ABUNDANCE AND DIVERSITY OF POLYCHAETES IN THE INTERTIDAL ZONE OF MYEIK COASTAL AREAS*

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Abstract

A total of 120 polychaete species belonging to 89 genera and 35 families were collected from 10 intertidal zone of Myeik Coastal Areas (Light-house, Daung-kumaw, Kyauk-phya, Pahtaw-west, Masanpa ,Maing, Panataung, Done-pale-aw, Sha-aw and Kyun-mweyar) for a period of two years from June 2010 to May 2012. The most speciose family was spionidae (12species). Species belonging to families Capitellidae, Neredidae, Orbiniidae, Glyceridae and Lumbrineridae were abundant. Polychaetes ranged from 0 to 172 individuals collected with the highest count recorded in Light- house Station (1003 individuals with 72 species) and the lowest count in Pahtaw-west Station (66 individuals with 15species). The higher composition in order of abundance was *Glycera sp., Heteromastus similis* and *Notomastus fauveli*. The highest species diversity was found in Panataung Station (3.62), near mainland and Done-pale-aw Station (3.22) away from mainland. The lowest values for species diversity were recorded in Daung-kumaw Station (2.26) and Sha-aw Station (2.73).

Keywords: Abundance, diversity, intertidal zone, Myeik Coastal Areas and polychaetes

Introduction

Polychaetes or bristle worms are a group of segmented worm and the largest group of the phylum Annelida.”Polychaete” means “many hairs, refer to the chitinous hairs that protrude from either side of their bodies, with an identical set of hairs per segment. They are one of the most abundant and diverse group in marine environments. They occur from the intertidal areas to the deepest oceanic trenches. They are mainly free-living, while some are commensal and very few are parasitic. Some species reproduced asexually and some sexually. Generally, polychaetes are separated into two large orders Errantia (free-living) and Sedentaria (living in burrows or tubes). They assist the deposition, breakdown and turnover of the organic matter in the sea bed that help to recycle nutrients to the overlying water column. They are an important link in marine food-webs. Due to the high content of protein, both the adult and the larvae of polychaetes are the main food of many economically important fishes. Polychaetes are very useful as indicator organisms for monitoring the health of marine environment (Ananthan, 2005). Some polychaete worms have been used as fish baits and were excellent live food for shrimp and fish in aquaculture with the results that maturation and breeding rates are higher.

To date over 20,000 species of polychaetes have been described and they are classified into over 70 families (Hutchings, 1984). Literatures on polychaetes of the intertidal zone in Myanmar were very rare, almost not existence. Except Yan-Kyu *et al.* (1974) conducted on Mon State; so far there was no actual record on the intertidal polychaete of Myanmar.

Previous study on polychaetes along Myeik area was conducted by Si Thu Hein (2011). This paper outlined the preliminary results on the polychaete profile within zone of Myeik Coastal areas. The main objectives of this study were:1) To know what kinds of polychaete are present in Myeik Coastal Area, 2) To state the abundance and diversity of polychaete in the study areas and 3) To establish base line data for future study.

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Materials and Methods

Study areas

The study area is situated in Myanmar southern coastal zone, Tanintharyi Division. Myeik coastal land mass is surrounded by waters mixing with marine and brackish waters. A total of ten exposed soft sediment intertidal stations were selected, seven stations off Myeik area and three stations off Thayawthadangyi-kyun and its vicinity. Regular monthly collections were made at six stations (Light-house 12° 29´N & 98°35´E, Daung-kumaw 12° 24´N & 98° 36´E, Kyauk-phya 12° 30´ N & 98° 41´E, Pahtaw-west 12° 27´N & 98° 34´E, Masanpa 12° 24´N & 98° 30´E and Maing 12° 21´N & 98° 29´E) and seasonal collections at four stations (Panataung 12° 37´N & 98° 30´E, Done-pale-aw 12° 22´N & 98° 4´E, Sha-aw 12° 25´N & 98° 6´E and Kyun-mweyar 12° 21´N & 98° 4´E) for a period of two years from June 2010 to May 2012. The Location of the study areas were shown in Figure (1)**.**

Sampling procedure

Three replicate sediment samples for 10 stations at three different tidal zones (High-tide, Mid-tide and Low-tide levels) were collected using a shovel**.** Sediment samples were taken in bucket and mixed with water. Then the mixed water passed through a hand sieve with 2mm mesh. Big animals were picked out by hand and small animals by a pair of forceps. The sieved organisms were preserved with 5% formaldehyde solution and then transferred to the laboratory for further analysis. Binocular microscope and compound microscope with digital camera were used to identify and capture the image of polychaetes. Identification of species was based primarily on Day (1967); Hutchings (1984) and Ananthan *et al.* (2005)**.** In some cases specimens could not be identified up to the species level due to damaged or unresolved taxonomic problems. Numerical abundance of each species were recorded and expressed as no./m^2.

Water temperature, salinity and soil pH were measured by thermometer, refractometer and soil pH meter in the field. Species diversity, Evenness and richness of polychaete were calculated by using the formula of Shannon-Wiener (1963) diversity index (H'), Pielou's (1966) evenness index (E') and Margalef's (1968) richness index (D').

$$H' = -\Sigma\ Pi\ In\ Pi$$

$$E' = H'/ In\ S$$

$$D' = S-1 / In\ N$$

Where, Pi = the proportional abundance of the i^{th} species (n_i / N),

n = the number of individual of the i^{th} species,

N = the total number of individuals in a transect, and

S = the total number of species

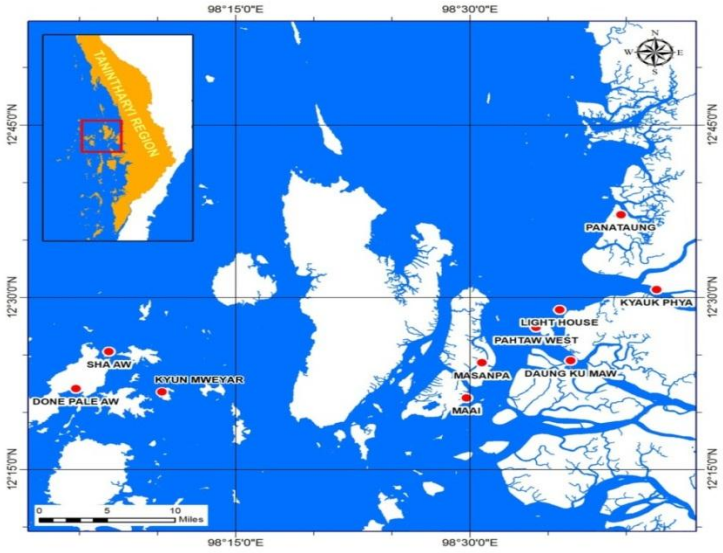

Figure 1 Map showing the specimen collecting sites in Myeik Coastal Areas.

Results

A total of 120 species of polychaetes belonging to 89 genera and 35 families were recorded. Errantia was represented by (49) species and sedentaria by (71) species. These species were from 15 families of errantia and 20 families of sedentaria.

Of the 49 species of errantia, the breakdown was as followed: 2 Amphinomidae, 1 Glyceridae, Goniadidae, Polyodontidae, Syllidae and Arabellidae each, 5 Hesionidae, 11 Nereidae, 7 Phyllodocidae, 3 Pilargidae, 4 Polynoidae, Eunicidae and Lumbrineridae, 2 Sigalionidae and Onuphidae. And the 71 species of Sedentaria: 5 species of Capitellidae, 8 species of Maldanidae and Orbiniidae each, 1 species each for Chaetopteridae, Cossuridae, Oweniidae, Magelonidae, Poecilochaetidae, Sternaspidae , Pectinariidae and Trichobranchidae, 4 species each for Cirratulidae and Serpulidae, 2 species each for Flabelligeridae and Ophellidae, Paraonidae and Ampharetidae, 3 species of Sabellidae, 12 species of Spinodae, 7 species of Terebellidae and 4 unidentified polychaete belonging to family Terebellidae, Hesionidae and probably Serpulidae.

Among them (98) species of polychaetes were found in Seven stations, near with Myeik mainland while (71) species were occurred along the Thayawthadangyi-kyun. The most speciose family was Spionidae (12 species), followed by Nereidae (11 species) .Only *Glycera sp.* occurred at all stations (406 individuals), with a density ranged from 2 to88 no./m^2 and was the most abundant at Light-house Station (88 individuals). *Heteromastus similis* was the second in abundant (307) with a density 0 to 180 no./m^2. *Notomastus fauvel* was the third abundant group (224) with an abundance of 0 to107 no./m^2. *Some were restricted in only one station such as Eurythoe sp, Syllidia sp, and Podarke sp*. The numerical abundance of polychaetes was generally high in Light- house Station (1003 individuals) for monthly data collection and Sha-aw Station (726 individuals) for five months seasonal collection. Panataung Station remained at second place in terms of abundance and species composition (628 individuals with 69 species). The composition differed at different stations. The highest species composition occurred in Light-

house Station (72 species) and Done-pale-aw Station (45 species). Pahtaw west (66 individuals with 15 species) and Kyun-mweyar (191 individuals with 27 species) Stations recorded the lowest abundance and lowest species composition.

The total abundance of polychaetes varied from 1 to 406 individuals. Near stations with Myeik mainland, polychaetes ranged from 0 to 141 individuals collected with the highest count recorded in Panataung Station (141no./m^2) in August 2011 and there was no records of polychaetes in Pahtaw-west Station (0 no./m^2) in March and August 2011. At away from mainland (Thayawthadangyi-kyun), polychaetes ranged from 31to 172 individuals collected with the highest count recorded in Sha-aw Station (172 no./m^2) and the lowest count in Kyun-mweyar Station (31 no./m^2) in September 2010. The monthly abundance and total abundance of polychaetes of ten stations was shown in Table (1). The abundance of each species from ten stations of Myeik Coastal Areas was shown in Table (2).

Family Nereidae was most abundant at Light-house Station. Capitellidae and Pilargidae were considerably abundant at Daung-kumaw and Kyauk-phya Stations. Glyceridae and Lumbrineridae were slightly higher in representation at Pahtaw-west. At Masanpa, Nereidae was very abundant. Glyceridae , Nereidae and Onuphidae showed their equal abundance at Maing Station. Maldanidae was very abundant in Panataung Station. Done-pale aw Station was dominated by Orbiniidae although Sha-aw was influenced by Capitellidae. Kyun-mweyar Station was also represented by Nereidae family.

Diversity index of polychaetes at each station were varied. The highest diversity (3.62) was recorded in Panataung Station followed by Light-house Station (3.56) and the lowest diversity (2.26) in Daung-Kumaw Station. At Thayawthadangyi-kyun, the highest diversity (3.22) was recorded in Done-pale-aw Station and the lowest diversity (2.73) in Sha-aw Station. Since Species diversity incorporates both the richness and an evenness property of the sample, the value of species richness and evenness indices mainly followed the trend of species diversity. Three diversity indices of polychaete of each station were shown in Table 3 and Figure 2.

Panataung Station is the most diversified sites and Spionidae family was the most diversified family with most representatives during the present study. On comparing the ten study areas for species evenness index high values were observed at Kyun-mweyar Staion and Panataung Station (0.86). At Sha-aw Station, the evenness in the distribution was comparatively low (0.74). So the polychaetes were not distributed with uniformity and indicating clear cut changes in the environmental conditions. The richness of the study areas varied from 2.62 to 10.55. Species richness measured by Margalef method was very low at Kyauk-phya Station (2.62).

Table 1 Monthly abundance (no./m^2) and total abundance of intertidal polychaetes in Myeik Coastal

Station	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
	2010												2011									2012				
Light-house	92	69	92	79	45	30	51	30	23	26	18	28	25	30	37	39	33	41	21	26	33	34	35	66	1003
Daung-kumaw	26	12	14	12	14	13	8	16	5	5	8	14	7	2	6	5	6	5	6	13	11	9	7	12	236
Kyauk-phya	19	22	12	14	27	22	14	17	28	24	21	19	18	26	14	19	11	24	11	16	18	16	12	20	444
Pathaw-west	3	3	6	1	3	2	5	2	2	0	2	2	2	5	0	2	2	1	4	3	4	5	1	6	66
Masanpa	25	18	20	27	5	15	5	9	4	8	10	24	14	10	24	7	8	12	5	1	14	11	7	20	303
Maing	25	39	27	20	18	15	11	17	17	17	13	13	17	13	23	12	12	11	15	14	16	3	25	19	412
Panataung			105				138			139					141				105						628
Done-pale-aw				110					139						81				102			54			486
Sha-aw				172					131						148				126			149			726
Kyun-mweyar				31					45						33				50			32			191

Table 2 Abundance of each polychaete species at different study areas

Sr.no	Family	Species	Light-house	Daung-Kumaw	Kyauk-Phya	Pahtaw-west	Masanpa	Maing	Panataung	Done-pale-aw	Sha-aw	Kyun-mweyar	Total
1	Amphinomidae	*Eurythoe sp.*	_	_	_	_	_	_	_	1	_	_	1
2		*Pseudoeurythoe sp.*	6	_	_	_	3	_	_	_	_	_	9
3	Glyceridae	*Glycera sp.*	88	41	75	22	48	62	51	10	7	2	406
4	Goniadidae	*Goniada sp.*	7	_	_	4	1	3	6	2	_	_	23
5	Hesionidae	*Leocrates sp.*	2	_	_	_	1	_	2	_	_	5	10
6		*Syllidia sp.*	_	_	_	_	_	_	2	_	_	_	2
7		*Telehsapia sp.*	9	6	6	2	2	3	_	_	_	_	28
8		*Ophiodromous sp.*	3	_	_	1	_	_	1	_	_	_	5
9		*Podarke sp.*	_	_	_	_	_	_	_	1	_	_	1
10	Nereididae	*Dendronereis sp.*	_	_	_	_	_	_	1	_	_	_	1
11		*Gymnonereis sp.*	29	_	_	6	_	_	28	45	56	23	187
12		*Laeonereis sp.*	4	_	_	2	_	_	4	9	8	6	33
13		*Namalycastis indicus*	4	_	_	_	1	_	_	_	_	_	5
14		*Namanereis sp.*	79	_	_	_	25	4	25	_	_	_	133
15		*Nereis sp.*1	9	1	7	_	8	7	14	8	8	_	62
16		*Nereis sp.*2	24	2	21	_	9	8	5	12	5	_	86
17		*Nereis sp.*3	129	_	_	_	12	30	1	_	_	_	172
18		*Nereis sp.*4	19	1	_	2	9	13	2	4	8	23	81
19		*Perinereis sp.*	29	_	_	_	_	_	_	_	_	_	29
20		*Ceratonereis sp.*	_	_	_	_	_	_	1	_	_	_	1

Table 2 Continued

Sr.no	Family	Species	Stations										Total
			Light-house	Daung-Kumaw	Kyauk-Phya	Pahtaw-west	Masanpa	Maing	Panataung	Done-pale-aw	Sha-aw	Kyun-mweyar	
21	Phyllodocidae	*Eteone sp.*	_	_	_	_	_	_	4	_	_	_	4
22		*Phyllodoce sp.*1	_	_	_	_	_	_	1	_	_	_	1
23		*Phyllodoce sp.*2	2	_	_	_	1	_	4	_	_	_	7
24		*Phyllodoce sp.*3	2	_	_	2	_	_	1	_	_	_	5
25		*Phyllodoce sp.*4	_	_	_	_	_	_	_	3	_	_	3
26		*Phyllodoce sp.*5	_	_	_	_	_	_	1	_	_	_	1
27		*Eulalia sp.*	4	_	_	_	1	2	_	_	_	_	7
28	Pilargiidae	*Ancistrosyllis sp.*	1	_	_	_	_	_	_	_	_	_	1
29		*Parandalia sp.*	7	15	19	_	6	7	_	_	_	_	54
30		*Pilargis sp.*	25	58	56	_	14	12	_	_	_	_	165
31	Polynoidae	*Polyeunoa sp.*	_	_	_	_	_	_	6	_	_	_	6
32		*Lepidonotus sp.*	1	_	_	_	_	_	_	1	_	_	2
33		*Iphione sp.*	_	_	_	_	_	_	_	_	_	1	1
34		*Harmothoe sp.*	_	_	_	_	_	_	_	_	1	3	4
35	Polyodontidae	*Polydontes sp.*	1	_	_	_	_	_	_	_	_	_	1
36	Sigalionidae	*Sagalion sp.*	_	_	_	_	_	_	1	_	_	_	1
37		*Sthelenalis sp.*	_	_	_	_	_	_	4	_	_	_	4
38	Syllidae	*Syllis sp.*	1	_	_	_	_	1	3	4	10	_	19
39	Capitellidae	*Heteromastus similis*	22	9	48	_	_	21	_	27	180	_	307
40		*Notomastus*	18	8	51			11	1	3	52	3	147

Table 2 Continued

Sr.no	Family	Species	Stations										Total
			Light-house	Daung-Kumaw	Kyauk-Phya	Pahtaw-west	Masanpa	Maing	Panataung	Done-pale-aw	Sha-aw	Kyun-mweyar	
41	Capitellidae	*Notomastus fauveli*	11	27	46	_	_	19	3	7	107	4	224
42		*Notomastus aberans*	6	33	21	_	11	4	13	_	_	2	90
43		*Pulliella sp.*	13	13	19	_	7	5	_	_	_	_	57
44	Maldanidae	*Axiothella sp.1*	28	_	_	_	_	_	28	6	_	10	72
45		*Axiothella sp.2*	1	_	_	_	_	_	_	_	21	_	22
46		*Euclymene quadrilobata*	13	_	_	_	_	_	38	3	_	_	54
47		*Euclymene mossambica*	_	_	_	_	_	_	6	_	_	_	6
48		*Euclymene annandalei*	15	_	_	_	_	_	33	2	13	_	63
49		*Euclymene luderitziana*	5	_	_	_	_	_	2	_	5	6	18
50		*Nicomache sp.*	_	_	_	_	_	_	15	3	_	_	18
51		*Petaloproctus sp.*	1	_	_	_	_	_	_	_	_	_	1
52	Chaetopteridae	*Phyllochaetopterus sp.*	1	_	_	_	_	_	_	_	_	1	2
53	Cirratulidae	*Cirriformia sp.*	_	_	_	_	_	2	32	18	11	_	63
54		*Cirratulus sp.*	4	_	_	_	_	_	2	27	_	_	33
55		*Tharyx sp.*	2	_	_	_	7	3	11	11	_	_	34
56		*Audouinia sp.*	2	_	_	_	_	_	_	5	_	_	7
57	Cossuridae	*Cossura sp.*	12	_	_	_	2	7	8	_	_	_	29
58	Eunicidae	*Marphysa sp.* 1	_	_	_	_	_	_	_	2	_	_	2
59		*Marphysa sp.* 2	12	_	_	_	_	_	_	24	67	34	137
60		*Marphysa sp.* 3	__-	-_	-_	-_	_-	_-	15	-_	-_	-_	15

Table 2 Continued

Sr.no	Family	Species	Stations										Total
			Light-house	Daung-Kumaw	Kyauk-Phya	Pahtaw-west	Masanpa	Maing	Panataung	Done-pale-aw	Sha-aw	Kyun-mweyar	
61	Eunicidae	*Eunice sp.*	_	_	_	_	_	_	_	_	_	2	2
62	Arabellidae	*Arabella sp.*	_	_	_	_	_	_	_	4	_	_	4
63	Lumbrineridae	*Lumbrinereis sp.*1	15	11	25	_	18	9	15	24	42	6	165
64		*Lumbrinereis sp.*2	6	_	_	3	2	_	10	37	19	13	90
65		*Lumbrinereis sp.*3	_	_	_	8	_	_	_	_	_	_	8
66		*Lumbrinereis sp.*4	7	5	9	_	5	4	9	_	_	_	39
67	Onuphidae	*Diopatra sp.*	45	_	_	_	8	51	23	5	6	_	138
68		*Onuphis sp.*	10	_	_	_	6	11	43	9	3	_	82
69	Flabelligeridae	*Pherusa sp.*	_	_	_	_	_	_	3	_	_	_	3
70		*Stylarioides sp.*	_	_	_	_	_	_	_	1	_	_	1
71	Magelonidae	*Magelona sp.*	9	_	_	_	_	3	_	_	_	_	12
72	Opheliidae	*Armandia sp.*	5	1	4	_	4	21	3	_	6	_	44
73		*Ophelina sp.*	12	_	2	_	7	8	4	_	_	_	33
74	Orbiniidae	*Orbina sp.*	4	_	_	3	_	_	2	9	_	_	18
75		*Haploscoloplos sp.*	1	_	_	_	_	_	18	_	_	_	19
76		*Scoloplos marsupialis*	56	_	_	_	3	33	_	21	7	_	120
77		*Scoloplos johnstonei*	13	_	_	_	_	_	1	_	_	_	14
78		*Scoloplos madagascariensis*	_	_	_	_	_	_	_	23	14	_	37
79		*Scoloplos armiger*	_	_	_	1	47	11	7	62	7	15	150
80		*Scoloplos sp.*	4	_	34	2	_	_	20	32	26	8	126

Table 2 Continued

Sr.no	Family	Species	stations										
			Light-house	Daung-Kumaw	Kyauk-Phya	Pahtaw-west	Masanpa	Maing	Panataung	Done-pale-aw	Sha-aw	Kyun-mweyar	Total
81		*Phylo sp.*	_	_	_	_	_	_	4	2	_	_	6
82	Paraonidae	*Aricidea sp.*	19	_	_	5	6	11	6	_	_	_	47
83		*Paraonis sp.*	11	_	_	3	6	4	2	3	_	2	31
84	Oweniidae	*Owenia sp.*	3	_	_	_	_	_	_	_	_	_	3
85	Sabellidae	*Potamilla sp.*	_	_	_	_	_	_	2	_	_	_	2
86		*Branchiomma sp.*	_	_	_	_	_	_	_	_	2	_	2
87		*Megalomma sp.*	_	_	_	_	_	_	1	_	_	_	1
88	Serpulidae	*Serpula sp.*	2	_	_	_	_	_	_	_	2	_	4
89		*Pomatoceros sp.*	_	_	_	_	_	_	_	_	_	2	2
90		*Hydroides sp.*	_	_	_	_	_	_	_	_	1	_	1
91		*Vermiliopsis sp.*	_	_	_	_	_	_	_	_	2	3	5
92	Spionidae	*Dispio sp.*	_	_	_	_	_	_	1	_	_	_	1
93		*Malacoceros sp.*	36	_	_	_	7	13	3	_	3	_	62
94		*Nerinides sp.*	18	5	1	_	10	1	2	3	1	_	41
95		*Orthoprionospio sp.*	_	_	_	_	_	_	1	_	_	_	1
96		*Spio sp.*	4	_	_	_	_	_	_	_	_	_	4
97		*Prionospio pinnata*	10	_	_	_	_	_	_	_	_	_	10
98		*P. malmgreni*	16	_	_	_	_	_	2	_	4	_	22
99		*P. sexoculata*	3	_	_	_	_	_	5	1	_	2	11
100		*P. steensterpuri*	1	-	-_	_-	-_	_-	_-	-_	-_	_-	1

Table 2 Continued

Sr.no	Family	Species	Stations										Total
			Light-house	Daung-Kumaw	Kyauk-Phya	Pahtaw-west	Masanpa	Maing	Panataung	Done-pale-aw	Sha-aw	Kyun-mweyar	
101	Spionidae	*Polydora caeca*	19	_	_	_	3	_	_	_	_	_	22
102		*P. flava*	_	_	_	_	_	_	_	1	_	_	1
103		*Pseudopolydora sp.*	4	_	_	_	_	_	_	_	5	_	9
104	Poecilochaetidae	*Poecilochaetus sp.*	10	_	_	_	_	5	29	_	_	_	44
105	Sternaspidae	*Sternaspis sp.*	2	_	_	_	2	3	_	_	_	_	7
106	Pectinariidae	*Pectinaria sp.*	_	_	_	_	_	_	3	_	_	_	3
107	Terebellidae	*Amaeana sp.*	_	_	_	_	_	_	19	_	4	_	23
108		*Lysilla sp.*	_	_	_	_	_	_	1	5	1	_	7
109		*Polycirrus sp.*1	_	_	_	_	_	_	2	_	_	_	2
110		*Polycirrus sp.*2	_	_	_	_	_	_	_	_	5	1	6
111		*Lanice sp.*	2	_	_	_	_	_	3	_	_	5	10
112		*Liomia sp.*	_	_	_	_	_	_	_	3	2	_	5
113		*Polymnia sp.*	_	_	_	_	_	_	_	_	_	6	6
114	Trichobranchidae	*Terebellides stroemi*	4	_	_	_	1	_	8	_	3	_	16
115		*Schistocomus sp.*	_	_	_	_	_	_	_	2	_	_	2
116	Ampharetidae	*Amphicteis sp.*	1	_	_	_	_	_	_	_	1	_	2
117	Terebellidae	Terebellid polychaete	_	_	_	_	_	_	1	_	_	_	1
118	Hesionidae	Hesionid polychaete	_	_	_	_	_	_	_	1	_	_	1
119		Sedentaria polychaete	_	_	_	_	_	_	_	_	1	_	1
120		Serpulid polychaete	_	_	_	_	_	_	_	_	_	3	3
	Total		1003	236	444	66	303	412	628	486	726	191	4495

Table 3 Total abundance and three diversity indices of intertidal polychaetes in Myeik Coastal Areas.

Sr. No.	Station	Number of Species	Abundance	Polychaete species		
				H´ (Diversity)	J´ (Evenness)	D (Richness)
1	Light-house	72	1003	3.59	0.84	10.27
2	Daung-kumaw	16	236	2.26	0.81	2.75
3	Kyauk-phya	17	444	2.49	0.88	2.62
4	Pahtaw-west	15	66	2.28	0.84	3.34
5	Masanpa	35	303	3.02	0.85	5.95
6	Maing	35	412	3.08	0.87	5.65
7	Panataung	69	628	3.62	0.86	10.55
8	Done-pale-aw	45	486	3.22	0.85	7.11
9	Sha-aw	40	726	2.73	0.74	5.92
10	Kyun-mweyar	27	191	2.82	0.86	4.95

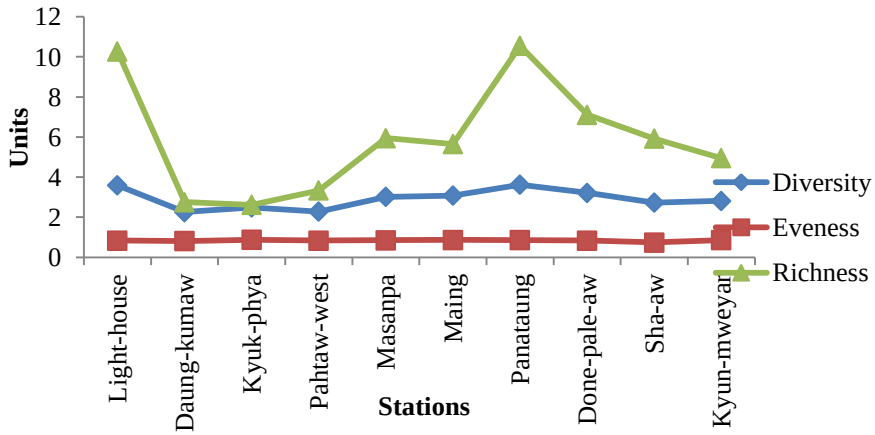

Figure 2 Three diversity indices of polychaetes from different stations of Myeik Coastal Areas.

Discussion

Polychaetes are the most important and abundant in the intertidal area. In the present study, 4495 individuals belonging to 120 species of polychaetes were collected from ten stations of Myeik Coastal Area. At near mainland, the highest abundance was recorded for Light-house Station (1003) followed by Panataung Station (628). The lowest abundance was recorded for Pahtaw-west (66). At away from mainland the highest abundance was recorded for Sha-aw Station (726) and the lowest abundance was recorded for Kyun-mweyar (191). While most of the species had limited distribution, some species showed wide distribution. Barrio Frojan *et al.* (2006) indicated that the variation in abundance of polychaete was probably caused by seasonal shift and environmental factors.

Three different terms of diversity indices (species richness, species evenness and species diversity) were used. The species richness (Margalef's index) is used to estimate the total number of species in a given area. The more the number of species, in a sample or the more species present in a species list of a given environment, the greater will be the species richness. High evenness occurs, when the species present are virtually in equal abundance, which, is conventionally equated with high diversity. The term species diversity is used for the number of species per number of individuals. The highest species diversity is possible when only one individual represents every species and the lowest diversity possible is when community consists of only one species (Soetaert and Heip 1990).

The highest number of species (72) was recorded at the Light-house sampling site. High values for species richness which were above 10 were recorded for Light-house and Panataung. The lowest values for species richness, which were less than 5, were recorded at Daung-kumaw, Kyauk-phya and Pahtaw-west. The high values for species diversity which were above 3 were recorded at Light-house, Masanpa, Maing , Panataung and Done-pale aw. The low values for species diversity (greater than 2) were recorded at Daung-kumaw, Kyauk-phya and Pahtaw-west, Kyun-mweyar and Sha-aw Stations.

The lowest species diversity and species richness were recorded at Daung-kunaw where the salinity was low due to freshwater inflow. The result of the present study indicated that at the sample site (Daung-kumaw Station) closer to the waste discharge point of the crab farm, the species richness as well as abundance of polychaete was low. At the sample site that was close to the human dwelling and fresh water inflow (Kyauk-phya Station), the species was less abundant. Besides, freshwater inflow might have contributed to low species diversity and species richness. At these two sites, Pilargids and Capitellids were widely distributed. Dahana Y Aka and Wijey Ara Tne (2006) described that Pilargids were widely distributed in the estuary. Low species composition and abundance at Pahtaw-west Station indicate the prevalence of stress condition due to dredging operations. The high species richness and species diversity of polychaetes were observed at Panataung and Light-house Stations. The high species richness and high diversity attributed to the more stable physical condition (Joydas and Damodaran 2001). Evenness values ranged from 0.74 to 0.88 during the two year's sampling. Evenness varied between 0.81 and 0.88 at near stations with mainland and indicating that species composition approached an equitable distribution.

Three indices at most stations were in the same parallel trend when the species diversity was high; the other two indices also positively followed. Highest species richness and diversity values were obtained from Light-house and Panataung attributing to the more stable physical conditions. Lowest species diversity and richness values were obtained from Daung-kumaw, Pahtaw-west and Kyauk-phya, suggesting poor environmental health due to anthropogenic activities.

Dean (2008) and Sukumuran and Devi (2009) revealed that decrease in species diversity led to increase in species dominance, because of effect of pollutants on the benthic environment. Low diversity and higher population density of a few organisms denote some major stress condition, which eliminated many species but promoted survival of a few. Lower H' value indicated poor environmental health. Sukumuran and Devi (2009) reported that in the good healthy environment Shannon diversity were higher than 2. And Barrio Frojan *et al.* (2006) revealed that H' values greater than 4 was considered as good as clean environment. In this study,

Light-house, Panataung and Done-pale aw Stations had diversity of > 3 and the remaining other stations had diversity of > 2. So it can be stated that the status of Myeik Coastal Areas indicate good healthy environment.

Conclusion

Near stations with Myeik city mainland were different the stations away from mainland in terms of species composition and abundance. A remarkable reduction in polychaete abundance and diversity was noticed at near three stations (Daung-kumaw, Pahtaw-west and Kyauk-phya) with Myeik city mainland due to waste discharge, fresh water inflow and anthropogenic activities. It is strongly believed that the present work will be valuable to be used as base line data to gauge any further change of polychaetes in Myeik Coastal Areas in some year to come.

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