



Anthropogenic Dispersal and Environmental Impact of Invasive Species of Mysidae (Mysidacea: Crustacea) on a World-wide Scale

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Anthropogenic modes of large-scale dispersal have so far been documented in 14 species of mysids (fam. Mysidae). In these cases, the limits of large hydrological systems, continents or even of the Atlantic or Pacific basins have been transgressed. Transoceanic dispersal mainly involved transport in ballast water. Dispersal between inland waters was formerly mainly due to intentional transplantations in order to enrich fish food: such practices in the 1950s to 1970s were terminated in the early 1980s when detrimental effects on the ecosystem level were noted. Non-intentional transcontinental dispersal mainly involved inland navigation, i.e. ballast water or cooling water filters, but fish stocking, construction of waterways and passage through water pipelines may also have played some role. Most cases of non-intentional anthropogenic dispersal affected euryhaline benthopelagic species, with at least some populations occurring in lagoons, estuaries and harbours. This holds true even for species with populations > 1000 km inland, such as *Hemimysis anomala*, *Limnomysis benedeni* and *Katamysis warpachowskyi*, all living along large river systems (Danube, Don, Volga).

Detrimental environmental impacts have so far mainly been related to the mass occurrence of predatory species (all being partly phytophagous, especially the early life stages) in deep inland waters. Water depths exceeding about 10 m appear to favour mass occurrence because low light intensities on the bottom protect against predation by visually oriented fish during daytime, while the mysids migrate upwards for feeding during the night. The observed detrimental effects after invasions of certain mysid species include overgrazing of zooplankton and subsequent eutrophication symptoms,

enhanced bioaccumulation of toxicants (PCB, Hg; possibly due to insertion of an additional trophic level into the food web), and reduction of certain fish stocks.