

Publication

An eDNA Assay to Monitor a Globally Invasive Fish Species from Flowing Freshwater

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 3707602**Author(s)** Adrian-Kalchhauser, Irene; Burkhardt-Holm, Patricia**Author(s) at UniBasel** [Holm, Patricia](#) ; [Adrian-Kalchhauser, Irene](#) ;**Year** 2016**Title** An eDNA Assay to Monitor a Globally Invasive Fish Species from Flowing Freshwater**Journal** PLoS ONE**Volume** 11**Number** 1**Pages / Article-Number** e0147558**Keywords** GOBY NEOGOBIUS MELANOSTOMUS; ENVIRONMENTAL DNA SAMPLES; ROUND GOBY; GREAT-LAKES; SURVEILLANCE; EXTRACTION; PROGRAM; GOBIES; BIODIVERSITY; DEGRADATION

Ponto-Caspian gobies are a flock of five invasive fish species that have colonized freshwaters and brackish waters in Europe and North America. One of them, the round goby *Neogobius melanostomus*, figures among the 100 worst invaders in Europe. Current methods to detect the presence of Ponto-Caspian gobies involve catching or sighting the fish. These approaches are labor intense and not very sensitive. Consequently, populations are usually detected only when they have reached high densities and when management or containment efforts are futile. To improve monitoring, we developed an assay based on the detection of DNA traces (environmental DNA, or eDNA) of Ponto-Caspian gobies in river water. The assay specifically detects invasive goby DNA and does not react to any native fish species. We apply the assay to environmental samples and demonstrate that parameters such as sampling depth, sampling location, extraction protocol, PCR protocol and PCR inhibition greatly impact detection. We further successfully outline the invasion front of Ponto-Caspian gobies in a large river, the High Rhine in Switzerland, and thus demonstrate the applicability of the assay to lotic environments. The eDNA assay requires less time, equipment, manpower, skills, and financial resources than the conventional monitoring methods such as electrofishing, angling or diving. Samples can be taken by untrained individuals, and the assay can be performed by any molecular biologist on a conventional PCR machine. Therefore, this assay enables environment managers to map invaded areas independently of fishermen's reports and fish community monitorings.

Publisher Public Library of Science**ISSN/ISBN** 1932-6203**edoc-URL** <http://edoc.unibas.ch/52949/>**Full Text on edoc** Available;**Digital Object Identifier DOI** 10.1371/journal.pone.0147558**ISI-Number** WOS:000369528200040**Document type (ISI)** Article