

# Current distribution and population dynamics of *Mnemiopsis leidyi* populations in the Belgian part of the North Sea and the Westerschelde estuary

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One of the most notorious marine invasive species is the ctenophore *Mnemiopsis leidyi*. The success of this species is attributed to its efficiency in occupying niches in an ecosystem. The combination of high feeding, growth and reproduction rates enable *M. leidyi* populations to rapidly increase in favourable conditions and facilitate range expansion. This caused economic and ecological problems in the Black Sea after the accidental introduction in the early 1980s. The ctenophore was recently observed in Belgian waters and thus poses a potential threat for the ecosystem of the southern North Sea.

This study presents detailed spatial and temporal distribution patterns of *M. leidyi* in the Belgian Part of the North Sea (BPNS), the Westerschelde estuary and three Belgian ports (Nieuwpoort, Oostende and Zeebrugge). In addition, the population dynamics of this non-indigenous species were elucidated for this area and its distribution was linked to prevalent environmental conditions. Ctenophores were sampled using a WP3 plankton net or hand net at each station in the study area during monthly sampling campaigns in 2011 and 2012.

Results show the seasonal occurrence of *M. leidyi* from August until December. The ctenophore was present in the port of Oostende and Zeebrugge, the Westerschelde and a nearshore station, whereas it was never observed off shore (> 50km from the coast). Densities were generally quite low ( $\leq 0.5 \text{ ind.m}^{-3}$ ) compared to other invaded areas (average density in the Black Sea:  $12.4 \text{ ind.m}^{-3}$ ). Nevertheless, densities up to  $18.37 \text{ ind.m}^{-3}$  were observed at the port of Oostende in September 2012 and up to  $1.85 \text{ ind.m}^{-3}$  in the Westerschelde estuary (October 2012). These areas form semi-enclosed basins with mild hydrodynamics, which allow larger populations. The same trend was observed in the estuaries of the Netherlands (Lake Grevelingen and Oosterschelde) and in bays along the east coast of the United States (*M. leidyi*'s native habitat). Furthermore, the Westerschelde and ports clearly function as breeding grounds for this species. Larvae were present in September 2012 in the ports and in October and December 2012 in the Westerschelde.

Although *M. leidyi* populations in Belgium are generally rather small, they can increase at a local and seasonal scale, causing a considerable impact on the ecosystem.