

## Identification of Invertebrate Species in the Coastal Area of Labuhan Lalar Village, West Sumbawa Regency

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**Abstract:** Coastal biodiversity plays a crucial role in maintaining the stability and productivity of marine ecosystems. Among the key contributors to these systems are marine invertebrates, particularly molluscs and crustaceans, which fulfil important ecological functions such as nutrient cycling, water filtration, and forming part of the marine food web. However, scientific data on the diversity of marine invertebrates in many Indonesian coastal regions remains limited, especially in remote areas like Labuhan Lalar Village, West Sumbawa Regency. This study aims to identify and classify marine invertebrate species found along the coast of Labuhan Lalar. An exploratory research approach was applied through direct field surveys along the shoreline, using a 3-meter transect from the high tide line toward the sea. Invertebrate specimens were collected manually and identified based on external morphological characteristics. A descriptive analysis was conducted with reference to scientific literature to determine species classification. The research identified a total of 15 marine invertebrate species belonging to two major phyla: *Mollusca* and *Arthropoda*. These species were further grouped into three classes: *Gastropoda* (10 species), *Bivalvia* (4 species), and *Malacostraca* (1 species). The presence of these diverse taxa indicates that the coastal ecosystem of Labuhan Lalar remains ecologically functional and supports a variety of marine invertebrate life. In conclusion, the coastal area of Labuhan Lalar demonstrates a relatively high level of marine invertebrate biodiversity. These findings may serve as baseline data for future biodiversity monitoring, conservation planning, and the development of sustainable coastal management strategies in the region.

**Keywords:** Arthropoda; Biodiversity; Labuhan Lalar Coast; Marine Invertebrates; Mollusca.

### Introduction

Coastal zones represent one of the most dynamic and biologically productive ecosystems on Earth. These regions serve as vital interfaces between terrestrial and marine environments, providing a range of ecological services that support both natural biodiversity and human livelihoods. Among the rich array of organisms inhabiting coastal areas, marine invertebrates such as molluscs, crustaceans, and echinoderms play essential ecological roles [1]. They contribute significantly to nutrient cycling, sediment stabilization, and food web dynamics. In addition to their ecological importance, many invertebrates hold substantial economic value, functioning as key commodities in fisheries, aquaculture, and the marine-based pharmaceutical and bioproduct industries [2].

The diversity and abundance of invertebrate species are closely linked to the quality of their surrounding environment. Factors such as water temperature, salinity, pH, dissolved oxygen, substrate type, and habitat complexity are known to shape invertebrate communities [3]. However, these communities are increasingly threatened by anthropogenic pressures, including overfishing, habitat destruction, coastal development, and pollution. In many parts of the world, unsustainable practices have led to a decline in invertebrate populations, with cascading effects on ecosystem stability and productivity [4].

One of the fundamental indicators of a healthy coastal ecosystem is high biodiversity, characterized not only by species richness, but also by the presence of functionally diverse taxa that contribute to ecological resilience [5]. Unfortunately, in many developing regions, baseline data on coastal biodiversity are lacking, making it difficult to implement effective conservation and management strategies. This is particularly true for remote or rural coastal communities, where scientific exploration has been minimal and local ecosystems remain largely undocumented [6].

Labuhan Lalar Village, located in West Sumbawa Regency, Indonesia, is a coastal area with high potential for marine biodiversity [7]. Anecdotal observations and preliminary assessments suggest the presence of a wide variety of marine life, including numerous species of invertebrates. However, to date, most research in the region has concentrated on socio-economic issues related to fisheries and coastal livelihoods, with limited scientific attention given to the biological and ecological aspects of the coastal marine environment [8].

Furthermore, increasing human activities such as artisanal and commercial fishing, the harvesting of marine organisms, land reclamation, and the rapid growth of tourism pose additional pressures on the local coastal ecosystem [9]. Without adequate knowledge of the biological resources, especially invertebrate diversity, there is a risk of unintentionally damaging the very ecological systems that support community well-being and economic development [10].

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The absence of fundamental biodiversity data hinders the formulation of evidence-based conservation policies. To address this gap, it is crucial to conduct field-based biological surveys that focus on identifying and documenting the species present, their habitats, and their potential ecological roles [11] [12].

This research aims to explore, identify, and map the diversity of marine invertebrate species along the coastal zone of Labuhan Lalar. Through a combination of field observations, specimen collection, and descriptive morphological analysis, the study seeks to produce primary data that can serve as a scientific baseline for future ecological monitoring, conservation planning, and biodiversity-based coastal management. Additionally, the findings of this study are expected to support local ecotourism initiatives and promote ecological awareness among coastal communities, reinforcing the link between biodiversity conservation and sustainable livelihoods.

This study presents new biodiversity data from a previously unexplored coastal area in West Sumbawa, where biological richness has remained undocumented. The novelty of the research lies in its direct focus on identifying and highlighting the ecological roles of marine invertebrates in this region. These findings support efforts in marine conservation, environmental education, and sustainable development both locally and more broadly.

Research Methods

This research was conducted in June 2025 along the coastal area of Labuhan Lalar Village, Taliwang District, West Sumbawa Regency. The study used an exploratory-








descriptive design, aiming to identify and document marine invertebrate species in their natural habitats. The field survey was carried out along the coastline, measuring 3 meters from the shoreline toward the open sea, using purposive sampling to select observation points with visible biological activity and accessible tidal zones.

The tools used during fieldwork included gloves, a refractometer, raffia rope (to mark sampling boundaries), a digital camera for photographic documentation, and stationery (pens and notebooks) for field notes. The sampling was conducted during low tide to maximize accessibility to the intertidal zone, where marine invertebrates are more easily observed. Data were analyzed using a descriptive analysis technique, which involved observing, recording, and describing the morphological characteristics and the ecological or economic functions of each invertebrate species encountered.

Results and Discussion

Based on the identification of invertebrate animals along the coast of Labuhan Lalar Village, West Sumbawa, a total of 15 species were recorded, belonging to two major phyla: Mollusca and Arthropoda, which were further classified into three classes: Gastropoda, Bivalvia, and Malacostraca. The identification process was carried out based on external morphological characteristics such as shell shape and color, body structure, and the habitat where the specimens were found. This scientific classification is essential to understanding the phylogenetic relationships between species and their ecological roles within the coastal ecosystem.

Table 1. Classification of Invertebrate Animals on the Coast of Labuhan Lalar Village

Pictures	Phylum	Class	Ordo	Family	Genus	Species
	Mollusca	Gastropoda	Neogastropoda	Conidae	Conus	Conus textile
	Mollusca	Gastropoda	Sorbeoconcha	Turritellidae	Turritella	Turritella terebra
	Mollusca	Gastropoda	Vetigastropoda	Trochidae	Trochus	Trochus maculatus
	Mollusca	Gastropoda	Littorinimorpha	Naticidae	Polinices	Polinices mammilla
	Mollusca	Gastropoda	Cycloneritida	Neritidae	Nerita	Nerita plicata
	Mollusca	Gastropoda	Cycloneritida	Neritidae	Nerita	Nerita undata
	Mollusca	Gastropoda	Cycloneritida	Neritidae	Nerita	Nerita picea

	Mollusca	Gastropoda	Neogastropoda	Muricidae	Chicoreus	Chicoreus brunneus
	Mollusca	Gastropoda	Littorinimorpha	Cypraeidae	Cypraea	Cypraea moneta
	Mollusca	Gastropoda	Neogastropoda	Olividae	Oliva	Oliva oliva
	Mollusca	Bivalvia	Venerida	Veneridae	Meretrix	Meretrix meretrix
	Mollusca	Bivalvia	Venerida	Veneridae	Gafrarium	Anadara antiquata
	Mollusca	Bivalvia	Venerida	Veneridae	Gafrarium	Gafrarium tumidum
	Mollusca	Bivalvia	Ostreida	Ostreidae	Saccostrea	Saccostrea cucullata
	Arthropoda	Malacostraca	Decapoda	Ocypodidae	Ocypode	Ocypode kuhlii

The Gastropoda class was the most dominant, consisting of ten species: *Conus textile*, *Turritella terebra*, *Trochus maculatus*, *Polinices mammilla*, *Nerita plicata*, *Nerita undata*, *Nerita picea*, *Chicoreus ramosus*, *Cypraea tigris*, and *Oliva oliva*. In general, gastropods have soft bodies protected by spiral shells and move using a muscular foot [13]. Their high diversity indicates that the coastal habitat provides various substrates and microhabitats suitable for different gastropod species, whether they live attached to rocks or buried in sand [14]. Ecologically, gastropods function as herbivores (algae grazers), detritivores, and even small predators. Moreover, some species, such as *Cypraea tigris* and *Oliva oliva*, have aesthetic and economic value due to their attractive shells, which are used in crafts [15]. Others, such as *Conus textile*, possess venom glands that are currently being studied for bioactive compounds with potential in pharmaceutical development, especially as analgesics (pain relievers) [16].

The Bivalvia class included four species: *Meretrix meretrix*, *Anadara granosa*, *Gafrarium tumidum*, and *Saccostrea cucullata*. These animals are characterized by two symmetrical shells connected by a ligament and fed by filtering seawater to obtain plankton and organic particles [17]. The presence of bivalves is not only important for marine ecosystem balance but also indicates good water quality, as this group tends to be sensitive to pollution [18]. In terms of benefits, several species, such as *Anadara granosa* and *Meretrix meretrix*, are valuable fishery commodities due to their high nutritional content. Meanwhile, *Saccostrea cucullata* (oyster) has the potential to be used as a biological indicator and a natural material for coral reef restoration [19].

Additionally, one species from the class Malacostraca was identified: *Ocypode kuhlii*, commonly known as the

ghost crab. This species belongs to the phylum Arthropoda, which is characterized by segmented bodies, a hard exoskeleton, and jointed legs [20] [21]. *Ocypode kuhlii* inhabits sandy areas and is often found digging burrows that serve as shelters and breeding sites. Ecologically, this species plays an important role in nutrient circulation and the decomposition of organic matter in the beach environment. Its presence can also serve as an indicator that the coastal area is still relatively natural and not heavily impacted by human activities [22].

Through the identification and classification of the invertebrate species found, it can be concluded that the coastal area of Labuhan Lalar Village possesses a relatively high level of biodiversity, as well as important ecological and economic potential that should be developed and conserved. This diversity serves as a direct indicator of the environmental health of the coastal zone and provides a scientific foundation for sustainable coastal management strategies.

### Conclusion

Based on the research conducted along the coast of Labuhan Lalar Village, West Sumbawa, it can be concluded that the area has a relatively high level of invertebrate biodiversity. A total of 15 species were successfully identified, classified into two phyla, namely Mollusca and Arthropoda, and consisting of three main classes: Gastropoda, Bivalvia, and Malacostraca. The Gastropoda class was the most dominant group, indicating that the coastal environment provides suitable and supportive habitats for various types of marine snails. The classification results show that each species plays an important ecological

role, including algae grazing, water filtration, and organic matter decomposition. In addition to their ecological functions, several species also possess economic value and potential for utilization in handicrafts, food sources, and pharmaceutical research. The presence of these diverse invertebrates also serves as an indicator that the coastal environment of Labuhan Lalar is still in relatively good condition and worthy of conservation. This research highlights the importance of identification and classification activities of macrofauna as a foundation for sustainable coastal resource management.

### Author's Contribution

Jami'atul Aulia: designed and structured the research, conducted field data collection, and led the manuscript writing. Dewi Seprianingsih: assisted in species identification and data analysis, and contributed to the discussion section. Sahratullah: participated in field data collection, documented data, and contributed to manuscript revision.

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