

Copepods promote nitrogen retention in estuarine sediments

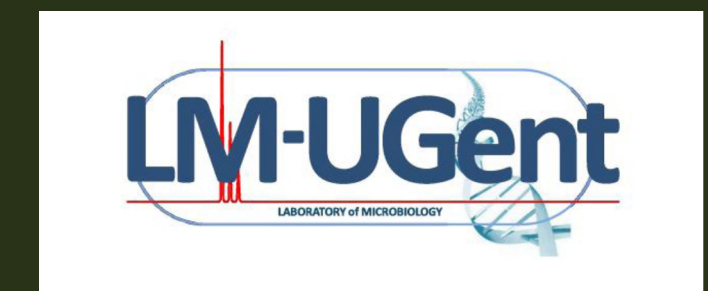
Complex interactions across the oxic-anoxic interface

Willem Stock¹, Kim Heylen², Koen Sabbe³, Anne Willems², Marleen De Troch¹

¹ Marine Biology, Department of Biology, Ghent University, Krijgslaan 281 – S8, B-9000 Ghent, Belgium

² Laboratory of Microbiology (LM-UGent), Department of Biochemistry and Microbiology, Ghent University

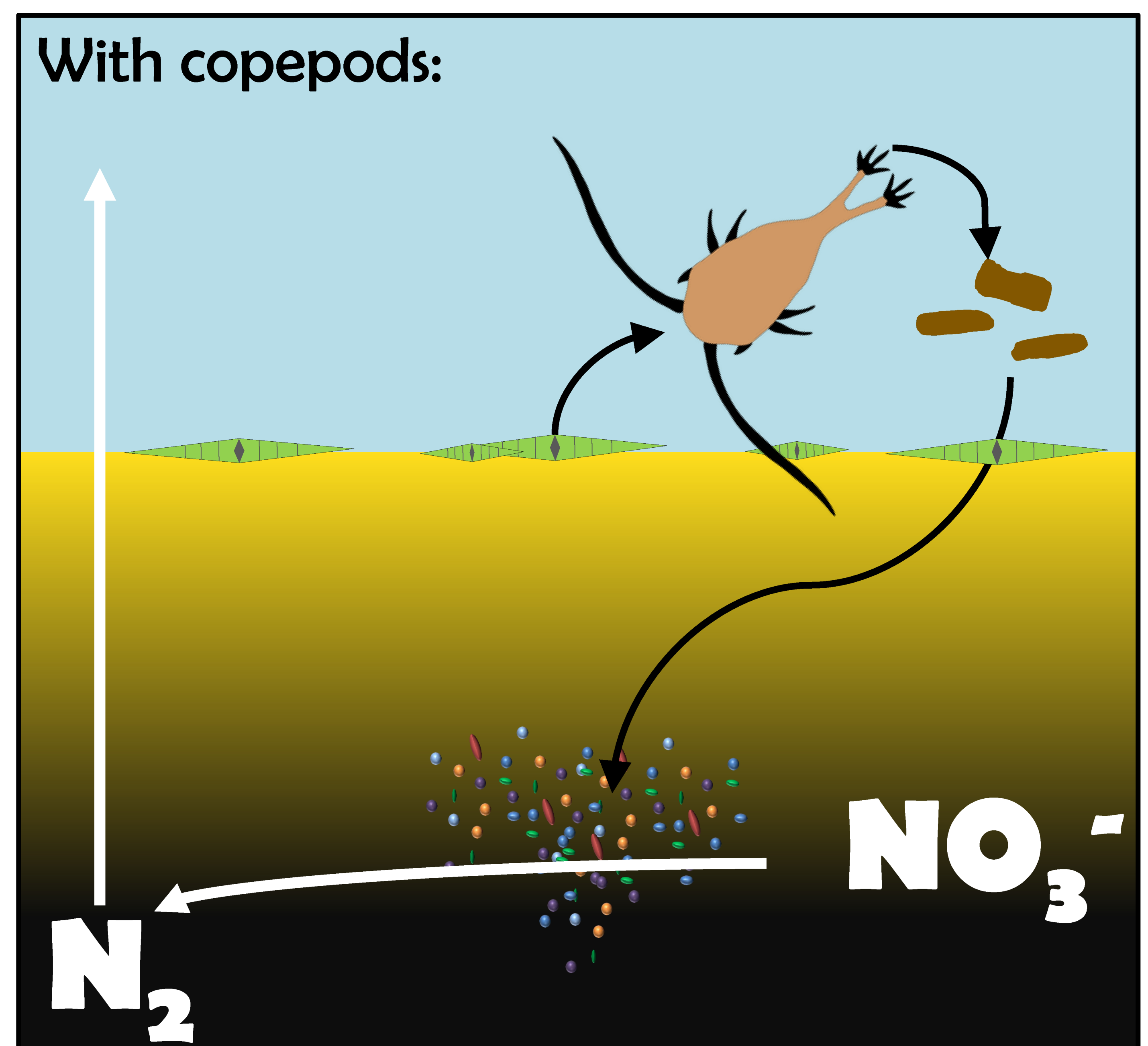
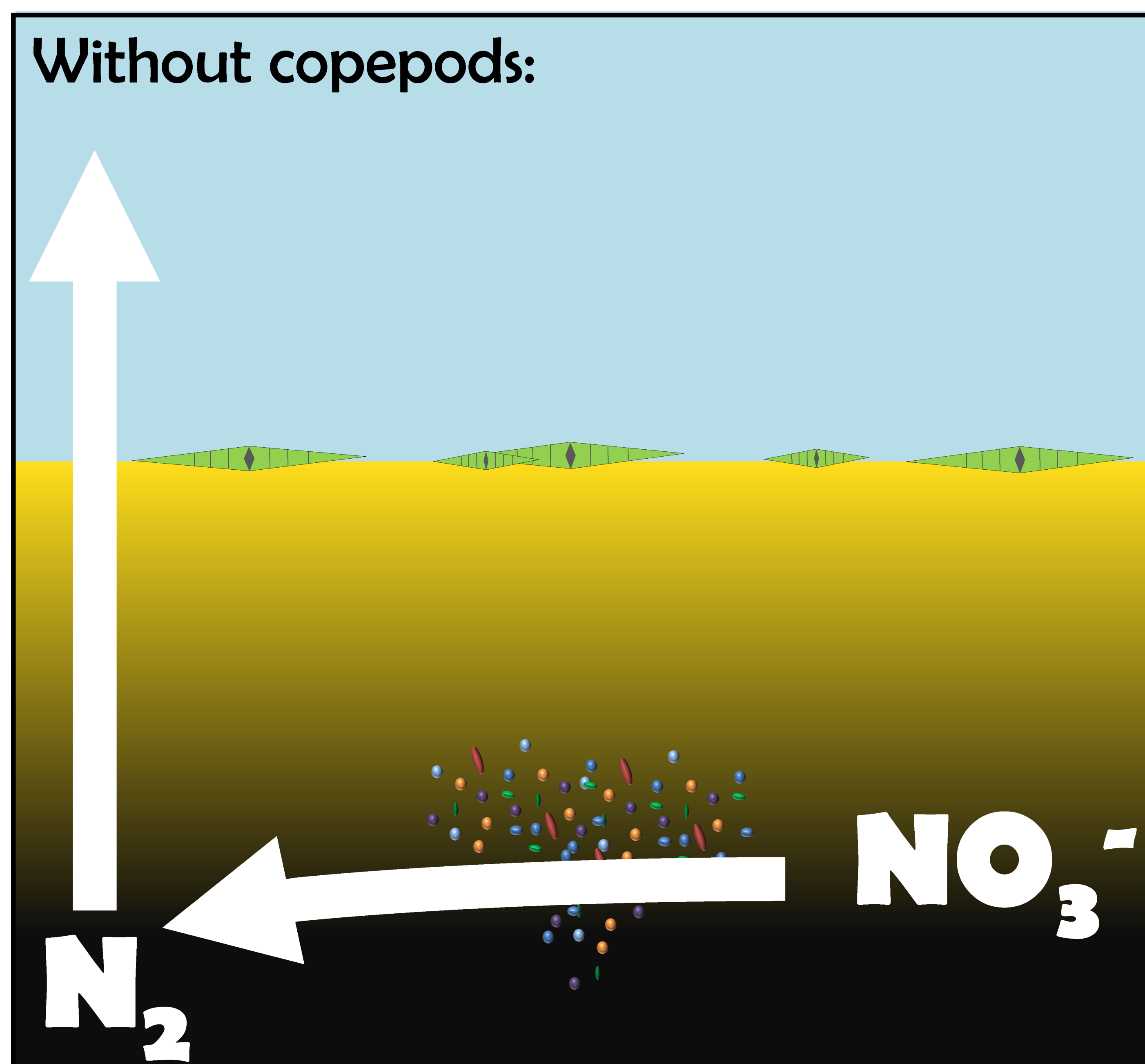
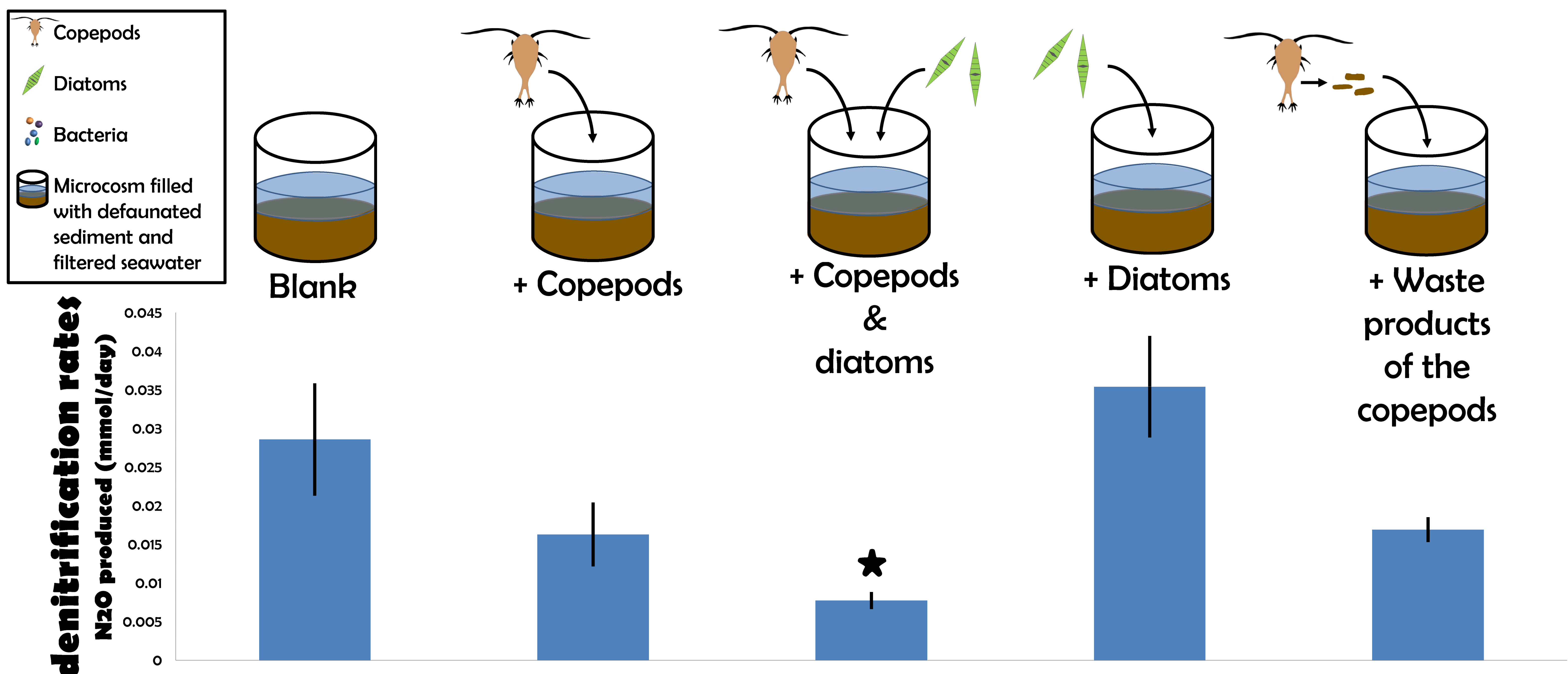
³ Laboratory of Protistology and Aquatic Ecology, Department of Biology, Ghent University



E-mail: Willem.Stock@Ugent.be

Intertidal sediments are important nitrogen sinks. This is due to the sediment inhabiting bacteria which anaerobically reduce high amounts of biologically reactive nitrogen under the form of nitrate (NO_3^-) to inactive nitrogen gas (N_2) through denitrification. High densities of copepods, small crustaceans, inhabit the upper, oxic layers of the sediment, where they graze on bacteria and microalgae such as diatoms.

The aim of this study was to determine if copepods and the interactions they have with their food sources could impact the denitrification rates occurring in the, deeper, anoxic sediment. We tested this with a microcosm experiment in which we measured the nitrogen fluxes after they were subjected to the following treatments:



Copepods were found to enhance nitrogen retention through their excretion products. Our findings suggest that the denitrifying bacteria are outcompeted in the presence of the copepods' waste products as other, non-denitrifying bacteria are better adapted to take advantage of this additional carbon. Although diatoms had no effect themselves, they enhanced the effect of the copepods by influencing the composition and quantity of their excretion products.

These results show that small-scale biological interactions between bacteria, copepods and diatoms across the oxic-anoxic can have an important impact on denitrification.