

The black box: a story of the brown shrimp and the (un)faithful mysids in the Westerschelde estuary

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The estuarine population of the brown shrimp *Crangon crangon* in the Westerschelde was sampled with a 3-metre beamtrawl and a hyperbenthic sledge with RV Luctor and with a 2-metre beamtrawl with the Riekus during several campaigns.

During the period 1999-2000 the densities of the brown shrimp were lowest in winter and highest in summer, respectively 1 and 4.5m⁻² in the brackish zone, where the densities were twice as high as in the marine zone of the estuary. Ten years earlier, between 1988 and 1991 the densities were approximately twice as high (max. 6.5m⁻² in August), as well in the marine as the brackish zone during all seasons, but especially in November. Even during a 24 hour sampling campaign in the brackish zone in September 1991 — the peak period for shrimps — the densities were much higher, on average 17m⁻² with a maximum of 30m⁻² in the afternoon. The difference between the seasons was extreme in the brackish intertidal in 1992 as densities were between 60 and 80 times higher in summer (4m⁻²) and fall (5m⁻²) than in spring (0.05m⁻²) with a maximum of 20m⁻² in October.

Analysing the diet was rather difficult as in most of the stomachs the prey items were almost completely crushed. Most probably shrimps use sand grains to help them with this job, as between 70 and 90% of the non-empty stomachs contained sand grains from a few to several hundreds per stomach. Furthermore, respectively in 40% and 20% of the stomachs unidentifiable crustacean parts and other unidentified matter was found.

Shrimps show a tidal feeding rhythm, with highest number of shrimps with some food in their stomachs at high water, as well during day as night. Shrimps seem to eat more in the brackish zone (more than 70% non-empty stomachs in the subtidal and even 90% in the intertidal) while in the marine zone on average 50% of the stomachs had some food particles in their stomach.

During the 24 hour sampling mysids (mainly *Neomysis* and *Mesopodopsis* and to a lesser extent *Gastrosaccus*) were the most important prey items (Frequency of Occurrence >90% of the non-empty stomachs). Even 10 years after, mysids constituted more than 70% of the shrimp diet in September. In May mysids were still an important prey item, surely in the marine zone (FO 70%), but in autumn and winter the occurrence of mysids in the diet dropped to 20%. In the intertidal mysids are infrequently preyed upon by shrimps. Here, amphipods (*Corophium* and *Bathyporeia*) constituted the main part of the diet (FO 40%).

Other less important prey items are bivalves (mainly *Mytilus spat*), polychaetes (mainly *Nereidae*), ostracods, copepods, cypris larvae and gastropods (mainly *Littorina*).