

Is the osmorepiratory compromise limiting invasive species? - DTU Orbit (09/11/2017)

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The round goby (*Neogobius melanostomus*) is a benthic fish native to the brackish waters of the Black and Caspian Seas; however, it has invaded several brackish and freshwater areas in North America and northern Europe. Notably, there are no records of *N. melanostomus* in high salinity marine habitats and the physiological mechanisms potentially constraining the invasion into this environment are largely unknown. The gills play major roles in gas exchange and ionic regulation and it has been hypothesized that an osmorepiratory compromise impacts performance of each process. The tradeoff of the large gill exchange capacity ideal for gas exchange is greater passive ion fluxes. High ionic waters would result in greater passive ion uptake that would require greater active ion excretion. This osmoregulatory disturbance may interfere with fish invasion by disrupting the regular activity of the gills, thus modifying the usual physiological mechanisms. To examine if the osmorepiratory compromise could constrain the invasion of *N. melanostomus* into high salinity environments, this study compared Na^+/K^+ ATPase activity of metabolic phenotypes exposed to 0, 15 and 30 ppt water). Additionally, we examined variation in two important MO_2 measures, standard metabolic rate (SMR) and maximum metabolic rate (MMR) when *N. melanostomus* is exposed to increasing water salinities. Fish with an initially higher MMR (at the control salinity - 0ppt) are likely to be more challenged by environmental stressors than fish with a lower MMR. Our results will enable a better understanding of the physiological mechanisms that may constrain invasive species in the aquatic environment

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