Acute hyperoxia induces systemic responses with no major changes in peripheral tissues in the Senegalese sole (Solea senegalensis Kaup, 1856)

Senegalese sole Solea senegalensis is currently farmed in recirculation aquaculture systems that often involve water reoxygenation, which in turn may cause acute or prolonged hyperoxia exposures. In order to understand the impact of acute hyperoxia on the fish immune system and peripheral tissues such as gills and gut, Senegalese sole juveniles (30g) were exposed to normoxia (100% O2sat) as control and two hyperoxic conditions (150 and 200% O2sat) and sampled at 4 and 24 h. Fish haematological profile, total and differential blood cell counts and plasma immune parameters were analysed. Histomorphology and immunofluorescence analyses of gills and intestine were performed, respectively, whereas head-kidney samples were used for assessing the expression of immune-related genes. Results indicate that acute hyperoxia exposure may reduce fish erythrocyte and haemoglobin levels. Moreover, decreases in total leucocytes numbers, circulating lymphocytes, monocytes, alternative complement pathway activity and expression of cyclooxygenase-2 were observed in fish exposed to hyperoxia. In contrast, hyperoxia did not induce major effects on gill histomorphology nor in the protein content of ion and glucose cotransporters as well as a macrophage marker (V-ATPase) in the intestine. Although the activation of humoral mechanisms and immune-related genes were not dramatically affected by acute hyperoxia, the compromised immune cell status and the reduction of some inflammatory indicators are issues to consider under acute hyperoxia conditions.
Environmental benefits of leaving offshore infrastructure in the ocean

The removal of thousands of structures associated with oil and gas development from the world's oceans is well underway, yet the environmental impacts of this decommissioning practice remain unknown. Similar impacts will be associated with the eventual removal of offshore wind turbines. We conducted a global survey of environmental experts to guide best decommissioning practices in the North Sea, a region with a substantial removal burden. In contrast to current regulations, 94.7% of experts (36 out of 38) agreed that a more flexible case-by-case approach to decommissioning could benefit the North Sea environment. Partial removal options were considered to deliver better environmental outcomes than complete removal for platforms, but both approaches were equally supported for wind turbines. Key considerations identified for decommissioning were biodiversity enhancement, provision of reef habitat, and protection from bottom trawling, all of which are negatively affected by complete removal. We provide recommendations to guide the revision of offshore
Environmental calcium and variation in yolk sac size influence swimming performance in larval lake sturgeon (Acipenser fulvescens)

In many animal species, performance in the early life stages strongly affects recruitment to the adult population; however, factors that influence early life history stages are often the least understood. This is particularly relevant for lake sturgeon, Acipenser fulvescens, living in areas where environmental calcium concentrations are declining, partly due to anthropogenic activity. As calcium is important for muscle contraction and fatigue resistance, declining calcium levels could constrain swimming performance. Similarly, swimming performance could be influenced by variation in yolk sac volume, because the yolk sac is likely to affect drag forces during swimming. Testing swimming performance of larval A. fulvescens reared in four different calcium treatments spanning the range of 4-132 mg l-1 [Ca2+], this study found no treatment effects on the sprint swimming speed. A novel test of volitional swimming performance, however, revealed reduced swimming performance in the low calcium environment. Specifically, volitionally swimming larvae covered a shorter distance before swimming cessation in the low calcium environment compared to the other treatments. Moreover, sprint swimming speed in larvae with a large yolk sac was significantly slower than in larvae with a small yolk sac, regardless of body length variation. Thus, elevated maternal allocation (i.e., more yolk) was associated with reduced swimming performance. Data suggest that larvae in low calcium environments or with a large yolk sac exhibit reduced swimming performance and could be more susceptible to predation or premature downstream drift. Our study reveals how environmental factors and phenotypic variation influence locomotor performance in a larval fish.

General information
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Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology, University of Manitoba, Fisheries and Oceans Canada
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BFI (2018): BFI-level 2
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BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 2.6 SJR 1.611 SNIP 1.306
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.62 SJR 1.824 SNIP 1.27
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.821 SNIP 1.211 CiteScore 2.4
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.742 SNIP 1.315 CiteScore 2.51
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.733 SNIP 1.314 CiteScore 2.75
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.627 SNIP 1.372 CiteScore 2.91
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.553 SNIP 1.321 CiteScore 2.77
Evidence of cormorant-induced mortality, disparate migration strategies and repeatable circadian rhythm in the endangered North Sea houting (Coregonus oxyrinchus): A telemetry study mapping the postspawning migration

Life history theory predicts a trade-off between migration and residency where migration is favoured when it infers elevated fitness. Although migration to more favourable environments offers higher growth rates, migrants often experience increased mortality due to predation. Here, we investigated mortality and migration behaviour of the North Sea houting (Coregonus oxyrinchus), an anadromous salmonid endemic to the Wadden Sea. We used acoustic telemetry to map the migration of the only remaining indigenous population by applying stationary hydrophones combined with manual tracking. Data suggested a total mortality of 26%, with 30% of the total mortality attributed to predation by great cormorants (Phalacrocorax carbo sinensis), highlighting that North Sea houting conservation could be jeopardised by increased cormorant predation. Risk of cormorant predation was size-dependent, with smaller fish suffering higher risk of predation. The study found North Sea houting to exhibit disparate migration strategies and identified a lentic area in the estuary as an important habitat. Two newly established artificial lakes within the river system significantly reduced the migration speeds, possibly indicating constrained navigation through the lakes. The migration into the Wadden Sea correlated with temperature perhaps indicating osmoregulatory constraints of sea entry. Unlike most salmonid species, migration occurred both day and night. Moreover, fish exhibited repeatable individual differences in diel activity patterns, suggesting that individuals differ consistently in their migratory activity throughout the 24-hr period. Our study provides novel information on salmonid migration, which is crucial for the development of science-based conservation strategies.

General information

State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology, Section for Ecosystem based Marine Management, Aalborg University, Institut National des Sciences Appliquees de Lyon
Authors: Jensen, L. F. (Ekstern), Rognon, P. (Ekstern), Aarestrup, K. (Intern), Bøttcher, J. W. (Ekstern), Pertoldi, C. (Ekstern), Thomsen, S. N. (Ekstern), Hertz, M. (Ekstern), Winde, J. (Ekstern), Svendsen, J. C. (Intern)
Pages: 672-685
Individual variation in aerobic scope affects modeled vertical foraging migration in Atlantic cod Gadhus morhua, but only in moderate hypoxia

Vertical migration is the most widespread migration in the aquatic world, yet the mechanisms limiting the extent of this behavior are largely unknown. In the Baltic Sea, some Atlantic cod Gadus morhua perform vertical foraging migrations into severely hypoxic demersal zones where aerobic metabolism is insufficient to cover energy requirements. After foraging, the fish return to better oxygenated waters for physiological recovery and digestion. To test the influence of phenotypic variation in aerobic scope (AS; the difference between the maximum and the minimum metabolic rate) on the capacity to migrate into severely hypoxic zones, we incorporated AS into a state-dependent individual-based model simulating vertical foraging migrations of G. morhua. We found little effect of individual variation in AS on the capacity for vertical migration when the zone used for physiological recovery was normoxic. In contrast, when there was moderate hypoxia (30% air saturation, O-2sat) in the zone used for physiological recovery, the high AS phenotype had a clear advantage because it could forage 3-4 times longer in the severely hypoxic (16% O-2sat, i.e. below the threshold for aerobic metabolism of the species) demersal zone compared to the low AS phenotype. Thus, phenotypic variation in AS is only important when there is moderate hypoxia in the zone used for physiological recovery, suggesting that the influence of AS variation on the capacity for vertical migration is context dependent. We propose that elevated AS may be evolutionarily favorable when hypoxia prevails in the water column.
ECOLOGY, MARINE, OCEANOGRAPHY, POSTHYPOXIC OXYGEN-CONSUMPTION, GADUS-MORHUA, SWIMMING PERFORMANCE, MARINE TELEOSTS, METABOLIC SCOPE, RAINBOW-TROUT, BALTIC SEA, TEMPERATURE, BEHAVIOR, ONCORHYNCHUS, Physiology, Behavior, Baltic Sea, Bioenergetics, Aerobic scope, Hypoxia, Gadus morhua, Individual-based model

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Publication: Research - peer-review › Journal article – Annual report year: 2018

World Heritage Site fish faces extinction

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Aarhus University, Aalborg University
Authors: Svendsen, J. C. (Intern), Alstrup, A. K. O. (Ekstern), Jensen, L. F. (Ekstern)
Pages: 174
Publication date: 2018
Main Research Area: Technical/natural sciences

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Journal: Nature
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BFI (2018): BFI-level 3
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 14.59
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 13.33
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 14.38
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 14.22
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 14.96
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
While marine reefs are degraded globally, the responses of fish to marine reef restoration remain uncertain, particularly in temperate waters. This study measured the effect of marine boulder reef restoration on the behaviour of Atlantic cod, Gadus morhua L., in a Natura 2000 area using acoustic telemetry. Cod were tagged and released in the study area before and after the restoration and tracked continuously for six months. A larger fraction of the released fish remained in the study area after restoration (94%) than before (53%). Moreover, throughout the study period, cod spent significantly more hours per day and prolonged their residence time in the study area after the restoration. The study indicates that marine reefs subjected to boulder extraction can be restored and function as favourable cod habitats. Temperate marine boulder reef restoration represents a valuable management tool to improve habitats for temperate fish species.
Effect of nanosilver on metabolism in rainbow trout (Oncorhynchus mykiss): An investigation using different respirometric approaches

Nanosilver (nAg) has been incorporated into many consumer products, including clothing and washing machines, because of its antimicrobial properties. Consequently, the potential for its release into aquatic environments is of significant concern. Documented toxic effects on fish include altered gene expression, gill damage, and impaired gas exchange, as well as mortality at high nAg concentrations. The present study reports the effects of nAg on the metabolism of rainbow trout (Oncorhynchus mykiss).
trout (Oncorhynchus mykiss). Fish were exposed to environmentally relevant concentrations (0.28±0.02μg/L) and higher (47.60±5.13μg/L) for 28 d, after which their standard metabolic rate (SMR), forced maximum metabolic rate (MMRf), and spontaneous maximum metabolic rate (MMRs) were measured. There was no effect observed in SMR, MMRf, or MMRs, suggesting that nAg is unlikely to directly affect fish metabolism. On average, MMRs tended to be greater than MMRf, and most MMRs occurred when room lighting increased. The timing of MMRf chase protocols was found to affect both MMRf and SMR estimates, in that chasing fish before respirometric experiments caused higher MMRf estimates and lower SMR estimates. Although compounded effects involving nAg and other environmental stressors remain unknown, the present study indicates that the tested range of nAg is unlikely to constrain fish metabolism.
Effects of acoustic telemetry transmitters on gill ventilation rate and haematocrit levels of round goby Neogobius melanostomus

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, Section for Ecosystem based Marine Management
Authors: Behrens, J. (Intern), Svendsen, J. C. (Intern), Deurs, M. V. (Intern), Sokolova, M. (Intern), Christoffersen, M. (Intern)
Pages: 416-419
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisheries Management and Ecology
Volume: 24
Issue number: 5
ISSN (Print): 0969-997X
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.823 SJR 0.746 CiteScore 1.59
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.85 SJR 0.858 SNIP 0.846
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.017 SNIP 1.109 CiteScore 1.91
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.939 SNIP 0.962 CiteScore 1.85
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.757 SNIP 0.774 CiteScore 1.36
Effects of dietary Gracilaria sp. and Alaria sp. supplementation on growth performance, metabolic rates and health in meagre (Argyrosomus regius) subjected to pathogen infection

Effects of dietary seaweed supplementation on basal physiology and health biomarkers were assessed in meagre (Argyrosomus regius) subjected to bacterial infection, using Photobacterium damselae subsp. Piscicida (Phdp) as the etiologic agent. Three test diets were prepared by supplementing a basal control formulation (44 % protein, 16 % lipid, 22 kJ g⁻¹ energy) with 0 % seaweed (control), 5 % Gracilaria sp. or 5 % Alaria sp. During the growth trial, 180 fish (39.70 ± 0.33 g) were daily fed for 69 days with the experimental diets. After the growth trial, 60 fish from each dietary treatment were divided into two groups, infected and non-infected. The infected group was injected intraperitoneally with a saline solution (HBSS) with 2.91 x 10³ CFU Phdp g⁻¹ fish, whereas the non-infected group was injected with HBSS without Phdp. Dietary seaweed supplementation did not affect fish growth performance. Standard and routine metabolic rates, and aerobic metabolic scope did not vary significantly among dietary treatments. Conversely, maximum metabolic rate was significantly higher in fish fed Alaria sp. diet when compared to control group. Non-infected fish had higher hematocrit levels than the infected group, regardless of diet. Lactate levels were significantly higher in fish fed Alaria sp. diet when compared to control, with no interaction between diet and infection. Lipid peroxidation was significantly higher in fish fed control diet than supplemented diets. Infected groups had lower antioxidant enzymes activities when compared to non-infected. An interaction between infection and diet was found for glutathione peroxidase and reduced glutathione activities. The current study suggests that dietary seaweed supplementation modulates metabolic rates and biomarker responses in meagre, which may confer advantages in coping with biotic stressors.
Effects of low-oxygen conditions on embryo growth in the painted turtle, Chrysemys picta

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Iowa State University; University of Porto
Authors: Cordero, G. A. (Ekstern), Karnatz, M. L. (Ekstern), Svendsen, J. C. (Intern), Gangloff, E. J. (Ekstern)
Pages: 148-156
Publication date: 2017
Main Research Area: Technical/natural sciences

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Journal: Integrative Zoology
Volume: 12
Issue number: 2
ISSN (Print): 1749-4869
Ratings:
Web of Science (2018): Indexed yes
Scopus rating (2017): CiteScore 1.75 SJR 0.854 SNIP 0.971
Web of Science (2017): Indexed yes
Scopus rating (2016): SJR 0.892 SNIP 1.033 CiteScore 1.81
Scopus rating (2015): SJR 1.023 SNIP 0.895 CiteScore 1.72
Scopus rating (2014): SJR 0.76 SNIP 0.827 CiteScore 1.55
Scopus rating (2013): SJR 0.823 SNIP 0.735 CiteScore 1.49
Scopus rating (2012): SJR 0.733 SNIP 0.786 CiteScore 1.49
Scopus rating (2011): SJR 0.622 SNIP 0.629 CiteScore 1.09
Scopus rating (2010): SJR 0.274 SNIP 0
Scopus rating (2009): SJR 0.122 SNIP 0
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10.1111/1749-4877.12206
Publication: Research - peer-review › Journal article – Annual report year: 2017

Erfaringsopsamling med kirugisk implantering af akustiske transmittere i sortmundet kutling (Neogobius melanostomus)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Living Resources
Authors: Christoffersen, M. (Intern), Sokolova, M. (Intern), Svendsen, J. C. (Intern), Deurs, M. V. (Intern), Behrens, J. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforskermøde, Helsingør, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2017

Erfaringsopsamling med kirugisk implantering af akustiske transmittere i sortmundet kutling

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Living Resources, Section for Marine Ecology and Oceanography
Authors: Christoffersen, M. (Intern), Sokolova, M. (Ekstern), Svendsen, J. C. (Intern), Deurs, M. V. (Intern), Behrens, J. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforskermøde, Helsingør, Denmark.
Main Research Area: Technical/natural sciences
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Fiskeristyrelsen
Authors: Kristensen, L. (Ekstern), Svendsen, J. C. (Intern), Støttrup, J. G. (Intern)
Publication date: 2017

Publication information
Source/Publisher: Fiskepleje.dk
Main Research Area: Technical/natural sciences
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Publication: Communication › Internet publication – Annual report year: 2017

Hvornår er der faglige grunde til rehabilitering af sæler?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Aarhus University
Authors: Alstrup, A. K. O. (Ekstern), Svendsen, J. C. (Intern), Jensen, L. F. (Ekstern)
Pages: 10-12
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
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Source: FindIt
Source-ID: 2356062619
Publication: Research › Journal article – Annual report year: 2017

If you can’t beat them, eat them: using acoustic telemetry to develop an economically viable fishery for the highly invasive round goby (Neogobius melanostomus)

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Living Resources, Section for Freshwater Fisheries Ecology
Authors: Christoffersen, M. (Intern), Svendsen, J. C. (Intern), Behrens, J. (Intern), Jepsen, N. (Intern), van Deurs, M. (Intern)
Publication date: 2017
Event: Abstract from ICES Annual Science Conference 2017, Fort Lauderdale, United States.
Main Research Area: Technical/natural sciences

Bibliographical note
ICES CM 2017/D:354
Publication: Research › Conference abstract for conference – Annual report year: 2017

Is the osmorespiratory compromise limiting invasive species?
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 osmorespiratory 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 osmoresporatory 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 MO2 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.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, Section for Ecosystem based Marine Management, University of Porto, University of West Georgia
Authors: Ferreira, P. G. (Intern), Flavio, H. (Ekstern), Hacking, H. (Ekstern), Genz, J. (Ekstern), Wilson, J. M. (Ekstern), Behrens, J. (Intern), Svendsen, J. C. (Intern)
Publication date: 2017
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2017

Lakselus kan måske komme til at udgøre en trussel mod danske bestande af vilde laksefisk

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Aarhus University
Authors: Alstrup, A. K. O. (Ekstern), Svendsen, J. C. (Intern), Jensen, L. F. (Ekstern)
Pages: 20-21
Publication date: 2017
Main Research Area: Technical/natural sciences
Publication information
Journal: Dyrlægen
Volume: 4
ISSN (Print): 1903-153X
Original language: Danish
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Source-ID: 2372287548
Publication: Research › Journal article – Annual report year: 2017

Intraspecific variation in aerobic and anaerobic locomotion: gilthead sea bream (Sparus aurata) and Trinidadian guppy (Poecilia reticulata) do not exhibit a trade-off between maximum sustained swimming speed and minimum cost of transport

General information
State: Published
Organisations: University of Porto, Fisheries and Maritime Museum, University of Copenhagen, Iowa State University
Authors: Svendsen, J. C. (Intern), Tirsgaard, B. (Ekstern), Cordero, G. A. (Ekstern), Steffensen, J. F. (Ekstern)
Pages: 13-24
Publication date: 2017
Host publication information
Title of host publication: Physiological adaptations to swimming in fish
Publisher: Frontiers Media
Editors: Planas, J. V., Palstra, A. P., Magnoni, L. J.
ISSN (Electronic): 978-2-88945-246-0
Main Research Area: Technical/natural sciences
Electronic versions:
Publishers version
DOIs: 10.3389/978-2-88945-246-0
Links:
Movement patterns of seaward migrating European eel (Anguilla anguilla) at a complex of riverine barriers: implications for conservation

River infrastructure such as weirs and hydropower stations commonly present migrating fish with multiple potential passage routes. Knowledge of the cues fish use to navigate such environments is required to protect migrants from hazardous areas and guide them towards safe passage; however, this is currently lacking for many species. Employing high-resolution positioning telemetry, this study examined movements of downstream migrating adult European eel, Anguilla anguilla, as they encountered a complex of water control structures in one location on the River Stour, southern England. The distribution of eels across five potential routes of passage differed from that predicted based on proportion of discharge alone. Certain routes were consistently avoided, even when the majority of flow passed through them. Passage distribution was partially explained by avoidance in the vicinity of a floating debris boom. Movement paths were nonrandomly distributed across the forebay and eels moved predominantly within a zone 2–4 m from the channel walls. Understanding of avoidance and structure oriented movement exhibited by eels will help advance effective guidance and downstream passage solutions for adults.
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.65 SJR 0.83 SNIP 1.046
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.66 SJR 0.8 SNIP 0.852
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.041 SNIP 1.186 CiteScore 1.92
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.874 SNIP 0.979 CiteScore 1.58
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.98 SNIP 1.049 CiteScore 1.77
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.075 SNIP 1.279 CiteScore 2.05
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.969 SNIP 0.907 CiteScore 1.65
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.819 SNIP 0.979
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.831 SNIP 1.051
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 0.956 SNIP 0.985
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.803 SNIP 0.879
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.881 SNIP 1.164
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.677 SNIP 0.919
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.913 SNIP 1.176
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.961 SNIP 0.796
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.966 SNIP 1.085
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.701 SNIP 0.697
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.563 SNIP 0.854
Scopus rating (1999): SJR 0.588 SNIP 0.681

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Muligheder ved ændret mindstemål og indførelse af vinduesmål for pighvarre (Scophthalmus maximus)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Aarhus University
Authors: Alstrup, A. K. O. (Ekstern), Jensen, L. F. (Ekstern), Christoffersen, M. (Intern), Svendsen, J. C. (Intern)
Pages: 30-38
Publication date: 2017
Main Research Area: Technical/natural sciences

Pighvarrers vandring i Roskilde Fjord

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Freshwater Fisheries Ecology
Authors: Svendsen, J. C. (Intern), Støttrup, J. G. (Intern), Flavio, H. (Ekstern), Christoffersen, M. (Intern), Aarestrup, K. (Intern)
Publication date: 2017

Publication information
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Main Research Area: Technical/natural sciences
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Pighvars vandring i Roskilde Fjord

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Svendsen, J. C. (Intern), Støttrup, J. G. (Intern), Flavio, H. (Ekstern), Christoffersen, M. (Intern)
Pages: 10-11
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Danske Fritidsfiskere
Issue number: 3
ISSN (Print): 1904-5387
Original language: Danish
Reconciling agriculture and stream restoration in Europe: A review relating to the EU Water Framework Directive

Agriculture is widespread across the EU and has caused considerable impacts on freshwater ecosystems. To revert the degradation caused to streams and rivers, research and restoration efforts have been developed to recover ecosystem functions and services, with the European Water Framework Directive (WFD) playing a significant role in strengthening the progress.

Analysing recent peer-reviewed European literature (2009–2016), this review explores 1) the conflicts and difficulties faced when restoring agriculturally impacted streams, 2) the aspects relevant to effectively reconcile agricultural land uses and healthy riverine ecosystems and 3) the effects and potential shortcomings of the first WFD management cycle.

Our analysis reveals significant progress in restoration efforts, but it also demonstrates an urgent need for a higher number and detail of restoration projects reported in the peer-reviewed literature. The first WFD cycle ended in 2015 without reaching the goal of good ecological status in many European water-bodies. Addressing limitations reported in recent papers, including difficulties in stakeholder integration and importance of small headwater streams, is crucial. Analysing recent developments on stakeholder engagement through structured participatory processes will likely reduce perception discrepancies and increase stakeholder interest during the next WFD planning cycle.

Despite an overall dominance of nutrient-related research, studies are spreading across many important topics (e.g. stakeholder management, land use conflicts, climate change effects), which may play an important role in guiding future policy. Our recommendations are important for the second WFD cycle because they 1) help secure the development and dissemination of science-based restoration strategies and 2) provide guidance for future research needs.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, University of Porto
Authors: Flavio, H. (Ekstern), Ferreira, P. (Ekstern), Formigo, N. (Ekstern), Svendsen, J. C. (Intern)
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Main Research Area: Technical/natural sciences

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BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.98 SJR 1.546 SNIP 1.65
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 5.09 SJR 1.652 SNIP 1.856
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.653 SNIP 1.648 CiteScore 4.33
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.635 SNIP 1.843 CiteScore 4.2
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.527 SNIP 1.745 CiteScore 3.73
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.749 SNIP 1.82 CiteScore 3.7
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
Respirometry increases cortisol levels in rainbow trout Oncorhynchus mykiss: implications for measurements of metabolic rate

This study aimed to assess the extent to which chasing, handling and confining Oncorhynchus mykiss to a small respirometer chamber during respirometric experiments is stressful and affects metabolic measurements. The study observed increased cortisol levels in animals tested using a chase protocol and subsequent intermittent-flow respirometry, suggesting that this procedural treatment may stress animals.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, University of Manitoba, Fisheries and Oceans Canada
Authors: Murray, L. (Ekstern), Rennie, M. D. (Ekstern), Svendsen, J. C. (Intern), Enders, E. C. (Ekstern)
Pages: 2206-2213
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Main Research Area: Technical/natural sciences

Publication information
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Volume: 90
Issue number: 5
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Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.71 SJR 0.822 SNIP 0.923
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.57 SJR 0.748 SNIP 0.83
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.961 SNIP 0.924 CiteScore 1.64
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.956 SNIP 0.931 CiteScore 1.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.058 SNIP 1.112 CiteScore 1.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.94 SNIP 1.045 CiteScore 1.88
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.895 SNIP 0.951 CiteScore 1.66
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.783 SNIP 0.832
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.782 SNIP 0.888
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 0.896 SNIP 0.968
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.013 SNIP 1.067
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.907 SNIP 1.049
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.833 SNIP 0.886
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.96 SNIP 1.145
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.942 SNIP 1.092
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.991 SNIP 1.093
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.877 SNIP 1.12
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.088 SNIP 0.978
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 1.046 SNIP 1.148

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DOIs:
Restoration of a boulder reef in temperate waters: Strategy, methodology and lessons learnt

Anthropogenic impacts on marine habitats are a global problem, particularly in coastal areas. While boulder reefs in temperate waters hold high biomass and biodiversity, and may be unable to recover from anthropogenic stressors without restoration efforts, little is known about how to restore and conserve this important marine habitat. Limited knowledge is a serious impediment to projects aimed at restoring boulder reefs that have been degraded or removed by substrate extraction. In 2008, a boulder reef was restored in Kattegat, the transitional waters between the North Sea and the Baltic Sea, using differently sized boulders. The restored reef covered approximately 27,600 m² seafloor and included 100,712 tons of boulders added at depths ranging between 4 and 11 m. This paper describes methodology and lessons learned during the restoration project. Before the restoration, geological and geotechnical surveys confirmed that the sea bed could support added boulders, and high resolution bathymetric surveys provided input for the design of the reef, particularly for numerical modelling of the hydrographic and sediment transport conditions. Numerical modelling was used to derive hydrographic design conditions for boulder placements and further, to ensure that the restored reef would not affect the sea bed morphology and hydrographic conditions at a local harbour and at a protected habitat, both situated in the vicinity of the restoration area. Data on the physical structure of the restored boulder reef, collected in 2009, demonstrated that cavernous structures and shallow reef areas were restored. Moreover, data collected in 2012 confirmed the stability of the restored reef. Finally, results highlighted the importance of stakeholder mapping at the outset, appropriate timing of stakeholder involvement and ongoing consideration of stakeholder perceptions. Charting strategy and introducing a checklist for marine restoration projects, this paper outlines important considerations and methodology needed to ensure that restoration of temperate reef structures meet the objectives, without having undesirable effects on existing hydrographic and morphological conditions, including nearby coastal areas and protected marine habitats

General information
State: Published
Authors: Støttrup, J. G. (Intern), Dahl, K. (Ekstern), Niemann, S. (Ekstern), Stenberg, C. (Intern), Reker, J. (Ekstern), Stamphej, E. M. (Ekstern), Göke, C. (Ekstern), Svendsen, J. C. (Intern)
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BFI (2017): BFI-level 1
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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 1.069 SNIP 1.534 CiteScore 3.45
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.081 SNIP 1.486 CiteScore 3.09
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.183 SNIP 1.653 CiteScore 3.03
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.231 SNIP 2.069 CiteScore 3.55
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.692 SNIP 2.124 CiteScore 3.48
Sortmunded kutting (Neogobius melanostomus) spreder sig på bekostning af hjemmehørende danske arter

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Aarhus University Hospital
Authors: Alstrup, A. K. O. (Ekstern), Jensen, L. F. (Ekstern), Svendsen, J. C. (Intern)
Pages: 6-11
Publication date: 2017
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Udsatte pighvarrer lader til at blive i Roskilde Fjord

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Freshwater Fisheries Ecology
Publication date: 2017

Publication information
Source/Publisher: Fiskepleje.dk
Main Research Area: Technical/natural sciences
Diets supplemented with seaweed affect metabolic rate, innate immune, and antioxidant responses, but not individual growth rate in European seabass (Dicentrarchus labrax)

This study investigated the effects of seaweed dietary supplementation on measures of fish performance including aerobic metabolism, digestive enzymes activity, innate immune status, oxidative damage, and growth rate using European seabass (Dicentrarchus labrax). Fish were fed for 49 days with three different diets: a control diet (CTRL), a Gracilaria-supplemented diet (GR7.5), and a mixed diet (Mix) composed of Gracilaria, Fucus, and Ulva genera representatives. All diets were isoenergetic (22 kJ g\(^{-1}\) adjusted for dry matter (DM)), isoproteic (47 %DM), and isolipidic (18 %DM) and tested in triplicate groups of 20 fish (initial body weight 25.5 ± 4.1 g). Final results showed similar growth rates and digestive activities between diets. Maximum and standard metabolic rates and aerobic metabolic scope revealed comparable results for the three diets. In contrast, fish fed with GR7.5 exhibited elevated routine metabolic rate (190.7 mg O\(_2\) kg\(^{-1}\) h\(^{-1}\)). Fish fed with the GR7.5 and Mix diets had lower alternative complement pathway (ACH50) (62.5 and 63 units mL\(^{-1}\) respectively) than CTRL (84 units mL\(^{-1}\)). GR7.5 increased lipid peroxidation and cholinesterase levels, as well as glutathione s-transferase activity. Mix diet increased glutathione reductase activity when compared to CTRL. Collectively, our findings suggest that dietary seaweed supplementation may alter seabass metabolic rate, innate immune, and antioxidant responses without compromising growth parameters.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Freshwater Fisheries Ecology, University of Porto, Aarhus University
Authors: Peixoto, M. J. (Ekstern), Svendsen, J. C. (Intern), Malte, H. (Ekstern), Carvalho, P. (Ekstern), Pereira, R. (Ekstern), Gonçalves, J. F. M. (Ekstern), Ozório, R. O. A. (Ekstern)
Pages: 2061-2071
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Journal: Journal of Applied Phycology
Volume: 28
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BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.59
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.46
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.32
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.88
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.78
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.68
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.29
ISI indexed (2011): ISI indexed yes
Konflikt mellem skarv og den udryddelsestruede snæbel

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Freshwater Fisheries Ecology, Aalborg University, Institut National des Sciences Appliquees de Lyon, Fisheries and Maritime Museum
Authors: Svendsen, J. C. (Intern), Aarestrup, K. (Intern), Hertz, M. (Ekstern), Thomsen, S. N. (Ekstern), Rognon, P. C. (Ekstern), Jensen, L. F. (Ekstern)
Publication date: 2016

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Publication: Communication › Internet publication – Annual report year: 2016

Laksens liv

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Fisheries and Maritime Museum
Authors: Jensen, L. F. (Ekstern), Svendsen, J. C. (Intern)
Number of pages: 95
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Original language: Danish
Main Research Area: Technical/natural sciences
Publication: Communication › Book – Annual report year: 2016

Linking reproduction, locomotion, and habitat use in the Trinidadian guppy (Poecilia reticulata)

General information
State: Published
Organisations: National Institute of Aquatic Resources, University of Porto, University of California
Authors: Banet, A. I. (Ekstern), Svendsen, J. C. (Intern), Eng, K. J. (Ekstern), Reznick, D. J. (Ekstern)
Pages: 87-96
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information
Journal: Oecologia
Volume: 181
Issue number: 1
ISSN (Print): 0029-8549
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BFI (2017): BFI-level 2
Scopus rating (2017): SNIP 1.175 SJR 1.695 CiteScore 3.17
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): SJR 1.803 SNIP 1.259 CiteScore 3.23
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.989 SNIP 1.281 CiteScore 3.16
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.822 SNIP 1.413 CiteScore 3.24
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.885 SNIP 1.426 CiteScore 3.41
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.978 SNIP 1.428 CiteScore 3.28
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 2.252 SNIP 1.448 CiteScore 3.54
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.307 SNIP 1.551
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.101 SNIP 1.416
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 2.458 SNIP 1.506
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 2.281 SNIP 1.542
Scopus rating (2006): SJR 2.339 SNIP 1.57
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 2.223 SNIP 1.667
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 2.493 SNIP 1.751
Scopus rating (2003): SJR 2.414 SNIP 1.803
Scopus rating (2002): SJR 1.93 SNIP 1.589
Scopus rating (2001): SJR 2.212 SNIP 1.679
Scopus rating (2000): SJR 2.292 SNIP 1.434
Scopus rating (1999): SJR 2.185 SNIP 1.398
Original language: English
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Publication: Research › peer-review › Journal article – Annual report year: 2016
Marin fiskepleje – Forskning i fiskenes levesteder

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Christoffersen, M. (Intern), Støttrup, J. G. (Intern), Svendsen, J. C. (Intern)
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Marin fiskepleje – Forskning i fiskenes levesteder

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Christoffersen, M. (Intern), Støttrup, J. G. (Intern), Svendsen, J. C. (Intern)
Publication date: 2016
Event: Poster session presented at Folkemødet 2016, Allinge, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2016

Marin Fiskepleje – Hvad er fiskepleje?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Christoffersen, M. (Intern), Støttrup, J. G. (Intern), Svendsen, J. C. (Intern)
Publication date: 2016
Event: Poster session presented at Naturmødet, Hirtshals, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2016

Marin Fiskepleje – Hvad er fiskepleje?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Christoffersen, M. (Intern), Støttrup, J. G. (Intern), Svendsen, J. C. (Intern)
Publication date: 2016
Event: Poster session presented at Folkemødet 2016, Allinge, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2016

Measuring maximum and standard metabolic rates using intermittent-flow respirometry: a student laboratory investigation of aerobic metabolic scope and environmental hypoxia in aquatic breathers

Metabolic rate is one of the most widely measured physiological traits in animals and may be influenced by both endogenous (e.g. body mass) and exogenous factors (e.g. oxygen availability and temperature). Standard metabolic rate (SMR) and maximum metabolic rate (MMR) are two fundamental physiological variables providing the floor and ceiling in aerobic energy metabolism. The total amount of energy available between these two variables constitutes the aerobic metabolic scope (AMS). A laboratory exercise aimed at an undergraduate level physiology class, which details the appropriate data acquisition methods and calculations to measure oxygen consumption rates in rainbow trout Oncorhynchus mykiss, is presented here. Specifically, the teaching exercise employs intermittent flow respirometry to measure SMR and MMR, derives AMS from the measurements and demonstrates how AMS is affected by environmental oxygen. Students’ results typically reveal a decline in AMS in response to environmental hypoxia. The same techniques can be applied to investigate the influence of other key factors on metabolic rate (e.g. temperature and body mass). Discussion of the results develops students’ understanding of the mechanisms underlying these fundamental physiological traits and the influence of exogenous factors. More generally, the teaching exercise outlines essential laboratory concepts in addition to metabolic rate calculations, data acquisition and unit conversions that enhance competency in quantitative analysis and reasoning. Finally, the described procedures are generally applicable to other fish species or aquatic breathers such as crustaceans (e.g. crayfish) and provide an alternative to using higher (or more derived) animals
to investigate questions related to metabolic physiology

**General information**
State: Published
Organisations: University of Porto, University of Leeds
Authors: Rosewarne, P. (Ekstern), Wilson, J. (Ekstern), Svendsen, J. C. (Intern)
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Main Research Area: Technical/natural sciences

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Volume: 88
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BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.71 SJR 0.822 SNIP 0.923
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.57 SJR 0.748 SNIP 0.83
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.961 SNIP 0.924 CiteScore 1.64
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.956 SNIP 0.931 CiteScore 1.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.058 SNIP 1.112 CiteScore 1.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.94 SNIP 1.045 CiteScore 1.88
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.895 SNIP 0.951 CiteScore 1.66
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.783 SNIP 0.832
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.782 SNIP 0.888
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 0.896 SNIP 0.968
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.013 SNIP 1.067
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.907 SNIP 1.049
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.833 SNIP 0.886
Web of Science (2005): Indexed yes
Partitioning the metabolic scope: the importance of anaerobic metabolism and implications for the oxygen- and capacity-limited thermal tolerance (OCLTT) hypothesis

Ongoing climate change is predicted to affect the distribution and abundance of aquatic ectotherms owing to increasing constraints on organismal physiology, in particular involving the metabolic scope (MS) available for performance and fitness. The oxygen- and capacity-limited thermal tolerance (OCLTT) hypothesis prescribes MS as an overarching benchmark for fitness-related performance and assumes that any anaerobic contribution within the MS is insignificant. The MS is typically derived from respirometry by subtracting standard metabolic rate from the maximal metabolic rate; however, the methodology rarely accounts for anaerobic metabolism within the MS. Using gilthead sea bream (Sparus aurata) and Trinidadian guppy (Poecilia reticulata), this study tested for trade-offs (i) between aerobic and anaerobic components of locomotor performance; and (ii) between the corresponding components of the MS. Data collection involved measuring oxygen consumption rate at increasing swimming speeds, using the gait transition from steady to unsteady (burst-assisted) swimming to detect the onset of anaerobic metabolism. Results provided evidence of the locomotor performance trade-off, but only in S. aurata. In contrast, both species revealed significant negative correlations between aerobic and anaerobic components of the MS, indicating a trade-off where both components of the MS cannot be optimized simultaneously. Importantly, the fraction of the MS influenced by anaerobic metabolism was on average 24.3 and 26.1% in S. aurata and P. reticulata, respectively. These data highlight the importance of taking anaerobic metabolism into account when assessing effects of environmental variation on the MS, because the fraction where anaerobic metabolism occurs is a poor indicator of sustainable aerobic performance. Our results suggest that without accounting for anaerobic metabolism within the MS, studies involving the OCLTT hypothesis could overestimate the metabolic scope available for sustainable activities and the ability of individuals and species to cope with climate change.

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Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology, Section for Ecosystem based Marine Management, Aalborg University, University of Porto, University of Copenhagen, Fisheries and Maritime Museum
Authors: Ejbye-Ernst, R. (Ekstern), Michaelsen, T. Y. (Ekstern), Tirsgaard, B. (Ekstern), Michaelsen, T. Y. (Ekstern), Wilson, J. M. (Ekstern), Jensen, L. F. (Ekstern), Steffensen, J. F. (Ekstern), Pertoldi, C. (Ekstern), Aarestrup, K. (Intern), Svendsen, J. C. (Intern)
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Web of Science (2018): Indexed yes
Scopus rating (2017): CiteScore 3.28 SJR 1.818 SNIP 1.301
Web of Science (2017): Indexed Yes
Scopus rating (2016): CiteScore 1.66 SJR 1.466 SNIP 1.075
Web of Science (2016): Indexed yes
Phenotypic differences between the sexes in the sexually plastic mangrove rivulus fish (Kryptolebias marmoratus)

To maximize reproductive success, many animal species have evolved functional sex change. Theory predicts that transitions between sexes should occur when the fitness payoff of the current sex is exceeded by the fitness payoff of the opposite sex. We examined phenotypic differences between the sexes in a sex-changing vertebrate, the mangrove rivulus fish (Kryptolebias marmoratus), to elucidate potential factors that might drive the ‘decision’ to switch sex. Rivulus populations consist of self-fertilizing hermaphrodites and males. Hermaphrodites transition into males under certain environmental conditions, affording us the opportunity to generate 40 hermaphrodite–male pairs where, within a pair, individuals possessed identical genotypes despite being different sexes. We quantified steroid hormone levels, behavior (aggression and risk taking), metabolism and morphology (organ masses). We found that hermaphrodites were more aggressive and risk averse, and had higher maximum metabolic rates and larger gonadosomatic indices. Males had higher steroid hormone levels and showed correlations among hormones that hermaphrodites lacked. Males also had greater total mass and somatic body mass and possessed considerable fat stores. Our findings suggest that there are major differences between the sexes in energy allocation, with hermaphrodites exhibiting elevated maximum metabolic rates, and showing evidence of favoring investments in reproductive tissues over somatic growth. Our study serves as the foundation for future research investigating how environmental challenges affect both physiology and reproductive investment and, ultimately, how these changes dictate the transition between sexes.
Phenotypic variation in metabolism and morphology correlating with animal swimming activity in the wild: relevance for the OCLTT (oxygen- and capacity-limitation of thermal tolerance), allocation and performance models

Ongoing climate change is affecting animal physiology in many parts of the world. Using metabolism, the oxygen- and capacity-limitation of thermal tolerance (OCLTT) hypothesis provides a tool to predict the responses of ectothermic animals to variation in temperature, oxygen availability and pH in the aquatic environment. The hypothesis remains controversial, however, and has been questioned in several studies. A positive relationship between aerobic metabolic scope and animal activity would be consistent with the OCLTT but has rarely been tested. Moreover, the performance model and the allocation model predict positive and negative relationships, respectively, between standard metabolic rate and activity. Finally, animal activity could be affected by individual morphology because of covariation with cost of transport. Therefore, we hypothesized that individual variation in activity is correlated with variation in metabolism and morphology. To test this prediction, we captured 23 wild European perch (Perca fluviatilis) in a lake, tagged them with telemetry transmitters, measured standard and maximal metabolic rates, aerobic metabolic scope and fineness ratio and returned the fish to the lake to quantify individual in situ activity levels. Metabolic rates were measured using intermittent flow respirometry, whereas the activity assay involved high-resolution telemetry.
providing positions every 30 s over 12 days. We found no correlation between individual metabolic traits and activity, whereas individual fineness ratio correlated with activity. Independent of body length, and consistent with physics theory, slender fish maintained faster mean and maximal swimming speeds, but this variation did not result in a larger area (in square metres) explored per 24 h. Testing assumptions and predictions of recent conceptual models, our study indicates that individual metabolism is not a strong determinant of animal activity, in contrast to individual morphology, which is correlated with in situ activity patterns.
Spatial ecology of blue shark and shortfin mako in southern Peru: local abundance, habitat preferences and implications for conservation

While global declines of pelagic shark populations have been recognized for several years, conservation efforts remain hampered by a poor understanding of the spatial distribution and ecology. Two species of conservation concern are the blue shark Prionace glauca and the shortfin mako shark Isurus oxyrinchus. To improve management of the species, this study examined their local abundance patterns, habitat preferences, and distribution in the Southeast Pacific. Catch per unit effort (CPUE) data from an artisanal fishery in Peru were used to identify geographic hotspots and model abundance estimates as a function of environmental variables including the El Niño Southern Oscillation (ENSO). A 10-year data series revealed declining annual landings since 2011, despite no changes in management structures. Significant aggregations of both species were found in the southwestern part of Peruvian waters (74–76°W; 17–19°S) with both locations targeted by major fishing efforts. P. glauca CPUE increased during La Niña conditions, and CPUE of both species declined when water depths exceeded 1000 m. Correlations with lunar illumination and chlorophyll-a were revealed in P. glauca and I. oxyrinchus, respectively. Modeling explained 57 to 61% of the deviance, indicating that other factors not included in the present study might account for unexplained variance in CPUE (e.g. thermocline, location of marine fronts, dissolved oxygen, and gear characteristics). Given the importance of the examined area to shark fisheries and the exploitation of multiple species of conservation concern, the information presented here can be used to inform management strategies designed to limit the depletion of pelagic sharks.
The North Sea houting Coregonus oxyrinchus is an endangered anadromous salmonid belonging to the European lake whitefish complex. The last remaining indigenous population of North Sea houting is found in the River Vidaa, Denmark. Despite legislative protection and numerous stocking and habitat restoration programmes, including a (sic)13.4 million EU Life restoration project, populations are declining in most rivers in Denmark. Limited knowledge of the general biology of the species, in particular of the early life history stages and habitat requirements, is a serious impediment to management and conservation. In this study, we investigated larval and juvenile salinity tolerance, providing novel information on the early life stages of North Sea houting. Results revealed an ontogenetic differentiation in salinity tolerance when comparing newly hatched larvae, larvae at later developmental stages and juveniles expected to initiate migration to the Wadden Sea. At all developmental stages, larvae exhibited poor hyperosmotic tolerance, while juveniles performed significantly better. Larvae suffered from high mortality and loss of body water at salinities of 18 ppt and higher, while most juveniles survived 30 ppt at least when exposed to gradually increasing salinities. Our results suggest that larval North Sea houting experience very high mortality if carried directly into the Wadden Sea prematurely, highlighting the need for suitable habitat within rivers to retain larvae. Our study shows how different life stages respond differently to varying environmental conditions and emphasizes the need for understanding the physiological mechanisms to improve conservation of endangered species.

Development of salinity tolerance in the endangered anadromous North Sea houting Coregonus oxyrinchus: implications for conservation measures

The North Sea houting Coregonus oxyrinchus is an endangered anadromous salmonid belonging to the European lake whitefish complex. The last remaining indigenous population of North Sea houting is found in the River Vidaa, Denmark. Despite legislative protection and numerous stocking and habitat restoration programmes, including a (sic)13.4 million EU Life restoration project, populations are declining in most rivers in Denmark. Limited knowledge of the general biology of the species, in particular of the early life history stages and habitat requirements, is a serious impediment to management and conservation. In this study, we investigated larval and juvenile salinity tolerance, providing novel information on the early life stages of North Sea houting. Results revealed an ontogenetic differentiation in salinity tolerance when comparing newly hatched larvae, larvae at later developmental stages and juveniles expected to initiate migration to the Wadden Sea. At all developmental stages, larvae exhibited poor hyperosmotic tolerance, while juveniles performed significantly better. Larvae suffered from high mortality and loss of body water at salinities of 18 ppt and higher, while most juveniles survived 30 ppt at least when exposed to gradually increasing salinities. Our results suggest that larval North Sea houting experience very high mortality if carried directly into the Wadden Sea prematurely, highlighting the need for suitable habitat within rivers to retain larvae. Our study shows how different life stages respond differently to varying environmental conditions and emphasizes the need for understanding the physiological mechanisms to improve conservation of endangered species.

General information
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Organisations: Fisheries and Maritime Museum, Rambøll Danmark A/S, University of Southern Denmark, Aarhus University
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Effects of temperature on specific dynamic action in Atlantic cod Gadus morhua

Growth requires that energy is directed towards ingestion, digestion, absorption and assimilation of a meal; energy expenditures are often expressed as the specific dynamic action (SDA). While SDA is an important part of fish energy budgets and strongly affected by water temperature, temperature effects are not known across a wide temperature range in Atlantic cod Gadus morhua. The objective of this study was to examine effects of temperature (2, 5, 10, 15 or 20 °C) on the energetic cost and time used for SDA in juvenile G. morhua by intermittent flow respirometry. At each temperature, G. morhua were fed a meal of herring (Clupea harengus) corresponding to 5 % of the body mass. Standard metabolic rates measured pre-feeding and post-feeding metabolic rates were measured to determine SDA. The study showed that SDA coefficients (%, SDA energy divided by meal energy) were significantly lower at 2 and 10 °C (5.4-6.3 %) compared to 5, 15 and 20 °C (10.4-12.4 %), while SDA duration increased significantly from 80 h at 10 °C to 130-160 h at 2, 15 and 20 °C and reached a maximum of 250 h at 5 °C. The significant decrease in SDA duration at 10 °C combined with a low SDA coefficient suggests that water temperatures close to 10 °C may represent the optimum temperatures for SDA in this population of G. morhua. Our results suggest that SDA is not a simple function of temperature, but may vary with temperature in a more complex fashion.
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Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.664 SNIP 0.889 CiteScore 1.77
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Scopus rating (2013): SJR 0.713 SNIP 0.961 CiteScore 1.72
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.612 SNIP 1.194 CiteScore 1.76
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.661 SNIP 1.039 CiteScore 1.6
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.525 SNIP 0.877
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Web of Science (2009): Indexed yes
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Scopus rating (2005): SJR 0.417 SNIP 0.425
Scopus rating (2004): SJR 0.254 SNIP 0.261
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Animalia (Animals, Chordates, Fish, Nonhuman Vertebrates, Vertebrates) - Osteichthyes [85206] Clupea harengus
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Geospatial modeling of the Birch River: Distribution of Carmine Shiner (Notropis percobromus) in Geomorphic Response
Units (GRU): Carmine Shiner distribution in GRUs

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Stewardship
Is warm-up important in fish locomotion? Recovery from anaerobic metabolism during exercise in striped surfperch Embiotoca lateralis

General information
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Intraspecific variation in aerobic and anaerobic locomotion: gilthead sea bream (Sparus aurata) and Trinidadian guppy (Poecilia reticulata) do not exhibit a trade-off between maximum sustained swimming speed and minimum cost of transport.

Intraspecific variation and trade-off in aerobic and anaerobic traits remain poorly understood in aquatic locomotion. Using gilthead sea bream (Sparus aurata) and Trinidadian guppy (Poecilia reticulata), both axial swimmers, this study tested four hypotheses: (1) gait transition from steady to unsteady (i.e., burst-assisted) swimming is associated with anaerobic metabolism evidenced as excess post exercise oxygen consumption (EPOC); (2) variation in swimming performance (critical swimming speed; U-crit) correlates with metabolic scope (MS) or anaerobic capacity (i.e., maximum EPOC); (3) there is a trade-off between maximum sustained swimming speed (U-sus) and minimum cost of transport (COTmin); and (4) variation in U-sus correlates positively with optimum swimming speed (U-opt; i.e., the speed that minimizes energy expenditure per unit of distance traveled). Data collection involved swimming respirometry and video analysis. Results showed that anaerobic swimming costs (i.e., EPOC) increase linearly with the number of bursts in S. aurata, with each burst corresponding to 0.53 mg O₂ kg⁻¹. Data are consistent with a previous study on striped surfperch (Embiotoca lateralis), a labriform swimmer, suggesting that the metabolic cost of burst swimming is similar across various types of locomotion. There was no correlation between U-crit and MS or anaerobic capacity in S. aurata indicating that other factors, including morphological or biomechanical traits, influenced U-crit. We found no evidence of a trade-off between U-sus and COTmin. In fact, data revealed significant negative correlations between U-sus and COTmin, suggesting that individuals with high U-sus also exhibit low COTmin. Finally, there were positive correlations between U-sus and U-opt. Our study demonstrates the energetic importance of anaerobic metabolism during unsteady swimming, and provides intraspecific evidence that superior maximum sustained swimming speed is associated with superior swimming economy and optimum speed.
Acoustic positional telemetry systems (APTs) represent a novel approach to study the behaviour of free ranging aquatic animals in the wild at unprecedented detail. System manufactures promise remarkably high temporal and spatial resolution. However, the performance of APTs has rarely been rigorously tested at the level of entire ecosystems. Moreover, the effect of habitat structure on system performance has only been poorly documented. Two APTs were deployed to cover two small lakes and a series of standardized stationary tests were conducted to assess system performance. Furthermore, a number of tow tests were conducted to simulate moving fish. Based on these data, we quantified system performance in terms of data yield, accuracy and precision as a function of structural complexity in relation to vegetation. Mean data yield of the two systems was 40% (Lake1) and 60% (Lake2). Average system accuracy (acc) and precision (prec) were Lake1: acc = 3.1 m, prec = 1.1 m; Lake2: acc = 1.0 m, prec = 0.2 m. System performance was negatively affected by structural complexity, i.e., open water habitats yielded far better performance than structurally complex vegetated habitats. Post-processing greatly improved data quality, and sub-meter accuracy and precision were, on average, regularly achieved in Lake2 but remained the exception in the larger and structurally more complex Lake1. Moving transmitters were tracked well by both systems. Whereas overestimation of moved distance is inevitable for stationary transmitters due to accumulation of small tracking errors, moving transmitters can result in both over- and underestimation of distances depending on circumstances. Both deployed APTs were capable of providing high resolution positional data at the scale of entire lakes and are suitable systems to mine the reality of free ranging fish in their natural environment. This opens important opportunities to advance several fields of study such as movement ecology and animal social networks in the wild. It is recommended that thorough performance tests are conducted in any study utilizing APTs. The APTs tested here appear best suited for studies in structurally simple ecosystems or for studying pelagic species. In such situations, the data quality provided by the APTs is exceptionally high.
Phenotypic variation in metabolism and morphology correlating with fish movements in the wild: a study combining respirometry and telemetry

General information
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Authors: Svendsen, J. C. (Intern), Baktoft, H. (Intern), Skov, C. (Intern), Aarestrup, K. (Intern), Koed, A. (Intern), Jacobsen, L. (Intern)
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Survival and progression rates of anadromous brown trout kelts Salmo trutta during downstream migration in freshwater and at sea

The marine migration of post-spawning anadromous fish remains poorly understood. The present study examined survival and progression rates of anadromous brown trout Salmo trutta L. after spawning (kelts) during downriver, fjord, and sea migration. Kelts (n = 49) were captured in the Danish River Gudenaa, tagged with acoustic transmitters and subsequently recorded by automatic receivers. Kelts spent on average 25 d moving down the 45 km river and through the brackish fjord. The fish entered the Kattegat Sea between 14 April and 30 May. Eighteen of the 49 kelts disappeared in the river and fjord during outward migration, likely due to mortality. Survival was not significantly related to gill Na+/K+-ATPase activity, suggesting that physiological adaptation to saltwater may be less critical for adults compared to juveniles (smolts). Of the 31 fish that entered the Kattegat Sea, 45% survived and returned to the fjord. The duration of the entire marine migration, from leaving to entering the river, was on average 163 d. The fish returned from the Kattegat Sea to the fjord between 22 July and 21 October. Upon return, the fish spent 1–90 d passing through Randers Fjord, with most individuals completing the reach within 4 d, suggesting that the kelts spent limited time foraging after returning to the fjord. The total survival during the entire marine migration, including the fjord, was a minimum of 29%. Our study provides data that are important for management of anadromous brown trout, and the high survival highlights that kelts may represent a valuable resource for both population reproduction and recreational fisheries

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Calcium-dependent behavioural responses to acute copper exposure in Oncorhynchus mykiss
Using rainbow trout Oncorhynchus mykiss, the present study demonstrated that: (1) calcium (Ca) increased the range of copper (Cu) concentrations that O. mykiss avoided; (2) Ca conserved the maintenance of pre-exposure swimming activity during inescapable acute (10 min) Cu exposure. Data showed that when presented with a choice of Cu-contaminated water (ranging from 0 to 454 µg Cu l(-1) ) and uncontaminated water in a choice tank, O. mykiss acclimated and tested at low Ca concentration (3 mg Ca l(-1) ) avoided the 10 µg Cu l(-1) only. By contrast, O. mykiss acclimated and tested at high Ca concentration (158 mg Ca l(-1) ) avoided all the Cu concentrations ≥37 µg l(-1). The Cu avoidance was connected with increased spontaneous swimming speed in the Cu-contaminated water. When subjected to inescapable Cu exposure (35 µg Cu l(-1) ), O. mykiss acclimated and tested at low Ca concentration reduced their spontaneous swimming speed, whereas no response was observed in O. mykiss acclimated and tested at high Ca concentration. Collectively, the data support the conclusion that in O. mykiss the behavioural responses to acute Cu exposure are Ca-dependent.

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Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology, Aarhus University
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Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
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Evidence of circadian rhythm, oxygen regulation capacity, metabolic repeatability and positive correlations between forced and spontaneous maximal metabolic rates in Lake Sturgeon Acipenser fulvescens

Animal metabolic rate is variable and may be affected by endogenous and exogenous factors, but such relationships remain poorly understood in many primitive fishes, including members of the family Acipenseridae (sturgeons). Using juvenile lake sturgeon (Acipenser fulvescens), the objective of this study was to test four hypotheses: 1) A. fulvescens exhibits a circadian rhythm influencing metabolic rate and behaviour; 2) A. fulvescens has the capacity to regulate metabolic rate when exposed to environmental hypoxia; 3) measurements of forced maximum metabolic rate (MMRF) are repeatable in individual fish; and 4) MMRF correlates positively with spontaneous maximum metabolic rate (MMRS). Metabolic rates were measured using intermittent flow respirometry, and a standard chase protocol was employed to elicit MMRF. Trials lasting 24 h were used to measure standard metabolic rate (SMR) and MMRS. Repeatability and correlations between MMRF and MMRS were analyzed using residual body mass corrected values. Results revealed that A. fulvescens exhibit a circadian rhythm in metabolic rate, with metabolism peaking at dawn. SMR was unaffected by hypoxia (30% air saturation (O₂sat)), demonstrating oxygen regulation. In contrast, MMRF was affected by hypoxia and decreased across the range from 100% O₂sat to 70% O₂sat. MMRF was repeatable in individual fish, and MMRF correlated positively with MMRS, but the relationships between MMRF and MMRS were only revealed in fish exposed to hypoxia or 24 h constant light (i.e. environmental stressor). Our study provides evidence that the physiology of A. fulvescens is influenced by a circadian rhythm and supports the conjecture that MMRF represents a measure of organism performance that could be a target of natural selection.
Laboratory experiments demonstrate that bubble curtains can effectively inhibit movement of common carp

Although bubble curtains have been proposed many times as practical and inexpensive solutions to hinder the movement of invasive fish, few studies have examined why or how they might work. By understanding how bubble curtains influence fish behavior, management tools could be developed to control movement of invasive fish. In this study, the common carp (Cyprinus carpio L.) was used to examine the performance of three different bubble curtains (fine-, graded-, and coarse-bubble) and acoustically enhanced systems in an indoor channel. Trials revealed that the graded- and coarse-bubble systems reduced common carp passage across the curtain by 75-85% in both up- and down-stream directions.

Concurrent acoustic field measurements revealed that these bubble curtains generated sound near 200 Hz at approximately 130 dB (ref 1 μPa), well above the common carp hearing threshold. Further testing with speaker arrays and lighting indicated that carp avoidance of the bubble curtain involved responses to sound and fluid motion rather than visual cues. Although field tests are warranted, our results suggest that bubble curtains may be a viable and inexpensive deterrence system to limit common carp movement. (C) 2014 Elsevier B.V. All rights reserved.
Muddied waters: suspended sediment impacts on gill structure and aerobic scope in an endangered native and an invasive freshwater crayfish

Suspended sediment (SS) loadings in freshwater habitats have increased over the past century and SS is now a significant environmental stressor. Greater tolerance to environmental stressors has been proposed as a factor in the success of aquatic invasive species. Further, parasites may interact with environmental stressors to increase host susceptibility to loss of fitness and mortality. We compared the effects of SS exposure on the gill structure and aerobic scope of the endangered white-clawed crayfish (Austropotamobius pallipes), and the invasive signal crayfish (Pacifastacus leniusculus), and assessed impacts in relation to parasite burden. SS caused gill fouling and reduction in...
aerobic scope in both species, though A. pallipes was more susceptible than invasive P. leniusculus. The parasite Branchiobdella astaci, a crayfish worm that infests the gills, interacted with the sediment to affect gill structure whereas infection with the microsporidian parasite Thelohania contejeani had no effect on crayfish response to SS. Juvenile P. leniusculus had a higher standard metabolic rate than A. pallipes, which may be linked to competitive advantages such as higher growth rate and behavioural dominance. Conservation of A. pallipes often involves relocation of threatened populations to isolated stillwaters; our findings suggest that SS levels should be assessed before relocation.

General information
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Organisations: National Institute of Aquatic Resources, University of Leeds
Authors: Rosewarne, P. (Ekstern), Svendsen, J. C. (Intern), Mortimer, R. (Ekstern), Dunn, A. (Ekstern)
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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.

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Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.25 SJR 0.904 SNIP 0.959
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.93 SJR 0.926 SNIP 0.739
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.196 SNIP 0.874 CiteScore 2.16
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.266 SNIP 0.875 CiteScore 2.26
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.011 SNIP 0.773 CiteScore 2.08
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.024 SNIP 0.887 CiteScore 2.22
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Effects of angling and manual handling on pike behaviour investigated by high-resolution positional telemetry

Human disturbances such as angling and manual handling may have long-term effects on the behaviour of pike, *Esox lucius* L., an ecologically important species. Using continuous high-resolution positional telemetry, this study compared the swimming activity of handled and unhandled pike in a small lake. Pike pre-equipped with acoustic transmitters were angled and exposed to a handling protocol including measurements of length and mass. Pike not recaptured constituted an unhandled control group. Results demonstrated that the handling protocol caused temperature-dependent changes in pike activity, with higher temperatures leading to lower activity of the recaptured pike. The effects, however, were transitory and not detectable after 48-h post-release. These findings indicate that pike are relatively resilient to handling and quickly resume pre-handling activity.

**General information**

State: Published

Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology, Department of Applied Mathematics and Computer Science, Centre for Ocean Life, Fisheries and Oceans Canada


Pages: 518-525

Publication date: 2013

Main Research Area: Technical/natural sciences

**Publication information**

Journal: Fisheries Management and Ecology

Volume: 20
Effects of intraspecific variation in reproductive traits, pectoral fin use and burst swimming on metabolic rates and swimming performance in the Trinidadian guppy (Poecilia reticulata)

There is considerable intraspecific variation in metabolic rates and locomotor performance in aquatic ectothermic vertebrates; however, the mechanistic basis remains poorly understood. Using pregnant Trinidadian guppies (Poecilia reticulata), a livebearing teleost, we examined the effects of reproductive traits, pectoral fin use and burse-assisted swimming on swimming metabolic rate, standard metabolic rate (MO2std) and prolonged swimming performance (Ucrit). Reproductive traits included reproductive allocation and pregnancy stage, the former defined as the mass of the reproductive tissues divided by the total body mass. Results showed that the metabolic rate increased curvilinearly with swimming speed. The slope of the relationship was used as an index of swimming cost. There was no evidence that reproductive traits correlated with swimming cost, MO2std or Ucrit. In contrast, data revealed strong effects of pectoral fin use on swimming cost and Ucrit. Poecilia reticulata employed body-caudal fin (BCF) swimming at all tested swimming speeds; however, fish with a high simultaneous use of the pectoral fins exhibited increased swimming cost and decreased Ucrit. These data indicated that combining BCF swimming and pectoral fin movement over a wide speed range, presumably to support swimming stability and control, is an inefficient swimming behaviour. Finally, transition to burst-assisted swimming was associated with an increase in aerobic metabolic rate. Our study highlights factors other than swimming speed that affect swimming cost and suggests that intraspecific diversity in biomechanical performance, such as pectoral fin use, is an important source of variation in both locomotor cost and maximal performance.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Department of Applied Mathematics and Computer Science, Statistics and Data Analysis, Section for Freshwater Fisheries Ecology, University of California, University of Copenhagen
Authors: Svendsen, J. C. (Intern), Banet, A. I. (Ekstern), Christensen, R. H. B. (Intern), Steffensen, J. F. (Ekstern), Aarestrup, K. (Intern)
Pages: 3564-3574
Publication date: 2013
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Experimental Biology
Volume: 216
ISSN (Print): 0022-0949
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 2.6 SJR 1.611 SNIP 1.306
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.62 SJR 1.824 SNIP 1.27
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.821 SNIP 1.211 CiteScore 2.4
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.742 SNIP 1.315 CiteScore 2.51
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.733 SNIP 1.314 CiteScore 2.75
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.627 SNIP 1.372 CiteScore 2.91
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.553 SNIP 1.321 CiteScore 2.77
Excess post-hypoxic oxygen consumption is independent from lactate accumulation in two cyprinid fishes

Carassius carassius responds to hypoxic conditions by conversion of lactate into ethanol, which is excreted over the gills. However, a closely related species, Cyprinus carpio, does not possess the ability to produce ethanol and would be expected to accumulate lactate during hypoxic exposure. While the increase in oxygen consumption in fish required following strenuous exercise or low environmental oxygen availability has been frequently considered, the primary contributing mechanism remains unknown. This study utilized the close relationship but strongly divergent physiology between C. carpio and C. carassius to examine the possible correlation between excess post-hypoxic oxygen consumption (EPHOC) and lactate accumulation. No difference in the EPHOC:O₂ deficit ratio was observed between the two species after 2.5 h anoxia, with ratios of 2.0 ± 0.6 (C. carpio) and 1.3 ± 0.3 (C. carassius). As predicted, lactate accumulation dynamics did significantly differ between the species in both plasma and white muscle following anoxic exposure. Significant lactate accumulation was seen in both plasma and muscle in C. carpio, but there was no accumulation of lactate in white muscle tissue of C. carassius. These findings indicate that lactate accumulated as a consequence of 2.5 h anoxic exposure is not a major determinant of the resulting EPHOC.
Local adaptation to altitude underlies divergent thermal physiology in tropical killifishes of the genus Aphyosemion

In watersheds of equatorial West Africa, monophyletic groups of killifish species (genus Aphyosemion) occur in discrete altitudinal ranges, low altitude species (LA, sea level to similar to 350 m) or high altitude species (HA, 350 to 900 m). We investigated the hypothesis that local adaptation to altitude by the LA and HA species would be revealed as divergent effects of temperature on their physiological energetics. Two species from each group (mass similar to 350 mg) were acclimated to 19, 25 and 28 degrees C, with 19 and 28 degrees C estimated to be outside the thermal envelope for LA or HA, respectively, in the wild. Wild-caught animals (F0 generation) were compared with animals raised in captivity at 25 degrees C (F1 generation) to investigate the contribution of adaptation versus plasticity. Temperature significantly increased routine metabolic rate in all groups and generations. However, LA and HA species differed in the effects of temperature on their ability to process a meal. At 25 degrees C, the specific dynamic action (SDA) response was completed within 8 h in all groups, but acclimation to temperatures beyond the thermal envelope caused profound declines in SDA performance. At 19 degrees C, the LA required similar to 14 h to complete the SDA, whereas the HA required only similar to 7 h. The opposite effect was observed at 28 degrees C. This effect was evident in both F0 and F1. Reaction norms for effects of temperature on SDA therefore revealed a trade-off, with superior performance at warmer temperatures by LA being associated with inferior performance at cooler temperatures, and vice-versa in HA. The data indicate that divergent physiological responses to temperature in the LA and HA species reflect local adaptation to the thermal regime in their habitat, and that local adaptation to one thermal environment trades off against performance in another.

General information
State: Published
Organisations: Université Montpellier, University of Copenhagen
Authors: McKenzie, D. J. (Intern), Estivales, G. (Ekstern), Svendsen, J. C. (Intern), Steffensen, J. F. (Intern), Agnese, J. (Ekstern)
Publication date: 2013
Main Research Area: Technical/natural sciences

Publication information
Journal: P L o S One
Volume: 8
Issue number: 1
Article number: e54345
ISSN (Print): 1932-6203
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.01 SJR 1.164 SNIP 1.111
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.11 SJR 1.236 SNIP 1.101
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.427 SNIP 1.136 CiteScore 3.32
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.559 SNIP 1.148 CiteScore 3.54
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.772 SNIP 1.153 CiteScore 3.94
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.982 SNIP 1.156 CiteScore 4.15
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 2.425 SNIP 1.233 CiteScore 4.58
Aspects of lentic fish behaviour studied with high resolution positional telemetry

General information
State: Published
Organisations: National Institute of Aquatic Resources
Authors: Baktoft, H. (Intern), Skov, C. (Intern), Svendsen, J. C. (Intern), Berg, S. (Intern), Aarestrup, K. (Intern), Koed, A. (Intern), Jacobsen, L. (Intern)
Number of pages: 118
Publication date: 2012

Publication information
Place of publication: Kgs. Lyngby
Publisher: Technical University of Denmark (DTU)
Original language: English
Main Research Area: Technical/natural sciences
Electronic versions:
120529_PhD_dissertation_Baktoft..PDF
Publication: Research › Ph.D. thesis – Annual report year: 2012

Excess posthypoxic oxygen consumption in rainbow trout (Oncorhynchus mykiss): recovery in normoxia and hypoxia

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources, University of Copenhagen
Authors: Svendsen, J. C. (Intern), Steffensen, J. F. (Ekstern), Aarestrup, K. (Intern), Frisk, M. (Ekstern), Etzerodt, A. P. (Intern), Jyde, M. (Ekstern)
Pages: 1-11
Publication date: 2012
Main Research Area: Technical/natural sciences
Ontogenetic differentiation of swimming performance and behaviour in relation to habitat availability in the endangered North Sea houting (Coregonus oxyrinchus)

The survival of the highly endangered, anadromous fish species North Sea houting (Coregonus oxyrinchus) depends on the correct timing of downstream dispersal during its early ontogenetic stages. To date, however, no studies have investigated the ontogenetic differentiation of swimming performance and behaviour, including the potential of habitat complexity to influence dispersal rates. By testing larval and juvenile North Sea houting in a laboratory, we examined (1) swimming performance measured as maximum swimming performance (Umax) and routine swimming speed (Uroutine)
and (2) the potential of habitat complexity (i.e., cover providing shade) to influence dispersal behaviour in an indoor stream channel. The Umax and the Uroutine were 9.4 and 4.6 cm s−1, respectively, in the larvae [body length (BL) s−1: 7.3 and 3.5, respectively], and 25.2 and 16.3 cm s−1 in the juveniles (BL s−1: 7.0 and 5.2, respectively). We compared laboratory swimming performance data with water speeds in North Sea houting spawning areas in the Danish River Vidaa. Results showed that the water speeds present in 95% and 85% of the water column caused downstream displacement of larvae and juveniles, respectively. However, areas with slow-flowing water near river banks and river beds could function as nursery habitats. Stream channel experiments showed that cover providing shade caused delayed dispersal in both larvae and juveniles, but the larvae dispersed later and spent less time under cover than the juveniles, a finding that implies ontogenetic effects. Finally, the larvae refused to cross an upstream-positioned cover, a behaviour that was not observed in the juveniles. Therefore, habitat complexity may have the potential to influence dispersal behaviour in both larval and juvenile North Sea houting. Overall, we provided the first evidence of ontogenetic differentiation in the North Sea houting. These findings will be valuable for the development and dissemination of science-based conservation strategies.

General information
State: Published
Organisations: Department of Mechanical Engineering, Fluid Mechanics, Coastal and Maritime Engineering, National Institute of Aquatic Resources, Fisheries and Maritime Museum, Christian-Albrechts-Universität zu Kiel, Ribe Environmental Centre
Number of pages: 9
Pages: 241-249
Publication date: 2012
Main Research Area: Technical/natural sciences

Publication information
Journal: Aquatic Living Resources
Volume: 25
Issue number: 3
ISSN (Print): 0990-7440
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.299 SJR 0.296 CiteScore 0.66
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.41 SJR 0.606 SNIP 0.728
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.755 SNIP 0.843 CiteScore 1.39
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.649 SNIP 0.892 CiteScore 1.25
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.556 SNIP 0.695 CiteScore 1.15
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.553 SNIP 0.586 CiteScore 1.19
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.633 SNIP 0.687 CiteScore 1.17
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.612 SNIP 0.564
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.486 SNIP 0.589
BFI (2008): BFI-level 1
Seasonal and diel effects on the activity of northern pike studied by high-resolution positional telemetry

Temperate lakes can be ice covered for several months each year, yet little is known about the behaviour and activity of the fish during the cold season. As northern pike represents the top of the food web in many northern temperate lakes and may structure the ecosystem both directly and indirectly, a detailed understanding of the behaviour of this species during winter is important. We continuously monitored the activity of adult northern pike (Esox lucius) in a small temperate lake from late summer to winter for two consecutive years using an automatic acoustic positional telemetry system. Four subsample periods representing different temperature regimes from each year were chosen for further investigation. The results revealed that pike activity was similar between seasons. In all periods, a distinct diel pattern, showing increased activity during day as compared to night, was evident. Our findings indicate that the fish component of temperate lentic ecosystems can be more active during the cold season than previously assumed. This may have implications for the structuring effect of pike on the lower trophic levels.
Snæbli – den lange kamp for overlevelse

General Information
State: Published
Organisations: Aarhus University
Authors: Jensen, L. F. (Ekstern), Poulsen, S. B. (Ekstern), Svendsen, J. C. (Intern)
Pages: 121-133
Publication date: 2012
Main Research Area: Technical/natural sciences

Publication Information
Journal: Sjæk'len. Årbog for Fiskeri- og Søfartsmuseet
Volume: 2012

DOI: 10.1111/j.1600-0633.2012.00558.x

Behaviour of rainbow trout Oncorhynchus mykiss presented with a choice of normoxia and stepwise progressive hypoxia

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Poulsen, S. B. (Intern), Jensen, L. F. (Ekstern), Nielsen, K. S. (Ekstern), Malte, H. (Ekstern), Aarestrup, K. (Intern), Svendsen, J. C. (Intern)
Pages: 969-979
Publication date: 2011
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Fish Biology
Volume: 79
Issue number: 4
ISSN (Print): 0022-1112
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.71 SJR 0.822 SNIP 0.923
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.57 SJR 0.748 SNIP 0.83
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.961 SNIP 0.924 CiteScore 1.64
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.956 SNIP 0.931 CiteScore 1.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.058 SNIP 1.112 CiteScore 1.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.94 SNIP 1.045 CiteScore 1.88
ISI indexed (2012): ISI indexed yes
Can metabolic properties explain variation in individual behaviour?

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate
Publication date: 2011
Event: Abstract from 1st International Conference on Fish Telemetry, Sapporo, Japan.
Main Research Area: Technical/natural sciences

Can metabolic properties explain variation in individual behaviour? Attempting to link physiology and morphology with field behavior

General information
Linking individual behaviour and migration success in Salmo salar smolts approaching a water withdrawal site: implications for management

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources, Section for Population Ecology and Genetics
Authors: Svendsen, J. C. (Intern), Aarestrup, K. (Intern), Malte, H. (Ekstern), Thygesen, U. H. (Intern), Baktoft, H. (Intern), Koed, A. (Intern), Deacon, M. G. (Ekstern), Cubitt, K. F. (Ekstern), McKinley, R. S. (Ekstern)
Pages: 201-209
Publication date: 2011
Main Research Area: Technical/natural sciences

Publication information
Journal: Aquatic Living Resources
Volume: 24
Issue number: 2
ISSN (Print): 0990-7440
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.299 SJR 0.296 CiteScore 0.66
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.41 SJR 0.606 SNIP 0.728
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.755 SNIP 0.843 CiteScore 1.39
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.649 SNIP 0.892 CiteScore 1.25
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.556 SNIP 0.695 CiteScore 1.15
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.553 SNIP 0.586 CiteScore 1.19
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.633 SNIP 0.687 CiteScore 1.17
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.612 SNIP 0.564
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.486 SNIP 0.589
Effects of a surface oriented travelling screen and water abstraction practices on downstream migrating Salmonidae smolts in a lowland stream

Downstream migration of immature salmonids (smolts) may be associated with severe mortalities in anthropogenically altered channels. In Pacific salmon, several investigations have suggested the use of the dominating surface orientation of smolts to improve fish by-pass structures in large and deep hydroelectric reservoirs. The present study tested the use of a surface orientated travelling screen to guide Atlantic salmon (Salmo salar L.) and brown trout (Salmo trutta L.) smolts past a water abstraction site in a shallow lowland stream. The percentage of total discharge abstracted from the stream was included in the analyses. Indigenous migrating smolts were trapped, PIT tagged and subsequently released upstream of the water abstraction site. Releases shifted between a present or absent travelling screen. The migration success of the released smolts was evaluated using a trap situated downstream of the water abstraction site. There was no evidence that the surface oriented travelling screen had any influence on the probability of fish passing the water abstraction site. However, for both species, the probability of successful migration past the water abstraction site correlated negatively with the abstracted percentage of the total daily stream discharge. These findings may have important management implications because they suggest that short term changes in the percentage of total stream discharge abstracted may have consequences for the downstream migration success of smolts. Copyright (C) 2009 John Wiley & Sons, Ltd.
Effects of food deprivation on refuge use and dispersal in juvenile North Sea houting Coregonus oxyrinchus under experimental conditions

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Poulsen, S. (Ekstern), Svendsen, J. C. (Intern), Jensen, L. (Ekstern), Schultz, C. (Ekstern), Jäger-Kleinicke, T. (Ekstern), Schwarten, H. (Ekstern)
Pages: 1702-1708
Publication date: 2010
Main Research Area: Technical/natural sciences
Partition of aerobic and anaerobic swimming costs related to gait transitions in a labriform swimmer

Members of the family Embiotocidae exhibit a distinct gait transition from exclusively pectoral fin oscillation to combined pectoral and caudal fin propulsion with increasing swimming speed. The pectoral–caudal gait transition occurs at a threshold speed termed Up–c. The objective of this study was to partition aerobic and anaerobic swimming costs at speeds below and above the Up–c in the striped surfperch Embiotoca lateralis using swimming respirometry and video analysis to test the hypothesis that the gait transition marks the switch from aerobic to anaerobic power output. Exercise oxygen consumption rate was measured at 1.4, 1.9 and 2.3 L s⁻¹. The presence and magnitude of excess post-exercise oxygen consumption (EPOC) were evaluated after each swimming speed. The data demonstrated that 1.4 L s⁻¹ was below the Up–c, whereas 1.9 and 2.3 L s⁻¹ were above the Up–c. These last two swimming speeds included caudal fin propulsion in a mostly steady and unsteady (burst-assisted) mode, respectively. There was no evidence of EPOC after swimming at 1.4 and 1.9 L s⁻¹, indicating that the pectoral–caudal gait transition was not a threshold for anaerobic metabolism. At 2.3 L s⁻¹, E. lateralis switched to an unsteady burst and flap gait. This swimming speed resulted in EPOC, suggesting that anaerobic metabolism constituted 25% of the total costs. Burst activity correlated positively with the magnitude of the EPOC. Collectively, these data indicate that steady axial propulsion does not lead to EPOC whereas transition to burst-assisted swimming above Up–c is associated with anaerobic metabolism in this labriform swimmer.
Survival and progression rates of large European silver eel Anguilla anguilla in late freshwater and early marine phases

The population of European silver eel Anguilla anguilla has declined tremendously in the last decades. The cause of this decline is unknown, and it is necessary to investigate the migratory behaviour and survival rates of silver eels during the reproductive migration in order to understand if the decline is related to factors acting during that migration. We estimated survival and progression rates of European silver eel migrating in the lower part of the River Gudenaa and during the first phase of the marine migration in the Randers Fjord in Denmark. Fifty migrating silver eel (total body length: 56 to 84 cm) were captured, and each was equipped with an acoustic transmitter. Their migration was subsequently monitored using an array of automatic listening stations, and progression rate and mortality in the river, inner part of the fjord, and outer part of the fjord were estimated. Survival was high in fresh water. However, 60% of eels were lost in the inner and outer fjord, supporting the hypothesis that mortality is large in the early phase of the marine migration and that fishing may be a major cause of mortality of silver eels. There was no indication that the slowest-migrating individuals were more prone to fishing mortality than the faster-migrating individuals. Progression rate increased as the eels proceeded downriver and out of the fjord. The migration was predominantly nocturnal, both in the river and fjord. Based on the available evidence, a considerable increase in eel survival in the river–fjord system will be needed in order to fulfil the goals in the European Union recovery plan for eels.

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Aarestrup, K. (Intern), Thorstad, E. B. (Ekstern), Koed, A. (Intern), Svendsen, J. C. (Intern), Jepsen, N. (Intern), Pedersen, M. I. (Intern), Økland, F. (Ekstern)
Pages: 263-270
Publication date: 2010
Main Research Area: Technical/natural sciences

Publication information
Journal: Aquatic Biology
Volume: 9
Issue number: 3
ISSN (Print): 1864-7782
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.99 SJR 0.949 CiteScore 2.23
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.898 SNIP 0.892 CiteScore 1.82
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.767 SNIP 0.689 CiteScore 1.41
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.688 SNIP 0.681 CiteScore 1.44
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.652 SNIP 0.627 CiteScore 1.34
ISI indexed (2013): ISI indexed no
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.819 SNIP 0.829 CiteScore 1.7
ISI indexed (2012): ISI indexed no
BFI (2011): BFI-level 1
Behavioural alarm and avoidance responses to copper in rainbow trout (Oncorhynchus mykiss): The effect of calcium

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources, Aarhus University
Authors: Poulsen, S. (Ekstern), Aarestrup, K. (Intern), Svendsen, J. C. (Intern), Malte, H. (Ekstern)
Pages: S103-S103
Publication date: 2009
Main Research Area: Technical/natural sciences

Publication information
Journal: Comparative Biochemistry and Physiology - Part A: Molecular & Integrative Physiology
Volume: 153A
Issue number: 2
ISSN (Print): 1095-6433
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.932 SJR 0.836 CiteScore 2.23
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.16 SJR 0.84 SNIP 0.891
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.943 SNIP 0.944 CiteScore 2.01
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.999 SNIP 0.951 CiteScore 2.18
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.974 SNIP 1.043 CiteScore 2.36
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.797 SNIP 1.048 CiteScore 2.18
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Linking reproduction, swimming performance, and habitat use in the Trinidadian guppy, Poecilia reticulata

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Banet, A. I. (Ekstern), Svendsen, J. C. (Intern), Eng, K. J. (Ekstern)
Publication date: 2009
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252660
Publication: Research › Poster – Annual report year: 2009

New insights in pike behaviour

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Baktoft, H. (Intern), Jacobsen, L. (Intern), Berg, S. (Intern), Aarestrup, K. (Intern), Skov, C. (Intern), Svendsen, J. C. (Intern)
Publication date: 2009
Event: Abstract from PhD Student Seminar, Søminestationen, Holbæk, Danmark, .
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252607
Publication: Research › Conference abstract for conference – Annual report year: 2009
New insights in pike behaviour using 2D/3D telemetry

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources, Mathematical Statistics, Department of Informatics and Mathematical Modeling
Publication date: 2009
Event: Abstract from 8th Conference on Fish Telemetry held in Europe; Umeå, Sweden; September 14-18, .
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252533
Publication: Research › Conference abstract for conference – Annual report year: 2009

Organochlorine fingerprinting to determine foraging areas of sea-ranched Atlantic salmon: A case study from Denmark

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Svendsen, T. C. (Ekstern), Vorkamp, K. (Ekstern), Svendsen, J. C. (Intern), Aarestrup, K. (Intern), Frier, J. (Ekstern)
Pages: 598-603
Publication date: 2009
Main Research Area: Technical/natural sciences

Publication information
Journal: North American Journal of Fisheries Management
Volume: 29
Issue number: 3
ISSN (Print): 0275-5947
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.751 SJR 0.761 CiteScore 1.13
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.661 SNIP 0.814 CiteScore 1.12
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.624 SNIP 0.786 CiteScore 1.04
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.583 SNIP 0.745 CiteScore 0.89
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.677 SNIP 0.915 CiteScore 0.94
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.781 SNIP 0.936 CiteScore 1.16
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.826 SNIP 0.822 CiteScore 0.94
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.819 SNIP 0.804
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.672 SNIP 0.784
Pectoral fin beat frequency predicts oxygen consumption during spontaneous activity in a labriform swimming fish (Embiotoca lateralis)

The objective of this study was to identify kinematic variables correlated with oxygen consumption during spontaneous labriform swimming. Kinematic variables (swimming speed, change of speed, turning angle, turning rate, turning radius and pectoral fin beat frequency) and oxygen consumption (MO2) of spontaneous swimming in Embiotoca lateralis were measured in a circular arena using video tracking and respirometry, respectively. The main variable influencing MO2 was pectoral fin beat frequency ($r^2 = 0.71$). No significant relationship was found between swimming speed and pectoral fin beat frequency. Complementary to other methods within biotelemetry such as EMG it is suggested that such correlations of pectoral fin beat frequency may be used to measure the energy requirements of labriform swimming fish such as E. lateralis in the field, but need to be taken with great caution since movement and oxygen consumption patterns are likely to be quite different in field situation compared to a small lab tank. In addition, our methods could be useful to measure metabolic costs of growth and development, or bioassays for possible toxicological effects on fish.

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Tudorache, C. (Ekstern), Jordan, A. D. (Ekstern), Svendsen, J. C. (Intern), Domenici, P. (Ekstern), DeBoeck, G. (Ekstern), Steffensen, J. F. (Ekstern)
Pages: 121-127
Publication date: 2009
Main Research Area: Technical/natural sciences

Publication information
Journal: Environmental Biology of Fishes
Volume: 84
Issue number: 1
ISSN (Print): 0378-1909
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.768 SJR 0.722 CiteScore 1.42
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.772 SNIP 0.749 CiteScore 1.43
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.737 SNIP 0.805 CiteScore 1.28
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.796 SNIP 0.943 CiteScore 1.47
BFI (2013): BFI-level 1
The volitional travel speed varies with reproductive state in mature female brown trout Salmo trutta

This study tested the effect of reproduction on the volitional travel speed of mature female brown trout Salmo trutta L. The downstream travel speed in the pre-spawning state was 0·25 m s−1 (95% CI: 0·19, 0·34) while it increased significantly to 0·65 m s−1 (95% CI: 0·49, 0·87) in the post-spawning state. The results suggest state-dependent travel speed in S. trutta.
Scopus rating (2017): CiteScore 1.71 SJR 0.822 SNIP 0.923
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.57 SJR 0.748 SNIP 0.83
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.961 SNIP 0.924 CiteScore 1.64
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.956 SNIP 0.931 CiteScore 1.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.058 SNIP 1.112 CiteScore 1.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.94 SNIP 1.045 CiteScore 1.88
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.895 SNIP 0.951 CiteScore 1.66
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.783 SNIP 0.832
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.782 SNIP 0.888
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 0.896 SNIP 0.968
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.013 SNIP 1.067
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.907 SNIP 1.049
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.833 SNIP 0.886
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.96 SNIP 1.145
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.942 SNIP 1.092
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.991 SNIP 1.093
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.877 SNIP 1.12
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.088 SNIP 0.978
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 1.046 SNIP 1.148
Original language: English
DOIs:
10.1111/j.1095-8649.2009.02310.x
Source: orbit
Source-ID: 250519
Evidence for non-random spatial positioning of migrating smolts (Salmonidae) in a small lowland stream

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Svendsen, J. C. (Intern), Eskesen, A. (Ekstern), Aarestrup, K. (Intern), Koed, A. (Intern), Jordan, A. (Ekstern)
Pages: 1147-1158
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Freshwater Biology
Volume: 52
Issue number: 6
ISSN (Print): 0046-5070
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 3.67 SJR 1.603 SNIP 1.418
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.36 SJR 1.584 SNIP 1.417
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.532 SNIP 1.364 CiteScore 2.95
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.502 SNIP 1.469 CiteScore 3.03
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.049 SNIP 1.86 CiteScore 4.02
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 2.076 SNIP 1.754 CiteScore 3.76
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.945 SNIP 1.629 CiteScore 3.33
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.754 SNIP 1.517
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.739 SNIP 1.513
Use of a novel acoustic dissolved oxygen transmitter for fish telemetry

The multiple responses of fishes to changes in dissolved oxygen saturations have been studied widely in the laboratory. In contrast only few studies have included field observations. The objective of the present study was to evaluate the performance of a novel acoustic dissolved oxygen transmitter for field biotelemetry. The results demonstrated that the output of the transmitter was unaffected by three different temperatures (10 to 30 degrees C) and described the dissolved oxygen saturation with high accuracy ($r^2 > 0.99$) over the entire range of 0 to 191% saturation. The response time ($\geq 90\%$ of end value) of the transmitter was 12 s both in terms of decreasing (100 to 0%) and increasing (0 to 100%) oxygen saturations. When externally attached to fishes the present findings support the use of the transmitter for reliable dissolved oxygen measurements on individuals living in environments that may change both temporally and spatially with regard to ambient temperature and dissolved oxygen saturation.

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Svendsen, J. C. (Intern), Aarestrup, K. (Intern), Steffensen, J. (Ekstern), Herskin, J. (Ekstern)
Pages: 103-108
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Technology Society Journal
Volume: 40
Issue number: 1
ISSN (Print): 0025-3324
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.624 SJR 0.298 CiteScore 0.69
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.364 SNIP 0.561 CiteScore 0.87
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.282 SNIP 0.702 CiteScore 0.65
BFI (2014): BFI-level 1
The angle of attack of the body of common bream while swimming at different speeds in a flume tank

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Svendsen, J. C. (Intern), Koed, A. (Intern), Lucas, M. (Ekstern)
Pages: 572-577
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Fish Biology
Volume: 66
Issue number: 2
ISSN (Print): 0022-1112
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.71 SJR 0.822 SNIP 0.923
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.57 SJR 0.748 SNIP 0.83
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Factors influencing the spawning migration of female anadromous brown trout

Radio telemetry was employed to study movements of adult female anadromous brown trout Salmo trutta (sea trout) during upstream spawning migration and following spawning in a stream with tributaries. Sea trout were monitored by manual tracking and by automatic listening stations. The latter suggested that initiation of upstream migration was positively correlated with stream discharge. Individual sea trout performed repeated upstream migration 'initiations' (visits) to areas where they were detected by the automatic listening stations. The first and subsequent upstream migration
"initiations" occurred under conditions of similar water temperature and stream discharge. Manual tracking indicated that in the pre-spawning state, the distance migrated over 3 days was positively correlated with stream discharge and water temperature, whereas in the post-spawning state, the total distance migrated was not correlated with any of these two environmental variables. (C) 2004 The Fisheries Society of the British Isles.
Intra-school positional preference and reduced tail beat frequency in trailing positions in schooling roach under experimental conditions

General information
State: Published
Organisations: University of Copenhagen
Authors: Svendsen, J. C. (Intern), Skov, J. (Ekstern), Bildsøe, M. (Ekstern), Steffensen, J. (Ekstern)
Pages: 834-846
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication Information
Journal: Journal of Fish Biology
Volume: 62
ISSN (Print): 0022-1112
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.71 SJR 0.822 SNIP 0.923
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.57 SJR 0.748 SNIP 0.83
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.961 SNIP 0.924 CiteScore 1.64
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.956 SNIP 0.931 CiteScore 1.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.058 SNIP 1.112 CiteScore 1.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.94 SNIP 1.045 CiteScore 1.88
Ørredyngel dræber ørredyngel

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Svendsen, J. C. (Intern), Sivebæk, F. (Intern)
Pages: 68-69
Publication date: 2002
Main Research Area: Technical/natural sciences

Publication information
Journal: Sportsfiskeren
Volume: 77
Original language: Danish
Source: orbit
Source-ID: 227595
Publication: Research › Journal article – Annual report year: 2002

Projects:
Other pressure factors in the marine environment than nutrients (39529)

Anthropogenic pressures are potentially of major importance to the ecological state of the marine environment. In coastal areas, ecological state of the marine environment is assessed according to the EU Water Framework Directive (WFD) using the quality elements phytoplankton, angiosperms (eelgrass), macro algae and benthic fauna. Additional supportive parameters like Secchi depth and occurrence of anoxia or hypoxia can be included in the assessment. Extensive research efforts have shown that excessive loading of the nutrients nitrogen and phosphorous are the most important pressure factors in the coastal marine environment of Denmark. However, other pressure factors like e.g. fisheries, gravel and sand extraction, invasive species, run-off of micro plastics and hazardous substances and physical modifications like sluices and dams. For Danish coastal areas, there is no overarching perspective to other pressure factors than nutrients and assessment of their potential impact on environmental status.

In the present project, the aim is to assess the potential impact of a number of expected pressure factors other than excess loading of nutrients and effects of climate changes on environmental state of the Danish water bodies according to the WFD. The assessment will be based on existing knowledge and existing data. The assessment will be performed as a review of documented effects of the different pressure factors on the quality elements and supportive parameters, assessment of data availability for analysis on water body level and documentation of dependence on the pressure factor of external environmental parameters like salinity and temperature. Based on the review of each pressure factor, an analysis will be performed to assess the impact of the pressure factor on the indicators depth limit of eelgrass, DKI and concentration of chlorophyll a during the summer period. The analysis will only be performed if an effect of the pressure factor is well documented and sufficient data are available. Finally, the project will assess how pres factors can be cumulated.

The project is funded by the Danish Environmental Protection Agency and is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Danish Shellfish Centre
Section for Ecosystem based Marine Management
Section for Marine Living Resources
Section for Oceans and Arctic

Aarhus University
Period: 01/03/2018 → 30/06/2019
Number of participants: 10
Research areas: Shellfish and seaweed, Ecosystem based Marine Management & Coastal Ecology
Project participant:
Rindorf, Anna (Intern)
Gislason, Henrik (Intern)
Christensen, Asbjørn (Intern)
Eigaard, Ole Ritzau (Intern)
Svendsen, Jon Christian (Intern)
Nielsen, Torkel Gissel (Intern)
Forbedring af forvaltningsgrundlaget for bestande i det rekreative fiskeri (39370)

National Institute of Aquatic Resources
Section for Monitoring and Data
Section for Ecosystem based Marine Management
Section for Freshwater Fisheries Ecology

Institute Management
Period: 14/07/2016 → 31/12/2018
Number of participants: 16
Acronym: REKREA
Project participant:
Olesen, Hans Jakob (Intern)
Storr-Paulsen, Marie (Intern)
Støttrup, Josianne Gatt (Intern)
Skov, Christian (Intern)
Christoffersen, Mads (Intern)
Reeh, Line (Intern)
Stubgaard, Karin (Intern)
Svendsen, Jon Christian (Intern)
Pedersen, Stig (Intern)
Pedersen, Michael Ingemann (Intern)
Jepsen, Niels (Intern)
Aarestrup, Kim (Intern)
Hansen, Frank Ivan (Intern)
Pinna, Line Giovanna Buhl (Intern)
Azour, Farivar (Intern)
Larsen, Peter Vingaard (Intern)

FishHab-II (39345)
The aim of the project is to map fish habitats to improve data and information for Maritime Spatial Planning. The project focuses on mapping the habitats for 9 commercially important fish species and one invertebrate species in the inner Danish waters. Within the project methods will be developed to map habitats in data-poor as well as data-rich areas. Data derived from different sources; surveys, fisheries, citizen science will be used and combined with information derived from fisher interviews. The mapping will include coastal habitats to provide the basis for advice on management of coastal fish nursery areas.

This project is coordinated by DTU Aqua.

The project is funded by the Ministry of Environment and Food of Denmark and the European Maritime and Fisheries Fund (EMFF).

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management

Danish Fishermen's Association

University of Copenhagen
Period: 01/03/2016 → 28/02/2018
Number of participants: 7
Research areas: Coastal Ecology & Ecosystem based Marine Management
Coastal mussel banks: The importance for the fish fauna and possibilities for habitat restoration (MusFisk) (39133)

Coastal mussel banks are commonly assumed to be good areas for recreational fishing, but few quantitative studies have investigated how fish abundance and diversity covary with mussel coverage. In many Danish coastal waters, mussel coverage is reduced compared to historic records, but the impact of the reduction on coastal fisheries remains largely unknown.

This project investigates fish abundance and diversity in various coastal habitats to predict possible effects of mussel bank restoration projects. Because it is increasingly recognized that restoration of coastal habitats support both pelagic and benthic fisheries, this study hypothesized that mussel banks may provide important shelter and foraging habitats for various trophic levels of fish. Covering different habitats, catch per unit effort (CPUE) was quantified using fyke nets, and fish abundance and behaviours were measured using stationary underwater video cameras. These studies revealed that blue mussel (Mytilus edulis) banks support fish abundance and diversity comparable to areas covered by eel grass (Zostera marina), indicating that mussel bank restoration projects could benefit fisheries in a fashion similar to eel grass habitats. Moreover, fish abundance, but not diversity, differed between mussel banks exposed to different current velocity regimes, suggesting that mussel banks exposed to higher current velocities support higher fish abundances. These findings indicate that mussel bank restoration carried out in high current velocity regimes may provide the most favorable habitats for fish. Surprisingly, fish behaviours were similar in different current velocity regimes, suggesting comparable ecological function of the habitats.

Planned data collection in 2016 includes experimental manipulations of mussel coverage in laboratory studies where habitat preferences and stress levels (cortisol) will be examined in a number of fish species. These findings will be useful to test findings from the field studies and help predicting the effects of mussel bank restoration in coastal areas.

This project is coordinated by DTU Aqua.

The project is funded by the Danish Rod and Net Fishing License Funds.

National Institute of Aquatic Resources

Section for Ecosystem based Marine Management

Period: 01/01/2014 → 31/12/2016

Number of participants: 4

Research areas: Coastal Ecology & Oceanography

Project participant:

Støttrup, Josianne Gatt (Intern)

Mariani, Patrizio (Intern)

Project Coordinator:

Svendesen, Jon Christian (Intern)

Stenberg, Claus (Intern)
Behaviour of lake-dwelling fish

National Institute of Aquatic Resources
Period: 01/12/2008 → 19/09/2012
Number of participants: 10

Phd Student:
Baktoft, Henrik (Intern)

Supervisor:
Aarestrup, Kim (Intern)
Berg, Søren (Intern)
Koed, Anders (Intern)
Skov, Christian (Intern)
Svendsen, Jon Christian (Intern)

Main Supervisor:
Jacobsen, Lene (Intern)

Examiner:
Rasmussen, Gorm (Intern)
Cooke, Steven J. (Ekstern)
Lucas, Martyn Charles (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: 1/3 FUU, 1/3 inst 1/3 Andet
Project: PhD