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Editorial

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The very moment this editorial was written a Dutch newspaper announced that the Asian whelk *Rapana venosa* has arrived. This gastropod may attain a shell height of 14 cm or more and tolerates low salinities. In Korean waters, it is a highly regarded seafood and fishermen also use the empty shells to trap octopus. This predator on other mollusks became accidentally introduced into the Black Sea some 60 years ago (Gomoiu et al. 2002). The population expanded and decimated mussels, oysters and various clams until the whelks were harvested and sold to Japanese gourmets. While whelks began to decline in the Black Sea, they invaded Adriatic lagoons where they happened to encounter as prey the Manila clam *Tapes philippinarum* and the soft-bottom clam *Anadara inaequalis*, both of which have been introduced from Asian waters as well (Savini and Occhipinti-Amrogi 2006). The Rapa whelk also invaded the French Atlantic coast and now finally has arrived in the North Sea. Will it there become a threat to cockles and mussels or will crabs and other predators take control of it?

European coastal history is full of such biological invasions. Mostly inadvertent introductions are changing coastal aquatic communities and ecological functioning. In a recent book on invasive species in European waters (Leppäkoski et al. 2002) an overview was presented, and the EU funded project DAISIE is compiling an up-to-date inventory of alien aquatic species which immigrated through canals and with ships, aquaculture or the aquaria trade and became established in European waters. Within the European Network of Excellence on “Marine Biodiversity and Ecosystem Functioning” (MARBEF) it was decided to focus on the effects that invasive species may have on the coastal

water ecosystems. With this aim, a workshop was hosted by the Alfred Wegener Institute for Polar and Marine Research (AWI) in its Wadden Sea Station on the island of Sylt in the North Sea from January 27 to 30 in 2005. The workshop was attended by 52 participants from 14 European countries, 23 formal lectures and several posters were presented on alien species from the Caspian Sea to the Azores.

This workshop on “Aquatic invasive species and the functioning of European coastal ecosystems” arrived at the following conclusions:

The global transport of marine and brackish-water organisms has caused an unprecedented increase in the number of species across European coastal seas. These introductions result in global mixing of previously isolated biotas and promote the dominance of universal species.

So far there is no evidence of European-scale extinctions of natives caused by the biological invasions while local extinctions are apparent. Introductions are noted more readily, however, prove of extinctions may take much longer. Strong shifts in ecosystem functioning already have been documented (e.g. the recent American comb jelly *Mnemiopsis leidyi* invasions into the Black and Caspian Sea).

Some invasive species (i.e. pathogens, toxic algae, fouling organisms) severely threaten the goods and services of European coastal ecosystems. On the other hand, introduced cultured marine organisms have attained high economic value. Introduced species have widened and intensified functional properties in European coastal ecosystems, achieving dominance and adding to food web and habitat complexity. Their effects are particularly strong in estuaries, coastal lagoons and isolated water bodies. The invasion success of introduced species in European seas is greatly facilitated by anthropogenic transformations, exploitations and disturbances of coastal ecosystems as well as by climate change.

The problem of biological invasions has now become the focus of a rapidly growing research area. Many

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indirect and cascading effects are still poorly understood, and mechanisms as well as long-term effects are largely unexplored. Interdisciplinary studies and an integrative approach on the effects of introduced species provide model systems for community interactions and may considerably improve our knowledge on biodiversity and ecosystem functioning. In order to elucidate mechanisms, evaluate effects and anticipate long-term consequences of species introductions into European coastal waters, it is necessary to proceed from national projects to a European-wide effort with a comparative approach. Once a species has been introduced, a further spread along European coasts is inevitable, and we need scenarios on expected spreading and impacts to provide a rationale for precautionary measures.

We recommend establishing European policies to minimize the risk of introductions of harmful species by precautionary measures based on sound research. We also recommend that existing protocols (i.e. ICES Code of Practice for the Introduction and Transfer of Marine Organisms and IMO Ballast Water Management Convention) to avoid unwanted introductions should be followed.

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