

Spatial distribution of animal species across a rocky shore.

Author: Mnisi Kholofelo

Introduction.

Rocky shores of Gqeberha coastline are home to abundant species with specific zones. These zones such as Afrolittorina, Balanoid, and Cochlear differ in species due to several factors such as tidal exposure or stresses. The aim of this practical was to investigate the pattern in which how animal communities are distributed across the coastline and to understand the physical stresses that determine these patterns. To succeed with the study, we must ask questions that have to be answered when the study is complete, such questions are, how do animal communities vary across the shore, which factors are responsible and how do the animals along the Gqeberha coastline vary from other intertidal communities along the South African coast? These questions help to create a core aim for the study.

Method.

We used a 50 x 50 cm quadrant to sample each zone. In each zone, three quadrats were placed at different ranges to ensure a difference in results. On each quadrat, we identify all species present and count the number of individuals present. We then estimated the percentage of each quadrat covered by individuals. The data collected from the quadrats were averaged to see differences in species richness, abundance, and coverage across the rocky shore zones.

Results.

The species found in the zones varied, such that some were only found at one zone or were found in multiple zones. This was also observed with the quadrats, some had their unique species not found on the other quadrat but

of the same zone.

Table: Lists the animal species found in each zone with an insight into species richness across the shore.

In the table, each quadrat represents the number of individuals of a certain species present in that zone. Large numbers are that of small individuals that can fit on the quadrat size.

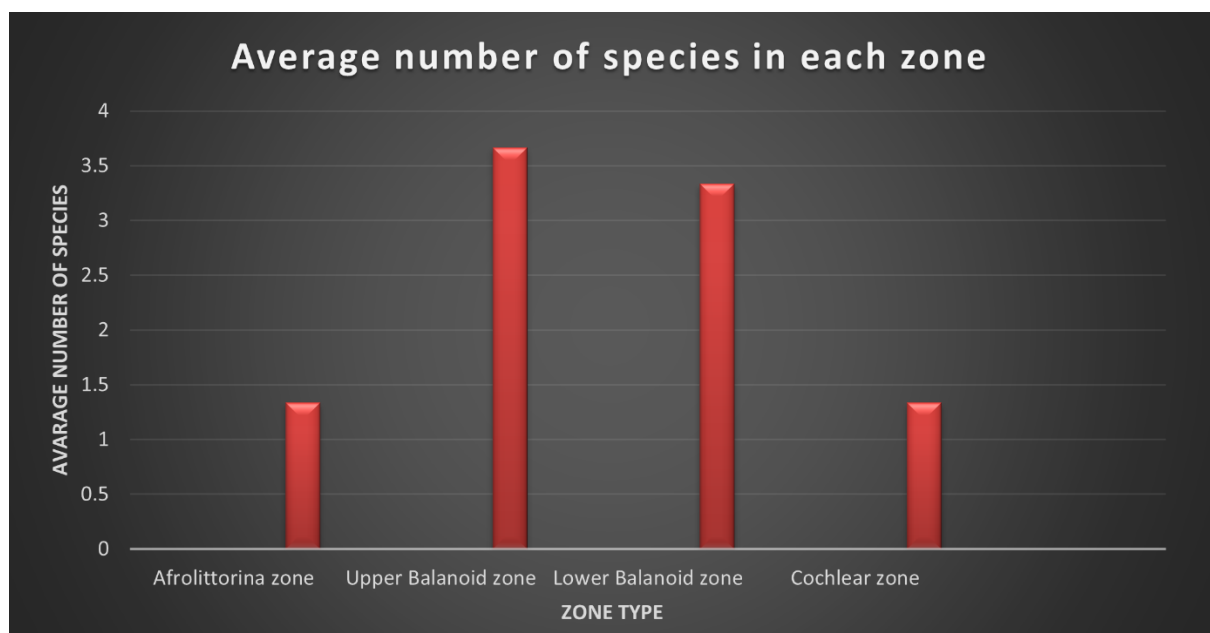


Figure 1. Average number of species across the rocky shore zones.

The above figure 1, shows the average number of species observed across the four different zones. The Lower Balanoid zone has the highest average of above 3.5 recorded, followed so close by the Upper Balanoid zone. The Afrolittorina zone, with an average of 1 species, and the Cochlear zone, with just under 1 species, show fewer species. This indicates that the

Balanoid zones tend to support a greater diversity of species compared to the other two zones.

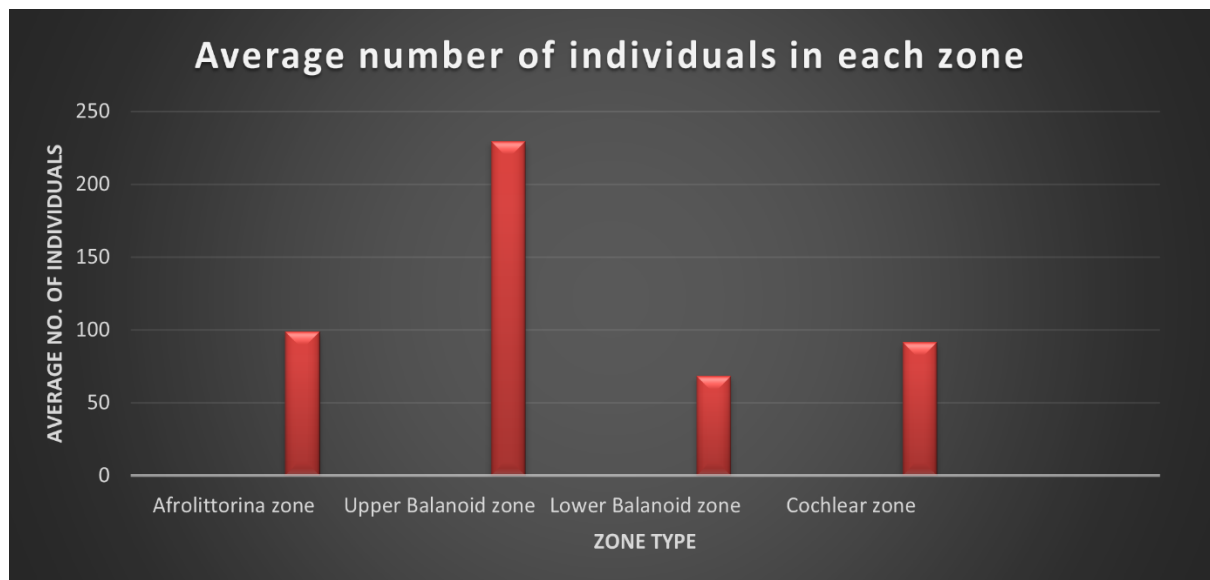


Figure 2. Average number of individuals in each zone.

The results presented in figure 2 show the average number of individuals recorded in each zone across the rocky shore. The Upper Balanoid zone had the highest average number of individuals, reaching over 200, while the Afolittorina zone and Cochlear zone showed lower averages, around 100 and 80, respectively. The Lower Balanoid zone showed a smaller number of individuals, falling between the Cochlear and Afolittorina zones. This pattern indicates a noticeable difference in species abundance across the zones, with the Upper Balanoid zone being the most densely populated.

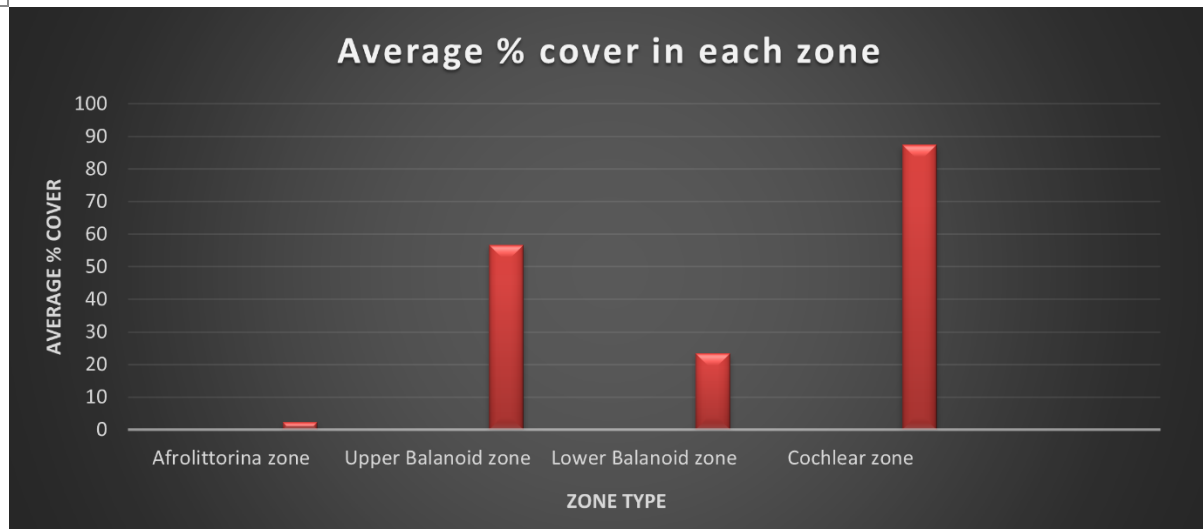


Figure 3. The average percentage covered by species on each zone.

The above figure 3 shows the average percentage cover in each zone. The Cochlear zone has the highest average cover, reaching about 87%, while the Upper Balanoid zone follows with roughly 56%. The Lower Balanoid zone has a significantly lower cover at around 23%. While the Afrolittorina zone shows almost no coverage, with values less than 5%. This suggests that the Cochlear zone has the densest coverage of species, while the Afrolittorina zone exhibits the least.

Discussion.

The results of this study reveal clear patterns in the distribution of animal species across the rocky shore zones of Gqeberha's coastline. As observed, the Lower and Upper Balanoid zones showed the highest diversity and abundance of species, with the Upper Balanoid zone having many individuals. This suggests that these zones provide a more suitable habitat for a variety of species, likely due to their specific environmental conditions, such as moderate exposure to tidal stress, which may favour greater biodiversity.

On the other hand, the Afrolittorina and Cochlear zones showed much lower species diversity. Having a connection with the conclusions made by Branch and Smith (1998). The Afrolittorina zone had both the lowest species count and almost no coverage at all, which could be a result of the position higher up the shore, where exposure to physical stresses like desiccation and temperature fluctuations may limit species survival.

Despite the Cochlear zone's low diversity, it had the highest percentage cover, which shows that while few species dominate, they do so in high density, due to specific adaptations to the conditions.

These findings align with general ecological principles of zonation along rocky shores, where species distribution is heavily influenced by tidal exposure and environmental stress. The Balanoid zones, located between the extremes, offer a balance of conditions, allowing more species. On the other hand, the Afrolittorina and Cochlear zones create niches where only specialized species can survive, explaining the differences in species richness and coverage observed.

References.

McLachlan, A., & J. H. Brown. 2006. *Rocky Shores: Ecology and Conservation*. Oxford University Press, Oxford.

Branch, G. M., & S. J. Smith. 1998. *The Biology of Rocky Shores*. Cambridge University Press, Cambridge.

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