

Biomass of epifauna in the northern Gulf of Trieste: composition, importance for defining benthic ecosystems, and potential fossil preservation

Martin ZUSCHIN ¹, Michael STACHOWITSCH ², Peter PERVESLER ¹ & Herbert KOLLMANN ²

The makroepifauna in the sublittoral muddy softbottoms in the inner Gulf of Trieste was studied regarding its biomass, areal distribution, and taphonomy.

More than 70 epifaunal taxa were recognized. Most of them live permanently on secondary hardgrounds (epigrowth and most of the vagile fauna) or are strongly associated with such hardgrounds (certain vagile forms). The total biomass in the 11.5m² collected was 6399.4 g wet weight, amounting to an average of 139.1 g ww / 0.25 m².

Diver-taken notes, underwater photographs and sample evaluation revealed that the biomass can be divided into two major groups: biomass on secondary hardgrounds and sediment dwellers. The former category includes overgrown hardgrounds (so-called multi-species clumps) which make up 92.5% (5917.9 g wet weight) of the total biomass and whose distribution closely parallels that of total biomass. The latter category encompasses organisms that inhabit the sediment surface itself.

The number of hardgrounds corresponds closely to the biomass values at the respective stations. This indicates that the number of hard substrates determines the potential biomass at a particular site and is a limiting factor for the development of clumps and related high biomass.

The total epigrowth biomass on hardgrounds amounted to 5412 g wet weight and thus made up 84.6% of total community biomass and 91.5% of multi-species clump biomass. Serpulids and their tubes are by far the dominating epigrowth category (2924.8g, 54.0%) followed by ascidians (1750.8g, 32.4%), sponges (413.9g, 7.6%), anemones (189.1g, 3.5%) and bivalves (133.4g, 2.5%). All of these categories show strong positive correlations with epigrowth biomass and total biomass. The sessile epigrowth forms associated with multi-species clumps and their suspension- and filter-feeding habits therefore characterize the investigated benthic ecosystem.

The total vagile biomass associated with multi-species clumps amounted to 505.9 g wet weight and thus represents 7.9 % of total community biomass and 8.5 % of multi-species clump biomass. The echinoderms *Ophiothrix quinque maculata* and *Cucumaria planca* are the two dominant forms, contributing 200.4 g (39.6%) and 199.8 g (39.5%), respectively. This is followed by crustaceans (59.5 g, 11.8%) and echinoids (43.5g, 8.6%). Polychaetes and gastropods each contribute below 1%.

The total biomass of soft-bottom dwellers amounted to 481.5 g ww and thus represents only 7.5 % of total community biomass.

The high biomass and the trophic structure of the epibenthic community defines the role of the benthos as a major suspension-feeding compartment in the overall system and justifies using the epibenthos, to define benthic communities.

Overall, the living communities we observed provide valuable information for the interpretation and definition of fossil benthic communities: even though some soft-bodied organisms will be lost in the fossil record (anemones, ascidians, sponges), the basic trophic structure (suspension feeding) will be preserved.

¹ Institut für Paläontologie, Universität Wien

² Institut für Zoologie, Abteilung für Meeresbiologie, Universität Wien