

Pathogens co-transported with invasive non-native aquatic species: implications for risk analysis and legislation

Rachel Foster¹, Edmund Peeler², Jamie Bojko³, Paul F. Clark¹, David Morritt⁴, Helen E. Roy⁵, Paul Stebbing⁶, Hannah Tidbury², Louisa Wood², and David Bass¹

¹Natural History Museum Zoology Department

²Centre for Environment Fisheries and Aquaculture Science Weymouth Laboratory

³Teesside University School of Health and Life Sciences

⁴Royal Holloway University of London School of Biological Sciences

⁵UK Centre for Ecology & Hydrology

⁶APEM Ltd

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Abstract

Invasive Non-Native Species (INNS) can co-transport externally and internally other organisms including viruses, bacteria and other eukaryotes (including metazoan parasites), collectively referred to as the symbiome. These symbiotic organisms include pathogens, a small minority of which are subject to surveillance and regulatory control, but most of which are currently unscrutinised and/or unknown. The (putatively) pathogenic symbionts co-transported by an INNS host may be latent or associated with asymptomatic infection and unable to cause disease in the INNS, but may be opportunistic pathogens of other hosts, causing impact to one or more hosts in their new range. These pathogens potentially pose diverse risks to other species, with implications for increased epidemiological risk to agriculture and aquaculture, wildlife/ecosystems, and human health (zoonotic diseases). Aquatic INNS and their symbionts have many introduction pathways, including commodity and trade (releases, escapes, contaminant), transport (stowaway), and dispersal (corridor, unaided). The risks and impacts arising from co-transported pathogens, including other symbionts of unknown pathogenic virulence, remain largely unexplored, unlegislated, and difficult to identify and quantify. Here, we propose a workflow to determine any known and potential pathogens of aquatic INNS. This workflow acts as a prerequisite for assessing the nature and risk posed by co-transported symbionts of INNS. A better understanding of co-transported organisms, the risks they pose and their impact, is necessary to inform policy and INNS risk assessments. This leap in evidence will be instrumental to devise an appropriate set of statutory responsibilities with respect to these symbionts, and to underpin new and more effective legislative processes relating to the disease screening and risk assessment of INNS.

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