Title: Varying response of bacteria and nematodes to environmental conditions of Sado estuary – implications for estuarine benthic food webs

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Sediment microbiome and benthic nematodes are indispensable in regulating benthic estuarine ecosystems and knowledge on their distribution patterns is essential for understanding of benthic food webs dynamics. However, simultaneous ecological analysis of bacteria and nematodes communities are seldom made, whereas the question if there exist a congruence between both taxonomic groups in their responses to different ecological conditions is largely unresolved. The main goal of this work was to analyze spatial and temporal distributional patterns of bacteria and nematodes in response to different environmental conditions in Sado Estuary, SW Portugal and further establish a link between these results and estuarine food web data generated using stable isotopes. All samples were collected at two distinct sampling occasions (autumn 2019 and Summer 2020) from three contrasting sites with varying sediment characteristics and human impact degrees. The sediment biogeochemical properties and the composition of bacterial and nematode communities were determined. To analyze bacterial communities, total DNA from sediment was extracted using DNeasy Power Soil kit® (MOBIO, Qiagen) and processed for Illumina MiSeq platform sequencing targeting the V3 and V4 region of 16S rRNA gene. Nematode assemblages were morphologically identified until genera level. All bacterial communities were highly diverse (α-diversity) presenting high β-diversity among the three sites and across two seasons. The distributional patterns presented a close concordance with ecological conditions associated to each site and season. Whereas nematode assemblages yielded a less clear distributional patterns suggesting that their response is rather driven by the within site specific factors. These results will be crossed with estuarine food web data generated through stable isotopes to resolve how distribution patterns of bacteria and nematode communities are reflected in the architecture of the estuarine benthic food webs.