Feeding behaviour of seven important fouling species: The key to their success?

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Offshore wind farms in the Southern part of the North Sea add artificial hard substrate to areas previously characterized by the presence of naturally soft bottoms only. These hard substrates are rapidly colonized along the depth gradient by fouling organisms. Some fouling species are found at the entire depth range along the wind turbines, while some of the species are restricted to limited parts of the pile. Most of the fouling species are suspension feeders, taking advantage of a variety of different food sources from the water column. The aim of the present study is to examine the intra-specific feeding behaviour of seven fouling species that are found at different depths on an offshore wind turbine. The investigated species included the blue mussel *Mytilus edulis*, the anemone species *Diadumene cincta* and *Metridium dianthus*, the crabs *Pisidia longicornis* and *Necora puber*, the amphipod *Jassa herdmani* and the brittle star *Ophiothrix fragilis*. Six sampling locations along the depth gradient and around the wind turbine were selected: the intertidal, the *Mytilus edulis* zone (~ 5 m depth), the *Jassa herdmani* zone (8-9 m depth), the *Metridim dianthus* zone (15-25 m depth), the erosion protection layer (EPL) and the soft substrate near the pile. At least three individuals belonging to the seven abovementioned species were collected where possible. From each of the species, the carbon and nitrogen stable isotopes were analysed. Using the stable isotope data, the trophic niches of each species at the different sampling locations were estimated. The position and overlaps of the trophic niches provided information with regards to the feeding preferences of each species at every location. The results indicated that some species (*Necora puber* and *Diadumene cincta*) exploit the same food source, independent of their sampling location. However, most of the investigated species shift food sources according to the depth at which they occur. Such trophic plasticity can be at the basis of their success as fouling organisms, as it allows them to take benefit of a wide range of food items. This study suggests that there is a difference in the resource exploitation by the same species occurring at different depths of the offshore wind turbines. Such variability emphasizes the importance of understanding the complexity of a species' feeding behaviour.

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