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Research Article

Effects of Mangrove Zonation and the Physicochemical Parameters of Soil on the Distribution of Macrobenthic Fauna in Kadolkele Mangrove Forest, a Tropical Mangrove Forest in Sri Lanka

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The ecology of the macrobenthic fauna of the mangrove forests has received little attention compared to the mangrove flora. The present study was aimed at filling this information gap and investigated if the diversity and distribution of macrobenthic fauna at Kadolkele mangrove forest, a pristine mangrove forest situated at the Negombo estuary in Sri Lanka, are governed by the mangrove zonation and variation of physicochemical parameters of the mangrove soil. Since the aerial photographs identified three distinct mangrove zones at Kadolkele, namely, *Rhizophora*, *Avicennia*, and *Lumnitzera* zones, fauna were sampled and physicochemical parameters of the soil were measured in belt transects that were established at each mangrove zone. Data were collected and analyzed using appropriate field sampling techniques and statistical methods, respectively. Results revealed that the physicochemical parameters in soil varied between the three mangrove zones and that the distribution of benthic fauna followed the mangrove zonation. Further, the diversity measures of epifauna were found to be higher than those of the infauna of this tropical estuary.

1. Introduction

Mangroves are woody plants that grow at the interface between land and sea in tropical and subtropical latitudes where they exist in conditions of high salinity, extreme tides, strong winds, high temperature, and muddy anaerobic soils [1]. Mangrove forests provide shelter, food, and breeding sites for a large number of marine and terrestrial organisms [2] and are also important to humans for a variety of reasons, including fisheries, tourism, agriculture, forestry, protection against shoreline erosion, source of fire-wood and building material, and other local subsistence uses [1, 3].

Mangrove forests can truly be considered as evolutionary hotspots where terrestrial species have readapted to marine life, and marine species have undergone the transition to terrestrial life [4]. The mangrove forest floors harbour a diverse and distinct assemblage of benthic organisms that range in size from the minute bacteria and protozoans to larger (0.5 mm < size) invertebrates termed as macrobenthos [5]. Kumar and Khan [6] emphasized that the distribution, abundance, and diversity of these mangrove benthic invertebrates and their relationships to environmental conditions are important parts of understanding the structure and function of mangrove ecosystems.

As a detritus based ecosystem, leaf litter from the mangroves provides the basis for adjacent aquatic and terrestrial food webs [7] where the macrobenthos typically occupy the second and third trophic levels [8]. Most of the macrobenthos assist in the breakdown of particulate organic matter by exposing them to microbes by shredding and their waste materials contain rich nutrients forming the food for other consumers. Alongi and Christoffersen [9] emphasized that the variations in the distribution and abundance of epibenthos of the mangrove area relate positively to variations in the quantity of exported detritus.