SPECIES COMPOSITION AND ABUNDANCE OF AMPHIPODS FROM SEAWEEDS AND SEAGRASSES OF THE SOUTHERN RAKHINE COAST

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Abstract

A total of 25 species of amphipod were recorded from the southern Rakhine Coast. *Elasmopus palu*, *E. pectenicrus*, *Hyale crassicornis* and *H. galateae distorta* were by far the most numerous and widespread species at all stations. The composition of amphipod fauna was higher in seaweed habitats than the others. *Maera quadrimana* and *M. serrata* were recorded only on *Halimeda opuntia* and *Gracilaria canaliculata*. *Melita zeylanica* showed the common occurrence on all habitats. *Parelasmopus suensis* was recorded only on *Gracilaria canaliculata*. The highest abundance of amphipod at all stations was observed from November to March and the lowest from June to September. The abundance and species composition of amphipod were related to the algal blooming periods.

Keywords Amphipod, abundance, composition, algal blooming period

Introduction

Amphipods are peracarid crustaceans that are divided into four suborders, Gammeridea, Hyperiidea, Caprellidea and Ingolfiellidea. The arrangement of the thoracic legs into forward and backward direction is one of the unique features of amphipods. A second unique characteristic is the biramous swimming legs (pleopods) and the thrusting legs (uropods).

The gammaridean amphipods are the dominant group of pericaridan crustaceans. Gammarid amphipods are small in size (1-8 mm), shrimp like crustaceans. The gammarideans, which are mostly free-living, occupy a wide variety of habitats; in rocky crevices, on coral rubble, on algae and seagrasses, burrowing in sediment, living in fixed or mobile tubes and living in invertebrate hots. Gammarid amphipods are important food items for fish and seabirds. They constitute a significant part of the demersal plankton, and inhabit every available substrate. A number of species are associated with seaweeds. Many species are found among the various crevices of live coral and coral rubbles in reef complexes. Amphipods are distributed according to the habitats, availability of food supplies and feeding methods. They are important in marine food web as secondary consumers.

This study is firstly record concerned with marine amphipod for these areas. Moreover, the research papers studied on marine amphipods from Myanmar coastal areas are very rare. The objective of this study was to know the seasonal composition and abundance of amphipod fauna of the seaweeds and seagrasses from the southern Rakhine coast.

Materials and Methods

The study areas, Poelaung Gyaing (Lat. 17° 12' N and Long. 94° 31' E), Wetthay (Lat. 17° 10' N and Long. 94° 28' E), Magyi (Lat. 17° 5' N and Long. 94° 27' E) Chaungtha (Lat. 16 º 57' N, Long. 94º 26' E) and Ngwesaung (Lat. 16° 52' N and Long. 94° 22' E), were situated in the Ayeyarwady Region, southern part of Rakhine coast. Sampling location from the study areas are shown in Fig. 1. Amphipod samples were collected from June, 2013 to May, 2015.

Seaweed and seagrass samples were collected by placing a 1 m x 1 m quadrat within 10 m interval along 100 m transect line and removing all the samples by scraping. The samples were quickly transferred to the 120 µm net. Plants are rinsed thoroughly with water and shaken

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to dislodge the fauna from them. After sieving, the specimens were preserved in 5% formalin and rose-bengol solutions for further analysis and identifications. The amphipods in these substrates tended to move very fast so the samples of these substrates were collected by hand and quickly transferred to a plastic bag. A small amount of 5% formalin was added and the plastic bag was tied and transported to the laboratory. Amphipod samples were analyzed under compound and stereomicroscope to species level as possible. Species identification was made by using Barnard and Karaman 1991, Myers 1981 and 1985.

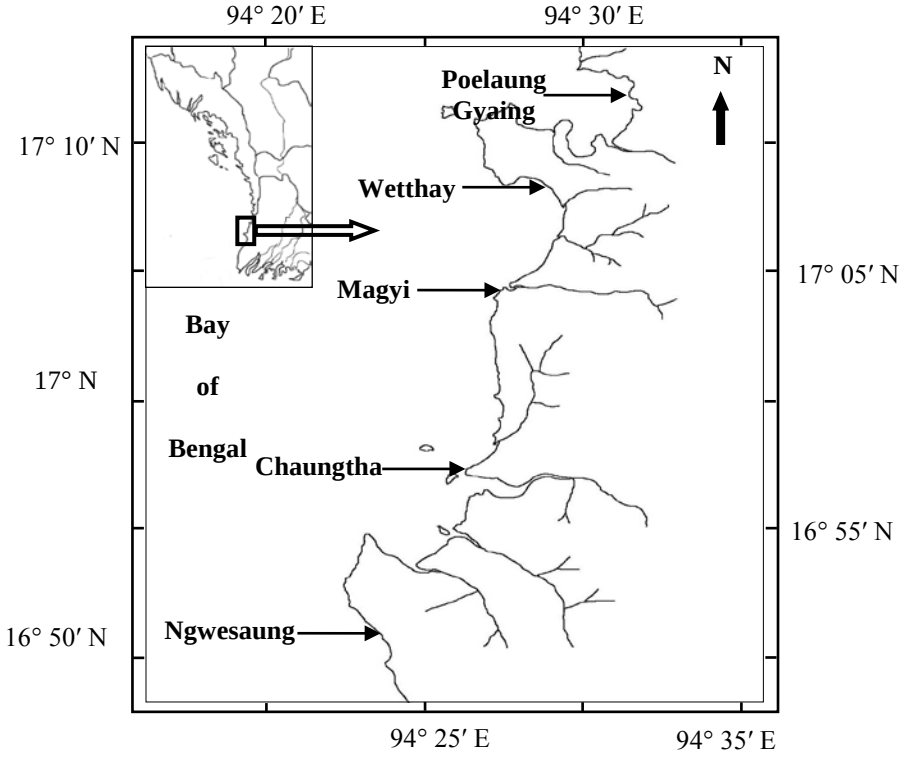

Figure 1 Map showing the sample collection sites of the study areas.

Environmental parameters

The seasonal variations of sea surface temperature and salinity of the study areas was shown in (Fig. 2). The seasonal range in temperature varied from 27°C to 36.5°C in Ngwesaung, 26.9°C to 32.1°C in Chaungtha, 26.9°C to 31.5°C in Magyi, 26.9°C to 31.5°C in Wetthay and 26.5°C to 32.1°C in Poelaung Gyaing. The salinity range was 23.3 ‰ to 33 ‰ in Ngwesaung, 23.3 ‰ to 34 ‰ in Chaungtha, 23.3 ‰ to 32 ‰ in Magyi, 24.3 ‰ to 33.6 ‰ in Wetthay and 25.5 ‰ to 33.1 ‰ in Poelaung Gyaing. (Fig. 2).

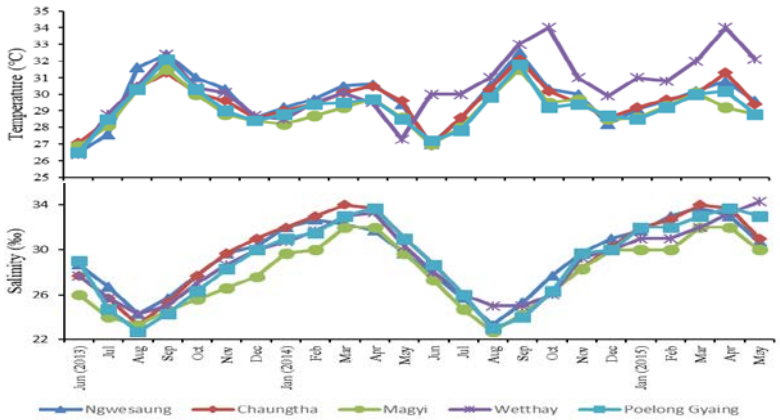

Figure 2 Seasonal changes of sea surface temperature and salinity at sampling stations.

Results and Discussion

Species compositions and abundance

A total of 25 species of amphipod belonging to 19 genera of 12 families were identified from all studied areas of the southern Rakhine coast. Family Gammaroidae was represented by 6 species, followed by Hyalidae with 4 species, Aoridae with 3 species, families Ampithoidae, Isaeidae, Leucothoidae with 2 species each and families Dexaminidae, Eophliantidae, Ischyroceridae, Lysianassidae, Phliantidae, Pleustidae with 1 species respectively. The distribution of amphipod species from the studied areas was shown in Table. 1.

Table 1 Distribution of amphipod species from the studied areas

No.	Name	Ngwesaung	Chaungtha	Magyi	Wetthay	Poelaung Gyaing
1.	*Ampithoe ramondi*	+	+	+	+	+
2.	*Cymadusa imbroglio*	-	+	+	+	+
3.	*Globosolembos ovatus*	+	+	-	-	-
4.	*Bemlos unicornis*	+	+	+	+	+
5.	*B. aequimanus*	-	+	-	+	-
6.	*Paradexamine rewa*	-	+	+	+	+
7.	*Bircenna dronga*	+	+	+	+	+
8.	*Hyale crassicornis*	+	+	+	+	+
9.	*H. galateae distorta*	+	+	+	+	+
10.	*H. rubra*	+	+	+	+	-
11.	*Parhyale hawaiensis*	+	+	+	+	-
12.	*Gammaropsis atlantica*	+	+	+	+	+
13.	*G. digitata*	+	+	-	+	-
14.	*Erichthonius brasiliensis*	-	+	-	+	-
15.	*Leucothoe diemenensis*	-	-	+	+	-
16.	*Leucothoella bannwarthi*	-	-	-	+	-
17.	*Parambasia nui*	+	-	-	-	-
18.	*Melita zeylanica*	+	+	+	+	+
19.	*Elasmopus palu*	+	+	+	+	+
20.	*E. pectenicrus*	+	+	+	+	+
21.	*Maera quadrimana*	+	+	+	+	+
22.	*M.serrata*	+	-	+	+	-
23.	*Perelasmopus* sp.	-	-	+	+	-
24.	*Pereionotus alaniphlias*	-	-	-	+	+
25.	*Parapleustes pulchellus*	+	+	+	+	+
	Total	17	19	18	23	14

The highest numbers of species were found in Wetthay station. The lowest was in Poelaung Gyaing station. *Ampithoe ramondi*, *Bemlos unicornis*, *Bircenna dronga*, *Hyale crassicornis*, *H. galateae distorta*, *Gammaropsis atlantica*, *Melita zeylanica*, *Elasmopus palu*, *E. pectenicrus*, *Maera quadrimana* and *Parapleustes pulchellus* were common at all stations. *Leucothoella bannwarthi* was only found in Wetthay station and *Parambasia nui* was recorded only in Ngwesaung station. Joseph (1978) recorded that 26 species of amphipods from 19 species of algal habitats. Seven species of six families of gammarid amphipod were recorded from seagrass beds of Libong Island, Trang Province, Thailand. Mondal *et al.* (2010) were identified 29 species of amphipods from all the nine habitats of southeast coast of India.

Ampithoe ramondi, *Bemlos unicornis*, *Bircenna dronga*, *Hyale crassicornis*, *H. galateae distorta*, *Gammaropsis atlantica*, *Melita zeylanica*, *Elasmopus palu*, *E. pectenicrus*, *Maera quadrimana* and *Parapleustes pulchellus* were dominated at all stations. The genera *Ampithoe* and *Cymadusa* were abundant in most of the algae and seagrass environments (Edgar 1983). *Ampithoe ramondi*, *Gammaropsis atlantica*, *Elasmopus pectenicrus* and *Erichthonius brasiliensis* were known to be circumtropical species (Appadoo 1997).

In the mean abundance of amphipod, its range from 50-150 ind/m^2 at Ngwesaung, 84-184 ind/m^2 at Chaungtha, 57-120 ind/m^2 at Magyi, 54-137 ind/m^2 at Wetthay and 24-72 ind/m^2 at Poelong Gyaing respectively (Fig. 3 and 4).

In the present study, the composition of amphipod fauna was higher numbers in seaweed habitats than the others (Table. 2). The melitids of the genus *Elasmopus* was commonly distributed on all seaweed. Appadoo (1997) stated that *Elasmopus pectenicrus* and *E. brasiliensis* have a high percentage frequency of occurrence only on algae. Moreover, the species occurring mainly on plant substrates (seaweed and seagrass) were *Maera quadrimana*, *Melita zeylanica*, *Gammaropsis atlantica*. *Ampithoe ramondi* was also found on coral rubble. Rao (1975) indicated that *Maera* and *Hyale* species were commonly distributed in the intertidal zone of the Indian coast.

It can be seen that amphipod species were also unevenly distributed in different seaweeds and seagrasses. The Hyalidae, *Hyale crassicornis*, *H. galateae distorta*, *H. rubra* and *Parhyale hawaiensis* were recorded on almost all the algae except for *Ulva* species. Their occurrence was coincided with the branched and complex type of seaweeds. The melitids of the genus *Maera* found only on a few species of algae. *Maera quadrimana* and *M. serrata* were recorded only on *Halimeda opuntia* and *Gracilaria canaliculata*. *Melita zeylanica* showed the common occurrence on all habitats. *Parelasmopus suensis* was recorded only on *Gracilaria canaliculata* among the others.

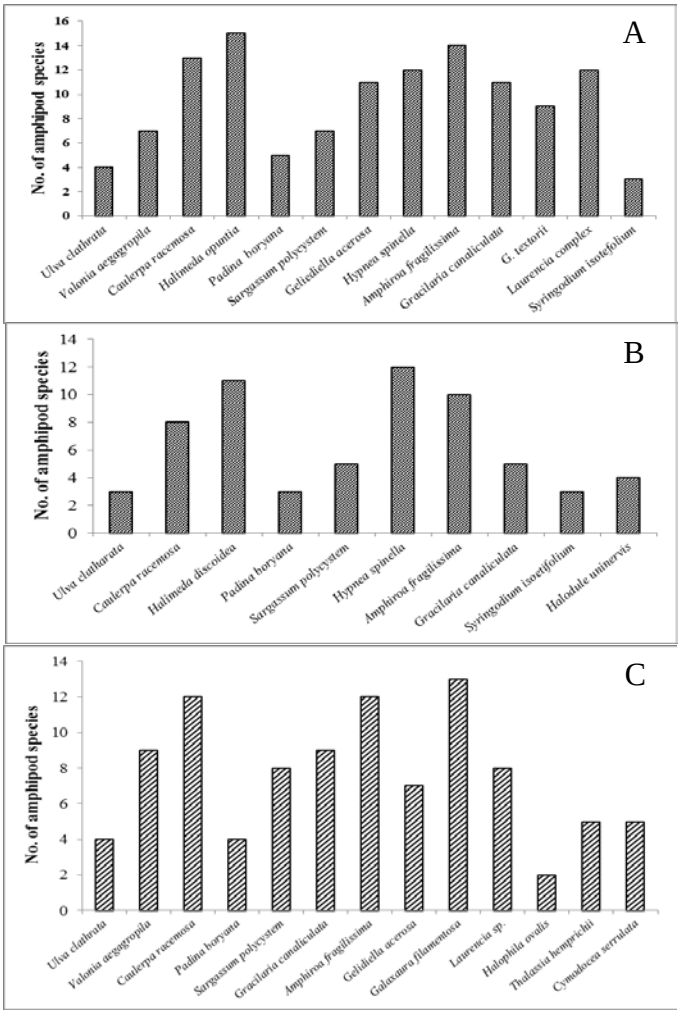

Figure 3 Distribution of ampipods on different seaweeds and seagrasses from (A) Ngwesaung, (B) Chaungtha, (C) Magyi.

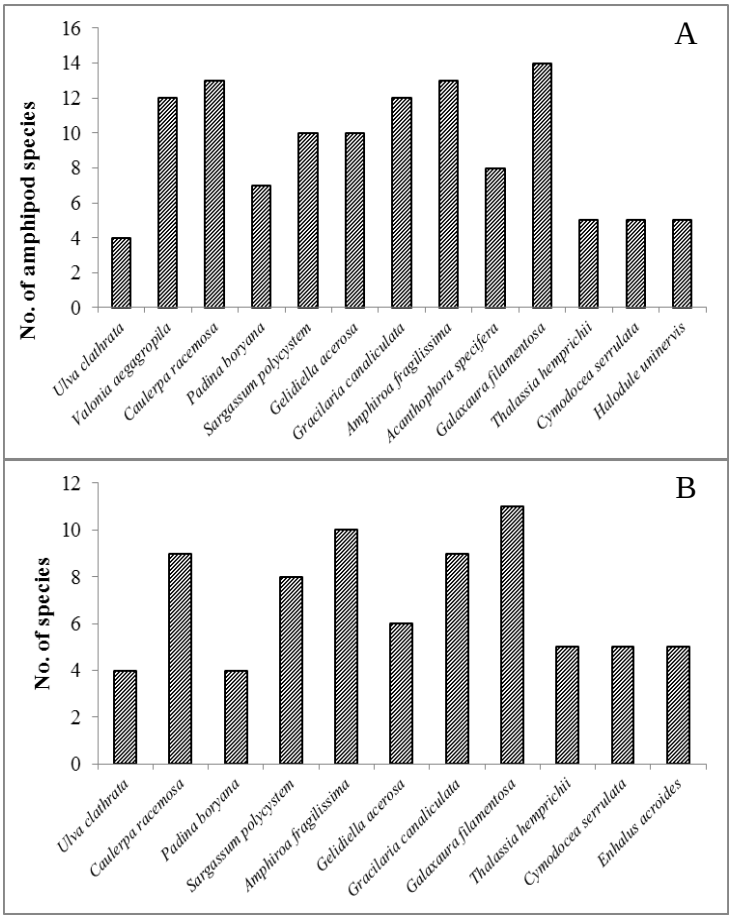

Figure 4 Distribution of ampipods on different seaweeds and seagrasses from (A) Wetthay, (B) Phoelaung Gyaing.

Ampithoe ramondi was commonly found on all algae whereas *Cymadusa imbroglio* only on a few algal categories. Ampithoids are the dominant groups that commonly herbivorous and prefer vegetative ecosystem such as seagrass bed and algae bed (Barnard 1970 and Myers 1985). Among the isaeid, *Gammaropsis atlantica* and *G. digitata* were observed only on *Caulerpa racemosa*, *Amphiroa fragilissima* and *Gelidiella acerosa*. Viejo (1999) observed that the gammarid amphipods were the most abundant group on both *Cystoseira* and *Sargassum*. The composition and density of the phytal fauna is influenced by the structure, texture, colour and the physical and developmental stage of alga. (Sarma and Ganapati 1972). In the present study, *Hyale* sp. was the abundant group of the algal habitats. Buschmann (1990) stated that the amphipods inhabit the algal resources as a refuge.

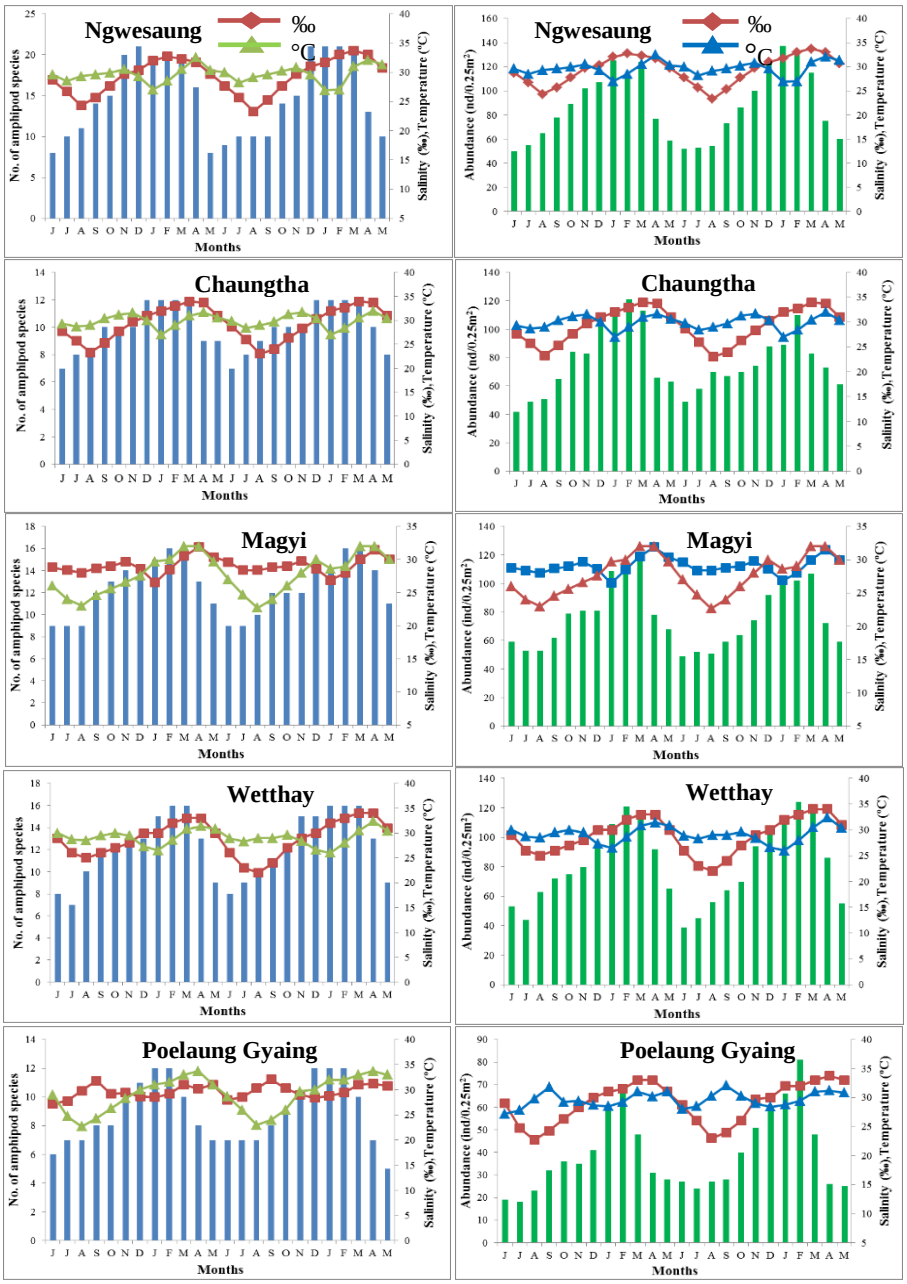

Figure 5 Comparison between species composition and abundance of amphipods in different salinity and temperature.

The Aoridae, *Bemlos unicornis* and *B. aequimanus* distributed only on some algal species. *B. aequimanus* was observed only in *Caulerpa racemosa* and *Amphiroa fragilissima*.

Seasonal variation of species composition and abundance of amphipod are shown in Fig. 5. It can be seen that both the composition and abundance of amphipod are higher in November to March but lower in June to September. This result is also coincident with the period of algal bloom. Soliman et. al., (2005) indicated that the abundance of macroalgae was the most important factor influencing amphipod distributions. Several studies have demonstrated that the assemblage structure of epibenthic marine fauna was influenced by the habitat heterogeneity and complexity (Edgar 1983).

As seen in Figure 5., the species composition and abundance of amphipods was correlated with the increasing salinity in all stations. In general, the increased number of species was coincided with the gradually increased of salinity at all stations. Moreover, the low salinity periods were also noticed that the species composition of amphipod was decreased. But the effect of temperature was not influenced markedly on species composition and abundance of amphipods. In all stations, the abundance of ampipod was also related to the salinity regime of the study sites. The high salinity period from December to March was resulted in an increased in abundance of amphipod.

Conclusion

A total of 25 species of amphipod were recorded from the studied areas. *Elasmopus palu*, *E. pectenicrus*, *Hyale crassicornis* and *H. galateae distorta* were by far the most numerous and widespread amphipods at all stations, very widespread were also *Ampithoe ramondi*, *Melita zeylanica*, *Maera quadrimana* and *Parapleustes pulchellus*. The composition of amphipod fauna was higher numbers in seaweed habitats than seagrasses and unvegetated habitats. *Elasmopus* sp. was the most abundant group at all stations. The abundance and species composition of amphipod were related to the algal blooming periods. The result of this study indicated that the seaweed and seagrass habitats and their complexity are important for the amphipod fauna. Amphipod and other associated epifauna provide tropic links between primary producers and predatory fishes. Consequently, understanding the role of seaweed and seagrass dominated habitats is necessary and these plants should not be destroyed through human activities like harvesting of seaweeds and seagrasses from their natural habitats, coastal developments, recreational activities and beach cleaning activities that can deplete valuable seaweeds and seagrasses from the coast.

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