

Seasonal and spatial variations in mesozooplankton biomass in the northern Gulf of Aqaba

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Abstract. No significant differences were found among the average amounts of mesozooplankton studied at seven stations in the northern part of the Gulf of Aqaba (six coastal and one offshore station) in 2003. The seasonal variation of the zooplankton biomass, however, followed a clear pattern: average values were high during autumn and spring, and low during summer (June–September). Size fractions $>500\ \mu\text{m}$ dominated the sampled biomass and comprised 69% of the total biomass. A higher portion of biomass (58%) was obtained at the coastal stations compared with 42% at the offshore station.

Kurzfassung. Im nördlichen Teil des Golfes von Aqaba wurde an sechs Stationen (fünf an der Küste und eine auf dem offenen Meer), die im Jahr 2003 untersucht wurden, keine signifikanten Unterschiede in der durchschnittlichen Menge des Mesozooplanktons gefunden. Das jahreszeitliche Auftreten der Zooplankton-Biomasse jedoch folgte einem klaren Muster: die Durchschnittswerte waren hoch im Herbst und Frühjahr, und nieder während des Sommers (Juni–September). Größenfraktionen von $>500\ \mu\text{m}$ waren im Zooplankton dominant und nahmen insgesamt 69% der Biomasse ein. An den Küstenstationen wurde ein höherer Anteil an der Biomasse gefunden (58%) als an der Station auf dem offenen Meer (42%).

Key words. Zooplankton, biomass, seasonality, Gulf of Aqaba, Jordan, Middle East, Red Sea.

Introduction

The seasonality of zooplankton variation is directly related to the phytoplankton cycles which are characterised by an intense but short period of algal growth at high latitudes, whereas in tropical regions the seasonal variations of phytoplankton biomass are dampened throughout the year (HEINRICH 1963). In temperate regions, the zooplankton generally display several seasonal peaks; a main peak in spring, and another in autumn or summer (SMITH 1988). The zooplankton as a community are important grazers in the pelagic zone (BURKILL et al. 1993, LANDRY et al. 1995), consuming a wide range of types and sizes of food particles. The zooplankton also contribute to the vertical export of carbon from the mixed layer of particulate, skeletal and faecal material (ROMAN et al. 1995, STOECKER et al. 1996). Within the zooplankton community, organisms of different sizes may play different roles in biogeochemical cycling and may thus influence the processes associated with the biologically mediated draw-down of atmospheric CO_2 , its transformation into particles, and sedimentation in the ocean.

For the Gulf of Aqaba, there are a few available quantitative data-sets on seasonality of zooplankton abundance and biomass distribution (GORDEYEVA 1970, VAISSIER & SEQUIN 1982, 1984, ECHELMAN & FISHELSON 1990, AL-NAJJAR 2000, AL-NAJJAR et al. 2002). This paper, based on studies at the northern tip of the Gulf, evaluates the zooplankton biomass variability in space (fine scale) and time (season), and compares the offshore and coastal biomass.