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Phylogenetic Affinities and Morphometric-Meristic Characteristics of Seagrasses in Coastal Waters of Saparua Island, Maluku, Indonesia

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ABSTRACT

This study aimed to analyze the phylogenetic relationships and morphometric-meristic profiles of seagrasses in the coastal waters of Saparua Island, Central Maluku, Indonesia. Sampling was conducted from January to March 2023 at four stations: Porto, Tiouw, Mahu, and Ihamahu. Data were collected using a transect method, with parameters including total number of leaves, number of leaf veins, number of intact leaves, leaf length and width, rhizome spacing and diameter, as well as root length and diameter. Hydrological parameters (temperature, salinity, pH, and dissolved oxygen) were also measured *in situ.* The results showed spatial variation in seagrass diversity, with Porto exhibiting the highest number of species (eight species). Morphometric and meristic characteristics varied among species but showed no significant differences among locations, except for the number of leaf veins ($P< 0.05$). Cluster analysis revealed close phenetic relationships among several species within a monophyletic group. These findings suggest that environmental factors such as salinity and substrate type have a greater influence on seagrass structure than geographic location. Therefore, sustainable and ecosystem-based management of seagrasses on Saparua Island is essential, with active involvement of local communities in conservation efforts.

INTRODUCTION

Saparua Island has been designated as a Small Island Marine Conservation Area (Taman Pulau Kecil) through the Decree of the Governor of Maluku Province No. 386 of 2016. This designation aims to conserve natural resources (NR) as conservation targets, support sustainable utilization by local communities, and promote tourism development based on local wisdom. The area has high marine potential, hosting various critical coastal ecosystems such as coral reefs, mangroves, and seagrass beds, which serve as habitats for diverse fish species and other marine organisms **(Islami *et al*., 2018)**.

One of the key ecosystems playing an important role in the waters of Saparua Island is the seagrass meadow. This ecosystem is distributed across several coastal villages, including Haria, Porto, Tiouw, Saparua, Kulur, Mahu, and Ihamahu. The diversity of seagrass species in the region reflects a high biological potential, with varied environmental characteristics, including substrate types such as sand, muddy sand, and carbonate **(Purwanto, 2020)**. These environmental differences may influence the growth, morphology, and distribution of seagrass species.

Research on seagrass morphometric and meristic profiles is essential to understanding intra- and interspecific variation among seagrasses living under different environmental conditions. Factors such as substrate type, nutrient content, temperature, salinity, pH, and coastal topography are known to influence seagrass morphological structures **(Tuapattinaya, 2014; Handayani, 2016; Wakano, 2017**). Such morphological variations not only reflect the ecological adaptations of species to their environments but also serve as early indicators for phylogenetic and conservation studies.

In the context of marine plant taxonomy and ecology, the analysis of morphometric and meristic traits can provide phenetic information useful for identifying similarities among seagrass species. Understanding morphological similarities can aid in accurately distinguishing species and identifying potential morphological variation influenced by local environmental factors **(Safitri *et al*., 2017)**. Through this approach, seagrass studies not only reinforce the scientific foundation for species conservation but also support more targeted and sustainable habitat management.

Although several studies on seagrasses have been conducted in Indonesia, locally specific information on species similarity and morphometric-meristic profiles of seagrasses in the waters of Saparua Island remains limited. Previous research has indicated significant variations in seagrass traits **(Amale *et al*., 2016; Setiawaty, 2018; Supriyadi *et al*., 2018; Sarinawati *et al*., 2020; Sermatang *et al*., 2021; Tuapattinaya *et al*., 2021)**.

Therefore, this study is crucial to filling scientific data gaps by exploring species similarity and morphometric-meristic profiles of seagrasses in the coastal waters of Saparua Island, Maluku. The findings of this study are expected to contribute to the conservation of seagrass species and the science-based, sustainable management of coastal resources.

MATERIALS AND METHODS

Time and location of the study

The research was conducted in the coastal area of Saparua Island, Central Maluku Regency, Maluku Province, from January to March 2023. Sampling locations were distributed across two sub-districts: Saparua Sub-district, covering Porto Village (Station 1/ST1) and Tiouw Village (Station 2/ST2), and East Saparua Sub-district, covering Mahu Village (Station 3/ST3) and Ihamahu Village (Station 4/ST4) (Fig. 1).

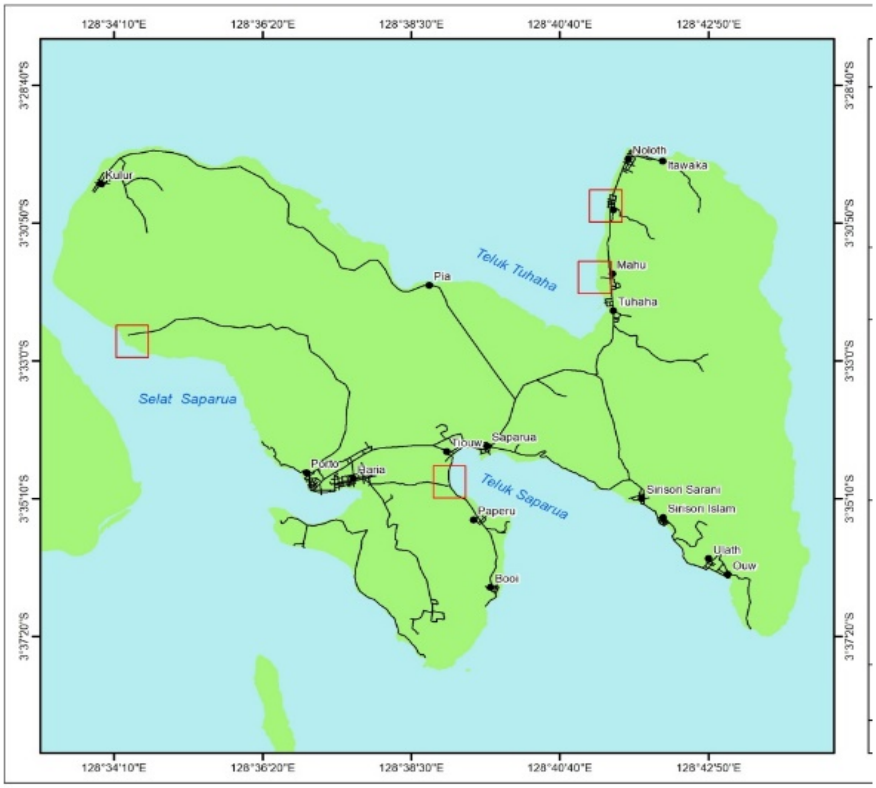

Fig. 1. Map of study sites

Type and research design

This study employed a combination of descriptive and correlational approaches. The descriptive approach was used to examine the morphometric and meristic characteristics of seagrasses, as well as the physico-chemical conditions of the waters within the study area. The correlational approach was applied to assess the relationship between hydrological parameters (temperature, salinity, pH, and dissolved oxygen) and the variation in morphometric and meristic traits of seagrasses.

Data collection procedures

Site determination and transect establishment

Seagrass samples were collected during low tide, when water levels ranged between 0.5 and 1.2cm. The line transect technique was applied following the method described by **English *et al.* (1994)**, in which a 100-meter transect line was laid perpendicular to the shoreline extending seaward. Along this transect, five fixed-size plots were established at 20-meter intervals. The plots were marked using stakes, raffia string, PVC pipes, and metal weights (Fig. 2).

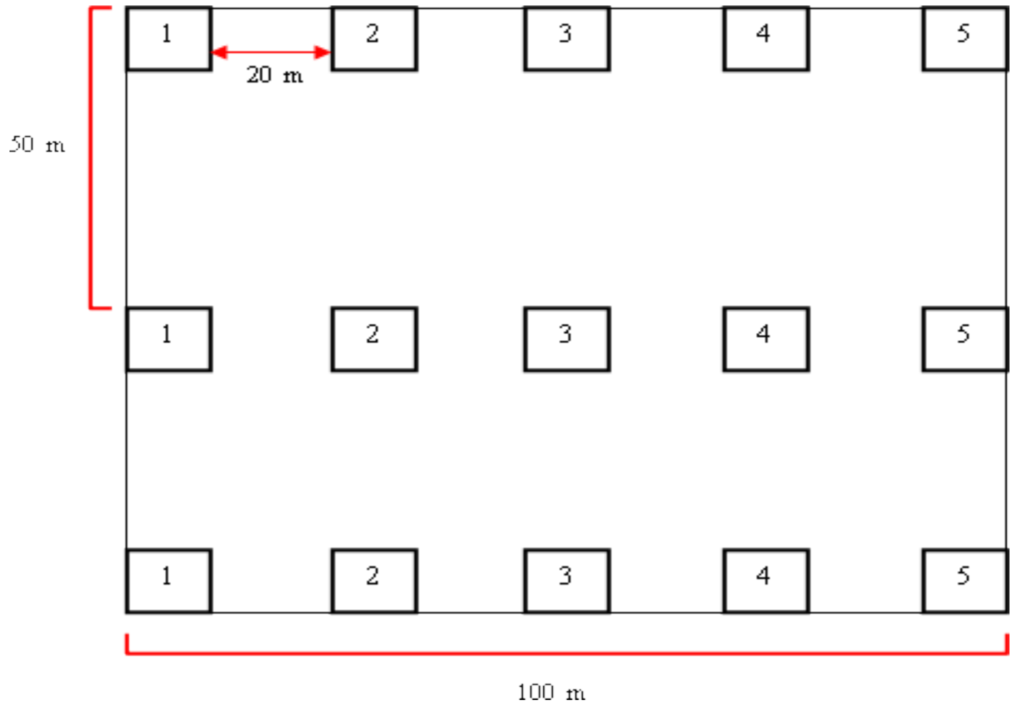

Fig. 2. Transect design and seagrass sampling plot

Sample collection

Each seagrass species found within the plots was collected using a hand hoe and was placed in labeled plastic bags for further analysis. Seawater samples were also collected simultaneously for hydrological parameter analysis.

Identification and measurement

Seagrass species were identified using the identification key developed by **Kuo and McComb (1989)**. Morphometric and meristic measurements were carried out at the Basic Biology Laboratory, Biology Education Study Program, Faculty of Teacher Training and Education (FKIP), Pattimura University. The measured parameters included: total number of leaves (JDT), number of leaf veins (JUD), number of intact leaves (JDU), leaf width (LD), leaf length (PD), rhizome spacing (JR), rhizome diameter (DR), root length (PA), and root diameter (DA). These characteristics are illustrated in Fig. (3).

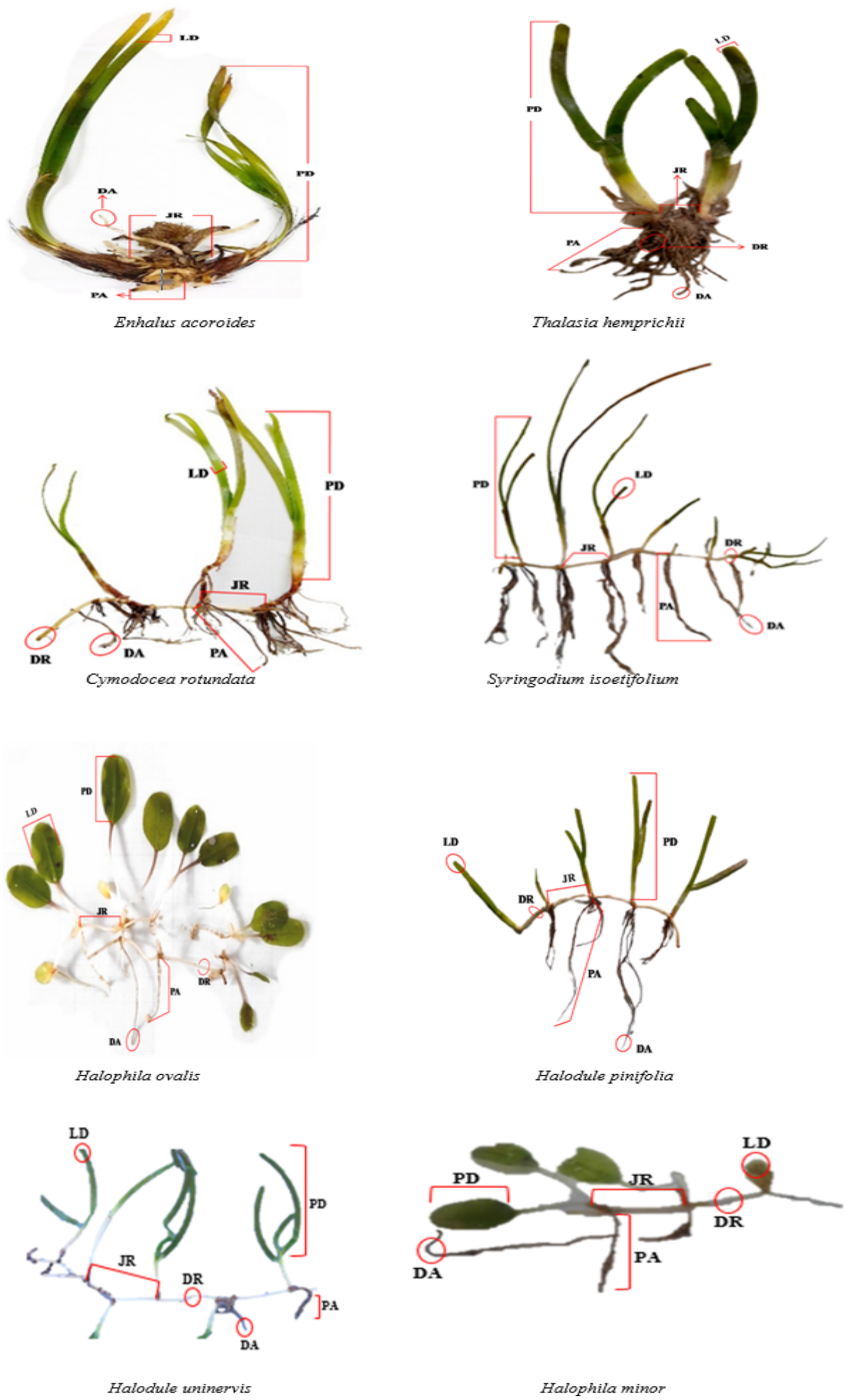

Fig. 3. Morphometric and meristic characteristics of seagrass: total number of leaves (JDT), number of leaf veins (JUD), number of intact leaves (JDU), leaf width (LD), leaf length (PD), rhizome spacing (JR), rhizome diameter (DR), root length (PA), and root diameter (DA)

Data analysis

Descriptive analysis

Morphometric and meristic measurement data were analyzed descriptively to obtain the mean and standard deviation for each parameter.

Diversity and phylogenetic relationship analysis

The measurement data were standardized prior to phenetic diversity analysis using PAST 4.0 software. Hierarchical clustering was performed based on the Jaccard similarity index to assess species relationships.

Correlation and regression analysis

The relationship between environmental parameters (temperature, salinity, pH, and dissolved oxygen) and morphometric-meristic variables was analyzed using multiple linear regression. Assumption testing included:

a) Interval or ratio scale data
b) Normal distribution
c) Homogeneity of variance among samples

Analysis of differences among locations

To determine the significance of differences in morphometric and meristic characteristics among study sites, analysis of variance (ANOVA) was employed.

RESULTS AND DISCUSSION

Species diversity

The diversity of seagrass species found across the four coastal villages of Saparua Island exhibited spatial variation, reflecting the influence of local environmental conditions. Porto Village recorded the highest number of species, with eight seagrass species observed, while Tiouw, Mahu, and Ihamahu Villages each had five species (Table 1). The high species richness in Porto suggested that this area possesses favorable environmental parameters, such as muddy-sand substrates, high water clarity, and suitable depth conditions for the growth of various seagrass species **(Waycott *et al.*, 2004)**.

Species composition also varied among the locations. Species such as *Cymodocea rotundata* and *Halophila minor* were only found in Porto, indicating that specific site conditions may support only particular species. Conversely, *Halodule pinifolia* was absent in Mahu and Ihamahu, possibly due to differences in hydrological factors such as salinity, current, or anthropogenic pressures **(Green & Short, 2003)**. These findings highlight the importance of a spatial approach in seagrass ecological studies.

Table 1. Seagrass species diversity in the waters of Saparua Island

Species	Locations			
	Porto	Tiouw	Mahu	Ihamahu
Enhalus acoroides	+	+	+	+
Thalasia hemprichii	+	+	+	+
Halodule uninervis	+	-	+	+
Cymodocea rotundata	+	-	-	-
Halophila minor	+	-	-	-
Syringodium isoetifolium	+	+	+	+
Halophila ovalis	+	+	+	+
Halodule pinifolia	+	+	-	_
Total	8	5	5	5

Note: + found; (-) not found.

Species such as *Syringodium isoetifolium*, *Enhalus acoroides*, and *Thalassia hemprichii* were consistently found across all study sites. These three species are known for their broad ecological tolerance, particularly to salinity fluctuations and physical disturbances, enabling them to adapt to a wide range of aquatic conditions **(Kuo & McComb, 1989)**. Their presence in all locations suggests a stable ecological foundation within the seagrass communities of Saparua Island's coastal waters.

When compared to data from Ambon Bay, the number of seagrass species recorded in Porto (eight species) is higher than that found in Ambon Bay. A study by **Waas *et al.* (2021)** reported only six seagrass species in Ambon Bay: *Enhalus acoroides*, *Thalassia hemprichii*, *Halophila ovalis*, *Halophila minor*, *Cymodocea rotundata*, and *Halodule pinifolia*. The lower species richness in Ambon Bay may be attributed to higher environmental stress, especially from anthropogenic activities such as coastal reclamation, sedimentation, and pollution from domestic and industrial waste.

In addition to reduced species richness, water quality in Ambon Bay also acts as a limiting factor for seagrass growth. The same study revealed that water temperatures were below the optimal range for seagrass growth (24–30°C), while nutrient concentrations (phosphate and nitrate) exceeded recommended thresholds, potentially leading to eutrophication and reduced water clarity **(Waas *et al.*, 2021)**. These conditions contribute to environmental stress for seagrass ecosystems.

The occurrence of *Cymodocea rotundata* and *Halophila minor* exclusively in Porto, but not in Ambon Bay, suggested that certain seagrass species are more sensitive to environmental changes. This supports the view that these species can serve as bioindicators of water quality **(Short & Wyllie-Echeverria, 1996)**. On the other hand, generalist species such as *Halophila ovalis* and *Thalassia hemprichii* tend to occur across various sites due to their broader ecological tolerance.

The distribution of seagrass species along the coastal waters of Saparua Island shows variation that correlates with the local physico-chemical water conditions. Porto recorded the highest seagrass species richness (eight species), likely influenced by a combination of favorable environmental factors, including warmer temperatures (29°C), high salinity (35‰), and a relatively neutral pH (7.6) (Table 2). High salinity is known to play a key role in supporting seagrass growth, particularly in species such as *Enhalus acoroides* and *Halodule uninervis*, which exhibit high salinity tolerance **(Short & Neckles, 1999)**. Conversely, sites like Tiouw, with lower salinity (28‰) and cooler temperatures (26°C), supported only five seagrass species. This indicates that variations in temperature and salinity significantly affect seagrass species abundance and distribution.

Table 2. Physical chemical parameters of coastal waters of Saparua Island

Locations	Temperature (^{0}C)	Salinity (‰)	pH	DO (mg/L)
Porto	29	3	7.6	5
Tiouw	26	28	7.5	6
Mahu	28	31	7.3	6
Ihamahu	30	33	7.4	5

Differences in dissolved oxygen (DO) levels also influenced seagrass distribution. Porto and Ihamahu, despite having relatively lower DO levels (5mg/ L), still exhibited high seagrass species richness—likely due to favorable conditions such as high salinity and stable substrates that support seagrass growth. In contrast, Mahu and Tiouw, which recorded slightly higher DO levels (6mg/ L), did not necessarily show greater seagrass diversity. This suggests that although DO is an important parameter for supporting organismal respiration, other factors such as salinity, temperature, and substrate type tend to have a more dominant influence on seagrass community composition **(Duarte, 1990; Hemminga & Duarte, 2000)**. Moreover, the presence of specific species such as *Cymodocea rotundata* and *Halophila minor* exclusively in Porto may serve as indicators of habitats with high salinity and stable water conditions.

Overall, these findings reinforce the understanding that local environmental factors—particularly temperature, salinity, and pH—play a crucial role in shaping seagrass community structure. The ecological adaptation of each species to the variability of these hydrological parameters is a key factor in determining distribution patterns in tropical waters such as those surrounding Saparua Island. Therefore, conservation and management efforts for seagrass habitats must be designed with careful consideration of aquatic environmental dynamics, in order to ensure the long-term sustainability of ecosystems that support diverse seagrass species.

The high species richness observed in Saparua Island, especially in the Porto area, highlights the ecological importance of this region as a natural habitat with significant conservation value. The preservation of seagrass ecosystems in this area should adopt an ecosystem-based approach that includes maintaining water quality, restricting harmful anthropogenic activities, and enhancing local community involvement. Raising public awareness about the ecological roles of seagrasses in maintaining coastal productivity and biodiversity is also a vital component of long-term management strategies **(Orth *et al*., 2006)**.

Morphometric-meristic characteristics of seagrass

The distribution and variation in morphometric and meristic traits of seagrasses across the four observation stations on Saparua Island indicated differences in community structure, reflecting species-specific ecological responses to local environmental conditions. Morphometric and meristic data from all four stations revealed significant interspecific and intersite variations (Tables 3–6), underscoring how each species adapts to local habitat conditions.

Enhalus acoroides, for instance, consistently exhibited the largest morphometric sizes among all observed species across all stations, particularly in leaf length (PD), reaching up to 47.6cm at Ihamahu (Station IV) and 43.2cm at Mahu (Station III). This finding is consistent with the ecological characteristics of *E. acoroides* as one of the largest tropical seagrass species, typically thriving in muddy to sandy substrates.

Other species, such as *Halophila ovalis* and *Halodule uninervis*, displayed narrower ranges of morphometric variation. For example, *H. ovalis* leaf length ranged from 1.8cm (Tiouw) to 2.8cm (Ihamahu), with a relatively consistent number of leaves per unit (JDU) ranging from 2 to 11. This limited variation suggests that these species possess broader ecological tolerances while maintaining compact growth forms, possibly as an adaptive response to hydrodynamic forces and substrate conditions.

Thalassia hemprichii, present in three of the four stations, showed a balanced morphometric pattern, with leaf lengths ranging from 10.3 to 14.8cm and root lengths from 10.2 to 13.6cm. These traits reinforce its role as an indicator species within seagrass ecosystems due to its adaptability across locations with fine-sand substrates and moderate exposure. The occurrence of *T. hemprichii* in Porto, Mahu, and Ihamahu also suggests stable hydrological parameters at these stations.

Species such as *Syringodium isoetifolium* and *Cymodocea rotundata* exhibited distinct patterns as well. At Tiouw and Mahu, *S. isoetifolium* showed relatively high leaf counts (up to 12 leaves), despite shorter leaf lengths, indicating a horizontal growth strategy that supports rapid photosynthesis and vegetative spread in fine-sand substrates. In contrast, *C. rotundata*, found only in Porto and Tiouw, had smaller leaf and root dimensions but displayed a high leaf-to-root length ratio (DA), reflecting an adaptation to more stable substrates.

Overall, the diversity in morphometric and meristic traits reflects the ecological roles and habitat specialization of each seagrass species within tropical marine ecosystems. Locations such as Porto and Ihamahu were dominated by large, morphologically complex species (*E. acoroides*, *T. hemprichii*), while Tiouw and Mahu were primarily inhabited by narrow-leaved, small-bodied species such as *Halodule* and *Halophila*. These patterns closely align with local physicochemical parameters, including salinity, temperature, and water clarity, which significantly influence seagrass vegetative growth.

Such morphometric and meristic variability can serve as an early indicator for assessing the ecological condition of tropical seagrass habitats. Conservation and management strategies for seagrass meadows on Saparua Island should consider the presence of morphometrically dominant species as key indicators of habitat quality. Long-term monitoring of these parameters will be crucial for detecting environmental changes driven by anthropogenic pressures and climate change.

Table 3. Morphometric-meristic seagrass at station I (Porto Village)

Species	JDT	JUD	JDU	LD	PD	JR	DR	PA	DA
Enhalus acoroides	5.20	4.55	12	16	9.90	5.90	7.90	17.80	0.15
Thalasia hemprichii	9.75	5.90	1	15	14.80	7.40	8.40	13.60	0.18
Halodule uninervis	6.75	3.55	13	4	13.70	5.20	5.90	12.70	0.17
Cymodocea rotundata	3.30	2.40	3	5	14.00	4.50	4.50	7.90	0.32
Halophila minor	9.00	1.00	1	7	9.00	1.70	1.90	2.80	0.15
Syringodium isoetifolium	7.20	1.00	9	3	13.50	4.80	5.90	5.70	0.11
Halophila ovalis	6.15	6.30	11	15	2.00	3.60	3.50	4.80	1.38
Halodule pinifolia	5.20	1.00	3	2	14.90	6.60	6.80	14.70	0.15

Table 4. Morphometric-meristic seagrass at station II (Tiouw Village)

Species	JDT	JUD	JDU	LD	PD	JR	DR	PA	DA
Enhalus acoroides	13	3	1	11	40.8	14	5.9	14.8	0.15
Cymodocea rotundata	5	1	3	4	11.7	3.5	3.5	5.8	0.45
Syringodium isoetifolium	4	2	12	2	9.7	13.2	4.2	5.2	0.20
Halophila ovalis	8	6	6	9	1.8	2.8	2.4	3.6	0.33
Halodule pinifolia	13	4	1	2	8.8	4.4	4.9	4.9	0.35

Table 5. Morphometric-meristic seagrass at station III (Mahu Village)

Species	JDT	JUD	JDU	LD	PD	JR	DR	PA	DA
Enhalus acoroides	4	12	3,05	13	43.2	4.5	6	15.3	0.28
Thalasia hemprichii	8	10	4,25	11	10.3	5.6	6.9	10.2	0.15
Halodule uninervis	6	9	1,5	2	9.7	3.8	3.4	9.4	0.13
Syringodium isoetifolium	3	3	1,5	2	10.3	3.7	4.5	5.4	0.25
Halophila ovalis	6	3	2,9	17	2.4	4.4	3.9	5.2	0.19

Table 6. Morphometric-meristic seagrass at station IV (Ihamahu Village)

Species	JDT	JUD	JDU	LD	PD	JR	DR	PA	DA
Enhalus acoroides	3	1.05	10	15	47.6	5	7.2	17.2	0.328
Thalasia hemprichii	7	3	9	13	12.3	6.4	7.8	12.8	0.125
Halodule uninervis	5	1	11	3	11.8	4.1	4.2	11.3	0.173
Syringodium isoetifolium	3	0.4	2	3	15.5	5.4	2-7	6.7	0.325
Halophila ovalis	5	4	3	20	2.8	4.3	4.5	5.7	0.139

To determine the significance of differences in morphometric and meristic characteristics of seagrasses across the study sites, the measurement data were analyzed using analysis of variance (ANOVA). A summary of the ANOVA results is presented in Table (7) below.

Table 7. Summary of variance analysis results

Morphometric-Meristic Variable	ANOVA		
	F	Sig.	Legend
JDT	2.206	0.121	Not Significant
JUD	4.353	0.017	Significant
JDU	1.215	0.331	Not Significant
LD	0.607	0.618	Not Significant
PD	0.265	0.850	Not Significant
JR	1.302	0.303	Not Significant
DR	0.604	0.620	Not Significant
PA	0.633	0.603	Not Significant
DA	0.295	0.829	Not Significant

Notes: JDT = total number of leaves, JUD = number of leaf veins, JDU = number of intact leaves, LD = leaf width, PD = leaf length, JR = rhizome spacing, DR = rhizome diameter, PA = root length, and DA = root diameter.

Table (7) indicates that the mean values of seagrass morphometric traits across the four study sites did not show statistically significant differences, except for the variable *Number of Leaf Veins (NLV)*, which exhibited a significant difference. The absence of significant differences is supported by F-test significance values (*P*-values) greater than the alpha level of 0.05. However, for the number of leaf veins, the F-value was 4.353 with a significance level of 0.017, which is below the 0.05 threshold. This indicates that there is a statistically significant difference in the number of leaf veins among the four observation stations.

Based on the results of the analysis of variance, it can be concluded that there are no significant differences in overall seagrass morphometric and meristic characteristics among the four study sites. These findings are consistent with previous research conducted by **Wagey (2017)** and **Putri *et al.* (2023)**, which also reported that site variation does not significantly influence seagrass morphometric and meristic traits. According to **Wangkanusa *et al.* (2017)**, such traits are more strongly influenced by substrate conditions that serve as the medium for seagrass growth. Field observations conducted during data collection revealed that substrate conditions across all four study sites were relatively uniform, consisting predominantly of coarse sandy-gravel sediment.

Phylogenetic affinities of seagrass

The mean values of morphometric and meristic traits from 23 individual samples for each seagrass species found at each study site—representing the coastal waters of Saparua Island—were standardized and subsequently analyzed using PAST 4.0 software, as illustrated in Fig. (4).

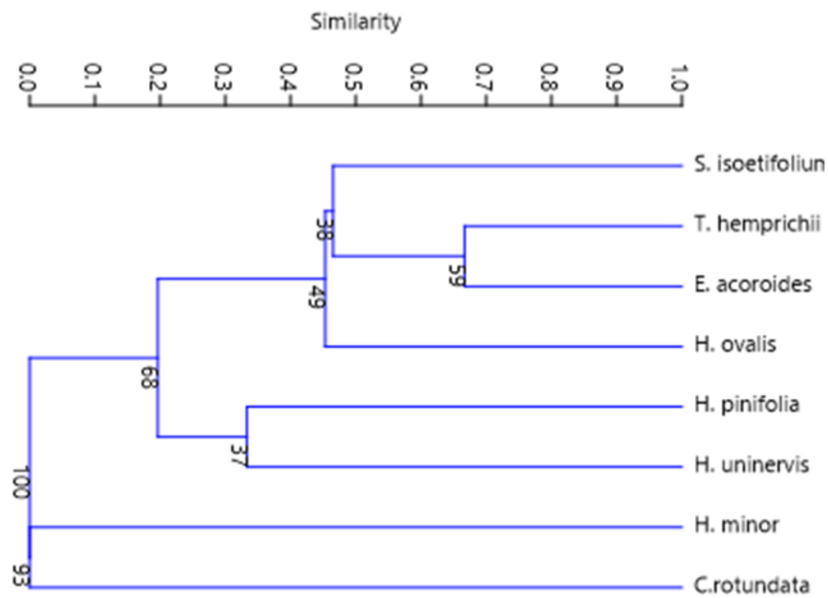

Fig. 4. Dendrogram showing the relatedness among seagrass species in the coastal waters of Saparua Island, generated using hierarchical clustering based on the Jaccard similarity index. Bootstrap analysis was performed with 1000 replicates to assess cluster stability

Phylogenetic studies have extensively utilized morphological data to link genetic diversity with the presence of species or populations in specific locations. Accordingly, morphological studies—such as morphometric and meristic analyses—can serve as a foundation for inferring genetic diversity and population structure of organisms within a given habitat.

Fundamentally, systematics aim to understand and describe the diversity of organisms, reconstruct their evolutionary relationships, and track evolutionary changes over time, organizing them into a classification system that reflects their evolutionary history. Reconstructing evolutionary relationships among groups of organisms is therefore a key objective of systematics. A monophyletic group consists of a common ancestor and all its descendants. The use of outgroups is essential in phylogenetic analysis because they provide a basis for character polarity. Apomorphic and plesiomorphic traits refer to derived and ancestral characters found within the ingroup, respectively, while plesiomorphic characters are typically shared with the outgroup. Synapomorphic traits are shared derived characters that define monophyletic groups.

A multivariate technique known as cluster analysis is used to group objects based on shared characteristics. This technique classifies objects such that those with the highest degree of similarity are placed within the same cluster. Cluster analysis reveals patterns of genetic distance in relation to physical distance between individuals, based on pairwise similarity values. The resulting clusters exhibit high internal homogeneity and external heterogeneity **(Albert *et al*., 1994)**.

The neighbor-joining (NJ) algorithm is a distance-based method for constructing phylogenetic trees, relying on the number of differences between sequences. In contrast, character-based algorithms focus on shared features to build the tree. The key to successful phylogenetic reconstruction lies in the accuracy of the selected method and the speed and precision in character assessment. A properly chosen method will yield a reliable evolutionary tree. Phylogenetic trees can be rooted or unrooted and visualized in various orientations (rightward, leftward, upward), and may include features such as bootstrap values, branch lengths, and OTU (Operational Taxonomic Unit) labels **(Muzzazinah, 2017)**.

Fig. (4) shows that *Thalassia hemprichii* and *Enhalus acoroides* form a monophyletic group (ingroup), sharing similar characters and indicating close evolutionary relatedness. Similarly, *Halodule pinifolia* and *H. uninervis* cluster together as a monophyletic group, as do *Halodule minor* and *Cymodocea rotundata*. These groupings suggest close phylogenetic relationships based on shared derived characteristics. Meanwhile, *Syringodium isoetifolium* and *Halophila ovalis* represent plesiomorphic characters within the genus *Cymodocea*, indicating more ancestral traits.

From a conservation perspective, genetic diversity within seagrass populations is crucial, as it enables adaptability and reformation of populations. Genotypes that are better adapted to specific environments play a critical role in evolutionary processes. The interaction between a seagrass genotype and its environment results in specific phenotypic traits expressed in the local habitat. Genetic diversity refers to allelic variation, while clonal diversity corresponds to genotypic variation **(Procaccini *et al*., 2007)**.

CONCLUSION

This study demonstrates that seagrass species diversity in the coastal waters of Saparua Island varies across locations, with Porto Village exhibiting the highest species richness. This variation correlates with differences in physicochemical parameters such as temperature, salinity, and pH. Morphometric and meristic analyses revealed interspecific variation in size traits; however, ANOVA results showed that most traits did not differ significantly among sites, except for the number of leaf veins (NLV), which displayed significant variation.

Phylogenetic analysis based on morphometric and meristic characteristics revealed patterns of similarity among species, forming distinct monophyletic groups. This indicates strong phenetic relationships and suggests shared evolutionary histories among certain species. These findings reinforce the critical ecological role of seagrass ecosystems in supporting coastal biodiversity and highlight the importance of considering localized environmental dynamics in conservation efforts.

Consequently, seagrass management on Saparua Island should adopt a sustainable, ecosystem-based approach that incorporates local environmental conditions and actively involves local communities as part of an integrated conservation strategy.

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