Tube-Worm Hunters: Ecological Aspects of Ficopomatus enigmaticus (Polychaeta) in Estuaries of the Baltic Sea

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Non-native species pose a global threat to aquatic ecosystems, with the potential to spread rapidly, reduce biodiversity, and induce ecological changes. The globally distributed Australian tubeworm (Ficopomatus enigmaticus) has been observed in high densities in estuarine waters of the Warnow River along the German Baltic Sea coast since 2020, with its rapid formation of extensive colonies causing economic damage. This study investigates the tolerance limits and ecological consequences of Ficopomatus enigmaticus' establishment within the river system. Sampling was conducted at 22 sites using a camera-assisted remotely operated underwater vehicle (ROV), a stake scraper, and a CTD sensor, supplemented by laboratory analyses. The results indicate that the species is widely distributed across the study area, while its ecological optimum declines toward the river mouth, with individuals preferring greater depths. This is likely a consequence of intensified water flow, lower temperatures, increased salinity and interspecific competition, suggesting an ecophysiological threshold. Additionally, a previously undocumented "lighting-up phenomenon" was described. Furthermore, these invasive colonies lead to the displacement of native species, the emergence of new microhabitats, and an unprecedented structural transformation of the ecosystem. These internationally applicable findings enhance our understanding of the adaptive strategies of Ficopomatus enigmaticus in non-native environments and underscore the growing need for continuous monitoring of invasive species amid rising anthropogenic pressures and climate change. Our research provides a valuable impetus for devising effective, sustainable, and scalable environmental monitoring strategies to manage non-indigenous species.

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