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similar but more variable results. Although simple growth models do not characterize the variance inherent in modular growth, these models can provide useful tools for the interpretation of population data. *P. elisabethae* is harvested in the Bahamas by cropping colonies. Using the age-mass relationship, a simple model of age specific growth and survivorship can be used to predict productivity and identify the age of maximum yield (14 y) and the effects of different harvest frequencies on annual yields.

SCALE RELATIONSHIPS BASED ON QUANTITATIVE COMPARISONS: AN EXAMPLE USING BENTHIC INTERTIDAL SPECIES

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One of the main themes of discussion in many areas of ecology is the description and quantification of the characteristic scales of patterns and processes. In practice, it is usually hard to accomplish this task due to the inherent difficulties in measuring all the spectrum of variability of the studied phenomenon. This nuisance has led to misunderstand the concept of scale turning on in a definition assuming that the processes and patterns are ordered from fine to coarse scales or vice versa. Here, using a sampling design consisting on contiguous quadrats along 100 m transects on an intertidal rocky shore, we have estimated the abundance of *Chtamalus* sp. and *Brachidontes exustus* in order to examine its distribution as a continuous function of scale. Additionally, we have measured the spatial variability of 3 physical variables associated to the substratum quality. Scale relations based on quantitative comparisons of grain and extent were used to assess the variability on species abundance distribution. The characteristics scales of observation (the one explaining the highest proportion of variance) for each species and physical variable were detected using semivariance analysis. Comparisons between scales were made using the following spatial grain and extent relations: hierarchical, intersecting hierarchical, nonintersecting hierarchical, adjacent hierarchical, nested extent, and nested grain. Results showed that the proportion of the explained variance on the abundance was species specific and higher (80 to 90%) at scales smaller than 4 m. Results also showed nested extent relationship for species distribution and hierarchical relationships for substratum characteristics. Overall, these results provide empirical insights on how scale relationships help to understand the changes across scales and emphasize the importance of adopting a multi scale approach.

ALGAE BASED BIOTOPES OF THE AZORES (PORTUGAL): SPATIAL AND SEASONAL VARIATION

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The increasing importance of coastal management creates the need for a systematic classification and characterization of the marine communities. The present study provides background knowledge for coastal management, and is intended to be generalized across oceanic islands for comparative purposes. As such, accurate quantitative methodologies developed in the Azores for rocky shore algae-based biotope definition, are tested on the islands of São Miguel and Santa Maria. Rocky intertidal and subtidal shores around the whole coast-length of both islands were surveyed, covering all substrate types. Santa Maria was sampled only in the summer, while São Miguel was sampled in the winter and summer. Biotopes were defined by assessing the associated habitat and species characteristics, using ANOSIM and SIMPER analysis, respectively. A total of ten biotopes were identified. Globally, both islands biotopes are characterized by the same species, in summer and in winter. However, association between these species and the shore height at which they occur differs geographically and temporally. Although of some geographical differences, there is a generalised gradual succession of species from upper intertidal down to deepest subtidal, with the highest biodiversity occurring at the land-water interface and decreasing towards both extremes (upper intertidal and deepest subtidal level). The strongest evidence of seasonal variation occurs at the upper intertidal. Results indicate that the methodology used is effective in broad scale shoreline assessment of biological communities, and thus suitable for the purpose it was developed for. As a natural consequence it should be applied to the remaining islands of the Azorean archipelago as well as to other Macaronesian islands, e.g. Madeira and the Canaries.

ECOLOGICAL HINDCASTING OF BIO-GEOGRAPHIC RESPONSES TO CLIMATE CHANGE IN THE EUROPEAN INTERTIDAL ZONE

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Intertidal organisms are often assumed to live close to their thermal limits, and have emerged as potential early