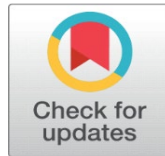


ECONOMIC IMPORTANCE OF MOLLUSCAN

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ABSTRACT

Molluscan, a diverse phylum of invertebrates, play a significant role in the global economy. Their economic importance stems from various sectors, including food, industry, and environmental services. One of the most prominent economic roles of molluscan is as a food source. Many species, such as oysters, clams, mussels, scallops, squid, and octopuses, are widely consumed worldwide. They provide a valuable source of protein, vitamins, and minerals, contributing to food security and dietary diversity. The aquaculture industry, particularly in coastal regions, plays a crucial role in cultivating and harvesting edible molluscan, generating employment and revenue. Beyond food, molluscan has various industrial applications. Pearl oysters produce pearls, highly valued gemstones used in jewelry and luxury goods. Shells of certain molluscan are used to create decorative items, buttons, and even roadbed material. Some molluscs also produce substances with potential medicinal properties, such as the purple dye extracted from certain species of sea snails. Molluscan also contributes to environmental health and ecosystem services. They play a vital role in marine and freshwater ecosystems as filter feeders, helping to maintain water quality by removing suspended particles. They also serve as a food source for other organisms, contributing to the overall biodiversity of aquatic ecosystems. Additionally, some molluscan, such as oysters, create habitats that provide shelter and support for other species.

Keywords: Economic, Molluscan, Organisms, Ecosystem

1. INTRODUCTION

The Molluscan, a diverse phylum of invertebrates, encompasses a vast array of organisms, from the familiar snails and clams to the enigmatic octopuses and squids. Characterized by their soft bodies, often protected by a hard shell, molluscans have adapted to a wide range of habitats, from the deep ocean to terrestrial environments. (Benkendorff, 2020)

The defining feature of molluscan is their unsegmented, soft body. This body plan allows for a wide range of shapes and sizes, contributing to the phylum's remarkable diversity. A thin, fleshy fold of tissue called the mantle covers the visceral mass, or internal organs. In many molluscans, the mantle secretes a hard shell for protection.

A muscular organ, the foot, is used for locomotion, attachment, or burrowing. It can be modified into various forms, such as the tentacles of cephalopods or the digging foot of bivalves. Most molluscans possess a radula, a rasping, tongue-like organ used for feeding. It is covered with tiny teeth that scrape food particles.

A calcareous shell, secreted by the mantle, provides protection and support. The shell can be one-piece (univalve), two-piece (bivalve), or absent in some groups. This class includes snails, slugs, and sea slugs. They typically possess a single, spirally coiled shell (or no shell in slugs). Gastropods are found in marine, freshwater, and terrestrial environments. (Atkinson, 2022)

Bivalves, such as clams, oysters, and mussels, have a two-piece shell hinged together. They are primarily filter feeders, straining food particles from the water. Cephalopods, including octopuses, squids, and cuttlefish, are highly intelligent marine animals. They lack an external shell or have a reduced internal shell. Cephalopods are known for their complex nervous systems and remarkable camouflage abilities. Chitons, belonging to this class, have a shell composed of eight overlapping plates. They are found clinging to rocks in intertidal zones.

Molluscs play crucial roles in various ecosystems. They serve as a food source for many animals, including fish, birds, and humans. Bivalves, as filter feeders, help to clean the water by removing suspended particles. Some molluscs, such as oysters, are important for reef formation and habitat creation. (Paul, 2020)

Molluscs have significant economic value. They are a major source of food worldwide, providing protein and other nutrients. Pearls, produced by certain molluscs, are highly prized gemstones. Molluscs also have cultural and aesthetic significance, inspiring art, jewelry, and other forms of expression.

Mollusca is a fascinating and diverse phylum of animals that exhibit a wide range of adaptations and play vital roles in the global ecosystem. Their economic and cultural importance further highlights their significance to humans.

Molluscs, a diverse phylum of invertebrates, play a crucial role in maintaining the health and balance of various ecosystems. Many molluscs, particularly bivalves like clams and oysters, are filter feeders. They strain microscopic organisms and organic matter from the water column, contributing to water clarity and nutrient cycling.

Molluscs serve as a vital food source for a wide range of animals, including fish, birds, mammals, and other invertebrates. They also act as predators, controlling populations of other invertebrates and contributing to the overall biodiversity of ecosystems.

Molluscs, especially those that build shells or burrow into sediments, create habitats for other organisms. Oyster reefs, for example, provide complex structures that support a diverse array of marine life.

The burrowing activities of molluscs like clams and snails aerate sediments, enhancing oxygen availability and nutrient exchange, which benefits other organisms in the ecosystem. Filter-feeding molluscs remove suspended particles and pollutants from the water, improving water quality and clarity. (Tan, 2021)

2. REVIEW OF LITERATURE

Carroll et al. (2021): Certain molluscs are sensitive to environmental changes, making them valuable bioindicators of water quality and ecosystem health. Molluscan shells, composed primarily of calcium carbonate, can act as significant carbon sinks, helping to regulate atmospheric carbon dioxide levels. The decomposition of molluscan shells releases nutrients back into the ecosystem, contributing to the cycling of carbon and other elements.

Boeuf et al. (2021): Molluscs, such as oysters, clams, mussels, and squid, are important sources of food for humans worldwide. The commercial harvesting and aquaculture of molluscs contribute significantly to the global economy. Molluscs have been used for various purposes throughout human history, including toolmaking, ornamentation, and religious practices.

Malve et al. (2020): Molluscs are essential components of many ecosystems, playing crucial roles in maintaining biodiversity, regulating nutrient cycles, and ensuring the health of aquatic environments. Their ecological importance underscores the need for conservation efforts to protect these valuable organisms and the ecosystems they inhabit.

Montaser et al. (2021): Molluscs, a diverse phylum of invertebrates, play a crucial role in maintaining the balance and health of various ecosystems. Their remarkable biodiversity contributes significantly to the intricate tapestry of food webs, impacting both marine and terrestrial environments.

3. ECONOMIC IMPORTANCE OF MOLLUSCAN

Molluscs exhibit an astonishing variety of forms, from the familiar snails and slugs to the enigmatic octopuses and squids. They inhabit diverse habitats, including oceans, freshwater bodies, and terrestrial environments. This diversity is reflected in their feeding habits, ranging from herbivores and detritivores to predators and filter feeders.

Coral reefs, deep-sea vents, and intertidal zones are home to a plethora of molluscan species. Bivalves like clams and oysters filter feed, while predatory gastropods such as cone snails and nudibranchs occupy higher trophic levels. Freshwater ecosystems, including lakes, rivers, and ponds, support a diverse array of molluscs. Snails and mussels play vital roles in nutrient cycling and water purification.

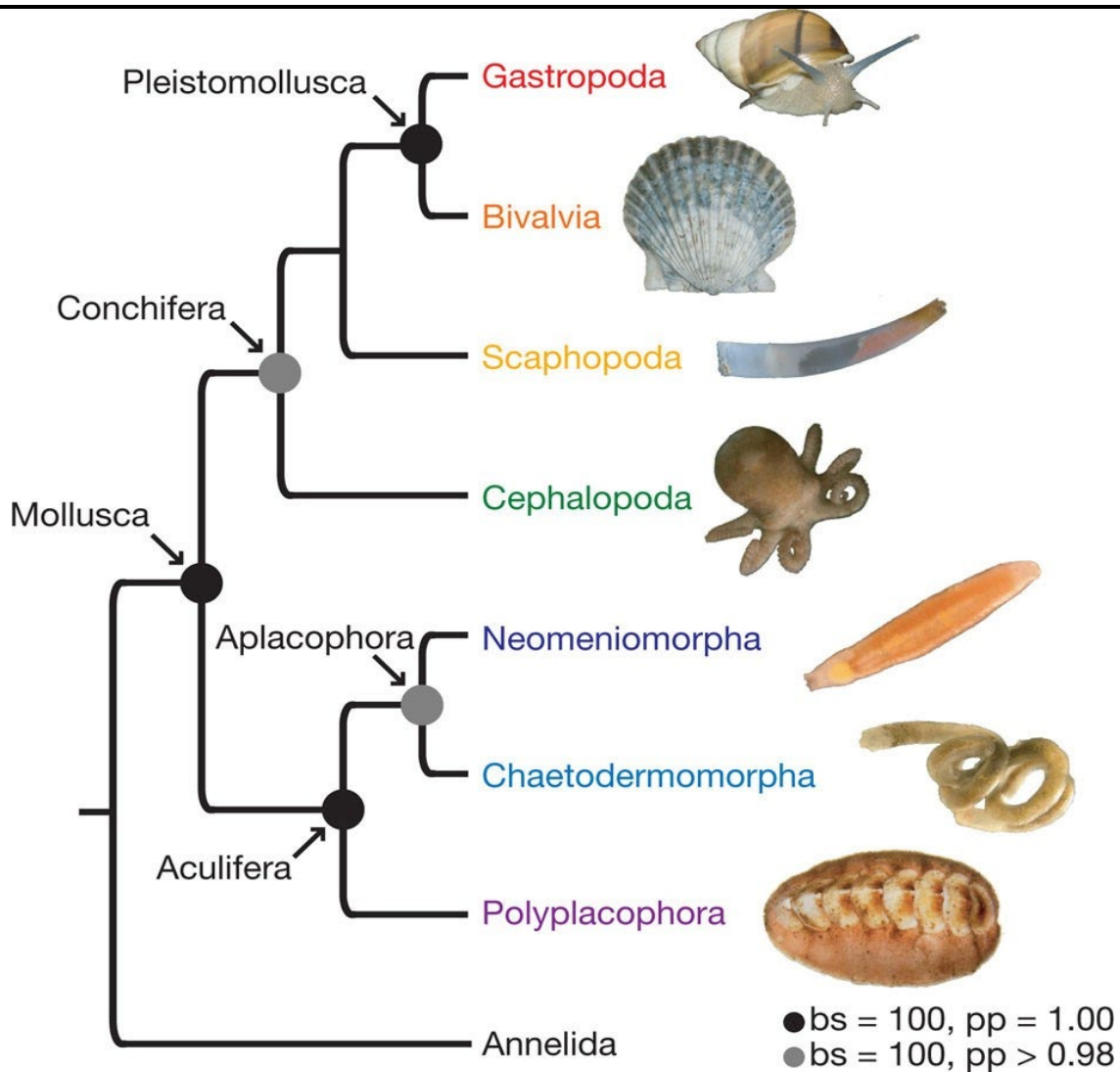


Fig 1: Molluscans relationship
Source: researchgate.in

Land snails and slugs contribute to soil health and nutrient turnover in terrestrial ecosystems. They also serve as a food source for various predators. Molluscan occupy various trophic levels within food webs, influencing the abundance and distribution of other organisms.

Some molluscan, particularly bivalves, contribute to primary production by filtering phytoplankton from the water column. Many gastropods graze on algae and plants, influencing plant community composition and nutrient cycling. Predatory molluscans, such as octopuses and squids, control the populations of their prey, maintaining the balance of marine ecosystems.

Detritivorous molluscan, like some snails and slugs, break down organic matter, returning nutrients to the soil. Molluscan serve as a crucial food source for a wide range of organisms, including fish, birds, mammals, and other invertebrates.

Human activities, including habitat destruction, pollution, and overexploitation, pose significant threats to molluscan biodiversity. These threats can disrupt food webs and have cascading effects on ecosystem health.

Molluscan biodiversity is essential for maintaining the health and stability of various ecosystems. By understanding their ecological roles and conserving their habitats, we can ensure the continued functioning of these vital components of the Earth's biodiversity.

Molluscan, a diverse phylum of invertebrates, play a significant role in the carbon cycle, the biogeochemical process that regulates the exchange of carbon between the Earth's atmosphere, oceans, land, and living organisms. Their impact on carbon cycling is multifaceted, encompassing various ecological functions.

Many molluscs, particularly bivalves, are filter feeders. They extract organic matter and particulate carbon from the water column, contributing to the removal of carbon from the surface ocean. This process can enhance water clarity and promote primary production by phytoplankton, which are the foundation of marine food webs.

Some molluscs, such as snails and slugs, graze on plants, influencing plant growth and decomposition rates. This herbivory can indirectly affect carbon storage in terrestrial ecosystems.

Molluscs, with their calcareous shells, act as significant carbon sinks. The formation of these shells involves the extraction of dissolved inorganic carbon (DIC) from seawater, effectively removing carbon from the atmosphere. Upon death and burial, these shells can become part of the geological carbon reservoir, contributing to long-term carbon sequestration.

Molluscs serve as a crucial link in marine and terrestrial food webs. As they are consumed by predators, carbon is transferred through the trophic levels, ultimately influencing the overall carbon flux within ecosystems. Like all living organisms, molluscs respire, releasing carbon dioxide (CO₂) back into the atmosphere. This process contributes to the atmospheric carbon pool.

When molluscs die, their bodies, including shells, undergo decomposition. This process releases carbon back into the environment, either as CO₂ or as dissolved organic carbon (DOC). The rate of decomposition can be influenced by factors such as temperature, oxygen availability, and the presence of decomposers.

Human activities, such as overfishing, habitat destruction, and climate change, can significantly impact mollusc populations and, consequently, their role in carbon cycling. For example, overfishing can disrupt food webs, affecting carbon flow and storage. Habitat destruction can reduce mollusc populations, diminishing their capacity to filter water and store carbon. Climate change can alter ocean chemistry, impacting shell formation and survival rates of molluscs.

Molluscs play a vital role in the carbon cycle, influencing carbon fixation, storage, and release. Their ecological functions, such as filter feeding, herbivory, shell formation, and trophic transfer, contribute to the regulation of carbon fluxes within marine and terrestrial ecosystems.

Understanding the role of molluscs in carbon cycling is crucial for developing effective strategies to mitigate climate change and conserve marine biodiversity. Coastal regions worldwide feature molluscs in diverse dishes, from raw oysters to stir-fried squid. Certain molluscs are associated with specific regions, such as New England clam chowder or Spanish paella with seafood. Chefs often incorporate molluscs into innovative and elegant dishes.

Some Molluscs can accumulate toxins from their environment, necessitating careful monitoring and regulation. Unsustainable harvesting practices can deplete mollusc populations, impacting ecosystems and livelihoods. Molluscs farming can help meet demand while reducing pressure on wild stocks, but careful management is crucial to avoid environmental impacts.

Molluscs have played a vital role in human nutrition throughout history. By understanding their nutritional value, culinary significance, and the challenges associated with their consumption, we can ensure their continued contribution to a healthy and sustainable food system.

4. CONCLUSION

Molluscs are a diverse group of organisms with significant economic importance. They provide food, industrial materials, and environmental services, contributing to human well-being and ecosystem health. Sustainable management practices are crucial to ensure the continued economic benefits and ecological significance of these valuable organisms. However, it is important to acknowledge the potential negative impacts of molluscs. Some species, such as shipworms, can cause damage to wooden structures, while others can be agricultural pests. Overfishing and habitat destruction pose threats to certain mollusc populations, impacting both the environment and the livelihoods of people who depend on them.

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CONFLICT OF INTEREST

None.

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