The ecological significance of freshwater and marine species in aquatic ecosystems

Eugenia Blackwood*

Department of Biology, University of Tabuk, Saudi Arabia

Received: *01-May-2024; Manuscript No: JAEFR-24-137673;* ***Editor assigned:*** *03-May-2024; Pre QC No: JAEFR-24-137673 (PQ);* ***Reviewed:*** *17-May-2024; QC No: JAEFR-24-137673;* ***Revised:*** *22-May-2024; Manuscript No: JAEFR-24-137673 (R);* ***Published:*** *29-May-2024;* ***DOI:*** *10.3153/JAEFR.10.05.41*

Introduction

Aquatic species, encompassing a vast array of organisms living in water environments, represent some of the most diverse and ecologically significant life forms on Earth. These species inhabit a variety of aquatic ecosystems, including oceans, rivers, lakes, and wetlands, each hosting unique communities adapted to specific environmental conditions. This article delves into the diversity, adaptations, ecological roles, and conservation challenges of aquatic species, highlighting their importance and the need for concerted efforts to protect these vital organisms. Aquatic species include organisms from various biological kingdoms, such as animals, plants, fungi, and microorganisms. The diversity within these groups is immense, with numerous species exhibiting a range of sizes, forms, and ecological niches. Marine species, residing in oceans and seas, account for a significant portion of global biodiversity. With over 33,000 species, fish are the most diverse group of vertebrates. They range from the tiny goby, measuring less than 1 cm, to the massive whale shark, growing up to 12 meters. Fish occupy various niches, from coral reefs to the deep sea. This group includes whales, dolphins, and seals. These mammals have adapted to marine life through physiological modifications such as blubber for insulation and specialized respiratory systems [1,2]. Marine invertebrates, such as mollusks, crustaceans, and cnidarians, exhibit a wide range of forms and functions.

Description

Coral reefs, built by tiny coral polyps, are among the most biodiverse ecosystems on the planet. Frogs, toads, and salamanders are crucial indicators of environmental health. Many amphibians have life cycles that require both aquatic and terrestrial habitats. Freshwater fish species, like trout, catfish, and cichlids, are vital for ecosystem health and human livelihoods. Many freshwater fish are adapted to specific water conditions, making them sensitive to environmental changes. Aquatic insects, such as dragonflies, mayflies, and caddisflies, play essential roles in food webs and nutrient cycling. Their larvae often live in water, while adults are typically terrestrial. Aquatic plants, such as algae, seagrasses, and freshwater macrophytes, are primary producers that form the base of aquatic food webs. Microorganisms, including bacteria, archaea, and plankton, are fundamental to nutrient cycling and energy flow in aquatic ecosystems. Aquatic species have evolved a myriad of adaptations to survive and thrive in water environments. These adaptations can be physiological, morphological, and behavioural. Aquatic organisms regulate their internal salt and water balance to cope with varying salinity levels. Marine fish actively excrete excess salts, while freshwater fish absorb salts to maintain homeostasis [3,4]. Gills are the primary respiratory organs in aquatic species, allowing efficient gas exchange in water.

Conclusion

Some species, like certain fish and amphibians, can also breathe air using lungs or specialized skin. Many aquatic animals have streamlined bodies to reduce drag and increase swimming efficiency. Examples include dolphins, sharks, and many fish species. Species like fish have swim bladders that regulate buoyancy, while others, such as cephalopods, use gas-filled chambers or oil deposits. Many aquatic species, such as salmon and sea turtles, undertake long migrations for breeding and feeding. These migrations are often triggered by environmental cues like temperature and daylight. Symbiotic relationships are common in aquatic ecosystems. For instance, cleaner fish and shrimp remove parasites from larger fish, benefiting both parties.

Acknowledgement

None.

Conflict of Interest

The author declares there is no conflict of interest in publishing this article.

*Corresponding to

Eugenia Blackwood

Department of Biology,

University of Tabuk, Saudi Arabia

Email: eugenia_blackwood@gmail.com

References

1. Babaei M, Tayemeh MB, Jo MS, et al. Trophic transfer and toxicity of silver nanoparticles along a phytoplankton-zooplankton-fish food chain. Sci Total Environ. 2022; 842:156807.
2. Bhuvaneshwari M, Kumar D, Roy R, et al. Toxicity, accumulation, and trophic transfer of chemically and biologically synthesized nano zero valent iron in a two species freshwater food chain. Aquat Toxicol. 2017; 183:63-75.
3. Chae Y, An YJ. Toxicity and transfer of polyvinylpyrrolidone-coated silver nanowires in an aquatic food chain consisting of algae, water fleas, and zebrafish. Aquat Toxicol. 2016; 94-104.
4. Choi JE, Kim S, Ahn JH, et al. Induction of oxidative stress and apoptosis by silver nanoparticles in the liver of adult zebrafish. Aquat Toxicol. 2010; 100(2):151-9.