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SESSION 6 — MAINTAINING AND ENHANCING EUROPEAN BIODIVERSITY

Movement pattern & colonization potential of stream fishes with restoration context

Gregor Thomas & Armin Peter

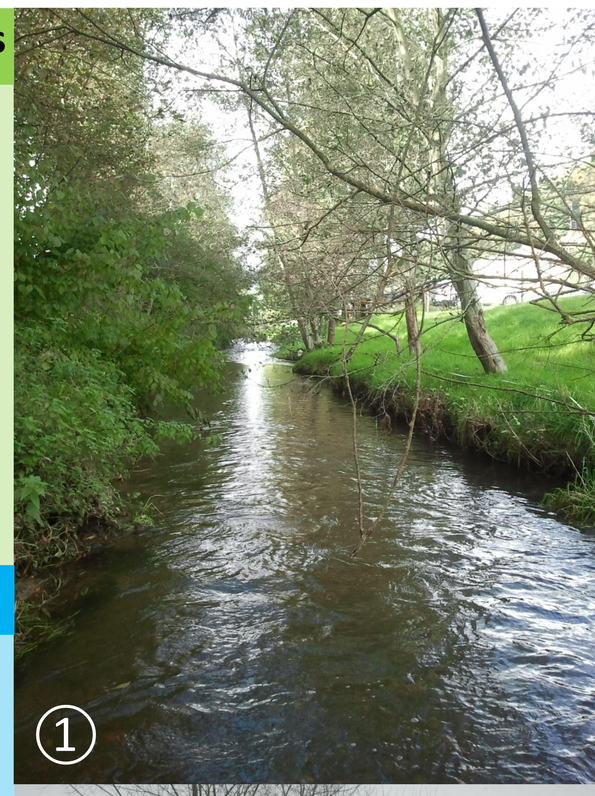
eawag aquatic research

Dept. Fish Ecology & Evolution, 6047 Kastanienbaum, Switzerland
gregor.thomas@eawag.ch

Motivation

Characterize movement pattern of stream fishes and asses colonization potential of restored reaches

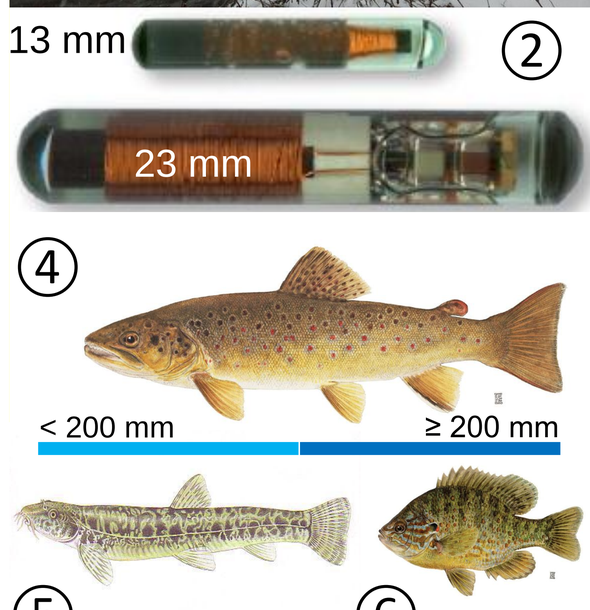
- Stream restorations demand for a compromise between social, economic and ecological needs.
- The «stepping stone concept» is a strategic approach to meet those diverse interests
- Via restored habitat islands («stepping stones») species should disperse, from refugiums throughout entire river networks again
- Empirical proof of functionality, of this theoretical concept, is still pending
- Uncertainties exist on the dimensioning of restored islands and distances between them
- This study should elucidate movement patterns and dispersal abilities of a stream fish community of a Swiss lowland stream
- Results are discussed in context with the «stepping stone concept»



Method

Follow PIT tagged fish along a 1.6 km long stream reach for 12 month

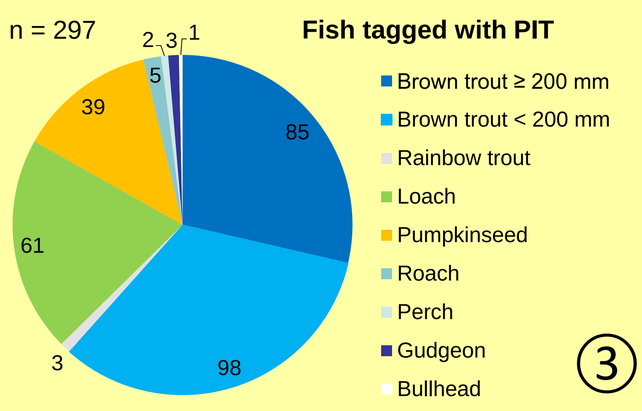
- Along the 1.6 km long downstream section of the stream «Seewag» ① (Canton Lucerne, 550 m AMSL), 8 x 75 m long stretches were electrofished end of February 2012
- In total 511 fish of eight different species were caught
- Fish were measured, weighted and individuals > 95 mm (pumkinseed > 70 mm) got tagged with passive integrated transponders (PIT) ②. Fish got released at those sites, where caught before
- In total 297 individuals got tagged ③, mostly brown trout (*Salmo trutta*) ④, loach (*Barbatula barbatula*) ⑤ and invasive pumpkinseed (*Lepomis gibbosus*) ⑥
- Positions (using measuring tapes at stream banks) of individual fish were recorded every 2-3 weeks with a mobile antenna ⑦ on 21 surveys during a 12 month lasting investigation period
- No tributaries or migration barriers (except downstream end) were present within the stretch

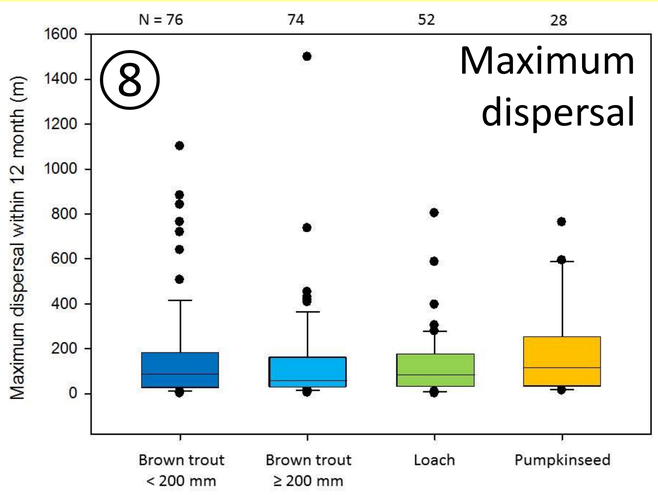


Results

Results based on detected PIT tags during 21 survey dates

In mean 90 tags per survey were recorded, 18.5% of tags were never recovered during the 21 surveys





Conclusion

Distances between restored islands should be short (≈1 km) and located downstream of species pools

- The majority of individuals of each analyzed group stayed within a 200 m range ⑧
- Few individuals dispersed further: brown trout 1,500 m; loaches + pumkinseed approx. 800 m ⑧
  → for self-sustaining sub-populations in more distant habitats, the number of colonizers is too low
- Direction of dispersal was balanced for brown trout groups, whereas loaches ⑨ & pumkinseed showed a pronounced trend for downstream dispersal, maybe related to flow → habitats downstream of species pools are more likely to become colonized
- Dispersal activity seems to be accelerated during spawning time for brown trout and loaches ⑩
- Trout show declining rates of mean dispersal over time, indicating fixed homeranges ⑪
- Loaches keep expanding linear over time ⑪ → ability to colonize distant habitats in the long run