

Publication

Round gobies in the third dimension - use of vertical walls as habitat enables vector contact in a bottom-dwelling invasive fish

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Sessile invasive species often efficiently exploit anthropogenic structures, such as harbour walls and pontoons, which can lead to increased vector contact (i.e. contact with boats), and therefore spread rate. The round goby (*Neogobius melanostomus*) is a bottom-dwelling invasive fish species which was never documented on boats or habitats near the water surface. In this study, we wanted to find out if this fish makes use boat hulls and other vertical anthropogenic structures, which could act as invasion beachheads. We inspected boats close to harbour walls in the river Rhine in Basel, Switzerland, to search for gobies on them and documented the position of the boat and the ways the gobies could have reached the hull. We observed round goby presence on three different boats, with up to 28 goby sightings on one boat hull in the course of 45 minutes. Additionally, we recorded gobies on walls between one and five meters above the ground. Based on these observations, we investigated the behaviour of round gobies using vertical walls as habitat and compared the observed behaviours to those exhibited by gobies on the bottom. Gobies used the habitat along a wall in a generally similar fashion to the habitat on the bottom. However, they sat still for less time and moved more on walls than on the bottom, while feeding activity was similar in both habitats. The results raise questions about the drivers for using vertical structures as habitat in the usually bottom-dwelling round gobies and the plasticity of this behaviour. Our study documents round gobies in direct contact with boats for the first time. Potentially, gobies could find hiding places or suitable structures to nest on boats. This study therefore provides support for the theory that boat hulls are potential vectors for the translocation of round gobies. Our observations should lead to an increased awareness about fish and their eggs on boat hulls and stimulate efforts to implement measures like the check-clean-dry routine for commercial as well as private boats.

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