a systematic collection of sediment and bottom water samples were made at 28 stations. Seven samples each were collected along four traverses, from off the coast of Tuticorin, Sippikulam, Mookaiyur and Volinokkam, for three seasons, representing Pre-monsoon, Post monsoon/winter and Summer. Thus the collections amounted to a total of 84 samples. A total of 48 species belonging to 36 genera, 18 families, 5 super families and 2 suborders of Podocopida have been identified. The bottom water parameters viz. temperature, salinity, dissolved oxygen and sediment parameters viz. calcium carbonate, organic matter content and sand, silt & clay ratio have been studied for three different seasonal collections along with the population distribution of the *Ostracoda*. Temporal variation of temperature, salinity and dissolved oxygen content of the bottom water shows a positive correlation with the distribution of *Ostracoda*. Spatially, higher CaCO₃ content and moderate organic matter content are associated with a higher

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population of *Ostracoda*. Temporally, the conditions prevailed during April (summer) accounts for higher population. The silty sand type of substrate is found to be an accommodative substrate for higher population.

Keywords: *Ostracoda*; *Innershelf*; *Population distribution*; *Temperature*; *Salinity*; *Dissolved oxygen*; *CaCO₃*; *Substrate*.

1. INTRODUCTION

Ostracoda are microcrustaceans typically around 1mm in size, varying between 0.2 to 30 mm, having a long and well documented fossil record from the Cambrian to the present day. *Ostracoda* have been particularly useful for the biozonation of marine strata on a local or regional scale, and they are valuable indicators of paleoenvironments because of their widespread occurrence, small size and very sensitive to micro level environmental modifications [1,2,3, 4]. These crustaceans live in an environment in which the controlling factors are temperature, bottom topography, depth, salinity, pH, alkalinity, dissolved oxygen, food supply, substrate and sediment organic matter content [5,6,7]. But the primary controlling factors governing the

ostracod distribution in estuarine and continental environments are salinity, water temperature and substrate [8,9,10,11].

1.1 Study Area

The area under investigation is located on the south-east coast of India, forming a part of Survey of India's topo sheets numbering 58 K/3,4 and 58 O/3,4. It occupies an area from off the coast of Tuticorin in the south to Volinokkam in the north, almost covering the southern part of Gulf of Mannar. It is geographically situated between the N 8°45' - N 9°10' and E 78°10' - E 78°30'. The location map of the study area is shown in the Fig-1. The region is shallow inner-shelf with a gentle slope topography towards the sea.

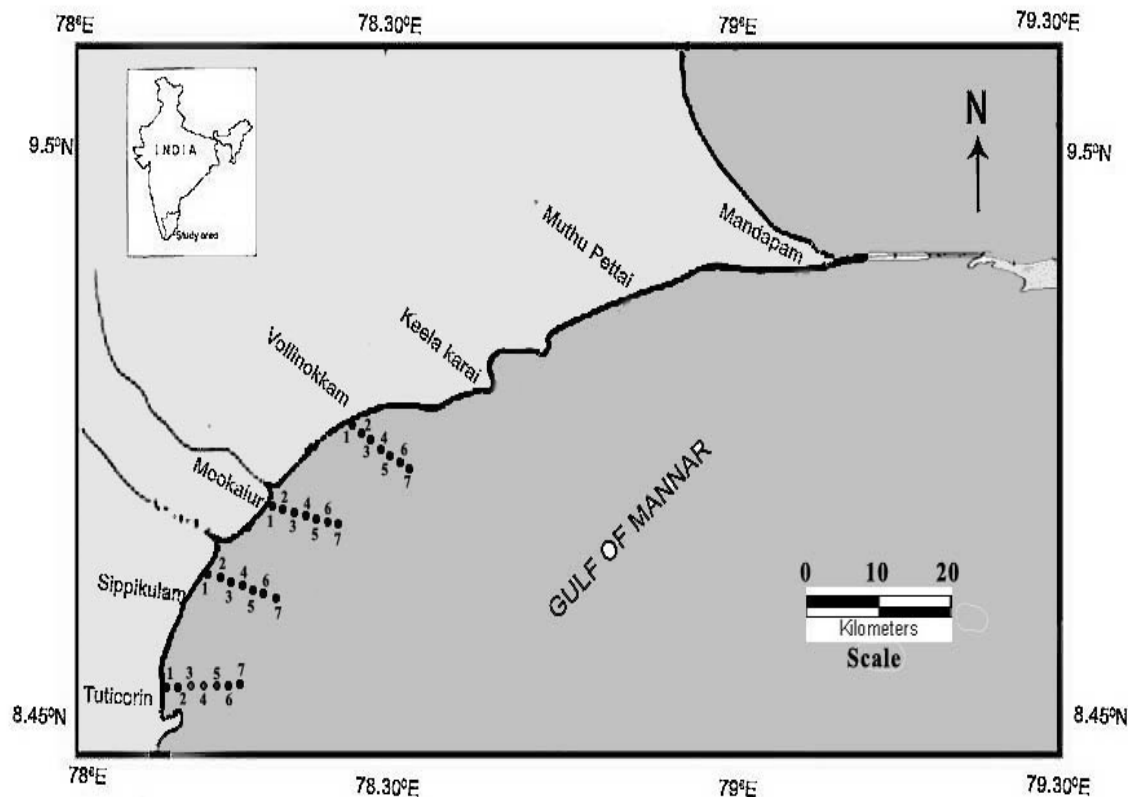


Fig. 1. Location map of study area

2. MATERIALS AND METHODOLOGY

The sediment and bottom water samples (sediment-water interface) were collected for three different seasons representing Pre-monsoon, Post monsoon/winter and summer. A total of 84 sediment samples were collected in four transects from off the coast of Tuticorin, Sippikulam, Mookaiyur and Volinokkam, approximately perpendicular to the coastline, with the help of Petersen grab and Nansen reversible water sampler.

A unit volume of 25 ml wet sediment taken from the top 10 cm layer, immediately after the collection, was preserved in 10% solution of neutralised formaldehyde for *Ostracoda* study. The remaining portion was preserved in a polythene bag for further laboratory investigations.

At each station, the temperature of the bottom water sample was recorded onboard using built-in thermometer. Salinity and dissolved oxygen content of the bottom water were also recorded onboard using portable salinometer and dissolved oxygen analyser, respectively [12].

The ratio of the sand-silt-clay fractions of each sample was calculated using the pipette method of Krumbein and Pettijohn [13]. Then, the sediment types were classified using Trefethen [14] textural nomenclature. Organic matter of the samples was estimated using the method proposed by Walkley and Black as detailed out by Jackson, 1967. Calcium carbonate content of the sediments was determined by rapid titration method of Piper [15].

Walton's rose staining technique [16] was followed for identifying the living forms. The preserved sediment samples were washed over 63µm size sieve to remove finer particles. After drying, the ostracod specimens were separated from the residue using CCl₄ floatation technique. Then using a stereo-binocular microscope, the specimens were identified, counted and mounted on micropaleontological slides.

3. RESULTS AND DISCUSSION

3.1 Ostracod Fauna - Composition and Distribution

Forty Eight species belonging to 36 genera, 18 families, 5 superfamilies and 2 suborders of

Podocopida were identified. Of these, 46 species belong to the suborder Podocopa and remaining 2 species belong to the suborder Platycopa. A checklist of the taxa encountered in the study area is presented in Table 2a. All the 48 ostracodal species recognized from the shelf sediments of Southern part of Gulf of Mannar, off Tuticorin, Sippikulam, Mookaiyur and Volinokkam are found in living condition in all the seasons. Among these 48 living species, the following species are considered widespread and abundantly occurring since they are found as living in more than 90% samples collected and studied. They are *Loxocorniculam lillgeborgii*, *Mutilus pentoekensis*, *Neocytheretta murilineata*, *Neomonoceratina iniqua*, *Tenella gracilis* and *Xestoleberis variegata*. Spatially, the ostracod population is controlled by various factors, of which CaCO₃ content and substrate type plays an important role.

In the present study, maximum population is found during April followed by October and January. Spatial distribution reveals that maximum population is found in mid-stations of all the traverses and in all the seasons. Shore stations are always with minimum population due to wave agitation. The total ostracodal population for all seasons in Tuticorin, Sippikulam, Mookaiyur and Volinokkam transects are 5540, 5819, 5636 & 5322 (number of specimens) respectively (Table 2a). Temporally, the population of *ostracoda* for a season ranges from 1725 to 2055, 1813 to 2175, 1764 to 2090, 1668 to 1953 in Tuticorin, Sippikulam, Mookaiyur and Volinokkam transects respectively. In all the transects, the minimum population is noticed during January and maximum during April (Table 2b). Graphical representation of the distribution of Ostracodal population in different stations of Tuticorin, Sippikulam, Mookaiyur and Volinokkam transects are given in Figs. 2, 3, 4 & 5.

The *Ostracoda* populations were correlated with the observed temperature, salinity, dissolved oxygen of the bottom water and organic matter, calcium carbonate, sand, silt and clay content of the substrate [17,18,19,20]. The depth of the water column also controls the distribution and population of the *Ostracoda* [21,22]. The values of sediment and bottom water parameters along with total population of all the stations along the four traverses (Tuticorin, Sippikulam, Mookaiyur and Volinokkam), for three seasons (April, January & Octobers) are given in the Tables 4, 5 & 6.

Table 1. Seasonal Mean Value of Sediment, Bottom Water Parameters and Total population

Season	Temperature(°C)	Salinity (ppt)	CaCo3 %	OM%	D/O ml/l	Sand %	Silt%	Clay%	Total Population
October	27.9	31.3	26.7	0.930	4.7	76.61	13.75	9.64	253
January	27.8	30.3	26.9	0.936	5.0	75.92	13.22	10.86	249
April	32.9	33.1	28.9	0.829	6.0	76.32	13.71	9.97	295

3.2 Temperature

In all the 7 stations of Tuticorin, Sippikulam, Mookaiyur and Volinokkam it is observed that there is no appreciable variation in water temperature among the different stations of a season, however, there is an appreciable variation in temperature during different seasons [23]. The temperatures of the bottom water have direct proportion to the total population for all the seasons. In the present study, the maximum temperature is noticed during April (32.9°C) and minimal temperature during January(27.8° C) which is directly correlated with total *Ostracoda* population(Table 1). In the Gulf of Mannar, off Tuticorin, Hussain [23] observed that there is no appreciable spatial variation in temperature during a season however, there is variation in temperature observed during different seasons (Tables 4, 5 & 6). According to Hussain [23], since the variation in depths between the stations is only marginal, rather small temperature variations (fractions of a degree) are justified.

3.3 Salinity

The mean value of salinity of the bottom waters for a season ranges from 30.3 ppt in the month of January to 33.1 ppt in the month of April (Table 1), but the salinity do not show any noticeable variation among the stations of a season. Based on the salinity it may be assumed that species encountered in the study area fall under Euhaline Species. The salinity variation shows a positive correlation with total ostracodal population in the study area which supports the results of Hussain et al. [24,25].

3.4 Dissolved Oxygen

The mean value of dissolved oxygen of the bottom waters for a season ranges from 4.7 ml/l in the month of October to 6.0 ml/l in the month of April (Table 1). Hussain and Ragothaman [24] inferred that increase in dissolve oxygen is favourable for a comparative abundance of

ostracod population in the bottom waters off Tuticorin, southeast coast of India. The population of *ostracoda* increases with increase in dissolved oxygen in all the seasons and in all the transects of the study area [24,25]. The values of dissolved oxygen in all the 7 stations of Tuticorin, Sippikulam, Mookaiyur and Volinokkam in all the season are given in Tables 4, 5 & 6.

3.5 Type of Substrate

The relative abundance of sand, slit & clay has been determined for all the samples collected in each of 7 stations from off Tuticorin, Sippikulam, Mookaiyur and Volinokkam for 3 different seasons. Out of possible 12 sediment types Trefethen's [14] only 4 sediment types are noticed in the study area viz., sand, silty sand, clay sand and silty clay sand. Among the total 84 samples, most of the samples are silty sand type. The types of substrate for all the samples collected are given in Table 3. In the present study, the most favourable substrate for the abundance of ostracode population is silty sand [26,27,23,25].

3.6 Calcium carbonate

The minimum percentage of CaCO₃ was recorded in October and maximum was recorded during April. The mean value of CaCO₃ content of a season varies from 26.7 to 28.9% (Table 1). It is found that the calcium carbonate content is more in the middle segment of the traverse and relatively less in shore samples (Table 4, 5 & 6). Coral reefs in the study area may have facilitated the recording of higher CaCO₃ in the sediments. Hussain [28] observed that higher CaCO₃ is one of the influencing factors for higher populations of *ostracods* in different areas off the southeast coast of India. However, earlier studies reveal difficulty to relate CaCO₃ content with *Ostracoda* population [23]. In the present study, the population of the *ostracoda* is directly proportional to the CaCO₃ content of the substrate.

Table 2a. Species-wise distribution of *Ostracoda* fauna in different seasons

Name of the Species	Tuticorin				Sippikulam				Mookaiyur				Volinokkam			
	Oct	Jan	April	Total	Oct	Jan	April	Total	Oct	Jan	April	Total	Oct	Jan	April	Total
1 Actinocythereis scutigera	1	1	4	6	2	3	4	9	0	0	3	3	1	1	3	5
2 Bairdoppilata alcyonicola	1	1	3	5	2	3	5	10	0	0	2	2	1	1	2	4
3 Callistocythere flavidofuca intricatoides	27	33	33	93	31	38	40	109	25	29	29	83	24	29	29	82
4 Caudites javana	8	8	8	24	10	13	13	36	16	20	20	56	10	10	10	30
5 Caudites rosaliensis	43	50	53	146	39	46	49	134	40	46	48	134	36	42	44	122
6 Chrysocythere keiji	60	69	74	203	62	73	79	214	58	65	69	192	54	61	65	180
7 Cushmanidea guhai	4	4	4	12	10	14	14	38	0	0	0	0	4	4	4	12
8 Cytherella diction	62	71	76	209	67	77	84	228	59	67	71	197	56	65	69	190
9 Cytherelloidea leroyi	88	94	92	274	96	96	98	290	93	93	100	286	92	91	105	288
10 Cytheropteron sp.	33	29	43	105	40	34	39	113	33	37	44	114	34	33	41	108
11 Hemicytheridea paiki	3	3	3	9	3	4	4	11	5	5	5	15	3	3	3	9
12 Hemicytheridea reticulate	3	3	3	9	1	1	2	4	2	2	3	7	0	0	4	4
13 Hemicytherura sp.	21	25	25	71	25	31	33	89	24	27	27	78	22	26	26	74
14 Hemikrithi peterseni	3	3	7	13	5	7	8	20	4	4	7	15	4	4	4	12
15 Keijella karwarensis	3	3	3	9	3	4	4	11	3	3	3	9	3	3	3	9
16 Keijella reticulate	3	3	5	11	2	3	3	8	4	4	4	12	2	2	2	6
17 Keijia demissa	3	3	3	9	1	1	6	8	3	3	5	11	0	0	4	4
18 Lankacythere coralloides	3	3	4	10	2	3	3	8	4	4	4	12	2	2	2	6
19 Loxoconcha mandviencis	0	0	5	5	0	0	4	4	0	0	6	6	0	0	3	3
20 Loxoconchella anomala	2	2	6	10	1	1	5	7	1	1	5	7	0	0	2	2
21 Loxocorniculam lillgeborgii	143	154	154	451	141	159	165	465	146	162	159	467	137	157	156	450
22 Macrocyprina decora	11	13	13	37	16	20	21	57	7	7	7	21	10	11	11	32
23 Mutilus pentoekensis	180	189	214	583	193	192	223	608	191	201	220	612	180	196	213	589
24 Neocytheretta murilineata	195	204	230	629	204	208	229	641	195	214	231	640	191	210	208	609
25 Neocytheretta snelli	11	12	12	35	12	17	17	46	8	8	8	24	8	8	8	24
26 Neocytheromorpha reticulate	7	7	7	21	4	5	5	14	12	13	13	38	7	7	7	21
27 Neocytheromorpha sp.	6	6	6	18	8	11	11	30	7	7	7	21	7	7	7	21
28 Neomonoceratina jaini	11	14	14	39	11	14	14	39	15	18	18	51	11	13	13	37
29 Neomonoceratina iniqua	197	72	226	495	203	81	244	528	200	63	222	485	194	65	217	476
30 Neomonoceratina procostata	6	0	3	9	11	0	3	14	11	0	3	14	13	0	3	16
31 Neomonoceratina spinosa	33	38	41	112	34	42	44	120	30	35	37	102	29	34	35	98
32 Neonesidea cf. Crecenticlavula	0	0	4	4	0	0	4	4	0	0	3	3	0	0	3	3
33 Neosinocythere dekrooni	2	2	3	7	2	3	4	9	1	1	1	3	1	1	2	4
34 Paijenborchellina prona	44	51	55	150	39	47	49	135	45	51	55	151	39	44	47	130

		Tuticorin			Sippikulam				Mookaiyur				Volinokkam				
35	Paracytheroma ventrosinuosa	0	0	3	3	0	0	4	4	0	0	4	4	0	0	3	3
36	Paradoxostoma bhatiai	0	0	2	2	0	0	3	3	0	0	3	3	0	0	3	3
37	Phlyctenophora orientalis	0	0	5	5	0	0	5	5	0	0	4	4	0	0	4	4
38	Pontocythere sp.	29	34	35	98	30	37	39	106	28	33	33	94	26	31	31	88
39	Propontocypris crocata	4	4	4	12	7	9	9	25	2	2	2	6	4	4	4	12
40	Propontocypris (Schedopontocypris) Bengalensis	59	68	72	199	65	76	82	223	57	64	68	189	55	64	68	187
41	Ruggieria sp.	20	24	24	68	18	23	24	65	24	28	28	80	19	23	23	65
42	Semicytherura sp.	0	0	3	3	0	0	3	3	0	0	3	3	0	0	3	3
43	Semicytherura contraria	0	0	2	2	0	0	3	3	0	0	4	4	0	0	2	2
44	Stigmatocythere indica	2	2	2	6	1	1	1	3	2	2	3	7	1	1	4	6
45	Stigmatocythere kingmai	13	17	17	47	2	3	4	9	18	21	22	61	10	11	11	32
46	Tenella gracilis	202	189	215	606	208	190	227	625	197	192	212	601	199	186	209	594
47	Triebelina sertata	8	8	8	24	8	11	11	30	12	14	14	40	9	9	9	27
48	Xestoleberis variegata	206	209	227	642	212	212	230	654	200	218	251	669	203	209	224	636
		1760	1725	2055	5540	1831	1813	2175	5819	1782	1764	2090	5636	1701	1668	1953	5322

Table 2b. Showing the distribution of ostracodal population in different stations

Season/stations	Tuticorin								Sippikulam							
	1	2	3	4	5	6	7	Total	1	2	3	4	5	6	7	Total
October	63	156	209	326	365	335	306	1760	94	163	240	356	367	317	294	1831
January	60	148	191	338	354	335	299	1725	108	155	230	379	355	315	271	1813
April	74	191	216	384	426	408	356	2055	130	193	265	426	446	383	332	2175
Season/stations	Mookaiyur								Volinokkam							
	1	2	3	4	5	6	7	Total	1	2	3	4	5	6	7	Total
October	66	144	230	305	357	362	318	1782	68	152	213	313	349	318	288	1701
January	70	136	240	290	349	357	322	1764	67	140	203	302	331	332	293	1668
April	81	156	265	345	439	419	385	2090	79	152	229	359	408	379	347	1953

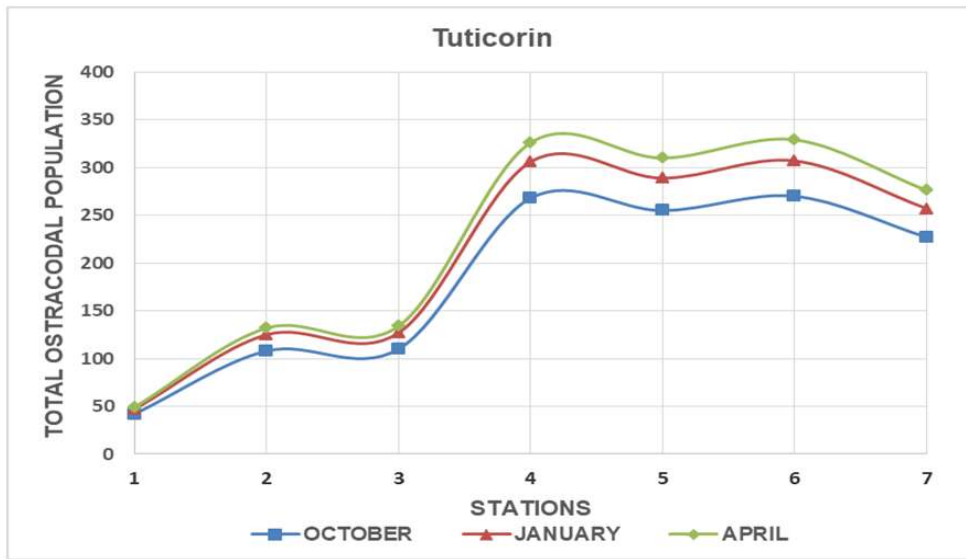


Fig. 2. Scatter plot showing the distribution of ostracodal population in different stations of tuticorin transect

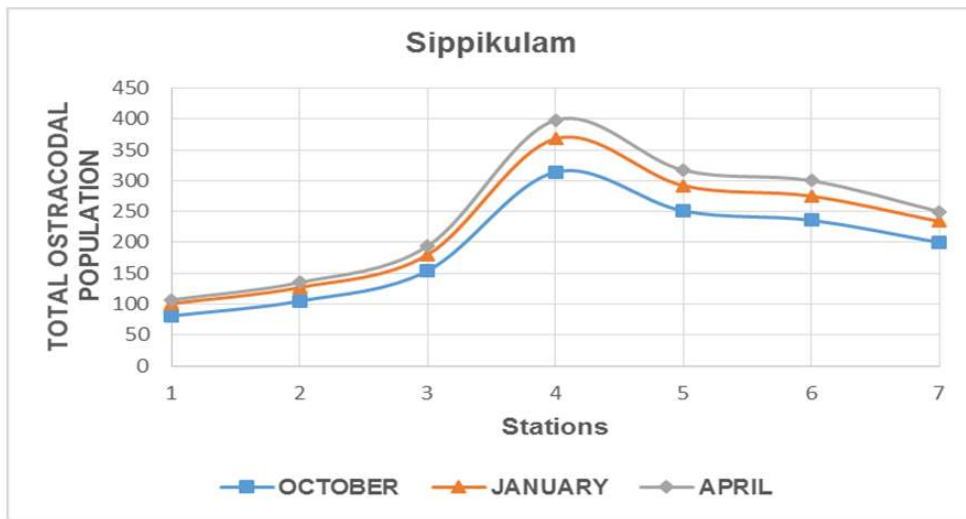


Fig. 3. Scatter plot showing the distribution of ostracodal population in different stations of sippikulam transect

Table 3. Distribution of sediment of different station in all the 3 seasons

Month	Sand	Silty sand	Clay sand	Silty clay sand
October	TP-1, SK-1, MK-1, VN-1	TP-2, TP-3, TP-4, TP-5, TP-6, TP-7, SK-2, SK-3, SK-4, SK-5, SK-6, SK-7, MK-2, MK-3, MK-4, MK-5, MK-6, MK-7, VN-2, VN-3, VN-4, VN-5, VN-6, VN-7,	-	-
January	TP-1, SK-1, MK-1, VN-1	TP-2, TP-3, TP-4, TP-5, TP-6, TP-7, SK-2, SK-3, SK-4, SK-5, SK-6, SK-7, MK-2, MK-3, MK-4, MK-5, MK-6, MK-7, VN-2, VN-3, VN-4, VN-5, VN-6, VN-7	-	-
April	TP-1, SK-1, MK-1, VN-1	TP-2, TP-3, TP-4, TP-5, TP-6, TP-7, SK-1, SK-2, SK-3, SK-4, SK-5, SK-6, SK-7, MK-1, MK-2, MK-3, MK-4, MK-5, MK-6, MK-7, VN-1, VN-2, VN-3, VN-4, VN-5, VN-6, VN-7	-	-

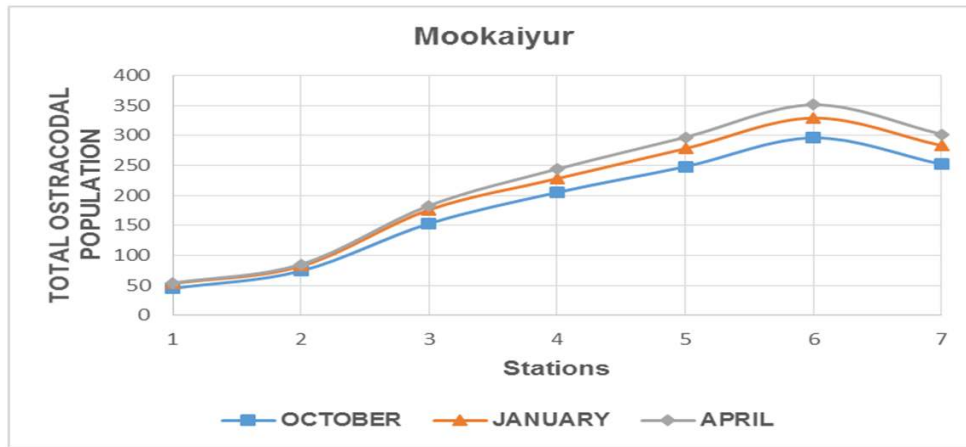


Fig. 4. Scatter plot showing the distribution of ostracodal population in different stations of mookaiyur transect

Table 4. Sediment and bottom water parameters along with total population for the October season

Station name	Station NO.	Depth M	Temp °C	Salinity ppt	CaCo3 %	OM %	D/O ml/l	Sand %	Silt %	Clay %	Total population Nos.
Tuticorin	TP 1	1.0	27.6	31.0	21.2	1.964	4.7	64.00	19.42	16.58	42
	TP 2	3.0	28.1	31.6	23.6	1.218	4.6	70.54	15.43	14.03	108
	TP 3	4.2	27.5	32.2	25.8	0.908	4.5	72.49	14.54	12.97	110
	TP 4	5.3	27.8	32.2	27.6	0.822	4.7	77.00	13.94	9.06	268
	TP 5	7.4	27.8	32.5	28.2	0.780	4.6	77.32	13.75	8.93	255
	TP 6	9.0	28.2	32.3	27.4	0.864	4.4	76.26	13.72	10.02	270
	TP 7	12.5	28.1	31.9	26.8	0.900	4.5	76.22	13.44	10.34	227
Sippikulam	SK 1	1.0	27.8	31.5	22.2	0.964	4.7	83.72	9.53	6.75	81
	SK 2	3.3	27.8	32.1	26.8	1.064	4.6	72.49	15.28	12.23	105
	SK 3	4.5	27.8	32.0	28.2	0.942	4.5	73.92	15.95	10.13	154
	SK 4	5.6	27.9	32.2	28.2	0.845	4.5	75.80	14.05	10.15	314
	SK 5	7.0	27.8	32.3	28.0	0.992	4.7	70.26	16.42	13.32	251
	SK 6	7.8	27.9	32.0	29.2	0.720	4.7	76.92	13.22	9.86	236
	SK 7	8.6	28.2	31.9	29.4	0.782	4.6	78.82	13.84	7.34	200
Mookaiyur	MK 1	0.9	27.1	31.0	21.6	1.056	4.4	83.52	10.22	6.26	45
	MK 2	4.2	27.1	30.8	25.4	0.944	4.4	77.16	13.24	9.60	74
	MK 3	7.2	27.2	31.0	27.6	0.882	4.3	78.92	13.88	7.20	153
	MK 4	9.8	27.1	30.9	29.2	0.794	4.4	78.48	13.75	7.77	205
	MK 5	12.0	27.2	30.9	29.6	0.782	4.5	78.85	13.96	7.19	248
	MK 6	13.2	27.3	31.1	27.8	0.808	4.4	78.35	13.85	7.80	296
	MK 7	15.0	27.1	31.0	26.2	0.794	4.5	78.57	12.04	9.39	252
Valinokkam	VN 1	0.8	28.5	30.1	21.4	0.975	5.3	84.28	9.38	6.34	52
	VN 2	4.6	28.7	30.1	25.0	1.112	5.2	72.86	15.18	11.96	88
	VN 3	7.0	28.9	29.9	27.8	0.894	5.0	74.65	14.18	11.17	125
	VN 4	6.8	28.7	29.6	30.0	0.804	5.1	78.08	13.57	8.35	233
	VN 5	10.4	28.9	30.2	29.0	0.756	5.1	79.05	12.85	8.10	226
	VN 6	13.8	29.0	31.4	26.2	0.816	4.9	78.71	12.94	8.35	238
	VN 7	14.5	28.9	31.2	27.4	0.844	5.0	77.95	13.29	8.76	204

3.7 Organic Matter

Organic matter is composed of elements such as carbon, hydrogen, oxygen, nitrogen and sulfur. Organic matter enhances the nutritive content of the water and substrate and thus, favours the

development of *Ostracoda* and thus become a important controlling factor of abundance. In the present study area, the mean value of the organic matter content of a season varies from 0.829 to 0.936% (Table 1), the maximum value was recorded during October and the minimum

was recorded during April. The lower organic matter and higher calcium carbonate of the sediments favour the population abundance in Gulf of Mannar, off Tuticorin [17]. The Organic matter content of the sediments in the study area

shows a negative correlation, temporally with the total population of *Ostracoda* and spatially, > 0.7 and <0.8 % favours higher *ostracoda* population (Tables 4, 5 & 6).

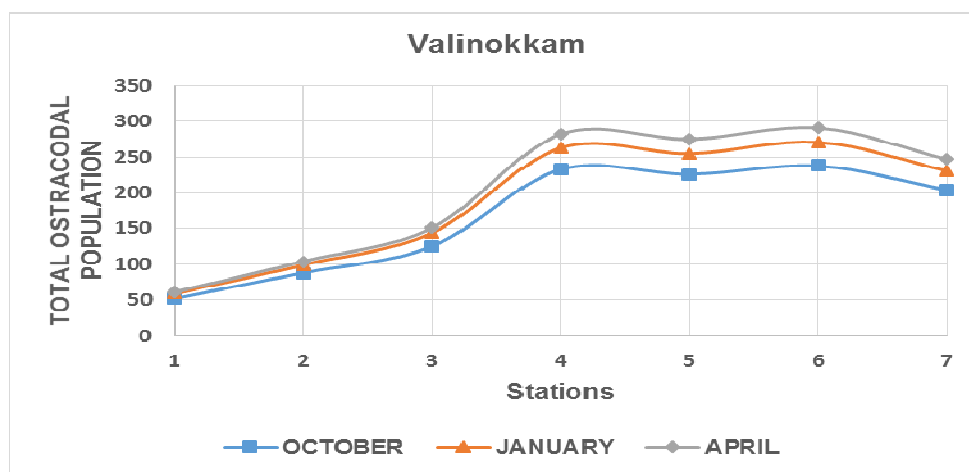


Fig. 5. Scatter plot showing the distribution of ostracodal population in different stations of valinokkam transect

Table 5. Sediment and bottom water parameters along with total population for the January season

Station name	Station NO.	Depth M	Temp °C	Salinity ppt	CaCo3 %	OM %	D/O ml/l	Sand %	Silt %	Clay %	Total population Nos.
Tuticorin	TP 1	1.2	27.4	29.8	22.4	1.544	5.2	69.20	17.64	13.16	47
	TP 2	2.8	27.9	30.2	23.7	1.160	5.1	72.16	14.62	13.22	125
	TP 3	3.7	27.8	30.4	26.4	0.924	5.3	74.55	13.71	11.74	127
	TP 4	5.1	27.5	30.3	27.8	0.846	5.2	75.68	12.75	11.57	306
	TP 5	6.9	27.5	30.4	28.4	0.820	5.1	75.23	12.83	11.94	289
	TP 6	9.2	27.7	30.5	27.6	0.836	5.3	74.26	13.84	11.90	307
	TP 7	11.8	27.8	30.5	27.3	0.848	5.4	76.68	12.38	10.94	257
Sippikulam	SK 1	1.0	27.6	30.2	23.2	1.228	4.9	79.54	10.22	10.24	101
	SK 2	3.1	27.4	30.4	25.6	1.172	4.9	73.45	14.12	12.43	127
	SK 3	4.2	27.4	30.4	27.5	0.914	5.0	74.42	13.82	11.76	180
	SK 4	5.8	27.5	30.6	28.0	0.822	5.1	75.18	13.85	10.97	368
	SK 5	7.1	27.6	30.5	27.8	0.873	5.0	73.18	14.82	12.00	292
	SK 6	9.5	27.6	30.4	28.4	0.804	4.9	75.29	13.10	11.61	275
	SK 7	11.7	27.8	30.6	28.5	0.780	5.1	78.06	11.98	9.96	234
Mookaiyur	MK 1	1.2	27.3	30.0	22.8	1.312	4.8	78.15	12.10	9.75	53
	MK 2	3.3	27.3	30.1	25.8	0.998	4.9	73.85	13.95	12.20	82
	MK 3	4.8	27.4	30.2	28.2	0.865	4.8	74.56	12.89	12.55	176
	MK 4	6.8	27.3	30.2	29.4	0.825	4.8	76.74	12.18	11.08	228
	MK 5	8.9	27.5	30.4	29.8	0.814	4.9	75.84	12.92	11.24	278
	MK 6	10.8	27.4	30.3	28.3	0.810	5.0	76.78	12.66	10.56	329
	MK 7	13.2	27.5	30.4	28.4	0.817	4.9	77.32	12.32	10.36	283
Valinokkam	VN 1	0.8	28.5	30.1	21.4	0.975	5.3	84.28	9.38	6.34	59
	VN 2	4.6	28.7	30.1	25.0	1.112	5.2	72.86	15.18	11.96	99
	VN 3	7.0	28.9	29.9	27.8	0.894	5.0	74.65	14.18	11.17	144
	VN 4	6.8	28.7	29.6	30.0	0.804	5.1	78.08	13.57	8.35	263
	VN 5	10.4	28.9	30.2	29.0	0.756	5.1	79.05	12.85	8.10	255
	VN6	13.8	29.0	31.4	26.2	0.816	4.9	78.71	12.94	8.35	271
	VN7	14.5	28.9	31.2	27.4	0.844	5.0	77.95	13.29	8.76	231

Table 1. Sediment and bottom water parameters along with total population for the April season

Station name	Station	Depth	Temp	Salinity	CaCo3	OM	D/O	Sand	Silt	Clay	Total Population
	NO.	M	°C	ppt	%	%	ml/l	%	%	%	Nos.
Tuticorin	TP 1	0.9	32.8	32.8	22.8	0.958	5.9	69.47	17.92	12.61	49
	TP 2	2.8	32.9	33.0	25.8	0.850	5.9	72.61	15.76	11.63	132
	TP 3	4.5	32.8	32.9	28.6	0.737	5.9	74.49	13.54	11.97	134
	TP 4	6.2	32.9	33.1	29.3	0.714	6.1	76.82	13.94	9.24	326
	TP 5	7.8	32.9	33.2	29.8	0.705	6.0	76.29	14.05	9.66	310
	TP 6	9.5	32.8	33.2	28.7	0.728	5.9	75.88	14.19	9.93	329
	TP 7	12.3	33.0	33.0	27.3	0.818	6.0	76.54	14.21	9.25	276
Sippikulam	SK 1	0.8	33.0	33.0	25.8	0.825	5.9	84.43	9.58	5.99	107
	SK 2	3.6	32.8	33.2	27.5	0.987	6.1	73.41	14.86	11.73	135
	SK 3	4.8	32.9	33.1	29.2	0.814	6.1	75.15	13.92	10.93	194
	SK 4	6.2	33.0	33.2	30.4	0.795	6.2	76.14	13.31	10.55	398
	SK 5	7.6	33.0	33.3	29.8	0.804	6.4	72.85	15.97	11.18	317
	SK 6	8.8	33.1	33.3	31.4	0.818	6.0	75.15	14.40	10.45	300
	SK 7	10.6	33.1	33.2	31.6	0.824	6.2	76.75	14.12	9.13	250
Mookaiyur	MK 1	1.0	32.9	33.0	22.5	0.882	5.9	83.87	9.40	6.73	54
	MK 2	4.5	32.8	32.8	28.2	0.980	5.8	75.78	13.24	10.98	85
	MK 3	7.0	32.8	33.0	31.4	0.838	5.8	76.08	14.88	9.04	183
	MK 4	8.8	32.9	32.9	32.0	0.746	5.9	78.24	13.75	8.01	244
	MK 5	11.6	33.0	32.9	31.6	0.754	6.0	77.91	12.88	9.21	297
	MK 6	13.4	33.1	33.1	30.6	0.822	5.9	75.67	14.12	10.21	351
	MK 7	14.6	33.1	33.0	30.4	0.843	5.8	74.77	13.61	11.62	302
Valinokkam	VN 1	1.0	32.2	33.2	23.2	0.932	6.2	84.45	9.71	5.84	61
	VN 2	3.6	32.5	33.1	27.8	0.896	5.9	73.46	14.87	11.67	104
	VN 3	6.1	32.6	32.9	30.4	0.912	6.1	74.29	13.89	11.82	151
	VN 4	7.8	32.8	33	31.6	0.801	6.2	76.14	13.81	10.05	282
	VN 5	10.5	33.0	33.2	30.8	0.751	6.1	77.94	12.57	9.49	275
	VN6	12.4	33.0	33.3	29.6	0.792	5.8	76.44	13.29	10.27	291
	VN7	14.3	32.9	33.2	30.2	0.881	6.1	76.05	14.06	9.89	247

4. SUMMARY AND CONCLUSION

The present work deals with the study of ecology and distribution of Recent *Ostracoda*, from the inner shelf sediments of Southern part of Gulf of Mannar. Sediment and bottom water samples were collected from 28 sampling stations, once in four months, for one year - representing, pre monsoon, winter and summer. Seven samples each were collected along four traverses, from off the coast of Tuticorin, Sippikulam, Mookaiyur and Valinokkam and the collection amounted to a total of 84 samples.

A systematic study of *Ostracoda* was lead to the recognition of 48 Ostracodal species belonging to 36 genera, 18 families, 5 superfamilies of 2 suborders. Among the 48 species, the following six species viz., *Loxocorniculam lillgeborgii*, *Mutilus pentoekensis*, *Neocytheretta murilineata*, *Neomonoceratina iniqua*, *Tenella gracilis* and *Xestoleberis variegata* are considered to be widespread and abundantly occurring since they are found as living in more than 90% samples collected and studied.

The present study shows that the samples collected in middle segment of all traverses record higher population. The total population is found to be maximum in summer (April) and minimum in the period of the winter (January). A correlation of the *ostracoda* population with known environmental factors reveals that, in general, a higher temperature, dissolved oxygen and salinity of bottom waters combined with higher CaCO₃ and moderate organic matter content of the substrate are congenial for maximum reproduction of *ostracoda* and thus resulting in abundance of population. Spatial distribution of the ostracodal population shows that the substrate with higher sediments fines (siltysand) provides a favorable niche for population abundance.

From the study, it is concluded that the faunal assemblage seems to be wholly consistent with deposition under tropical shallow water environment [29,30,31,32] with siltysand substrate. Depth, temperature, CaCO₃, salinity & do show a strong positive correlation with the ostracodal population. In the shore, the

ostracodal population was minimal due to wave agitation. It is concluded that in the present study area, the total population of *ostracoda* in the inner shelf environment is not controlled by single limiting controlling factor.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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