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Associated faunas of seaweeds and seagrasses in the Southern Rakhine coastal zone

Abstract

A total of 62 taxa of associated faunas were recorded from seaweeds and seagrasses of Southern Rakhine coastal zone. The percentage of associated faunal composition was represented by 55% of Annelida, 27% of Arthropoda, 11% of Mollusca and others. Polychaetes and amphipods were constituted the highest number of species among the other groups. Seaweeds were more favourable for syllid polychaetes than seagrass. *Melita zeylanica* and *Maera quadrimana* were commonly distributed in both habitats at all stations. *Paradexamine rewa* was only recorded from seagrasses of Wett hay station. The associated faunas were more favourable to inhabit in seaweeds than seagrasses. The composition and distribution of associated faunas were varied with seaweeds and seagrasses according to their different structure of plants, types of substrate and sediment retention capacity.

Keywords: associated faunas, amphipods, polychaetes, seaweed, seagrass, Southern Rakhine coast

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Introduction

Marine environments, such as mangroves, coral reefs, seaweeds and seagrasses, are important for marine organisms. Seaweed and seagrass habitats support as the primary producer to link with higher trophic level in the marine food chain. Not only their physical structure (blades and leaves) provides food for invertebrate and vertebrate grazers but their highly organic content substrate persuades to detritus and deposit feeders. The diversity and abundance of benthic fauna may vary based on their habitat preference. Anandavelu[1], Sarma & Ganapati[2], Sarma et al.,[3] Jansi & Ramadhas[4] found that the physical and developmental state of algae affected on the composition and abundance of phytal fauna. Moreover the capacity of sediment retaining of the algae was also influenced on the density of some organisms like foraminiferans, polychaetes and nematodes. Naufal & Padmavati[5] also stated that the plant morphology of different seagrass species influence on associated faunal communities.

Benthic faunal studies on different substrate (sand, mud and mangrove swamp) were made from the different coastal regions of the world. But those on the micro- and macrobenthic fauna associated with seaweeds and seagrasses were little. Ranjitham et al.,[6] studied the associated fauna of seaweeds and seagrasses in Vellar estuary. Jansi and Ramadhas[4] recorded the diversity of fauna associated with four different species of seaweeds of Manakkudy estuary. Jaya et al.,[7] reported the diversity of meiofauna associated with nine different species of algae at Visakhapatnam coast. Azhagu et al.,[8] recorded twenty-one species of associated fauna in *Chaetomorpha aerea.* Muralikrishnamurty[9] studied the distribution of phytal macro and meiofauna on nine species of intertidal algae off Gangavaram, East coast of India. In Myanmar, Ei Ei Mon[10] studied the invertebrate fauna associated with red seaweed, *Laurcencia* sp. from Setse and Kyaikkhami coastal areas. The objective of this study is to know the species composition and distribution of associated fauna inhabited in the seaweeds and seagrasses from the Southern Rakhine coastal zone.

Materials and Methods

The study areas, Chaungtha (Lat. 16º57'N, Long. 94º26'E), Magyi (Lat. 17˚5'N and Long. 94˚27'E) and Wetthay (Lat. 17˚10'N and Long. 94˚28'E), were situated in the Ayeyarwaddy Region, Southern part of Rakhine coast. Sampling location from the study areas are shown in Figure 1. Seaweeds and seagrass samples were collected randomly from each station at low tide. A PVC frame of 50cm x 50cm was placed over the area covered by seaweeds and seagrasses and the contents of which are picked up and kept immediately in plastic bag separately and preserved in 5% of formaldehyde and seawater. Plants are rinsed thoroughly with water and shaken to dislodge the fauna from them. The specimens were taken into a Petri dish and carefully examined under a binocular microscope. The faunas (polychaetes, mollusks, amphipods, isopods) are identified to genus or species level as possible and others are group (phylum) level in the laboratory by using compound microscope. The identifications are followed by Barnard[11,12] Dance[13] Day[14] Fish and Fish[15] Myers.[16]

Results and Discussion

The investigation of associated fauna from three stations of Southern Rakhine coastal zone showed that the presence of a high diversity polychaetes and amphipods. Moreover, a number of isopods, gastropods and ostracod were also recorded. In the present study, a total of 62 species of associated faunas were recorded in seaweeds and seagrasses from three stations (Table 1) (Figures 2-63). Of these, 34 species of polychaetes, 9 species of amphipods, 7 species of mollusks, 4 species of isopods, 2 species of tanaids and 1 species of Platyhelminthes, Nemartina, sipunculid and echinoderm respectively. The percentage of faunal composition was represented by 55 % of Annelida, 27% of Arthropoda, 11 % of Mollusca and others. Jaya et al.,[7] recorded 18 diverse taxa of meiobenthos from the different species of algae at Visakhapatnam coast. The rich variety of nematodes, harpacticoids, amphipods, polychaetes, ostracods and gastropods were revealed from the four species of algae in Vellar estuary by Ranjitham et al.,[16] Azhagu Raj et al.,[8] Muralikrishnamurty[9] found that associated faunal groups like isopods, gastropods, polychaetes and amphipods were high number in the intertidal algae off Gangavaram coast. Azhagu Raj[8] recorded twenty one species of seaweed associated fauna from Pulicat estuary.

Table 1 Classified list of associated faunas

Phylum	Class	Order	Family	Genus	Sr.No.	Species
Platyhelmi-nthes	Turbellaria	Polycladida	Leptoplani-dae	*Leptoplana*	1.	*Leptoplana* sp.
Sipunculid-ae					2.	Sipunculid worm
Nemertina	Anopla				3.	Nemertine sp.
Annelida	Polychaeta	Phyllocida	Polynoidae	*Paralepidonotus*	4.	*Paralepidonotus* sp.
		Flabelliger-ida	Flabelliger-idae	*Piromis*	5.	*Piromis* sp.
		Capitellida	Maldanidae	*Clymenura*	6.	*Clymenura* sp.
				Euclymene	7.	*Euclymene lunderitziana* Augener
					8.	*E. oerstedi* Day
			Capitellida	*Praxillella*	9.	*Praxillella* sp.
		Opheliida	Opheliidae	*Polyophthalmus*	10.	*Polyophthalmus pictus* Dujardin
					11.	*Polyophthalmus* sp.
		Phyllodoci-da	Syllidae	*Syllis*	12.	*Syllis amica* Quatrefages
					13.	*S. hyalina* Grube
					14.	*S. exilis* Gravier
					15.	*S. gracilis* Grube
					16.	*S. nigropharyngea* Day
				Trypanosyllis	17.	*Trypanosyllis* sp.
				Pionosyllis	18.	*Pionosyllis malmgreni* Mclnlosh
				Spermosyllis	19.	*Spermosyllis capensis* Day
				Sphaerosyllis	20.	*Sphaerosyllis semiverrucosa* Ehlers
				Autolytous	21.	*Autolytous* sp.
			Orbinidae	*Scoloplos*	22.	*Scoloplos* sp.
			Scalibreg-midae	*Hyboscolex*	23.	*Hyboscolex* sp.
			Eunicidae	*Lysidice*	24.	*Lysidice ninetta* Audouin & Milne Edwards
				Nematonereis	25.	*Nematonereis unicornis* Grube
				Arabella	26.	*Arabella iricolor* Montagu
		Phyllodoci-da	Nereididae	*Platynereis*	27.	*Platynereis isolita* Gravier
				Nereis	28.	*Nereis jacksoni* Kinberg
					29.	*N. trifasciata* Grube
					30.	*N. persica* Fauvel
					31.	*N. operta* Stimpson

Citation: Htaik AA. Associated faunas of seaweeds and seagrasses in the Southern Rakhine coastal zone. *J Aquac Mar Biol.* 2018;7(3):163–170. DOI: 10.15406/jamb.2018.07.00203

Table Continued

Phylum	Class	Order	Family	Genus	Sr.No.	Species
Annelida	Polychaeta	Phyllodoci-da	Nereididae	*Ceratonereis*	32.	*Ceratonereis mirabilis* Kinberg
				Perinereis	33.	*Perinereis capensis* Kinberg
		Sabellida	Sabellidae	*Euchone*	34.	*Euchone* sp.
				Oriopsis	35.	*Oriopsis* sp.
		Terebellida	Terebellid-ae	*Terebella*	36.	*Terebella ehrenbergi* Grube
			Serpulidae	*Hydroides*	37.	*Hydroides uncinata* Philippi
Mollusca	Polyplaco-phora	Chitonida	Chaetople-uridae	*Chaetopleura*	38.	*Chaetopleura* sp.
	Gastropoda	Neogastro-poda	Columbell-idae	*Pyrene*	39.	*Pyrene* sp.
			Mitridae	*Mitra*	40.	*Mitra* sp.
		Mesogastr-opoda	Cerithidae	*Cerithium*	41.	*Cerithium* sp.
	Bivalvia	Pelecypoda	Cardiidae	*Clinoardium*	42.	*Clinoardium* sp.
			Mytilidae	*Mactra*	43.	*Mactra* sp.
				Setifera	44.	*Setifera* sp.
Arthropoda	Crustacea	Ostracoda			45.	Ostracod
		Pantogoda	Pycnogon-idae	*Pycnogonum*	46.	*Pycnogonum* sp.
		Amphipoda	Dexamini-dae	*Paradexamine*	47.	*Paradexamine rewa* Myers
			Eophlianti-dae	*Bircenna*	48.	*Bircenna dronga* Myers
			Hyalidae	*Hyale*	49.	*Hyale galateae distorta* Myers
				Parhyale	50.	*Parhyale hawaiensis* Dana
			Isaeidae	*Gammaropsis*	51.	*Gammaropsis atlantica* Stebbing
			Gammari-dae	*Melita*	52.	*Melita zeylanica* Stebbing
				Elasmopus	53.	*Elasmopus rapax* Costa
					54.	*E. pectenicrus* Bate
				Maera	55.	*Maera quadrimana* Dana
		Tanaidacea	Apseudid-ae	*Apseudes*	56.	*Apseudes* sp.
			Paratanaid-ae	*Paratanais*	57.	*Paratanais batei* Sars
		Isopoda	Gnathiidae	*Gnathia*	58.	*Gnathia maxillaries* M. Edw
					59.	*Gnathia* sp.
			Aegidae	*Aega*	60.	*Aega tridens* Leach
					61.	*Aega* sp. Lutken
Echinoder-mata	Ophiuroid-ea				62.	Ophiuroid brittle star

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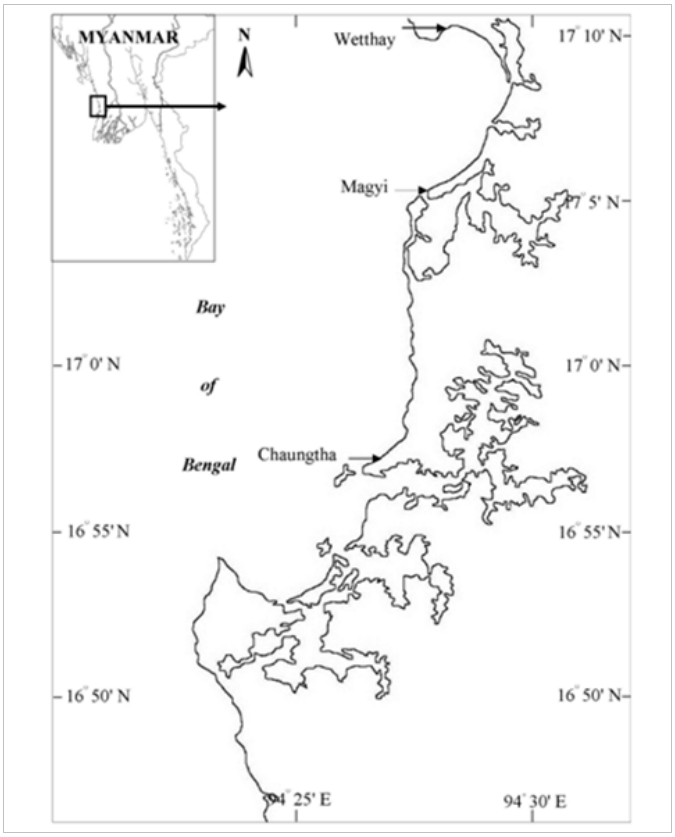
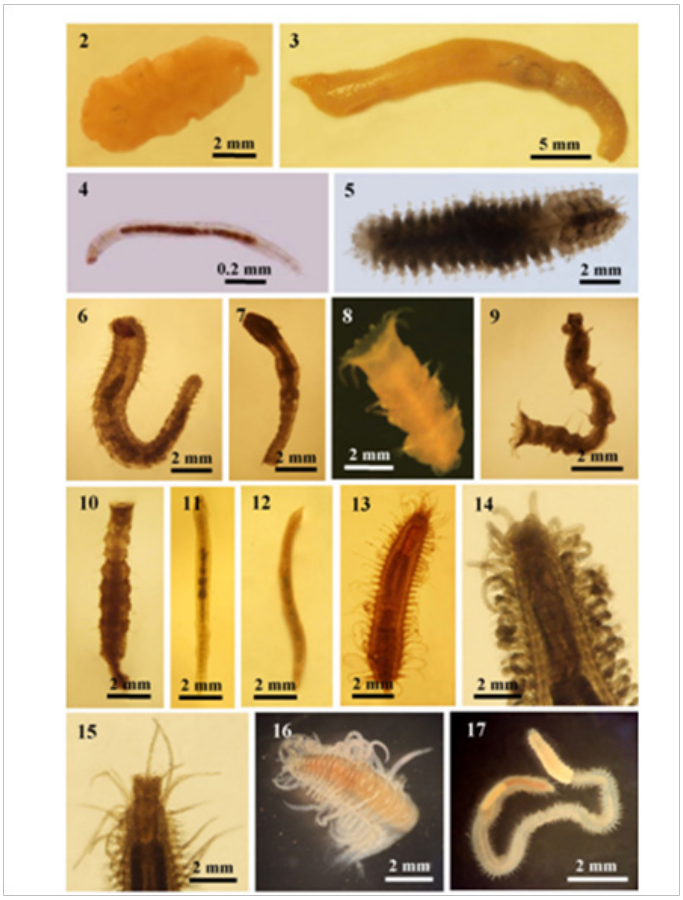


Figure 1 Map showing the sample collection sites of the study area.

The distribution and composition of associated fauna from three stations was presented in Figures 64-66 and (Table 2). It can be seen clearly that seaweeds were more favourable for associated faunas to inhabit than seagrasses. Sarma[17] suggested that the stable sediment of algal belts, the fronds of algae and the organic detritus content in sediment from the death and decay of algal fronds were supported to different types of organisms. Moreover, the polychaetes were also the highest diversity of species among the other groups in all stations. In contrast to seagrass habitats, seaweed habitats were more number of polychaete species. It may be due to the different structure of plants, types of substratum and the ability of sediment retained by plant Sarma[17], Sarma et al.,[3] Ranjitham et al.,[6] Azhagu Raj et al.,[8] Muralikrishnamurty,[9] Sarma and Gnapati[2], Pati et al.,[18] and Mohan Joseph[19] . Naufal[5] found that the morphology of the different leaf blades of the seagrass species was a major factor for the attachment of organisms. Ranjitham et al.,[6] reported that the environmental factors including temperature, salinity, turbidity, oxygen concentration, pollution, water movement and level of nutrients also influence animal distributions. Anandavelu et al.,[1] suggested that the sediment retention capacity of weeds might play an important role on the assemblage of epifaunal community. Ranjitham et al.,[6] Jansi and Ramadhas[9] found that the filamentous algae of *Enteromorpha compressa* with poor sediment retention capacity may be comparatively lower faunal association than that of other algae.

In this present study, maldanid and syllid polychaetes were constituted in great quantities. The maldanids are highly specialized burrowers feeding on organic particles buried in the mud Day.[14] They can be found in the tube forms attached to seaweeds. Mohan Joseph[19] stated that the majority of polychaetes inhabited in algal fronds were the tube dwelling or living in the sediments retained by the holdfast.



Figures 2-17 Associated faunas. (2) *Leptoplana* sp., (3) Sipunculid worm. (4) Nemertine sp., (5) Paralepidonotus sp., (6) *Piromis* sp., (7) *Clymenura* sp., (8) *Euclymene lunderitziana*, (9) *E. oerstedi*, (10) *Praxillella* sp., (11) *Polyophthalmus pictus*. (12) *Polyophthalmus* sp., (13) *Syllis amica* (14) *S. hyaline* (15) *S. gracilis* (16) *S. exilis* (17) *S. nigropharyngea*.

The syllids are also a large and diverse group of small active worms in this present study and most of which are found creeping over algae. Ei Ei Mon[10] indicated that the syllid polychaetes were outnumbered in *Laurcencia* sp. of Kyaikkhami coastal area. Mohan Joseph[19] found that *Syllis* (*Typosyllis*) *krohnii* and *Syllis prolifera* were abundant in the sediments retained by the algae. Nereid polychaetes are also equally diverse group and inhabited among the complex structures of seaweeds and seagrasses.

A large variety of amphipods and isopods were also found in this study. Their grasping appendages could hold firmly the cylindrical filaments of the algae Sarma and Gnapti.[2] *Melita zeylanica* and *Maera quadrimana* were commonly distributed in both habitats at all stations. *Paradexamine rewa* was only recorded from seagrasses of Wetthay station. Ranjitham et al.,[6] suggested that seagrass fauna rarely associate to particular seagrass species but respond to a restricted set of physical environmental parameters. Consequently many animal species are common to adjacent beds of different seagrass speices. The bivalve mytilid mollusks were endowed with their by ssus adhere to the holdfasts of the seaweeds. The gastropods, *Pyrene* sp. and *Mitra* sp. were distributed on both habitats. *Leptoplana* sp., the ophiuroids, *Pycnogonum* sp. and nemartine were also distributed in both seaweeds and seagrasses.

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Table 2 The distribution of associated faunas along the study areas

No.	Species name	Chaungtha		Magyi		Wetthay	
		seaweed	seagrass	seaweed	seagrass	seaweed	seagrass
1.	*Leptoplana* sp.	+	+	+	+	+	+
2	Sipunculid worm	+	+	-	-	-	-
3.	Nemertine sp.	+	+	+	+	+	+
4.	*Paralepidonotus* sp.	+	+	-	-	+	-
5.	*Piromis* sp.	+	-	-	-	-	-
6.	*Clymenura* sp.	+	-	-	-	+	-
7.	*Euclymene lunderitziana*	+	-	+	-	-	-
8.	*E. oerstedi*	+	-	-	-	-	-
9.	*Praxillella* sp.	+	-	-	-	+	-
10.	*Polyophthalmus pictus*	+	-	+	-	+	-
11.	*Polyophthalmus* sp.	+	-	+	-	+	-
12.	*Syllis amica*	+	-	+	-	-	-
13.	*S. hyalina*	+	-	-	-	-	-
14.	*S. exilis*	-	-	+	-	+	-
15.	*S. gracilis*	-	-	+	-	-	-
16.	*S. nigropharyngea*	+	-	-	-	-	-
17.	*Trypanosyllis* sp	-	-	-	-	-	-
18.	*Pionosyllis malmgreni*	+	-	-	-	-	-
19.	*Spermosyllis capensis*	+	-	-	-	-	-
20.	*Sphaerosyllis semiverrucosa*	-	-	+	-	-	-
21.	*Autolytous* sp.	-	-	-	-	+	-
22.	*Scoloplos* sp	-	+	-	-	-	-
23.	*Hyboscolex* sp.	-	-	-	-	+	-
24.	*Lysidice ninetta*	-	+	-	+	-	-
25.	*Nematonereis unicornis*	+	+	-	-	-	-
26.	*Arabella iricolor*	-	-	-	-	+	-
27.	*Platynereis isolita*	-	-	-	-	+	+
28.	*Nereis jacksoni*	+	+	-	-	-	-
29.	*N. trifasciata*	-	-	+	+	+	+
30.	*N. persica*	-	-	+	+	+	+
31.	*N. operta*	-	-	+	+	+	+
32.	*Ceratonereis mirabilis*	+	+	+	+	+	+
33.	*Perinereis capensis*	+	-	-	-	-	-
34.	*Euchone* sp.	-	-	+	-	+	-
35.	*Oriopsis* sp.	+	-	+	-	+	-
36.	*Terebella ehrenbergi*	+	+	-	-	+	+
37.	*Hydroides uncinata*	-	-	+	-	-	-
38.	*Chaetopleura apiculata*	+	-	+	-	-	-
39.	*Pyrene* sp.	+	+	-	-	-	
40.	*Mitra* sp.	+	+	+	+	+	+
41.	*Cerithium* sp.	-	-	+	+	+	+
42.	*Clinocardium* sp.	-	-	-	-	+	+
43.	*Mactra* sp.	+	+	+	+	-	
44.	*Setifera* sp.	+	+	+	+	+	+
45.	Ostracod sp.	+	-	-	-	+	+
46.	*Pycnogonum* sp.	+	+	+	+	+	+
47.	*Paradexamine rewa*	-	-	-	-	-	+

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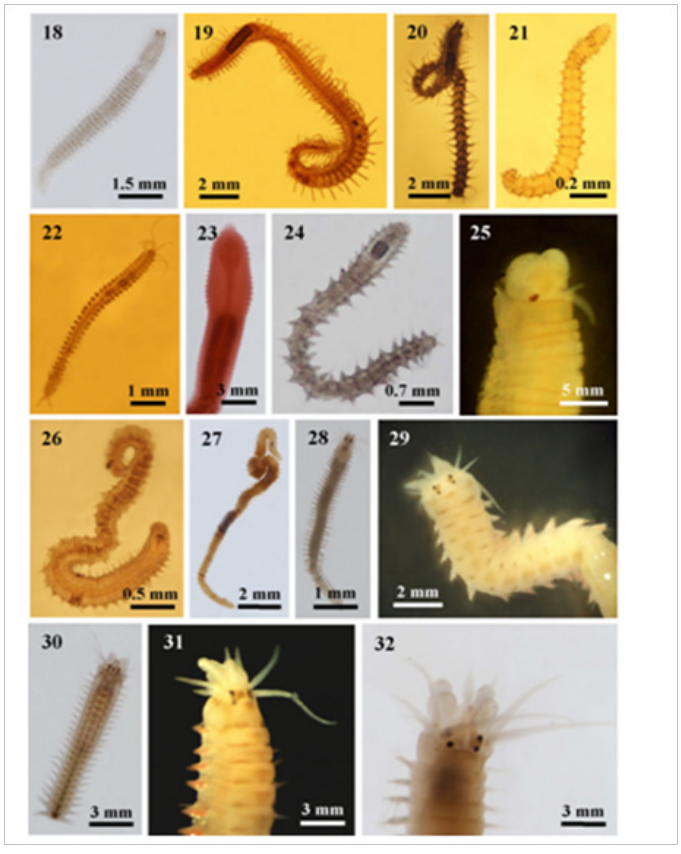
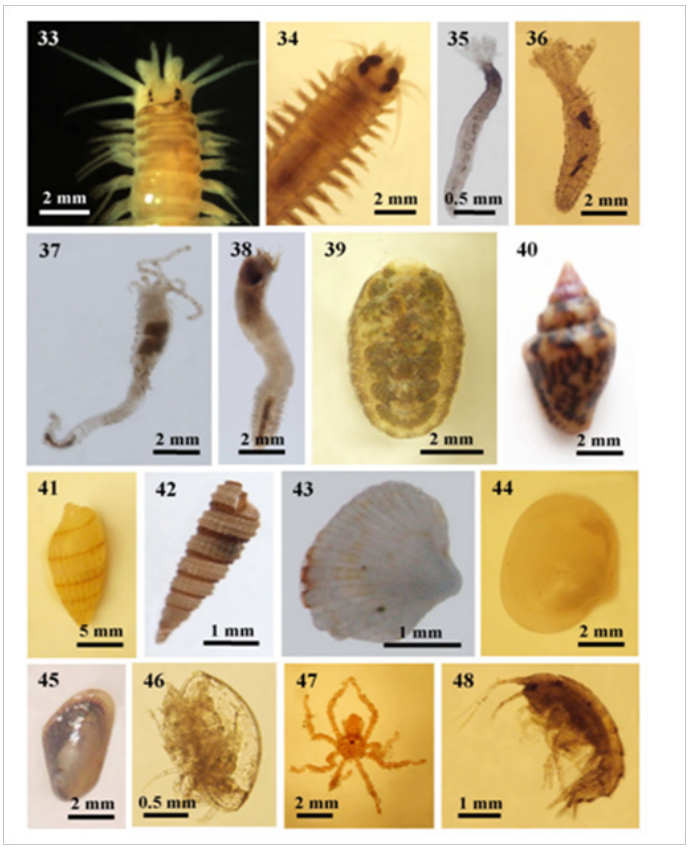
Table Continued

No.	Species name	Chaungtha		Magyi		Wetthay	
		seaweed	seagrass	seaweed	seagrass	seaweed	seagrass
48.	*Bircenna dronga*	-	-	-	-	+	+
49.	*Hyale galateae distorta*	+	-	+	-	-	-
50.	*Parhyale hawaiensis*	+		+	+	+	+
51.	*Gammaropsis atlantica*	-	-	+	+	+	+
52.	*Melita zeylanica*	+	+	+	+	+	+
53.	*Elasmopus rapax*	+	-	-	-	+	+
54.	*E. pectenicrus*		+	-	-	-	-
55.	*Maera quadrimana*	+	+	+	+	+	+
56.	*Apseudes* sp.	-	-	+	-	-	-
57.	*Paratanais batei*	-	+	-	-	-	-
58.	*Gnathia maxillaries*	-	-	+	+	+	+
59.	*Gnathia* sp.	-	-	-	+	-	+
60.	*Aega tridens*	+	-	-	+	-	-
61.	*Aega* sp.	-	-	-	-	-	+
62.	Ophiuroid brittle star	+	+	+	+	+	+
	Total	36	20	30	20	33	25



Figures 18-32 Associated faunas. (18) *Trypanosyllis* sp., (19) *Pionosyllis malmgreni*, (20) *Spermosyllis capensis*, (21) *Sphaerosyllis semiverrucosa*, (22) *Autolytous* sp., (23) *Scoloplos* sp., (24) *Hyboscolex* sp., (24) *Lysidice ninetta*, (25) *Nematonereis unicornis* (26) *Arabella iricolor* (27) *Platynereis isolita* (28) *Nereis jacksoni* (29) *N. trifasciata*, (30) *N. persica* (31) *N. operta*.



Figures 33-48 Associated faunas. (33) *Ceratonereis mirabilis* (34) *Perinereis capensis* (35) *Perinereis capensis*, (36) *Oriopsis* sp., (37) *Terebella ehrenbergi* (38) *Hydroides uncinata* (39) *Chaetopleura* sp., (40) *Pyrene* sp., (41) *Mitra* sp. (42) *Cerithium* sp. (43) *Clinoardium* sp., (44) *Mactra* sp., (45) *Setifera* sp., (46) Ostracod (47) *Pycnogonum* sp., (48) *Paradexamine rewa*.

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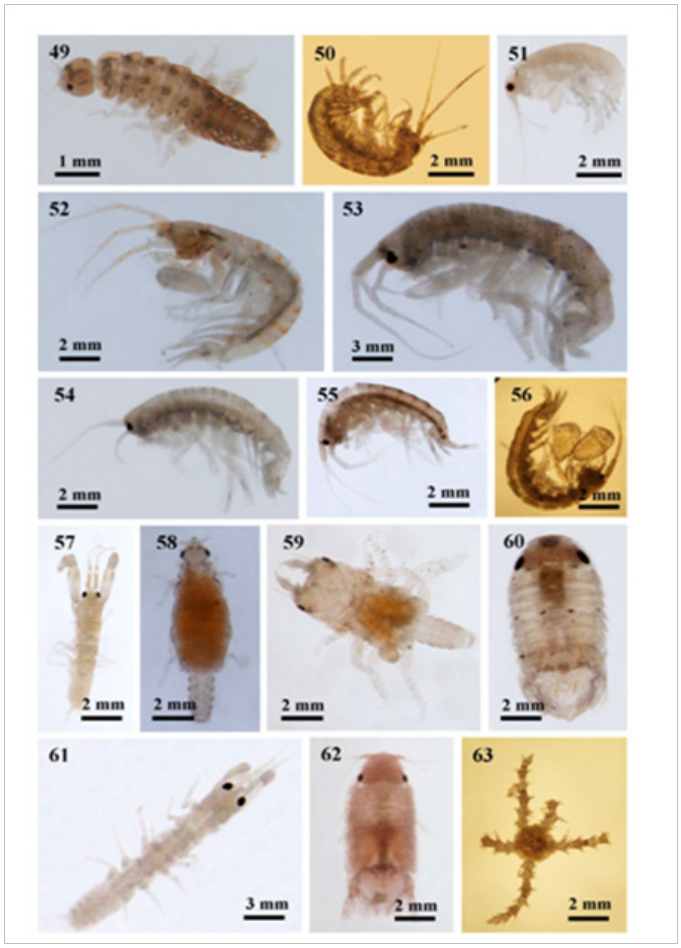


Figures 49-63 Associated faunas. (49) *Bircenna dronga* (50) *Hyale galateae distorta* (51) *Parhyale hawaiensis* (52) *Gammaropsis atlantica* (53) *Elasmopus pectenicrus* (54) *E. rapax* (55) *Melita zeylanica* (56) *Maera quadrimana* (57) *Apseudes* sp., (58) *Gnathia maxillaries* (59) *Gnathia* sp., (60) *Aega tridens* (61) *Paratanais batei* (62) *Aega* sp., (63) Ophiuroid brittle star.

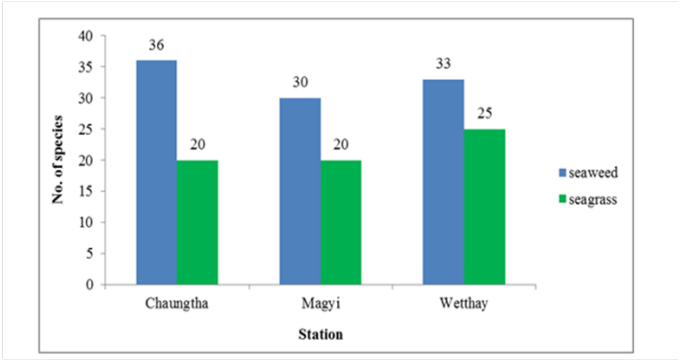
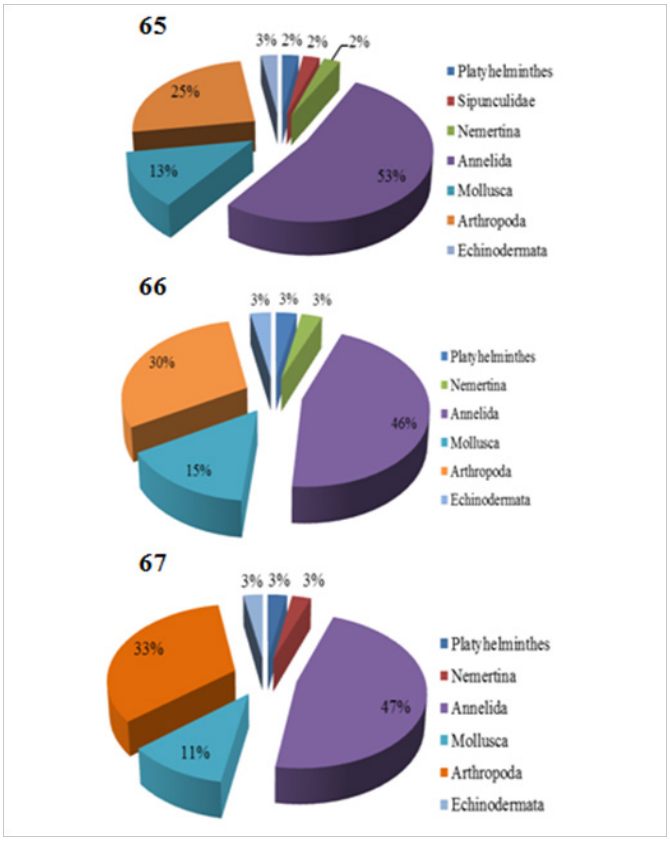


Figure 64 The composition of associated faunas in seaweeds and seagrasses from three stations.

Many species inhabiting seaweeds and seagrasses depend on them for food. The most common are polychaetes, amphipods and gastropods. The feeding relationship of the faunas was also varied. Many are filter feeders, detritus feeders, scavengers or carnivores; algivores ranging from minute crustaceans to large sized gastropods Sarma & Gnapati, Ranjitham, Azhagu Raj, Mohan Joseph, Sarma, et al.[2,6,8,17,19]



Figures 65-67 Percentage composition of associated faunas in seaweeds and seagrasses from three.

Conclusion

It is well known from this study that seaweed and seagrass habitats provide high diversity of associated fauna. These habitats are important for shallow water marine organisms in order to get food and shelter from biotic and abiotic factors (predators and waves). This study revealed that baseline information for associated faunas of seaweeds and seagrasses from Southern Rakhine Costal zone. Seasonal and spatial abundance of associated fauna with respect to these habitats should be continued thoroughly in future. Because of seaweeds and seagrasses and their associated fauna support directly and indirectly to the route of energy transfer linked with the higher trophic level in marine food web, they are needed to be protected from human activities like overharvesting of seaweeds and seagrass from their habitats, habitats lost by coastal development, recreational activities and beach cleaning.

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Conflict of interest

The author declares that there is no conflict of interest.

References

1. Anandavelu I, Jayabarathi R, Padmavati G, et al. Epifaunal assemblage on morphologically distinct intertidal seaweeds of Kodiyaghat (South Andaman), India. *Proceedings of the International Academy of Ecology and Environmental Sciences*. 2013;3(3):229–237.
2. Sarma ALN, Ganapati PN. Faunal associations of algae in the intertidal region of Visakhapatnam. Proc. *Indian natn Sci Acad*. 1972;(B)38:380–396.
3. Sarma ALN, Satapathy S, Rao DG. Phytal macro & meiofauna of Chilka Lake. *Indian Journal of Marine Sciences*.1981;10:61–65.
4. Jansi M, Ramadhas V. Diversity of fauna associated with four different species of seaweeds of Manakkudy estuary. *Seshaiyana*. 2009;17(1):1–3.
5. Naufal PJ, Padmavati G. 2018. Meiofaunal distribution and abundance from the intertidal seagrass patches of Chidiyatapu, Port Blair. *Indian Journal of Geo Marine Sciences*. 2018;47(02):357–364.
6. Ranjitham NS, Thirumaran G, Anantharaman P, et al. Associated fauna of seaweeds and seagrasses in Vellar estuary. *American–Eurasian Journal of Botany*. 2008;1(1):9–16.
7. Jaya P, Annapurna C, Bhanu V. Diversity of meiofauna associated with nine different species of algae at Visakhapatnam coast. *IJBPAS*. 2012;1(4):469–483.
8. Azhagu Raj R, Ganesh J, Prakasam A, et al. Fauna associated with the marine macro alga *Chaetomorpha aerea* (Dillwyn) Kutzing, (Chlorophyceae) in Pulicat estuary, Tamil Nadu, India. *International Journal of Fisheries and Aquatic Studies*. 2017;5(1):319–326.
9. Muralikrishnamurty PV. Intertidal phytal fauna off Gangavaram, East coast of India. *Indian Journal of Marine Sciences*. 1983;12:85–89.
10. Ei Ei Mon. Study on the invertebrate fauna associated with red seaweed, *Laurcencia* sp. from Setse and Kyaikkhami, Mon State. Unpublished M.Sc. Thesis. Department of Marine Science, Mawlamyine University, Mawlamyine, Myanmar. 2010.
11. Barnard JL. *Gammaridean Amphipoda of Australia*. Part I. 1972; 334 p.
12. Barnard JL. *Gammaridean Amphipoda of Australia*. Part II. 1974; 160 p.
13. Dance SP. Shells. Smithsonian Handbooks. 2002; pp. 1–256.
14. Day JH. A monograph on the polychaeta of Southern Africa. *The British Natural History Museum*. London. 1967; 878 p.
15. Fish JD, Fish S. A student's guide to the sea shore. *Cambridge University Press*. 2011; 1–573.
16. Myers AA 1985. Shallow–water, coral reef and mangrove Amphipoda (Gammaridea) of Fiji. *Records of the Australian Museum, Supplement.* 1985;5:1–143.
17. Sarma ALN. Phytal fauna of *Caulerpa taxifolia* & *C. racemosa* off Visakhapatnam coast. *Indian Journal of Marine Sciences*, 1974;3(2):155–164.
18. Pati MP, Nayak L, Sharma SD. Studies on biomass of seagrass, seaweed and its associated fauna from Chilika lagoon. International Journal of Environmental Sciences. 2014;5(2):423–431.
19. Mohan Joseph M. Ecological studies on the fauna associated with economic seaweeds of south India. I. Species composition, feeding habits and interrelationship. *Seaweed Res. Util*. 1978:3:8–25.

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