International Journal of Earth Sciences Knowledge and Applications
www.ijeska.com

Research Article

e-ISSN: 2687-5993

Preliminary Observation on Some Marine Molluscs of Northern Rakhine Coastal Area in Myanmar

Naung Naung Oo[1]*

[1]*Department of Marine Science, Sittway University, 07011, Sittway, Rakhine State, Myanmar*

INFORMATION

Article history
Received 27 November 2020
Revised 04 January 2021
Accepted 04 January 2021
Available 15 March 2021

Keywords
Brackish water
Marine
Seashells
Habitats
Northern Rakhine coast

Contact
*Naung Naung Oo
E-mail: naungnaungoomarine@gmail.com

ABSTRACT

A total of 95 species of brackish water and marine molluscs were recorded in Nantha Island, Sittway Point and Hnget Gaung Taung in northern Rakhine State. Of these, 2 species of polyplacophora, 50 species of gastropoda, 42 species of bivalvia and 1 species of scaphopoda were also recorded with photo illustrations. Shells were collected from various substrata such as mangrove swamp, muddy sand, sandy mud and rocky fringe along with intertidal areas. Most of the molluscs are estuarine forms and marine species are less abundant except drift shells. According to habitat distribution, the highest recorded species distribution was 47 species in muddy sand area and followed by rocky fringe 38 species, mangrove swamp 33 species and sandy mud 23 species, respectively. In this survey, Myengu Kyun (Hnget Gaung Taung) area was the highest percentage occurrence of 45% and the second was Nantha Island 41% and Sittway Point 14% was the third rank.

1. Introduction

The Rakhine Coastal Region has a coastline stretching about 740 km facing the Bay of Bengal which possesses marine fishery resources. Northern Rakhine coastal area is the portion of Rakhine Coastal Region of Western Myanmar, and is popular for both local and foreign tourists for its beautiful islands, beaches, and submarine fauna and flora. This includes Nantha Island and near Mayyu estuary which designated as Ramsar wetland site in Myanmar, Sittway Point and Hnget Gaung Taung (Myengu Kyun = Western Bo Ron Ga Island), a large island in northern Rakhine State. Land development can be found in many areas around the island.

The literature of the molluscs is vast in other countries but in Myanmar only a few books are available for reference work. Consequently, it is found that there have been relatively very few works that deal with Myanmar molluscs in the past. The earliest work on Myanmar molluscs is that of Mason (1850, 1852 and 1882). Mason's books covered almost all branches of science that could be investigated at that time.

As far as molluscs were concerned he was able to divide them into 4 classes, 2 subclasses, 7 orders, 84 families, 15 subfamilies and 710 species. However, Mason had collected his fauna not only from the Taninthayi Coastal Region but also from the Rakhine Coastal Region in the north. The next

appreciable earlier publication on Myanmar molluscs appeared by Mann (1888). It was fairly up to date literature on shells available for serious students of molluscs of the world. In this way, there was an entire lack of modern literature on Myanmar molluscs, and information gained from this literature was very scare and inadequate.

Thu (1970, 1971, 1972, and 1980) had recorded the diversity of seashells from Ngapali, Maungmagan and various localities of Myanmar coastal waters. Consequently, Myint (1971) had published a checklist comprising of 248 species of the marine gastropods, bivalves and cephalopods in the Moscos Islands.

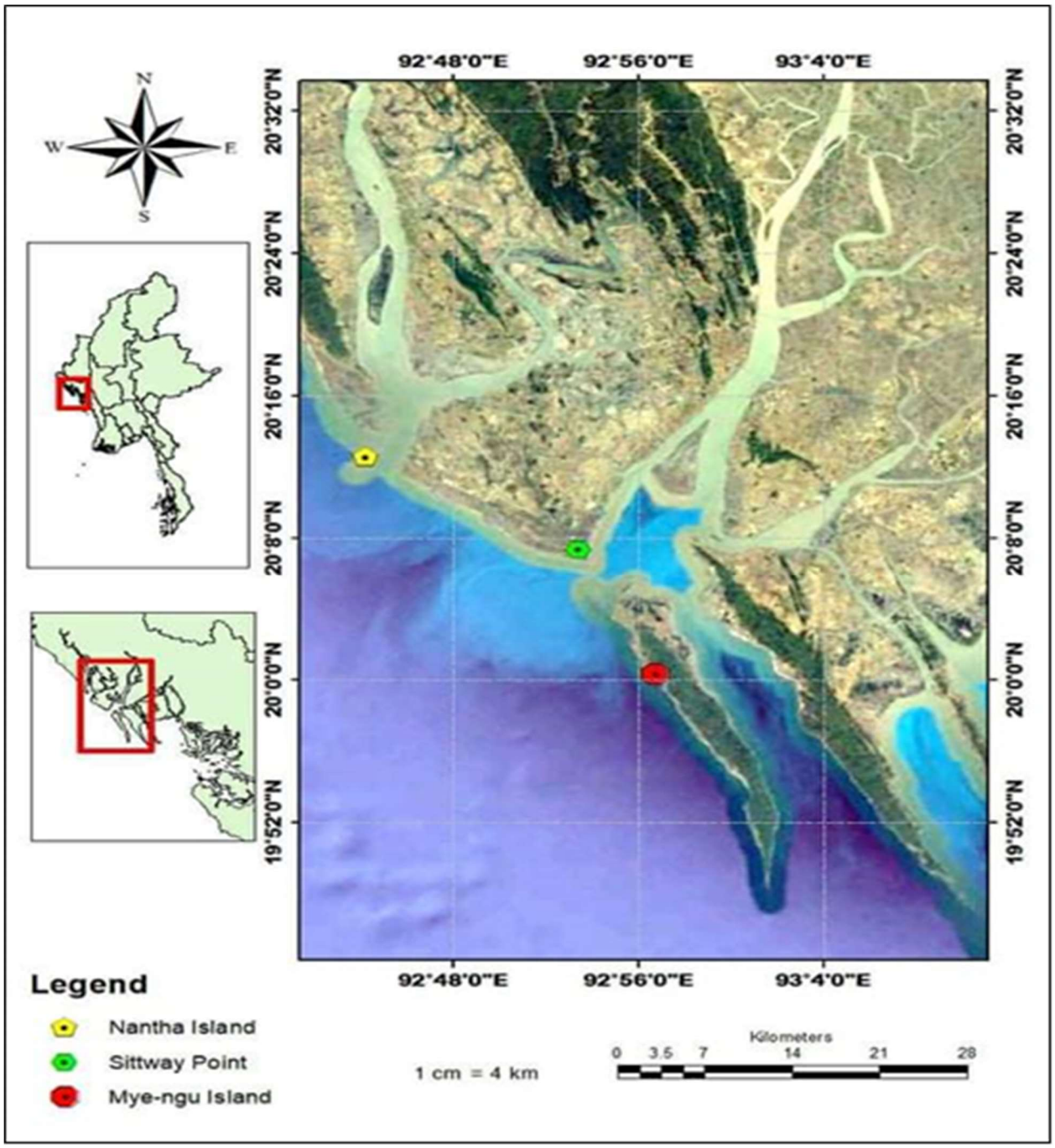

Fig. 1. Map showing the collection sites of molluscs in northern Rakhine coastal area

The list includes 72 families which however is not yet a complete checklist for Myanmar. Gyi (1973) had been studied on the phylum Mollusca by Myanmar language submitted at the university publication. Win et al. (1975) had also reported the morphology and taxonomy of some marine molluscs found in Myanmar's coastal waters. Moreover, Sein (1982) studied the taxonomy and distribution of Burmese marine bivalves in three coastal regions of Burma. Lwin (1985) studied the spat fall of *Crassostrea blecheri* in Ye River, Mon State in Burma. Nu (1985) studied on the spat fall of *Pena viridis* (Linnaeus) in Ye River, Mon State in Burma. Aung (1987) studied on the experimental pilot-scale spat

collecting and growing of *Crassostrea belcheri* and *Saccostrea cuccullata* at Setse, Thanbyuzayat Township in Mon State. Win (1990) had studied the taxonomy of some molluscs trawled offshore in Myanmar waters. Khaing (1995) studied the settlement, collection and on growing of spat of the oyster *Saccostrea cuccullata* (Born) on artificial collectors at Setse. Nyunt (1996) studied reproductive biology and hatchery culture of larvae of *Saccostrea cuccullata* (Born) at Setse, Mon State in Myanmar. Thu (1998) studied taxonomic on some marine bivalves of Dawei, Myeik and Kawthaung along the Taninthayi coast.

Moreover, a systematic account on some marine gastropods, pelecypods (= Bivalves) and cephalopods in various localities of Myanmar had been carried out by Zin et al. (2007), Aung (2011), San (2011), Oo (2012), Win (2012, 2013), Hlaing (2012), Tun et al. (2012), Thin (2015), Tun (2016), Latt (2017), Nwe (2017), Phyo (2019) and Nwe (2019), respectively. Much information such as their distribution pattern, habitat preferences and habitat range remained unknown.

In the 1980s, Thu (1980), Thein (1982) and Sein (1982) reported that common species of brackish-water molluscs inhabit in Rakhine Coastal Region. Sein (2019) reported that 3587 individuals of marine gastropods in Western Bo Ron Ga Island, of which 2475 individuals in sandy shore, 975 individuals in rocky shore and 137 individuals in muddy shore, are focused only on seasonal abundance. The major intent of this study was to investigate the species distribution of brackish-water and marine molluscs in northern Rakhine coastal area.

2. Materials and Methods

Some molluscs were collected in the forms of drift and live specimens living in intertidal and shallow subtidal areas such as Nantha Island, Sittway Point and Hnget Gaung Taung (= Myengu Island) in northern Rakhine coastal area (Fig. 1) during the field trip from December 2019 to November 2020. All live collections were preserved in 10 % formalin in seawater. The epifaunas were removed by soaking the shells in a solution of caustic soda and then cleaned, washed, dried, and ready for storage, they are lightly rubbed with a small amount of oil applied with a brush to make them fresh-looking in a slight lustre to the surface, and aid in presenting the delicate coloring for further study. All voucher specimens were housed at the Museum of the Department of Marine Science, Sittway University (SUMS). The zoogeographical distribution of each species was prepared with the data from the literature available. Ecological notes and associated species of these molluscs were also recorded in the field.

3. Results and Discussion

The intertidal border between the land and the sea in the northern Rakhine coastal region is a productive and diverse habitat. It has high biodiversity and is home to many slow-moving or sessile species that are relatively easily quantified for monitoring changes. Collecting data on species distribution, abundance, community structure and biodiversity will provide a useful baseline for detecting any future changes.

It has been found out that the distribution of brackish and marine molluscs species that have been inhabiting northern Rakhine coastal area belong to four existing classes such as polyplacophora, gastropoda, bivalvia and scaphopoda (Table 1 and Figs. 2-96, 97-98). The classification of each species follows that of Poutiers (1998) and WoRMS (2020). In this study areas, the number of useful and beautiful objects made from shells or ornamented with shells and frequently collected for food locally by coastal people.

A large assemblage of different forms collects on the upper tidal zone. Others prefer sandy flats where they burrow into the sand during ebb tide. Some shells live only in the purest seawater tolerating no brackishness at all; whereas other seem to like it better where the water is brackish, often thriving best in partially polluted areas. Habitats given for each shell have been described as mangrove swamp, muddy sand, sandy mud and rocky fringe, respectively (Fig. 99).

Table 1. List of some molluscs from northern Rakhine coastal area

No	Species	Distribution		
		Nantha Island	Sittway Point	Hnget Gaung Taung
	Polyplacophora			
	Chiton shell (Kyauk-poe)			
1	*Acanthopleura gemmata* *	-	-	+
2	*A. granulata* *	-	-	+
	Gastropoda			
	Limpets (Si-mee-noh/ Noh-chauk)			
3	*Patelloida striata*	-	-	+
4	*Patella depressa* *	-	-	+
5	*P. stellaeformis*	-	-	+
6	*Cellana rota* *	-	-	+
7	*Siphonaria atra*	-	-	+
8	*S. laciniosa*	-	-	+
9	*S. sirius*	-	-	+
10	*S. subatra*	-	-	+
	Top shell (Kyauk-gaung-baung)			

11	*Trochus maculatus*	-	-	+
12	*T. radiatus*	-	-	+
13	*T. sacellum*	-	-	+
	Nerits shells (Jade/ Kha-yu-ma)			
14	*Nerita albicilla*	-	+	+
15	*N. articulata*	-	+	-
16	*N. costata*	-	+	-
17	*N. funiculate*	-	+	+
18	*N. polita*	-	+	-
19	*N. undata* *	-	+	-
20	*Clithon faba* *	-	+	-
	Periwinkles (Kyauk-than)			
21	*Littoraria littorea*	+	+	+
22	*L. melanostoma*	+	+	+
23	*L. scabra*	-	+	+
24	*L. undulata*	-	-	+
25	*Echinolittorina trochoides*	-	+	+
	Ceriths (Shunt-kha-yu)			
26	*Cerithium vulgatum*	+	-	+
27	*Rhinoclavis sinensis*	+	-	+
28	*Clypeomorus bifasciata*	-	-	+
29	*Cerithidea cingulata*	+	-	-
	Swamp-ceriths and horn shells (Ma-yut)			
30	*Telescopium telescopium* *	+	-	-
	Turret shell (Kha-yu-saeti)			
31	*Turritella carnifera*	+	-	+
32	*T. duplicata* *	+	-	-
	Worm shells (Kyauk-kyoe-khway)			
33	*Serpulorbis medusae*	-	+	+
	Clusterwinks (Kha-yu-lone)			
34	*Planaxis sulcatus*	-	-	+
	Conch shells (Kha-yu-sin-nar-ywet)			
35	*Strombus canarium*	+	-	+
36	*S. mutabilis*	+	-	+
	Cowry shell (Kwaye-poke)			
37	*Cypraea eglantina*	-	-	+
	Moon snails and necklace shells (Phoe-la-min)			
38	*Polinices didyma* *	+	-	+
39	*P. mammilla*	+	-	+
40	*Natica severa*	+	-	-
41	*N. tigrina*	+	+	+
	Tun shell (Kyauk-u)			
42	*Tonna dolium* *	+	-	+
	Frog shell (Kha-yu)			
43	*Bursa granularis* *	+	+	+
	Rock shell (Yoke-soe)			
44	*Morula nodulosa*	-	-	+
45	*Thais mutabilis*	-	+	+
	Melongenas (Jum)			
46	*Pugilina cochlidium* *	+	+	+
47	*P. ternatana* *	+	+	+
	Whelks (Nandar-hlaing)			
48	*Babylonia formosae* *	+	-	-
49	*B. spirata* *	+	-	+
	Olive shell (Phat-late)			
50	*Oliva ispida* *	+	-	+
	Cone shells (Kha-yu-ka-dawt)			
51	*Conus achatinus*	+	-	+
52	*C. coronatus*	+	-	+

	Pelecypoda (= Bivalvia)			
	Venus clams (Kha-yu/Shut/Gone)			
53	*Circenita callipyga* *	+	-	+
54	*Circe scripta* *	+	-	+
55	*Coecella chinensis* *	+	-	+
56	*Meretrix casta* *	+	-	-
57	*Ruditapes philippinarium* *	+	-	+
	Sea mussels (Mae-daw-let-thae)			
58	*Perna viridis* *	+	+	+
59	*Brachidontes setiger*	-	+	+
	Ark shells (Kha-yu-mote-seik)			
60	*Barbatia decussata* *	+	-	+
61	*B. foliata* *	+	-	+
62	*B. virescens* *	+	-	+
	Blood clam/ cockle (Gone/ Gin)			
63	*Anadara antiquata* *	+	-	+
64	*A. granosa* *	+	-	+
65	*A. inaequivalvis* *	+	-	-
66	*A. pilula* *	+	-	-
	Windowpane shells (Tha-byar/Ka-byar)			
67	*Placuna ephippium* *	+	-	-
68	*P. placenta* *	+	-	-
	Honeycomb oysters (Thit-ywat-ka-mar)			
69	*Hyotissa hyotis*	+	-	-
70	*H. inermis*	+	-	-
71	*Neopycnodonte* sp.	+	-	+
	Oysters (Ka-mar/Sar-ka-mar)			
72	*Crassostrea belcheri* *	+	-	+
73	*C. gigas* *	+	-	+
74	*C. nippona* *	+	-	+
75	*Dendostrea folium*	+	-	-
76	*Ostrea denselamellosa*	+	-	-
77	*Saccostrea cucullata* *	+	+	+
78	*S. echinata* *	+	+	+
79	*S. scyphophilla*	+	-	-
	Jewel box shells (Sue-ka-mar)			
80	*Chama pacifica* *	-	-	+
	Trough shells (Gone)			
81	*Mactra achatina* *	+	-	-
82	*M. cuneata* *	+	-	-
83	*M. luzonica* *	+	-	+
84	*M. maculata* *	+	-	+
85	*M. mera* *	+	-	-
86	*M. violacea* *	+	-	-
	Tellins (Moe-thee)			
87	*Tellina valtonis*	+	-	-
88	*T. virgata*	+	-	-
	Donax clams (Thae-kha-yu)			
89	*Donax faba*	+	-	+
90	*D. incarnatus*	+	-	+
91	*D. scortum* *	+	-	+
92	*D. spinosa*	+	-	+
	Glauconomyas (Yauk-cho)			
93	*Glauconome virens* *	+	-	+
	Sunset clams, sanguins (Yauk-cho)			
94	*Gari togata**	+	-	-
	Scaphopoda (Tusk shell) (Sin-swel-kha-yu)			
95	*Dentalium octangulatum*	-	-	+
	Total number of species	**63**	**21**	**68**

(Symbols:* +: present; -: absent; *: utilized for food)*

Figs. 2-38. 2) *Acanthopleura gemmata*; 3) *A. granulata*; 4) *Patelloida striata*; 5) *Patella stellaeformis*; 6) *P. depressa*; 7) *Cellana rota*; 8) *Siphonaria subatra*; 9) *S. atra*; 10) *S. laciniosa*; 11) *S. sirius*; 12) *Trochus maculatus*; 13) *T. sacellum*; 14) *T. radiatus*; 15) *Nerita albicilla*; 16) *N. funiculate*; 17) *N. articulata*; 18) *N. polita*; 19) *N. costata*; 20) *N. undata*; 21) *Clithon faba*; 22) *Littoraria scabra*; 23) *L. melanostoma*; 24) *L. littorea*; 25) *L. undulata*; 26) *Echinolittorina trochoides*; 27) *Cerithium vulgatum*; 28) *Rhinoclavis sinensis*; 29) *Clypeomorus bifasciata*; 30) *Cerithidea cingulate*; 31) *Telescopium telescopium*; 32) *Turritella carnifera*; 33) *T. duplicata*; 34) *Serpulorbis medusae*; 35) *Planaxis sulcatus*; 36) *Strombus canarium*; 37) *S. mutabilis*; 38) *Cypraea eglantina.*

Figs. 39-72. 39) *Polinices didyma*; 40) *P. mammilla*; 41) *Natica severa*; 42) *N. tigrina*; 43) *Tonna dolium*; 44) *Bursa granularis*; 45) *Morula nodulosa*; 46) *Thais mutabilis*; 47) *Pugilina cochlidium*; 48) *P. ternatana*; 49) *Babylonia spirata*; 50) *B. formosae*; 51) *Oliva ispida*; 52) *Conus coronatus*; 53) *C. achatinus*; 54) *Circenita callipyga*; 55) *Circe scripta*; 56) *Coecella chinensis*; 57) *Meretrix casta*; 58) *Ruditapes philippinarium*; 59) *Perna viridis*; 60) *Brachidontes setiger*; 61) *Barbatia decussata*; 62) *B. foliata*; 63) *B. virescens*; 64) *Anadara antiquata*; 65) *A. granosa*; 66) *A. pilula*; 67) *A. inaequivalvis*; 68) *Placuna ephippium*; 69) *P. placenta*; 70) *Hyotissa hyotis*; 71) *H. inermis*; 72) *Neopycnodonte* sp.

Figs. 73-96. 73) *Crassostrea belcheri*; 74) *C. gigas*; 75) *C. nippona*; 76) *Dendostrea folium*; 77) *Ostrea denselamellosa*; 78) *Saccostrea cucullata*; 79) *S. echinata*; 80) *S. scyphophilla*; 81) *Chama pacifica*; 82) *Mactra achatina*; 83) *M. cuneata*; 84) *M. luzonica*; 85) *M. maculata*; 86) *M. mera*; 87) *M. violacea*; 88) *Tellina valtonis*; 89) *T. virgata*; 90) *Donax faba*; 91) *D. spinosa*; 92) *D. incarnates*; 93) *D. scortum*; 94) *Glauconome virens*; 95) *Gari togata*; 96) *Dentalium octangulatum*.

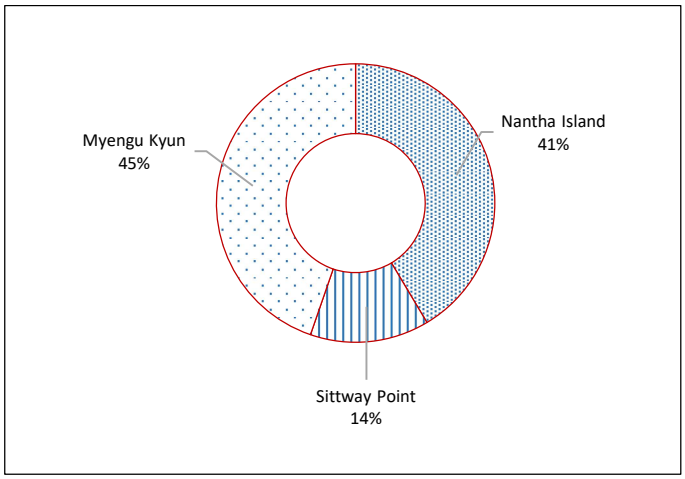

Fig. 97. Station-wise percentage occurrence of some marine molluscs in northern Rakhine State

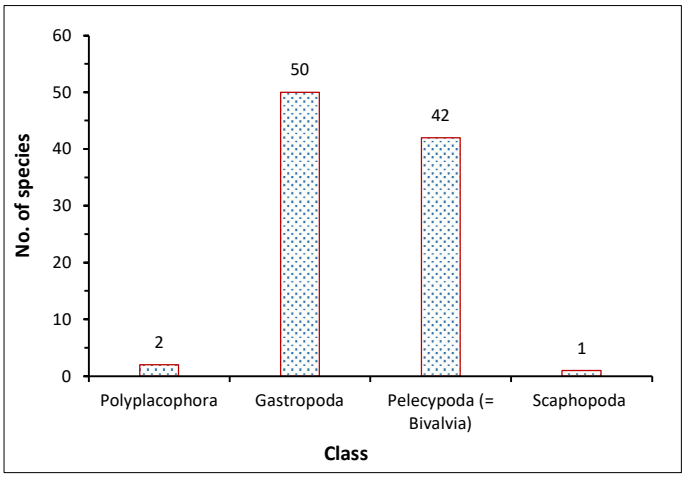

Fig. 98. Species occurrence of some marine molluscs in northern Rakhine State

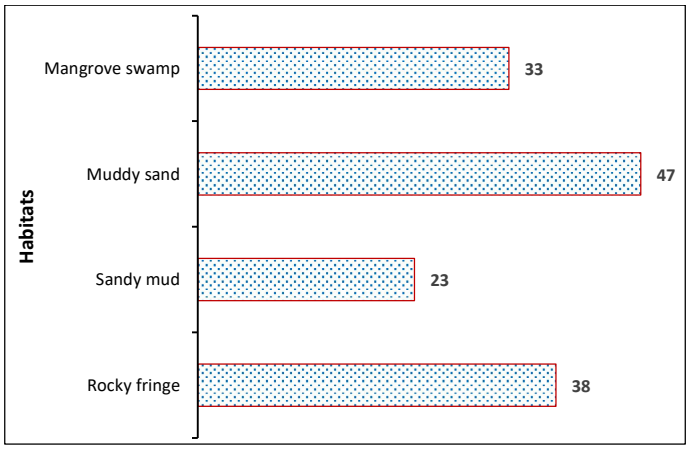

Fig. 99. Habitats distribution of some marine molluscs in northern Rakhine State

4. Conclusion and Recommendations

1. The present study listed 95 species of estuarine and marine molluscs in northern Rakhine coastal area and this may increase with continued survey especially in the subtidal to deeper waters.

2. The meat of most of these species is valued as food and most if not all of the shells are used in handicraft/shell craft industry. Further study is recommended to enrich this list.

3. There could be variations on the similarities of species especially across wide regions but the numbers of reported species provide information on how much species a locality can support.

4. Aside from continued species inventory, habitat and population assessment of commonly harvested species is needed to find out the true status of these marine resources in northern Rakhine coastal area.

References

Aung, H., 1987. Study on the experimental pilot scale spat collecting and growing of *Crassostrea belcheri* and *Saccostrea cuccullata* at Setse, Thanbyuzayat Township, Mon State. Unpublished MSc. Thesis, Department of Marine Science, Moulmein Degree Collage. Burma.

Aung, H., 2011. Study on the spat collection and grows out culture of oyster in Shwe Thaung Yan coastal area. Unpublished PhD. Dissertation, Department of Marine Science, Mawlamyine University. Myanmar.

Gyi, K.M., 1973. Phylum Mollusca. University publication, Yangon, 77 pp.

Hlaing, S.S., 2012. Study on the bivalve near the shell dunes near Pyin Bu Gyi Village, Palaw Township, Taninthayi Region. Unpublished MSc. Thesis, Department of Marine Science, Myeik University, Myeik. Myanmar.

Khaing, M.M., 1995. Studies on the settlement, collection and on growing of spat of the oyster Saccostrea cuccullata (Born) on artificial collectors at Setse. Unpublished MSc Thesis, Department of Marine Science, Mawlamyine University. Myanmar.

Latt, A.K., 2017. Study on the gastropods and pelecypods of Kawdut coastal area, Ye Township in Mon State. Unpublished MSc Thesis, Department of Marine Science, Mawlamyine University, Myanmar.

Lwin, L., 1985. Study on the spat fall of Crassostrea blecheri in Ye River, Mon State, Burma. Unpublished MSc. Thesis, Department of Marine Biology, Moulmein Degree Collage. Burma.

Mann, J.G.D., 1888. Fauna of Mergui Archipelago. Marine Zoology (Taylor and Francis, London) 1 (1), 56-80.

Mason, R.F., 1850. The natural productions of Burma or "Notes on the fauna, flora and minerals of the Tenasserim provinces and the Burma Empire". American Mission Press, Moulmein 211 p.

Mason, R.F., 1852. Tenasserim or Notes on the fauna, flora, minerals and nations of British Burma and Pegu: with systematic catalogues of the known minerals, plants, mammals, fishes, molluscs, sea–nettles, corals, sea urchins, worms, insects, crabs, reptiles and birds: with vernacular names. American Mission Press: Moulmein, 550 p.

Mason, R.F., 1882. Burma, its people and production. Notes on the fauna, flora and minerals of Tenasserim, Pegu and Burma. Volume 1: Geology, Mineralogy and Zoology. Stephen Austin and Sons Company Ltd, Hertford, 220 p.

Myint, K., 1971. Check list of Molluscs of the Mergui Archipelago and the Moscos Islands. University Education Journal 6 (2), 37-48.

Nwe, K.Y., 2017. Fishery biology of some loliginids of Myeik coastal waters. Unpublished PhD. Dissertation, Department of Marine Science, Mawlamyine University. Myanmar.

Nwe, W.W., 2019. Biology and culture of green mussel Perna viridis (Linnaeus, 1758) from Ye estuary in Mon State. Unpublished PhD Dissertation, Department of Marine Science, Mawlamyine University. Myanmar.

Nu, T., 1985. Study on the spat fall of Pena viridis (Linnaeus) in Ye River, Mon State, Burma. MSc. Thesis, Department of Marine Biology, Moulmein Degree Collage. Burma.

Nyunt, H., 1996. Study on the reproductive biology and hatchery culture of larvae of Saccostrea cuccullata (Born) at Setse, Mon State, Myanmar. Unpublished MSc. Thesis, Department of Marine Science, Mawlamyine University. Myanmar.

Oo, N.N., 2012. Study on the marine gastropods from Mon coastal areas. Unpublished MRes Thesis. Department of Marine Science, Mawlamyine University. Myanmar.

Phyo, A.P., 2019. Bivalve molluscs of Mon coastal area with special reference for habitat, local distribution and utilization. Unpublished MSc. Thesis, Department of Marine Science, Mawlamyine University. Myanmar.

Poutiers, J.M., 1998. Bivalves. In: Carpenter KE, Niem VH, editor. FAO Species Identification Guide for Fishery Purposes. The Living Marine Resources of the Western Central Pacific. Volume 1. Seaweeds, Corals, Bivalves and Gastropods. Food and Agriculture Organization, Rome, pp. 123-362.

San, J., 2011. Studies on the morphology and distribution cephalopods in Mon coastal areas. Unpublished MSc. Thesis, Department of Marine Science, Mawlamyine University. Myanmar.

Sein, M.L.M., 1982. The taxonomy and distribution of Burmese marine bivalves. Unpublished MSc Thesis, Department of Zoology, Art and Science University, Rangoon. Burma.

Sein, N., 2019. Seasonal abundance of some gastropods in west Pha Yon Gar Island, Rakhine State. Sittway University Research Journal 6 (2), 98-107.

Thein, A.T., 1982. The taxonomic studies on the Burmese marine nerites (Gastropoda: Neritidae). Unpublished MSc Thesis, Department of Zoology, Art and Science University, Rangoon. Burma.

Thin, K.M. 2015. A study on the occurrence and distribution of Polymesoda expansa Mousson, 1758 (Corbiculidae, Mollusca) from Zee-Phyu-Thaung coastal areas, Ye Township, Mon State. Unpublished MSc. Thesis, Department of Marine Science, Mawlamyine University. Myanmar.

Thu, S., 1970. Sea shells of Ngapali. University Education Journal. 5 (1): 317-368.

Thu, S., 1971. Sea shells of Maungmagan. University Education Journal. 6(2): 397-432.

Thu, S., 1972. The sea shells. Ministry of Information. Yangon 63 pp.

Thu, S., 1980. Taxonomy and distribution of Burmese marine gastropods. Unpublished MSc Thesis, Department of Zoology, Art and Science University, Rangoon. Burma.

Thu, T.T., 1998. Taxonomic studies on some marine bivalves of Dawei, Myeik and Kawthaung along Taninthayi coast. Unpublished MSc Thesis, Department of Zoology, University of Yangon, Yangon. Myanmar.

Tun, S.P., 2016. The composition and distribution of benthic mollusks along southern Taninthayi Coastal Region. Unpublished MSc Thesis, Department of Marine Science, Mawlamyine University. Myanmar.

Tun, T.Z.N., Kyaw, A.M., Aung, P.W., 2012. Preliminary Survey of Gastropods and Pelecypods around Kanpani Village, Longlone Township, Taninthayi Region. Unpublished BSc. Term Paper, Department of Marine Science, Mawlamyine University, Mawlamyine, Myanmar.

Win, M., Aung, T., Myint, A., 1975. Studies on the some molluscs from Burma waters. Unpublished BSc. Term Paper, Department of Marine Biology, Moulmein Degree College, Moulmein, Burma.

Win, P.P.K., 1990. Taxonomic studies on some molluscs trawled off-shore in Myanmar waters. Unpublished MSc Thesis, Department of Zoology, University of Yangon, Yangon. Myanmar.

Win, P.T.S., 2012. Study on the marine gastropods and pelecypods from Setse and Kyaikkhami coastal areas. Unpublished MSc Thesis. Department of Marine Science, Mawlamyine University. Myanmar.

Win, P.T.S., 2013. A study on the marine pelecypods from Mon coastal areas. MSc. Thesis, Department of Marine Science, Mawlamyine University. Myanmar.

WoRMS., 2020. Available Source: http://www.marinespecies.org.

Zin, A.T., Khaing, L.L., Lwin, C.C., 2007. Perliminary survey of gastropods and Pelecypods around the Sin-Ma village, Pathein Township. Unpublished Term paper, Department of Zoology, Pathein University, Pathein, Myanmar.