International Journal of Agronomy and Agricultural Research
ISSN: 2223-7054 (Print); 2225-3610 (Online) | IJAAR |
Website: https://www.innspub.net
Email: info@innspub.net

RESEARCH PAPER
Vol. 27, Issue: 1, 2025
OPEN ACCESS

Intertidal seagrass habitat and its macroinvertebrate assemblages in Baylimango, Dapitan City

MA. Dulce C. Guillena*

JRMSU-Katipunan Campus, Katipunan, Zamboanga del Norte, Philippines

DOI: https://dx.doi.org/10.12692/ijaar/27.1.16-26

ARTICLE INFORMATION

RESEARCH PAPER

Vol. 27, Issue: 1, p. 16-26, 2025

Int. J. Agron. Agri. Res.

Guillena

ACCEPTED: 12 July, **2025**

PUBLISHED: 18 July, **2025**

Corresponding author:
MA. Dulce C. Guillena
Email: dulceguillena@yhaoo.com

ABSTRACT

The seagrass community, a vital component of coastal marine ecosystems, serves as a dynamic habitat that supports a rich diversity of marine organisms in Baylimango, Dapitan City. This study aimed to determine the species composition of the intertidal seagrass beds and associated macroinvertebrate assemblages. Using transect-quadrat and belts transect methods from August 2023 to January 2024, five seagrass species were identified: *Thalassia hemprichii*, *Enhalus acoroides*, *Cymodocea rotundata*, *Halodule pinifolia*, and *Halophila minor*. The mean seagrass coverage was 88.33%, with *Thalassia hemprichii* exhibiting the highest percentage cover. Seasonal fluctuations, particularly during the northeast monsoon, influenced coverage and species presence. A total of 51 macroinvertebrate species from four phyla- Mollusca, Echinodermata, Porifera, and Cnidaria- were recorded. Mollusks comprised the highest relative density (59%), followed by echinoderms (37%). Species such as *Strombus* sp. (aninikad), *Diadema setosum* (toyom), and *Trochus niloticus* (amomongpong) were abundant and economically significant. The study provides baseline ecological data for coastal resource management and sustainable use of coastal ecosystems.

Key words: Ecosystems, Macroinvertebrates, Mollusca, Seagrass, *Thalassia hemprichii*

INTRODUCTION

Seagrasses are specialized marine flowering plants that adapt to the nearshore environment. Most of the species are entirely marine although some of the kind cannot reproduce as the condition is or subject to marine fresh water inflow. Seagrasses can survive in a range of conditions encompassing freshwater, estuarine, marine or hypersaline. Although there are relatively few species globally (about 60) which are grouped into 13 genera and 5 families (Short *et al.*, 2001; Fortes 2013) worldwide, these plants play an important role in many shallow, near-shore, marine ecosystems.

Seagrass meadows provide ecosystem services that rank among the highest of ecosystems on earth. It has direct monetary outputs, in fact substantial one since highly valued commercial catches such as prawns and fish are dependent on these systems. They provide protective shelter for many animals, including fish and can also be a direct food source for manatees and dugongs, turtles, waterfowl and some herbivorous fish and sea urchins (Short *et al.*, 2001; Fortes, 2013). Their roots and rhizomes of seagrasses also stabilize sediments and prevent erosion while the leaves filter suspended sediments and nutrients from the water column. Moreover, the meadows are thus linked to other important marine habitats such as coral reefs, mangroves, salt marshes and oyster reefs.

Research studies have evidences that seagrasses are experiencing declines globally due to anthropogenic threats (Duarte, 2002; Turschwell *et al.*, 2021). It identified runoff nutrients and sediments that affect water quality is the greatest anthropogenic threats to seagrass meadows, although there are other stressors which include aquaculture, pollution, boating, construction, dredging and landfill activities, and destructive fishing practices. The natural disturbances such as storms and floods also cause adverse effects. Potential threats from climate change include rising sea levels, changing tidal regimes, UV radiation damage, sediment hypoxia and anoxia, increases in sea temperatures and increase storm and flooding events. Thus, the ecosystems that seagrass support and the ecosystem services that they provide are threatened by the multitude of environmental factors which are changing day-to-day. But, it is the recent recognition of the economic value of the seagrass beds as nursery areas for commercial and recreational marine species has sparked concern for the preservation of seagrass habitats.

Though, the destruction or loss of seagrasses have been reported from most parts of the world (Short *et al.*, 2001; Fortes, 2013) to be natural cause or high energy storms. Today, the destruction were found as result from human activities such as the consequence of eutrophication or land reclamation and the changes in land use (Govindasamy, 2011).

Increase in dredge and fill, construction on the shorelines, damage associated with commercial overexploitation of coastal resources and recreational boating activities along with anthropogenic nutrients and sediments have dramatically reduced seagrass distribution (Short *et al.*, 2018; Fortes, 2013). Nutrient enrichment of sea waters had stimulated phytoplankton blooms, thus weakening the sunlight penetration, reducing photosynthesis that nourishes seagrasses (Larkum *et al.*, 2018; Björk, 2021). While, mechanical destruction and overfishing may not decrease the photosynthetic activity of seagrasses but eventually these destroy the development of roots and rhizomes, thereby reducing its capability of absorbing nutrients through either their leaves or roots.

Unquestionably, many people know about the plants but the role that the plants play and just how important they are in the coastal ecosystems in Baylimango is less understood by the populace. An ocular inspection on coastal and marine resources in Baylimango which was conducted by the Siliman University-Angelo King Center for Research and Environmental management (2000) showed that the area has been overfished and dynamited in the past.

Worst of all, the coral reef has not recovered. The absence of schooling fish and common coral reef fish indicate the prevalence of intensive exploitation.

The poor quality of the marine resources on the other hand could be attributed to the lack of protection and community involvement. Since seagrass communities provide habitats and nursery grounds for many marine animals including the macroinvertebrates, it is imperative to have a better management on the ecology of seagrass community in gaining back the once rich marine resources in the Baylimango coast.

Along this context, the research is carried out to determine the species composition and its associated macroinvertebrates The research output shall serve as baseline information for dissemination to the populace on the importance of seagrasses. Also to make them aware and appreciate some of the plant and animal associations within the seagrass ecosystem.

MATERIALS AND METHODS

The study utilized descriptive-evaluative method of research with the aid of systematic transect quadrat (TQ) and belt transect method for better quantification of both seagrasses and macroinvertebrates. Seagrasses and macro-invertebrates were collected and photographed for identification purposes.

This study was conducted in the coastal waters of Baylimango, Dapitan City from October 2023 to January 2024. Baylimango is located approximately 10 kilometers from Jose Rizal Memorial State University (Fig. 1). It is a coastal barangay which lies on the northern part of Dapitan City. The traditional source of income for the community is fisheries. The sea offers the fishermen the opportunity to earn a living. With the bounty of the sea life, fishes are are abundant well as edible macro-invetebrates which are gathered for sale and for their own consumption. These macro-invertebrates are gathered from the seagrass meadows of the barangay during the low tide.

Three study sites selected for samplings which served as replicates. The first site was in an intertidal flat located near the barangay's cemetery (N 8° 41.567', E 123° 27.196'). The residents of the barangay mostly had their swimming activity in this area. Site 1 was approximately 1.3 km away from site 2.

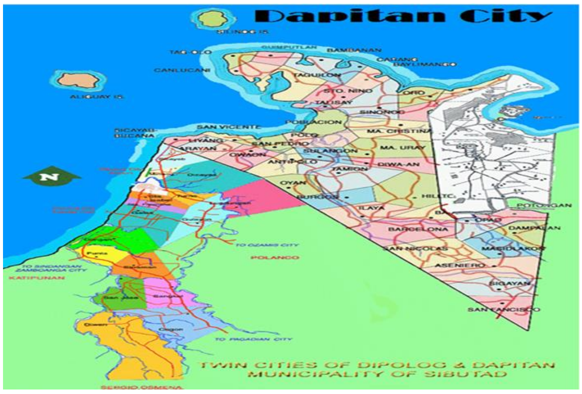

Fig. 1. Map of Dapitan city

Site 2 was situated on a tidal flat fringed on the landward side by mangroves (N 8° 41.443', E 123° 27.612'). This site is the mangrove sanctuary of the barangay. It is a protected area that covers 7 hectares. Substrate was mud/ silt, sand and rubble. Site 2 is approximately 1.2 kilometers away from site 3.

The third sampling site was Cavite, one of the "sitios" in Baylimango, 1,200 meters away from site 2. The area is characterized by rocky and coral rubbles coastline (N 8° 41.40', E 123° 27.176'). Found in the area were the sediments like silt, sand with coral rubbles and patches of hard substrate were encountered along the transect line. Fish cages were also seen, built within the seagrass beds where there is a strong current of water flowing through the estuary.

The line transect method and quadrats were used for percentage cover of seagrass species. Transects started at mangrove edges and run perpendicular to the shoreline. A distance of 50 meters was maintained between transect lines. There were two transect lines laid at points where the habitat starts and ends. A quadrat measuring 1m x 1m was set every 10 meters along the transect lines to serve as representative samples. The quadrat was divided into sixteen squares for easy percentage estimation.

The belt transect method was employed in determining the macroinvertebrates' diversity and density in the area. A 100 meter transect line perpendicular to the sea was established in each site. All the macro-invertebrates were counted and recorded.

General collection was done for the identification of its local name through the help of local people and scientific naming was done using Barnes (2000), Oliver (1981), Severns (2004) and the internet. Descriptive statistics was used to analyzed/summarized all data sets.

RESULTS AND DISCUSSION

Species composition

Table 1 and 2 present the seagrass species found in the Baylimango Coastal waters. The seagrass bed was a mixed community, composed of five seagrass species. The species identified belongs to Family Hydrocharitacae (*Enhalus acoroides*, *Halophila minor*, *Thalassia hemprichii*) and Family Potamogetonaceae (*Cymodocea rotundata*, *Halophila minor*).

Enhalus acoroides was not observed to grow in site 1. On the other hand, *Halophila minor* was also absent in site 1 and site 2. The Hydrocharitacae can be monoecious or dioecious, annual or perennial aquatic herbs.

Leaves without a ligule. Tannin cells present or absent. Stomata present or absent. Flowers unisexual, enclosed within a spathes of 2 bracts. Perianth in one or two whorls of 3 free segments. Male flowers with anthers sessile or on slender filaments. Pollen grains globose to ellipsoid. Female flowers usually with a long hypanthium. Ovary inferior, compound; unicular, ovules numerous. Fruit fleshy, usually indehiscent.

Genus *Cymodocea* are rhizome creeping, herbaceous, monopodially branching with each node 1-5 or more branched roots and a short erect stem bearing 2-7 leaves. Leaf blades linear, with 7 to 17 longitudinal veins, margins smooth but spinulose or serrulate near the apex, apex rounded or sometimes notched.

Enhalus acoroides is the largest of the seagrass species from the Philippines reaching a height of more than a meter as identified by (Short *et al.*, 2018). Rhizome thick up to 1.5 cm in diameter, deeply embedded in substrate, bearing many roots, 2-5 mm in diameter and up to 15 cm long. Persistent leaf fibers very dense and masking rhizome. Leaves 3 to 4, produced directly from rhizome; leaf blades linear to 1.5 cm wide and reaching 1 m length; leaf tips rounded, beset occasionally with minure serrate projections when young; leaf margins entire, slightly rolled. Characteristic tough, black vascular bundles persistent after death and decay of other leaf tissues. Nerve 10-40 parallel to about as many air channels. Fruits ovoid, 4-7 cm long with acuminate tips and densely covered with bifid projections. Fruit stalk long and coiled.

Table 1. Species composition of seagrasses in Baylimango Coast, Dapitan City (x = absent; √ = present)

Family	Scientific name	Local name	Sampling sites		
			Site 1	Site 2	Site 3
Hydrocharitaceae	*Enhalus acoroides*	Lusay	x	√	√
	Halophila minor	Lusay	x	x	√
	Thalassia hempirichii	Lusay	√	√	√
Potamogetonaceae	*Cymodocea rotundata*	Lusay	√	√	√
	Halodule pinifolia	Lusay	√	√	√

Table 2. Overall estimated percentage cover of seagrasses

Months	Overall **percent cover** of Seagrasses			
	Site 1	Site 2	Site 3	Mean
Aug 2023	100	100	83	94.17±10.01
Sept 2023	99	99	81	93.18±10.32
Oct 2023	99	98	81	92.52±10.33
Nov 2023	100	93	80	91.06±10.13
Dec 2023	86	86	69	80.61±9.74
Jan 2024	87	84	69	80.01±9.34
Overall	95	93	77	88.33±9.87

Halophila minor is the smallest of the seagrass found in the Philippines, with rhizomes barely reaching 1 mm in diameter (Short *et al.*, 2001). Internodes 7-20 mm long, usually root below each erect shoot. Erect shoot consisting of a pair of leaves on each node. Leaves with petioles, 2-8 mm long, each enveloped by a pair of transparent, orbicular scales with rounded apices. Leaf blade elliptic or obovate, width 2-3 mm, length 4-7 mm, apices rounded, bases attenuate; margins entire; with 4-7 pairs of cross-veins. Staminate flowers pedicellate, with obtuse, convex sepals, anthers approximately 2 mm long. Pistillate flowers with 3 styles, each up to 15 mm long; ovary ovoid, reaching a length of 3 mm. Ellipsoid, ovoid or globose fruits up to 4 mm long, bearing 2-6 mm long beaks; seeds subglobose, about 0,5 mm long.

On the other hand, *Thalassia hemprichii* was described by (Short *et al.*, 2001) as plants of moderate size consisting of a robust rhizome, 2-4 mm in diameter; internodes 3-6 mm long; roots clothed with dense filiform laterals, one per node if present. Erect shoot short, with 2-6 leaves enveloped by 3-8 cm long sheaths; erect shoots sparsely distributed along rhizome.

Leaf blades linear and distinctly falcate (particularly in less grazed area), 4-10 mm wide, 7-40 cm long (commonly less than 25 cm long) apices rounded, occasionally uneven, margins entire; 10-16 nerves by cross veins; median nerve often conspicuous.

Cymodocea rotundata is a plant of moderate size with moderately robust rhizomes, reaching 2 mm in diameter; internodes 0.53 cm long; laxly branched roots usually 1-3 per nodes.

Erect shoots short, generally 2-4 leaves. Persistent leaf sheaths up to 4 cm long, usually forming scarious mass at maturity; when shed, conspicuous scars are left on stem. Leaf blades linear, 2-4 mm wide and up tp 10 cm long, with round apices or slightly serrulate, nerves 8-12.

Halodule pinifolia is a plant with slender rhizomes, up to 1.5 mm in diameter; internodes usually 0.5-2.0 cm long, simple or laxly branched roots, 2 to several per node. Short, erect shoots consisting of 2-4 leaves borne at each node. Leaf blades linear, 4-15 cm long, not more than 1.5 mm wide. Leaf tips obtuse with few irregular serrations. Leaf margins entire; conspicuous midrib furcated at the tip. Basal portion of leaves enclosed by sheaths, 3 cm long. Ovate scales on each node not persistent at maturity.

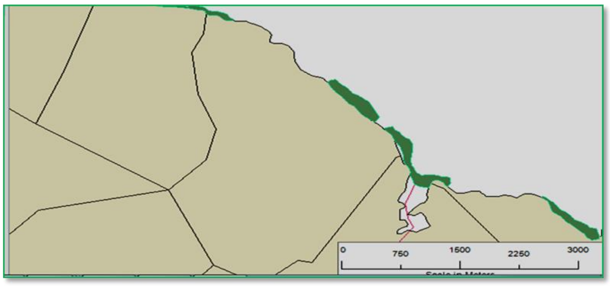

Fig. 2. Map of Dapitan city showing seagrass bed (green) in Baylimango coastal waters

Shown in Fig. 2 is the coverage of seagrass bed in Baylimango Coastal waters indicated by the green color. A global positioning system (GPS) was used to obtain the coordinates of the area. Based on calculations, it was found out that the extensive seagrass bed runs along the coast to a length of 2, 561.30 meters or 2.56 kilometers and extends offshore about 0.2 kilometers, hence the seagrass bed is more or less 512, 260 square meters or 51.23 hectares in area. The seagrass bed was a mixed stand of the five identified species of seagrasses.

Similarly, the Siliman University-Angelo King Center for Research and Environmental Management -SUAKREM (2000) found out that the the seagrass bed in the coast of Baylimango was a mixed community, composed of *Thalassia hemprichii*, *Halodule pinifolia* and *Enhalus acoroides*. It extended from within the mangrove forest, to approximately 500 meters offshore. Hence, an additional of two seagrass species were identified in this study namely, *Cymodocea rotundata* and *Halophila minor*.

The total percentage cover of seagrasses was estimated to be at 88.33±9.87%. The percent cover for August, September, October and November were at 94.17±10.01, 93.18±10.32, 92.52±10.33, 91.06±10.13 respectively. It can be seen from Table 3 that the percent cover for the month of December was only at 80.61±9.74 and for the month of January was only at 80.01±9.34. The low percent cover for these months could be attributed to the northeast monsoon which brings not only heavy rains but also strong winds thus bringing strong waves. 7

In situ observations revealed that strong waves cause the sand to cover some of the seagrass species. Generally, the percentage cover was at 80-100% which is comparable to the results estimated by SUAKCREM researchers.

Table 3 revealed the overall estimated percent cover of each of the seagrass species. As shown in the Table 3, *Thalassia hemprichii* registered the highest percent coverage at 46.32±10.35. *Cymodocea rotundata*'s percent cover was 32.82±24.37 and *Enhalus acoroides* percent cover was 6.53±7.98. *Halodule pinifolia* and *Halophila minor* had the least percentage cover which is 6.53±7.98 and 2.78±2.58 respectively. The low percent cover and morphology were the reasons why the productivity of these two species, *Halodule pinifolia* and *Halophila minor*, were not determined.

Table 3. Overall estimated percent coverage of each of the seagrass species

Seagrass **species**	Percent cover of each seagrass species			
	Site 1	Site 2	Site 3	Mean
E. acoroides	0	4.17	15.42	6.53±7.98
H. minor	0	0	0.42	0.14±0.24
T. hemprichii	49.38	34.79	54.8	46.32±10.35
C. rotundata	40.14	52.69	5.63	32.82±24.37
H. pinifolia	5.73	1.67	0.94	2.78±2.58
Overall	95	93	77	88.33±9.87

Table 4. Frequency of occurrence of macroinvertebrates in Baylimango coast

	Frequency of occurrence of Macro-invertebrates in Baylimango Coast							
Scientific name	Local/English name	Aug 2023	Sept 2023	Oct 2023	Nov 2023	Dec 2023	Jan 2023	Frequency (%)
C. Medusae	jellyfish	+	+	+	+	+	+	100
A. typicus	starfish	+	+	+	+	+	+	100
L. laevigata	starfish	+	+	+	+	+		83.33
P. obtusatus	starfish	+	+	+	+	+	+	100
P. nodosus	starfish	+	+	+	+	+	+	100
D. setosum	toyom	+	+	+	+	+	+	100
E. mathei	siyok	+	+	+	+	+	+	100
E. calamaris	parang	+	-	-	+	+	+	66.67
E. diadema	dagom-dagom	+	+	+	+	+	+	100
S. sphaeroides	dapaw-dapaw	+	+	+	+	+	+	100
T. gratilla	Salawaki	+	+	+	+	+	+	100
A. echinites	balat	+	+	+	+	+	-	83.33
H. pulla	balat	+	+	+	+	-	+	83.33
H. fuscopunctata	balat	+	+	+	-	+	+	83.33
H. scabra	balat	+	+	+	+	+	+	100
E. godeffroyi	bahag-bahag	+	+	+	+	+	+	100
S. maculata	bahag-bahag	+	+	+	+	+	+	100
M. longepeda	taob-taob	+	+	+	+	+	+	100
O. pictum	taob-taob	+	+	+	+	+	+	100
O. scolopendrina	taob-taob	-	+	+	+	+	+	100
O. sp.	taob-taob	+	+	+	+	+	+	100
A. satowi	litob	+	+	-	+	+	-	66.67
C. cardissa	kasing-kasing	-	+	+	+	+	-	66.67
S. regius	tikod-tikod	+	+	+	+	+	+	100

T. crocea	taklobo	+	+	-	-	+	+	66.67
A. sp.	dunsol	+	+	+	+	+	-	83.33
C. labiatus	aninikad	+	+	+	+	+	+	100
C. ponderosa		-	+	+	+	+	+	83.33
C. vibex	ahos-ahos	+	+	-	+	+	+	83.33
C. caeruleum	buta-buta	+	+	+	+	-	+	83.33
C. capucinus	buta-buta	+	+	+	+	+	+	100
Conus	tapok-tapok	-	+	+	+	+	+	83.33
C. aquatile		+	+	+	+	-	+	83.33
C. vespertilio	kibol	+	+	+	+	-	+	83.33
C. annulus	sigay	+	+	+	-	+	+	83.33
C. lynx	puki	+	+	+	+	+	+	100
C. tigris	puki	+	+	+	+	+	-	83.33
N. planospira	sihi	+	+	+	+	+	+	100
N. undata	uwan-uwan	+	+	+	+	+	+	100
M. margariticola	anso-anso	+	+	+	+	+	+	100
P. senticosus	dalo-dalo	+	-	+	+	+	+	83.33
P. pullus	punaw	+	+	+	+	+	+	100
P. porcellanus	bolan-bolan	+	+	+	+	+	+	100
T. telescopium	bagongon	+	+	+	+	+	+	100
T. niloticus	amomongpong	+	+	+	+	+	+	100
Z. olivaceus	suso	+	+	+	+	+	+	100
Neopilina	wasay-wasay	+	+	+	+	+	+	100
Chiton	tangkologan	+	+	-	+	+	+	83.33
C. sp.	gamosa	+	+	+	+	+	+	100
P. lita	gamosa	+	+	+	+	+	-	83.33
S. sp.	gamosa	+	+	+	+	+	+	100

Associated macroinvertebrates

A total of 51 species of macro-invertebrates were found in the seagrass beds of Baylimango coastal waters. These species were identified to belong to four phyla in 10 classes: Scyphozoa, Asteroidea, Echinodea, Holothuroidea, Ophiuroidea, Bivalvia, Gastropoda, Monoplacophora, Polyplacophora and Demospongiae (Table 4).

Phylum Cnidaria includes the jellyfishes, (Class Scyphozoa). Cnidaria is a large phylum composed of some of the most beautiful of all the salt and freshwater organisms: the true jellyfish, box jellyfish, coral and sea anemones, and hydra. They occur seasonally in large aggregates and are easily observed as they swim slowly near the surface. Scyphozoans having different types of nematocysts are entirely marine with their habitats near shore. They sometimes are blown or carried into brackish water estuaries. Most cnidarians prey on organisms ranging in size from plankton to animals several times larger than themselves, but many obtain much of their nutrition from endosymbiotic algae, and a few are parasites. Many are preyed upon by other animals including starfish, sea slugs, fish and turtles.

Phylum Echinodermata is represented by five living classes, namely: Asteroidea (sea stars), Echinoidea (sea urchin), Holothuroidea (sea cucumbers) Ophiuroidea (brittle stars) and Crinoidea (feather stars), of which were found in the study area. The colorful starfish have five arms, the number and length of arms can vary, in some, the arms are essentially non-existent in adults.

All crawl using the tube feet which arises from the ambulacral grooves on the lower (oral) surface of each arm and converge on the mouth. The habitat varies and includes coarse and shelly gravel rock. They are typically predators and detritus feeders (Thomas, 2003).

Linckia laevigata's highest density was in October but it was not observed to occur in December. *Protoaster nodosus*' density in August and September were of the same values (1.5/200 sq.m.). Its density for October, November and December was only (0.5/200 sq. m.) *Pentaster obtusatus*' density was highest in September (1.5/200 sq. m.) and lowest in October and November (0.5/200 sq. m.). *Archester typicus* density in August was 1.5/200 sq. m. while 1.0/200 sq. m. in October, November and December. Generally, the sea stars' density was highest in dry season and lowest in wet season.

Sea urchins have a spherical body with stiff, often spines which easily penetrate and break off in human skin. They have venomous pedicellariae which can inflict possibly fatal wounds.

Certain sea urchins, particularly those living in inshore, cover themselves with bits of seagrass or algae to protect their body from predator. On the bottom side of a sea urchin are five teeth that these organisms use to ingest algae and break down other foods they consume.

On the outside of their body are hundreds of transparent tubes that emerge which allow them to stick to the bottom of the ocean or to move at a very slow pace. These unusual tubes are called "tube feet." Their tube feet are much longer than the spines outlining their shells and they are also used by the sea urchin to trap food and in respiration.

Diadema setosum registered the highest density for the whole duration of the study. Most species of Class Echinoidea occurred in almost all months but their density was relatively low, less than 5 individuals per 200 square meter.

Sea cucumbers are marine animals with leathery skin and an elongated body containing a single, branched gonad. Sea cucumbers have lower surface modified with abundant tube feet for attachment or creeping. They are capable of exuding sticky, distasteful white tubules if disturbed to deter predators. Holothurians bear 5 to 30 oral tube feet modified as tentacles for feeding. Most species are deposit feeders. When threatened, cucumbers can contract their muscles and shoot out water from their body making them shorter, thicker, and harder.

Euapta godeffroyi registered the highest density (4.0/200 sq.m.). On the other hand, *Synapta maculata* ranked second with the highest density (2.0 /200 sq.m). *Holothuria fuscopunctata* was not observed in October. Similarly, *Holothuria scabra* was not found in November.

The brittle star (also called the serpent star) is a spiny, hard-skinned, long-armed animal that lives on the rocky sea floor, from shallow waters to great depths. There are over 2,000 different species of brittle stars worldwide. Most brittle stars have five (or a multiple of five) long, thin, spiny arms that radiate from a flat central disk; the arms do not touch each other at their bases. Many of the arms are forked. If a brittle star's arm is cut off, it will regenerate.

Brittle stars that have multiple-forked arms are called basket stars. They have a hard endoskeleton and vary in color. They do not have a brain; they have a simple ring of nerve cells that moves information around the body. Tube feet located along the arms sense light and smells. Brittle stars are mainly detrivores, they eat decaying matter and plankton. The *Macrophiotrix longepeda* had a density of 14/200 sq. m., 8/200 sq. m., 7/200 sq. m. in October, September, November and December respectively.

Phylum Mollusca is extremely diverse in form and these include bivalvia, gastropoda, monoplacophora, polyplacophora, cephalopods and few other classes. The diversty of molluscans species reflects their great success in adapting to many different habitats and lifestyles. A significant characteristics of mollusks is their possession of a coelom, a fluid-filled cavity that develops within the mesoderm. All mollusks have a soft body which is generally protected by a hard, calcium containing shell.

Mollusks are characterized by a toothed tongue, the radula, composed primarily of chitin. The radula serves both to scrape off algae and other food materials and also to convey them backward to the digestive tract. In some species it is also used in combat.

Bivalves are mollusks with two shells or valves, hinged along one edge, with the animal in between. In sand-dwelling bivalves the foot is adapted for burrowing. In sessile bivalves with one valve firmly cemented to rock or other hard substratum (oysters), the foot is reduced.

Densities of *Andara satowi* in August and October were relatively high. Densities of other species of bivalves were relatively low. As shown in the Table 3, some species were even absent in certain months. *Corculum cardissa* were not found to occur in July and December. *Spondylus regius* had relatively similar densities comparable to *Andara satowi.*

Gastropods are the dominant grazers of algae and aquatic plants in many lakes and streams, and can play a vital role in the processing of detritus and decaying organic matter. They are themselves consumed by a host of invertebrate predators, parasites, fish, waterfowl, and other creatures great and small. An appreciation of freshwater gastropods cannot help but lead to an appreciation of freshwater ecosystems as a whole (Dillon, 2000).

Canarium labiatus registered consistent high density. *Trochus niloticus* had a relatively high density in August, September and October and it increases in November. Moreover, other species of class gastropoda had densities higher than 2/200 sq.m. but a large number of gastropods were having density lower that 2/200 sq.m.

There are also chitons. These are flattened with eight overlapping plate comprising the shell, surrounded by a girdle. Most tropical Pacific species are intertidal or shallow subtidal and have a large foot by which they can clamp down to rock so tightly that they cannot moved, thus they are generally slow moving, inconspicuous animals. Most feed on algae, grazing the surface rocks, while a few also feed on assorted encrusting invertebrates.

The oldest living group of multicellular organism belongs to Phylum porifera They are sedentary filter-feeders. They lack the muscles, nerves and the body organs. Skeletal support in sponges is provided by a network of hard spicules, flexible fibers, foreign sand or combination of the three (Thomas, 2003). Sponges densities were below 4/200 sq .m.

Monoplacophorans are small and limpet-like having a single cap-like shell, attached to rocks, and in debris collected from the bottom. They are fed by scraping off the thin layer of sediment and eating mineral particles, unidentified organic material, scattered sponge spicules, small polychaete bristles. (www.ucmp.berkeley.educ.) The density values for the rest of the months were less than 1/200 sq.m.

A strombus species locally called "aninikad" has a density of 56.75 individuals per 200m^2. This was followed by class echinoidea, *Diadema setosum* (toyom) with a mean density of 22 individuals per 200 m^2. The density of *Trochus niloticus* is seven individuals per 200 m^2 thus making it the third most abundant species in the area. Similarly*, Macrophiothrix longepeda* (brittle star) locally named as taob-taob has a density of 7 per 200 m^2.

In the macroinvertebrates assessment conducted by Montero (2010) at the intertidal community near the Minterbro Port, Davao City, the major groups of organisms collected were composed of gastropods, echinoderms, bivalves, crustaceans, polychaetes and nematodes. Similarly, gastropods and echinoderms dominated the study area that coincides with the results conducted by Montero (2010).

The first three abundant species were harvested by shell collectors in the barangay to be sold in the markets of Dapitan and Dipolog City and for household consumption. Class Ophiuroidea do not have economic importance to the people in the community but they had their own roles in the food chain of the seagrass ecosystem. More than 50% of the total number of species was found present in all sampling stations with in the six months study period although most species are in smaller density.

According to Moverley (2000) macroinvertebrates are important in the aquatic environment. They are important for describing environmental conditions. Monitoring their diversity is important because their structural assemblages can be affected by environmental disturbances. Intertidal macroinvertebrates like crustaceans, gastropods and marine worms are major components of the food web between primary producers and large consumers (Purwoko, 2007).

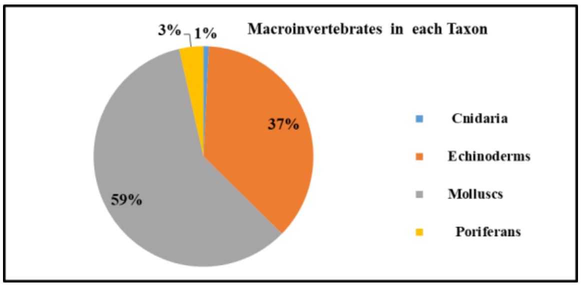

Fig. 3. Percentage of macroinvertebrates in each Taxon

In terms of relative densities at the phylum level, it revealed that 59% of the macroinvertebrates belonged to phylum Mollusca (Fig. 3). This was followed by phylum Echinodermata (37%). The two remaining phyla were phylum Porifera (3%) and phylum Cnidaria (1%).

Fifty-nine percent of the species belonged to Class Mollusca and included most of the valuable or commercially important species (Fig. 4). Class Echinodermata was next in having the highest relative density. Other classes have far below the values of the four dominant species.

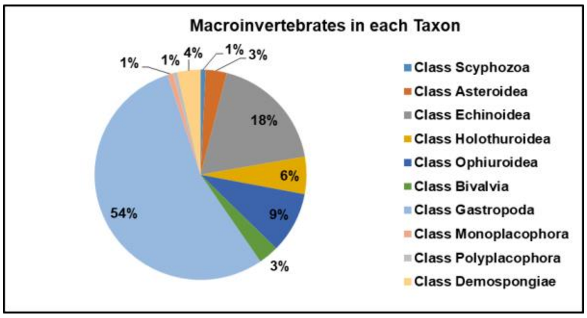

Fig. 4. Class of macroinvertebrates

An assessment on the associated macroinvertebrates of seagrasses in Eastern Coast of Aborlan Palawan conducted by Amarille (2007) registered at least 13 macroinvertebrates species in 12 genera and 12 families were encountered. A similar study conducted by Van Long *et al.* (2007) in the Northern Spratlys Island reported a total of 53 species in 7 classes and 3 phyla. Similarly, this study registered a total of 51 species in 10 classes and 4 phyla.

CONCLUSION

The intertidal seagrass beds in Baylimango, Dapitan City form a mixed seagrass community highlighting the ecological richness and productivity of the area. A total of 51 macroinvertebrate species belonging to four phyla (Mollusca, Echinodermata, Porifera, and Cnidaria) and ten classes were identified within the seagrass beds. Several macroinvertebrates, including *Strombus* sp. (aninikad), *Diadema setosum* (toyom), and *Trochus niloticus* (amomongpong), were not only abundant but also noted for their economic significance to the local community. The seasonal variation in seagrass coverage and species density, particularly during the northeast monsoon is influenced by climatic conditions on the seagrass ecosystem. Moreover, the presence and relative abundance of diverse macroinvertebrate taxa indicate the functional importance of these seagrass habitats as breeding, feeding, and nursery grounds.

REFERENCES

Amarille R. 2007. Benthic macroinvetebrates. College of Forestry and Environmental Science, Aborlan Palawan. http://www.wpu.edu.ph/cfes/index.php

Björk M, Asplund ME, Deyanova D, Gullström M. 2021. The amount of light reaching the leaves in seagrass (*Zostera marina*) meadows. PLoS ONE **16**(9), e0257586. https://doi.org/10.1371/journal.pone.0257586

Duarte CM. 2010. Seagrass meadows. http://www.eoearth.org/article/Seagrass_meadows

Duarte CM. 2000. Seagrass ecology. Cambridge University Press. xi+298 p. ISBN 0-521-66184-6.

Govindasamy C. 2011. Concentration of heavy metals in seagrasses tissue of the Palk Strait, Bay of Bengal. International Journal of Environmental Sciences **2**(1), 20011. ISSN 0976–4402.

Larkum AW, Waycott M, Conran JG. 2018. Evolution and biogeography of seagrasses. In: Seagrasses of Australia, 3–29. https://doi.org/10.1007/978-3-319-71354-0_1

Montero Y. 2010. Macroinvertebrates of upper intertidal zone of a selected site in Barrio Ilang, Tibungco, Davao City. http://www.scribd.com/Research/Science

Short FT. 2001. Global seagrass research method. Elsevier B.V.

Short FT, Short CA, Novak AB. 2018. Seagrasses. The Wetland Book, 73–91. https://doi.org/10.1007/978-94-007-4001-3_262

Smith R. 2002. Elements of ecology. 4th edition. Pearson Education Asia Pte Ltd.

Thomas FM. 2003. Ammonium uptake by seagrass communities: Effects of oscillatory versus unidirectional flow. Marine Ecology Progress Series **247**, 51–57.

Turschwell MP, Connolly RM, Dunic JC, Sievers M, Buelow CA, Pearson RM, Tulloch VJ, Côté IM, Unsworth RK, Collier CJ, Brown CJ. 2021. Anthropogenic pressures and life history predict trajectories of seagrass meadow extent at a global scale. Proceedings of the National Academy of Sciences **118**(45). https://doi.org/10.1073/pnas.2110802118