

Internet-based information resources on aquatic invasive species in Europe

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During the last two decades rates of invasions of European inland and coastal waters by alien species increased significantly. Ballast water release is considered as the main vector of aquatic species introductions in Europe, but other human-mediated vectors like intentional introductions and accidental release are also important. In many cases introductions of invasive species have caused significant losses in marine, estuarine and inland waters biodiversity and economy in Europe. Development of the Internet-based information resources on aquatic invasive species is considered as one of the most important mechanisms of information exchange within the European scientific community and worldwide. These resources may provide comprehensive information for management of aquatic invasive species in Europe, as well as for scientific and educational purposes.

The International Commission for the Scientific Exploration of the Mediterranean Sea (CIESM) Atlas of Exotic Species (<http://www.ciesm.org/atlas/>) is one of the most comprehensive Internet-based atlases of aquatic alien species in the world, and includes detailed description of alien crustacean decapods, fishes and molluscs, which invaded the Mediterranean Sea basin. The Baltic Sea Alien Species Database encourages the exchange of data within the Baltic Sea area, providing a competent system regarding biological invasions, vectors of introduction, spread of alien species and their impacts on environment and economy (<http://www.ku.lt/nemo/mainnemo.htm>). Presently it includes about 100 species, information on each species is standardized according to eight major features allowing search and data retrieving according to user formulated requests. Detailed information on the American ctenophore *Mnemiopsis leidyi*, which recently invaded Black and Caspian Seas, is available on the website of the UNDP Caspian Environment Programme (<http://caspiansenvironment.org/mnemiopsis/>). Information on aquatic invasive species in Europe can be found at the FAO Database on Introductions of Aquatic Species (<http://www.fao.org/waicent/faoinfo/fishery/statist/fisoft/dias/mainpage.htm>), and in the Global Invasive Species Database, which include the List of 100 of the World's Worst Invasive Species (<http://www.issg.org/database/welcome/>). Information on European cooperation in ballast water management can be found on the website of the ongoing MARTOB project (<http://www.marinetech.ncl.ac.uk/research/martob/>), supported by the European Union. Comprehensive information of ballast water management is available at the Global Ballast Water Management Programme (GloBallast) web site (<http://globallast.imo.org/>).

Early 2001, the website of the Regional Biological Invasions Center (RBIC), provides access to the Internet-based information resources on aquatic invasive species research and management in Europe and worldwide (<http://www.zin.ru/projects/invasions/>). The development of the Geographic Information System 'INVADER' as international database on the Internet (<http://www.zin.ru/projects/invasions/gaas/invader/invader.htm>) is one of the RBIC priorities. On-line geo-referenced distribution maps of selected species, along with detailed descriptions of their taxonomy, invasion histories and biology, are available at the RBIC Illustrated Database of the Aquatic Invasive Species of Europe (http://www.zin.ru/projects/invasions/gaas/aa_idb.htm), linked to the Baltic Sea Alien Species Database, to the Global Invasive Species Database, and to the other species-specific on-line information sources.