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Assessment of Species Diversity of Reef Fishes Impacted by Upwelling in Southern Sri Lanka

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Abstract

Reef ecosystems play a vital role in marine biodiversity, serving as important habitats for a wide variety of fish species. However, these ecosystems are highly susceptible to the adverse effects of climate change, particularly fluctuations in temperature. In the southwest monsoon of 2024, the coastal upwelling along the southern coast of Sri Lanka, which occurred from end of July to mid of August, had a devastating impact on reef fish species. As a result of the sudden influx of cold water, many reef fish species were unable to tolerate the abrupt drop in temperature. According to the NASA Ocean color images the surface temperature falls between 23.5 -25.5 ^{0}C. This led to distressing outcomes, with some fish floating to the surface due to cold shock, while others succumbed to the extreme conditions and perished.This study aims to evaluate the species diversity of died reef fishes across the nine sampling sites along the coastal area of the south coast from 31st July to 25th August 2024. Data collected through physical observations and social media platforms and also species identification performed following the morphological traits and aided by standard taxonomic guides.The highest species diversity was recorded in the Thalaramba coast, with 24 species, followed by Bundala 17, Pareiwella 13 species, Rekawa and Godawaya recorded 9 species in each, Habaraduwa 8, Mirijjawila 7 and Welipatanwila 5 species. A total of 45 species, belonging to 20 families, were identified. The families Balistidae and Pomacanthidae were the most prevalent, with 8 species each, followed by Acanthuridae with 5 species and Chaetodontidae and Lethrinidae with 3 species each. Caesionidae, Lutjanidae, and Scorpaenidae were represented by 2 species each. Additionally, 1 species each from Holocentridae, Labridae, Leiognathidae, Mullidae, Ostraciidae, Pempheridae, Scaridae, Serranidae, Siganidae, Soleidae, Stomopneustidae, and Zanclidae were documented. *Centropyge multispinis* was the most abundant species, comprising 12.03% of the total, followed by *Apolemichthys xanthurus* (8.6%), *Centropyge flavipectoralis* (8.2%), *Balistapus undulatus* (7.2%), *Chaetodon decussatus* (5.84%), *Zanclus cornutus* (5.5%), Pempheris sp. (4.81%), *Sufflamen chrysopterum* (4.47%), *Melichthys indicus* and *Odonus niger* (3.8% each), and *Balistoides viridescens* (3.44%). This study reveals notable variations in species diversity across different coastal areas, with Thalaramba displaying the highest diversity. The predominance of certain families suggests ecological resilience; however, continued monitoring is crucial to assess the long-term effects of environmental changes. This research highlights the importance of conserving reef habitats to sustain marine biodiversity in Sri Lanka.

Keywords: *Reef fish, Species diversity, Cold-water conditions, Southern Sri Lanka, Coastal ecosystems*