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MONOGRAPH

Amphipod importance in the trophic network of the eastern part of the English Channel

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ABSTRACT Benthic and suprabenthic macrofauna and demersal before fish has been sampled on a future offshore wind farm site in the eastern English Channel. The amphipods are among the dominant group of the macrofauna and dominate the suprabenthos and fish stomach content. Seasonal and spatial differences between two benthic habitats (sand and gravel) occur showing the higher importance of amphipods on sand than on gravel in spite of a higher diversity and abundance on gravel. The trophic transfers between benthos, suprabenthos and fish are discussed.

KEY WORDS English Channel; stomach contents; amphipods in trophic chain.

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The French government has set a target of 23% of energetic consumption derived from renewable energy sources including Marine Renewable Energy for 2020. Eight Offshore Wind Farms (OWF) are planned and among them Dieppe-Le Tréport site in the eastern English Channel (eEC). In order to further knowledge on the structure and functioning of the ecosystem before the installation of OWF, the PhD thesis of J.P. Pezy is focused on the establishment of the trophic network within ECOPATH model (Pezy et al., 2017) on this site in comparison with similar benthic habitats from the eEC. The collection of new data on biological compartments (zooplankton, suprabenthos, meiofauna, benthos and demersal fishes) are essential. So, four campaigns (summers 2014 and 2015 then winters 2015 and 2016) has permitted to estimate the contribution of each zoological group in two main benthic habitats: i.e. sandy gravels and medium clean sands, founded on the site (about 30 km²) (Fig. 1). Macrofauna was sampled with a 0.1 m² Van Veen grab (five replicates in 25 stations), suprabenthos with a modified Macer-Giroq sledge (Dauvin et al., 1994) in one station from each benthic habitat (day and night sampling) and fish with a beam trawl in ten stations including four on the sand habitat and six in the gravel habitat. A total of 1,584 demersal fishes has been collected and their stomach contents has been examined. The data are grouped in two seasons (summer and winter) and two main benthic habitats sandy gravel (19 stations) and medium sand (6 stations) has been identified. A total of 42 amphipod species has been recorded: 37 on gravel, 25 on sand for the benthos, 26 in the suprabenthic samples and 24 in the stomach contents.

There are high seasonal and spatial difference between both habitats, with a higher proportion of amphipods in summer than in winter to the sandy gravel habitat than medium sand habitat for the

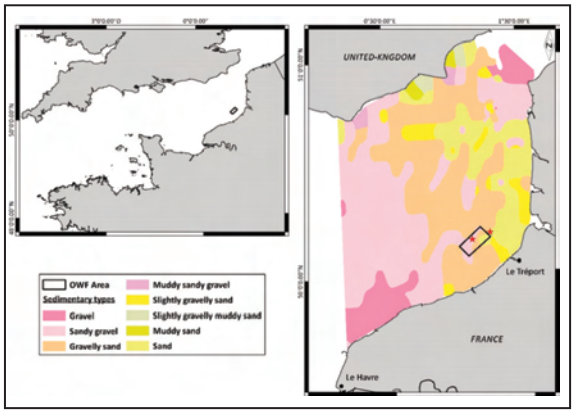


Figure 1. Location of the sampling zone in the eastern part of the English Channel. Red star corresponds to the suprabenthic samples in both medium sand and sandy gravel habitats.

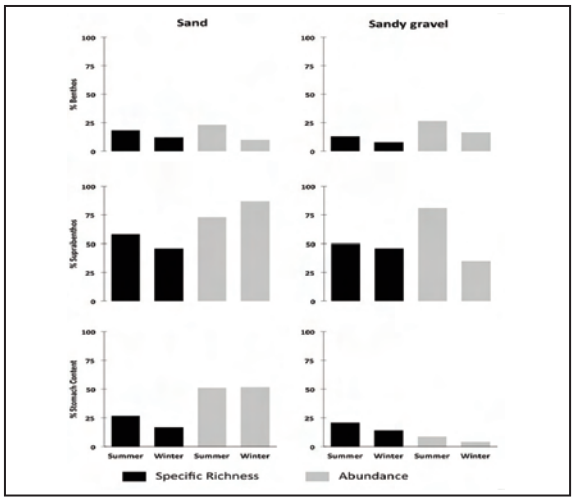


Figure 2. Proportion of amphipods in the benthos, suprabenthos and stomach contents for both seasons and both habitats in the Dieppe-Le Tréport area.

benthos, while the suprabenthos showed higher proportion on medium sand than on sandy gravel. Similarly the amphipods formed > 51% of the preys on fish sampling on medium sand and less than 10% of the fish sampling on sandy gravel. It appeared that the amphipods are much consummated while the large bivalves which form the main part of the benthic biomass are unconsumed. Thus it exists a disparity between the assessment of benthic biomass and prey looked by the fishes.

The stomach content results obtained in this part of the English Channel are compared with those obtained in the Bay of Seine (Mallek-Zouhiri, 1999; Tous Rius, 2009) and the Bay of Morlaix (Dauvin, 1998). The role of the amphipods in the fish prey item through their accessibility in the suprabenthic layer are underlined. Moreover, high differences between both benthic habitats underline the fundamental role of surficial sediment at small spatial scale and their specific assemblages in the trophic food web.

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