

Invading macroinvertebrates in navigable canals: the role of artificial structures.



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Fig. 1: Study area.

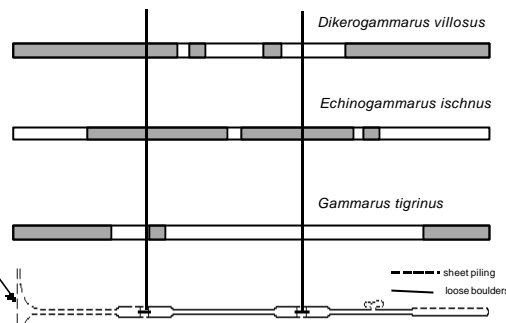


Fig. 2: Distribution patterns of Amphipods on embankment structures in the branchcanal Salzgitter. Left: Mittellandkanal, right: Salzgitter harbour, vertical line: position of locks, dotted: presence of species.

Locality and Methods

In the Salzgitter branch canal of the Mittellandkanal in Lower Saxony near Braunschweig, Germany (Fig. 1), the main bank structure consists of steel sheet-piling and stone-embankment made of loose boulders. The temporal (not presented in the poster) and spatial distribution of several macroinvertebrate taxa was investigated in 1998 by applying different sampling methods including experimental substrates, e.g. former car seat belts.

Introduction

Navigable canals are important for the dispersal and range extension of aquatic invading species, by connecting rivers as well as offering an artificial habitat with new ecological niches. The knowledge on habitat preferences will help for understanding the success of these species.

Results

Areas surrounding harbours and locks were hot spots in macroinvertebrate diversity and abundance. The sheet-pile and stone-embankment sections look very monotonous and do not show a high species richness. They have however a distinct microdistribution in different investigated taxa.

Dominant species are *Cordylophora caspia* (Hydrozoa), *Corophium curvispinum* (Amphipoda), *Dikerogammarus villosus* (Amphipoda), *Dreissena polymorpha* (Bivalvia) and *Tinodes waeneri* (Trichoptera).

Amphipod species showed a distinct spatial distribution pattern which is associated with the structure of the embankment (Figs 2 & 3).

Sessile macroinvertebrates exhibited reduced abundance in the canal sections with no structuring elements (Fig. 3). Near the locks (SkS-km 3.5) or the mouth to the Mittellandkanal (SkS-km 0.0) the numbers increased. On experimental substrates, they mainly grow on the bottom-side of the substrates, and were found more frequently on the side of the substrates which was directed to the sheet-piling.

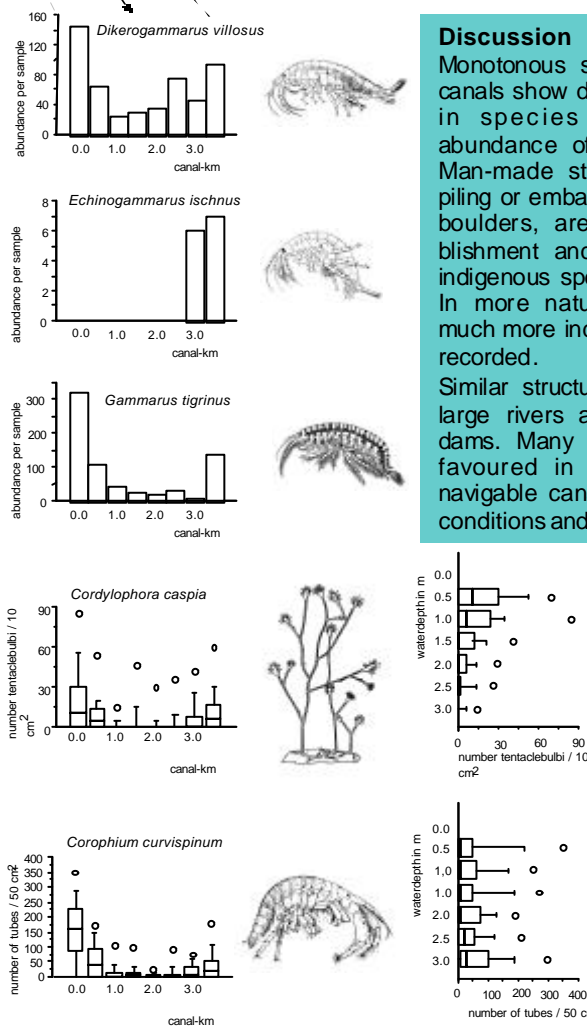


Fig. 3: Horizontal (left) and vertical (right) patterns of nonindigenous macroinvertebrates on experimental substrates in the branchcanal Salzgitter, Germany. Sessile species: Box plot with median, 75%, 95% and max.

Discussion

Monotonous stretches of navigable canals show drastic local differences in species composition and abundance of macroinvertebrates. Man-made structures, e.g. sheet-piling or embankment made of loose boulders, are important for establishment and abundance of non-indigenous species in these waters. In more natural structured areas much more indigenous species were recorded.

Similar structures can be found in large rivers as groynes or rivers-dams. Many invading species are favoured in large rivers and/or navigable canals, by these artificial conditions and factors.