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Zooplankton in the Schelde estuary, Belgium and the Netherlands: long-term trends in spring populations

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Abstract

A compilation of available data in between 1967 and 2002 on spring zooplankton abundance was made for the brackish and the freshwater zone of the Schelde estuary. The general picture is a significant increase of 1–2 orders of magnitude in abundance for Rotifera, Copepoda and Branchiopoda (mainly Cladocera) in the freshwater zone, while zooplankton abundance in the brackishwater zone remained more constant. Possible natural and management related causes for this increase in zooplankton abundance are briefly discussed.

The *Schelde* estuary is one of the few remaining estuaries with an extensive salt-, brackish-and freshwater tidal reach in Europe (Fig. 1). Located in an area with high population density, the Schelde was considered as one of the most eutrophic systems in the world during the second half of the 20th century (Heip, 1988). A gradual improvement is however observed since the mid-seventies as a result of substantial emission reduction efforts throughout the watershed (Van Damme et al., 1995). By their pelagic life-style and their requirement for oxygen, zooplankton organisms are strongly affected by the water quality.

In this paper, we look at the long-term changes in the mesozooplankton populations in the Schelde

estuary. We have combined abundance data on mesozooplankton in the Schelde obtained during 1967–1969 (De Pauw, 1973,1975; Bakker & De Pauw, 1975), 1989–1991 (Soetaert & Van Rijswijk, 1993) and 1996–2000 (Tackx et al., 2003 and unpublished results of the ongoing ‘Onderzoek Milieu – effecten Sigmaplan (OMES) project). Two zones were considered: the brackish water zone (at 57.5–71.5 km from the mouth) and the freshwater zone (78.5–155 km) (Fig. 1; Van Damme et al. 2005). For each spring month (February–May), the average abundance of each taxon was calculated from all available data within the zone. The number of stations per zone varied between 1 and 12 (minimum 3 in most cases). During 1989–1991,

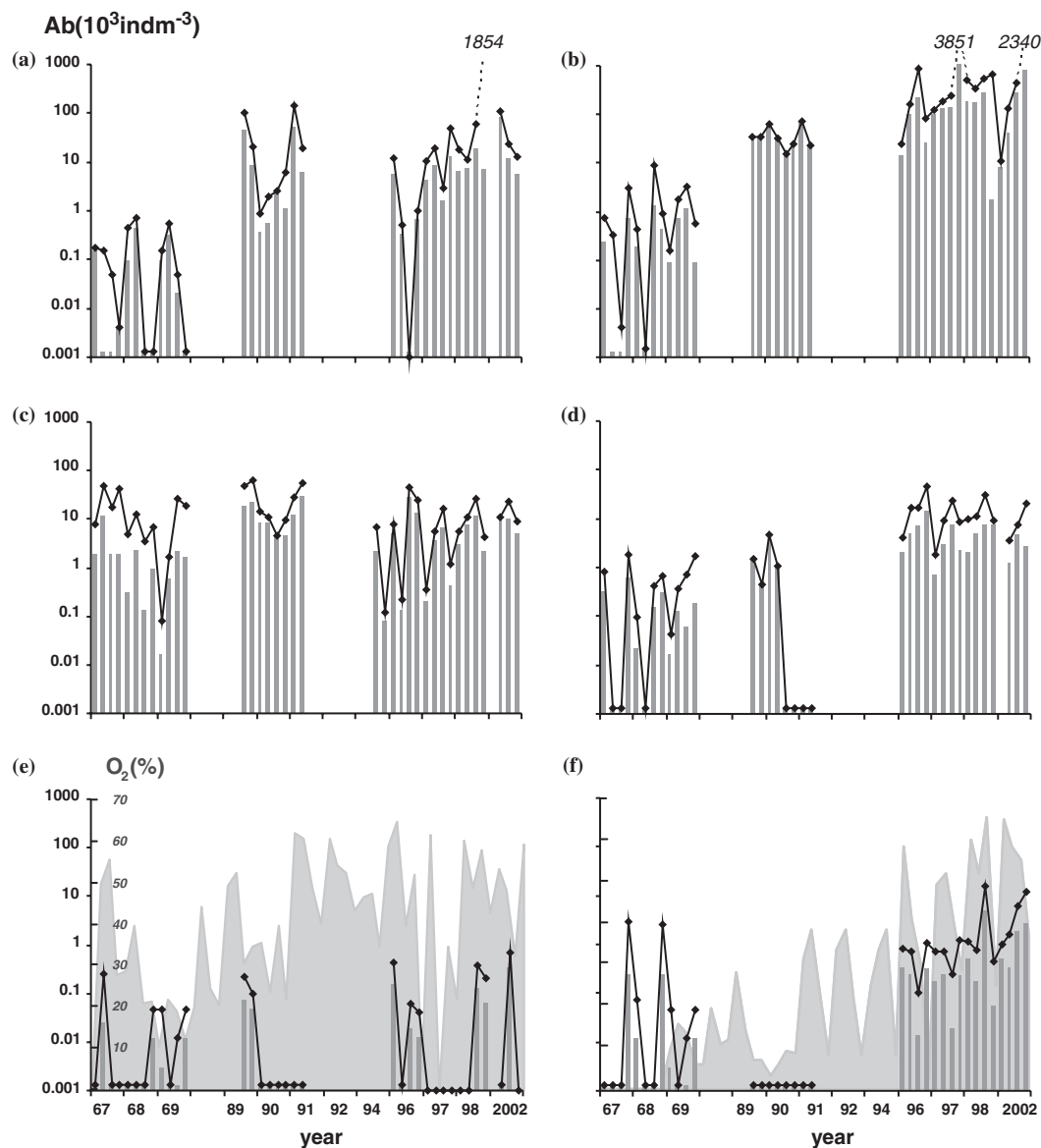


Figure 2. Spring (February–May) mean abundance (bars) and maximum abundance (line with diamonds) of Rotifera (a), Copepoda (c) and Branchiopoda (e) observed in the brackish zone and of Rotifera (b), Copepoda (d) and Branchiopoda (f) observed in the freshwater zone of the Schelde estuary from 1967 till 2002. Note the logarithmic scale. Shaded area in Fig. 2e, f Percentage oxygen saturation. See text for further explanation.

freshwater zone from the 90ties onwards (Fig. 2e, f) can be considered an important factor in relation to this zooplankton development. Multivariate analysis using the more the consistent dataset between zooplankton and environmental variables since the OMES monitoring campaigns (1986) could further elucidate this hypothesis (Azémar et al., in preparation).

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