



## **Microphytobenthos sustain intertidal fish production in the Persian Gulf (Northern Indian Ocean)**

Maryam Shahraki (1), Uwe Krumme (2), Tim Rixen (1,3)

(1) Leibniz Center for Marine Tropical Ecology (ZMT), Bremen, Germany (maryam.shahraki@zmt-bremen.de), (2) Thünen Institute of Baltic Sea Fisheries (TI-OF), Alter Hafen Süd 2, 18069 Rostock, Germany, (3) Institute of Geology, University of Hamburg, Bundesstraße 55, 20146 Hamburg, Germany.

In order to better understand the role of mangroves for fish production, we assessed the relative importance of potential food sources to fish diet in the mangrove-lined and un-vegetated intertidal creeks of Qeshm Island at the Strait of Hormuz, Persian Gulf, Northern Indian Ocean (26° N). The most abundant feeding guilds, stable carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) isotopic ratios of food sources and fishes as well as nutrient concentrations were determined in both sites.

Detritivores were the most abundant feeding guild in both the mangrove and un-vegetated sites (41% and 81% relative abundance, respectively), followed by zooplanktivores (32%; 8%) and macrobenthivores (18%; 7%).

At both sites, organic matter formed by mangrove trees contributed only up to 20% to the fish diet whereas organic carbon produced by microphytobenthos and plankton played a major role in the diet of the dominant fish species.

Compared to the mangrove-lined creek, the pelagic and benthic food webs of the un-vegetated creeks were enriched in the heavier  $^{13}\text{C}$  and lighter  $^{14}\text{N}$  indicating an enhanced proportion of organic matter originally produced by benthic nitrogen-fixing cyanobacteria within food web of the un-vegetated creeks. The dominant role of cyanobacteria was also reflected in the nutrient concentrations. Relatively high nitrate and low phosphate concentrations showed the preferential capturing of phosphates that is leached from the sediments by the cyanobacteria mats leading to phosphate-limiting conditions in the un-vegetated intertidal creeks. Higher phosphate and lower nitrate concentrations suggest in turn that nitrate is, as in many other ecosystems, the factor limiting productivity of the pelagic food web in the mangrove-lined creek. Since the species richness in mangrove creeks was higher than in un-vegetated site, it is furthermore assumed that mangrove trees play an indirect role in the food web by providing a more heterogeneous substrate for associated biota, besides functioning as temporal nurseries and sheltering areas for a variety of organisms.