

ABSTRACT

The objective of this study was to examine the relationship between *sand dollar* density and total organic matter (TOM) content in sediment within the intertidal zone of Lhokseumawe City, Indonesia. The research was conducted at three observation stations representing different habitat characteristics, including variations in substrate composition, environmental conditions, and levels of human activity. *Sand dollar* density was determined using the quadrat transect method, while sediment total organic matter was analyzed using the Loss on Ignition (LOI) method. In addition, several environmental parameters, including water temperature, sediment temperature, salinity, pH, dissolved oxygen (DO), and sediment characteristics, were measured to provide supporting information regarding habitat conditions. The relationship between *sand dollar* density and organic matter in sediment was analyzed using simple linear regression. The results showed that Station 3 exhibited the highest *sand dollar* density, whereas Station 1 contained the highest total organic matter content. Differences in *sand dollar* density among stations were associated with variations in habitat characteristics, sediment composition, and anthropogenic activities. The regression analysis revealed a moderate negative relationship between sediment organic matter and *sand dollar* density, with a correlation coefficient (R) of 0.53 and a coefficient of determination (R^2) of 0.2774. These findings indicate that organic matter in sediment explained 27.74% of the variation in sand dollar density. In contrast, the remaining variation was likely influenced by other environmental and ecological factors not examined in this study. Furthermore, the results suggest that habitat quality, sediment texture, and environmental conditions collectively contribute to the spatial distribution of *sand dollars* in the intertidal ecosystem. Therefore, maintaining sediment quality and conserving intertidal habitats are essential for supporting sustainable *sand dollar* populations and preserving ecological functions in the coastal waters of Lhokseumawe City. This study provides valuable baseline information for future ecological research and coastal ecosystem management, particularly regarding the conservation and sustainable utilization of intertidal habitats.

Keywords: Density, intertidal zone, *sand dollar*, sediment, total organic matter.