Benthic polychaete off Tanintharyi Island, Myeik Archipelago

Zarni Ko Ko\textsuperscript{1} and Hnin Pwint Htwe\textsuperscript{2}

Abstract: The survey examined shallow to deep-sea benthic data on benthic fauna from the Myanmar coastal region’s northern sector. Benthic samples were collected from 17 stations (26-1500m depth) off Taninthary Island during the Myanmar ecosystem survey of the R/V Dr. Fridtjof Nansen Research Vessel. Polychaete (25 taxa in total) had a higher proportion than other groups of benthic fauna. The range of species diversity and evenness were insignificantly different, but species richness differed. The highest species diversity, species evenness, and richness were showed in shallow areas (26 m depth).

Key words: Diversity indices, Polychaetes, Taninthary Island, Myeik Archipelago.

Introduction

Polychaete is part of the old, a group that is longer than full and non-vertebrate. The polychaetes are multi-segment annelids with parapodia; setae are present in distinct fascicles. They are dioecious and have simple existing ducts from the gonad. They are usually marine, rarely fresh-water, and only rarely terrestrial or parasitic in their habitat. Any of these features needed not is present, and none of them is essential for the recognition of an animal as a polychaete.

Polychaetes are the dominant macrofaunal taxa in all marine sites from the intertidal region down to the deep ocean. They constitute more of the entire microscopic creatures in terms of the number of species and individuals. The lion’s share of the species is minimal and short-lived, showing a tall auxiliary generation. Consequently, they are a primary connection in marine nourishment networks and highlight necessarily within the diets of numerous bottom-feeding angles.

Being small-sized life forms, they play a pivotal part in biology and Environmental Impact Assessment (EIA) ponders. As numerous polychaetes are inactive, changes in their wealth and differences have been utilized in natural checking, especially in evaluating the estuaries’ wellbeing.

The present survey area, Taninthary Island, Myeik Archipelago, is located in the Southern part of the Myanmar Coastal Region. This benthic survey was the preliminary survey of the R/V Dr. Fridtjof Nansen Research Vessel on the parts of northern Myanmar. On 17 transections, bottom sediments were sampled at depths of 26m, 43m, 44m, 46m, 53m, 60m, 100m, 106m, 220m, 245m, 249m, 252m, 295m, 341m, 351m, 500m, 1000m, and 1500m (Table 1). The samples were taken with wire mounted Van Vee Grab, washed with sea-water in these two drawers, which included 5 mm sieve and 0.5 or 0.3 mm sieve and preserved by 4-8 % formalin or 96 % ethanol with 1 spoon of borax powder and put them into the 1-liter bottles. Species diversity indices for each sample were calculated using Shannon and Weaver\textsuperscript{4}.

Results and Discussion

A total of 25 genera of Polychaetes were recorded in the present study; 1 genus from Ampharetidae, 1 genus from He- sionidae, 3 genera from Capitellidae, 1 genus from Sabellariidae, 2 genera from Eunicidae, 1 genus from Lumbrineridae, 1 genus from Glycerida, 1 genus from Nephtyidae, 1 genus from Nereidae, 1 genus from Phyllodocidae, 2 genera from Polynoidae, 1 genus from Sabellidae, 1 genus from Sabellariidae, 1 genus from Maldanidae, 1 genus from Orbinidae, 1 genus from Paraonidae, 1 genus from Poecilochoetidae, 2 genera from Spionidae, 1 genus from Flabelligeridae, 1 genus from Terebellidae were described.

Materials and methods

The study area, Taninthary Island, Kyunsu Township, Taninthary Region, is located between Lat. 12°50’N & 10°10’N and Long. 98°15’E & 97°50’E. Samples of polychaetes were taken in June 2015 onboard the R/V Dr. Fridtjof Nansen Research Vessel on the parts of northern Myanmar Archipelago. On 17 transections, bottom sediments were sampled at depths of 26m, 43m, 44m, 46m, 53m, 60m, 100m, 106m, 220m, 245m, 249m, 252m, 295m, 341m, 351m, 500m, 1000m, and 1500m (Table 1). The samples were taken with wire mounted Van Vee Grab, washed with sea-water in these two drawers, which included 5 mm sieve and 0.5 or 0.3 mm sieve and preserved by 4-8 % formalin or 96 % ethanol with 1 spoon of borax powder and put them into the 1-liter bottles. Species diversity indices for each sample were calculated using Shannon and Weaver\textsuperscript{4}.

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About 25 polychaete species were identified from the studied areas, of which 19 taxa were identified from the shallowest water (26m depth), 4, 4, 1, 2, and 3 taxa of polychaetes from depths 44m, 46m, 53m, 60m, 66m respectively. And only 3 taxa of polychaetes were also identified form eleven sampling sites of deepwater, off Taninthary Island, Myeik Archipelago (Table 2). In 2013, 120 species of polychaetes were recorded in soft-bottom intertidal zones of Myeik coastal areas by War War Soe\textsuperscript{3}. Moreover, 31 species of polychaete were ob-

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1. Lecturer, Department of Marine Science, Mawlanyine University, Mon State, Myanmar.
2. MRes, Department of Marine Science, Myeik University, Myeik Taninthary Region, Myanmar.

Corresponding author: zmiko1446@gmail.com
Figure 1. Showing the sampling sites of the Tanintharyi Island, Tanintharyi Coastal Region.

Table 1. Sampling sites of the station Tanintharyi Island, Tanintharyi Coastal Region.

| Sites | Depth | Coordinates |
|-------|-------|-------------|
|       |       | Latitude (N) | Longitude (E) |
| 1     | 26m   | 12.6685      | 98.2115       |
| 2     | 44m   | 12.7392      | 98.1797       |
| 3     | 46m   | 12.6686      | 98.1233       |
| 4     | 53m   | 12.7182      | 97.9778       |
| 5     | 60m   | 12.6005      | 98.0052       |
| 6     | 66m   | 12.3254      | 97.8215       |
| 7     | 100m  | 12.5859      | 97.2501       |
| 8     | 106m  | 12.5703      | 97.104        |
| 9     | 220m  | 12.4747      | 96.9776       |
| 10    | 245m  | 12.5807      | 96.8462       |
| 11    | 249m  | 12.401       | 96.8741       |
| 12    | 252m  | 12.5564      | 96.9414       |
| 13    | 295m  | 12.5799      | 96.8469       |
| 14    | 341m  | 12.6166      | 96.7655       |
| 15    | 500m  | 12.536       | 96.6453       |
| 16    | 1000m | 12.5232      | 96.5123       |
| 17    | 15000m| 12.5155      | 96.4173       |
In the present survey, *Notomastus* was commonly found at 26m, 44m, 46m, 53m, and 500m depths in shallow and depth-water. *Heteromastus* was also found commonly at 26m, 46m, and 60m depths, respectively. *Paraonis* was only occurred at deepwater of 1000m depth. At survey depths: 100m depth (site 7), 220m depth (site 9), 245m depth (site 10), 249m depth (site 11), 252m depth (site 12), 295m depth (site 13), and 341m depth (site 14) were no observed any polychaete taxa.

Depth wise taxa composition in Tanintharyi Island was shown in Table 2 and Figure 3.

In the present study, Shannon diversity values for polychaetes were in the range of 0-2.79. The $H'$ for polychaetes in Myeik Archipelago and Dawei point was the range in 2.26-3.62 and 1.83-2.62, respectively. The range of evenness ($E'$), richness ($D'$) for polychaetes was 0-1 and 0-5.52, respectively. In Myeik Archipelago, $E'$ value was the range in 0.74-0.88, and $D'$ was War War Soe reported 2.62-10.55. Moreover, in Dawei's point, the values $E'$ and $D'$ were ranged in 0.77-0.88, and 2.33-6.16 was noticed.

Low diversity and a higher population density of a few organisms denote stress conditions, which practically eliminate many species but promote a few survival. Contrary to this, high diversity and lesser relative dominance of individual species characterize areas of relative environmental stability. In the present study, benthic production in terms of abundance and number of polychaete genera low in deepwater stations. Low diversity and lower benthic fauna at depth water stations indicated around the Dawei point, Tanintharyi Coastal Region.

### Table 2. Distribution of polychaetes at all sites of Tanintharyi Island, Tanintharyi Coastal Region.

| Sr. No. | Species name | 26 | 44 | 46 | 53 | 66 | 100 | 220 | 245 | 249 | 252 | 295 | 341 | 500 | 1000 | 1500 |
|---------|--------------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1.      | *Amphorhate* | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 2.      | *Leocrates*  | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 3.      | *Coptella*   | -  | +  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 4.      | *Heteromastus* | +  | -  | +  | -  | +  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 5.      | *Notomastus* | +  | +  | +  | +  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 6.      | *Lygdamis*  | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 7.      | *Ennace*     | -  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 8.      | *Magophyes*  | +  | -  | -  | -  | -  | +   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 9.      | *Lumbreniweis* | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 10.     | *Glycera*   | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 11.     | *Nephtys*   | -  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 12.     | *Naretis*   | -  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 13.     | *Phylliodie* | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 14.     | *Hemmothoe* | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 15.     | *Leptomanus* | +  | +  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 16.     | *Pomarella* | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 17.     | *Manelythus* | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 18.     | *Malonyce*  | +  | +  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 19.     | *Scoloplos* | +  | +  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 20.     | *Paraonis*  | -  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 21.     | *Poetochaenius* | +  | +  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 22.     | *Primoupio* | -  | +  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 23.     | *Siplo*     | -  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 24.     | *Diplocteria* | -  | +  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| 25.     | *Silophosita* | +  | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |

*Figure 2.* Composition, Abundance, Species Diversity, Eveness and Richness of polychaete in Tanintharyi Island.
cate stress conditions because of destructive fishing activities (trawling and purse seining) and dredging. Besides, fishers’ fishing activities, especially those living in a coastal area, can damage the bottom communities.

In the present study, high species diversity, species richness, species evenness of polychaetes were noticed at shallow water sites, low species diversity, low richness, and low evenness of polychaetes were noticed in depth beyond 86m. Species diversity index varied between 0.69 and 2.79. Sites 8, 15, and 16 showed the least species diversity of all sites that present only one genus. At stations 4 and 5, only 2 genera were occurred, showing the low richness of 1.44. In the other stations, the index varied from 0 to 5.52. On comparing for species, evenness distribution high values were observed at stations 2, 4, and 5. The study of polychaetes in the area showed a wide variation in distribution, abundance, and composition. This decrease in species richness and diversity of benthic fauna cannot be due to the lack of food, and the only factor that appears to be limiting is dissolved oxygen.

The study of benthos in the area showed a wide variation in distribution, abundance, and composition. This may be probably due to various biological and physicochemical environmental factors. Wide fluctuation in salinity and the nature of substratum and organic enrichment in the sediment are the critical factors restricting the abundance of benthos (Sheeba). The studies by Rosenberg and Jones and Candy suggested that the benthic fauna of dredged areas differs from that of non-dredged areas concerning species composition, abundance, and diversity.

### Table 3. Abundance of polychaetes at all sites of Tanintharyi Island, Tanintharyi Coastal Region.

| Sr. No. | Species name     | Depth in meter |
|--------|------------------|----------------|
| 1      | Ampharetaceae    | 26             |
| 2      | Leocrates        | 44             |
| 3      | Capitella        | 46             |
| 4      | Heteromastus     | 53             |
| 5      | Notomastus       | 66             |
| 6      | Lychnia          | 80             |
| 7      | Eunice           | 100            |
| 8      | Naris            | 126            |
| 9      | Phyllodoce       | 146            |
| 10     | Harmothoe        | 166            |
| 11     | Leptodactylus    | 186            |
| 12     | Potamilla        | 200            |
| 13     | Fistularia       | 220            |
| 14     | Scoloplos        | 240            |
| 15     | Paramonts        | 260            |
| 16     | Pseuderolatius   | 280            |
| 17     | Scoloplos        | 300            |
| 18     | Niphrus          | 320            |
| 19     | Nereis           | 340            |
| 20     | Nereis           | 360            |
| 21     | Dipleocoritus    | 380            |
| 22     | Streblomona      | 400            |

### Table 4. Composition, Abundance, Species Diversity, Evenness, and Richness of polychaete in Tanintharyi Island, Tanintharyi Coastal Region.

| Sites | Depth (m) | No. of taxa | Abundance | Diversity (H') | Evenness (E) | Richness (R') |
|-------|-----------|-------------|-----------|----------------|--------------|---------------|
| 1     | 20        | 19          | 20        | 2.79           | 0.93         | 3.52          |
| 2     | 44        | 4           | 4         | 1.39           | 1.00         | 2.17          |
| 3     | 46        | 4           | 6         | 1.30           | 0.54         | 1.67          |
| 4     | 53        | 1           | 1         | 0              | 0            | 0             |
| 5     | 60        | 2           | 2         | 0.69           | 1.00         | 1.44          |
| 6     | 66        | 3           | 3         | 1.10           | 0.91         | 1.82          |
| 7     | 100       | 0           | 0         | 0              | 0            | 0             |
| 8     | 106       | 1           | 1         | 0              | 0            | 0             |
| 9     | 220       | 0           | 0         | 0              | 0            | 0             |
| 10    | 245       | 0           | 0         | 0              | 0            | 0             |
| 11    | 269       | 0           | 0         | 0              | 0            | 0             |
| 12    | 292       | 0           | 0         | 0              | 0            | 0             |
| 13    | 295       | 0           | 0         | 0              | 0            | 0             |
| 14    | 341       | 0           | 0         | 0              | 0            | 0             |
| 15    | 500       | 1           | 1         | 0              | 0            | 0             |
| 16    | 1000      | 1           | 1         | 0              | 0            | 0             |
| 17    | 1500      | 0           | 0         | 0              | 0            | 0             |
Figure 3. Polychaetes: 1) Amphiparete, 2) Leocrates, 3) Capi-tellia, 4) Heteromastus, 5) Noto-mastus, 6) Lygdamis, 7) Eunice, 8) Morphyx, 9) Lumbrineris, 10) Glyceria, 11) Nephtys, 12) Nereis, 13) Phylloclace, 14) Harmothoe, 15) Lepidonotus, 16) Potamila, 17) Idanthyrsus 18) Maldane, 19) Scoloplos, 20) Paraonis, 21) Poe-cilochaetus, 22) Prionospio, 23) Spio, 24) Diplocirrus, 25) Streblosoma. Scale bars= 1.5 mm
Conclusions

The recorded specimens comprised 25 taxa of polychaetes and some taxa of arthropods. Echinoderm and mollusks were removed because most are dead shells. Among the benthic fauna, polychaetes were the most dominant taxa from the present survey. Site 1 (26m depth) showed the highest abundance of benthic fauna (polychaetes) in terms of number and genera. In the present study, benthic production in terms of abundance and the number of genera low in deepwater stations. It can be stated that low diversity and a lower number of benthic fauna at deepwater stations indicate stress conditions because of destructive fishing activities and dredging. This study supports as baseline data for future monitoring programs in the area.

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