The physiological basis of the migration continuum in brown trout (Salmo trutta) - DTU Orbit (10/11/2019)

The physiological basis of the migration continuum in brown trout (Salmo trutta)

Partial migration is common in many animal taxa; however, the physiological variation underpinning migration strategies remains poorly understood. Among salmonid fishes, brown trout (Salmo trutta) is one of the species that exhibits the most complex variation in sympatric migration strategies, expressed as a migration continuum, ranging from residency to anadromy. In looking at brown trout, our objective with this study was to test the hypothesis that variation in migration strategies is underpinned by physiological variation. Prior to migration, physiological samples were taken from fish in the stream and then released at the capture site. Using telemetry, we subsequently classified fish as resident, short-distance migrants (potamodromous), or long-distance migrants (potentially anadromous). Our results revealed that fish belonging to the resident strategy differed from those exhibiting any of the two migratory strategies. Gill Na,K-ATPase activity, condition factor, and indicators of nutritional status suggested that trout from the two migratory strategies were smoltified and energetically depleted before leaving the stream, compared to those in the resident strategy. The trout belonging to the two migratory strategies were generally similar; however, lower triacylglycerides levels in the short-distance migrants indicated that they were more lipid depleted prior to migration compared with the long-distance migrants. In the context of migration cost, we suggest that additional lipid depletion makes migrants more inclined to terminate migration at the first given feeding opportunity, whereas individuals that are less lipid depleted will migrate farther. Collectively, our data suggest that the energetic state of individual fish provides a possible mechanism underpinning the migration continuum in brown trout.

General information
Publication status: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology, Institute Management, Aarhus University, University of Southern Denmark, University of Porto
Contributors: Boel, M., Aarestrup, K., Baktoft, H., Larsen, T., Madsen, S. S., Malte, H., Skov, C., Svendsen, J. C., Koed, A.
Pages: 334-345
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Physiological and Biochemical Zoology
Volume: 87
Issue number: 2
ISSN (Print): 1522-2152
Ratings:
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 2.26 SJR 1.266 SNIP 0.872
Web of Science (2014): Impact factor 2.398
Web of Science (2014): Indexed yes
Original language: English
DOI: 10.1086/674869
Source: FindIt
Source ID: 260852286
Research output: Contribution to journal › Journal article – Annual report year: 2014 › Research › peer-review