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ECOSYSTEM ENGINEERING BY THE LUGWORM *ARENICOLA MARINA* REVEALED BY A LARGE SCALE EXCLUSION - IMPLICATIONS FOR ECOSYSTEM CHARACTERISTICS

Large scale experimental exclusion of a dominating bioturbator of intertidal sands *Arenicola marina* L. revealed a manifold effect of this polychaete on ecosystem characteristics and functional biodiversity. Lugworms reduce the microphytobenthic biomass and prevent sediment clogging with fine particles. Thereby high sediment permeability is preserved, which enhances porewater exchange rates and oxygen supply and reduces sulfide accumulation due to advection and bioirrigation. These biogeochemical habitat modifications by the lugworm turned out to be a key to the functional composition of the zoobenthos. On lugworm exclusion areas a dominance of motile burrowing subsurface feeders gave way to mostly surface feeding gastropods and bivalves. Higher sediment stability enabled tube building polychaetes to settle and allowed for an ephemeral development of epibenthic algal tufts which in turn triggered juvenile settlement of clams. We conclude that the bioturbation of a large subsurface feeder inhibits successional developments at the sediment surface.

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