

ARE HIGHER TAXA ADEQUATE SURROGATES FOR SPECIES LEVEL RICHNESS IN MARINE BENTHIC MOLLUSC COMMUNITIES?

Irini Tsikopoulou^{1*}, Chryssanthi Antoniadou¹, Eleni Voultziadou¹ and Chariton Chintiroglou¹
¹ Department of Zoology, School of Biology, Aristotle University of Thessaloniki - etsikopo@bio.auth.gr

Abstract

The higher-taxa richness as a surrogate of species richness in macrobenthic mollusc communities was explored in Thermaikos Gulf, north Aegean. Statistical analysis showed significant correlation between richness at the species level and richness at the genus as well as the family level. In addition, an increase in correlation values over the years of study was observed, implying an increase of anthropogenic impact in the area.

Keywords: Aegean Sea, Biodiversity, Bivalves, Gastropods, Mollusca

Introduction

Species richness is considered as the most appropriate measure to assess biodiversity in a specific area [1]. However, in many cases the use of higher-taxa levels as surrogates for the species level can produce a reliable faunal distribution pattern provided that there is a strong correlation between species richness and genus and/or family richness [2]. Such an approach has the advantages of being expense-reducing and time saving for biomonitoring studies ([3], [4]). The present study examines the genera and families levels of gastropod and bivalve molluscs for their suitability as surrogates of species level in abundance and species richness assessment of macrobenthic molluscan communities, in Thermaikos Gulf, north Aegean.

Materials and methods

Sampling was carried out for three successive years (summer 2001 - winter 2004). Three vertical transects along the NE coasts of Thermaikos Gulf were selected in the area around the construction site of the new air corridor of Thessaloniki Airport. Six stations - two on each transect were sampled for benthic macrofauna with corer samplers at depths between 3 and 10 m. The Spearman rank correlation coefficient was used to determine whether there was a statistically significant correlation (r_s values) between richness at different taxonomic levels.

Results and discussion

In total, 6931 gastropods were collected belonging to 62 species and 920 bivalves belonging to 39 species. Genus and family levels provided adequate surrogates, for gastropod and bivalve species richness, in the three annual samplings (Figure 1). The correlation between species and family richness was lower ($r_s=0.81$) in the first sampling period (2001) than in the other two periods (2002, 2003). These results are in accordance with those of Chintiroglou et al. ([5]) for the same area concerning the mollusc fauna as a whole. In areas where anthropogenic impact is extensive, higher taxa are represented by a small number of species and their use as surrogates of species richness is more reliable than in non-disturbed areas ([1],[6]). In the study area an increased anthropogenic perturbation has been recorded over the years ([7]).

References

- 1 - Olsfrad F., Somerfield P.J., and Carr M.R., 1998. Relationships between taxonomic resolution, macrobenthic community patterns and disturbance. *Mar. Ecol. Prog. Ser.*, 172: 25-36.
- 2 - Williams P.H. and Gaston K.J., 1994. Measuring more of biodiversity: can higher-taxon richness predict wholesale species richness? *Biol. Conserv.*, 67: 211-217.
- 3 - Balmford A., Green M.J.B. and Murray M.G., 1996. Using higher-taxon richness as a surrogate for species richness. I. Regional tests. *Proceedings of the Royal Society of London*, 263: 1267-1274.
- 4 - Gaston K.J., 2000. Biodiversity: higher taxon richness. *Progr. Phys. Geo.*, 24: 117-127.
- 5 - Chintiroglou C.C., Antoniadou Ch., Damianidis P. & E. Kourelea., 2007. Surrogate measures of biodiversity in macrobenthic communities in Thermaikos Gulf, Greece. *Rapp. Comm. int. Mer Médit.*, 38, 449.
- 6 - Olsford F. and Somerfield P. J., 2000. Surrogates in marine benthic investigations - which taxonomic unit to target? *J. Aquat. Ecos. Stress Recov.*, 7: 25-42
- 7 - Antoniadou C., Krestenitis Y. and Chintiroglou C., 2004. Structure of the "amphioxus sand" community in Thermaikos bay (Eastern Mediterranean). *Fresen. Environ. Bull.*, 13: 1122-1128.

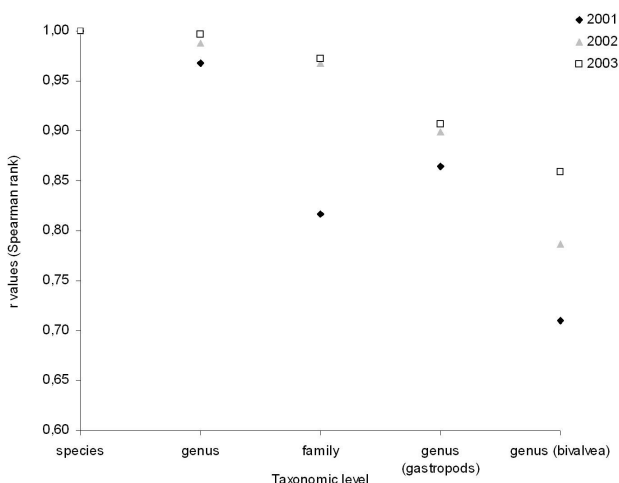


Fig. 1. Degree of correlation between richness for the species level and richness for higher taxonomic levels of molluscs as well as for gastropods and bivalves separately in the three sampling periods